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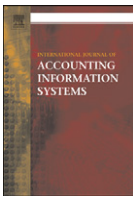

The "now" economy and the traditional accounting reporting model: Opportunities and challenges for AIS research ☆

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ABSTRACT

The real time economy (RTE) can be characterized by a substantive acceleration of business measurement, assessment, and decision processes. It implies a new business model where there is reduction of intra-process and inter-process latency. The AIS research literature has failed to develop new paradigms for accounting of accelerated processes. This paper places key relevant research questions for accounting, assurance, and business information systems in the RTE.

1. Introduction

"In years to come, experts predict, many companies will use information technology to become a "real-time enterprise"—an organization that is able to react instantaneously to changes in its business. And as firms wire themselves up and connect to their business partners, they make the entire economy more and more real-time, slowly but surely creating not so much a 'new' but a 'now' economy." The Economist, February 1, 2002.

"We have only just said goodbye to the new economy, yet it's time to say hello to the "now economy." Never heard of it? You're not alone. Even technology gurus sing different tunes when describing the newest buzzwords. The now, or real-time, economy is a complex set of enterprise software products and services that could transform the way companies work. This software could

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> speed up supply chains, cut inventory costs, facilitate cross-company process reengineering, and put more oomph into CRM." The McKinsey Quarterly Newsletter, February 2002.

There is a new business model arising that is predicated upon the speeding up of business processes and the reduction in latency between decisions and their consequences. Businesses are taking the lead to adapt to and to also accelerate the development of the "now" economy, through the widespread adoption of integrated company software such as enterprise resource planning systems (ERP), modern communication technologies that ensure that workers are on the job 24/7/365, and monitoring systems that give a greater range of managers the ability to track and control key business processes. All this allows businesses to manage their processes based on up to the minute information and to achieve rapid adjustments of tactics and strategies.

Both the Economist and McKinsey have adopted the terminology as a way to describe a complex set of evolving changes that are bringing the provisioning of information closer to the causal events. Their adoption of the term the "now" economy indicates its progressive understanding in the business community:

> "Never mind New Economy vs. Old Economy industries. What matters is if your business enjoys intelligently revised and technologically enhanced business processes. Business process innovation is beginning to move in concert with accelerating technological evolution. Say goodbye to the New Economy; meet the Now Economy. We are witnessing the emergence of real-time enterprises (RTEs) that will comprise the bulk of the Now Economy. In the Now Economy, information flows rapidly through supply and demand chains, crossing corporate boundaries, ensuring maximum efficiency and responsiveness.
>
> The ideal vision of the RTE is one of companies where information moves without hindrance, and business processes are continuously monitored and trigger rapid reactions, usually automated according to embedded business rules. RTEs also sense shifts in tastes and practices and respond by offering new products and services. Automated processes easily traverse corporate boundaries, time zones, media and systems. Batch processes and manual input are minimized by ensuring that real-time information among employees, customers, partners and suppliers is current and coherent. The Now Economy is the instantaneous, frictionless economy of economists' legend—the mythical beast that may finally be emerging from the mist. The Now Economy is a web of RTEs that form a virtual supply and demand chain continually seeking information, monitoring, and responding, guided by humans, mostly at the highest strategic level." Max More, foreword to Fingar and Bellini (2004).

Particularly significant is what has happened in accounting—and accounting research—over the past few years. The financial institution crisis has again illustrated how the current accounting measurement methodologies fail to predict/detect serious crises. Bear Sterns, Lehman Brothers, Freddie Mac, Fannie Mae, and AIG had clean audit opinions and no going concern qualification just one month prior to their failure.

Despite incremental changes, such as section 409 of the Sarbanes–Oxley Act (which calls for more timely disclosures), the evolution of continuous assurance, and the forward movement of XBRL and so on, the fundamentals of accounting—and accounting research—remain as they were a decade earlier. External accounting reports are presented quarterly, accounting standards are introduced in a reactive mode and are meant for purely manual application, with no directly formulated provision for tagging or automated referral; auditing firms in general still retain billing practices developed for a highly manual audit process and mainstream accounting research looks backward on the impact on financial markets of disclosures already made rather than looking forward to how technologies that are already in widespread use elsewhere in business can be used to transform accounting practice. In short, while businesses are moving on to the "now" economy, accounting remains in a "traditional" mode.

It is this gap in the pace of change between business and accounting that is the basis for this examination of new opportunities for accounting information systems research. Alles et al. (forthcoming) argue that if AIS researchers are to add value to an industry which dwarfs them with their own research and development efforts, they need to find areas of comparative advantage. One such area is long term normative research, in which researchers bring in knowledge from other fields and/or proactively analyze potential as opposed to established areas of accounting practice.

