Applying UFO-L Legal Core Ontology to Bridge Legal and Accounting Domains

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Abstract

While accounting frameworks and standards are primarily oriented toward economic concerns, their legal foundation is indispensable. This paper explores the integration of the Hohfeldian Analytical System and UFO-L Legal Core Ontology into Core Ontology for Financial Reporting IS (COFRIS). It expands UFO-L applications by recognizing Legal Positions and Relators for Economic Resources and thus Assets as well as for Intermediate Legal Positions and Relators to maintain commensurability in economic exchanges. Tables and OntoUML diagrams of enriched ontology fragments, as well as an example, are provided.

Keywords

UFO, UFO-L, IFRS, COFRIS

1. Introduction

A significant percentage of the workforce, spanning various roles and industries, needs a basic understanding of accounting principles and standards. One notable illustration of challenges in this domain is that, for a single accounting revenue standard, around 2,000 pages of additional handbooks were needed, and approximately 1,000 "Interpretive Responses" were issued[1] This reflects areas where authoritative literature proved to be either overly complex, incomplete, or otherwise ambiguous. To address this, accounting frameworks should be designed for broad applicability and computational utility, enabling seamless integration, reuse, and clear communication across diverse financial reporting contexts. Engineering their ontologies is a promising approach to meet these goals. The concepts underlying these ontologies are rooted in foundational ontologies, such as the Unified Foundational Ontology (UFO) [1], and extend to domain-specific ontologies, including core legal ontology (UFO-L) [2], economic, and finance ontologies (OntoFINE) [3], as well as those modeling economic exchanges (COFRIS) [4].

Recent research introduced ontological engineering methods to address the formal conceptualization of the International Financial Reporting Standards (IFRS) Framework [5], conceptualized

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[1]https://kpmg.com/us/en/frv/all-topics/revenue.html

as the CF Ontology [6, 7]. This approach fosters interoperability across various landscapes/domains, addressing ambiguities and enhancing the conceptual consistency of the Framework. As depicted in [7], such Framework ontologies should be grounded in unified foundational ontologies, in this case in UFO [1] and in an already large set of UFO-grounded core ontologies [2, 3, 8-12]. The next step involves the specialization of the CF Ontology for creating IFRS standard ontologies, such as for IFRS 15 Revenue from contracts with customers [15] highlighted in [16]. In addition, there is a need for the convergence of different frameworks and standards.

The problem of engineering ontology common for economics and accounting has been regarded before, e.g., [17]; however, [18] is the sole documented effort exclusively focused on the (previous iteration of the) IFRS CF itself. Other efforts were devoted to the ontology of Economic Exchange and its use in accounting. Several ontologies for economic exchange were proposed grounded in UFO, and in a recent work, they have been consolidated for standard setting [4].

While accounting frameworks and standards are primarily oriented toward economic concerns, their legal foundation is indispensable. This stems from the inherent assumption in accounting frameworks that economic resources correspond to rights, while claims are naturally linked to obligations, aligning such frameworks with the principles of the Hohfeldian Analytical System [2]. Hohfeldian analysis *refines* legal relationships into fundamental components—claim-rights, duties, permissions, no-rights, powers, subjections, immunities, and disabilities. While IFRS (and most accounting frameworks) speak about "rights" and "obligations" in a broader, more pragmatic sense, there are situations in standard-setting where a more granular, Hohfeldian system can illuminate how and why certain rights and obligations should be recognized, measured, or disclosed.

Notable examples include principal-agent analyses in revenue recognition [15], distinguishing powers from claim-rights for investors and lessees, services from leases and licensing, possession from ownership, and clarifying the definitions of intangible assets, convertibles, and derivatives. Although there is a broad literature on the Hohfeldian system and its jurisdictional applications [13], there remains no well-established, mainstream body of scholarship that explicitly and systematically applies Hohfeld's framework to IFRS or accounting standard-setting in a comprehensive manner. Particularly noteworthy is work on POA theory [14] that discusses legal foundations of accounting elements as technical constructions of bookkeeping and economic exchange; however, this work neither employs Hohfeld's legal positions nor is it grounded in the UFO.

The primary objective of this study is to analyze and create a core ontology artifact: the Core Ontology for Financial Reporting Information Systems 3.0 (COFRIS 3.0). This enhanced ontology builds upon COFRIS 2.0 and incorporates concepts grounded in UFO-L to bridge the semantic gap between legal and accounting domains. COFRIS 3.0 is initially aimed at validation and knowledge representation of existing frameworks and standards, creating and providing standard Exposure Draft comments, and the further facilitation of standard-setting.

