

# Economic Resources vs Assets

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**Abstract.** Definitions of economic resources and assets in financial reporting and different enterprise information system frameworks are analyzed. A conceptual model of economic resources and assets, grounded on UFO foundational ontology, is introduced. Some improvements of the conceptual framework for financial reporting are suggested.

**Keywords:** Economic Resource, Asset, Financial Reporting, Ontology

## 1 Introduction

In conceptual modeling of economic, accounting and financial reporting (FR), supply-chain and other enterprise business domains, the concepts of economic resources and assets, as well as their counterparts – claims and liabilities, play an important part. Analysis of different ontologies and standards show that their definitions are not consistent, and in addition, resources and assets are regarded almost as synonyms [12, 19]. The need for consistency and distinction increases in network-based market models, such as DLT enabled systems and traditional exchange platforms, governmental systems, banks, communities, and corporations of related enterprises, joint ventures and principal-agent based relationships.

In a market society, market participants – persons and enterprises, contractual groups of people and enterprises, or the society at large – enter into economic (offering, contract, resource obligation and right) relationships over objects. Economic activities of consumption, production and exchange are stipulated by economic relationships, resulting in participation actions – creation, change, termination or usage – of economic relationships and underlying objects.

Economic activities and relationships are captured in Market and Enterprise Information Systems (IS) – see Table 1. The information in the Market IS is *correlative* and *consensual* – symmetrical and agreed among the participants. The information in the Financial Reporting IS is more specific and interpreted per financial reporting standards, enterprise’s restrictions, abilities, and intentions. In the contemporary world, where the semantic interoperability is badly needed but rarely achieved, the standards and ontologies (especially in the biomedicine domains) seem to facilitate better understanding. However, standards and ontologies tend to be domain specific with a little interdomain effort. Financial Reporting as a domain, and henceforth its conceptualization, has some characteristics that could make it a base for a core ontology of business.

First, its concepts are quite universal and applicable for all industries and enterprises. Second, FR is global and coexistent with different law systems. Third, it is understood, co-developed and used by probably the largest amount of employed people covered by any standard. And finally, it has an official power of a regulation.

The objective of Financial Reporting (FR) is to provide information (useful for financial decisions) about the nature and valuation of:

- economic resources controlled by the enterprise – assets,
- economic obligations – claims against the enterprise – liabilities and equity claims,
- changes within a period in those assets and claims – income, expenses, and equity changes.

The need of the Assets (vs Resource) concept in accounting was questioned a long time ago, e.g. by suggesting an “inductive approach” in [8], and recently in [15]. Such approach assumes reporting of uninterpreted object (resource) transactions involving the reporting enterprise. In contrast, the conventional accounting is based on a functional classification of transaction effects (recognition) and valuation (measurement) in assets [16]. However, the importance of observing transactions in their consensuality and correlativity is increasing because their information is becoming more faithful, immutable and easier captured in the Market IS and Business IS by other than accounting departments. The information of such transactions should be grounding, but not substituting, the accounting *recognition* and *measurement*. A new aspect of our ontology of Market and Enterprise IS interplay is the disclosure of the enterprise-specific (but non-sensual) transaction level and provenance information to the Business and Market IS.

The requirements of financial reporting standards specify some aspects of transactions not captured by (but possibly consequent for) contractual parties and business. These aspects need to be included in the transactional information as early as possible. Such situation requires deeper understanding and integration of information systems of market, business and financial reporting, existing and potential investors and creditors of an enterprise. The needs for understanding, integration and information exchange are requiring a rather universal ontology of market and enterprise financial reporting.

The Core Ontology for Financial Reporting Information Systems (COFRIS) [4, 9, 10] is grounded on Unified Foundational Ontology (UFO) [5]. In this paper, we build on COFRIS and attempt to align different definitions of economic resources and assets in different standards and propose to distinguish between economic resources as potential and actual participants of consensual economic exchanges in the market and assets as enterprise-specific economic exchange effects and dispositions, see Table 1.

We start this paper with the analysis of resource and asset concepts in UFO, in different standards and in financial reporting, we continue with a more detailed conceptualization of economic relators and events in COFRIS and we finalize with some suggestions for the Conceptual Framework of Financial Reporting [2].