While research tends to be incremental, there is a need for some of it to attempt to create discontinuous change to established paradigms, and that is true most of all for AIS, which has to reflect the ongoing

disruptive change in underlying technologies if it is to remain credible. We do not lay out a comprehensive framework for research into the "now" economy in this paper—it is still too premature for that, and our aim is to encourage an open ended research agenda, not to constrain it into a particular program. Our objective is to describe the nature of this new economy and to show that questions arise naturally as to the role of accounting in it.

In order to further understand research needs and opportunities, this paper first discusses the most obvious characteristic of the "now" economy, that firms are increasingly running their business processes in real time. That leads to the question of the role of accounting in such a real time environment and having identified the shortcomings of the current accounting model, in Section 4 we propose a Real Time Economy Business Information System (RETBIS). We then turn to the most obvious instance of "traditional" accounting, the persistence of the periodic audit and the emergence of continuous auditing as a better match for real time firms. Section 6 offers concluding comments.

2. Real time business processes

The real time economy can be characterized by a substantive acceleration of business measurement, assessment, and decision processes. For example, companies must manage their cash on a day to day basis to be able to apply it and borrow it overnight, companies must manage receivables and payables on a day to day basis to take advantage and grant discounts, companies must manage inventories up to the minute to do just in time factory management. These are just a few examples of the advent of a real-time economy. Moreover, the effects of wireless technology, RFID and sensors and integrated software are just now starting to emerge. The next years will bring in more nimble and more adaptive companies integrated along the world.

The Economist (2002) points out the issue of instant gratification:

> "**Instant Gratification**: To advocates of the concept, the real-time enterprise is a giant spreadsheet of sorts, in which new information, such as an order, is automatically processed and percolates through a firm's computer systems and those of its suppliers. Thus a simple inquiry such as, "When is my order being shipped?" can be answered immediately, and not six phone calls and three days later, explains Vinod Khosla, a partner with Kleiner Perkins Caufield & Byers and one of the most notable advocates of the real-time concept. Many consumers have already encountered real-time business without realising it, for instance when they order a Dell computer. The firm's website allows customers to check the status of their order at any time.
>
> But the real-time enterprise is not simply about speeding up information flow. It is also, as GE's example shows, about being able to monitor a business continuously and react when conditions change. Today, businesses "are mostly shooting in the dark", says Michael Maoz, a research director at Gartner, an IT consultancy, and one of the pioneers of the concept. Real-time technology, he predicts, will give firms a window into their business they never had before."

While the technological underpinnings of the real time economy continue to evolve and emerge, it is also important to focus on the changes it brings about on the mentality of management. In particular, the lessening of latency between transaction and decision point, means that processes have to be viewed with that latency taken into account in a way that did not have to occur when managers had more time to reflect. These processes can be classified in at least four different overlapping ways, each with different implications for decision making, control and monitoring:

1. Processes that are supported by real-time systems
2. Processes which are monitored on a close to continuous basis
3. Processes that are highly time dependent
4. Processes where timely decisions give competitive advantage

The classification of processes into these categories is not static, but dynamic with respect to technology, business process reengineering and competitive pressures. Thus as an increasing number of processes at more firms fall into categories 1 and 2 then the more likely they are to be used as sources of competitive advantage. Eventually, such practices become ubiquitious in an industry, at which point they stop providing

a competitive advantage, but become a minimum necessary to stay competitive. Examples of such dynamics are the development of SABRE at American Airlines, the assignment of real time seat choice on airline websites, the onslaught of online payment mechanisms, or the ability for consumers to track packages at UPS and Fedex and the USPS. (Wiseman, 1988).

The acceleration of business processes and their accompanying decision points necessitates access by a larger range of people within businesses of high quality data with the ability to drill down and search unconstrained by traditional data aggregation methods, such as into income statements. Thus, almost all firms of any significant size today use ERP systems that integrate their information flows into one easily accessible data processing system. Add on software, such as those providing increased business intelligence and customer relationship management enable rapid and detailed analysis of that flood of data to allow decisions to be made at a level not possible before, such as treating each and every customer differently based on their individual profitability. Thus (Economist, 2002) the connection between technology and the management use of that technology is clear:

> "In the past, firms have faced a trade-off between being integrated and being flexible. New software technology promises to ease that trade-off, or even do away with it altogether. At the same time, new hardware, such as wireless sensors, makes it possible to gather ever more information about the physical world and feed it into a company's computer systems. Turbines made by GE are equipped with sensors that allow the firm to tell its customers online how efficiently their machinery is operating. Similarly, companies can now collect more data about people, even tracking their location. By themselves, these data would just contribute to the increasing information overload. But they present a new business opportunity: to develop software that analyses them and suggests ways of optimizing the supply chain, or even automates the response to certain kinds of new information."

While business is moving ahead in creating and responding to the "now" economy, accounting and accounting research has failed to keep up with this pace of innovation. Except in some limited areas, mainstream accounting research has all but ignored the ferment of change going on around it in business and focuses more on how markets reacted in the past to accounting disclosures than it does on what such disclosures need to look like in the future if they are to accurately reflect the performance of a real time business operating in the "now" economy.

