Critical Perspectives on Accounting 23 (2012) 468–482

Contents lists available at SciVerse ScienceDirect

Critical Perspectives on Accounting

journal homepage: www.elsevier.com/locate/cpa

E-business audit: Advisory jurisdiction or occupational invasion?

Amr Kotb[a], Clare Roberts[b], S. Sian[c,*]

[a] Cairo University, Faculty of Commerce, Department of Accounting, Giza 12613, Egypt
[b] University of Aberdeen Business School, Edward Wright Building, Dunbar Street, Aberdeen AB24 3QY, UK
[c] Queen Mary, University of London, School of Business and Management, Francis Bancroft Building, Mile End Road, London E1 4NS, UK

ARTICLE INFO

Article history:
Received 5 December 2009
Received in revised form
30 November 2011
Accepted 28 March 2012

Keywords:
Accountability
Critical
Accounting firms
Information technology
Audit

Mots clés :
Redevabilité
Responsabilité
Critique
Cabinets comptables

Keywords:
问责
批判性
会计师事务所

Palabras clave:
Rendición de cuentas
Crítica
Firmas de contabilidad

ABSTRACT

This study sets out to examine the impact of technological change on the external audit function of e-businesses and, specifically, the professionals involved in executing it. Utilising semi-structured interviews combined with a questionnaire survey, this paper explores the possible implications of developments in e-business audit for financial auditors as a professional group. The findings suggest that the traditional authority enjoyed by external financial auditors is being, and will be, increasingly challenged by IT audit specialists. The role of the professional bodies, responsible for the education and training of financial audit professionals, in particular, is highlighted as key to the outcome if they are to fend off challenges in this growing arena and retain jurisdictional control.

1. Introduction

The course of professionalisation is very much coupled to inter-professional relations and the activities and tasks performed by professionals. To this end, the history of the professions is littered with cases of jurisdictional manoeuvring, where the hegemony of a professional group is threatened or even eclipsed by another with a skill set more specific to a

* Corresponding author. Tel.: +44 020 7882 8570.
E-mail addresses: kotb.amr@gmail.com (A. Kotb), c.roberts@abdn.ac.uk (C. Roberts), s.sian@qmul.ac.uk (S. Sian).

1045-2354/$ – see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.cpa.2012.03.003

particular task.[1] In British accountancy, accountants had plied their trade long before professional organisation was initiated in the late nineteenth century (Matthews et al., 1998), competing with solicitors for legal and financial business. They carved a specialised niche for themselves, initially engaging in resolving the fallout from bankruptcies and liquidations and eventually monopolising the legal requirement for audit and slowly expanding their jurisdictional claims to encompass cost and management accounting too. The professionalisation process is one of evolution[2] and accountancy has long been, and continues to be, a contested terrain in the modern economy (Cooper and Robson, 2006). At various times, accountants also engaged with bankers over the jurisdiction of business advice and with managers over the provision of staff services (Abbott, 1988). In more recent times the work performed by accountants has been significantly transformed by the introduction of information technology (IT) (Caglio, 2003; El Sayed, 2006). For auditors, in particular, the computerisation of clients' systems and the recent growth in e-business present new audit challenges.

Within the last decade the literature pertaining to the use of information technology (IT) in accountancy (Orlikowski, 1992; Caglio, 2003) and in the audit process (Manson et al., 2001; Bierstaker et al., 2001; Shaikh, 2005; Matthews, 2006; Janvrin et al., 2008; Omoteso et al., 2010; KPMG, 2010) has been steadily growing. Some of these have focussed on the use and inadequacies of computer assisted audit tools (CAATs) (Bierstaker et al., 2001; Shaikh, 2005), whilst others have, more recently, explored the relationship between financial auditors and IT specialists involved in external audit (Vendrzyk and Bagranoff, 2003; Brazel, 2008).[3] However, very little attention has been directed towards the use of IT audit specialists in the external audits of e-businesses.

