Legal Patterns for Different Constitutive Rules

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Abstract. The research for solutions for compliance is mainly focused on the representation of regulative rules, i.e. the imperatives that the industry is asked to comply to. Yet, a relevant part of the legal knowledge contained in regulation cannot be expressed in terms of deontic statements, and is instead represented as *constitutive rules*. This concept was first introduced by philosophers of language such as J.L. Austin and J.R. Searle and further developed in legal philosophy, where constitutive statements are classified in categories according to their legal effects. The present paper presents a heuristic approach for the representation of alethic statements as part of a methodology aimed at ensuring effective translation of the regulatory text into a machine-readable language. The approach is based on a classification of constitutive statements contained in the work of legal philosophers A.G. Conte and G. Carcaterra. The methodology includes an intermediate language, accompanied by an XML persistence model, and introduces a set of "legal concept patterns" to specifically represent the different constitutive statements. The paper identifies five patterns for the corresponding constitutive statements found in financial regulations: legal definitions, commencement rules, amendments, relative necessities, and party to the law statements.

Keywords: Constitutive rules · Legal patterns · Legal definitions
Meta-rules · SBVR

> "*Comprendere un diritto significa sapere che cosa esso è, sapere che cosa è significa possederne la definizione*."
> Understanding a right implies knowing what it is, and knowing what it is implies possessing its definition.
>
> Carcaterra [9, p. 25].

1 Introduction

Assessing compliance means checking the correspondence of an activity with a set of norms. Here, norm is intended as the interpretation of a rule contained in a regulation. To assess compliance, we need two pieces of information: one about the activity, and the other about the interpretation of the regulation. In order to speed up the process of compliance assessment, we thus need a machine-readable interpretation of the law.

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Great are the potentials of semantic web technologies to express semantics of legal texts, especially in terms of legal references (e.g. LegalDocML [24]) and legal scope (e.g. LKIF [8]). Several rule languages exist that manage legal rules, and rest on solid logical foundations (e.g. LegalRuleML, see survey [13]). Unfortunately, those layers of technology are difficult for lawyers to grasp, and the related solutions are still out of their reach.

The goal of the research presented in this paper is to represent regulations for GRC tasks in financial industry. To achieve this, we developed a Regulatory Interpretation Methodology (RIM) to guide a Subject Matter Expert (SME, e.g. the legal expert) and a Semantic Technology Engineer (STE) in a collaborative process of transformation of the regulatory text into machine-readable information [1].

To represent the semantics of regulatory requirements in a machine-readable format with a SME-friendly process we built an intermediate language based on SBVR (Semantics of Business Vocabulary and Business Rules [25]). SBVR is a powerful instrument for building a vocabulary representing business activities [34, p. 14], but unfortunately it isn't suitable – as is – for the representation of legal rules in a machine-readable format: besides SBVR being designed for human-to-human communication across a business and not for automatic reasoning, some of its components are falling short in capturing legal concepts, such as constitutive rules.

Philosophy of language [3, 32] identified two types of rules: regulative rules and constitutive rules. Previous work describes our approach to regulative rules [12]. The present paper discusses the representation of constitutive rules, which, despite not being requirements themselves, still play more than a marginal role in compliance assessment.

1.1 Scope

The present paper focuses on the issue of representing alethic statements (including legal definitions, meta-rules, statements of facts) in a machine-readable way. The proposed solution employs an intermediate language based on SBVR and follows the classification drawn in legal philosophy for constitutive statements. Because the research is focused on compliance, constitutive statements are seen as complementary, and represented only to the extent necessary to define and specify the effects of regulative statements. Legal philosophy identifies different categories of constitutive rules, and this paper follows these classifications in order to represent their semantics. The paper introduces the concept of **legal concept patterns**, that work as templates to represent constitutive norms with fixed effects, and presents five legal concept patterns for capturing five types of constitutive rules.

This paper is structured as follows: Sect. 2 introduces the concept of constitutive rules and the relevant doctrine on them. Section 3 introduces legal concept patterns, used to represent constitutive norms as explained in Sect. 4.

2 Constitutive Rules

In legal theory, constitutive norms[1] are the result of declarative acts [6]. These norms introduce new abstract classifications of existing facts and entities. Those classifications are called institutional facts (e.g. marriage, money, private property) and they emerge from an independent ontology of "brute" physical facts. Differently from regulative rules, constitutive norms have no deontic content: they do not introduce obligations, prohibitions or permissions. Instead, they typically take the following form:

$$(a) \text{ counts as } (b) \text{ in context } (c)$$

In order to capture these rules, it is thus necessary to identify three elements:

- a material (or previously identified) phenomenon (*token*);
- an abstract concept that is created by the constitutive rule itself (*type*);
- a limited area of application (*context*).

Two additional elements, the (alethic) modality and the legal source, are in common with regulative rules. Constitutive norms are also called "determinative rules" [18]. In LegalRuleML, that class is represented as *ConstitutiveStatement* node element. In Normative Multi-Agent systems, they are formalized as belief rule of normative agents: from a knowledge representation point of view, they behave as data abstraction in programming languages [7]. An investigation of the logic underlying "count-as" statements is performed by Grossi [20], including a wide survey of the existing attempts to provide a formalization for constitutive norms and count-as conditionals [21]. In it, the diversity of formal approaches is evident. Seven strands of research are identified [21, p. 429]: contextual aspects of counts-as; classificatory aspects of counts-as; counts-as and actions; counts-as and conventions; counts-as as grounded on dedicated agents; counts-as as related to regulative norms; counts-as as related to the definition of legal terms.

