The use of Internet technology for corporate reporting is now a well-established activity in countries that have developed securities markets, raising many questions for the provision of audit and assurance on such reports. This paper reviews the state of guidance provided by securities regulators and audit standards setters. We find that, notwithstanding the recognition by various audit standards bodies of the need for further guidance to auditors on the implications of Internet financial reporting; the actual pronouncements made thus far by the various bodies around the world fall considerably short as a response to the challenges that arise from current and future Internet reporting technologies. We point in particular to shortcomings related to the way in which users interact with Internet financial reporting web sites, the implications of this interaction and on what we term ‘information component’ technologies such as the XML-based eXtensible Business Reporting Language (XBRL). The paper sets out a range of institutional, standards setting and technological solutions to these issues.

Key words: Internet, business financial reporting, audit, XBRL, standard setting pronouncements and guidelines
function associated with Internet financial reporting, the validity of the traditional boundaries of the audit function in an Internet-based disclosure environment, and the appropriateness, and use, of the audit report associated with Internet financial reporting. We review the state of guidance provided by securities regulators and audit standards setters. We find that, notwithstanding the recognition by various audit standards bodies of the need for further guidance to auditors on the implications of Internet financial reporting, the actual pronouncements made thus far by the various bodies around the world fall considerably short as a response to the challenges that arise from current and future Internet reporting technologies. We point in particular to the way in which users interact with Internet financial reporting web sites and the implications of this interaction and on what we term ‘information component’ technologies such as the XML-based eXtensible Business Reporting Language (XBRL). We discuss a set of institutional, standards setting and technological solutions to these issues. At the same time, we recognize that these solutions are partial only and that much research is required from both natural- and design-science perspectives.

1. INTRODUCTION

The use of Internet technology for corporate reporting is now a well-established activity in many countries that have developed securities markets (Deller et al., 1999; Ettredge et al., 2002; FASB, 2000; IASC, 1999; Lymer and Tallberg, 1997; Pirchegger et al., 1999; Richardson and Scholz, 2000; Trites, 1999). From a supply perspective, any corporation in the world wishing to build an international profile or tap international sources of funds must have a corporate web site that includes an investor relations component. From a demand perspective, investors rely increasingly on corporate web sites for periodic and annual financial statements and also for press releases, speeches, investor conference calls as well as links to product and other information (Allam and Lymer, 2002; Ettredge et al., 2000; Richardson and Scholz, 2000). Increasingly securities regulators are mandating the use of the Internet for corporate performance disclosure purposes.

In the USA, for example, the Securities and Exchange Commission has proposed a rule that would require filers to disclose in their annual report (Form 10K) whether the various SEC reports (10K, 10Q, 8K) are available on the company’s web site and, if not, provide reasons why such access is not made available (SEC, 2002). The Internal Market Directorate-General of the Commission of the European Union has proposed a package of measures that would enhance corporate transparency. The Commission envisages that corporations listed on European exchanges should be able to use their web sites as the primary means of disclosure (European Commission, 2002). The Commission also proposes that national exchanges or regulators provide a repository function that would allow interested parties access to corporate disclosures. Finally, the Commission has proposed that larger corporations issue quarterly reports.

The rapid increase in voluntary and mandated Internet financial reporting brings the issue of audit of such disclosures firmly to center-stage. This paper addresses the role of the audit function associated with Internet financial reporting, the validity of the traditional boundaries of the audit function in an Internet-based disclosure environment, and the appropriateness, and use, of the audit report associated with Internet financial reporting. We review the state of guidance provided by securities regulators and audit standards setters. We find that, notwithstanding the recognition by various audit standards bodies of the need for further guidance to auditors on the implications of Internet financial reporting, the actual pronouncements made thus far by the various bodies around the world fall considerably short as a response to the challenges that arise from current and future Internet reporting technologies. We point in particular to the way in which users interact with Internet financial reporting web sites and the implications of this interaction and on what we term ‘information component’ technologies such as the XML-based eXtensible Business Reporting Language (XBRL). We discuss a set of institutional, standards setting and technological solutions to these issues. At the same time, we recognize that these solutions are partial only and that much research is required from both natural- and design-science perspectives.

The remainder of this paper proceeds as follows: in the next section, we set out some background to Internet financial reporting and set out a range of issues addressed in the relevant literature. In Section 3, we review and analyze the relevant professional pronouncements on auditing and assurance of Internet financial reporting. In the
following section we then point to a number of gaps we perceive between these pronouncements and both current and future technologies. In this fourth section, we also point to some technological solutions to these gaps in the context of XBRL. In Section 5, we make concluding comments and examine a future research agenda.

2. BACKGROUND

The reporting of corporate performance has undergone a critical change in the period since the beginning of widespread commercial adoption of the Internet. IASC (1999, 53) sets out a three-stage process by which corporations use the Internet for corporate performance reporting. In the first stage, corporations use the Internet solely as another distribution channel for their existing printed financial reports. Typically, in this stage a corporation provides annual reports only, in HTML or Adobe Acrobat format. In the second stage, corporations move to disclose their information in a form with which Web browsers and search engines can readily interact. Finally, in the third stage, corporations provide not only the standard information that could be expected in a printed report, but also provide enhanced or expanded information that cannot be produced cost-effectively in a print format. They may also provide interactive tools with which to analyze the information.

In the intervening period since the publication of the IASC report, we have seen many corporations moving along this three-stage process. These corporations have developed detailed investor relations web sites containing a wide range of corporate reporting information. The low cost of information provision and widespread availability of new web technologies, such as RealAudio, to support online delivery of wider ranges of information types has enabled corporations to increase the range of information made available. Investor relations sites now regularly contain not only annual reports, but also quarterly reports, corporate press releases, corporate presentations, white papers and links to product information, analysis tools, stock/share tracking facilities and other features (Allam and Lymer, 2002).