The research is framed within the Design Science Research methodology, with COFRIS serving as the central artifact through multiple development cycles. The paper represents a new design cycle with three key objectives:

- Validate COFRIS's practical utility by applying it to IFRS Conceptual Framework legal

grounding.
- Propose necessary extensions to COFRIS.
- Improve the depiction of accounting and legal concepts in OntoUML diagrams.

The paper is organized in a logical progression: Section 2: Provides a concise overview of UFO-L and the IFRS Conceptual Framework, establishing the theoretical foundation; Section 3: Examines COFRIS 2.0 Ontology with emphasis on legal relators, positions, and triggering events that serve as foundational elements; Section 4: Introduces preliminary additional fragments of COFRIS 3.0 Ontology, presented through OntoUML diagrams, tables, and practical example; Finally, Section 5 concludes the paper and outlines future work focused on validation.

2. Background

2.1. The IFRS Conceptual Framework

The International Accounting and Financial Reporting Standards Conceptual Framework (IFRS CF) [5] sets out the fundamental concepts that guide the standard-setters in developing international accounting and financial reporting standards. The key objectives and concepts outlined include:

- The objective of General Purpose Financial Reporting is to provide financial information about the reporting entity that is useful to existing and potential investors, lenders, and other creditors in making decisions relating to providing resources to the entity.
- Stewardship Responsibility: An entity, through its management, has a stewardship obligation to realize the entity's economic resources efficiently and effectively.
- Qualitative Characteristics of Useful Financial Information: Fundamental Characteristics are Relevance for decision-making and Faithful Representation. Enhancing Characteristics are Comparability, Verifiability, Timeliness, and Understandability.
- Financial reports provide information about the reporting entity's economic resources, claims against the entity, and the effects of transactions and other events and conditions that change those resources and claims. In many circumstances, *the substance of an economic phenomenon and its legal form are the same.*
- Recognition Criteria: Resources and claims are recognized when it is probable that future economic benefits will flow to or from the entity, and the item can be measured reliably.
- Measurement Bases: Historical Cost, Fair Value, Current Cost, and Value in Use.
- Going Concern Assumption: It is assumed that the entity will continue operating in the foreseeable future unless management intends to liquidate or cease operations.
- Accrual Basis of Accounting: Financial statements are prepared by recording transactions and other events when they occur, regardless of when cash is received or paid.

2.2. Unified Foundational Ontology (UFO) and Legal Core Ontology (UFO-L)

Unified Foundational Ontology (UFO) is an axiomatic domain-independent formal Theory. UFO is divided into three layered compliance sets: UFO-A, an ontology of concrete *endurants* –

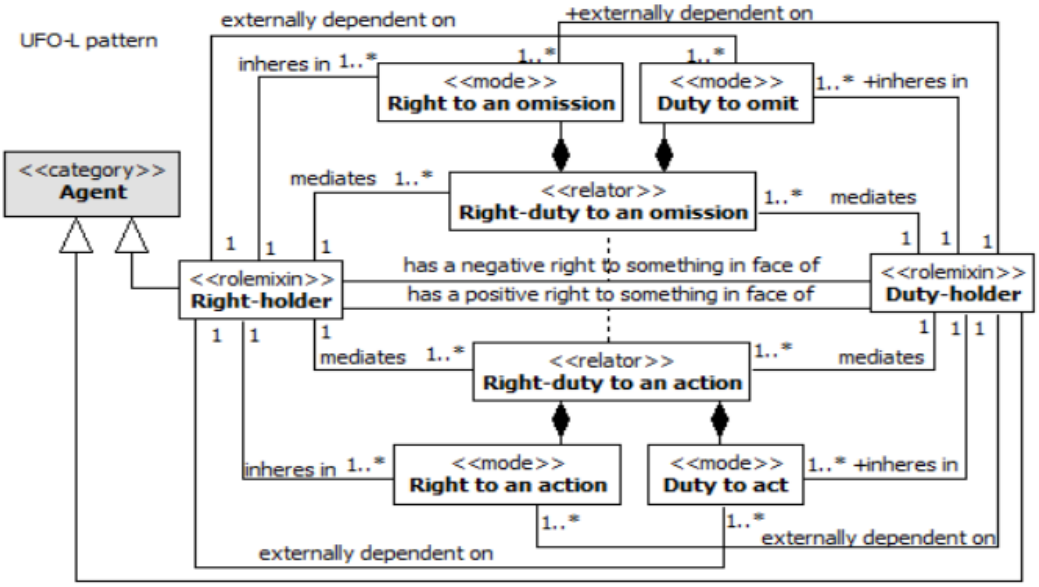

Figure 1: OntoUML diagram of a Right-Duty Pattern, adapted from [2].

of *substantials* and *aspects* [1]; UFO-B, an ontology of *events* [8]; and UFO-C, an ontology of *intentional* and *social entities* [9]. OntoUML is a language whose meta-model has been designed to comply with the ontological distinctions and axiomatization put forth by UFO [10].