This multiplicity of approaches suggests that a unique formalization is not capable of representing all the possible aspects of constitutive norms. Furthermore, the distinction [19] of counts-as statements in classificatory counts-as, proper classificatory

[1] The concept of constitutivity, as distinguished from the regulative effects of norms, was first introduced by John Rawls [27], with the following distinction: "justifying a practice and justifying a particular action falling under it… [by meaning for] practice any form of activity specified by a system of rules which defines offices, roles, moves, penalties, defenses, and so on, and which gives the activity its structure". Austin [3] investigated the phenomenon of the *performative utterances*, defining them as: "Utterances […] that […] do not 'describe' or 'report' or constate anything at all, are not 'true or false,' and the uttering of [which] is, or is a part of, the doing of an action, which again would not normally be described as, or as 'just,' saying something" (pp. 5–6). The concept of performative utterances was later refined by Searle [32] into that of speech acts and constitutive rules, defined as follows: "[R]egulative rules regulate antecedently or independently existing forms of behaviour […]. But constitutive norms do not merely regulate, they create or define new forms of behaviour. The rules of football or chess, for example […] create the very possibility of playing such games" (p. 33).

counts-as, ascriptive counts-as and constitutive counts-as, is a proof of the heterogeneity of such statements, not only in their form but also in their effects.

SBVR's restricted language does not explicitly include institutional facts or constitutive norms, although it has a rule category called structural (or definitional) rules that can be used for the purpose. These rules are represented in the language through alethic statements instead of deontic statements.

The rest of this section will present part of the research conducted in philosophy of law on the subject of constitutive rules with the aim of identifying a taxonomy of constitutive rules.

2.1 On the Constitutivity of Rules

Over the last decades the Italian school of legal philosophy introduced distinctions within constitutive statements [9, 14, 16, 22]. According to Carcaterra [9, p. 61], the constitutive statement "produces, at the very moment when it enters into force, the effect that is its scope and content". Carcaterra distinguishes two meanings of constitutivity in legal norms: according to the first meaning, constitutivity is a process downright creator of legal effects (or states of affairs). Rules carrying such constitutivity correspond to Searle's declarative speech acts [33, pp. 16–20]. In the second meaning, constitutivity is the process of creation of acts and facts with a specific legal meaning. Such meaning of constitutivity differs from that of declarative speech acts, rather resembling the creative attitude of Searle's "rules that are constitutive of speech acts".

According to this distinction, we can distinguish two types of constitutivity: thetic-constitutivity (from θέσις, "affirmation") directly creates its object (a legal effect or state of affairs), while eidetic-constitutivity (from εἶδος, shape) rather creates the abstract concept of its object, thus making such legal effect or state of affairs possible in the legal system. An example of thetic-constitutive rule (a declarative speech act) would be a marriage celebrated by a public officer (as it creates the legal bond between two individuals) or the divorce sentence of a judge (as it removes it), while examples of an eidetic-constitutive rule (a statement constitutive of speech acts) would be the laws that establish such procedures and effects (marriage and divorce).

Conte [14, pp. 82–83] classifies those rules as conditions for their regulated entity: then, an eidetic-constitutive rule is a necessary condition and a thetic-constitutive rule is a sufficient condition. These two types of constitutive rules are different, and this duality cannot be reduced or simplified, as argued by Roversi [29].

2.2 Relative Necessities as Constitutive Statements

According to Sartor [31], "in many cases, when a legal text uses the words must, ought, may, or can, it does not express obligations or permissions in the sense discussed above, but it conveys a completely different notion, which is parasitical on the idea of a normative conditional."

Consider those cases in which, for example, the law says that a petition or contract must or must not be done in a certain way, or that it can or cannot contain certain terms. In these cases, the law establishes what we may call a relative necessity: it establishes that certain requirements have (or don't have) to be satisfied for a certain legal result to

be obtained in a certain way. Often, the specification of this result is left to further normative propositions. For instance, suppose that in a legal text, after stating that "whoever appropriates the property of others is going to be punished as a thief", it is stated that "the appropriator must have the intention of getting permanent possession of the stolen object". Clearly, there is no legal obligation to have such intention. The "must" signals a necessity, relative to the normative antecedent which determines subjection to punishment for theft. It indicates that the elements explicitly contained in the antecedent of the rule on theft are not really sufficient to produce the effect indicated in that rule: a further element, namely, the intention to appropriate, is also required to instantiate the precondition of the rule.

We may use the term anankastic – from the Greek word Ἀνάγκη, necessity – to characterise the (anankastic) propositions expressing this kind of necessity. As we may have normative propositions expressing anankastic connections, we may also have propositions denying (excluding) such connections. However, the basic and constant meaning of the anankastic must consist in what Sartor calls relative necessity, that corresponds to the combination of the following propositions (1) and (2):

(1) if A then B

(2) C must be realized for B to be determined according to (1)

Being considered equivalent to the following proposition (3):

(3) if A and C then B.