Although annual financial statements and the audit report now play an arguably less important role in the tapestry of information transfer between corporations and stakeholders than they may have done so in the past, they continue to play a central role in maintaining the quality of such information flow (see, e.g. DiPiazza and Eccles, 2002; La Porta et al., 2000; Levitt, 1999; Pitt, 2002). The manner by which audit reports are transmitted to users in an Internet-based financial reporting world remains a worthy matter for research and professional endeavor.

2.1. The provision of online audit reports

The various academic and professional reports referred to previously show that more than two thirds of large corporations based in countries that have developed securities markets make some form of Internet financial reporting. In markets such as the USA, UK, Australia, Canada and Hong Kong effectively all major corporations now make use of such disclosures. Allam and Lymer (2002) illustrate the extent of this development in these markets as summarized in Table 1.

While these studies show that corporations have rapidly adopted Internet financial reporting, they also show the extent to which audit reports were displayed on a corporation’s web site varied considerably. The audit report was rarely fully associated with the full annual reports to which it related. Table 2, adapted from IASC (1999) and Allam and Lymer (2002) illustrates this point.

This position reflects little change from a study made in Europe in late 1998 by Debreceny and Gray (1999). Their study indicated that of the fifteen largest corporations in each of the UK, Germany and France (45 in total), each of which already had a web site by that point, only ten provided their audit report online in any form. Not one firm linked their audit report to the relevant auditors’ web site. Nor did any site provide any kind of signature on the document, even an image of the signature. Only four web sites had hyperlinks between the report and other parts of the financial information displayed on their site. This indicates that the corporations did not place a high degree of emphasis on the role offered by these reports as value bearing documents.

The 1999 IASC study found only 36% of companies surveyed provided auditor reports (IASC, 1999). The FASB survey of US companies in late 1999 (FASB, 2000) suggested 35% of their sample did not provide reports at the time; 19% providing unsigned versions of audit reports and the remaining 46% providing signed reports as would be expected to be associated with paper versions of the annual reports.
Table 1: Attributes of financial reporting web sites of five countries as at end 2001 (based on Allam & Lymer, 2002, table 3, p. 10)

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<th>UK %</th>
<th>Canada No.</th>
<th>Canada %</th>
<th>Australia No.</th>
<th>Australia %</th>
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</table>
Table 2: Comparison of percentages of top 50 (Allam) or top 30 (IASC) companies in geographic domains who provide key elements of an annual report on their web site for accounting periods ending to end 2001 (Allam) or mid 1999 (IASC) (Source: from Allam & Lymer, 2002, table 3, p. 10 and IASC, 1999, table 6, p. 55)

<table>
<thead>
<tr>
<th>Financial Summary</th>
<th>Balance Sheet</th>
<th>Income Statement</th>
<th>Cash Flow Statement</th>
<th>Notes to Accounts</th>
<th>Audit Report</th>
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<tr>
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<td>98</td>
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</table>
The most recent review available of audit report use in association with online financial data (Allam and Lymer, 2002) suggests much greater availability of audit reports is now the case (see Table 1 for country-specific details). They report 96.4% of companies across their sample of 250 companies provide such data (maximum 100% availability in Canada to a low of 89.8% in Hong Kong). Of these, however, 44.6% of the sample still provided unsigned reports (although the name of the auditor or auditing firm was usually present).1

2.2. The issues

The development of Internet financial reporting brings into focus a number of issues for the external audit function that are discussed in this section.

The scope of verification

Many authors highlight the change in roles that may be required of the external auditor as reporting activity moves from paper-based to online reporting (e.g. AICPA, 1996; Wallman, 1996; Wyatt, 1997). In a paper-based reporting environment the extent to which auditors are required to specifically examine other information is limited to that produced as part of the package of the annual report (Debreceny and Gray, 1999). As financial reports are normally delivered as just one part of a corporate web site, misleading information may potentially be presented alongside the financial data for which the auditor is primarily responsible. The determination of the boundary of the external auditor’s responsibility may therefore become problematic.

Allam and Lymer (2002) discuss the techniques used by companies to provide guidance to users of their information on their location within the reporting environment, or as the FASB (2000) report terms it, providing indicators of the user being ‘Inside the Annual Report’. Debreceny and Gray (1999) note, the responsibilities of auditors to evaluate information other than the financial statements is much less clear when those statements form just one part of a comprehensive investor relations web site. Current auditing standards require auditors to examine a range of additional information. For example in the UK context, requirements include examination of the Director's Report and the Operating and Financial Review (OFR) now provided by many corporations as part of their annual reporting process (Arthur Andersen, 2000). The further a user traverses the corporate web site from the Internet financial reporting component, the less information displayed that is of a business reporting nature, with the associated clearer reporting restrictions. This creates a potentially misleading situation for the user of this data.

Extent of reviewed information

As Debreceny and Gray (1999) note, the responsibilities of auditors to evaluate information other than the financial statements is much less clear when those statements form just one part of a comprehensive investor relations web site. Current auditing standards require auditors to examine a range of additional information. For example in the UK context, requirements include examination of the Director's Report and the Operating and Financial Review (OFR) now provided by many corporations as part of their annual reporting process (Arthur Andersen, 2000). The further a user traverses the corporate web site from the Internet financial reporting component, the less information displayed that is of a business reporting nature, with the associated clearer reporting restrictions. This creates a potentially misleading situation for the user of this data.

Depth of reviewed information

The depth to which data is audited has also been questioned within the context of the scope of verification (e.g. Cushing, 1989; IASC, 1999). An online reporting environment may enable users to drill down into reported data to remove layers of aggregation. If this facility is provided a point will soon be reached at which information is not audited, as the traditional audit function will not be able to place acceptable levels of verification on such disaggregated data as part of the traditional audit engagement.2 This issue is perhaps the most hotly debated of those raised in this section and the recent auditing guidance on the audit of the use of the Internet in business activity has much to say on this issue (e.g. AASB, 2001; IFAC, 2001).

