From conceptual framework toward revenue recognition

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Abstract

The International Financial Reporting Standards (IFRS), adopted across 168 jurisdictions and subject to continuous refinement, serve not only for report preparers and users, but also as a critical underpinning for localized policies across countries, industries, and individual enterprises. Although the IFRS are constructed upon the foundational premises of the Conceptual Framework for Financial Reporting (CF), inconsistencies persist, leading to challenges in the *comparability* of financial reports. Grounding of the concepts in Unified Foundational Ontology (UFO) has helped to improve different frameworks and standards. Leveraging this approach, we have developed, refined, and herein present the CF Ontology. Using CF Ontology, we conduct an ontological analysis of the IFRS 15 standard, "Revenue from Contracts with Customers", and introduce a preliminary ontology model for this standard in OntoUML.

Keywords

UFO, OntoUML, COFRIS, Financial Reporting, Revenue Recognition, Unit of Account, Control

1. Introduction

The International Financial Reporting Standards (IFRS) [1], adopted across 168 jurisdictions and subject to continuous refinement, serve not only for report preparers and users, but also as a critical underpinning for localized policies across countries, industries, and individual enterprises.

Although the IFRS are constructed upon the foundational premises of the Conceptual Framework for Financial Reporting (CF) [2], issues of inconsistencies, e.g., between concepts of transferability and control in different frameworks and standards persist, leading to challenges in the *comparability* of financial reports. The underlying Issue is that CF and IFRS lack formal and explicit specifications of a shared conceptualization.

Grounding of the concepts in Unified Foundational Ontology (UFO) [3] has helped to improve different standards and frameworks [4]. Leveraging this approach, we have developed a Core Ontology for Financial Reporting IS (COFRIS) [5]. Building upon COFRIS we have developed [6], refined, and herein present the CF Ontology in Section 3.

Following the Design Science Research (DSR) methodology [7], the subsequent cycle in the evolution of the core CF Ontology involves its *practical application in the creation and refinement*

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of the IFRS ontologies, as well as in the formulation of a systematic methodology for their development.

This research-in-progress paper conducts an ontological analysis of the IFRS 15 standard, "Revenue from Contracts with Customers" [1] and introduces a preliminary ontology model for this standard in Section 4. This model, crafted within the OntoUML language [6], evolves directly from the foundational CF Ontology, illustrating our approach to addressing complex financial reporting standards through ontological analysis and model specialization. The conclusion in Section 5 reflects our findings and outlines further validation efforts.

2. Background

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 – of substantials and aspects [3], 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 [4]. OntoUML diagrams (e.g., Figure 1) represent types. In UFO-C, agents and (non-agentive) objects specialize substantials [9]. Objects can be physical and social (e.g., economic resources, money). Agents can be physical (e.g., a person) or institutional (e.g., an enterprise) and have intentional aspects that can be mental or social.

Mental aspects include intentions, beliefs (that can be justified by situations), and desires (which express the will of an agent toward a situation). The notion of intention refers to a situation that the agent commits to bring about by pursuing goals and executing actions. A closed intention specializes commitment to pursue a goal in a specific way, i.e., constrained by a particular type of action type termed a plan [9] or a schedule.

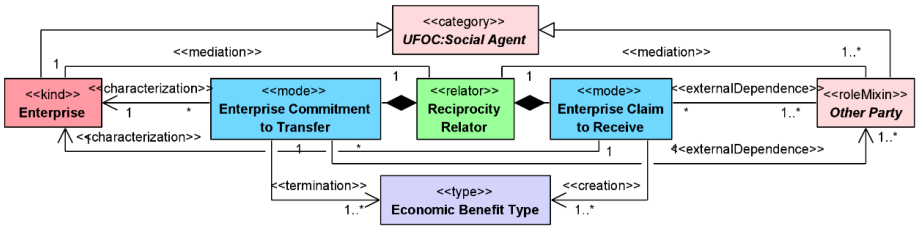

Figure 1: OntoUML diagram of economic Reciprocity Relator. Inspired by [10]. Enterprise perspective. In all diagrams, types are represented in purple, agents in pink, modes in blue, events in yellow, and relators in green.