According to Conte [15, p. 362], *anankastic-constitutive* rules create a (necessary) condition for their regulated entity, rather than being themselves a condition.

2.3 A Taxonomy of Constitutive Statements

The considerations of the previous paragraphs allow us to identify three types of constitutive rules, namely:

- rules that directly constitute new entities and are sufficient conditions for the new entity to exist (*thetic-constitutive* rules);
- rules that merely create the possibility of new entities and are necessary conditions for the new entity to exist (*eidetic-constitutive* rules);
- rules that, without constituting new entities, introduce necessary conditions for them to exist (*anankastic-constitutive* rules).

Azzoni, scholar of Conte, completed this taxonomy adding *noetic-constitutive* rules (directly constituting new entities with necessary and sufficient conditions, e.g. the *Grundnorm* of a legal system), *metathetic-constitutive* rules (introducing a sufficient condition, e.g. the rule of the House of Lords Act 1999 that grants the right to membership to 90 hereditary peers) and *nomic-constitutive* rules (introducing a necessary and sufficient condition, e.g. the rule in Article 12 of the Constitution of Ireland saying that "The President is elected by direct vote of the people") [4, p. 161]. Azzoni's

taxonomy is represented in Table 1. Introducing *noetic* and *nomic* constitutive rules, however, exalts some critical points in the taxonomy [30, pp. 1289 ff.], which is outside of the scope of the present paper.

Table 1. The six types of constitutive statements as identified by Azzoni [4].

	Declarative speech act	Constitutive of speech act
Necessary	Eidetic	Anankastic
Sufficient	Thetic	Metathetic
Nec + Suf	Noetic	Nomic

This taxonomy suggests that, when dealing with constitutive rules, we need to ask two questions:

– Is the posed condition necessary, sufficient, or both?
– Does it create its effect directly or indirectly?

Answering these questions helps in defining the effects of constitutive rules[2]. Specifically, answering the first question helps to determine its logical formulation. In our research, the second question helps in distinguishing rules that affect the legal source from rules that have only affect the single interpreted rules or entities.

In a more recent work [6], conceived for rationalization of legislative drafting for automation purposes, what we define so far as "constitutive statements" are classified alternatively as constitutive rules or metarules (see Table 2).

Table 2. Constitutive rules and metarules found in legal texts as identified by Biagioli [5].

Classes	Rules	Arguments
Constitutive rules		
Definition	Term	definiendum, definiens
	Procedure	addressee, counterpart, action, object
Creation	Institution	addressee
	Organization	addressee
Attribution	Power	addressee, counterpart, activity, object
	Liability	addressee, counterpart, activity, object
	Status	addressee, object
Metarules		
Application	Inclusion	partition
	Exclusion	partition
Modification	Repeal	partition, position, out, in
	Insertion	partition, position, out, in
	Substitution	partition, position, out, in

[2] It is however necessary to be careful in the classification of constitutive rules because it can change depending on the perspective taken [29]: there are views where all rules are constitutive, or none of them are.

2.4 Constitutive Rules for Compliance

In financial regulations, our research has so far identified five types of constitutive statements. We will now present these, describing how each of them specifies the generic form "(*a*) counts as (*b*) in context (*c*)" introduced at the beginning of this section.

- *Legal definitions*: these rules, often contained in the first article of regulations, specify the meaning (*a*) of specific terms (*b*) that are found throughout the regulative text or in a subpart of it (*c*). When terms specifically appear in *legal definitions*, the interpretation of their meaning cannot be arbitrary: every time they occur in the text, they must be understood as meaning the exact combination of words (or sentences) that appear in the definition (*a*). In this sense, legal definitions are creators of intermediate legal concepts, one of the ways to represent constitutivity [28]. Legal definitions are thus *eidetic constitutive rules* in the distinction made by Carcaterra [10]: they are in fact called "stipulated definition" by Guastini [22]. They are thus *constitutive of speech act*, not *speech act* themselves: to have the latter we need also the rules that tell us the legal valence of that concept [30, p. 1278]. When exhaustive (intensional definitions), legal definitions are actually *nomic* constitutive rules, as they do not only define what something *is* (the definiens), but also what something *isn't* (the negation of the definiens). This is true only for intensional definitions, while extensional definitions are, strictly speaking, not *eidetic* rules [30, p. 1278]. For our representation we treat all legal definitions as *declarative speech acts*, and therefore intensional definitions are *noetic* constitutive rules while extensional definitions are *thetic* constitutive rules.
- *Commencement rules*: these rules indicate a (directly or indirectly identified) time parameter (*a*) as the starting point for the validity (*b*) of the regulation (or part of it) (*c*). Commencement rules are *eidetic* constitutive rules in the distinction made by Carcaterra [10], and they are really descriptive, as they do not constitute alone the legal effect: to constitute it, in fact, we also need the rules that describe the legal valence of the concept of *validity*. For reasons of simplicity in our representation, however, in our work we treat commencement rules as *thetic* constitutive rules.
- *"Party-to-the-law" statements*: these rules extend the subjective or objective dimension (*b*) of the norm (*c*), by identifying new addressees (*a*) to it. Imposing a sufficient condition, and its effects being mediated (by the other conditions of the target rule) makes it a *metathetic* constitutive rule.
- *Relative necessities*: Rules restricting the subjective or objective dimension (*b)* of the norm (*c*), by identifying a limitation (*a*) to it. These rules, as explained in Sect. 2.2, pose new limit on the subjective or objective aspect of another rule. They are similar to legal definitions except they do not create a new intermediate concept. Because they impose a necessary condition and their effect is mediated (by the other conditions in the target rule) they are *anankastic* constitutive rules.
- *Amendments*: these rules modify the legal source (*c*), either by adding, removing, or modifying (*a*) the textual content (*b*). Some theorists don't classify these as constitutive rules but rather as meta-rules [5]. According to Carcaterra [9], repeal laws are definitely *thetic*, because their effect (the disappearance of the norm from the legal system) is immediate.