Reporting issues

A number of papers highlight specific issues of concern in relation to the audit of Internet financial reporting. Debreceny and Gray (1999) discuss the following issues:

- Is the audit opinion safe from change by the client or other party?
- Should the web-based auditor’s report reside at the auditor’s or the client’s web site?
- What weight should be given to an auditor’s report date when documents on the web can be changed?
• Should the auditor allow hyperlinks to, and/or from, the auditor’s report?
• The look and feel of the auditor’s report.
• The expression of authority of audit statements.
Most of these issues are still current and have not been addressed as yet by professional standards setting bodies. Ashbaugh et al. (1999) also addressed the role of the auditor in ensuring the reliability of reported data online. In their examination of US online corporate reporting activity, Ashbaugh et al. (1999) reported that only 35% of responding firms provide any form of direct assurance to users of their web sites as to the accuracy of the information they provide online. They also suggest that even where this assurance is provided, the extent to which this is fully provided and clearly visible to users is very limited.

3. PROFESSIONAL PRONOUNCEMENTS
Professional auditing and accounting standard setters and regulators are clearly aware of the rapid development in the use of global communications media for the distribution of corporate reporting data. A number of existing regulations have been changed to address the growth in the use of this distribution media. While still limited in number and scope, some new regulations addressing issues of online availability of data have also been issued. This section briefly reviews a number of related announcements that are of interest to the extent that they modify the audit regulatory environment. The following section reviews the relevant pronouncements of auditing regulators and standard setters.

3.1. Guidance from non-audit standards setters and related organizations

IASC
In November 1999 the International Accounting Standards Committee published a commissioned study, Business Reporting on the Internet (IASC, 1999). This report reviewed the development of Internet financial reporting as well as non-financial corporate performance data. Amongst other matters the report proposed the short-term need for a code of conduct for Internet financial reporting as well as a longer-term review of the need for more specific accounting standards and amendments to existing standards related to release of reporting information electronically. The proposed code included elements related to the audit of Internet financial reporting. The audit-related elements of the proposed code included (i) requiring indication of whether or not specific items of data had in fact been subject to external verification; (ii) which GAAP (or GAAPs) had been used in their creation or calculation, and (iii) how excerpts from financial statements, and their related audit statements, should be shown if made available outside of the context of the full statements in an annual report.

The proposal for a code also suggested that auditors would play a role in (i) ensuring the web site made clear which information they took responsibility for; (ii) outlining areas where the reporting entity had deviated from the Code of Conduct and for what reasons, and (iii) monitoring changes and developments to the corporate web site. The IASC report suggested that such a monitoring role would enhance the quality of the corporate web site and boost the perceived value to investors.

This proposed code was the subject of a joint working party of the (now) IASB and IFAC during 2000 but was suspended as an IASB Staff project with the launch of the new Board in July 2001 before the final code was agreed. Auditing related elements of the Code continued to be developed by IFAC, however, and were issued in August 2002 in the form of a Staff Discussion Paper on this topic (IFAC, 2002). Amongst wider corporate governance issues, this paper emphasized the need for directors to ensure that Internet financial reporting was produced with the same integrity as paper form reports (para. 9), that a specific agreement outlining the extent to which audited information was included on the corporation’s web site (para. 12.ii), that a clear distinction between audited and un-audited information was made (para. 13) and that access to the auditor’s report should be ensured (para. 24.i).5

ICSA
In conjunction with the Department of Trade and Industry in the UK, the Institute of Chartered Secretaries and Administrators (ICSA) produced guidance on electronic communication with companies in the form of a Consultative Document (ICSA, 2000). This document addressed issues of detailed procedure in implementing an electronic communications strategy for shareholders of UK...
companies. Much of the guidance given in the proposal would result in a direct impact on the internal audit function, with somewhat fewer implications for the external audit function. The consultative document notes that artifacts, such as the use of page numbering systems, are inappropriate ways of referring to online information. The Consultative Document asserted that alternatives better suited to online presentation of information are required.

The document also suggests that the use of hyper-linking of information sources can lead to confusion in the message being created by specific data sets such as annual reports and that care should be taken in placing these links in the web site to reduce this risk. The ICSA suggests that firms clearly differentiate audited data, or data verified in some other way, from un-audited information. One method of separation could be by watermarking the web page in some way.

The document also recommends that the home page of company’s web site should include a direct link to the package of statutory information it is required to make public, at present through other means. This, by implication, suggests the best practice recommendation is that corporations should make such information easily available through the Internet.

Most companies in countries with developed securities markets now follow these guidelines implicitly, if not explicitly, as representing what has become normal practice for Internet financial reporting (Allam and Lymer, 2002).

UK accounting standards board

In February 2000 the UK Accounting Standards Board (ASB) published a discussion paper as part of its ‘Year-end Financial Reporting Structure’ project. This paper proposed a shift in emphasis from full annual reports produced sometime after the year-end (the present reporting pattern) to releases of summary data much closer to the year-end reporting date. Full, audited, statements would then follow at a later date.

The paper explicitly addressed the issue of reporting via the Internet in considering the changing role of the Annual Report. The ASB considered that further regulation should include requiring corporations to release their preliminary data online. The paper also repeated the issues of inconsistency and misunderstanding as critical issues for consideration by auditors due to the potential of the use of technology to create or enhance these reporting concerns.

Comments on this document were required by the end of May 2000. As the work engaged in by the ASB is occurring at the same time as a wider UK review of Company Law, the ASB has passed the details of the discussion caused by this document to the working party tasked with this legal review. Both the final report of the UK review, released in July 2001, and the subsequent White Paper issued by the UK Government, included direct references to the importance of developments in Internet financial reporting to the future corporate reporting framework envisioned for the UK. This has raised the significance of this topic, in the UK at least, to the highest level.