The real time economy has posed a series of major issues on business operations and measurement. While the multiple areas of business research each has to deal with the changes in their domain concerning real-time action (e.g. real time marketing, advertising, human resources management, supply chain) we will focus our questions on business measurement and data quality (assurance). Thus, we now turn to discussing specific areas in which research is needed to complement/enhance/guide the developments that businesses are already implementing or visualizing in several areas of their activities.

3. The role of accounting in "now" economy

Before we can develop a response to the move to real time processes and decision making by businesses, we have to first understand the dimensions of the problem—and that means focusing not only on changes in technology, but in changes in how managers use that technology to manage key processes and make decisions better and faster. Thus, we have to:

- understand how decisions can be automated to take latency out
- understand the different levels of decision making in order to provision them with information:

1. decision-specific relevant
2. locally relevant
3. organizationally relevant, and
4. externally relevant

- understand the dimensions of information provisioning:

1. the timing of information
2. the aggregation of information

3. the user relevance of information
4. the global sources and uses of information

• understand the different stakeholders with information needs

1. customers and suppliers
2. the different governments (e.g. local and federal)
3. employees and unions
4. bankers and insurers
5. international partners and jurisdictions

The AIS research literature has both failed to develop new paradigms of accounting for accelerated processes, and to examine many of the most basic questions that such processes pose for accounting practice. By contrast, while accounting practice ignores these issues, business practice does not.

For example, no ERP system can be developed without addressing such issues as the focus of relevant information, the degree of its aggregation, timing, and so on. It is accounting that has failed to catch up for instance, not taking advantage of the built in capabilities of those ERP systems. Thus, whilst preparing balance sheets and income statements quarterly may have made sense when ledgers were written by pen on paper, still doing so today is to ignore the sophistication and power of an IT system such as SAP. Moreover, the content, format and information structures of the traditional balance sheet and income statement along with funds flow statements represents a compromise between information needs and the cost of generating information. In a real time economy not only are these compromises obsolete, but they are counterproductive to the extent that constraining discussion to such a limited cost/benefit framework inhibits discussion of a more fundamental reengineering of business measurement and reporting. Managing a real time business changes the relevance of information to users. Actionable data becomes of greater importance than traditional archival data. The stakeholders of business become more diverse and the information set more timely and narrow. The competitive advantage obtainable from actionable data raises substantively the need for timely and reliable data. Efforts in data quality have a cost benefit return of itself. Thus, many of the verities of standard financial reporting are brought into question (Table 1).

Further, rather than accepting the one-size-fits-all aggregation of the standard financial reports, real time firms are viewing data using a variety of different mechanism that are designed to closely align with their unique strategies, from Balanced Scorecards[1] and Strategy Maps[2] to Dashboards. These customized, dynamic, real time metrics put decision relevance over the comparability and reliability criteria that dictates the standard accounting reports. Thus, here is a description of GE's use of dashboards, followed by a screenshot of one:

> "GE's aim is to monitor everything in real time, Mr Reiner explains, calling up a special web page on his PC: a "digital dashboard". From a distance it looks like a Mondrian canvas in green, yellow and red. A closer look reveals that the colours signal the status of software applications critical to GE's business. If one of the programs stays red or even yellow for too long, Mr Reiner gets the system to e-mail the people in charge. He can also see when he had to intervene the last time, or how individual applications—such as programs to manage book—keeping or orders—have performed.
>
> As chief information officer, Mr Reiner was the first in the firm to get a dashboard, in early 2001. Now most of GE's senior managers have such a constantly updated view of their enterprise. Their screens differ according to their particular business, but the principle is the same: the dashboard compares how certain measurements, such as response times or sales or margins, perform against goals, and alerts managers if the deviation becomes large enough for them to have to take action."

Dashboards used for many different purposes of decision support tend to mix high level aggregate numbers, to red-yellow and green signals, and to action oriented types of tools related to communication

[1] See Kaplan, R.S. and Norton, D.P. The Balanced Scorecard: Translating Strategy into Action, Harvard Business School Press, Boston, Mass., 1976.
[2] See Kaplan, R.S. and Norton, D.P., Strategy Maps, Harvard Business School Press, Boston, Mass., 2004.

Table 1
Sample of changed relevance tables

Factors of changed relevance	Comment
Actionable data	Can provide competitive advantage on improving decisions or beating the competitors on certain opportunities
Good will	Little relevance as computed today since it fails to take many intangible factors such as human capital and intellectual property into account
Depreciation	Very little relevance on a close to the event reporting world except for tax effects
Decision models	Determining factors on the value relevance of information
Human/manual processing of information	Major source of competitive disadvantage
Internal information structures/relationship equations	Businesses run on an internal models hat help decisions on many variables. For example advertising expenses are decided on media mix and reaction models. These models now can not only be disclosed but populated to justify management actions bringing disclosure to a different level.

and follow-up. The figure below illustrates one of these dashboards supplied to high level operational executives of GE groups (Fig. 1).[3] Data is composed of aggregates and key performance indicators along three major categories: sell, make, and buy. Operational variables and statistical ratios explain much of these categories. The sidebar of tools has a message center, a cockpit (dashboard) navigation map, graphs and the ability to download to PDAs.