With help from the classification of Carcaterra et al. explained in Sect. 2.3, we can group together these constitutive statements depending on their category, and model their content and effects consequently. We see two groups here: one is composed by *commencement* and *amendment*, who are speech acts, immediately laying their effects either on a legal source or on single rule statements, and the second is composed by *legal definition*, *relative necessity* and *party to the law*, which are rules constitutive of speech acts (and in fact they lay their effects mainly in the vocabulary section and in single rule statements). While legal definitions pose necessary and sufficient conditions, and explicitly introduce an intermediate legal concept (which in turn translates to an autonomous vocabulary entry in SBVR), relative necessities and party-to-the-law statements introduce necessary and sufficient conditions respectively, and do not explicitly create intermediate legal concepts. In SBVR these two statements can be represented in the rulebook, by limiting or extending one or more factors of one or more conditions, or in the vocabulary, creating an intermediate concept or "convenience form" (see Sect. 4.2) that applies within the context.

In order to support the lawyer's work on regulations, it is necessary to capture – and represent in the formal model – the semantics of those five types of constitutive rules. This activity complements the work on regulative rules in producing a complete representation of the semantics of a regulation.

3 Legal Concept Patterns

The specific needs of the research presented in this paper suggested a rather heuristic approach in representing constitutive rules: the focus on regulatory compliance, and thus on regulative norms, means that the constitutive norms are ancillary norms, used to specify and extend the semantics of the requirements. For the same reason, the abstract model does not involve the representation of Hohfeldian powers and thus it is not possible to represent rules attributing powers.

The use of SBVR as a basis for the intermediate language, and the creation of the Regulatory Interpretation Methodology, creates the possibility of an ad-hoc solution where the templates for constitutive rules are specified in the methodology documentation (the "Protocol") in the style of a user manual, and their semantics can be specified within the vocabulary part, through general entries that constitute a template (i.e. *thing*^{1} counts as *thing*^{2} in *context*). The literature supports this approach for representing constitutive rules since, as explained in the previous section, it highlights the risks and limitations of a omni-comprehensive, generic approach to their representation.

The transformation of regulatory language into SBVR is aimed at providing the knowledge engineers with an unambiguous, understandable text while at the same time maintaining the implicit legal knowledge that is expressed by the original legal fragment. This, however, is not always possible: some legal concepts exist, that can be expressed only by a specific combination of words. Also, sometimes a certain combination of words has a specific legal meaning, corresponding to a precise legal figure. In these cases, the risk exists that aspects of the legal figure are lost in the passage from the legal text to the machine-readable information. In order to store the semantics of

these legal figures in the knowledge base we need specific patterns which, in turn, take into account the limitations coming from the targeted formal language backing the knowledge base.

For example, saying that "law *x* applies to entity/activity *y*" doesn't necessarily mean that the law performs some particular action: if the statement following the "party to the law" pattern, then it means that for the entity or activity *y* new obligations apply, i.e., the entity or activity *y* must comply to the obligations of the law *x*. In the computable model, the rule should therefore be represented as "it is necessary that entity/activity *y counts as* addressee *in* law *x*", but can a computer scientist in charge with the formal model (an STE) independently do this when he reads the original "law *x* applies to entity/activity *y*"?

A second example is the sentence "in the present law, a handshake has the value of an agreement" which corresponds to the constitutive statement "handshake counts as agreement in Law X". Being an extensional *legal definition*, that statement introduces a sufficient condition ("it is necessary that handshake *counts as* agreement *in* Law X") but not also a necessary condition ("it is impossible that [something that is] not [a] handshake counts as agreement in Law X"), which would be the case in presence of an intensional definition such as "A meeting of minds with the understanding and acceptance of reciprocal legal rights and duties as to particular actions or obligations counts as agreement in Italian Law". Should the computer scientist (STE) know about legal definitions, their status of thetic-constitutive rules, and the distinction between extensional and intensional definitions, in order to correctly translate the structured English into the formal model? Or should instead be the legal expert (SME) the one in charge of this identification, and deliver to the STE not only the sentence in structured English, but also an indication in the Terminological Dictionary that the sentence follows a specific template with specific semantics?

To represent sentences and forms with specific legal meaning, we thus introduce *legal concept patterns*. Legal concept patterns are related to similar figures, known in the literature e.g. as "technical relations" [5, 17] or "logical relations" (e.g. Hohfeldian relations [23]).

