

Ascribing Exchange Value

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Abstract. There exist several forms of the value of notion in the literature, including use value, economic value, exchange value, and market value. In this paper, we discuss how exchange value is related to use value by proposing a definition that defines exchange value in terms of compensations of use values.

1 Introduction

This paper addresses value ascription, investigating how actors can measure and ascribe value to objects. An example could be a taster who samples a glass of wine, ascribes some value to it according to a value structure, and compares the value with those of other samples. For some time, there has been research on the development of ontologies for value ascription in an enterprise modelling setting [4, 1]. One question in this research is whether the value ascribed is ascribed to the object being evaluated, the evaluator, or the relationship between the object and the evaluator. In [4] it was proposed that value is ascribed to the relationship, which is modelled as a relator [4]. Another question concerns the notion of context, i.e., the situation in which an object is used, and its relation to value ascription.

In [1] some questions were answered in the form of an ontology that included the notion of context as a key component. A limitation of the work done in [1] was that it only addressed use value. This limitation reduces the applicability of the ontology in a value network setting, which is primarily concerned with economic and exchange values.

Within economics, several kinds of value have been investigated. One of these is use value that concerns the value an actor receives in the use of an object. Another kind of value is economic value, which has been defined as "*the maximum amount a consumer is willing to pay for an item*" [5]. Similarly, Gordijn and Akkerman state that "... a rational actor is only willing to exchange an object, O_{out} , if it obtains another object O_{in} in return. Moreover, it must assign to object O_{in} in a higher economic value than to object O_{out} " [3]. A third kind of value is market value, which has been defined as "*the price an asset would fetch in the marketplace*" [6], thus depending on demand and supply. While economic value is relative to a single actor, market value is relative to a market, i.e., a group of actors. The term "exchange value" can be used to refer to either economic value or market value.

In this paper, we propose an extension of the work started in [1] for the purpose of ascribing exchange value. The extension relies on the view on economic/exchange value by Gordijn and Akkermann, [3], but we have changed the perspective from the buyer to the seller, thereby considering not what someone is prepared to maximally pay or sacrifice, but instead what someone requires minimally to receive in compensation. Thereby, we are able to provide a conceptualization of exchange value that relies on use value as a basis.

The paper is structured as follows. Section 2 offers an overview of the work in [1], while Section 3 contains the extension to include exchange value, and Section 4 lists some open issues.

2 Value Protocol Ontology

An agent is an enduring that can carry out actions and have intentions. An agent can play two different roles in a value ascription: it can be the one for whom a value is ascribed to a value object, and it can be the one who makes the value ascription. These two roles are modelled by the associations for and by in figure 1. An agent performs a value ascription by assessing how well the qualities and dispositions of a value object fit the needs and wants of herself or some other agent.

A value object is an object to which an agent can ascribe value. As argued in [4], in principle any object can be a value object, including physical objects, mental states, events, and actions. But we will here only consider value objects as substantials, meaning that a value object has identity and persists over time. Typical examples of value objects are goods, services and social relationships based on these, such as orders and invoices.

Through a value ascription event, an agent ascribes a value to a value object. This value depends on properties of the agent as well as circumstances around the agent. In order to capture these, we introduce the notion of a value protocol, which consists of three components: (1) A context frame consisting of a set of contexts that specify in which circumstances a value object will be used; (2) A value structure consisting of a set of value dimensions that specify which kinds of value that are to be considered in a value ascription; and (3) A comparison frame consisting of a set of value objects that provide a base-line for a value ascription.

Value depends on the context, or contexts, in which a value object is intended to be used. For example, a sports car may offer much status when used in the context of driving to work but much less status when used for driving on a countryside vacation. Intuitively, a context is a state of affairs with a hole that leaves some relationships under specified. When the hole is filled by a value object, the result is a state of affairs. Thus, ascribing value to a value object in a context means to evaluate a state of affairs. The class VO Value Ascription represents value ascriptions that take into account a context frame, consisting of a set of contexts.

The value ascribed in a value ascription is a value quale. In the simplest case, it is just a scalar, e.g., a utilitarian value could be described by a single number. In more complex cases, a value quale belongs to a value structure that is a multi-dimensional space. Value ascriptions are justified through an analysis of the fits between value objects, contexts and the needs, preferences, and desires of agents.

It is not the case that value can be ascribed in an absolute sense. Instead, value ascriptions are about comparing value objects along one or several value dimensions. As a consequence, performing a value ascription requires that in advance some set of value objects to be valued and compared have been identified. This can be addressed by introducing a comparison frame, i.e., a set of value objects that provide a baseline for a value ascription. The choice of comparison frame will typically have a significant effect on the value ascribed by a value ascription. For example, the same computer may be ascribed a high value on convenience when compared to a set of legacy computers but a low value when compared to a set of up-to-date premium computers.