This empirically rooted study sets out to redress this and examines the impact of developments in e-business on the external audit function and, specifically, on the professionals involved in executing it. E-businesses evolve in an IT-driven environment and are dependent upon the use of composite technologies for networks, communications, databases, and securities (Pathak and Lind, 2007; Kotb and Roberts, 2011). This has become an important area for study for two reasons. Firstly, the last five years has witnessed a period of accelerated growth in e-business both in the UK and globally. In the UK, the corporate website has become an essential means of communication with stakeholders with the proportion of non-financial businesses selling over the Internet doubling from 7% to 15% between 2002 and 2007, by which time 70% of businesses had a website (The Office for National Statistics ONS, 2009). More importantly for this study, also by 2007, 19.3% of all UK businesses (and 68.9% of larger businesses – those with at least a 1000 employees) used automated data exchange, 17.8% (50.3%) automatically integrated orders received with their accounting system while 12.8% (48.5%) did the same for orders placed with suppliers. Secondly, for audit purposes, the implementation of an e-business system can alter the risk profile of the enterprise (The Institute of Internal Auditors IIA, 2003; Kotb and Roberts, 2011). Although the basic principles and essential procedures underlying the external audit of such entities are not significantly different to those that apply to the audit of other businesses, in an e-business environment economic transactions are captured, measured, and reported on a real-time basis without either internal human intervention or paper documentation (Auditing Practices Board (APB), 2001; Australian Accounting Research Foundation (AARF), 2002; Chatzoglou and Diamantidis, 2009) and accordingly, the information produced by these systems needs to be audited on a real-time basis (Zhao et al., 2004). Continuous auditing[4] and assurance is increasingly utilised by audit firms in the audit of web services such as XBRL-based accounting systems and ERPs (Du and Roohani, 2007; Vasarhelyi, 2010). This means that a number of audit practices and techniques are no longer ideal or even applicable in an e-business environment, for instance traditional paper-based audit evidence, testing controls and transactions, and the year-end audit approach (Shaikh, 2005; Chou and Chang, 2010; Masli et al., 2010; Chan and Vasarhelyi, 2011). Such developments imply that auditors have been, and are likely to be, increasingly faced with the need to adopt new audit techniques (Kotb and Roberts, 2011) and employ the use of new IT based techniques in order to accommodate the unique features of e-business.

However, the literature suggests that there is evidence that financial auditors are often reluctant or unable to take responsibility for real-time audit and technically specialised IT audit roles are increasingly growing in importance and driving the need for a very specialised IT expertise (Vendrzyk and Bagranoff, 2003; Brazel, 2008)[5] that has not, to date, been a significant part of financial auditors' education or training (Bedard and Chi, 1993; Albrecht and Sack, 2000; Arnold and Sutton, 2007; Coe, 2006; Pathak and Lind, 2007). This study sets out to explore the consequences of the delegation of

[1] In his study of "The System of Professions", Abbott (1988) cites various historical cases of jurisdictional usurpation, including the rise of psychiatrists in America, from being the superintendents of asylums for the insane to replacing neurologists as the "outpatient border guards of the medical profession" (Abbott, 1988, p. 22). In Britain, the security enjoyed by barristers in the legal profession was threatened by the association of solicitors in the early nineteenth century, who triumphed in their attempts to secure a monopoly over the lucrative business of conveyancing, although the barristers retaliated by consolidating their rights to verbal pleading within courts of law (Abbott, 1988).

[2] For accountants, this has included establishing and maintaining their position and monopoly, fighting off challenges from below, nurturing the profession–client relationship, developing the education of current and prospective members and seeking out new opportunities by engaging in competition.

[3] Brazel (2008) notes that in a complex IT environment audit quality is partially determined by the IT expertise of the financial auditor and his evaluation of an IT specialist's assessment. Vendrzyk and Bagranoff (2003) found that audit firms typically have separate IT and financial audit practices within a risk assurance group and an audit team will include members of both.

[4] Continuous audit is a "a methodology that enables independent auditors to provide written assurance on a subject matter using a series of auditors' reports issued simultaneously with, or a short period of time after, the occurrence of events underlying the subject matter" (Shields, 1998).

[5] Evidence from the USA suggests that IT auditors have become permanent fixtures on audit engagements due to changes in audit standards in US – SAS 108 and 109 (Brazel, 2008).

significant amounts of e-business audit work (either voluntarily or under obligation from professional guidance) by financial auditors to IT specialists and the related implications of this for the profession and its traditional jurisdictional claim over the audit process.

Drawing on both interview and questionnaire data, this study aims to make a contribution to the extant literature at a number of levels. Firstly, it sheds new light on the e-business audit, an area that is growing in significance and yet remains relatively unexplored in the mainstream accounting-related literature. Although various studies have focussed on the developing relationship between audit and IT (Bierstaker et al., 2001; Matthews, 2006; Curtis et al., 2009; Omoteso et al., 2010), the impact of e-business on the audit function remains an area ripe for investigation. Secondly, it provides new empirical evidence on the cognitive challenges and changing skills requirements for auditors in a techno-centric environment and on whether or not these are being satisfied. In doing so, it also extends the work of Kotb and Roberts (2011).[6] Thirdly, adopting Abbott's (1988) conceptualisation as a platform, this study extends the accounting-related literature focussed on the examination of shifting jurisdictional claims by professional groups in the wake of disturbances to the status quo (Covaleski et al., 2003; Pong, 1999; Walker, 2004). In doing so, it contradicts the extant literature that so often portrays a dominant expansionist view of a flourishing profession on the rise by exploring a very specific situation in which accountants may potentially lose their hard earned jurisdictional space to another occupational group. Finally, it dispatches a note of caution to the professional associations representing external auditors, who ultimately defend the jurisdictional space occupied by their membership.

