Understanding Accounting from the REA Perspective

Pavel Hruby and Christian Vibe Scheller
REA Technology
http://reatechnology.com

Abstract

This position paper compares the dynamic accounting theory by Henning Kirkegaard with the REA ontology. Kirkegaard's dynamic accounting theory is a significant contribution to describing how a balance sheet can be constructed from the REA model.

REA Contributions to the Accounting Theory

The REA model (resources, events, agents) is an entity-relationship view of accounting models and an ontology for business systems (Geerts and McCarthy 2000, 2002).

The REA ontology adds two important aspects to traditional double-entry bookkeeping (Partridge 2002):

Firstly, the REA model recognizes the non-monetary element of an economic event. A well-known inadequacy of double-entry bookkeeping is that the ledger is restricted to monetary entries. The REA model remedies this shortcoming, although it was already suggested by Manzoni in 1534 (Partridge 2002). In the REA model, there is no requirement that economic events record the monetary values of economic resources, and the REA model can therefore express exchanges where money is not involved, such as barter trade.

Secondly, the REA model explicitly recognizes two parties in every exchange transaction. In double-entry bookkeeping, the proprietor – the owner of the books – is implicit; the trading partners are referred to indirectly as owners of the accounts across which the entries are posted, such as creditor and debtor. Making the parties to the transaction explicit becomes essential in many situations: in the supply chain, where a producer or a dominant trading partner is interested in monitoring the transactions of other partners in the chain; in internal trading in which trading partners are both parts of one entity; and in modeling cooperatives, where a group of peers is interested in modeling the cooperative a whole, as well as each member's individual contribution to the cooperative.

Dynamic Accounting by Henning Kirkegaard

Danish economist and professor of accounting Henning Kirkegaard published in 1997 a book "Improving Accounting Reliability" (Kirkegaard 1997), where he established the foundations of a new accounting theory. While traditional accounting theory considers balance sheet as a tool for writing a financial history, Kirkegaard proves that by using proper definitions and semantics of accounting concepts, the balance sheet contains information for reliable prediction of future payments. Consequently, the balance sheet contains reliable data, based

on measurements, not estimates, about future solvency or insolvency of a company. It should be noted that, unlike the REA model, Kirkegaard's dynamic accounting theory stays within the limits of double-entry bookkeeping.

The dynamic accounting theory results in a new definition of balance sheet, containing accounts at four levels, based on the time point of financial measurement:

- Accounts for expected transactions (plans, budgets, quotations)
- Accounts for agreed transactions (orders, contracts)
- Accounts for realized transactions (invoices)
- Accounts for paid transactions (payments)

Balance sheet in the traditional accounting contains only the last two levels of accounts, for realized and paid transactions, and also the accounts for owner's equity.

Kirkegaard's scheme does not contain accounts for owner's equity, because it can always be calculated as a difference between assets and liabilities, and because from the semantic point of view, the concept of owner's equity is "unclear and misleading, and has therefore been directly damaging on several occasions in the past. Financial statements have often given the impression that enterprises are perfectly sound, only for the same enterprises to suspend their payments and be declared bankrupt shortly afterwards". Kirkegaard concludes that "the concept of owner's equity belongs to the same category as astrology and other pseudoscientific practices, so it should be abandoned in accounting theory and practice as soon as possible. Indeed, we believe that its use should be forbidden by law." (Kirkegaard 1997, page 207).

The Dynamic Accounting Theory and the REA Ontology

Kirkegaard's dynamic accounting theory contains a concise specification of balance sheet, which might represent a significant contribution to understanding accounting practices in REA terms. The following table summarizes how Kirkegaard's balance sheet can be expressed using REA concepts.

Concept of the dynamic accounting	Concept of the REA ontology
Expected transactions	Not-fully-specified contracts or groups of economic events
Agreed transactions	REA commitments
Realized transactions	Unrequited economic events
Paid transactions	Requiting economic events

For modeling **expected transactions** using the REA concepts, at least two approaches have been suggested: to model expected transactions as not-fully-specified contracts, for example, as contracts related to a group of agents (Jesper Kiehn, personal conversation), or as groups of economic events (Guido Geerts, personal conversation). According to (Haugen 2007, page 9), there might be several levels of expected transactions, demand, supply, need, ability, and potential, with various degrees of probability of fulfillment.

Agreed transactions can be modeled as REA commitments. However, as agreed transactions must provide reliable information about the future solvency of a company, they must also include the terms of the contract and conditional commitments. For example, for contracts that specify discount applicable only if the payment is made within certain time interval, both alternatives – with the applied discount and without it – should be expressed in the balance sheet.

Realized transactions can be modeled as unrequited economic events. This leads to some surprising findings in the REA modeling. For example, money in a bank is not an economic resource, but an unrequited event of a money deposit; a money-owner borrows the money to the bank and the transaction is not requited until the money is drawn in cash.

Paid transactions can be modeled as requiting economic events. The fact, that enterprises as legal entities always delegate responsibility for their resources, also leads to some surprising findings. For example, as an enterprise's money are almost always controlled by other agents, such as by a cashier or by a bank, all requiting economic events are simultaneously accompanied by other unrequited events, which create claims of an enterprise towards the agents that control its resources.

Conclusions

It is possible to express Kirkegaard's balance sheet using REA concepts. However, the REA ontology seems to contain a more fine-grained classification of economic concepts, as the REA ontology provides several ways to map to the categories of Kirkegaard's balance sheet. This might indicate that Kirkegaard's balance sheet should actually contain more levels. On the other hands it seems that the semantics of REA entities should be made more precise to enable unambiguous mapping.

References

Geerts, G. L., McCarthy, W. E.. 2000. The Ontological Foundations of REA Enterprise Information Systems. *Annual Meeting of the American Accounting Association*, Philadelphia, PA, USA.

Geerts, G. L., McCarthy, W. E.. 2002. An Ontological Analysis of the Primitives of the Extended REA Enterprise Information Architecture. Available at: http://www.msu.edu/user/mccarth4/

Haugen, B. 2007. Beyond the Enterprise: Taking REA to Higher Levels, *REA-25 conference*, Newark, Delaware, USA. Available at: http://www.aisvillage.com/rea25/program/haugen.pdf

Kirkegaard, H. 1997. Improving Accounting Reliability: Solvency, Insolvency and Future Cash Flows, *Quorum Books*, Westport, Connecticut, USA

Partridge, C. 2002. A new foundation for accounting: Steps towards the development of a reference ontology for accounting, *Technical Report 23/02,* LADSEB-CNR*,* Padova, Italy