Legal concept patterns are created in the form of a verb concept with generic verb concept roles (e.g. the Legal Definition pattern "definiens *counts as* definiendum *in* context"). When the SME meets a rule that follows one such pattern (e.g. "handshake *counts as* agreement *in* Italian Civil Law"), a verb concept entry is created and the applicable pattern is indicated as a specific attribute. The roles played by the verb concept roles in the pattern definition are important, as they determine the classification of the instances found in the single rules: e.g. the Legal Definition pattern "definiens *counts as* definiendum *in* context" tells the STE where to locate the information related to "definiens", "definiendum" and "context" in the rule "handshake *counts as* agreement *in* Italian Civil Law" (i.e. handshake is the definiens, agreement is the definiendum, and Italian Civil Law is the context)[3].

[3] It is also possible to extend the basic patterns into more complex forms by further specifying its verb concept roles, even introducing verb concepts as roles (e.g. adding the vocabulary entry "person1 *shakes hands with* person2" with the attribute "general concept: handshake" results in the more complex pattern "person1 *shakes hands with* person2 *counts as* agreement *in* Law X" – see Fig. 1).

Generally, legal concept patterns enhance the interaction between SME and STE during the iterative process of translation by allowing both users to refer to concepts that are defined both in their legal valence (for the SME) and in their formal model (for the STE). When a STE finds "handshake *counts as* agreement" and doesn't know how to model it in the machine-understandable knowledge base, the STE can ask the SME to point at a legal concept pattern to specify the intended legal meaning. The SME would refer e.g. to the *legal definition* pattern that indicates "definiens counts as definiendum in context", and this would at the same time specify the role of the terms handshake and agreement in the formal model, for the STE, and remind the SME that e.g. according to the Protocol (RIM – Regulatory Interpretation Methodology) the context of legal definitions must be explicitly stated.

Legal concept patterns thus assist SMEs in conveying legal content in a way that is understandable by the STE, without abandoning the legal language constructs that express a specific meaning[4].

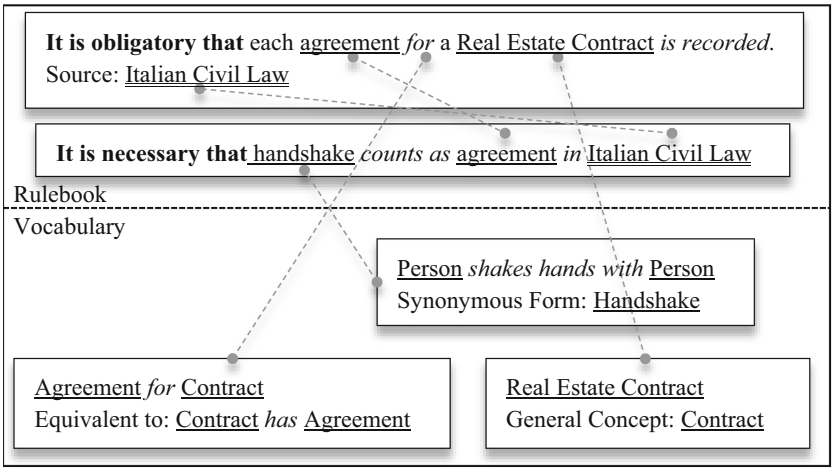

Fig. 1. Example of an implicit ontology built using SBVR. In the example, any occurrence of the verb concept "person shakes hands with person" that is referred to a Real Estate Contract is implicitly inferred as being subject to duty of recording. Additional vocabulary entries such as the noun concept "Real Estate Contract" and the verb concept "Agreement for Contract" enrich the implicit ontology further.

[4] By combining the SBVR attributes "general concept" and "synonymous (form)", the Legal Concept Patterns, and verb concept roles, the SMEs effectively build taxonomies – and even simple ontologies – covering portions of the knowledge base (see Fig. 1). Those ontologies are built independently, but can be linked together (e.g. through a common term or pattern). In this way, the burden of enriching the ontology is shared between the SME and the STE, with the first building modules of a legal ontology to express legal concepts, leaving to the latter only the task of merging and consistency checking.

In regulatory interpretation, legal concept patterns can be used for three purposes:

- When **defined in the protocol**, to help representing the most important legal figures. A number of legal concept patterns are introduced in the RIM documentation, that can be used to express common legal concepts. Their use however is not compulsory: the SME can decide to ignore them for their first iterations, relying on them only to disambiguate resulting vocabulary and rules when required by the STE (see the last point).
- When **defined by SMEs within their SBVR transformation**, to represent recurring (also non-legal) patterns easily (see business definitions and convenience forms in Sect. 4.2).
- When **used within SME-STE iterations**, to disambiguate concepts and keep track of the incremental process. Because legal concept patterns are documented both in their legal model (for the SME to understand) and in their machine-understandable formal model (for the STE to understand), they are the common ground that allows the feedback between the two and the progressive refinement of the knowledge base.