UFO-C encompasses *social relators* of *social commitments* (obligations) and *claims* (rights) between *social agents*. Rights and Obligations are correlative; one logically entails the other and have unique propositional content, often allowing a description of a correlative social relator by only one party's *mode*, and a reciprocal relator, such as a contract, by a minimum of one *mode* of each party. However, each party's standpoint in a social relationship involves a specific form of "ought": one bears a commitment or obligation (ought-to-do), and the other holds a claim or right (ought-to-be). This dynamic underscores the complementary but asymmetrical nature of legal relationships [19].

Another important issue for accounting is that the nature of the relationship between parties in a social relator and transaction [20] fundamentally impacts the recognition, measurement, and disclosure of rights and obligations. The three primary types of relationships—independent parties, related parties, and principal-agent relationships—each carry distinct accounting implications.

UFO-L is a core legal ontology grounded on the Unified Foundational Ontology (UFO) [2,11]. It employs UFO's theory of relations to model legal positions (e.g., rights, duties, powers, subjections, etc.) from the relational perspective advocated by Hohfeld and Alexy (see Figure 1). UFO-L defines four simple *legal relators* of *correlative* pairs of *legal positions* (*modes*) between two *legal agents* w.r.t their *actions of conduct* or *institutional actions*:

- (Claim-)Right and Duty. If subject S1 has the right to an action A or omission O against subject S2, then subject S2 has a duty to perform action A (or omitting O).

- Permission and No-Right. If subject S1 holds permission towards subject S2 to an action A (or omission O), then subject S2 has no-right to demand that the permission holder S1 omits action A (or refrains from omitting O).
- Power and Subjection. If subject S1 has legal power in face of subject S2 to create, change, or extinguish a legal position (a right, power, etc.) X for subject S2 *by means of institutional actions*, then subject S2 has subjection towards subject S1 w.r.t this legal power.
- Disability and Immunity. If a subject S1 has, in face of subject S2, no power to create, change, or extinguish a legal position X for subject S2, then subject S2 is immune to changes in the legal position that affect S2.

3. Core Ontology for Financial Reporting Information Systems and their Conceptual Framework (COFRIS 2.0)

The core ontology for financial reporting information systems (COFRIS) builds on the foundational works of institutional economics [20] and the theory of accounting measurement [21], which view economic exchange as the backbone of economics, accounting and, by extension, financial reporting. COFRIS [22, 23], grounded in the UFO and presented in OntoUML, is consolidated in [4] with other UFO ontologies of economic exchange, namely COEX [3], OntoREA [24], and REA2 [25], and includes specific considerations relevant to financial reporting information systems. Recently, COFRIS has been updated to encompass IFRS and US GAAP concepts, particularly their terminology [7]. This update will be referred to as COFRIS 2.0 where appropriate. Below, we outline the COFRIS 2.0 Ontology, depicted by the OntoUML diagram in Figure 2 and detailed in subsections 3.1-3.4. In the discussion, concepts specific to this ontology appear in italics (e.g., *Economic Resource*).

3.1. Enterprise and Market Participants. Economic Exchange

An *Enterprise* is defined as an organization operating as a going concern and functioning as a market participant. The term *Market Participant* encompasses persons, organizations, or collectives engaging in economic exchanges. Examples include individual entrepreneurs (e.g., John Doe), corporations (e.g., Acme Corporation), investor consortia, and family-owned businesses. Enterprises assert claims on economic resources (assets) while simultaneously facing claims from external parties (liabilities and equity claims). They also demonstrate a commitment to their owners and leverage both resources and claims in exchanges designed to realize economic benefits.

When used as an adjective, *Economic* refers to the monetary valuation or financial aspects of a given concept.

An *Economic Exchange* is a reciprocal transaction process where market participants transfer economic resources for commensurate benefits. An enterprise decreases its value by consuming services and assets or creating liabilities to produce services and other economic resources for transfer to other parties at an agreed price. In return for that price, it receives services and other resources to increase its value by producing further services and assets or terminating liabilities. These exchanges are driven by contractual rights and obligations, which specify the

types of resources and services and the to-be-affected assets, liabilities, and equity claims. (see Figure 2, Part 1).

3.2. Economic Resources and Claims

An *Economic Resource* is an enabling right that empowers an enterprise to engage in the production and exchange of economic resources, thereby generating entitlement to *Economic Benefits*. For instance, homeownership functions as an economic resource by mediating the relationship between the enterprise and the broader market. Such resources (see Figure 2, Part 2) embody an *Enabling Right* (e.g., the right to transfer the rights of a house) paired with a corresponding *Benefit Potential* (e.g., the expectation of payment or receivable). These enabling rights may arise from the ownership of a *Property* or from the right to transfer a claim, such as in a mortgage arrangement.