Dashboard technology is rapidly evolving and many vendors offer such technology. For example, Corda Technologies[4] describes its product, CenterView, in the following terms[5]:

> "A business dashboard is a must for C-level executives or business managers to stay on top of their companies' activity and progress… CORDA CenterView™ operates on any platform and operating system. With a single mouse click, you can view data from almost any type of ERP, BI, or analytics system, including data from Excel, SQL, XML and flat files. CenterView™ offers custom and freeform business dashboards, or choose from the pre-designed layout templates. Once you've selected your data set from a single source or multiple sources, CenterView™ presents the data in attractive charts, graphs, maps and custom visuals. This helps you to better interpret what the numbers mean, identify trends over time and take action for the future. Business dashboard software from CORDA puts you in the driver's seat of your business.
>
> The infinite drill-down capabilities of CenterView™ offer you even more information at the click of a mouse. Additionally, you can roll the mouse over a bar or point on a line for popup information, making analysis simple. The drill-down capabilities of CenterView™ enable you to click a bar, line or point to reveal related graphs, charts and statistics. With all your business information at your fingertips, you will be able to better understand where your company has been and where it needs to go."

Now contrast those capabilities with the analysis that is possible with the standard balance sheet, income statement and cash flow statement provided annually, written on paper. Such user and decision unfriendly documents hardly provide the kind of real time information that a dashboard does and that is not only because the dashboard uses technology to be constantly up to date; but also because dashboards are meant for general usage by a firm's managers, and not only by trained accountants.

This "democratization" of the business's data is a key enabler of the "now" economy, but accountants are far behind in either understanding the phenomenon or providing competitive tools of their own. The same power presented by internal decision support dashboards must be used for external disclosure explaining business performance and future prospective.

[3] The GE's dashboard was obtained through private communications with the company and has been presented by the company in several professional meetings.

[4] The IT market now offers a wide range of dashboard/cockpit solutions. We sue Corda's as an illustration. Many others of analogous characteristics are available as well as in-house developed solutions.

[5] http://www.corda.com/business-dashboard.php.

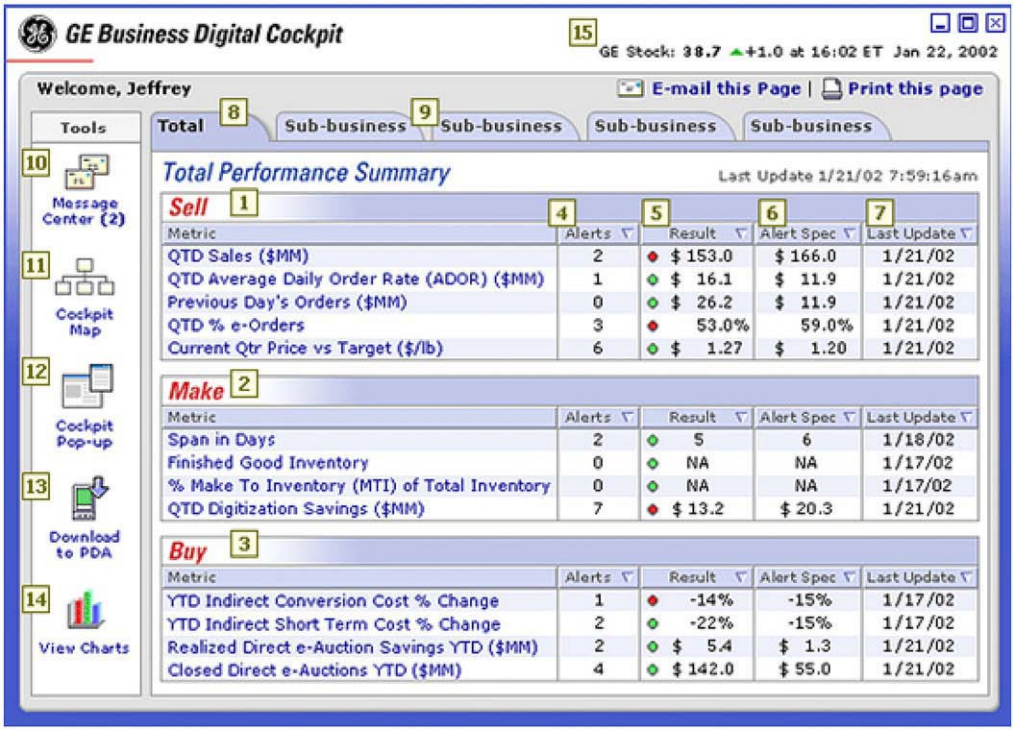

Fig. 1. GE's corporate dashboard.