3 Extended Value Protocol Ontology

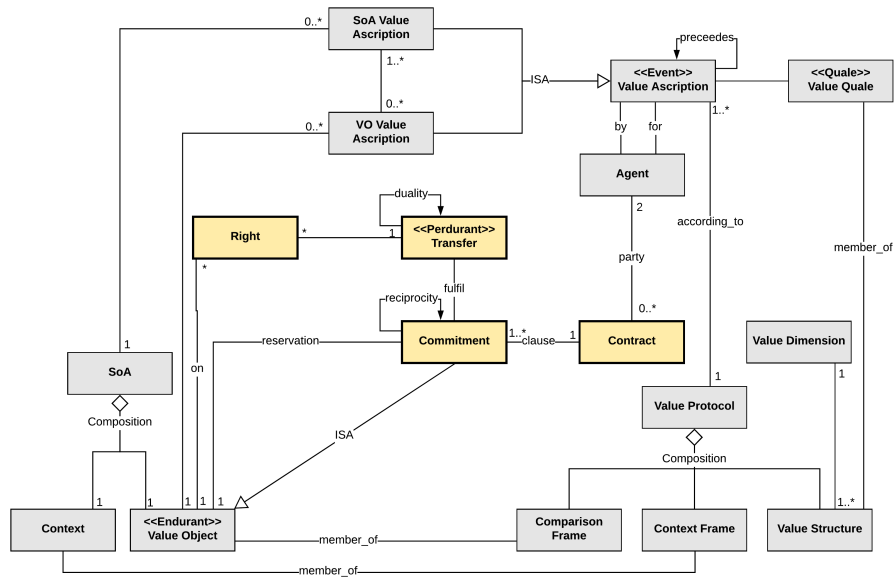


Fig. 1. An Ontology for Value Ascription

In this paper, we propose an extension of the ontology to also accommodate the notion of exchange value. As stated the extension relies on views proposed

in [3] and [2]. When discussing value exchanges, [3] states that the goal behind the value exchange modelling construct is to "...model a legal transfer of value objects." Furthermore, it is stated that "A value exchange may coincide with a flow of a physical product or information if these are of value to a stakeholder" and "... a value exchange expresses a change of ownership (as an economic result, not a process outcome)...". We interpret those quotes to say that an economic exchange is concerned with the transfers of rights. The transfer of rights expresses the legality of coincidental transfers of objects on a non-legal level. From REA [2], we note the pattern where a duality of value transfers (an exchange) fulfills some reciprocity of economic commitments by economic agents.

The action theory of exchange (ATE) is supportive of the view that an economic exchange is a duality of transfers [7]. Citing an example from the paper, exchange is formulated as "*Julie transfers her bike to Paul and, in exchange, Paul transfers his money to her*".

As in REA an agent acts as a party in a contract. Parties in contracts are always economic agents in the REA sense. The cardinality constraint is that a contract is always related to two agents. This is a limitation as real-world contracts often include more than two parties. This is, however, usually solved by means of sub-contracts. A contract is made up of one or several clauses expressing the parties' commitments. In other words, a contract contains promises that the parties related to the contract commit to do something. A commitment may concern the reservation of a value object. A reservation of a value object means that it cannot be reserved in another commitment in the contract. The reservation indicates which value object the commitment is about. Each commitment stands in a reciprocal relationship with another, i.e., the duties and privileges of one party correspond to some duties and privileges of the other party. Commitments are fulfilled by transfers of rights on the reserved value object from one party (the rights holder) to the other. A pair of transfers stands in a duality relation with each other. That is, through the transfer of a right a party satisfies an obligation to respect the other party's claim thereby fulfilling a duty to honour a privilege as the party has committed himself to. The duality relation implies that the other party also satisfies his corresponding obligation. As stated, what is transferred between the agents are rights (e.g. ownership or lease) on a value object. Exchanges always concern transfers of rights. Note that we consider a commitment to be a value object in itself. This means that a commitment (essentially a promise) is an object that can, as any value object, be ascribed a value. Furthermore, it may also be reserved as a value object in a contract and the rights on it can be transferred. Based on the extended ontology, we can now define exchange value as follows.

An exchange value for a rights holder R regarding a value object VO is an acceptable use value of a compensating value object VO that R demands in order to enter a contract that includes a commitment to transfer rights on R's VO as well as a commitment to transfer rights on a compensating value object C to R

In [1] the value protocol was introduced as a conceptual structure central for value ascription. It was exemplified as a tabular structure with value objects in the leftmost column and contexts in the other. For example, in Figure 2 there is but one value object (Ford Focus) with three contexts (at work, on vacation, in exchange). The third context, in exchange, represents the extension of the ontology presented in this paper. A value in a cell in the table is a quale (see Section 2). It is the value ascribed to a value object for its use in the context indicated as a column header. For example, the value of a Ford Focus for use in the context 'at work' is here $\langle \text{fun}, 9 \rangle$ i.e., on the value dimension 'fun' the value object has the value 9 (without going into detail on how to understand the scale). The context 'in exchange' represents the value of the value object

	Context		
Value Object	at work	on vacation	in exchange
Ford Focus	$\langle \text{fun}, 9 \rangle$	$\langle \text{fun}, 5 \rangle \dots$	$\langle \text{pleasure}, 7 \rangle$

Fig. 2. Extended Value Protocol

as used in an exchange similarly to the other contexts. In the example table, it is stated that in exchange the value of the value object is $\langle \text{pleasure}, 7 \rangle$ but what is the meaning of this value ascription? There are some alternatives: it can mean that the exchange of the car in itself is rather pleasurable or it can mean that getting rid of the car is pleasurable or it can mean that, similar to a price tag, it is what the owner of the car expects in return for transferring the ownership of the car to some other agent, which agrees with the above definition. The extension of the ontology is able to reflect this latter view. The meaning of a value ascription in an exchange context is the use value the owner of a value object demands in order to enter an agreement resulting in the transfer of his rights on it. Motivating his calculations is the expected use value of the value object he receives in the exchange.

4 Open Issues

The extension of the value ascription ontology to also include exchange value is straight forward. It hinges on exchange value being expressed in terms of

use value and elements of the REA business ontology. Nevertheless, there are a number of open issues in the approach taken, including:

- Are rights value objects in themselves? What is their ontological status?
- What does it mean to use a commitment? In the ontology we say that a commitment is a value object and as such it can be given a use value. But how is it used? Is it to neutralize an obligation or is it to reserve another commitment or something else?

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