The paper begins with an exploration of the prior literature and provides an overview of the theoretical context. This is followed by a presentation of the empirical findings and related analysis. The final section draws conclusion from the findings.

2. Theoretical context

In his theorisation, Abbott (1988) conceives of an interacting system of professions within which they compete with each other. Disturbances[7] can disorder this system, at varying times, resulting in the creation of new tasks, the abolition of old ones or simply reshaping them.[8] Such activity, consequently, can create opportunities for the constituent professional groups in the system, resulting in a degree of jostling for position and readjustment arising from new jurisdictional declarations[9] and, potentially, appropriation of tasks by one professional group at the expense of another. Through a process of transformation, jurisdictional disputes can be resolved, although the outcome does not necessarily create a clear victory and the extent of settlement (stabilisation) can be variable. Indeed, the claim to full and final jurisdiction[10] is just one end of the spectrum of settlement possibilities and Abbott identifies at least five others (see Abbott, 1988, p. 69–76). The most familiar of these, perhaps, is subordination and the case of nursing (which has occupied a subordinated position to medicine) is a good example.[11] Further along the spectrum, there are instances of settlement by division of labour – where standoffs or drawn contests are followed by a division of jurisdiction between the competing groups – Abbott cites the case of accountants and lawyers in the USA and the division of tasks relating to taxation. The maintenance of such division of labour arrangements can be difficult and a great degree of assimilation is required, sometimes obscuring boundaries and leading to a fusion of the two specialisms. Positioned somewhere between subordination and division of labour, is another alternative form of settlement: intellectual jurisdiction – where a profession retains control of cognitive knowledge of the field but allows (voluntarily or forcibly) competitors unrestricted access. An example in this category might be that of psychiatry, which retains control of its knowledge base whilst allowing it to be sourced by other (lower) professional groups such as psychologists and social workers. Yet another form of settlement is what Abbott refers to as advisory jurisdiction – where one professional group may seek the right to interpret or modify actions another group undertakes within its own full jurisdiction. Abbott suggests that advisory jurisdiction is "sometimes the leading edge of invasion, sometimes

[6] Kotb and Roberts (2011) presented evidence on the implications of an e-business environment for traditional external audit techniques and practices, highlighting changes arising. This study examines a different aspect of the same scenario and focusses on how the role and status of external auditors (as represented by the professional bodies) is potentially open to challenge as a result of operating in an e-business environment.

[7] Challenges to the established balance between a profession and the tasks performed by its members may be external or internal. External disturbances may come in the form of technological advances or organisational changes. Internal disturbances could include developments in vocational knowledge or skills. These forces are likely to either strengthen or weaken a profession's jurisdiction by opening or closing areas for work to be done by existing or new/rival groups seeking new jurisdictions. In relation to accountancy, Abbott argues that the rise of large-scale organisations was responsible for creating the need for management, reporting and audit and that technological advances in calculating machines transformed the work performed by accountants (p. 145–146).

[8] Abbott (1988) suggests that not only can the start of a professional trajectory be identified but in some cases also the terminus and cites the case of the professional death of psychological mediums.

[9] Abbott notes the development of an abstract system of knowledge is the key to maintaining professional status and it is from the knowledge base that a profession establishes jurisdiction.

[10] Full jurisdiction claims are made in public and later confirmed via legislation. Such claims are made by formally organised groups and are based on the power of the group's abstract knowledge to define and solve a certain set of problems which may already be under the jurisdiction of another group. They are effectively a professional invasion and often the ultimate goal of other forms of settlement (Abbott, 1988, p.70). Examples include law (full jurisdiction over social disputes) and medicine (over sickness).

[11] Subordinate jurisdiction is also a legal and public settlement and it has clear advantages for the dominant group, allowing it to delegate routine work and extend its dominant position without sacrificing perquisites. In accountancy, accounting technicians occupy such a subordinate position.

the trailing edge of defeat" and rather ominously, perhaps, that "where there is advice today, there was conflict yesterday or will be conflict tomorrow" (p. 76). The final form of settlement is jurisdictional settlement by client differentiation – perhaps most commonly illustrated by internal stratification within professional groups – a good example being the organisation of accountants into distinct groups in Britain: cost and management accountants, public sector accountants and auditors.

Despite some reservations (see for example Dezalay, 1995; Sikka and Willmott, 1995; Walker, 2004), in the accounting related literature there have been various studies which have drawn from Abbott's conceptualisation and analysed instances of change within the profession's course of development. These have explored both internal disturbances arising from within the professional group (Robson and Cooper, 1990; Richardson, 2002; Covaleski et al., 2003; Arena and Jeppesen, 2010) and exogenous sources of disturbance arising from beyond the boundaries of the group (Abbott, 1988; Armstrong, 1985; Dezalay and Sugarman, 1995; Martens and McEnroe, 1991, 1998; Napier and Noke, 1992b; Pong, 1999; Walker, 2004) – this latter group being particularly pertinent for this study.

