

# The future of accounting and Electronic Commerce on the Internet

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The Internet started as a personal phenomenon increasing the ways individuals expressed themselves and published to the world. Now however, we see the emergence of the Internet as a business phenomenon. While commerce platforms are being developed, market players search for products and offerings which make economic sense. Currently, most of the Fortune 500 companies have expanding presence on the Web. Relatively few, however, seem to know how to make money on the Web. Eventually accountants are bound to evaluate the medium and experiment with providing their current and expanded services over the Internet.

As specific new offerings, like online tax consulting, and remote auditing evolve, demand for the electronic version of traditional services, such as accounting / bookkeeping services on the net will follow. While many cyber-services are not intrinsically different in the e-commerce arena, their nuances, methods, and marketing will change considerably. The challenge for the profession, is to offer a balance of services that are sound, that eventually will be profitable, and that satisfy the needs of e-commerce and of society at large.

The explosive growth of the Internet is bound to have a profound impact on the accounting profession. A growing Internet provides wider, less costly, and often almost instantaneous access to increasing amounts of on-line economic information, and very fast means of transfer and retrieval of such information. This growing body of financial information has to be collected, classified, presented, analyzed, and assured by accountants. Much of this information will be available on-line, world wide, and will be continuously changing. Consequently to remain current and accounting information associated with electronic transactions will have to be continuously updated and accessible on-line.

## ***The Environment***

### **A More Central Role for Accountants**

Accountants will operate in an increasingly networked world, with most organizations being on the net. Most professional accountants will access the Internet at work and at home. As professionals charged with the primary task of collecting and organizing financial information to support business decisions, accountants will have to cope with immediate access to an ever-growing array of traditional and non-traditional data including traditional accounting data. Accounting systems will have interact and incorporate increasing and faster flows of business intelligence about customers, competitors, new products and technologies.

Within their organizations, most accountants will be also hooked to Intranets (“internal organizational webs”). Intranets use Internet technology and protocols, but are typically insulated by protective “fire walls” from the external world. Sooner rather than later, Intranets will house most of corporate financial and management accounting systems. Accountants will be called upon to play a leading role in deciding where, and to whom, will on-line intranet information items (about costs, revenues, production, budgets, standards, variances, and quality) flow. The degree of access to, and protection of, any part of the Intranet will depend on the sensitivity of the information it handles. Organizational accountants will have to supply and interpret information from most areas on the Intranet.

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Business enterprises will grant their major constituencies qualified access to and interface with their Intranets (Extranets). These constituencies include investors, creditors, customers, suppliers, employees, and governments. These will require accountants to design, add content, analyze, control and audit the Extranets. Furthermore, accountants are well placed to play a major role in the design, creation, and management of the information links between Intranets, Extranets and the Internet. While the Intranet / Internet dichotomy is often discussed, the world will be not that simple. Corporations will open parts of the internal networks to suppliers and other parties that add value to or depend on their processes. For example, in just-in-time manufacturing arrangements, suppliers will examine inventory levels, orders and production plans, on the client's Intranet as part of their internal processes.

## **The business environment**

### ***Continuously Interactive Customers and Suppliers***

Internet technology will give buyers greater opportunities for frequent on-line interaction with sellers. Customers and competitive pressures will require firms to provide more and better information over the Internet. This will include a greater array of high quality post-purchase customer services. Company accountants will have to provide more information for these enhanced services, account for them, audit them, and possibly manage much more detailed individual customer records.

Companies and their suppliers will broaden and deepen the Internet - Intranet interfaces. Many long term suppliers will have continuous on-line access to specification, production schedules, and sales forecasts of the companies to whom they supply materials products and services. Accountants of the supplying and supplied companies will have to participate in linking databases and information systems of the respective entities, and jointly designing, operating, and controlling those interfaces.

### **Technological Change**

Accountants will be called upon to develop services designed to take advantage of the opportunities offered by worldwide connectivity. The ensuing projections give a glimpse of the forthcoming technological projections future environment.

- *Computer systems will be online and virtually connected.* Organizations up and down of the value chain will share processes and information.
- *Distributed intelligence systems will be prevalent.* Such systems distribute the loci of decisions. In the future, with many localized processes making decisions, there will be substantial decentralization of intelligence. For example, logistic truck routing will be made while en route considering information available at the time over the network.
- *Computer sites will harbor intelligent agents.*<sup>2</sup> Intelligent agents are software systems capable of exercising judgment in making choices. Among them we can find purchase agents, bill paying agents, and information gathering agents.
- Computer systems will be *deskbound, distributed and ubiquitous*, with many computer environment build into appliances With chip / device integration and interplay, many support functions (e.g., menu planning, temperature control, energy management, information routing) will be performed automatically without human intervention.
- Financial systems will be *distributed* and more often than not packaged. Individual development of applications, while more adaptive and easier to absorb, is expensive and error prone.
- Applications will be integrated along functional lines. Value chain related computer systems will span entire production cycles and across organizations. Consequently, corporations will readily recognize common applications and reengineer them for common use

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<sup>2</sup> Vasarhelyi, M. A. & Sareen, V. J., "Towards Intelligent Agents In Accounting: Background and Potential," Rutgers University Faculty of Management, presented at the AI/ES In Accounting Symposium, University of Huelva, Spain, September 1996.