What then must accountants do, to transform the way they do accounting to better match the needs of managers and investors in the "now" economy? This basic question raises a series of thought leading research questions for accounting scholars.

- How to better match the dynamics—the timing, aggregation and decision relevance—of the accounting system to the accelerated business processes that define the firm.
- How to transform accounting from the "traditional" to being an essential element of the "now" economy.
- What are the new tradeoffs between fineness of information (detail) and the cost of disclosure
- What types of technologies can be relied upon to extract highly detailed information and not to reveal private or competitively restricted information (Gal, forthcoming)?
- What are the formal financial statements of the "continuous reporting" era? Is articulation necessary? What accounts should be updated as they happen? What estimates are still needed? Should the real time reports articulate with the annual/quarterly traditional reports?
- Both Sarbanes–Oxley and SEC's FD rule create obstacles for a more frequent reporting schema. How should these be changed or how can the accounting profession bypass these difficulties.

4. Towards a real time economy business information system

Mock et al. (2007) draw on Mock (1976) (Fig. 2) to relate the Empirical Relational System (ERS) to the Numerical (representational) Relational System where the first encompasses the relationships in real life while the second their measurement. This framework provides a way of examining the relationship between underlying business processes and their measurement through accounting, with the obvious implication that when one changes so must the other. Over twenty years ago this logic was applied by management accountants when they developed Activity Based Costing to better match cost allocation with the firm's then increasingly automated production process. Accounting researchers have to do the same if they are to update financial reporting practices for the "now" economy.

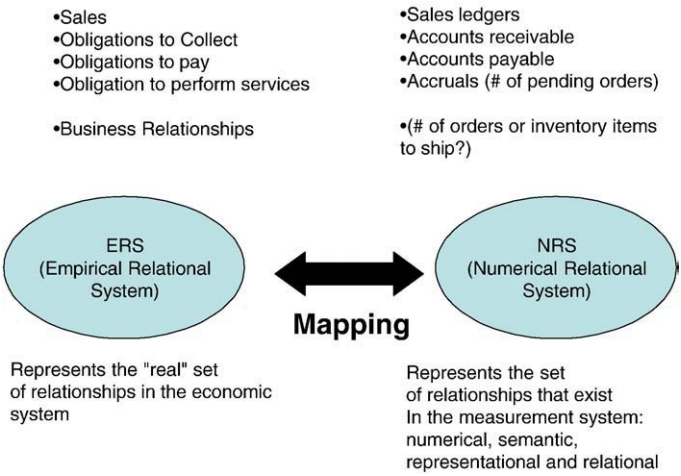

Fig. 2. Reality and its measurement.

The real time business represents a substantially changed ERS compared to traditional firms, with a substantially shortened business cycle, a rapid feedback loop, and a decision function modulating this feedback loop. Essential for the understanding of the mapping between the redefined ERS and a NRS that more appropriately reflects it are questions such as:

- Should accountants measure levels for the balance sheet of items that are elements in the value chain but to not belong to the entity, such as supplier managed inventories?
- Do they need to measure the levels at the partners that supply this inventory?
- Do accountants need to consolidate these values along the value chain to represent the situation of the value chain?
- Within the framework of the NRS are there factors to be measured that are not numerical, such as flow of news about the company, patents, ethical tone, etc?
- Are the rules of valuation (linking the ERS and NRS) constant or variable depending on contingencies?
- Should the systemic risks and element specific risks be disclosed?
- Should the assumed relationships of business elements and the ensuing operational business models, be disclosed?

Clearly many more such questions can be asked once one accepts the premise that the "now" economy changes the underling ERS and that the accounting NRS has to change in turn. The point is for researchers to face that reality rather than continuing to claim that the underlying assumptions of accounting are unaffected by the revolutions taking place elsewhere inside and between businesses.

This same point, of the failure of the current accounting system to capture the full dimensions of the "now" economy can be seen in Fig. 3. Developed by Mock et al. (2007), it maps the end-to-end processes in business and demonstrates the distinction between what current accounting systems measure and the full dimensionality of business activity. In this framework, levels 1 (L0) to 5 (L5) entail the macro-processes while only level 3 (L3) is actually part of the extant business reporting model.

The takeaway from the Mock et al. (2007) framework is that, as Bill McCarthy puts it, "by the time a transaction is booked, the most interesting things in business measurement have already taken place"[6] To fully capture all relevant processes, the business reporting model must be extended to include the full end-to-end set of processes which include 1) underlying environmental factors, 2) business strategy, and 3) lead actions prior to the completed transactions, which is all the traditional financial accounting systems measure, as well as to 5) consequent events.

[6] Private communication, 2006.

