

Exploring the Extent to Which Enterprise Systems Employ REA and Transforming the Practice of Corporate Financial Reporting

A position paper by Cheryl Dunn, Florida State University for the First International REA Technology Workshop

I currently have two research projects underway with respect to the REA enterprise ontology and I also have some ideas for further development of the ontology. This paper therefore has three sections. In Section 1, I describe a project in which I am attempting to compare the REA enterprise ontology to the underlying database schema of an ERP software package. In section 2, I describe a project in which I am attempting to use REA constructs to recommend a dramatic change in the corporate financial reporting model. In section 3, I describe some general thoughts and issues with respect to REA that I believe warrant discussion, at least to further my own understanding.

Section 1: Exploring the Extent to Which Enterprise Systems Employ REA

ERP software packages are increasingly adopted by companies to capture, maintain, and use information for various decision needs, including accounting, management, marketing, and so on. Developers of ERP software claim one of the software's primary goals is to enable a company to capture and store data in one place in its information system in such a way that it may be retrieved in various formats for all decision-making purposes. This would virtually eliminate redundancy from information systems, thereby increasing data consistency and integrity. This claim is consistent with the goal of the REA enterprise ontology. Indeed, on the surface, many of the REA constructs seem to be represented in ERP software and vice versa. However, horror stories abound of integration in ERP software packages not being as complete and clean as would be necessary to be fully consistent with REA. Therefore I have embarked on a project of comparing at the database schema level, the REA ontology constructs with one ERP software package (JD Edwards' OneWorld, which is now part of the PeopleSoft product line) to determine the extent to which they match and to explore the implications of any mis-matches. The software vendors can learn from a rigorous analysis of the theoretical constructs, and the theorists can learn from a rigorous analysis of the elements used in practice. Identifying the points of convergence and departure may also facilitate future experimental studies of performance comparisons for decision makers using the two different system structures.

Section 2: Transforming the Practice of Corporate Financial Reporting

One obvious area of departure of ERP software from the recommendations of REA is the inclusion of double-entry general ledger artifacts as base objects in the system. Consideration of this divergence led me to contemplate what conditions are likely necessary for systems designers in practice to stop "paving the cowpaths" of traditional financial accounting and to design systems that truly take advantage of modern computing technology.

Technological advances have enabled storage of a myriad of measurements that could be useful to external users' decisions; however, the corporate financial reporting model has not been revised to include new measurements. In fact, in spite of its architectural inefficiencies in a database environment, the traditional corporate financial reporting model that is focused on the general ledger and the double-entry accounting equation $\text{Assets} = \text{Liabilities} + \text{Owners Equity}$ continues to be the central building block of most enterprise resource planning (ERP) software. ERP software is used by most large companies as the backbone of their enterprise-wide integrated information systems. David, McCarthy, and Sommers (2003) claim that for software to evolve to a level that more effectively facilitates inter-enterprise integration, the double-entry accounting equation will need to be removed as the cornerstone and replaced with more meaningful and transparent constructs. In *Mission Critical*, Thomas Davenport complains that although the information supplied by enterprise systems is "undoubtedly the most comprehensive, high-quality information on what is happening in their businesses that they have ever possessed" most companies have not made significant changes in their measurement and reporting systems. Rather, he says, "the primary information benefits from an enterprise system realized thus far have generally involved producing similar information content with less time and human effort." It appears that there exists a Catch-22 with respect to corporate financial reporting and enterprise systems. Enterprise systems have maintained the double-entry accounting equation as a cornerstone because that structure readily produces the reports with which users are familiar and accustomed to using. It appears likely that a transformation of the practice of corporate reporting is a prerequisite to any change in the architecture of ERP software. Ironically, as Davenport points out, ERP software contains many high-quality pieces of information that are largely ignored even though they could be used to develop a more transparent and meaningful corporate financial reporting model.

This project is based on the premise that the current financial accounting model is broken and needs to be fixed. The current model was developed in simpler times; indeed its footprints date back to the middle ages. The current model was developed to accommodate a simpler set of decision maker needs in an environment characterized by a constrained set of information. The constraints were imposed by simpler then-existing technologies and economic feasibility. A less aggressively competitive non-global environment also was more easily satisfied. In recent times shortcomings of the model (and of the standard financial reports that build upon the model) have become increasingly evident. The FASB and the SEC in the US have appended to the model a series of major and minor "fixes" but eventually the set of fixes becomes so cumbersome that one must concede a paradigm shift is in the making (analogous to all other fields of scientific inquiry). In accounting we have fixed the old financial reporting model with patches such as mark-to-market, voluminous footnotes disclosures, and expensive second and third party analysts' "intelligence." And, still, despite all the patches, the current model is not meeting the needs of the participants in the 21st Century capital markets. Arguably, the much heralded "efficiency" of our capital markets has diminished and certainly an uneven playing field has emerged with inside information creating towering advantages for the "informed" over the general public that continues to rely on periodic corporate financial statements for their information. The

credibility of the financial system and financial markets is at risk. Investors increasingly believe they have access to only “part of the story” and increasingly they are sitting on the sidelines.