US financial accounting standards board

Under the Business Reporting Project framework, the FASB has also made statements relating to auditing Internet financial reporting. The first report issued as part of this project, Electronic Distribution of Business Information (FASB, 2000), also addressed the issue of timeliness of information disclosure using Internet financial reporting and how this should be effectively integrated with previously issued information in various formats. This report also discusses concerns the authors have related to completeness of information disclosed. They argue that because information is not packaged together in Internet financial reporting in the way it is when printing the annual reports and distributing them physically, then the inherent contextual link between the data items can be lost.

Of the other issues this report outlines, risks associated with inappropriate hyper-linking of information from different sources of differing natures is also suggested as being an issue of which auditors may need to be aware.

3.2. Securities markets regulatory responses

This section examines a limited number of studies and reports released by bodies from security market regulators, accounting standards setters and other bodies, particularly professional accounting bodies and government bodies. The primary regulations related to release of corporate reporting data are set in most countries by security market regulators and these regulatory bodies were the first to amend existing, and to create new,
regulations directly related to the distribution of corporate reporting data via the Internet. The first such bodies to make these kinds of announcements were the French Securities Regulator (Commission des Operations de Bourse – COB) and the Toronto Stock Exchange (TSE). These bodies have been followed by others, including the London Stock Exchange (LSE) and the Securities and Exchange Commission (SEC). These bodies have not made pronouncements specifically related to auditing of Internet financial reporting but rather to the more general issues of information quality, reliability and availability. The COB has, however, expressed concern over the speed of the development of adequate audit guidelines for Internet financial reporting (COB, 2000). The COB has issued three versions of their general online reporting rules (COB, 1999a; 1999b; 2000). The most recent version goes as far as to specifically address the need to develop externally validated internal controls for release of corporate data, although does not prescribe how such controls should be implemented. The COB is concerned about the distribution of false information via web sites, and other electronic means, and is concerned that the auditing profession appears to be slow in addressing these issues (COB, 2000).

**UK Electronic Communications Act**

After a lengthy consultation period the Electronic Communications Act took effect in late 2000. This law creates the legal framework in the UK for electronic communications for many reporting purposes by making amendments to the Companies Act 1985. The reporting practices influenced include statutory filings, communicating with shareholders, issuing summary information, signing of documents, and issuing of the multiple notifications corporations are required to post at various points in their life cycle. The underlying tone of the Act, and the various Orders under the Act, is one of permission rather than requirement. This means that corporations and shareholders can use electronic means to communicate with each other provided both parties are willing for this to happen. Neither party can force the other to use these means. Traditional means of communicating reporting events on paper are likely to continue for the near future at least. As this law is relatively new, we cannot yet determine what effect the change in the legal foundation for online reporting will in fact bring to reporting practices.

### 3.3. Auditing standards setter responses

#### Australia

The most developed pronouncement on the role of the auditor in the context of online reporting of corporate data is the Australian Audit and Assurance Standard Board Auditing Guidance Statement AGS 1050 – Audit Issues Relating to the Electronic Presentation of Financial Reports (AASB, 1999). The expressed aim of this statement was ‘to provide guidance for auditor when an entity uses information technology for the presentation of audited financial information on a public network such as the Internet’ (Para 01). The statement reiterates basic principles by emphasizing that ‘responsibilities of management and the auditor do not change when the financial report is electronically presented’ (Para 04). Although primary responsibility for reporting remains with management, AGS 1050, however, suggests that releasing financial reports electronically may change the auditor’s approach to their audit procedures and the communication of the audit report (Paras 04 and 16). AGS 1050 identifies specific issues for the auditor together with the assistance of management. Attention to these matters is primarily to reduce risk that the audit report on the entity’s financial report is inappropriately associated with un-audited information on the entities web site (Para 05). Interestingly, the guidance suggests that assurance engagements related to other aspects of the web site should not form part of financial reporting audit engagement itself (Para 06) and should be agreed with management as a separate engagement.

Explicit recognition is required in engagement terms of the audit of the fact that the characteristics of online reporting may increase risk of mis-association of audited and un-audited data to which the audit report relates, and to other presentation issues, such as the integrity of the web site and links to other information or other web sites. The guidance suggests the engagement terms explicitly drawing management’s attention to the need for appropriate controls do not form part of the financial audit. An example paragraph provides additional direction for auditors. The
suggestion is also made that unambiguous management representations be sought on these issues to protect the auditor (Para 38).

To address the issue of separating audited information from un-audited information, the guidance proposes (Appendix 1 Para 07) that audited information and un-audited information should not form part of one composite section of a web site. The guidance considers the need for auditors to be concerned with the use of their report in connection with potentially dynamic information delivered through a web site. It makes the point that current audit report forms are primarily suited to traditional, printed, annual reports. The provision of the same report on the electronic version of the annual report may therefore not be adequate for the purpose. Areas of concern raised by the guidance in this respect include the reference to page numbers in an audit report, the dating, and the signature of the report (Paras 23–26). Appendix 3 of the guidance discusses the nature of fixed format electronic delivery, such as the use of Adobe Acrobat (PDF) versions of reporting information, in this regard. The guidance suggests that even though page numbering may then be consistent, it is unlikely to be adequate as more corporations move away from the provision of information solely in this format because of the reporting constraints they offer. In respect of the signature, the guidance suggests the need to develop cryptographic solutions suitable for the technology to associate signed audited documents with the audit statement (Appendix Para 5).