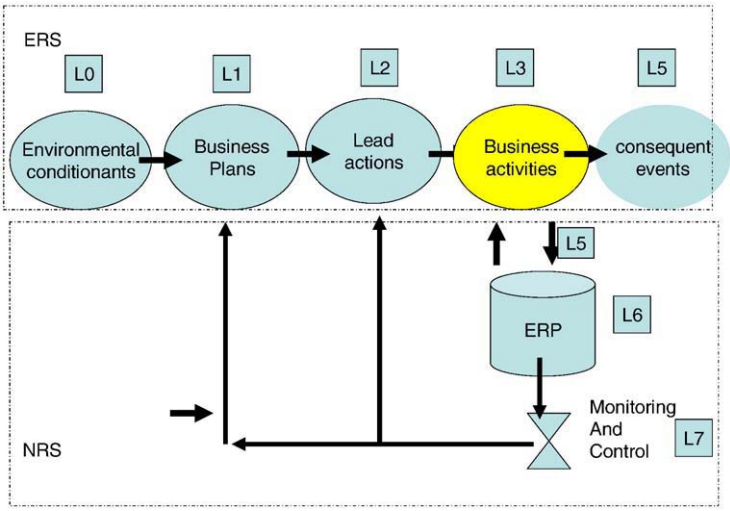

Fig. 3. The macro stages of business activity (Mock et al., 2007).

Intrinsic to the "now" economy is the issue of information timing and information latency. Furthermore in an extended macro stage schema other issues arise. Lead action data can be used as surrogates for past business activity data.

- How does lead data replace/interact with business activity data?
- How can real time changes in business lead activity be reconciled with longer term business data?
- What should be the disclosure requirements at the macro stages?
- How can feedback loops be developed that evaluate and rate management on their performance/preparedness for the later stages in business activity?
- What elements must be included in the RTEBIS to provide measurements of the "softer" variables of the L0 and L1 levels?

In addition to extending the measurement model to other macro-stages of business activity the real time economy makes it essential to consider other related entities that may be related either as part of the virtual value chain as well as part of the fuzzy boundaries of the system being measured. The "now" economy is real time not just in terms of the speed of transactions, but also in the fluidity of business relationships. This is only to be expected, because if time is of the essence businesses will not constrain themselves to a given set of partners/suppliers/investors/customers, since that partner's timing may not match their own at a given point in time. For the same reason, relationships and contracts between these parties will be equally dynamic, with partnerships formed and dissolved as necessary and not because of some static master plan.

These related entities, such as the Special Purpose Entities utilized by Enron, are thus a reality of the fuzzy nature of organization structures derived by business related and accounting related organizational engineering. The arbitrary (rule based) threshold of the consolidation requirement is just one of the variables around which organizational components are engineered some times in conjunction with financial instrument engineering. The following ill-disguised anecdotes illustrate some of the problems caused by fluid business relationships in the "now" economy:

- Organization A holds 40% equity on a separate organization B which owns 20% of SPE C that does exclusively business with organization A.
- Organization D sells insurance in the US and applies part of its compensation pool resources in partnership E in the Caiman Islands. The CEO of D is also the managing partner of E. E resells/re-insures in large volumes of D.

- Organization F acquires a set of sub-prime and normal mortgages and securitizes them into three pools of security risk profiles. The resources of the acquisition of the mortgages comes from short term paper of high quality organizations that is turned over when they expire. As both sides of the transaction do not have direct ownership of F this securitizing entity S is not in the books of F which, however, drew rich profits in both sides and paid enormous bonuses to their management and brokers typically as a percentage of profits. When the sub-prime mortgages sour the highest risk security pool has difficulty refinancing its short term paper. The environment changes and regardless of the F not having direct liability on the securities, these have been marketed under their name and there is residual legal liability. Firms in this situation have 1) brought the liabilities into the books or 2) have not but worked on creating reserves for the losses, or 3) let the securities go and with that some of their goodwill.
- A computer company practically outsources all of its component and software manufacturing. In their production lines all inventory is supplier managed so its on the books of the supplier. CC has a downturn in business and cannot absorb the forecasted inventory usage. CC writes down over 2billion dollars of inventory much of it which is not on their books.

The above examples illustrate the difficulty in any case of understanding and measuring the actual boundaries of a particular organization. The three dimensions that are the subject of potential extension/measurement are therefore:

- Macro-stages of business activity
- The entities involved and their boundaries
- The sectors and measurement of the macroeconomic environment.

A real time economy business information system (RTEBIS) would be explicitly designed to deal with the underlying drivers and consequent complexity of the basic characteristics of the "now" economy:

- Very rapid business cycles
- Instant need of resolution of certain business needs (for example monthly billing may not be acceptable)
- Service agreements that specify a certain degree of data reliability
- Rapid change in the terms of agreements contingent on dynamic parameters
- Utilization of Service Oriented Architectures that allow for dynamic servicing of clients and dynamic acquisition of suppliers and service providers

Measurement systems for a RTEBIS will be different than traditional ones along timing, aggregation, user relevance, globalization, and other relevant information, which raises many important issues for AIS researchers:

1. How do the three dimensions of change (macro-stage measurement, entity boundaries, and macro-economic contingencies) alter factor relevance?
   a. Macro-stage measurement and related events
   b. Entity boundaries and sector reporting
   c. Fair value and macro-economic contingencies
2. What should be eliminated from the current accounting model on the basis of relevance? Total assets? Articulation of BS and IS? Assumption of "one" set of financials for all users?
3. What is the relationship of the three dimensions of change, timeliness, and the different books we keep (tax, financial, managerial, others)?