- Monitoring systems will focus on exception reporting and will place heavy emphasis on funds transfer systems. The advent of an all encompassing network, linking internal and public systems will improve the identification and analysis of significant audit variances. For example, the CPAS<sup>3</sup> effort at AT&T Bell Laboratories focused upon “audit by exception,” as opposed to auditing actual reporting. System performance is monitored and exceptions brought to the attention of the auditor.
- Viruses and hackers will continue to permeate the environment. So far, viruses have been primarily inflicted directed by a small number of hackers as proofs of technical proficiency. A bigger risk is posed by the advent of a class of computer criminal geared at hacking for profit.
- Unauthorized invasions will be among the top security concerns. The opening of corporate systems to the Internet and file sharing along the value chain creates major weaknesses in the structure of corporate information systems. Exposures are exploding due to the natural desire to open systems to the clientele, to decrease costs, and increase service.

These technological trends create a set of needs, exposures and opportunities for measurement sciences and management. They also open up great opportunities for the accounting profession. New reporting methods, new auditing procedures, new attestation services, and additional analytical systems and technology call for changes in accounting support systems.

### **Online Accounting Knowledge Platforms and Expert Systems**

The Internet is bound to serve as an ideal medium for the proliferation of on-line accounting knowledge platforms. These will contain papers, lectures, conference proceedings, documents, standards, guidelines, pronouncements, accounting practice, legal precedents, etc. We will also witness the emergence of expert systems in such areas as auditing and tax<sup>4</sup>, as well as in all of the important sub-disciplines of accounting. As a result, a vast body of accounting knowledge with elaborate search engines will be available on-line for the use accounting practitioners, scholars, educators and students.

### ***How the Internet will affect accounting***

Accounting evolution will depend on developments in the Internet and electronic commerce. Accountants will have to use technology to record, analyze and forecast business activity in an online real-time mode.

### **Enhanced and changed disclosures**

The ease of electronic publishing and the ubiquitous nature its display will tempt organization to move from traditional reports to Web published reports. These will first resemble their paper counterparts and then evolve towards the real use of the medium. When IBM first placed its financial report online, it was an exact copy of its printed counterpart. When the 1995 and 1996 reports were placed on the Web site, it already had some Internet medium enhancements. The reader should also notice the “adjusted, unaudited” notice in the header. While interesting, these enhancement are just the tip of the iceberg. Firms, catering to special audiences, will increase their public disclosure (always concerned with the shadow of public liability) of data maybe allowing drill downs to divisional or product data. [e.g., drill downs to SFAS 14 (segment reporting) data, see Figure 1].

### **Broader and Deeper Financial Disclosure**

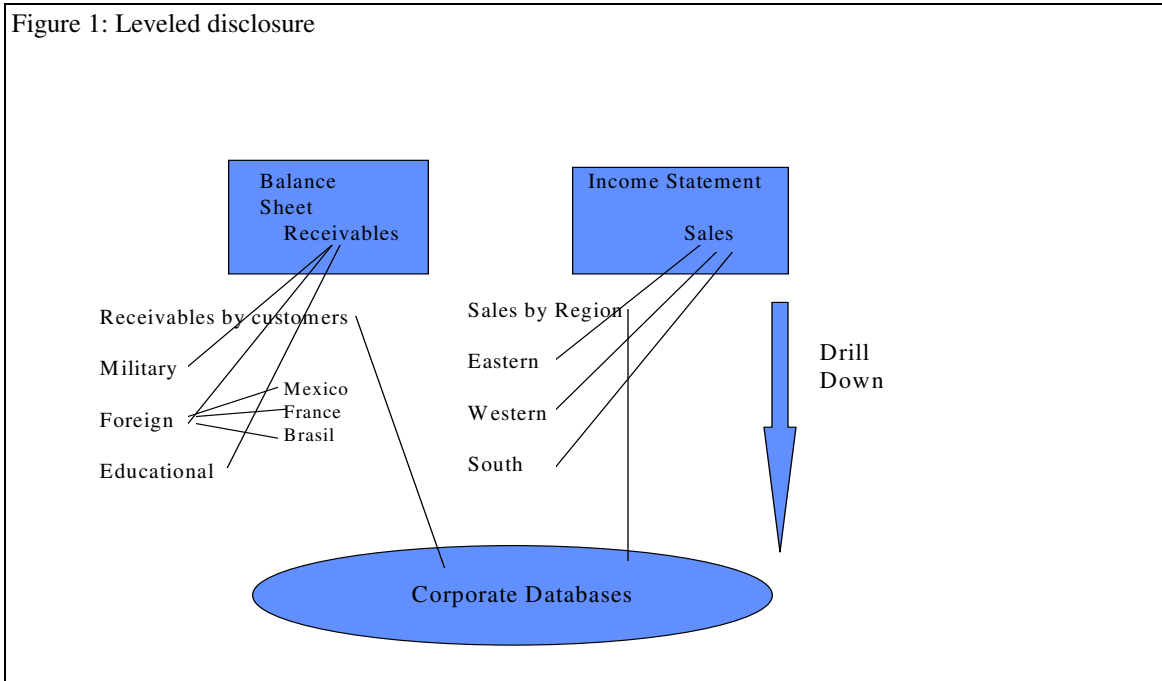
Investors are aware that firms have vast quantities of continuously updated on-line information and that cost of electronic disclosure is decreasing exponentially. Investors will require not only more detailed and timely disclosures but also for permanent on-line links to certain intranet sectors. Consequently we should see an increase in **the scope and frequency** of financial disclosure.