The relationship between accountancy and law has been extensively investigated (Bromwich and Hopwood, 1992; Dezalay and Sugarman, 1995) and has provided a fertile ground for the examination of inter-professional relations, jurisdictional conflict and resulting settlement to restore occupational balance. Walker (2004), for instance, utilised Abbott's conceptualisation to analyse inter-professional conflict between accountants and lawyers over insolvency work in Victorian England, identifying the Bankruptcy Act, 1869 as the key disturbance to the status quo. In their study, Napier and Noke (1992a,b) presented an analysis of a dispute between accountants and lawyers (and its subsequent settlement) initiated by changes in the law for accounting for business combinations (a disturbance) via the *UK Companies Acts 1948 and 1981*. Similarly, Pong (1999) detailed the inter-professional conflict (and eventual settlement in the form of a divided jurisdiction) arising from issues relating to off-balance sheet finance and the subsequent issue of *Technical Release 603, and Exposure Draft 42 and 49* by the Accounting Standards Committee (ASC) in the UK.

Various studies have also focussed on the inter-professional rivalries between accountants and engineers and managers. In his study of the competing roles of accountants and other professionals within the management hierarchies of large UK/US corporations (and contrasting this to Germany and Japan), Armstrong (1985) documents the subordination of engineers to accountants in key decision-making roles within these corporations.[12] The study concludes that where the group's knowledge basis is too accessible to outsiders it may be possible for professional usurpation to take place (see also Loft, 1990). In a similar vein, but analysing a much later time period, Burns and Scapens (2000) focussed on expanding the jurisdictional domain of management accountants and investigated claims that management accounting had "lost its relevance" in informing the decisions made by managers in a rapidly changing technological environment (Bromwich and Bhimani, 1989; Johnson and Kaplan, 1987). One of the key findings of the research was the emergence and rise of "proactive" management accountants who were integral to the management team, displacing the "traditional manager".[13] This new breed of high level management accountants were termed "hybrid" accountants by the authors – that is, someone who has both accounting knowledge and an in depth understanding of the operating functions or commercial processes of the business (Burns and Scapens, 2000).

In their study of professional rivalries as a driving force in market-driven healthcare, Samuel et al. (2005) analyse the jockeying for jurisdictional space amongst accountants, engineers, economists and physicians. Informed by the work of Abbott, they show how in the (now) profit-centred healthcare industry in America, accountants "calculate the costs of products devised by engineers and exchanged in a bazaar conceptualised by economists" (Samuel et al., 2005, p. 251). They suggest that accountants have encroached upon the domain of the physician not by directly contesting medical practices or their knowledge base but rather by dominating entirely the process of the financial representation of medical costs.

The previous examples have all focussed on the expansionary jurisdictional claims of accountancy. In contrast, Kurunmaki (2004) focuses on encroachment upon the accountant's territorial domain. She also analyses the encounter, within the system of professions, between accountancy and medicine. In particular, she documents the willing adoption of management accounting techniques by medical professionals. Such action resulted, not in a jurisdictional conflict as Abbott's model might predict, but rather in a form of settlement that Kurunmaki identifies as the "hybridisation" of medical expertise – the focus here being the mobility of techniques and their appropriation, rather than abstract knowledge[14] (Kurunmaki, 2004, p. 327).

What these studies show us is that Abbott's model is a useful platform for examining points of change on the professionalisation trajectory. They show us that history is constantly repeating itself as the profession expands and contracts its jurisdictional domain through skirmishes with neighbouring protagonists. Many (but not all) of these studies have been based on secondary data from archival records and are effectively documenting historical events (as did

[12] Armstrong attributes this to the more narrowly technical work performed by later generations of engineers, allowing accountants to gradually replace them in such roles. The latter had the advantage of not only a specialist knowledge base but also the efforts of their professional groups in developing their techniques into a system of managerial control was a means of achieving managerial ascendancy (Armstrong, 1985, p. 145).

[13] The traditional manager was not necessarily a trained accountant but may well have "displayed a very high level of understanding of accounting systems". Management accountants were equipped to provide a much broader understanding of the business.

[14] At the same time, this study also provides an interesting counterpoint in citing the case of the UK where medical professionals have positively resisted the intrusion of accounting practices into the medical domain.

Table 1
Questionnaire response rate.

Groups	Sent out		Returned		Response rate
	No.	%	No.	%	
Financial auditors	1179	89	74	82	6%
IT/IS auditors	142	11	16	18	11%
Total	1321	100	90[16]	100	7%

Abbott himself). This study too, utilises Abbott's conceptualisation as a platform. However, in contrast, this study is not historical but examines a current, pivotal point on the professionalisation trajectory of accountancy that has the potential to veer in a number of different directions and is, to a large extent, dependent on the actions of the profession itself.