Social commitments and claims (aka expectations) specialize social aspects [9]. A social commitment is the commitment of an agent A towards another agent B. As an externally dependent mode, a social commitment is a characterization of the A, has externalDependence on the B, and causes the creation of an internal commitment in the A [9]. Also, correlative to this internal commitment, a (comparative) social claim of the B towards the A is created.

Social commitments and claims always form a pair that refers to unique propositional content. A social relator, mediated by agents, is an example of a relator composed of correlative commitments/claims. Actions are intentional events, i.e., events that are performed by agents to satisfy their goals. Actions are manifestations of agent modes and action types are specified in commitment schedules or by committed resource types [9].

Reciprocity relators [10, 5] combine commitments (or correlative claims) of each of the two agents, e.g., the enterprise and the other market participant(s), as in contracts. The services ontology UFO-S [10] regards reciprocity relator as an agreement to exchange service actions. In the most general case, the Other Party represents Market Society. Reciprocity relators also can mediate different roles of an enterprise in a production process.

In Figure 1 and further, we use the same stereotypes for *intentional* relations between endurant types and modes as for *actual* relations between instantiated endurants and manifested events respectively.

Core Ontology for Financial Reporting IS (COFRIS) [5] adds economic resource flow and affected resource stock concepts to the commitments/obligations and their (incremental) fulfillment. Furthermore, economic resources are considered as a set of institutional rights (including rights to receive and provide services) that have the potential to produce economic benefits. An Economic Exchange is defined as a transaction whereby two economic agents (A and B) conclude and execute contracted reciprocal performance obligations to transfer economic resources and to provide services, affecting both parties' resources and activities, with the goal of producing economic benefits for either party [5].

Transactions are regarded primarily as institutional actions of Transfer of rights (and assumption of obligations) over resources that may involve the simultaneous or postponed manifestation of service provision, including productive activities of object custody, delivery, or conversion.

The resource flow affects other transactor activities and/or economic resources (and claims) held and controlled by parties, termed assets (and liabilities), valued by their holders or the market. The market is a network of market participants – enterprises and persons serving to facilitate exchanges and economic resource-related rights and obligations.

For instance, in a basic sales contract, an enterprise employs designated quantities of grain assets *and* a hired workforce labor to transfer and deliver these resources to the other party. In return, the enterprise's cash assets are affected by the receipt of cash, but the accompanying bank's services are expensed for the benefit of operations.

3. Ontology of conceptual framework for financial reporting

The Ontology of the conceptual framework for financial reporting (CF Ontology) is depicted in the white sections of Figure 2, and its description follows the sequential arrangement of the framework's [2] chapters necessary for processing transactions and other events relevant to financial reporting.

CF Ontology is built upon the foundation laid by COFRIS, but CF Ontology takes a broader perspective by encompassing not only economic exchanges, but also events, roles, and phases of resources and claims additionally required for the framework. About 60 concepts in total and terminology have been refined to align closely with those used in established frameworks. We have tried to minimize the introduction of new concepts beyond those found in existing

frameworks. However, it is assumed that for most concepts, corresponding high-order types and correlative counterparts of concepts exist.

The UFO foundational concepts are denoted in camelCase, such as roleMixin but CF Ontology concepts in Capitalized Words – Economic Resource. In this paper, the adjective Economic refers to the monetary value of most of the regarded concepts. Some concepts in the diagram are duplicated to ease their specialization.

Building upon the declarations in [2]: The **purpose** of the IASB Conceptual Framework and CF Ontology is to:

1. assist the IASB in developing IFRS and IFRS Ontologies that are based on consistent concepts.
2. assist preparers in developing consistent accounting policies and their ontologies.
3. assist all parties in understanding and interpreting the IFRS.