<sup>3</sup> Vasarhelyi, M. A. & Halper, F. B., "Continuous Process Auditing," (with F.B.Halper), *Auditing: A Journal of Practice and Theory*, Spring 1991

<sup>4</sup> See Vasarhelyi, M. A. “Artificial Intelligence and Expert Systems in Accounting and Finance,” Vols. I, II, III & IV, Markus Wiener Publishing, 1993 to 1997 for examples of this emerging technology.

**Scope** entails different *presentation methodologies* as well as *additional information content*. For example, with the IBM chart builder, interactive report presentation allows for the *presentation* of the currently available data in many forms, some of which that best satisfy the individual information needs of the investor. It is also conceivable that organizations would offer supporting layers of information breaking down information from its balance sheet disclosed level to details (drilling down) which support their claims illustrates this mode of reporting. The levels of detail naturally kept in corporate databases, and summarized along many dimensions for management purposes, can be made available to the world for little incremental cost. What will be at issue is the desirability of doing so.

Figure 1: Leveled disclosure



Many accounts (e.g. cash, receivables, inventory) are kept updated in real-time and used for the management of many essential functions. For example, cash balances, in many banks are kept updated on an online real-time basis to allow overnight cash applications. Often these cash balances are updated with reliance on their bank's overnight clearing systems, illustrating reliance on shared data from cooperating systems. Online applications allow for reporting at increased **frequencies**.

The most important remaining barrier to expanded disclosure will be the danger of compromising the confidentiality of strategically sensitive information. This may put the disclosing firms at a competitive disadvantage, thereby potentially hurting the very investors who clamor for these disclosures.

Large creditors and investors will bargain private disclosure deals which will give them **selective and restricted access** to certain information. The legal ramifications of selective disclosure are many and precedents have not been fully established. Accountants will design and manage specialized and dedicated information links between selected constituents and Intranet sectors for these restricted types of financial disclosures. From a public interest viewpoint, restricted private disclosure agreements over the Internet may give some large investors considerable advantages over smaller investors. Regulators will have to rule on the extent to which such differentiated disclosure patterns should be legally permissible. More complex SEC rules and FASB guidelines may result, confronting professional accountants with considerably more complex disclosure compliance and auditing tasks.

## Tax Accounting

The federal government and local government are important constituencies of business. Internet technology is likely to increase the reliance of tax authorities on on-line interactive tax audits. The cost of specific

audits will decrease, thereby permitting to audit more businesses more frequently and more intensely. Increasingly sophisticated on-line expert systems in tax accounting are likely to proliferate. Taxpayers and tax accountants may have to be more careful, meticulous, and alert. Likewise, on-line interactive audit technology will enable governments to audit more comprehensively and frequently business compliance with a host of laws and regulations which will create a more challenging environment for business and government accountants alike.

### **Remote Computer-Based Accounting Services**

Remote tax consulting services, remote bookkeeping, remote financial statement preparation, remote auditing, and continuous auditing processes are progressively emerging as realistic services that may even make a profit. The scope and nature of these services, initially mainly a mutation of traditional services, are rapidly evolving.

### **Goodbye to Ledgers and T-Accounts, Hello to Databased Accounting**

Ledgers, T-accounts and paper-based journals are an anachronism. Computer-based packages are now integrated databases using distributed relational database systems to create views of the performance and management of a corporation. Relational Database products (such as Oracle and Ingres) are progressively the base for a larger and larger percentage of financial applications, often segmented by organizational unit. For example, each division has its own financial set of systems located on a large workstation running Oracle, and one corporate system consolidating results. New accounting rules, new government rules relative to document format and retention will appear and redefine the field taking in consideration the new technological and cost realities. The advent of the Internet greatly facilitate the interface among computerized systems which are geographically and organizationally distributed.