Some guidance is provided on the extent to which the auditor will be required to review the context in which the audited statements will be presented, in accordance with the existing rules relating to other information in documents containing financial reports (rules outlined in AUS 212). The guidance suggests (Para 36) that the auditor does have some responsibility for examination of the related electronic data within which the audited financial information will be presented – in direct contrast to the current US position on this issue, which we will discuss below. However, the guidance stops short of making explicit recommendations as to how this should work in practice and to what extent the auditor may have to examine the rest of the corporate web site. The guidance suggests auditors should ‘use professional judgment to determine what other information presented with an annual report on the web site is to be read in accordance with AUS 212’ (Para 37).

The issue of the nature of the audit report in terms of its coverage of the financial report as a whole, not its parts, creates a further issue for the provision of this data online. Where a financial report is split up into parts on the web site the guidance suggest auditors should consider supplying different reports to be associated with the online reports than that for the paper version (Paras 39–41). This is in direct contrast to the UK position, where the importance of the consistency of the reports across media of delivery was considered to be critical (APB, 2001).

The guidance also suggests (Para 44) that where summary information is provided on the web site that it would be inappropriate to provide the full audit report with this information and a secondary, special purpose, report may be required.\(^\text{11}\)

Although the majority of the guidance is targeted at issues to be considered during the performance of an annual, or other, audit engagement, AGS 1050 does provide some protection from subsequent misuse of audit reports produced by this process by the recipient corporations. It suggests that proactive monitoring of the use of audit reports should reveal when management is not fulfilling its responsibility over correct use of the audit report as agreed by the engagement terms (although auditors will not be required to be proactive in this way under this guidance – Para 32). The guidance suggests the ultimate sanction under these circumstances should be for the auditor to deny permission for the electronic presentation of the audit report (Para 29c).

**UK**

In January 2001 the UK’s Auditing Practices Board issued their guidance related to this area, *Electronic Publication of Auditors Reports* (APB, 2001). As is the case in Australia, the APB makes clear that providing assurance on an entity’s web site does not form part of a normal audit engagement as currently undertaken. This includes issues of the maintenance and integrity of the site, such as questions of the security of data (Para 7). Again, as in Australia, the APB views the ultimate responsibility for the preparation, dissemination and signing of financial reports as that of the entity’s management (Para 8) as detailed in UK law.\(^\text{12}\)
The APB guidance, however, goes further than the Australian Accounting Research Foundation (AARF) guidance in a number of respects. This includes the ability for auditors to withhold the rights for the electronic presentation of their report if they are not satisfied that management have appropriately drawn a separation between audited and un-audited data on the company’s web site or use their report inappropriately after having the information presented on the web site (Paras 24–25, 31).

The UK guidance also emphasizes several other issues, including: (i) making more explicit the requirement that auditors check the conversion of the manually signed reports into their electronic equivalent and review the process by which the conversion takes place (Para 13); (ii) the need to identify the nationality of the accounting standards applicable to the audit report (Para 20); (iii) explicit exclusion of auditors’ responsibility for checking prior year information (Para 15) and (iv) increased focus on the use of hyper-linked information from the audited data to other data (Para 22).

The Bulletin suggests that auditors require that management provide warnings when a user moves from audited to un-audited information on a web site. The Bulletin also makes it clear that the new regulatory environment for UK corporations, in which they are able to fulfill statutory requirements by electronic means, will have implications for the audit engagement. The APB recommends that auditors review with management their compliance with the associated best practice guidance for electronic communications with shareholders developed alongside the regulations for the Department of Trade and Industry by the Institute of Chartered Secretaries and Administrators (ICSA, 2000).

**USA**

In 1997, the USA became the first country to issue guidance to auditors directly related to online reporting. The Audit Issue Task Force (AITF) issued AU550 ‘Other Information in Electronic Sites Containing Audited Financial Statements’ as an interpretation of SAS No. 8 ‘Other Information in Documents Containing Audited Financial Statements’.

AU550 pronounced that US auditors have no responsibility for information presented on the Internet. The justification for this position was that a web site is not a part of the coverage of other documents as defined by SAS No. 8. The interpretation suggested that web sites are just a means of distributing information. According to this interpretation, auditors do not have to read information on web sites or consider the consistency of information included on web sites with the original, paper-based documents containing their opinion.

The AITF saw that drawing an impermeable perimeter around the object of the audit opinion is not possible. Their conclusion was that it would be better instead to make clear the auditor had nothing whatsoever to do with the electronic dissemination of the financials of the company they were auditing. At the same time, the Audit and Attestation team of the AICPA established the ‘Electronic Dissemination of Audited Financial Information Task Force’, to examine the longer-term implications for auditors of online reporting however, this body seems to have gone into abeyance.

The related Practice Alert 97-1 issued by AICPA for members in public accounting firms (updated through August 15 1999 and currently the latest issue) entitled *Financial Statements on the Internet* provided details of the position of the AICPA Audit and Attestation team. This Alert suggests that users of Internet versions of reports are different to the users of paper versions with a strong marketing emphasis. The Alert provided various FAQs including: (i) continued support for the AU550 view that auditors do not need to read or consider information included in an electronic site; (ii) the need to discuss security of information integrity concerns with a client to ensure they are making reasonable attempts to protect their systems; and (iii) support of the view that a firm make clear to users of the boundaries to annual report and audited data on their web sites.

In summary, national auditing standards setters in Australia, the UK and USA have all responded to the challenges presented by Internet financial reporting. The guidance ranges from the US response which can be categorized as ‘it’s all too difficult, therefore ignore it’ to the UK’s ‘the Web is just another form of disseminating printed reports,’ to the Australian perspective that new approaches will be required for the differing types of reports and user interaction arising from Internet technologies. These differing perspectives do create some inconsistencies of treatment across...
reporting jurisdictions. This will undoubtedly lead to some confusion, at best, at the margins for users of this information who can access Internet financial reporting web sites from anywhere in the world. In the next section, we place this range of guidance in perspective with current and future Web technologies that impact upon Internet financial reporting.