4 Legal Concept Patterns for Constitutive Rules

We model constitutive rules according to the doctrine explained in Sect. 2, not using formal logics as suggested in the state-of-the art [19, 20] – as this would be too abstract for an SME to use – but rather modelling single types of constitutive rules as predefined legal concept patterns. Table 3 shows the list of legal concept patterns currently available for constitutive rules:

4.1 General Properties of a Constitutive Rule

In this section we are going to present the common attributes of constitutive rules, and then introduce the five legal concept patterns that specify those attributes for the five types of constitutive rules identified in the table above, with an indication of the meaning of the variables and on the effect that these constitutive rules have on the regulative rules contained within the context of application of these constitutive rules. As illustrated in Fig. 2, all constitutive rules share five main attributes:

- Modality
- Source
- Token
- Type
- Context

Every constitutive statement has exactly one constitutive **modality** out of three possible values (possibility, impossibility, necessity). This attribute indicates the modality in which the original rule entry in the rulebook has been modelled by the SME: a necessity statement can in fact be transformed into an equivalent impossibility statement (and vice versa), but it still makes sense, for authoring purposes, to specify which

Table 3. The list of legal concept patterns currently available for constitutive rules. For each of them, we show the syntax that these patterns normally use in legal language, followed by the syntax used in our research to capture those statement in a uniform way.

Legal Concept	Pattern
Constitutive Rule (generic template)	it is necessary that thing_1 *counts as* thing_2 *in* context
Legal Definition	definiendum *means* definiens = it is necessary that definiens *counts as* definiendum *in* context it is impossible that not definiendum *counts as* definiens *in* context
Party-to-the-law	law *applies to* Thing Synonymous Form: it is obligatory that thing *complies with* law = it is necessary that thing *counts as* addressee in context
Relative Necessity	addressee *must be* qualified = it is impossible that not qualified *counts as* addressee *in* context
Commencement	law *comes into force on* date = it is necessary that date *counts as* start date *in* rule *or* source
Amendment	old text *is* repealed *in* context new text *is* added *in* context old text *is replaced by* new text *in* context = it is necessary that new text *counts as* old text *in* context

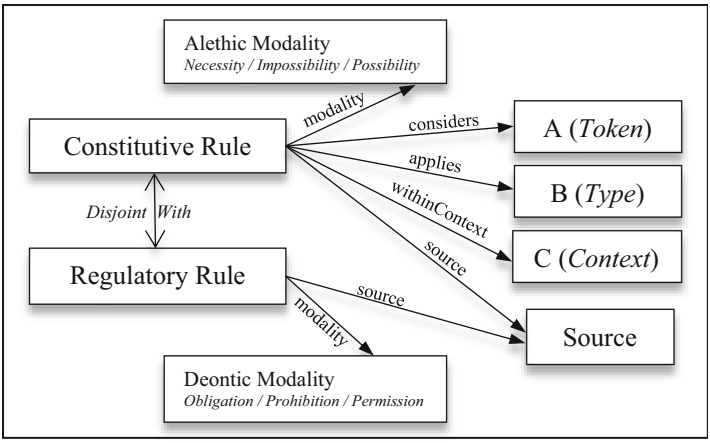

Fig. 2. Ontology of a constitutive rule.

modality was originally employed. The modality also identifies necessary and/or sufficient conditions: sufficient conditions are in fact represented as necessities, while necessary conditions are represented as impossibilities of the opposite. For example, the sufficient condition of a legal definition is "it is necessary that definiens counts as definiendum in context", while its necessary condition is "it is impossible that not definiendum counts as definiens in context".

Source is a general element in SBVR, and our application uses LegalDocML [24] for its representation in a machine-understandable format.

Token and **type** change depending on the legal concept pattern being used, as the present work does not define their semantics (and the semantics of "counts as") at a generic level [20]. This is when the classification proposed by the legal theory and presented in Sect. 2 turns out useful, as it can be used to guide the design choices. While the dichotomy thetic/ipothetic has not been given too much importance (the distinction itself being criticized also in the theory [30, p. 1291]), the distinction of the type of condition being posed (necessary or sufficient) played a major role in distinguishing and modelling those rules.

Finally, every constitutive statement has a **context**. In legal theory, the context of a constitutive rule is used to identify the limits within which the constitutive effects of the rule take place. In our approach, the concept of context is used in a slightly different way: it represents the domains where the rule is relevant. This difference becomes evident when dealing with commencement rules (see below): while in the legal theory the context of a commencement rule is the entire legal system (jurisdiction), in our approach it is used to indicate which legal fragments have their coming into force date affected by the commencement rule. Context can be specified in terms of themes, activities, rulebooks, or sources. For legal rules, the context must include a legal source. The context determines which regulative rules are affected by the constitutive rule.

4.2 The Legal Concept Pattern for Legal Definitions

Legal definitions are eidetic-constitutive rules because they create the *possibility* of a *speech act*. In legal theory they are called *constitutive definitions* and reduced to a thetic-constitutive rule and an agreed definition. Semantic Web frameworks treat them as *technical relations* [17]. In our model we treat extensional definitions as sufficient conditions and intensional definitions as necessary and sufficient conditions. In this latter case we need two rules to represent this condition: the first stating the necessity of it and the second stating the impossibility of the opposite (see Sect. 4.1).