The Objective of Financial Reporting. Per [2:1], The objective is to provide financial information about the reporting entity that is useful to existing and potential investors and creditors in making decisions relating to providing resources to the entity.

The Qualitative Characteristics of Useful Financial Information. "If financial information is to be useful, it must be Relevant and Faithfully Represent what it purports to represent. The usefulness of financial information is enhanced if it is Comparable, Verifiable, Timely, and Understandable" [2:2.4].

However, the Framework's "Qualitative Characteristics are not so much a description of the properties of accounting information but, rather, of useful information in general" [11].

Reporting Entity and Financial Statements. Per [2:3], "Financial statements provide information about transactions and other events viewed from the perspective of the reporting entity as a whole, not from the perspective of any particular group of the entity's existing or potential investors or creditors.

A reporting entity, an Enterprise, is a kind of institutional agent, and a Market Participant in a Going Concern phase, who is obliged or committed to preparing Financial Statements [2:3.10].

Statement of Financial Position provides information about the nature and amounts of the entity's Economic Resources and Claims Against the Entity at Measurement Date [2:3].

Statements of Financial Performance for the Reporting Period depict the effects of Transactions and Other Events with Enterprise participation that change an entity's Economic Resources and Claims Against the Entity [2:3].

Market Participant – is a roleMixin played in a Market Society by a person, an Enterprise, a collective of persons or Enterprises, or Society itself [2:4.29].

The common practice in financial reporting is calling by the same names both the financial representations in financial statements and the *items* - resources, claims, transactions, or events that they represent. *Elements* of financial statements – assets, liabilities, equity claims, income, and expenses are the classes of items that financial statements comprise [12]. We model items and elements as economic phenomena of the situation of Financial Position underlying Statement of Financial Position, and situation of Financial Performance underlying Statements of Financial Performance.

3.1. Financial position

Reciprocity Relator, briefly considered in Section 2, mediates an Enterprise with Market Society – a collective of Market Participants (including an Enterprise in another role) and specifies the Commitment to Outflow and the Expectation to Inflow (aka claim) of an Enterprise.

The scope of the Reciprocity Relator can be understood to encompass offerings as broad as the entire Enterprise's purpose or as specific as ownership of a particular resource or claim.

Commitment to Outflow mode specifies Types for transfer and termination of the complex Resources (and/or receipt and creation of Claims) including Service manifestation and Object termination. The Sacrifice Belief component mode specifies Types for the assessed termination of Assets (creation of Liabilities) to produce the Outflow.

Expectation to Inflow mode specifies Types for the receipt and creation of the complex Resources (transfer and termination of Claims) including Service manifestation and Object creation. The Benefit Belief component mode specifies the assessed creation of Assets (termination of Liabilities) or Outflow to be produced by the Inflow.

Economic Resource[2] specializes Reciprocity Relator when either:

(a) Non-Agentive Object instantiates the Object Type, and
Right to Outflow specializes Commitment to Outflow, or
(b) Fulfilled Commitment specializes Commitment to Outflow,
Right to Inflow against Other Party specializes Expectation to Inflow, and
Other Party specializes Market Participant.

For example, the entity has: (a) a property right to sell inventory (to terminate assets and create resources transferred) and to retain any sale proceeds (to terminate resources received and create assets), and (b) a receivable when the inventory has been transferred.

Asset[3] is a recognized role of the Economic Resource in the Enterprise when:
Control to Outflow specializes Right to Outflow, and
Control to Inflow specializes Expectation to Inflow.

The meaning of *control* is often taken for granted but requires some attention. Per [2:4.20]

"An entity *controls* an economic resource if it has the present *ability* to direct the use of the economic resource (and to prevent others from directing) and obtain the economic benefits that may flow from it (and prevent others from obtaining)."

Ontologically, the *ability* is an intrinsic characteristic of an agent tied to the agent's skills, knowledge, competencies, or powers [13]. Abilities are generally not transferable because they are inherently linked to the agent's modes or qualities.