4. GAPS BETWEEN TECHNOLOGY UTILIZATION AND PROFESSIONAL RESPONSE

Many perspectives are evident when examining the development of Internet financial reporting audit pronouncements. The initial perspective, adopted by the AICPA, was that the Internet made no difference to the audit function. The second perspective adopted was to take a position at the opposite end of a spectrum of views and suggest that Internet technology changed everything and was, therefore, too difficult to address immediately. The initial UK position characterized this latter perspective. The third, and most recent, perspective has been to attempt to identify areas of concern the regulators and standard setters believe they can helpfully comment upon, or specifically address and to provide guidance or standards in those areas. This perspective more closely typifies the current Australian and UK stances.

The use of newer technologies for accessing and reporting Internet financial reporting has implications for the audit and verification of Internet financial reporting. We argue that developments in technology, such as being currently utilized by many large reporting entities and the forthcoming application of current technologies, notably XBRL, are widening the gap between traditional paper-based reporting practices and modern combined reporting environments that are partly founded on a paper-based distribution model and which partly employ information and communications technology. In this section, we examine two primary and related issues. First, how do users access Internet financial reporting? Second, how do users retrieve information from financial reporting web sites and web pages? We discuss each of these in turn and outline their implications for the audit function.

4.1. User access to Internet financial reporting

The major technologies currently employed in Internet financial reporting are HTML and Adobe Acrobat (pdf files). While reporting in HTML is widely found, the electronic paper or Acrobat technology continues to be popular as a foundation for Internet financial reporting. Indeed, the proportion of companies reporting in HTML has declined in favor of Acrobat. As discussed in some depth by both Trites (1999) and IASC (1999), Adobe Acrobat has many advantages in the presentation of accounting information. The information comes as a package, comparable to that of the printed report. The package clearly demarcates the boundary between the annual report and the rest of the financial statements. The Acrobat report provides stability to the contents. Further, Adobe Inc. provides a variety of technical solutions for the signing electronically of such Acrobat reports. Acrobat is an appropriate solution to the obvious problems that current Web technologies bring to Internet financial reporting. These include poor support for printing and downloading, browser-dependent screen display and uncertainty in the authenticity of documents.

We argue, however, that Acrobat does not represent a long- or even medium-term solution to Internet financial reporting. We argue that Acrobat fails two important tests: (1) downloaded files are generally too large for all but those with a high-speed link to the Internet; and (2) automated extraction of semantic meaning from the reports is difficult or impossible. We consider that we are at a point where the benefits of HTML and XML are beginning to outweigh those of electronic paper (i.e. Acrobat). A major driver of this change is the advent of XBRL (eXtensible Business Reporting Language), a technology to which we will return shortly.

Presentation of financial reports in HTML, XML or XHTML to a greater extent, or in Adobe Acrobat to a lesser extent, give rise to a number of issues in terms of the manner in which users access Internet financial reporting. Users retrieve online reports in three primary ways. First, users proceed directly to the corporation’s web site, and follow links to the Internet financial reporting component on the web site. They follow links typically titled ‘investor relations’ or ‘annual report.’ Once at the investor relations portion of the web site, they access a variety of information, most of which is not
audited. Second, they search for information on a general-purpose search engine such as Google.com or AltaVista.com. From the results of the search, they navigate directly to one of the pages on the corporate web site, or to some other web site that will usually not be associated with the corporation in question. Third, they access information on third-party web sites. In the US context, this would include information that has been derived from filings under the SEC’s EDGAR14 system. Information accessed under this category also includes third-party information intermediaries such as Hoovers.com, which provides free, pay-per-use and subscription services to corporate performance databases.

The audit guidance discussed in the previous section seems, in our view, to assume that most users access online financials by the first of these options, i.e. by users navigating directly to the corporate web site. The UK APB recommendation that management provide warnings within these links that a user is moving from audited to unaudited information is an example of the navigation styles used by information consumers. Such guidance is entirely futile should users navigate directly from a general-purpose search engine to a particular page on the corporate web site or if they extract information from a third party’s information database. Clearly, users increasingly go first to all-purpose search tools, such as Google.com, for their information searches rather than directly to the corporation’s home page.

Suggestions, such as those made by the UK APB or Australian AARF, are entirely reasonable in the short run. They do not, however, represent a realistic solution to the practical ways in which users access their desired Internet financial reporting by search engines retrieving fragments of web sites. Methods are required for providing assurance to users on the status and authenticity of individual reporting elements, and not just complete packages of information, or by providing dialog boxes to advise users that they are about to access information on a page not subjected to an audit.

4.2. User extraction of information

The second primary issue is user extraction of information from Internet financial reporting. With electronic paper solutions, notably via Adobe Acrobat, few differences result to the information from a traditional print format. The report is often printed out and information needs to be re-keyed for further electronic analysis. Indeed, this is how most of the third-party databases from organizations such as GlobalVantage, Dow-Jones or Bloomberg are populated. Keypunch operators search the printed annual reports and then key the information into the database. In this manual process, the connection of the audit statement to the underlying information is often lost. When users access information on databases provided by information intermediaries such as Bloomberg, Dow-Jones or Reuters, they are typically not made aware by the operators of such databases whether the information is subject to an audit opinion or not. When the audit report is provided, it is normally stored in a separate audit statement element in the database rather than as an integrated part of the context of data items, as implied in a printed format of the accounts.

On two grounds we believe that such a convoluted process is inappropriate for the rapid, accurate and cost-effective transmission of financial reporting on the Internet. First, the audit status of the information is separated from the underlying accounting data. Second, the time delays and potential errors involved in moving information from printed reports are unacceptable in a world of rapid changes in the securities values of corporations, and when accounting information is increasingly taking second place to other forms of analysis and reporting partly because of the delay in availability as a decision support aid.