**Table 1.** Relational and Event Contexts of Market Resources and Enterprise Assets in IS

Context	Market Perspective	Enterprise-Specific Perspective	
	Consensual IS	Business IS	Financial Reporting IS
Economic Relationships	Exchange Dispositions:	Business Objects	Enterprise Control:
	Economic Offerings/Contracts		Units of Account
	Economic Claims		Liabilities and Equity
	Economic Resources		Assets
Economic Exchanges	Exchange Participants:	Business Activities	Enterprise Effects:
	Economic Offerings/Contracts		Changes in Units of Account
	Economic Claims		Changes in Liabilities
	Economic Resources		Changes in Assets
			Resulting Equity changes

← specialization →  
 ← aggregated information →  
 ← recognition/classification/valuation →  
 ← disclosure of non-sensual information →

## 2 Aspects of Economic Resource and Asset Conceptualization

The concepts of resources and assets are key in accounting but also turn out to be hard to define and distinguish. We begin with an example to illustrate the difference between the resources and assets.

A corporation develops software products (intellectual property assets) and sells MRP II Software licenses – economic resources with a market value of 200K€ per license. A manufacturing company contracts for this license type. As fulfillment of the contract obligations the software license with ID:123 (the resource) is transferred to the company in exchange for 200K€ to be used in an MRP resource role in its manufacturing activities. Company recognizes the license combined with implementation services (another transferred resource) as a product and an asset at a cost of 250K€ to be amortized (i.e. used as a resource) by 25K€ per year. Soon after the purchase and implementation, company’s manufacturing activities are discontinued due to political sanctions – an economic event affecting the asset. The asset does not have a use value anymore and did not have an exchange value initially, because the company didn’t have sublicensing rights, and the company does not have any realistic opportunity to use the license to service other companies. The value of the asset is nil, and the asset is derecognized, while it still counts as an economic resource in a market perspective. It is *held* (owned) by the company, but it is not *controlled* by the company.

We follow now with some aspects of asset and other concept definitions.

Firstly, there is a common practice of calling by the same names both the representations of objects and the real-world objects themselves. On the contrary, we may design different names for these two cases, and call the elements of enterprise financial statements – assets and claims, and the objects of the enterprise they represent – economic resources and claims. Our analysis shows that the accounting frameworks [12]

refer to both meanings with the same name, and that different enterprise related standards [11, 17] use terms assets (liabilities) outside the context of representation.

Secondly, there is a need to distinguish between the relational and event [22, 23] context, i.e., between *dispositions* and objects participating in the *manifestation* of such dispositions, e.g., ‘widgets [held for sale]’ vs ‘transfer of widgets’. UFO [6] describes Resource as a role that an object plays [or could play] in an action needed to make progress towards the goal. More specifically, Resource is defined as a type-level entity, capturing the role of an (agentive or non-agentive) object in the scope of a material relation or in the scope of an event [6]. The object type is restricted to an “allowed type”. In FR resources are represented as rights over the objects [2], see Table 2.

Thirdly, there is a need to distinguish the market and reporting enterprise perspective. In the consensual and correlative market perspective, dispositions of resources (claims) are entitlements [14] – general *rights* (resp. disablements – general *claims*) held by some generic agent over an object. The allowed type and rights and expected value are constraining the allowed value-producing activities and the role for the object. In the reporting enterprise perspective, assets are dispositions of resources *controlled* by the reporting enterprise.

**Table 2.** Relational and Event definitions of Market Resources and Enterprise Assets

Context	Market Perspective	Enterprise Perspective
<b>Eco-nomic Relators</b>	<b>Exchange Disposition:</b> <u>Economic Resource</u> is a Right that has the potential to produce Economic Benefits [FR: 2]	<b>Enterprise Control:</b> <u>Asset</u> is a present Economic Resource controlled by the Enterprise as a result of past events [FR: 2]
<b>Eco-nomic Events</b>	<b>Exchange Participants:</b> Resource is a Role of an Object that participates in an (Creation, Termination, Change, Usage) Action. [UFO: 6]	<b>Enterprise Effects:</b> <u>Income</u> is increases in Assets, ... <u>Expenses</u> are decreases in Assets [FR: 2] Resulting in <u>Equity changes</u> [FR: 2]