Our approach captures legal definitions by using the rule that is attached to a vocabulary entry (the *definiendum*). Token and type are *definiens* and *definiendum* respectively, and *context* is the context of the definition, i.e. the act(s) where it applies. For regulative rules whose source is within such context, the *definiens* and *definiendum* are thus equivalent: the *definiens* can be replaced with the *definiendum*, and vice versa. Figure 3 shows the replacement of the word "relevant bank". Other examples:

- (*defining a noun concept*) It is necessary that trade *has value* more than 10k USD *counts as* Relevant Trade *in* Code of International Trade.

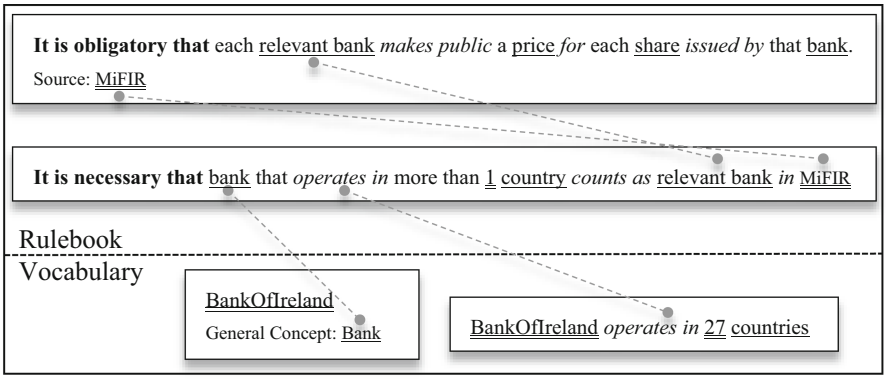

Fig. 3. Example of the relationship between an operative rule and the legal definition of a noun concept. Please note that the two vocabulary entries do not result from an interpretation of the regulatory text but rather from internal company data.

- (*defining a verb concept*) It is necessary that person *helps* person that *commit* crime *counts as* person *participates in* crime *in* Italian Criminal Code.

Legal Definitions vs. Business Definitions and Convenience Forms

When modelling the representation of concept definitions, it is important to distinguish legal definitions (explicitly introduced by legal texts) from business definitions (created within the company or industry, or by the SMEs themselves).

In our approach, business definitions also cover what in SBVR is defined as "convenience form": in regulatory texts, it is common that parts of text are repeated several times. For example, locutions such as "Market operators and investment firms operating a trading venue" and "bonds, structured finance products, emission allowances and derivatives traded on a trading venue" are found several times in the MiFIR[5] regulatory text. To make the work less repetitive, and to increase human readability of the interpreted rules, the SME can use convenience forms for these locutions (e.g. "trading operator" for the first, and "traded instrument" for the second) in the rulebook, and then define them in the terminological dictionary. As a result, during the process of interpretation the SME divides the regulatory statement into one requirement (regulatory rule, a deontic statement in the rulebook) and one or more definitions (constitutive rule, a structural statement in the terminological dictionary). This process is also very valuable towards automatizing some phases of the translation: once defined, those forms can in fact be automatically detected by NLP tools, thus easing the process of writing SBVR rulebooks. Please note that, from a legal-philosophical point of view, legal definitions are themselves convenience forms [28, 29, p. 112], only with an authoritative value derived from the legal system they are part of.

[5] Regulation (EU) No. 600/2014 of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No. 648/2012.

In our approach the distinction between legal definitions on one side, and business definitions and convenience forms on the other, is explicitly stated in the rulebook, as every rule is either a legal rule (legal definition) or a business rule (a business definition or a convenience form). Further distinction between the latter two is to be found in the context: while business rules are valid within a certain class of actions (e.g. pertaining to a specific business activity or industry, or to a specific company), convenience forms are valid within a certain rulebook (because they are subjective, ad-hoc solutions for the simplification of the interpretation job at hand).

4.3 The Legal Concept Pattern for Commencement Rules

Commencement rules are thetic-constitutive rules, as they directly modify the validity of the norms contained in the legal source indicated as context [26]. Token is a date, while type is either a start or an end date of validity. Context is the legal source whose efficacy times are affected. Regulative rules within the context have their applicability restricted by the start and/or end date, as shown in Fig. 4. Examples:

- (*start date*) MIFID II Comes into force on January 10th, 2014.
  It is necessary that January 10th, 2014 counts as efficacy start in MIFID II.
- (*end date*) MIFID I Stops being into force on January 10th 2014.
  It is necessary that January 10th, 2014 counts as efficacy end in MIFID I.
- (*start and end date*) Article 13 is in force from January 1st, 2014 to December 31st, 2014.
  It is necessary that January 1st, 2014 counts as efficacy start in Article 13.
  It is necessary that December 31st, 2014 counts as efficacy end in Article 13.
- (*end and start date*) Article 13 is suspended from June 1st 2014 to June 15th 2014.
  It is necessary that June 1st, 2014 counts as efficacy end in Article 13.
  It is necessary that June 14th, 2014 counts as efficacy start in Article 13.