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[2] Economic Resource is a right that has the potential to produce economic benefits [2:4.4].
[3] Asset is a present Economic Resource controlled by the entity as a result of past events [2:4.3]

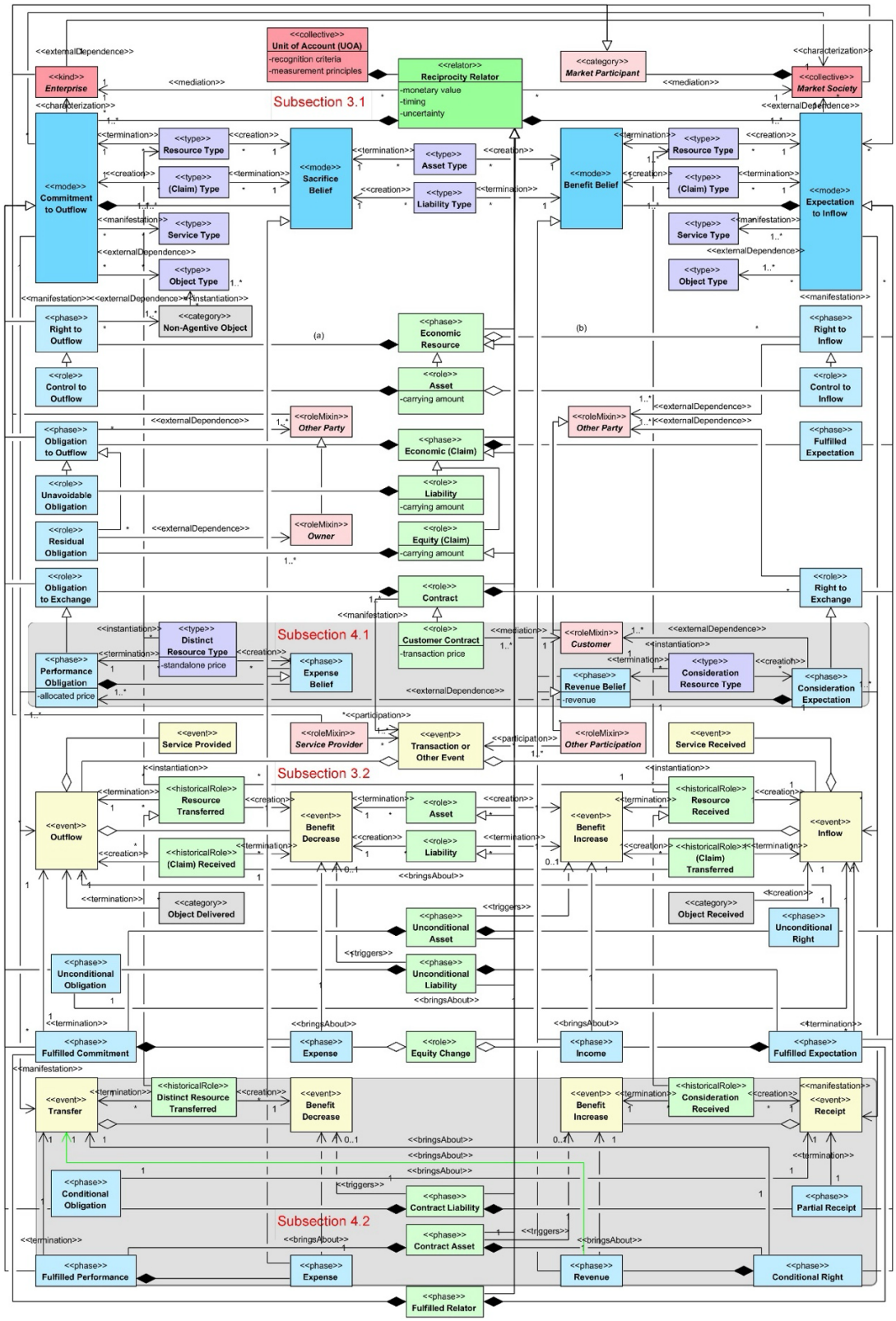

Figure 2: CF Ontology (white sections) and IFRS 15 Ontology (grey sections) OntoUML diagram. Subsections of the Figure are described in the corresponding subsections of the paper.