A *Claim of Entity* (e.g., a receivable), a subkind of Economic Resource, represents an *Entitlement Right* corresponding to an obligation of *Other Parties*. This indicates that the *Constructive Right* was established, or the *Enabling Right* was *Realized* for the benefit of *Other Parties*, thereby creating a direct claim to specific economic resources. For example, once a service is rendered, the enterprise acquires the right to receive payment.

Conversely, a *Claim against Entity* (e.g., payable, deliverable) constitutes an Enterprise's constructive or exchange obligation with the potential to transfer economic resources, including the assumption of a new claim, such as an obligation to settle payment with a supplier. It means that the Economic Benefit has been *Received*.

3.3. Assets, Liabilities, and Equity

An *Asset* (see Figure 2, Part 2) is understood as the present role of an Economic Resource that is controlled by an enterprise. For example, crude oil held in inventory may serve as a raw material asset. This role arises when the enterprise enhances the inherent properties of the resource. The role of *Enablement Control* specializes the concept of *Enabling Right* by reflecting the enterprise's authority to direct and deploy the resource in a transaction. Similarly, the role of *Benefit Control* indicates the enterprise's capacity to derive economic benefits from that resource.

Liability (Legal or Constructive) is a present and unavoidable claim against the enterprise. It is characterized as an *Unavoidable Obligation*, exemplified by a business's mandatory duty to pay employee salaries.

An *Equity Claim* represents a residual claim on the enterprise's Assets after deducting its Liabilities. This claim, often referred to as a *Residual Obligation*, is primarily held by the *Owners* or shareholders of the enterprise.