In his analysis of the "quantitative task area", Abbott suggests that the system model for the study of the evolution of professions raises three pertinent questions: "What were the external disturbances and their effects on professional demand and performance? What internal changes in knowledge and structure changed competitive positions? How did internal differentiation interact with system structure to create temporary stabilities?" (Abbott, 1988, p. 226).[15]

This study sets out to consider these questions as they apply to the case of professional accountants undertaking external e-business audits. The next section briefly summarises a suitable research design developed to facilitate this.

3. Research design

Given the nature of the subject under study and the fact that it remains relatively under-explored, initial semi-structured interviews were conducted with senior professionals who have a direct role/interest in IT based audit.[17] Further to this, a postal questionnaire was developed, to augment the interview data, and sent to a sample of ICAS, ICAEW and ISACA qualified financial and IT audit specialists employed by the largest 20 UK audit firms (as ranked by *Accountancy*, 2007) in ten large cities in the UK.[18] The combination of these two data collection methods extended the reach and bolstered the robustness of the research, thereby enhancing the validity of the conclusions drawn. In addition, such a dual approach also assisted in circumventing the prevailing problems generally associated with a single data method. After initial pilot testing,[19] the questionnaire was sent to a sample of 1179 financial auditors and 142 IT auditors, with a follow-up two months later, resulting in a final usable sample of 90 or a response rate of 7%, as shown in Table 1.[20]

Non-response bias was examined by comparing the responses from the first and second requests. The Chi-square test failed to identify any significant differences in the responses of the two groups. The typical respondent was an experienced auditor (58% 11 or more years) with a professional qualification (87%).

In order to address the questions raised by Abbott in his analysis, the research design was constructed in a way that allowed data to be assembled in three key areas: (1) the adequacy of financial audit in an e-business environment; (2) the role of IT auditors in an e-business environment; (3) the need for and acquisition of IT knowledge and skills. The data gathered is now presented and analysed in the following sections.

4. E-business: the adequacy of financial audit

In recent decades, computerisation has meant that technical audit work has changed drastically (Matthews, 2006). More recently, the unique features of e-business (such as total reliance on IT controls, uncertainty, use of real-time systems, and security) require auditors to increasingly resort to audit software and IT specialists in the audit of e-businesses (Kotb and Roberts, 2011). Rapid advances in the Internet and the web, and the increased ease of interaction with consumers

[15] Prior works have responded to Abbott's suggestion that his theorisation be tested by reference to historical cases. Despite the contemporary nature of this study it is appropriate to utilise Abbott's conceptualisation as a platform in this instance as the case presents an opportunity for a real-time analysis of jurisdictional invasion, albeit by consent.

[16] The total number of returned questionnaires was 110, although 20 questionnaires were excluded as unusable.

[17] The interviewees included 5 academics, 3 representatives from medium-sized audit firms and 4 representatives from the large audit firms who have e-business clients, 4 representatives from companies operating in an e-business environment and 1 representative from an association of professional auditors. The interviewees were selected for their depth of experience in the field and their time in service ranged from 8 to 32 years. The taped interviews were face to face – although one was by phone and one by email. For a full discussion on research method see Kotb (2008).

[18] London, Manchester, Birmingham, Leeds, Liverpool, Newcastle, Southampton, Cardiff, Edinburgh, and Glasgow. 55 responses were received from the offices of the "Big 4" firms and 35 responses were received from other mid-tier firms. See Table 1 for a breakdown of the responses received from financial auditors and IT audit specialists.

[19] The initial questionnaire was tested by 4 accounting academics (based in the UK, USA, and Australia), a risk assurance professional at a UK big 4 audit firm and by two members of the research department at ICAS.

[20] A major reason for such a low response rate was oversampling. Many offices had a policy that only one person in the firm replies to questionnaires and all questionnaires were automatically sent onto that one person. In these cases, sending multiple questionnaires to the same firm failed to increase the number of replies.

and business partners brought about by these advances mean that the use of internet-based business models will continue to grow (Laudon and Traver, 2004) bringing the issue under study here further to the fore. This section sets out to ascertain the role of financial auditors in an e-business environment and the perceived adequacy of their skills set for this role.

Internet-based business models range from enterprises using the web only to build awareness amongst stakeholders to enterprises using an integrated web-based supply chain linking together customers and suppliers with back-office processing and information systems. The complexity level of the e-model being audited obviously impacts upon the sophistication of the appropriate audit techniques. For example, a head of internal audit from a company that uses its website only to build awareness among stakeholders (interviewee H, the Head of Internal Audit of a Building Society), when asked about the extent to which they use IT in auditing their own business, responded:

> "What we do is only using hacking techniques to conduct ethical hacking and penetration tests of the website"

Conversely, interviewee I, from a company that has an online business where its web-based processing systems are fully connected to operating and accounting systems, indicated that most online applications already had built-in tools to assure transactional data accuracy, completeness, and integrity. He further noted the use of some forms of CAATs and other techniques that look at changes to the security elements such as firewalls configurations and penetration tests. Interviewees L and N (both IT audit partners – L with a medium-sized firm and N with a large firm) addressed the association between the type of internet-based business model and the extent of IT use in auditing. They noted that the use of IT in auditing depends, to a large extent, on the degree of integration between the entity's systems. For example, interviewee N responded:

> "We have a classification for businesses depending upon three factors: importance of IT in conducting business; complexity of IT environment; and extent of use IT in business. These factors lead to three types of businesses: 'Minor'; 'Significant'; 'Dominant'. What I can say is IT auditors do a big job with auditing of the IT dominant business such as banks and telecommunication businesses."