Economic Claim[4] against the Enterprise specializes the Reciprocity Relator as a result that economic benefits have been obtained [2:4.43], and:

Fulfilled Expectation specializes Expectation to Inflow,

Obligation to Outflow specializes Commitment to Outflow, and

Other Party specializes Market Participant.

Liability[5] is a recognized role of the Economic (Claim) when:

Unavoidable Obligation specializes Obligation to Outflow.

Issue 1. The definition in [2:4.26] correctly posits the *transfer* of *rights*, but not *control*. In our opinion, it mistakenly omits the *receipt* of *obligations*.

Equity[6] Claim is a residual role of the Economic Claim of an Owner of the Enterprise (aka Holder of Equity Claims), who specializes the Other Party.

While rights and obligations of the counterparties are correlative, assets and liabilities are not: "A requirement for one party to recognize a liability and measure it at a specified amount does not imply that the other party (or parties) must recognize an asset or measure it at the same amount" [2:4.30].

Issue 2. It proves the statements of COFRIS [5] that the economic exchange conceptualization necessitates not only the inclusion of the actions, as argued in [14], but also resources affected by these actions, and that in contrast with [15] "for internal database purposes of corporate accountability", *enterprise perspective* terms are *not* directly derivable from *independent perspective* terms. However, the CF is silent about the use of correlative rights and obligations and independent perspective for improving qualitative characteristics of financial information.

Contract[7] specializes the Reciprocity Relator when:

Obligation to Exchange specializes Commitment to Outflow,

Right to Exchange specializes Expectation to Inflow, and

Other Party specializes Market Participant.

An Executory Contract [2:4.54] is a phase of a Contract or a portion of a contract, that is equally unperformed—neither party has fulfilled any of its obligations, or both parties have partially fulfilled their obligations to an equal extent. An executory contract establishes a combined right and obligation whereby right and obligation are interdependent and cannot be separated.

The Unit of Account[8] (UOA), a pivotal object of CF Ontology, is a collective of Reciprocity Relators that should be recognized, measured, set off, classified, and aggregated according to particular IFRS, forming situations of Financial Position and Performance which underly Financial Statements. A UOA can bundle a (consolidated) enterprise, a cash-generating unit, a portfolio of contracts, a contract, economic resources, or claims.

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[4] We use (Claim) in parentheses or simply Claim to denote claim *against the enterprise*.

[5] Liability is a present obligation of the entity to *transfer* an economic resource. An obligation is a duty or responsibility that an entity has no practical *ability* to avoid [2:4.26].

[6] Equity is the residual interest in the assets of the entity after deducting all its liabilities [2:4.63].

[7] Contract is an agreement between two or more parties that create enforceable rights and obligations [1]

[8] The Unit of Account is the Right or the group of rights, the Obligation or the group of obligations, or the group of rights and obligations, to which Recognition Criteria and Measurement Concepts are [or will be] applied [2:4.48].

3.2. Financial performance. Transactions and other events

Transactions and Other Events are Outflow and Inflow events affecting the Economic Resources and Claims of an Enterprise either via interaction with Other Parties, or due to changes in disposition, substance, or Current Value. Some transactions, such as taxes, owner contributions and distributions, can be non-reciprocal [16].

The participants of a Transaction – Resources and Claims Transferred and Received, play historicalRoles. Market Participants play historicalRoleMixins. A Service with a Service Provider participation is a manifestation of an Economic Resource right and a component of a Transaction.

Outflow event is a manifestation of any non-terminal phase of Commitment to Outflow, causing termination of Resources Transferred (creation of Claims Received) and the manifestation of Services Provided, resulting from the Benefit Decrease event. Outflow causes Commitment to Outflow termination into the Fulfilled Commitment phase.