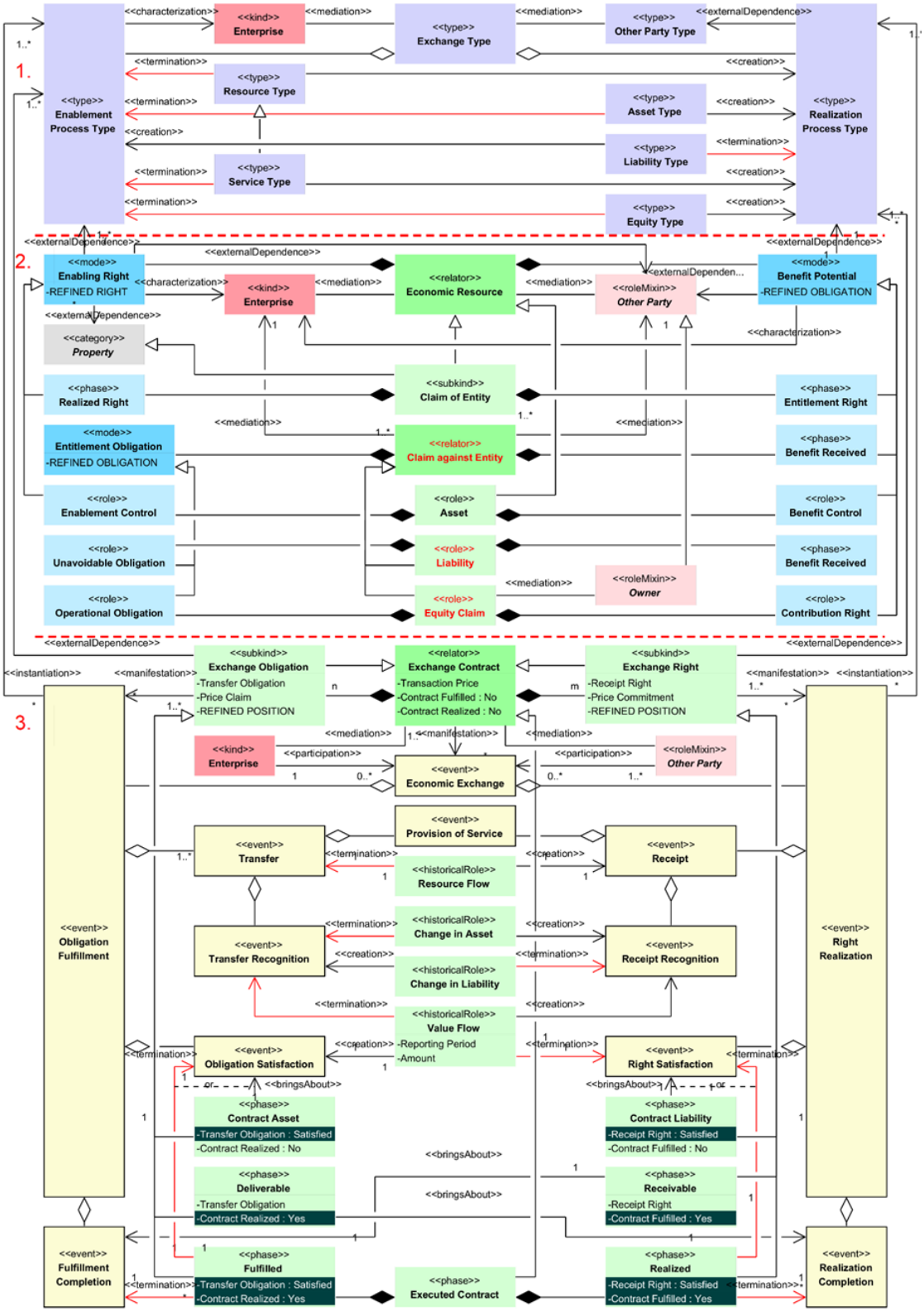

Figure 2: COFRIS. OntoUML diagram of Economic Exchange. Enterprise view. In all diagrams, types are represented in purple, objects in pink, modes in blue, events in yellow, and relators in green. Parts: 1. Exchange Type, 2. Resource and Claims, Asset, Liability, and Equity, 3. Exchange Contract. Attributes in capital letters designate the placement of refinements for existing legal positions.

3.4. Exchange Contracts, Transactions, and Other Events

An Exchange Contract (see Figure 2, Part 3) is modeled by a UFO-C social relator that mediates between an Enterprise and Other Parties, representing a mutually agreed upon exchange. It is composed of two sets of relators:

One or more distinct *Exchange Obligation* relators mediate between:

- a *Transfer Obligation* that specifies the deliverable and transformative bundle of *Resource* and *Service Types, Asset, Liability, and Equity Types* to be affected, and *Timing* of *Satisfaction.*
- a *Conditional Price Claim* of the amount to be recognized upon *Satisfaction.*

One or more distinct *Exchange Right* relators—the exchange obligations of the other parties—mediate between:

- a *Receipt Right* that specifies the receivable and transformative bundle of *Resource and Service Types, Asset, Liability, and Equity Types* to be affected, and *Timing* of *Satisfaction.*
- a *Conditional Price Commitment* of the amount to be recognized upon *Satisfaction.*

On inception and in maintaining commensurability, it holds that the sum of all price claims equals the sum of all price commitments. Prices are not paid or received but accrued.

For instance, consider:

A barter agreement in which:

- A car and software embedded in the operating system of a car valued at $140,000 are to be transferred on February 1, and
- A trailer valued at $160,000 to be delivered on March 1 are exchanged for:
- Three monthly installment payments in Bitcoin, starting in January, each valued at $100,000.

Notice that each non-divisible economic resource and benefit not proportional to the other leads to the barter. The barter operations may be substantially hidden for reporting because of net effects and absence from cash flow statements. All sustainability restoration transactions are barters.

A mobile phone transaction where:

- A phone valued at $1,000 is sold for:
- A combination of $750 trade-in value and $250 in credit.

A service arrangement where a marketing agency simultaneously:

- Receives specialized market research services (a receipt), and
- Provides social media consulting services (a transfer) of equivalent value.

These examples, while unconventional, illustrate the flexible yet precise nature of Exchange Contracts. The model for Contract Execution can be built using either modes or relators. Since relators (accounts) are preferred in accounting, we depict modes as attributes. Notice also that we model contract as mediating two sets of relators instead of four sets of modes as in UFO-L because it provides more semantics of mode relationships.

The contract execution occurs through concurrent Obligation Fulfillment and Right Realization, processes recognized as *Changes in Value Stocks* (Assets and Liabilities) and *Value Flows* of the entity. Initially, a Contract is not *Fulfilled*, nor *Realized*.

3.4.1. Obligation Fulfillment

An *Exchange Obligation* manifested by and triggering the *Obligation Fulfillment* process comprises one or more value *Transfer* events. Each Transfer event may include:

- *Service Provision* Event to Other Parties.
- *Resource Flow Transfer* Event to Other Parties.
- Transfer of Rights to Other Parties concurrent with assuming Liabilities from them.

Each *Transfer* implies a *Transfer Recognition* event that results in a decrease in *Value Flow* equal to the Carrying Amount (e.g., Expenses) and possible decreases in *Assets* or increases in *Liabilities*.

Obligation Satisfaction occurs when the Other Party accepts control of the transferred economic benefits, thereby making the *Transfer Obligation Satisfied*. This event either brings about a *Contract Asset* or terminates a *Deliverable*, resulting in an increase in *Value Flow* (e.g., Revenue Recognition) equivalent to the Price Claim amount.

Fulfillment Completion occurs when all Transfer Obligations have been Satisfied, resulting in a *Fulfilled Contract*. If the contract is also *Realized*, it is considered *Executed*. Otherwise, any outstanding Receipt Rights are recognized as *Receivables*.

