The Impact of Electronic Commerce on Information Technology Auditing

Amelia A. Baldwin (E-mail: abaldwin@cba.ua.edu) University of Alabama, Tuscaloosa
Michael K. Lavine (E-mail: mlavine@towson.edu) Towson University

Abstract

The changes that Electronic Commerce (EC) brings to business are dramatic and greatly impact the way organizations conduct many of their traditional, core business processes. While building on traditional Electronic Data Interchange (EDI) capabilities EC is bringing about changes in the way that information technology auditors conduct their work. In the Information Age, when technology continuously gets faster, less expensive and more complex what are the critical issues that accountants and IT auditors be focussed on to benefit their client organizations? This essay addresses some of 'hot topics' in EC, as they relate to IT auditing and the accounting profession as a whole.

Introduction

A tremendous amount of change in the traditional business paradigm has been occurring over the past two decades. The modern world has made huge A tremendous amount technological advances in the way trade is conducted across the globe.

For centuries, the economies of the western world were based almost entirely on the land and other natural resources; this formed what economists considered an agrarian society. Since the time of the Industrial Revolution society slowly moved to a manufacturing environment. Major city centers developed around factories that produced consumer and commercial products that enabled large-scale growth in the general economic strength of 'first world' countries. This situation progressed until the middle part of the twentieth century, and remains in a state of continuous change

Readers with comments or questions are encouraged to contact the authors via e-mail.

As lesser-developed countries become more prosperous, traditional first world countries are migrating to become strong service oriented economies. Currently, this situation is causing a dramatic shift in the way young professionals pursue education and employment opportunities. Furthermore, the economy of today is faced with rapid advances in information technology and science that exponentially effect our business and personal lives. The most dramatic technological innovation that our generation has been fortunate enough to witness is the Internet.

The Internet was originally used to share military, research and educational information within the academic community in the United States. The original model facilitated the interchange of this information to and from various local networks based on university campuses and military installations around the country. Today, while many individuals still use the Internet for educational purposes; the commercial benefits of this medium are just beginning to be realized.

Those organizations that can exploit this technology for its commercial benefits; while understanding and mitigating its inherent risks are likely to gain competitive advantage.

What is Electronic Commerce?

Today, electronic commerce is the business model of choice for many consumers and businesses. Electronic commerce is much more than Internet shopping, which is becoming so familiar today. Electronic commerce includes business processes that are enabled by the Internet and the World Wide Web technologies (CREC 1999).

Broadly, electronic commerce includes using technology to:

- automate communication and business processes,
- create closer relationships with partners, suppliers and customers, and
- deliver information, goods and services more efficiently and effectively.

Thus, electronic commerce is really a mindset of doing business by applying technology wherever appropriate within the business organization, its processes and relationships. Similarly, PricewaterhouseCoopers uses the term e-business:

E-business is using electronic information to improve performance, create value and enable new relationships between businesses and customers (PwC 1999).

Common technologies used by EC-enabled companies include electronic data interchange (EDI), and electronic funds transfers (EFT). EC-enabled companies may continue to interact with customers in traditional ways, but can now use technology to enhance their customer relationships, for example, through web storefronts and easy-to-use e-payments. Likewise, investor relations may also be enhanced by electronic means of communicating financial and other business information.

The following figure depicts a general

overview of modern EC. The major elements that interact with an electronic commerce enabled company are not new – they are customers, suppliers, creditors, and investors. Rather, the interfaces between these elements have changed. Electronic technologies such as Internet hardware and software, enable closer relationships, better communications and the ability to improve performance.

By incorporating all parties in the supply chain and transmitting data and funds electronically human intervention and error can be greatly reduced. Therefore, costs decrease, service improves and competition is sustained. In reality, a company will likely gain many if not all of these advantages providing they can successfully implement enterprise wide electronic commerce solutions.

Electronic commerce is experiencing a phenomenal growth rate. In fact, according to a recent study business to business electronic commerce in the US alone is expected to reach 220 billion dollars, and consumer to business electronic commerce should reach 140 billion dollars by 2003 (McDonald 1999). With this large magnitude of potential, the important role of accounting and auditing in the electronic commerce business paradigm cannot be overlooked.

Accounting and Auditing in the Electronic Age

This essay focuses on some of the most important accounting and auditing issues in electronic commerce. By no means, is this an all inclusive set of ideas, and our underlying position is that the traditional accounting and auditing paradigms need to adapt more quickly to new technologies and proactively assist their organization(s) in achieving their business objectives. As well, we believe that the EC paradigm provides an environment in which auditors can conduct their reviews in near real-time, depending on the internal IT processes and timetables.