The goal of this research project is therefore to significantly advance development of a new corporate reporting model that will take advantage of the information storage and retrieval capabilities of enterprise-wide information systems. The traditional financial reporting model has been criticized as an input-oriented approach; that is, the “technicians” decided what information could be made available and the users then decided how they could use that information. Therefore this project will not limit analysis to the information that is currently available in existing information systems, but will also analyze other types of information that are used by financial statement users/analysts irrespective of the source, and set about to model the decisions of relevant participants in the capital markets. For example, financial analysts look at beta and other risk measures, EVA-type adjustments, composite costs of capital, etc., that are not typically captured by enterprise software.

Another premise of this study is that accounting (and ERP) systems will continue to use the double-entry accounting equation as a foundation as long as the double-entry accounting equation is the foundation of the corporate financial reporting model, that is, as long as the financial accountants have no incentive to change.

I do not yet have a fully developed proposed alternative to the current Income Statement, Balance Sheet, Statement of Changes in Equity, and Statement of Cash Flows. I have been drafting possibilities such as a Statement of Resource Flows, a Statement of Commitments and Economic Events, and a Statement of Agents. I am attempting a systematic analysis of information needs and assumptions originally made in the derivation of the original statements and challenging the assumptions to determine which information is still necessary today and what alternative information may better serve today’s decision makers. I am examining current financial statement footnote disclosures, financial statement analysis textbooks, business intelligence metrics, and management accounting literature to determine as many information needs as possible. I hope to have a new model drafted and pilot-tested by mid-June and will then conduct an experimental study to assess its ease of use, transparency, and decision-support effectiveness as compared to the traditional financial reporting model.

To summarize my second research project, and also my main position with respect to REA, I believe that accounting systems (and enterprise-wide systems) are broken, and that the traditional corporate financial reporting model is also broken. I believe that REA provides a good solution for the broken accounting systems and I suspect that REA can also provide a good solution for corporate financial reporting.

Section 3: Ideas for Furthering the REA Ontology

During the last several years teaching REA, and particularly during the last two years as I was writing a recently published REA-based textbook, *Enterprise Information Systems:*

A Pattern Based Approach, I began to contemplate but not to completely detail a couple of ideas with respect to REA.

One is the inclusion of Agents in the model. I have always advocated to students that anything that can be reengineered away should not be included as a base object in the pattern. Yet Agents can be reengineered away. We can change which position is responsible for any particular event type, including changing from an internal to an external agent, and in fact we can even change whether a type of event is even accomplished by a person at all. For example, I may start out saying my Sales event is accomplished by a Salesperson, an internal agent. Next year I may outsource my sales function to independent contractors or to another company, either of which are external agents. Or I may engage in an agreement with my customers to allow an automated inventory replenishment system to determine when they need new product, thereby reducing my need for salespeople and instead letting my computer system generate many of my sales. Instead of capturing Agents as the foundational object associated with Events, I suggest we consider capturing Roles and spend some time identifying which Roles should be part of the ontology. We may change who performs the role of executing an event, but we won't change the fact that it needs to be executed. Similarly, we may change who performs the role of authorizing an event, but we won't change the fact that it needs to be authorized (if not explicitly, then implicitly). The ontology has been developing toward this approach with the specification of agent-involved relationships such as assignment, association, custody, etc. I am not advocating the removal of agents completely from the model. However, specification of separate roles as relationships as opposed to the specification of many separate agent entities enables agents to be combined into one agent entity. This is consistent with the approach taken by some current systems. For example, JD Edwards OneWorld maintains a single address book that includes customers, employees, and suppliers. That address book application does contain multiple tables but they appear to be created for normalization purposes and the separate categories of people are separated in a manner that appears mostly consistent with generalization hierarchies to satisfy the need to capture some different attributes for employees versus customers versus suppliers.

The other issue is one that is already on the agenda and others in the group (including Bill, of course) have already done a lot more organized thinking about, and that has to do with separating commitment events into various components. In my own thinking I have called these components strong and weak commitments, general and specific commitments, or hard and soft commitments. I think general and specific is most descriptive. At any rate, because others have better developed ideas on this, and because I have already used up four pages, I will wait until the meeting to express any further insights on commitments.