A further complication in information retrieval is the use of dynamic interaction with web sites rather than the static presentation of information. Increasingly corporations are providing dynamic alternatives or supplements to information that has traditionally been provided only in printed form, or not provided at all. The best example of such reporting, frequently referenced in the Internet financial reporting literature, is that made for a number of years now by Microsoft. Microsoft provides information consumers, including annual financial statements in different currencies under the relevant GAAP, Excel pivot tables of financial history and Excel financial models into which users can input their own assumptions.15 Whilst few corporations have followed the Microsoft example in providing such a range of content and user-friendly interface to Internet financial reporting, we are seeing other forms of enhancements to Internet financial reporting.
These disclosures are a mix of (i) mandated disclosures to which an audit opinion has been attached but which is presented in alternative forms, for example longitudinally, (ii) mandated disclosures as in (i) but for which no audit opinion has been mandated and (iii) voluntary disclosures (FASB, 2000; 2001). This wide variety of disclosures, each presented in an interactive form, makes a mockery of audit guidance fixed in print or static HTML presentation models.

In the next section, we briefly discuss some possible solutions to the issues of access to Internet financial reporting web sites and the extraction of information to other databases and to decision makers’ analytical models. We place our discussion in the context of reviewing how audit data might be associated with XBRL-based Internet financial reporting.

4.3. XBRL

At the forefront of current developments in newer Internet financial reporting technologies is the eXtended Business Reporting Language (XBRL) project (www.xbrl.org; Debreceny and Gray, 2001). This global project is applying XML technologies to business reporting. XML enables information to be marked in such a way as to encapsulate not just numbers or sequences of words for display, but as objects containing information (numbers and words with attached meaning and context). This is achieved by adding descriptions to the data that can be interpreted by an appropriate electronic tool to display the information in the given context.

XBRL provides, for example, the ability to create a Balance Sheet containing not just a presentation of the numbers and their titles, but all the details that join those numbers together to form a Balance Sheet produced using a specific GAAP. This marking up of data process, once undertaken, enables information to flow between computing applications in a seamless fashion. An example of such flow is from a public corporate report on the Web to a database maintained by an information intermediary.16

The use of such mark-up tools as XBRL, however, creates a number of concerns from an auditing perspective. Where data is disaggregated to its constituent components, the auditing of GAAP faithfulness becomes irrelevant. The data can instead be manipulated through various GAAP filters to produce accounts in any GAAP that may be required.

We believe that audit opinions will increasingly move from a ‘one-size-fits-all’ approach which applies only to the annual financial statements to an approach where varied levels of assurance is provided on different reports. For example, an increased emphasis placed by securities regulators, such as the SEC and the UK Listing Authority (FSA, 2001, para 2.27–29), on the quality of quarterly reports. The regulators have expressed their desire to see an audit review of such quarterly results at some level of assurance less than that made on the financial statements. Whilst all parties recognize that such assurance is not equivalent to that provided for the Annual Report, such a review clearly provides market-relevant information. Disclosure of the nature and extent of audit review of quarterly information, to continue this example, could be attached to the financial disclosures in XBRL. The same can be said for interim reports prior to the release of the full financials and to other disclosures that have been subjected to some form of assurance.

How might this then be associated with an XBRL disclosure? At present neither the current XBRL (2.0) specification, nor the taxonomies that have been created under the specification, refer to the provision of assurance status other than the scenario attribute.17 This attribute is user-defined and can, therefore, be used in very different ways by firms reporting under XBRL. At this early stage such an approach is understandable as XBRL International grapples with building workable and robust specifications and as a result national, and by extension, industry and firm-level taxonomies. At a relatively simple level of disclosure we believe that it is straightforward to present information about the assurance status on the disclosure of assurance attached to XBRL-based reporting. Technologically this can be achieved in XBRL 2.0 by a set of attributes that discloses the assurance status of the disclosure (e.g. none, review, attest, etc.). Reporting with such an attribute would allow the representation of information by Extensible Stylesheet Language (XSL) to, for example, highlight the assurance status of particular disclosures by physical rendering such as bold, italics, font type or color. The assurance status would, of course, also then be clear to any software agent because of the attribute disclosure (Baldwin and Williams, 1999).

Representation by the corporation itself of the audit status of its own financial statements or other disclosures may not be acceptable to the
corporation’s auditors or to investors or other stakeholders that rely on the disclosures and on the agent-monitoring role played by the auditor. Alternative technologies are now available, or in the W3C standards pipeline, to resolve such issues. First, and arguably most importantly for this purpose, is the XML Signature recommendation.\(^{18}\) The objective of this recommendation is to provide a method for providing authenticity over XML content by hash signatures.\(^ {19}\) Interestingly, but perhaps not surprisingly given the nature of the subject matter, XML-Signature is the product of a joint W3C/IETF working party.\(^{20}\) We return to XML Signature in the next paragraph. The second development is the W3C’s work on XML encryption.\(^{21}\) This is at a much earlier stage of standards development than XML Signature. The various working papers, white papers, and draft standards all are designed to support both symmetric and asymmetric encryption under private and public key distribution models and rely extensively on X.509 (Ford and Baum, 2000). Importantly for XBRL, whatever type of encryption finally forms part of the XML family of standards will allow plaintext meta-tagging of encrypted documents. This would be important in, for example, transmission by auditors of encrypted filings to a securities or prudential regulator in the financial services sector.

While most XBRL documents will be in the public domain there will be an increasing role for the private exchange of information in XBRL form. An example of such private exchange would be the submission by corporations of monthly or quarterly data to providers of debt capital such as banks. These disclosures may have some level of assurance attached to them. None of the three parties, corporations, assurance providers and banks, would wish this XBRL-based information to be made public. Direct support for encryption in the XBRL family of standards would add value to all stakeholders in the XBRL community.