Clearly, the growth of electronic commerce, and its likely acceptance as the main-

Figure 1. The Electronic Commerce Enabled Company.

Figure 2. The Role of Accounting and Assurance Services in Electronic Commerce

stream business paradigm, means that accounting and assurance services will become even more important. These services, particularly assurance services, are the buffer between the technology and people issues of electronic commerce, as shown in Figure 2.

Clearly, as the electronic commerce business model becomes the norm, opportunities for expanded and enhanced accounting and auditing services will grow exponentially. In addition, the importance of the auditor's technology knowledge and skills will also increase over time.

Electronic Commerce Challenges

Three of the most dramatically evolving areas that must be considered by accountants and auditors are the dramatic changes in the internal control environment, IT security, and emerging technologies.

Dramatic Changes in the Internal Control Environment

Auditors are no longer focussing their efforts on pulling invoices, selecting samples and substantive happening with the basic management control processes found in the overall internal control environment. One major force driving these changes is enterprise computing.

Enterprise Resource Planning

The new era of flattened management structures and employee empowerment have yielded a new mentality in the corporate world. Additionally, powerful enterprise resource planning (ERP) systems like SAP, PeopleSoft and BAAN now offer tightly knit modules some which provide automated processes for: workflow, inventory control and interfaces for financial reporting. More than ever, many front-line supervisors have more authority and control over day to day operations; this situation should be addressed by accountants and auditors who seek to balance rewards and mitigate risks.

Enterprise computing reduces the need for multiple interfaces to stand alone applications.

This can save on costly customizations, on-going maintenance costs, and potentially labor costs for support personnel. In the next century, IT auditors need to take a broader approach to traditional auditing. Their organizations will continue to see an increase in competition and auditors need to assist management in growing the business. With data as the key component of management decision making, incorrect, irrelevant and untimely data could result in disaster for a company.

While ERP systems can yield very large financial savings; proper set-up/configuration, on-going maintenance and data integrity are crucial issues that require involvement and continuous review by accountants and auditors. Auditors can provide near real-time auditing via computer assisted audit techniques that will increase their reliance and use of near real time information to make key operating and strategic decisions. In the new millennium, we can expect more enhancements to the ERP systems, as well as new applications to functionally link e-commerce, legacy, decision support, data warehousing and data mining tools.

Financial Reporting

Furthermore, improvements in the yearly financial statement audit process can be significantly improved if auditors can develop a greater understanding (through technical knowledge/expertise and computer based testing) of the systems used by their client organizations and the control features inherent in the application. In doing so, it is likely that the amount of substantive testing can be reduced due to a higher reliance on tests of controls. In the end, this will create a more efficient more audit with truly value-added comments for management's consideration. The key is better technology proficiency for auditors. This is not an insignificant goal, given the rapidity of technological change we are currently witnessing.

Dramatic Changes in IT Security

New tools used by businesses to control and implement IT security will also impact the approach to auditing in the next millennium. Se-

curity of company data including the use of certificate authority and IT outsourcing arrangements require important controls and safeguards.

Certificate Authorities

Organizations are embracing the role and functions of Certificate Authorities (CAs). Global service providers such as GTE, Verisign and others have developed offerings that can be utilized by multi-national corporations. Password authentication and encryption will remain key IT security features in the next millenium and CAs can be an excellent method of supporting these controls. In this aspect, whether these functions are managed internally or outsourced to a third party provider, it will be important for accountants/auditors to increase their involvement and review efforts in this area.

Outsourcing

IT outsourcing has been become the norm in many companies. As organizations continue to struggle to find the appropriate human resources to fill IT positions many have opted for an outsourced arrangement. While these agreements free the company from the hassles and difficulties of recruiting, retaining and developing IT personnel; it also poses a large risk to the enterprise. In completely outsourced environments, the company relies on a single outside party to run and maintain its information systems. With marked increases in competition the organization puts a tremendous amount of reliance in its outsource provider. If IT security is outsourced as well, access control and data security issues can easily go unaudited or undetected. Theft of data is not beyond the realms of imagination. Hence, the importance of the role of auditors in companies which utilize IT outsourcing cannot easily be overstated. Clearly, auditor proficiency in audit, security and technology, are all of major importance.