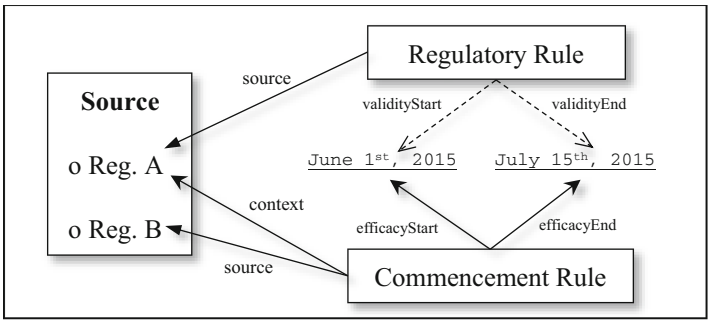

Fig. 4. Ontological model of the relationship between a regulatory rule and a commencement rule. The dashed properties of the regulatory rule are inferred.

4.4 The Legal Concept Pattern for Party-to-the-Law Statements

Party-to-the-law statements are metathetic-constitutive rules, as they create the possibility of "new speech acts" by specifying a new category of addressees for an existing speech act. Token is one (or more) person(s); type is "the addressee of a norm" or "the co-responsible of the breach" or other similar legal liability figures; context is the norm or legal text. Regulative rules within the context have now potentially new addressees. Examples:

- (*context as a legal source*) It is necessary that Person that *participates in* crime *counts as* subject to the law *in* Article 13
- (*context as an interpreted norm*) It is necessary that Person that *participates in* crime *counts as* subject to the law *in* Obligation_L_143.

4.5 The Legal Concept Pattern for Relative Necessities

Relative necessities (see Sect. 2.2) are the converse of party-to-the-law statements, as they identify necessary conditions for the regulative rule. On this aspect, they are anankastic-constitutive rules. Token is the new requirement; type is the target condition contained in the context; context is the target regulatory statement(s) or legal source. Regulatory statements within the context have their condition extended with the new requirements.

Because they are necessary conditions, they are better expressed as impossibility statements, stating the impossibility of negating the condition. Example:

- It is prohibited that appropriator *steals* object
- It is impossible that person that not *has* intention *to keep* object *counts as* appropriator *in* Rule1.

4.6 The Legal Concept Pattern for Amendments

Amendments are thetic-constitutive rules, as they immediately create new states of affairs (insert/remove/modify regulation from legal system). Token is the new text, type is the old text, and context is the target location as a structural element (e.g. article, clause). Regulative rules within the context are replaced/repealed. Examples:

- (*substitution*) It is necessary that "10" *counts as* "15" *in* Article 13 charposition 134-135.
- (*new text*) It is necessary that, ", as specified in Article *13bis*" *counts as* new text *in* Article 13 charposition 145.
- (*repeal*) It is necessary that repeal counts as "with the exception of relevant transactions" in Article 13 charposition 180-227.

4.7 Possibility Statements

SBVR possibility statements can be used for representing exceptions [13]. They can also be used for representing *eidetic* (or, in some cases, *metathetic*) constitutive rules or rules that attribute Hohfeldian powers ("ESMA will publish technical standards on

what constitutes a prevalent market condition"): because these rules introduce events that may or may not happen, the purpose is not to trigger automatic conclusions out of those statements, but only to record the eventuality of them to happen and the legal relevance attributed by the law to such administrative acts. Because the scope of our research is regulatory compliance, this information is only marginally relevant and thus needs to be recorded but not semantically enriched. From a theoretical point of view, such statements are constitutive to the extent to which they attribute a new power (as noted previously, Hohfeldian powers are not represented in our approach). In all other cases, e.g. when they foresee the publishing of some documentation, these statements have no constitutive power as they are statements *de jure condendo* and not *de jure condens* [11, p. 19, 30, p. 1273].

5 Conclusions

The paper presented results from applied research on compliance regarding the representation of alethic statements in an intermediate language that is human-readable and that can be mapped to a machine-understandable language. The solution applies notions from philosophy of language and philosophy of law to AI & Law, identifying different types of constitutive statements.

The paper claims that, in order to capture the different legal effects of these statements, we need to represent them through distinct models, with different semantics but a similar syntax, emanation of a general "constitutive rule" pattern.

Legal concept patterns are thus conceived to fill the gap between the SME and STE in the process of translating the regulatory text into machine-readable information, a process that is collaborative and iterative. This process, and this solution, are part of the Regulatory Interpretation Methodology (RIM), that governs the translation process.

Applications of legal concept patterns and the RIM include: building a knowledge base and exploring it; modelling the effects of alethic statements in the document metadata (for metarules) or in the rulebook/vocabulary (for constitutive rules); mapping the knowledge to external ontologies such as FIBO or FIRO (Financial Industry Regulatory Ontology [2]) for reasoning and queries; mapping to a (defeasible) rule language.

In FIRO, reasoning capabilities rely on axiomatization of rules through conditions and factors. The model for regulative rules is explained in previous work [2], while the model for constitutive rules is currently under construction.

The next step for the research is to find a logical formulation for the types of constitutive statement, similarly to what has been done [13] for regulative rules. This will allow the definition of the logical expressivity necessary to represent them in a rule language. Outside of constitutive rules, but towards the same goal of logical formalization, the attention will focus on the formalization of keywords (especially logical operators and quantifiers). The research is also investigating the application of NLP techniques to speed up the translation process, especially in the most repetitive tasks.

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