A complete manifestation of Obligation to Exchange bringsAbout the reciprocal Right to Exchange into the Unconditional Right phase and the Contract into the Unconditional Asset (aka Receivable[9]) phase that triggers the Benefit Increase event.

Inflow event is a manifestation of any non-terminal phase of Expectation to Inflow, causing the creation of Resources Received (termination of Claims Transferred) and manifestation of Services Received, resulting in the Benefit Increase event, or directly in the Outflow event.

Issue 3. For example, Services Received can simultaneously serve as Services Provided without generating interim assets or resources, contrary to the suggestions in [1, 2].

A complete manifestation of the Right to Exchange manifestation bringsAbout the reciprocal Obligation to Exchange into the Unconditional Obligation phase and the Contract into the Unconditional Liability (aka Payable) phase that triggers the Benefit Decrease event.

Benefit Decrease is a manifestation of Sacrifice Belief, causing termination of Assets (creation of Liabilities). It bringsAbout Sacrifice Belief into the Expense[10] phase if the Inflow or Outflow causes an Equity Change and that event does not involve the Owner.

Benefit Increase is a manifestation of Benefit Belief, causing the creation of Assets (termination of Liabilities). It bringsAbout Benefit Belief into the Income[11] phase if the Inflow or Outflow causes an Equity Change and that event does not involve the Owner.

Fulfillment of both Commitment to Outflow and Expectation to Inflow bringsAbout the Contract into the Fulfilled Relator phase.

Income and Expenses characterize the Period, Nature, Role, and Value effects of the flow of resources and claims. Given the specialization of relationships within the enterprise - assets, liabilities, and equity claims specialize resources and claims as roles.

Recognition [2:5] is the process of capturing for inclusion in the situations of Financial Position and Financial Performance underlying Financial Statements, an item that meets the

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[9] Receivable is a right to consideration that is unconditional [1].
[10] Expenses are decreases in assets, or increases in liabilities, that result in decreases in equity, other than those relating to distributions to holders of equity claims [aka owners] [2:4.68].
[11] Income is increases in assets, or decreases in liabilities, that result in increases in equity, other than those relating to contributions from holders of equity claims [aka owners] [2:4.68].

definition of one of the elements. The amount (aka value) at which an asset, a liability, or equity is recognized in the situation of Financial Position is referred to as its Carrying Amount.

If it is uncertain whether an asset or liability exists, or the probability of an inflow or outflow of economic benefits is low, the asset or liability is not recognized. The criteria for recognition are the matter of IFRS.

Derecognition is the removal of all or part of a recognized asset or liability from an entity's Financial Position.

In CF Ontology the specified or actual recognition (derecognition) is modeled as the primitive relation of creation (resp. termination) between an event and the element or the change of the element by an event that bringsAbout element mode.

Measurement. Per [2:6] elements recognized are quantified in monetary terms of an item being measured. This requires the application of a measurement basis at Historical Cost or Current Value. Current value measurement bases include Fair Value, Value in Use, Fulfillment Value, or Current Cost. Conceptually, an item bears all these values, while a particular one is selected for presentation following the principles of particular IFRS.

Historical Cost of an Asset at creation is the Consideration Value paid or payable for the creation of the Asset plus inflow transaction costs[12]. Termination of the Asset bringsAbout an Expense measured at the Historical Cost of an Asset, plus outflow transaction costs. The Expense arising from the exchange of a Resource of an Asset is recognized at the same time as the Consideration Value for that exchange is recognized as Income.

Historical Cost of a Liability at creation is the Consideration Value received or receivable for creation minus transaction costs. Termination fulfillment of the Liability gives rise to Income measured at the Consideration Value received for the part fulfilled. The Historical Cost is updated over time to depict the impairment of an Asset or if a Liability becomes onerous.

Fair Value is the price [Consideration Value] that would be received to sell [a Resource of] an Asset or paid to transfer [a Claim of] a Liability, in an orderly Transaction between Market Participants at the Measurement Date [2:6.12].