Dramatic Changes in Emerging Technologies

Emerging technologies are those whose application is novel and that are little understood. Technologies cease to be "emerging" when they

have either become incorporated in the mainstream of information systems or are now obsolete. Two emerging technology issues that may prove important to auditors are virtual private networks and intelligent Internet agents

Virtual Private Networks

A Virtual Private Network (VPN) extends the boundaries of traditional wide area networks. By using the Internet as the link between the selling party and the consumer organizations are able to dramatically reduce their telecommunication costs. Furthermore, VPNs can provide connectivity for geographically dispersed telecommuters and road warriors. In standard Wide Area Networks (WANs) high-cost, leased lines would need to be maintained; whereas today the Internet can be utilized as cost-effective replacement. However, typically rely on multiple Internet Service Providers (ISPs) to provide these services because not all ISPs provide services in all areas needed by the company. This situation presents an important risk to the business.

Intelligent Internet Agents

An intelligent Internet agent is a system that uses the mobility of the Internet to perform human-like tasks. These software agents can be used to simplify data collection and analysis, and a number are currently in development and use. Examples with applications to accounting and auditing include: EdgarScan™ (PricewaterhouseCoopers), Fraank (Rutgers U./U. Kansas), Warren (Carnegie Mellon University), and numerous agents developed by Andersen Consulting (Andersen Consulting 1999).

The potential of intelligent Internet agents is important to accountants and auditors for two reasons. First, these agents can assist in the performance of accounting and audit tasks. Some of them are already used for financial statement analysis tasks. Others, such as Fraank, are being developed to make real time auditing easier.

Second, this emerging technology is important because of its inherent risk. Companies who use intelligent Internet agents will need as-

surance that the technology is providing exactly what is needed. In addition, security breaches by mobile agents are a possible risk. Safeguarding against unwanted intrusion by agents gathering information may become an important security and audit issue.

Suggestions for Future Research

The type of future research could include empirical as well as applied studies as to the effectiveness of E-Commerce related assurance services, IT security practices and privacy issues. Additionally, best practice information in the outsourcing, risk management and supply chain management might be investigated to consider the effective use of ERP systems and emerging technologies.

Conclusions

Electronic commerce is a wonderful new approach to trade. It requires a significant new understanding and approach by accountants and auditors. The most significant of which are the impact on the internal control environment, IT security and emerging technologies. Accountants and IT auditors should more aggressively and proactively help their organizations capitalize on innovation, while still maintaining a calculated approach to business risks, controls and rewards. This new business environment also creates many exciting opportunities for accountants and auditors to learn new technologies and develop new IT skills. By increasing our own professional development programs and adding more information systems specialists to our own organizations, we can migrate from the traditional 'tick and flick' financial audit approach of the twentieth century to forging closer relationships with our auditees and look for better opportunities in the new millennium.

Note: The views expressed in this paper are strictly the personal opinions of the authors, and do not reflect the opinion(s) of their affiliated organizations.

References

1. Andersen Consulting (1999). Intelligent Agents. Available online: http://www.ac.com/services/cstar/cstar_child/ecagents_cn.html (Accessed 15 June 1999).
2. EdgarScan TM (1999). An intelligent Internet agent created by PricewaterhouseCoopers. Available online: <http://edgarscan.tc.pw.com/> (Accessed 15 June 1999).
3. FRAANK (1999). An Intelligent Internet Agent. Available online: <http://lark.cc.ukans.edu/cgiwrap/sirvasta/agent.cgi> (Accessed 15 June 1999).
4. Gillooly, Carolyn, "Enterprise Management - Is the Promise of Enterprise Management Too Good to Be True?", *Information Week*, February 16, 1998, pp. 42-46
5. Julian, Ted, Hannigan, Brendan, Goodtree, David, Davis, Ashley and Wakeman, Matthew, "Turning Security on its Head", *The Forrester Report*, Volume Thirteen, Number Two, January 1999
6. Karake, Zeinab A., *Information Technology and Management Control*, Praeger Publishing: Westport, Connecticut, 1992
7. McDonald, Scott, "Spotlight: Corporate E-Commerce Kicks Into Gear", *The Industry Standard*, March 29, 1999, p. 46
8. PricewaterhouseCoopers (1999). What is E-business and why PricewaterhouseCoopers? Available online: http://www.e-business.pwcglobal.com/why_pwc/definition.asp
9. PriceWaterhouse (1998). *Technology Forecast: 1999*.
10. Taylor, D. and Berg, T., "The Business Value of Electronic Commerce", *Strategic Analysis Report*, GartnerGroup, September 25, 1995
11. Warren (1999). An intelligent Internet agent created at Carnegie Mellon University. Available online: <http://www.cs.cmu.edu/~softagents/warren/> (Accessed 15 June, 1999).