The evidence from interviewees seems to suggest that financial auditors do not currently possess the skills required to undertake this specialist audit work and perhaps there is a need to embrace new areas of expertise in IT that have not commonly been part of their education or training (Bedard and Chi, 1993; Pathak and Lind, 2007) – a view expressed by interviewee F (a senior audit manager with a medium-sized firm):

> "In (an) internet-based business, there are new aspects that (financial) auditors did not deal with in traditional audits even in computerised systems such as security technologies, networking technologies, integrated information systems, web pages, conducing online transactions, wireless data transmission . . . I think these new technical aspects of web-based businesses have affected the structure of auditors' knowledge and skills. Thus, if the auditor does not possess relevant technical knowledge and skills about the client's business and understand how the client's system works, simply he/she would not be able to make appropriate enquiries and tests and this might affect the effectiveness of the audit task."

Similarly, interviewee B (a professor at a UK university) argued that:

> "Auditors cannot effectively audit different information systems or different applications with just generic IT knowledge, but they should have high levels of technical knowledge and skills depending upon the nature of systems and software applied within the business being audited."

The views expressed support findings in the extant literature that suggest that financial auditors do use IT, specifically CAATs, but only in a very limited way (Curtis et al., 2009; Shaikh, 2005), restricted by their lack of higher IT knowledge and skills. Such concerns about specialised IT technical knowledge and skills are heightened further still in an e-business environment as echoed by interviewees C (an IT academic), who noted that:

> "An auditor in an e-business audit process should know and understand the whole mechanism of doing online transactions starting from the moment of entering details of credit/debit card of a purchaser as a payment method, and calling on the database from the server, then later on contacting the bank data server and exchanging the information. In addition, an auditor in an e-business audit environment should be aware of levels of network, security techniques (e.g. which techniques are implemented), how programmes function, how e-business models work and the roots of every online transaction."

Specifically, interviewee A (an academic at a UK university) stressed the need for auditors of e-businesses to extend their skill set to incorporate both financial and IT audit specialisms:

> "We need a specialist e-business auditor . . . what I would call a hybrid auditor, who has a combination of accounting knowledge as well as IT/IS knowledge."

Interviewee E (also an academic) went further in his assessment of the need for financial auditors to re-skill:

> "In future, I can expect to see financial auditors will have specialism not only in e-business but in technologies enabling e-business such as networking auditor, databases auditor, and security auditor."

Other studies, too, present evidence that supports the convergence of IT and financial audit skills with respect to the e-business audit:

> "The IS [Information Systems] auditor and the financial auditor will be one and the same, and the IS audit will take over the [financial] audit . . . the financial statement audit will become almost totally an IS assessment" [Bagranoff and Vendrzyk, 2000, p. 36].

The evidence presented in this section would suggest that there is a general feeling that being an experienced professional auditor is not enough on its own to audit highly integrated e-business models. The highly technology-supported nature of e-business requires elevated levels of IT expertise which have not traditionally been a core area of expertise of financial auditors (Pathak and Lind, 2007). Bagranoff and Vendrzyk (2000) take this point further and suggest it is likely to challenge the role of financial auditors in the e-business audit market and increase the likelihood that many of the financial auditors' responsibilities will be passed over to specialist IT auditors – a concern expressed by interviewee E:

> "Some people say that financial auditors can use the work of the IT or IS auditors when conducting the technical issues of an e-business audit. But, in e-business, it is completely different, where the core of e-business audit is IT-based work. Therefore, I see that the reliance upon IT professionals to a large extent when auditing e-businesses without training financial auditors will lead them to the same problem of the past [auditing around and/or through the computer] and might undermine their role, at least, in the e-business audit market."

Similarly, interviewee I (Head of Internal Audit at an investment management company) further remarked that:

> "It is the same as what happened with EDP [Electronic Data Processing] audit ages ago, where we [financial auditors] used IT audit specialists to do technical jobs. Nowadays, every business is IT based so every single auditor must have a high level of expertise in IT audit."