3.4.2. Right Realization

An *Exchange Right* manifested by the *Right Realization* process involves one or more value *Receipt* events. Each Receipt event may include:

- *Provision of Services* to the Entity from Other Parties.
- *Resource Flow Receipt* Event from Other Parties.
- Receipt of Rights from Other Parties that simultaneously enforce Liability transfer to them.

Each *Receipt* implies a *Receipt Recognition* event that results in an increase in *Value Flow* equal to the Carrying Amount, typically either by increasing Assets or by decreasing Liabilities.

Right Satisfaction occurs when the Entity accepts control of the received economic benefits, thereby making the *Receipt Right Satisfied*. This event either brings about a *Contract Liability* or terminates a *Receivable*, resulting in a decrease in *Value Flow*, equal to the Price Commitment amount.

Realization Completion occurs when all Receipt Rights have been Satisfied, resulting in a *Realized Contract*. If the contract is also *Fulfilled*, it is considered *Executed*. Otherwise, any outstanding *Transfer Obligations* are recognized as *Deliverables*.

It is also noteworthy that resource and service inflows can be immediately offset by corresponding outflows. Thus, in the above example, a marketing agency, might simultaneously receive specialized market research services (a receipt) and provide social media consulting services (a transfer) of equivalent value. In such instances, only the net equity changes are recognized, and no asset or liability is recorded. Similarly, claims may be raised by outflows and extinguished by matching inflows.

The Action Theory of Economic Exchanges in UFO [3], unlike UFO-S [12], recognizes ownership transfer as a distinct type of action and incorporates value ascription based on preferences. However, for law, economics, and accounting, the crucial aspect of exchange actions lies in their impact on rights, obligations, and the value of objects. Furthermore, an exchange execution is not merely a pair of actions but rather a concurrent process involving intertwined (transformational) transfers and services. This process unfolds through intermediate rights, obligations, and value ascriptions.

From a legal perspective, a service contract is an arrangement between two or more parties designed to produce juridical effects—namely, to create, extinguish, modify, transfer, or maintain legal positions [11]. The absence of ownership transfer in service contracts (except in the case of payments) has shifted scholarly focus toward contract formation, violation, and modification. However, for economic and accounting purposes, ownership-related juridical effects are of paramount importance, making them the focal point of this paper.

4. Towards UFO-L Grounded Core Ontology for Financial Reporting Information Systems (COFRIS 3.0)

Further, we want to explore which UFO-L legal positions would be important to introduce on the Conceptual Framework level into the element definitions and concepts. This Section presents the COFRIS ontology interpreted and enriched by the UFO-L legal concepts forming an updated ontology to be named COFRIS 3.0. The competency questions to be answered in a Hohfeldian way are:

1. How do Hohfeldian legal relators and positions refine and structure the rights and obligations associated with economic resources, claims, and contracts?
2. Which transactions and economic events are triggered by legal relators and positions, and how do they affect economic resources, claims, and contracts, particularly in governing their lifecycle phase transitions?

We will continue to take an enterprise perspective and analyze only those legal positions and relators with monetary valuation. Our objective will be to put behind the social relator and modes of each element at least four legal relators and hence a minimum of eight positions further describing the element's legal substance specialized by their roles in exchanges and other events.

Entity Enabling Rights	Other Parties Correlative Obligations	Entity Benefit Potential	Other Parties Correlative Potential
Enablement Permission	**No-Right of Exclusion**	**Receipt Permission**	**No-Right of Receipt Exclusion**
Enterprise owns a van for deliveries and operates or leases it freely.	Competitors cannot prevent the Entity from using/leasing the van.	Enterprise receives lease or rental income from the van.	Unrelated third parties cannot demand a share of the income.
Exclusion Right	**No-Permission to Enablement**	**Receipt and Exclusion Right**	**Duty to Provide Benefit**
Enterprise controls access and prevents unauthorized use.	Others cannot use the van without authorization.	Enterprise exclusively receives lease payments from the lessee.	The leasee has a duty to make lease payments.
Expropriation Immunity	**No-Power to Enablement**	**Obtainment Immunity**	**No-Power to Obtainment**
Enterprise is protected from unlawful government seizure.	The government/private entities cannot expropriate the van.	Enterprise is protected from the lessee reclaiming paid rent.	The leasee cannot demand a refund unless contractually allowed.
Enablement Power	**Acceptance Subjection**	**Obtainment Enforcement Power**	**Subjection to Enforcement**
Enterprise can sell or lease the van, transferring ownership.	Buyers/Leasees must comply with contract terms when acquiring the van.	Enterprise can assign or sell the right to receive future lease payments.	The leasee remains liable to pay rent even if the claim is transferred.