XML Signature provides support for the digital signing of ‘arbitrary digital content,’ which will typically be one or more XML documents. Documents are digested and the digest is signed with appropriate public- or private-key cryptographic approaches. This means that the information is not itself encrypted – only a digest of the information. If the XML within the tags \(<\text{SignedInfo}>\</\text{SignedInfo}>\) were to be changed after signing, the digest would not then accord with the signature that had been applied to the digest. The XBRL standard would set out the manner by which the signature was to be applied to the XBRL disclosures. It might also set out a regime for the maintenance of signatures. The XML Signature recommendation is, understandably, currently silent on the issue of signing key maintenance. The international accounting and auditing community probably cannot afford to be silent on such matters if it is to support an international, interoperable form of XBRL-based reporting.

An XBRL solution may also mean that the verification will need to be performed at something close to the transactional level. The key issue for the audit function would become one of determining the semantic fidelity of the information. This requires the addressing of questions such as, to what degree does this data create an accurate picture of the individual transactions that are being undertaken by the company rather than the ways in which these transactions have been aggregated. This would result in a much greater focus on the verification of processes than on outputs (see also ICAS, 1999).

We believe that a combination of (i) attributes that describe the assurance status of a disclosure, even if self-reported but preferably by a controlled taxonomy; (ii) direct support for XML Signature within the XBRL standard process and (iii) future support for XML Encryption, would as a package add considerable value to information providers, auditors and information consumers. We believe that the time is now appropriate for the XBRL and audit communities to address not only the current reality of Internet financial reporting, but the future reality of XBRL reporting.

5. CONCLUSION

This paper addresses the changing environment in which external audit is conducted resulting from the use of electronic means of reporting by corporations. Its primary focus is on the use of the Internet as the most established electronic communications tool for reporting at present, although the implications of changed reporting patterns are applicable to a wider range of electronic communications media.

The paper examines the existing pronouncements related to the audit function and Internet financial reporting from various professional bodies. It looked initially at the statements made by bodies who were commenting...
more widely than solely on audit implications and then examined the positions of the auditing standard setters in the USA, Australia and the UK at the time of writing this paper.

This analysis shows clearly that, although many of the general, procedural issues related to the external audit of online financial information are being addressed by these standard setting bodies, the wider implications of the impact on the audit function have not yet been addressed in detail. The recent change in the legislative environment in the UK at least will require these bodies to continue to consider these wider issues and eventually to issue further guidance in this area.

We argue that the professional responses to Internet financial reporting are an inadequate response to the technological developments. We do not argue, as some in the profession do, that we should replicate the paper-based environment in electronic form by, for example, providing Adobe Acrobat versions of printed documents. To the contrary we argue that the global accounting and audit community has a public responsibility to promulgate the most effective and efficient distribution of accounting data via the Web.

NOTES

1. There is no evidence to suggest the signing or non-signing of the online versions of the audit report in any way affects its use. This is a research topic worthy of examination although a study by Hodge (2001) addresses some elements of this issue.

2. We will return to this point shortly, when we discuss the implications of XBRL for the external audit.


5. By the end of 2002 no responses to this Discussion paper had been made available by IFAC staff.

6. This is as currently being proposed by the SEC (SEC, 2002).

7. Work started on this project in March 1998 as a long-term review of UK Company Law. A final report was released in July 2001 that was followed up by a UK Government White paper in July 2002. For details on the latest state of this project see the Company Law Review pages on the DTI’s web site (http://www.dti.gov.uk/clr/review.htm).

8. The Final Report of the UK Review Board on Company Law suggested (para 8.91) ‘We accordingly recommend that website publication should be mandatory for the earliest reporting by quoted companies of any preliminary statement and for the core reporting document on the basis of which stewardship and overall performance is assessed, i.e. the full statements’. Interestingly, this section of the Final Report then proceeds to suggest that whilst such a mandate is considered appropriate, they would not foresee legislation describing what website publication should include and instead call again on the Standards Board, having raised this issue in their February 2000 Year-end Reporting document, to undertake the task to prescribe what this should indeed include. However, no further development of this mandate has occurred in either the UK Accounting or Auditing Standards Boards at the time of completing this paper.

9. The most recent development on this project occurred in May 2002 with the announcement of the repeat during 2002 of the statistical work referred to above from the 1999 report (FASB, 2000). Although this work was scheduled to be reporting in mid-2002 no reports have yet been issued of this revised data set (see http://www.fasb.org/project/busreport.shtml for the latest information on this project). The wider work of the FASB on this project was extended in October 2001 into the Financial Performance Reporting by Business Entities project – see http://www.fasb.org/project/fin_reporting.shtml for further details on the current status of this new project. This new project is formally linked with the Year-end Reporting project still in operation in the UK.


11. See AUS 802 – ‘The audit report on financial information other than a general purpose financial report’.


13. Allam & Lymer (2002) report that, of their survey of 250 companies (50 in each of five sophisticated financial markets) only 2.8% now
reported only in HTML formats compared with 53.5% in pdf format only.

14. Electronic Data Gathering and Retrieval System – see http://www.sec.gov/edgar for further details of this system.


16. A discussion of the business case and technologies which underpin XBRL can be found in IASC (1999); Debreceny and Gray (2001) and Hoffman and Strand (2001).

17. At the time of writing, the most relevant taxonomy was the Global Common Document (GCD) taxonomy, then in public working draft stage (see http://www.xbrl.org/taxonomy/int/br/common/gcd/2002-10-15/). As the name suggests, the GCD taxonomy is designed to provide a consistent means for national or international taxonomies to incorporate metadata about the instance document. While the GCD does provide tags for metadata such as revision history of the document, details of the entity and period, there are no tags on the audit status of the document.

18. See www.w3.org/TR/xmldsig-core/ and Simon et al. (2001). See the design requirements at http://www.w3.org/TR/xmldsig-requirements.


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