5. Assurance in the "now" economy

In the "now" economy, frequent data capture and consequent utilization is performed by automated processes. This process is highly dependent on the quality of data being provisioned. Modern systems are highly interdependent with many feeds coming from upstream processes or from outsourced business processes often connected by third party data channels. Assurance/quality processes of many types are necessary to not only verify the quality of data but also to monitor this quality of data, assess its quality, and take remedial action if the quality is not adequate. The starting point of such a monitoring and assurance system is the use of continuous auditing (CA) to replace outmoded manual auditing, for it is in the

continuing reliance on the periodic audit that accounting most earns the epithet of "traditional" accounting despite being in a "now" economy.

The main factor that will constrain the adoption of CA (Alles et al., 2002) is the lack of demand for real time monitoring, not the supply of the enabling technology. While recent surveys indicate that CA is finally on the verge of becoming mainstream, a large host of research issues remain, which we examine next in greater detail. Today's financial world focuses on "audited financial statements" associated to a particular state-of-the-world at the end of the fiscal year or quarter. This is clearly inadequate for the real time dynamics of the "now" economy. In order to satisfy the quality needs of that economy it is useful to classify assurance at three levels: process level assurance (PLA), data level assurance (DLA) and opinion level assurance (OLA). Among these three levels a series of assurance processes and services may eventually be desirable:

5.1. Process level assurance (PLA)

PLA focuses on assuring a particular process or sub-process that may be used by the corporate value-chain internally or that has been outsourced. With the increasing trend towards outsourcing, audit opinions will have to increasingly rely on external/third party assurances of outsourced processes. PLA opinions are to be frequently used as a partial base for auditor opinions. For example ABC Company outsources its collection functions to a third party. This Web Service collections agent has undergone a process level assurance[7] engagement issuing an opinion about the process. The opinion to be issued on ABC company will rely on the outsourced process PLA. The outcome of a PLA study may be expressed in probabilistic form and serve as an input for data level assurance. For example, a PLA study may conclude that a company's collection processes can be relied on at the 95% level. This piece of information would be a tag on a collection notice. Corporate IT systems and processes of the future will be a combination of internal and outsourced processes at different geographic locations. These processes will have different levels of reliability. The initial best estimator of the data level reliability of a particular datum is the reliability of the PLA that generated it or the modified chain of affecters up to that point of the process sequence.

5.2. Data level assurance (DLA)

With the progressive evolution of data sources that are self contained and often prepare data that is self-explanatory (for example XML based) a new set of assurance needs emerge. Bringing it to the financial domain, when financial data are provided item by item as opposed to being in complete financial statements, certain items have more precise measurement than others. For example, the measurement of the cash number tends to be more precise than receivables, which by its turn is a more precise inventory, which by its turn is substantially more meaningful and precise than intangibles. Furthermore, the measurement of inventory generally is more accurate at a well controlled central warehouse than when the items are distributed over thousands of stores in different countries. With the advent of XBRL and substantial integration of internal and external processes into systems across the value chain there is an increasing role for assurance of individual pieces of data.[8] This assurance is essentially a step in the monitoring, assessment and improvement of the quality of data in the organization. For performing this function innovative tools must be developed to define and assure datum that come from upstream and are used downstream in the value chain. Vasarhelyi et al. (2008) have proposed a series of validation instruments that encompass viewing data as objects, and using control tags, cookie crumbs, control paths, and aggregate estimates to accomplish this task.

5.3. Opinion level assurance (OLA)

The traditional audit focuses on generating audit evidence that supports the issuance of a yearly opinion on corporate financial statements, assured in the form of a blanket opinion which states that there is no

[7] For a definition and description of SysTrust the reader should refer to the AIPCA Web site http://infotech.aicpa.org/Resources/System+Security+and+Reliability/System+Reliability/Principles+of+a+Reliable+System/SysTrust®+Definition+of+a+Reliable+System.htm.

[8] http://www.xbrl.org.

material error in the statement as a whole. This opinion may mean that there are offsetting errors of material level but the result would not lead an investor to a different investment action. If the data is balkanized, meaning broken into more disaggregate measures, say cash, or accounts receivable, and then distributed over the Internet, each of these datum are not assured individually as being free of material error. Opinions on systems reliability and many forms of SAS #70 work may fall into this category. Continuous audit OLA may also encompass continuous control effectiveness assessments, evergreen opinions, and other reports. The traditional form of OLA must be changed to deal with these issues.[9]

New methods of continuous assurance must be developed for all three of these levels in order to properly monitor the reporting of transactions in the digital age. Assurance in the "now" economy, however, extends beyond the macro audits such as the ones described above which are performed by an external auditor. Dynamic, constantly changing relationships and processes can only be adequately controlled and relied upon with a real time monitoring and control system which will enable:

5.4. Continuous monitoring

Continuous monitoring entails close to real time measurement of a particular process, its comparison with a behavior model, the assessment of the degree of variance between the two, and the potential issuance of a warning/alarm/action about this variance if a particular threshold of variance (significant variance) is reached.