*Control* is a valuable capability of the reporting enterprise “to direct the use of the economic resource and obtain the economic benefits that may flow from it” [2]. Thus, Assets *inhere in* the reporting enterprise. Asset’s disposition, enough (*assez*) to play a role in the controlling enterprise activity:

- is constrained by the rights, abilities, regulations, rational intentions of the enterprise (or – as was demonstrated by the example – not even recognized);
- is increased by the enterprise’s synergies in combination with other possibly unrecognized assets or legal rights and tax benefits;
- accumulates enterprise’s economic experience of asset type or an item;
- is protected from unauthorized use by other market participants.

In UFO analysis [6] resource is also defined as “an asset owned or controlled”, while financial reporting has the opposite definition – an asset is a resource controlled by the enterprise as a result of past events [2]. However, there is almost no difference, because the first definition says that the resource is something of value for at least one market participant [20], but the second says that a resource valuable in the market is an asset for the reporting enterprise, if the resource is controlled by the enterprise [2]. A financial reporting standard [1, IFRS 13] also implies that the economic resource is an asset

of a market participant that has an ability to generate economic benefits by using the asset in its *highest and best use* or by selling it to another market participant that would use the A in its *highest and best use*.

Disposition in the case of asset is characterized by *control*, that is understood differently in different frameworks. For example, the employment contract mentioned in [6] as an asset, at inception is not recognized as an asset for Financial reporting, because the *conditional commitments* of the contract are rights and obligations to exchange, and valuation of such contract generally is equal to zero, i.e., control is obtained ‘as a result of past (expenditure) events’, but not by signing the contract. As identified in IAS 38 [1], an enterprise does not have enough control over its skilled workforce (and the training that has created those skills) to meet the definition of an asset.

REA – ISO/IEC 15944-4:2015 [15] does not define assets and thus the recognition criteria, intentions and valuations of reporting enterprise. However, the assessment of asset disposition (but not forecast) perhaps is the most important task of accounting and financial reporting. Obligations and claims are described in REA [15] as entities optional to “ontological completeness”. For these reasons REA is sometimes regarded as an “operational ontology” [21] and suggested to be augmented by concepts relevant for accounting [18].

Fourthly, in extension to the *recognized* resources and claims for financial reporting, there are *intentional* resource and claim transfer participations and dispositions disclosed, committed in offerings and contracts. The *valuations* for such items may not be exact but are instead estimated, or dependent on market, timing and uncertainty. Such information is *partially* disclosed in the FR Notes of financial statements and not enough conceptualized.

Such extensions and UFO-S [13] patterns also provide grounds for their relation to analogue Enterprise Architecture concepts. The OMG Business Motivation Model (BMM) [17] specification provides a scheme or structure for developing, communicating, and managing business plans in an organized manner. The standard introduces asset and liability concepts but claims that they are real-world objects without “accounting flavor” (of representation). Of course, these are *planned* assets (liabilities) and moreover, in a state long before any contracts. However, we do not find any differences in the meaning, classification and treatment of the assets of BMM vs FR, except that *current assets* are called *resources*. The assessment described in the standard, could be well enough aligned with the assessment required for financial reporting. As we argued above, the valuation aspect may not be exact at the early stages, and the legal aspects are implicit, assuming ownership, while it may be important even for a business plan to decide between the lease and acquisition of fixed assets. BMM *Liability* definition says that “it reserves resources needed to meet commitments”, in FR is not a liability but an (equity) *provision* but could be generalized to align with financial reporting.

Fifthly, the assets (liabilities) and the economic resources (claims) represent social relationships and their exchange among the participants of the market society. In recent accounting frameworks, an *economic* resource is “a right that has the potential to produce economic benefits” [2], while in the REA Ontology presented in ISO/IEC 15944-4 [15], and in other standards, social, legal position and derivative aspects are not emphasized. In UFO the rights aspect is elaborated by UFO-L sub-ontology [14].