Value in Use is the present value of the economic benefits that an entity expects to derive from the Outflow of an Asset (use of an asset and its ultimate disposal) [2:6.17].

Fulfillment value is the present value of the Economic Resources that an entity expects to be obliged to transfer as it fulfills a Liability [2:6.17].

Current Cost of an Asset is the Consideration Value that would be paid for an equivalent Resource of an Asset at the Measurement Date plus transaction costs [2:6.21].

Current Cost of a Liability is the Consideration Value that would be received for an equivalent Claim of a Liability at the Measurement Date minus transaction costs [2:6.21].

Presentation and Disclosure [2:7]. Classification of elements based on shared characteristics for presentation and disclosure include the Economic Nature of the item, its role (or Function) in the entity's Activities, and how it is measured.

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[12] Defining which costs are transaction costs is beyond the scope of the Conceptual Framework. They have normally been defined in particular Standards as incremental costs, other than the transaction price [16].

4. IFRS 15 Ontology: Revenue from contracts with customers.

IFRS 15 Revenue from the contracts with customers [1] Ontology is depicted in the grey sections of Figure 2 as a specialization of CF Ontology depicted in white sections. We will continue with the primitive relation approach used in CF Ontology.

As for any standard, in the OntoUML diagram and for the ontology, we will try to answer the following competence questions for a particular standard concerning Units of Account, their recognition, and measurement: (1) What are the Units of Account and their modes and qualities specified; (2) What are transactions and other events affecting those UoAs; and (3) What are phases of the lifecycles of UoAs and their modes?

4.1. Specification of the main unit of account of IFRS 15

IFRS 15 guides how an enterprise should recognize revenue arising from a contract with a customer in four specifications' and one recognition step.

Identify the Customer Contract. The main UOA of IFRS 15 is a Customer Contract which specializes the Contract mediated by the Enterprise and the Customer[13]. The Customer specializes Other Party.

Identify Performance Obligations. Customer Contract Performance Obligations[14] specialize Obligations to Exchange. Performance Obligation mode specifies termination and transfer of the [contracted bundle of] Distinct Resources including Object termination and the manifestation of Services. The Sacrifice Belief mode specifies the assessed termination of Assets to produce the Outflow. Distinct Resources specialize Resources and are complex.

A good or service promised is Distinct if both of the following criteria are met: (a) the customer can benefit from the good or service either on its own or together with other resources that are *readily available* to the customer; and (b) the entity's promise to transfer the good or service to the customer is separately identifiable from other promises in the contract [1].

Issue 4. Case (a) of the definition requires information on the (readily available) resources and abilities of the other parties, which presently is out of the scope of the framework and standards.

In contrast, case (b) is in line with COFRIS [5], regarding transfers as productive activities, cf. [1:29] "The nature of the promise, within the context of the contract, is to transfer each of those goods or services individually or, instead, to transfer a combined item or items to which the promised goods or services are inputs." Our suggestion is to define Distinct Resources as complex resources promised.

Determine the Transaction Price. Expected Consideration specializes Right to Exchange. Consideration specializes Resource whose Fair Value is known.

The Transaction Price – the quality of the Customer Contract - is the Consideration Value to which the entity expects to be entitled in exchange for the promised goods or services in the contract. It can be fixed and specified in the contract, but also variable and dependent on

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[13] A customer is a party that has contracted with an entity to obtain goods or services that are an output of the entity's ordinary activities in exchange for consideration [1].

[14] A performance obligation is a promise in a contract with a customer to transfer to the customer either: (a) a good or service that is distinct; or (b) a series of distinct goods or services that are substantially the same [1].

different factors such as significant financing component, noncash consideration, and consideration payable to a customer. These factors will not be considered further in this paper.

Allocate the Transaction Price to the Performance Promises in the Contract. The allocation of the transaction price to the performance obligations is done based on the Standalone Selling Price[15] of the economic resources specified in the performance obligation. The Allocated Transaction Price is a quality of Performance Obligation.