5.5. Continuous business assessment/decision

Continuous business assessment entails the continuous monitoring of business and the assessment of the effect of a "significant variance" on the current conditions of business. Continuous business assessment links continuous monitoring to environmental conditions and to consequent management actions. For example:

<if significant variance occurs>
  <and inventories are less than average + 2 * variance>
    <then order more>

RTEBISs will combine close monitoring of economic operations, with sophisticated adaptive modeling to determine meaningful variance measurement, and a macro continuous assurance process whereby data and processes are monitored and data quality improved. The agenda for forward looking research in the assurance area includes further specification of products at the three levels, but also many other questions such as:

- What is independence in a Continuous audit environment?
- Continuous audit monitoring routines—are they a control or an audit?
- Who should perform the monitoring function? Audit or management?
- Can audit rely fully on management monitoring?
- How can we perform automatic error correction? (Kogan et al., 2007)
- How to perform alarming on data where measurement scales are not ordinal nor ratio?
- How to create business models for monitoring that take in consideration the outsourced nature of modern business processes?

6. Conclusion

This paper is aimed at understanding the key research questions that emerge with the advent of the real time business processes and decision making and the fluid relationships between parties that together

[9] An evergreen opinion is an audit opinion that is always effective until specifically withdrawn. For example a company would have an opinion posted on the Internet and certain automatic criteria would support this opinion. If conditions change the opinion is suspended. Up to the present this is just a proposed approach.

make up what is called the "now" economy. This paper started a dialogue to identify the drivers and business practices that motivate new information structures in this economy. In particular, AIS researchers need to develop new reporting structures that better match the rapidly changing real economy.

At some point the gap between the paradigms driving business and the underlying assumptions of accounting will become so great as to make society question the value of having meaningless (non predictive) financial statements and the usefulness of their traditional audit. Indeed, the IMA has offered a new definition of management accounting for comment, concerned that its members are not perceived as offering enough value added to firms today and thus inviting competition from other professionals, particularly MBAs.[10] The AICPA faces similar threats, although they are shielded from competition to the extent that only CPAs can sign audit opinions. But as the CEOs of the largest professional service firms themselves recognized in their Paris declaration in 2006, the accounting profession has to embrace change and technology, particularly, if it is to meet the needs of investors and regulators.[11] Ironically, where this gap remains as large as ever and essentially unchallenged is in academic research.

Friedman (2005) states: "But when the world becomes this flat—with so many distributed tools of innovation and connectivity empowering individuals from anywhere to compete, connect and collaborate—the most important competition is between you and your own imagination, because energetic, innovative and connected individuals can now act on their imaginations farther, faster, deeper and cheaper than ever before." It is up to accounting researchers—especially those in AIS—to embrace change and assert the role that they have by removing the "traditional" label from accounting in the "now" economy.

References

Alles MA, Kogan A, Vasarhelyi MA. Feasibility and economics of continuous assurance. Audit J Pract Teach Theory 2002;21(1): 125–38 (March).
Alles MA, Kogan A, Vasarhelyi MA. Exploiting comparative advantage: a paradigm for value added research in accounting information systems. International Journal of Accounting Information Systems forthcoming.
Economist. The real time economy; 2002. January 31.
Fingar P, Bellini J. The real time economy. Meghan Kiffer Press; 2004. October.
Friedman T. The world is flat. Farrar, Strauss & Giroux; 2005.
Gal G. Query issues in continuous reporting. Journal of Emerging Technologies in Accounting, forthcoming;5.
Kogan A, Alles MG, Vasarhelyi MA, Wu J. Continuous data level auditing using continuity equations. Working Paper. Newark, New Jersey: Rutgers Accounting Research Center; 2007.
Mock T. Measurement and accounting information. American Accounting Association; 1976.
Mock TJ, Vasarhelyi MA, Romero S. A measurement theory perspective on business measurement. Working Paper. Rutgers Business School; 2007. November.
Vasarhelyi MA, Alles MG, Kogan A. Transaction objects, control objects, control tags and tags dynamics. Working Paper. Newark, NJ: Rutgers Accounting Research Center; 2008.
Wiseman CS. Strategic information systems. McGraw Hill Professional; 1988.

[10] http://www.imanet.org/pdf/08_08_sma_draft.pdf.
[11] The CEOs of the largest CPA firms in their report entitled "Global Capital Markets and the global Economy: a Report of the CEOs of the International audit Networks, November 2006, www.GlobalPublicPolicysymposium.com.