Sixthly, while some assets are named as property, e.g., *intellectual property*, there is a difference between property rights and assets, *economic resources* and [proper] resources. The difference lays in the control and *valuation*, i.e., economic resources are valued resources, and assets are controlled and valued property rights.

And finally, it is important to distinguish resources and claims, and assets and liabilities as simple concepts in contrast with groups (complexes) of these entities, that constitute a disposition or transfer bundle, e.g., over a physical object, contract or business.

ISO 55000:2014 Asset management [11] defines an asset as an “item, thing, or entity that has potential or actual value to an organization . . . Value can be tangible or intangible, financial, or non-financial, and includes consideration of risks and liabilities. It can be positive or negative at different stages of the asset life”. In this case, the asset is regarded as a group of rights and obligations, otherwise the meaning is close to financial reporting elements.

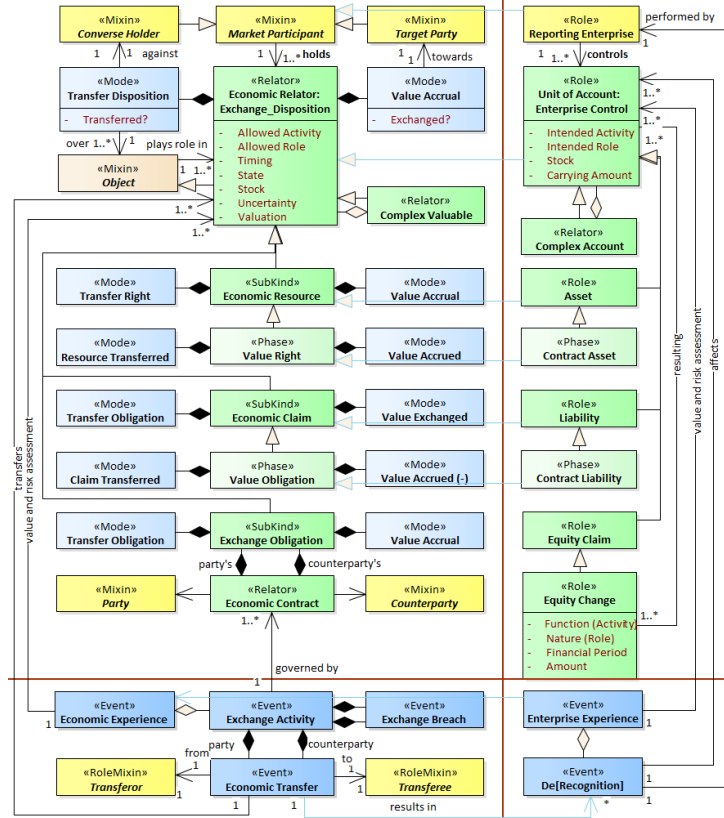
Similarly, in OntoREA [18] “the Economic Resource is typified into Phase classes according to the economic value specialization condition for distinguishing between Asset, Liability, Equity and Claim whereas this condition is considered as an intrinsic property of the resources”. Considering that in FR assets are resources controlled by an enterprise, but liabilities and equity are claims against an enterprise, economic resources and claims, and assets and liabilities are sub-kinds but not phases of a *simple* economic relationship. The valuation specialization condition though is valid in distinguishing a *residual* class of a complex relationship formed by a group of rights and obligations, also called *unit of account* [2]. The *offsetting* of rights and obligations is the exchange of these rights and obligations.

### 3 COFRIS. Economic Resources as Exchange Dispositions

For modeling economic relationships, a *reciprocal* social relator [13] called *Economic relator* is introduced that mediates a party – market participant – with the society and other parties. Economic relator captures offering, contract, claim and ownership grounded dispositions to exchange economic resources (resp, claims) for value rights (resp, obligations). The left side of the Fig.1 depicts the *consensual* market perspective of an Economic Relator in a relational context. Thus, it shows the concepts agreed (or offered to be agreed) among the contract parties (or within groups, in the market).