4.2. Transactions and other events affecting the unit of account of IFRS 15

Recognize Revenue. Per [1]: An entity shall recognize Revenue, an Income arising in the course of an entity's ordinary activities, when (or as) the entity satisfies a performance obligation by transferring a promised good or service (i.e. an asset) to a customer.

In terms of Figure 2, the Transfer event causes the termination of a Distinct Resource and the manifestation of Services Provided to the Customer, produced by the termination of Assets. Transfer event bringsAbout reciprocal Contract Asset that triggers Benefit Increase which bringsAbout Revenue in an amount reflecting Allocated Transaction Price.

Issue 5. According to [1] "an asset is transferred when (or as) the customer obtains *control* of that asset". In the previous section, we argued that the transfer of control generally is not possible. Information about the abilities of a customer and thus the state of control is out of the scope of the framework and standards. We find that the only reliable criteria for the transfer are obtaining rights or obligations.

Issue 6. Based on the preceding analysis, it is deduced that the transferability attribute does not pertain to an Asset directly, but rather to an Economic Resource.

Complete manifestation of the Contract, Obligation to Exchange and Right to Exchange progresses as described in subsection 3.2. Their partial manifestation progresses as follows:

Performance Obligation manifestation by the Transfer event causes its termination into the Fulfilled Performance phase and bringsAbout Expectation to Consideration into the Conditional Right (to Consideration) phase and the fulfilled part of the Contract into the Contract Asset[16] phase. Contract Asset increase triggers the Benefit Increase event that bringsAbout Benefit Belief into the Revenue phase.

Revenue recognition could be modeled more directly by bringsAbout association (marked green in Figure 2) connecting the Transfer event with recognized Revenue. However, the primacy principle of the CF requires to define assets and liabilities first and to define income and expenses as changes in assets and liabilities [12, 16].

Right to Exchange manifestation by the partial Receipt event bringsAbout part of it into the Partial Receipt phase. It bringsabout the Performance Obligations (if any) into the Conditional Obligation phase and the fulfilled part of the Contract into the Contract Liability[17] phase.

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[15] The price at which an entity would sell a promised good or service separately to a customer.
[16] An entity's right to consideration in exchange for goods or services that the entity has transferred when that right is conditioned on something other than the passage of time (for example, the company's future performance) [1].
[17] An entity's obligation to transfer goods or services to a customer for which the entity has received consideration (or the amount is due) from the customer [1].

Contract Liability increase triggers Benefit Decrease event that bringsAbout SacrificeBelief into the Expense phase.

Per [1], contract assets and contract liabilities arising from the same contract are presented net as either a single net contract asset or single net contract liability for presentation purposes i.e., the contract value oscillates, but that does not contradict their separate conceptual existence.

5. Conclusion and future work

Our investigation into engineering ontologies for IFRS, using specialization of the CF Ontology, reveals significant overlaps. On one hand, standards replicate or even are inconsistent with concepts of the framework. On the other hand, there is potential for resolving issues such as mentioned in the paper and utilizing shared concepts that might be integrated into the CF Ontology.

The entrenched nature of existing practices presents a significant challenge to the development of IFRS Ontologies, transcending mere theoretical complexities. However, this very challenge enhances their practical utility and relevance. A special, more elaborate transaction pattern and tools should be introduced to facilitate specialization and improve understandability. Possibly a value cycle or shared ledger model should be used as suggested in [6].

Utilizing OntoUML stereotypes enhances the accuracy of our descriptions, though they may diverge from the traditional language of standard setters; for this, a specialized version of stereotypes is required. In [6], a set of specific stereotypes was suggested; however, it was found that their integration into the existing OntoUML plug-in poses considerable challenges.

Future efforts should focus on the methodology for developing IFRS ontologies and validating and elucidating IFRS ontologies through real and hypothetical examples. Possible ways of example generation can include those featured in OntoUML predecessors but now unsupported, GPT-4, or special software [17].

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