Historically, the success of audit professionals in capturing the market for assurance services has not been solely attributable to the technical superiority of the methods and techniques they use and their knowledge-based expertise, but also to their role as a professional group serving the public interest (Matthews et al., 1997) and to the ability of the professional associations to portray themselves as elite, competent and necessary (Macdonald, 1995). However, as the data here seems to suggest, there does appear to be a perception that financial auditors are not necessarily up to the task in the techno-centric e-business environment.

5. The role of IT auditors in an e-business environment

Although in other areas of business IT specialists and financial auditors coexist and cooperate, the emergence of e-business presents significant new challenges for financial auditors. It is generally recognised that financial auditors are not necessarily expected to possess expertise in non-accounting related fields and Auditing Standards, therefore, provide guidance to auditors when relying upon the work of a specialist in an audit: in the USA, SAS 11, 'using the work of a specialist', and its revised version: SAS 73 (AICPA, 1989, 1994), and in the UK and Ireland, ISA 620, 'Using the work of an expert', and its revised versions (APB, 2004). The specialist might be a member of the audit firm or recruited externally, in either case the specialist is a member of the audit team and needs to be supervised by the financial auditor. This suggests that the financial auditor, who is leading the audit team, must acquire a sufficient level of expertise to be able to communicate with the specialist, determine what the specialist is required to achieve, and evaluate the results of the specialist's work and its effect on the audit task objectives (Yang and Guan, 2004). Auditing standards are based upon the premise that the role of the IT specialist is largely to add support to the financial auditor, particularly in investigating and evaluating computer-based internal controls, as put rather succinctly in Bagranoff and Vendrzyk (2000): "the IS audit is a fly on the back of a giant gorilla [financial audit]".

However, in an e-business audit scenario, the role of IT specialists is entirely different. A wide range of new and complex technologies influence the e-business entity's systems and applications and, in turn, audit practice. The literature has already picked up on this and Bagranoff and Vendrzyk (2000) argue that if financial auditors do not possess the skill set to assume full responsibility for the task and continue to delegate most IT-based audit tasks to IT specialists then the latter may well drive the financial audits of e-business in future. Looking at it from another point, Zhao et al. (2004, p. 399) posit the question: "who will be the ideal job candidate for an auditing firm in five years?" Similar concerns were also voiced by interviewee E (an academic):

> "Evaluation of internal controls is the core part of the audit process . . . what many audit firms do by giving out this task to IT specialists [either within or outside the audit firm] can only be seen as a starting point in preparing the profession for e-business . . . [however] I think if the profession keeps delegating computer audit tasks even in e-business audit to IT specialists, [this means] the profession will make the same mistake they made with audit 'around' and 'through' the computer."

Table 2
Types of IT auditors by audit firms.

	Types of audit firms			All
	Big four firm	Medium-sized firms	Other firms	
IT specialists without training in accounting and auditing	7%	10%	33%	10%
IT specialists with training in accounting and auditing	55%	66%	33%	57%
Financial auditors with IT qualifications	7%	10%	0%	8%
Combination of above	31%	14%	33%	25%
Total	100%	100%	100%	100%

Furthermore, he warned that:

> "If they [financial auditors] are not prepared for this change . . . I expect that they will not have any role and other professionals such as IT specialists will take it [financial auditing] over".

In this section we analyse the data gathered to determine whether financial auditors have adequate training to deal with an e-business audit and, if not, how such skills shortages are or could be circumvented in practice by the use of IT specialists.

In order to explore the extent to which audit firms train their financial auditors in e-business audit, respondents were asked to identify the approximate percentage of time that was devoted to e-business audit issues during the last year's audit training. Surprisingly, 33% of respondents indicated that this was not included in audit training, while 47% indicated that less than 25% of training was devoted to this issue. Rather strikingly, a very low percentage (6%) of respondents indicated that more than 50% of the last year's audit training covered e-business audit issues.

This relative lack of specialist e-business audit training was commented upon by interviewee P (an IT manager at an oil company):

> "The very interesting thing that I found over previous years is the missed relationship between business people and IT specialists . . . it is very hard to find someone who has a good understanding of IT as well as business expertise . . . [for example] those business people should know how to apply IT to their business and how things work in IT-based systems"

Despite indicating a skills gap, the data also suggested that such skills are actually in demand as many firms already have e-business clients. An assessment of the scale of current e-business audit work was undertaken and respondents were asked: "how significant is the percentage of e-business audit clients to the whole population of audit clients?" More than half of the respondents reported that e-commerce clients (companies that integrate their web-processing activities with the back-office processing and information systems) and e-business clients (companies that interact with customers and suppliers through an integrated web-based supply chain) accounted for up to 50% of existing audit clients.

The survey also set out to determine the extent to which skills of IT audit specialists are employed by accounting firms and to this end the questionnaire respondents were asked to indicate, from a number of choices, which best describes the IT audit specialists employed by their firm. From this list, as shown in Table 2, the most common single description is 'IT specialists with training in accounting and auditing', with these being found in 57% of firms while 10% employed only pure IT specialists who are not accounting or auditing trained. In contrast, only 8% of firms employed financial auditors with a professional IT qualification.