Figure 3: Refined Legal Positions for Economic Resources of a Van. Enterprise view.

Let us first regard the main Legal Positions of Enabling Rights of an Economic Resource concerning Property and thus of an Asset, following [26, 28], complemented by Legal Positions for Benefit Potential. See Table in Figure 3 for an example of a van and Figure 4 for an OntoUML diagram. The fundamental building blocks of all property analysis consist of four elemental entitlements: enablement-permission, exclusion-right, expropriation-immunity, and enablement-power.

Refining Legal Positions for Claims of and against Entity is similar. Following Section 3.2, when modeling Claims of Entity, all Enabling Right Positions are Realized, and Benefit Potential Rights are converted into Entitlements. Conversely, when modeling Claims against Entity, all Benefits are recognized as Received, and all Enablement Rights are reclassified as Entitlement Obligations. All transactions and events—including inflows and outflows influenced by environmental or market conditions, as well as services received and immediately consumed—are transformed into institutional actions of Transfer and Receipt Recognition (see Figure 2) through the accounting processes of recognition and derecognition. The following actions related to the Exchange Contract qualify as institutional actions in their own right.

The *Contract Inception* process establishes an Exchange Contract with Exchange Obligation and Right Relators (see Table in Figure 5 and Figure 2). Contract Fulfillment process, by performing Transfers satisfies Transfer Obligations ***and their refinements***, turning Exchange Obligations into Contract Assets. Conversely, the Realization Process, by accepting Receipts satisfies Receipt Rights ***and their refinements***, turning Exchange Rights into Contract Liabilities. Contract Fulfillment Completion marks the Contract as Fulfilled, but unsatisfied Receipt Rights and their refinements as Receivable. Conversely, Realization Completement marks the Contract as Realized, but unsatisfied Transfer Obligations as Deliverable. For example, these refinements enable the analysis of whether a price concession is feasible. For example, the refinements allow us to analyze whether a price concession is possible. In a typical contract

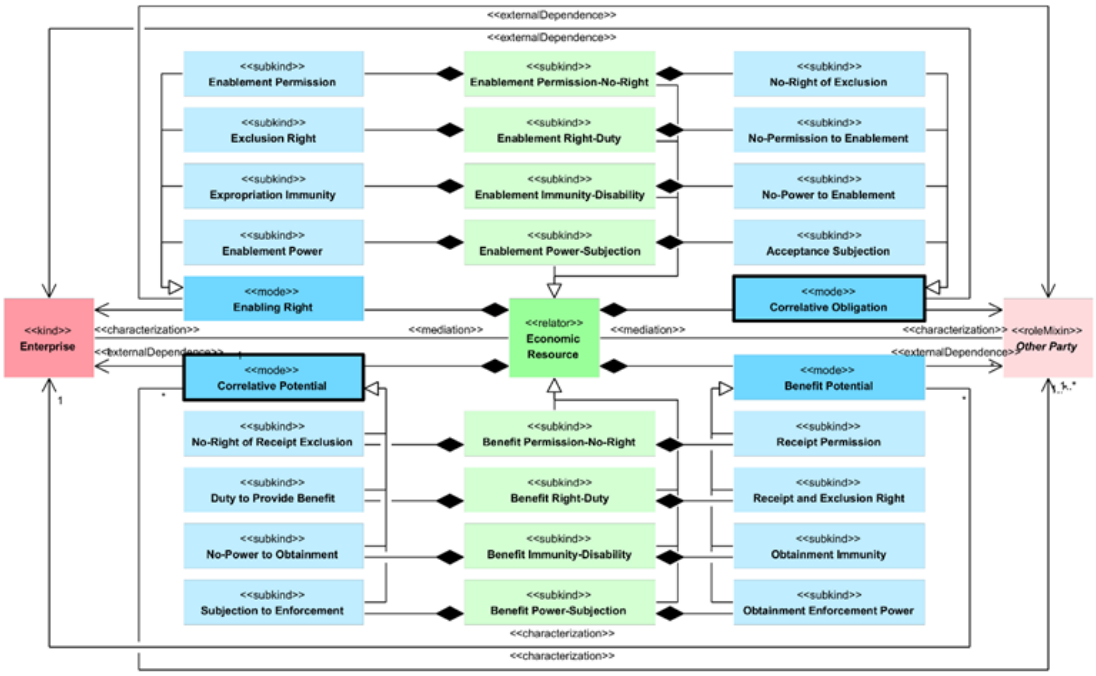

Figure 4: OntoUML diagram of Refined Positions of Economic Resource. Enterprise view.

for the delivery of goods or services, the entity holds the necessary permissions and powers to transfer the associated economic resources, as well as certain immunities from improper interference in fulfilling transfer obligations. Correspondingly, the other party has a subjection to receipt of the goods or services. The other party also lacks the right to unilaterally revoke performance without lawful cause or contractual basis.