More specifically *Economic relator* represents *Exchange Disposition of a party to accrue value by transfers of rights (obligations) over an object that fulfil the goals of a target party and implied realization of the accrued value by the target party transfers that fulfil the goals of the party.*

For example, a (present and historical) ownership (against any converse holder), tenure and value of a real-estate object are listed in a public registry. The record represents the object, rights and obligations over the object, and thus the allowed activities of a holder, e.g., to use the object as an economic resource in the activities of an enterprise, to use it as a collateral or residual in creditor and owner relationships, to sell it, to insure it, to incur a claim to pay property tax, etc. The relationship is consensual and correlative with any market participant. From an enterprise perspective, this *resource* would be recognized as an *asset* to be used in production activities for the next 50 years.



**Fig. 1.** COFRIS. OntoUML diagram for the Relational context. Market participants in yellow, Economic events in blue, Economic relators and their roles in green.

*Valuation* of an economic relator can be based on *Transaction price* that is the contracted value to be received (resp. paid) for the transfer; or *Market price (Fair value)* that is the value that could be received (paid) in the marketplace for similar transfer; or disclosed *Historical cost* as a transaction price.

*Economic resource*, a sub-kind of exchange disposition, represents rights over an object that can be transferred (used) in exchange for value accrual – a right to receive value. Assuming that rights are allowed actions for allowed objects in allowed roles, we reconcile the above definition in terms of the one in [6]:

*Economic resource* is an *allowed role* played by an object in a transfer to make progress towards a goal of accruing value in an *allowed exchange activity*. The allowed activity and role are determined w.r.t. allowed object type and marketplace, disregarding the abilities of a particular holder.

A transfer (a usage) should be physically or technologically possible, legally empowered (permissible), and financially feasible w.r.t. accrued value. *Converse party* for a resource is a society or a debtor. *Target party* for a resource is a target customer community [13] – ready to pay the price. A target party may be the holder itself – ready to incur the cost. *Value right* is accrued by the transfer of an economic resource and is

to be realized after complete fulfillment or applied in a settlement. Thus, the timing of a value right is within the production or exchange activity.

*Economic claim*, a sub-kind of exchange disposition, represents a duty or responsibility to transfer economic resources to which the market participant is legally or constructively bound (to make a settlement action). *Value obligation* is accrued by the transfer of an economic claim (an action different from a settlement).

An Economic resource or claim play the role of *Valuable*. *Complex valuable* is a group of resources and/or claims which are offered, agreed, fulfilled, settled, transferred, or maintained together.

*Exchange obligation (or commitment)*, a sub-kind of exchange disposition, represents an agreed promise to transfer a resource (resp, claim) in exchange for a value right (resp, obligation) accrual. Economic commitment stipulates its fulfillment by transfer of resources or claims and evolves into resource or claim during its fulfillment.

In the conceptualization of *Economic commitment*, we ground on UFO-C [6] and UFO-S [13], where a social commitment is a mode, but not a relator. We represent a social relator through its commitment mode, implying the correlative claim. *Social relator* [13], representing two sides of the same coin – social commitment and correlative claim, is consensual – agreed between and among the parties. In contrast, a *Commitment (claim) offering*, another sub-kind of exchange disposition, is a commitment (or claim) that is *offered* but not yet agreed. Social commitment in our case is a UFO-C *Complex closed appointment* and is composed of a number of commitments that should be *realized* by executing a number of actions (transfers) of a particular type under certain types of situations, characterized by *Timing* and *Uncertainty*.

Commitment provides meaning of the fulfillment and per UFO-S assumes providing benefit for a counterparty. *Economic commitment* assumes a *return (a revenue)* for providing a benefit (sacrifice) – a value claim of a party. Thus, economic commitment is a conditional commitment to exchange a fulfillment for a value. *Service* is a valuable and agreed interaction; thus, it requires a commitment.

*Economic contract* integrates party's and counterparty's obligations (commitments), governs their fulfillment, value exchange (realization) and settlement. Contract is a reciprocal [13] relator comprised of conditional commitments of the parties. It assumes the exchange of value accrual of a completed fulfillment of one party for enforcement of unfulfilled commitments of the other party and settlement of the latter. Reciprocal (contract) relators are comprised of two sub-relators including a party's commitment and a counterparty's commitment, and thus each sub-relator can be depicted by its commitment, whereby the correlative claim is implied [9].