### **Interactive Distance Auditing**

Private accountants for companies and investors will have to design, administer, control, and audit much more complex information networks born out of a variety of Internet - intranet fusion patterns. Public accountants will have to modify their assurance procedures to allow for more information being disclosed with greater speed and frequency.

The Internet will allow for greater reliance on interactive distance auditing. With exceptions for physical inspection of assets, Internet technology will make physical proximity and personal presence in auditing much less important. On-line access to materials, and remote transfer and retrieval of documents, will be enhanced by audio and video capabilities. This will make distance auditing via the Internet fully interactive. Costs of specific audit tasks will be significantly reduced. At the same time the variety, scope and frequency of on-line distance auditing will grow. A large portion of on-line auditing will become continuous.

Continuous on-line distance auditing over the Internet is bound to increase opportunities for more timely detection of serious lapses in financial reporting and financial performance. Commensurably, obligations and legal liability of auditors will undergo substantial changes. Auditors will have to be much more alert and timely in their reporting, recommendations and certification.

### **Other assurance services (of virtual nature)**

The need for measurement of Internet activity, such as number of hits per site, number of impressions of an add, number of purchases directly through the Internet, or purchases facilitated by the Internet, are generating attestation service needs. These areas are prime candidates for CPA involvement and there is an acute need for the AICPA to provide professional statutes for professional guidance. The Elliott Committee<sup>5</sup> of the AICPA took a broad look at expanded assurance services creating a proposed new menu of roles for assurers.

Among the questions that a new environment may raise are:

- Auditors' responsibility in relation to expanded information reporting and online disclosures

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<sup>5</sup> <http://www.aicpa.org/assurance>.

- Is online auditing more like supervision than traditional auditing?
- Should auditors attest to software reliability, integrity, a being free of viruses?
- What type of professional services can accountants provide online?
- Can public accounting firms run e-commerce finance servers and remain independent?

### ***Electronic commerce***

Exponential growth in electronic commerce will challenge accountants to new and demanding tasks. Accountants will have to set new accounting systems, and in the process modify existing accounting procedures. For example, new methods will be required for billing advertising on the Internet and to attest to its effectiveness. On-line selling of products and services may necessitate commensurate on-line accounting entries, postings, reporting, retrieval and electronic signatures.

Accounting rules and procedures for electronic transactions are likely to undergo significant transformations, partly due to changes in legal requirements. For example the timing of revenue and expense recognition, may change if on-line contracts will be judged legally valid and binding at the moment an "enter" key is struck. Accounting for some intangible assets, such as on-line intellectual property may be particularly affected by future legal developments.

The Internet is likely to revolutionize financial service industries. On-line financial investment services could be broadened to include on-line issue of equity and debt. Securities trading could be largely performed on-line rather than on floors of stock exchanges. The use of digital cash and virtual banking will transform accounting for cash and cash transactions. All these developments will require modified and enhanced accounting services.

### **Security of Online Accounting Systems**

The sheer size and number of users of the Internet multiplies the opportunities for security breaches and fraud. This places additional burdens on company accountants to guard against, detect, control, and counter business espionage and financial fraud. Certainly, the role of forensic accountants will grow. They will have to become increasingly familiar with security technology over the Internet. Accountants will have to play an important role in designing information systems which meet security requirements. Additionally, detection and prevention of fraud and espionage will require a mix of accounting and technologic knowledge. Forensic accounting will also become increasingly preoccupied with counter intelligence.

### ***Concluding Remarks***

Accountants, being information providers, are natural agents and users for information technologies. In an environment of continuous contact with customers, electronic care, and continuously changing costs and benefits new roles and activities are emerging. In a computer environment that will link many processes, intelligent agents performing many functions, deskbound and distributed, monitoring features will emerge to facilitate accounting practice and enable online auditing. Risks and exposures, particularly of intrusion and viruses, will present new challenges to accountants.

Disclosure change both in scope and frequency. Broader and deeper financial statements, with drill downs and user based presentation, will push the limits of the current standards and acceptable practices. Managers, as well as accountants, will have to get used to this environment and adapt their practices to a new world.

As the spread of the Internet revolutionizes access to information and spawns electronic commerce, it is bound to profoundly change accounting information systems and professional practices in auditing, financial reporting, management accounting, tax accounting, forensic accounting and business intelligence and counter intelligence. Many of these developments will be affected by future legal changes relating to electronic transactions, on-line contracts, and intellectual property rights.