Let us regard how Hohfeldian and our frameworks can help analyze legal positions in contracts by breaking down rights, duties, permissions, and powers into precise legal relations. Using this approach, we can distinguish whether a contract involves a software license (granting ownership-like rights over software) or a SaaS agreement (providing access but retaining control) using the Table in Figure 6 and then analyzing them in all phases of a contract by applying Figure 2 and the Table in Figure 5.

By using Hohfeld's framework, we can see that a software license grants claim-rights (limited property-like control). A SaaS contract only grants permissions (revocable access to a service). However, Contracts often blend licensing and SaaS (hybrid models), and Companies use misleading or vague terms in agreements. Without refining contracts, we cannot achieve both legal precision in contract characterization and accounting accuracy in revenue recognition.

5. Conclusion and future work

This paper employs the Hohfeldian Analytical System and UFO-L Legal Core Ontology as a foundational framework for analyzing the elements and transactions of financial reporting. By

Economic and Institutional Events:	Satisfaction		Completion	
Contract Inception	Obligation	Right	Fulfillment	Realization
Exchange Obligation Relator Phases:	**Contract Asset**	-	**Receivable**	**Fulfilled**
Transfer Obligation Bundle Refinement:				
Duty to transfer economic resources				
Subjection to enforcement by other party				
Disability to avoid transfer				
No-Right to refuse transfer				
Conditional Price Claim Bundle Refinement:				
Right to accrual Price				
Power to enforce accrual				
Permission to price concession				
Immunity to unilateral withdrawal by others				
Exchange Right Relator Phases:	-	**Contract Liability**	**Realized**	**Deliverable**
Receipt Right Bundle Refinement:				
Claim-right to benefit receipt				
Power to enforce obtainment				
Permission to waive or delay enforcement				
Immunity to unilateral withdrawal by others				
Conditional Price Commitment Bundle Refinement:				
Duty to accrual price				
Subjection to accrual enforcement				
Disability to revoke accrual				
No-Right to change price				

Figure 5: Refined Legal Positions of Exchange Rights and Obligations. Enterprise view.

Refinement	Software License	SaaS Contract
Rights Granted	Right to use software	Permission to access software
Ownership Control	Licensee gets some legal control over software use	Provider retains all control
Modification Rights	No-right to modify unless explicitly allowed	No modification rights at all
Revocability	May be perpetual or limited	Access can be suspended at any time per contract
Payment Structure	Usually one-time or term-based	Recurring subscription model
Infrastructure	Runs on the customer's system	Runs on the provider's system

Figure 6: Rights provided by Software License and SaaS agreement.

integrating these models, we achieve a more formalized and rigorous understanding of financial entities and their interrelationships. Our analysis highlights two key contributions.

Firstly, the correlativity inherent in legal positions facilitates the inter-company reconciliation of elements and transactions, particularly in auditing, triple-entry accounting, and transaction-level valuation. However, Hohfeldian correlatives are asymmetrical. The obligation side is predominantly characterized by required performance, while the rights side is defined by the achievement of specific outcomes. The asymmetry of correlatives and the dependencies between parties influence the recognition and measurement of elements and transactions, leading to

differences in financial reporting among parties. While the transaction can often be described by reciprocal obligation execution, the unbundling of the rights side can be equally important.

Secondly, we extend the conceptualization of bundles of rights and obligations that refine and structure economic resources and assets, an aspect previously underexplored in UFO-L applications. Additionally, intermediate events, legal positions, and relators that emerge in economic exchanges to maintain commensurability are explicitly recognized and refined.

We present a practical example of legal relator modeling, addressing a persistent issue where many "Interpretive Responses" from consultants currently exist. This highlights the need for a more structured and ontologically grounded approach to financial interpretation.

Future validation of this methodology will involve the formal representation of existing frameworks and standards, the drafting of standardized Exposure Draft comments, and deeper engagement in standard-setting processes to enhance conceptual clarity and regulatory consistency.

For future work, recognition and measurement introduce new dimensions to the Hohfeldian system. Legal position strength can influence element carrying amount, e.g., the stronger the right to use/exclude others, the higher the value, but it can also raise the associated costs. Similarly, unrestricted permissions and powers to transfer or modify assets could further impact valuation.

Further research will also address contract modifications and their implications within this ontological framework.

The COFRIS 3.0 Ontology diagrams were syntactically verified using OntoUML tools. The COFRIS 3.0 Ontology is submitted for publishing in OntoUML/UFO Catalog.

Declaration on Generative AI

During the preparation of this work, the authors used ChatGPT o1, and Grammarly in order to: Grammar and spelling check, Paraphrase, and reword. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the publication's content.

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