The right part of the Fig.1 represents Enterprise perspective on the economic relationships (and their changes) in which the reporting enterprise is involved. Enterprise exchange control intentions and capabilities are specializations of resources (resp, claims) and are captured and possibly recognized for financial reporting as assets (resp, liabilities and equity claims). The changes in assets and liabilities resulting from economic exchanges and other events are represented by income, expenses and other equity changes. Value rights (resp, obligations) are represented by contract or work in progress assets (resp, liabilities).



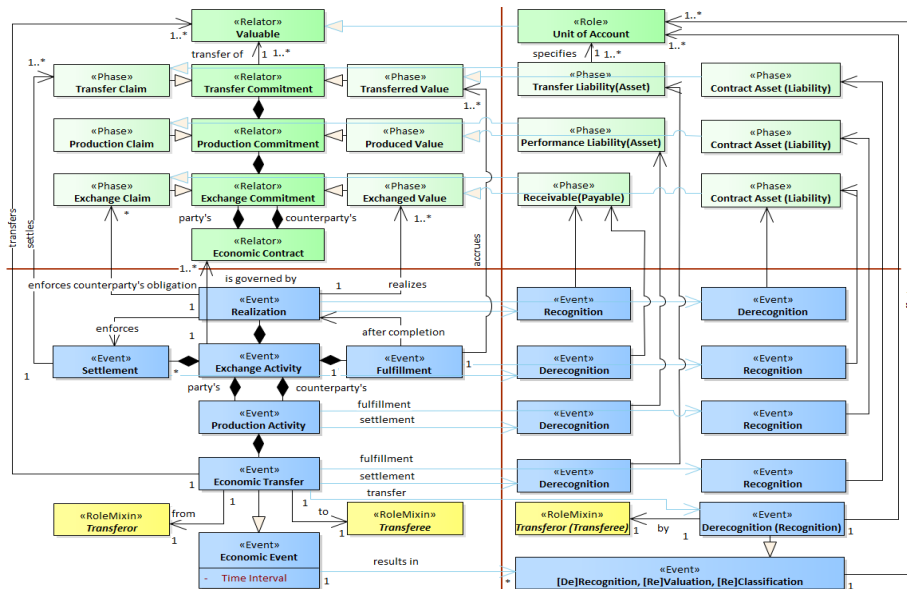
*Assets* (resp, *Liabilities and Equity*) are present resources (resp, claims) controlled (resp, indebted and unavoidable) by the reporting enterprise, as a result of past economic events which form their *Historical cost* [2].

Assets, Liabilities and Equity (provisions) are multi-layer classified by intended activities, such as *held for production or sale*, by roles items play in these activities such as *raw materials, equipment and finished goods*, timing (current or non-current) of the activities, risk assessment and valuation method (measurement basis).

*Equity changes* resulting from asset and liability changes caused by transfers or other economic events, classify the performed activities by *Function*, such as *administration, sales of goods and rendering services, and production*, and the roles items played in performed activities by *Nature*, such as changes in *raw materials, finished goods, depreciation, and employee benefits*. *Carrying amount* represents the present valuation of assets (liabilities). While all exchanged resources (claims) are enterprise asset (liability) changes in Financial reporting, some are regarded as *momentarily* [12], i.e., are transferred (consumed) as received. Momentarily assets (liabilities), such as services, increase (decrease) carrying amount of affected stock assets (liabilities or equity).

#### 4 COFRIS. Economic Resources as Exchange Participants

In COFRIS we define *Economic exchange* as an interaction of two market participants (parties) whereby a party accrues value by transfers of rights (obligations) over an object that fulfil the goals of a target party and implied realization of the accrued value by the target party transfers that fulfil the goals of the party. The Economic event context of economic relationships is depicted in Fig. 2.



**Fig. 2.** COFRIS. OntoUML diagram for the Event context. Enterprise perspective is depicted for a *transferor*. The correlative events and elements for the *transferee* are shown in brackets.

We need to make an addition to the relational contract structure, in order to specify the activities of the party and counterparty aimed at fulfilling a specific goal – a product. While particular transfers are delivering resources, they constitute the means for achieving such a goal. In our example in section 2, the MRP software license, and the implementation service were the means of achieving a goal – a working system. In an Enterprise context, a specific Asset and a Revenue is recognized, when achieving a production goal. Generally, achieving several such goals may be required before the realization of the value exchange.

*Economic event* affects Economic relators and includes *Economic Exchange activities* and other events. *Exchange activity* is governed by an economic contract and comprises of *Production activities*, performed by a party and a counterparty of a contract, to achieve product goals. Production activities, in turn, comprise *Economic transfers*.

In short, economic transfer is a fulfillment of a commitment of providing services or delivering goods in exchange for receiving value.

More specifically *Economic transfer* is a transaction whereby in exchange for accrued (resp, received) value, and in fulfillment of obligations (resp, settlement of claims), the rights (resp, obligations) – over an object held by the transferor:

1. are used for the benefit (resp, sacrifice) of the transferee; and/or
2. are terminated and equal rights (resp, obligations) held by a transferee are created.

In accordance with Hohfeld’s theory of rights and its application in e.g. [20, 14], the economic resource includes a privilege to use an object for a holder’s benefit or stay idle. The agreed use of an economic resource for a counterparty’s benefit is a service and a transfer of a claim-right [20]. To convey the rights or obligations over an object the holder needs to hold power rights and optional converse holder’s consent.

We distinguish *service* in a broader sense, that is any action specified by commitment, and in a sense of financial reporting. Financial reporting regards transfer of power (to use, to transfer power) as “goods” delivery, and actions that do not transfer power (but transfer usage of the rights) as “services”. A well-known example is a difference between purchase of a car, lease of a car (“goods” transfer) or using a taxi (“services”).

Initially, both parties perform the *Fulfillment of Transfer commitments* and accruing value, that leads to the fulfillment of *Production commitments* and finally to the fulfillment of *Exchange commitment*. The party who first fulfils the exchange commitment *realizes* the *Exchanged value* in exchange for unconditional *Exchange obligation* of the counterparty and becomes a creditor. The debtor performs the *Settlement of Exchange, Production and Transfer claims*.

Exchanges in the market and other events involving the reporting enterprise result in an enterprise asset and liability (and their change) recognition and derecognition, valuation and classification. By recognition we understand making the information about controlled resources (claims) available to financial reporting. Other events, circumstances and conditions in the market and enterprise, such as the passing of time, impairment, price changes, contract and claim breaches etc., may result in *revaluation* and *reclassification* of assets, liabilities and equity of the enterprise.

## 5 Preliminary Suggestions to IASB Conceptual Framework

In March 2018 IASB released the revised version of the Conceptual Framework (CF) for Financial Reporting [2]. Our goal is to be reasonably compliant with the framework in engineering COFRIS. Another goal is to see where the CF could benefit from our ontological analysis. In addition to a need for information systems based ontological approach covering the market and enterprise entities, we list the following suggestions:

Firstly, Financial reporting should aggregate *transaction-centric* plus enterprise-specific, but not exclusively *enterprise effect-centric* information. Thus, an economic exchange should be introduced as a unifying concept. Aggregating consensual transactions for Financial reporting, instead of accounts, would provide additional opportunities for comparability with other enterprise processes, possibilities of application of process mining methods, disclosure of event-specific information [23] and insights into the value co-creation processes.

Secondly, competitive *consensuality* – meaning that among parties there is an agreed shared ledger of contracts and their fulfillment, including provider and customer resources (claims) and required asset (liability) information – should be a quality aspect, even within the old context of audit reconciliations. Consensuality should be added to comparability, verifiability, timeliness, and understandability as a qualitative characteristic that enhances the usefulness of information that both is relevant and provides a faithful representation of what it purports to represent and reduces *reporting uncertainty*.

Thirdly, *correlativity* in economic relationships should be a standard-setting principle. The important intermediate resources (claims) of exchange, activities, and transfer should be defined. When correlativeness and consensus are not regarded as a principle, deficiencies emerge in standards already discussed by us elsewhere, such as those concerning leases [10], contract assets and revenue [3].

Fourthly, in FR Assets (Liabilities) are conceptualized only as *recognized*, while they and other economic relators may also be intended, planned, offered, contracted, suspended etc. Some of these states need to be disclosed in the FR Notes of financial statements, thus they also need to be conceptualized in the framework.

And finally, a unifying concept of an *Economic relator* should be introduced. A partial effort in the framework has been made by defining the concept of a Unit of Account as a group of related rights and/or obligations. The economic relator is a most atomic building block that involves the value relationship, from which more complex economic relators such as the contracts, investment portfolios, cash-generating units, and businesses can be built.

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## References

1. IASB homepage, <http://www.ifrs.org/issued-standards/list-of-standards>, IASB, 2019
2. IASB Conceptual Framework for Financial Reporting, IASB, 2018.

3. Weigand H., I. Blums, J. de Kruijff: Shared Ledger Accounting – Implementing the Economic Exchange Pattern. *Journal of Information Systems*, 2019 (Submitted).
4. Blums, I., Weigand, H.: Towards a core ontology for financial reporting information systems (COFRIS). C. Debruyne et al. (Eds.): *OTM 2017 Workshops*, LNCS 10697: 302–306, 2018
5. Guizzardi, G.: *Ontological Foundations for Structural Conceptual Models*, Telematics Instituut Fundamental Research Series, No. 015, ISSN 1388---1795, The Netherlands (2005).
6. Azevedo C.L.B. et al: Modeling resources and capabilities in enterprise architecture: A well-founded ontology-based proposal for ArchiMate. *Inf. Syst.* 54: 235-262 (2015)
7. Guizzardi, G., et al, *Endurant Types in Ontology-Driven Conceptual Modeling: Towards OntoUML 2.0*, ER 2018, Xi'an, China.
8. Schrader, W.J. "An Inductive Approach to Accounting Theory," *Accounting Review*, Vol. XXXVII (October 1962), pp. 645-49.
9. Blums I., H. Weigand: Towards a Reference Ontology of Complex Economic Exchanges for Accounting Information Systems. *EDOC 2016*: 119-128
10. Blums I., H. Weigand: *Financial Reporting by a Shared Ledger*. JOWO 2017
11. ISO 55000:2014 Asset management — Overview, principles and terminology.
12. FASB Exposure Draft. Statement 8—Conceptual Framework for Financial Reporting, 2016
13. Nardi, J., et al., *Towards a Commitment-based Reference Ontology for Services*, *EDOC*, 2013.
14. Criffo C., Almeida, J.P.A., Guizzardi, G., *From an Ontology of Service Contracts to Contract Modeling in Enterprise Architecture*, *EDOC 2017*.
15. ISO/IEC. *Information Technology — Business Operational View — Part 4: Business Transactions Scenarios — Accounting and Economic Ontology*. ISO/IEC FDIS 15944-4: 2015.
16. Ijiri Y., *Theory of Accounting Measurement*. American Accounting Association, 1975.
17. *Business Motivation Model Specification*, version 1.3, OMG 2015.
18. Fischer-Pauzenberger C., W.S. A. Schwaiger, *The OntoREA Accounting Model: Ontology-based Modeling of the Accounting Domain*. *CSIMQ 11*: 20-37 (2017).
19. Sales T.P., et al, *Ontological Analysis and Redesign of Risk Modeling in ArchiMate*, *EDOC 2018*, Stockholm, 2018.
20. Andersson B., M. Bergholtz, P. Johannesson: *Resource, Process, and Use – Views on Service Modeling*. *ER Workshops 2012*: 23-33.
21. Melse E., *The Financial Accounting Model from a System Dynamics' Perspective*, [mpra.ub.uni-muenchen.de](http://mpra.ub.uni-muenchen.de), 2006.
22. Guizzardi G., Wagner G., de Almeida Falbo R., Guizzardi R.S.S., Almeida J.P.A. (2013) *Towards Ontological Foundations for the Conceptual Modeling of Events*. *ER 2013*.
23. Guarino N., Guizzardi G. (2016) *Relationships and Events: Towards a General Theory of Reification and Truthmaking*. *AI\*IA 2016*. LNCS, vol 10037. Springer, Cham.