A number of expected technical and social consequences of the implementation of e-business models for the auditing profession were also included in the questionnaire and results are shown in Table 3. The mean statistics for almost all items are above 3.00 and the large majority of respondents (75% or above) indicated agreement with almost all the statements,

Table 3
Potential consequences for the auditing profession of e-business.

	N	Strongly agree/agree 5–4	Neither 3	Strongly dis-agree/disagree 2–1	5-Point mean	Std. Dev.
Number of IT specialists used by audit firms will increase	90	80%	16.7%	3.3%	3.96	0.702
IT training for financial auditors will increase	90	76.7%	20%	3.3%	3.92	0.722
The use of audit software packages will increase	90	71.1%	25.6%	3.3%	3.89	0.771
The ratio of IT auditors to financial auditors will increase	90	64.5%	30%	5.5%	3.71	0.797
IT specialists will have a wide range of roles in the audit profession	90	53.3%	32.2%	14.4%	3.47	0.877
Greater emphasis will be placed on IT skills when recruiting	90	53.4%	31.1%	15.5%	3.47	0.902
Most audit tasks will become IT-based	90	51.2%	22.2%	26.6%	3.37	1.106
The use of continuous audit rather than periodical audit will increase	90	52.1%	25.6%	22.3%	3.32	1.058
IT specialists will have higher senior positions within audit firms than ever before	90	28.8%	35.6%	35.6%	2.92	1.008

Table 4
Main reasons for financial auditors to acquire IT knowledge and skills.

	N	% of respondent auditors			5-Point mean	Std. Dev.
		Strongly agree/ agree 5–4	Neither 3	Strongly disagree/ disagree 2–1		
To fulfil current audit task requirements	90	62.2%	30%	7.8%	3.82	0.931
Because clients expect individual auditors to be IT literate	90	60%	32.2%	7.8%	3.64	0.916
For professional development of individual auditors	90	53.4%	41.1%	5.5%	3.57	0.780
To give competitive advantage to auditors and audit firms	90	58.9%	25.6%	15.5%	3.50	0.915
To sustain the professional identity of auditors and audit profession in IT-based work environment	90	53.3%	28.9%	17.8%	3.47	0.985

Table 5
IT expertise needed by financial auditors in an e-business audit environment.

	N	% of respondents			5-Point mean	Std. Dev.
		V. important/ important 5–4	Neither 3	V. unimportant/ unimportant 2–1		
E-business risks	88	84.1%	14.8%	1.1%	4.18	0.720
IT audit solutions	88	74%	24%	2%	4.08	0.834
Communication supported by IT	87	63.2%	27.6%	9.2%	3.80	1.010
IT management	87	58.7%	33.3%	8%	3.66	0.913
General information systems concepts	87	51.7%	37.9%	10.4%	3.55	0.974
E-business systems and applications	88	50.1%	38.6%	11.3%	3.51	0.935
IT strategy	87	52.8%	31%	16.2%	3.49	1.055
Online transactions handling in business systems	87	49.4%	37.9%	12.7%	3.49	0.874
Applications software	86	47.7%	33.7%	18.6%	3.35	0.891
Systems software	86	39.6%	44.2%	16.2%	3.35	0.967
Networks and electronic data transfer	86	30.2%	41.9%	27.9%	3.01	1.057
Protocols, standards, and enabling technologies	87	30%	37.9%	32.1%	2.98	0.988
Physical and hardware components of IT systems	86	26.7%	37.3%	36%	2.88	1.022

which suggests a high degree of consensus across the respondents. It would seem that respondents expect that there will be an increase in the number of IT auditors employed by audit firms as well as an increase in IT training for financial auditors. These expectations were also expressed by interviewee G (a partner with a medium-sized audit firm in the UK):

> "... Over time I expect the proportion of situations where controls based approaches and interrogation based approaches will increase and therefore the proportion of staff with this knowledge will increase ..."

It is noteworthy that more than two-thirds of respondents expected to witness the substitution of IT auditors for traditional financial auditors in the e-business audit marketplace. The evidence also indicated that IT specialists will have a wide range of roles in the audit profession and IT skills will be given priority in the recruitment process, concurring with findings in Zhao et al. (2004). Further, more than half of respondents indicated that most of the technical audit work will be IT-based and the annual audit approach will therefore be far less important, as continuous audit techniques are set to dominate in this arena (KPMG, 2010; Vasarhelyi, 2010). Although respondents expected an increase in the numbers of IT specialists with a wider range of roles, there was no strong consensus over whether or not IT specialists would, as a result, have higher positions in audit firm management.

The above findings suggest that the auditing profession continues to mitigate the lack of IT expertise among financial auditors by recruiting IT specialists and providing them, to some extent, with an accounting and auditing background. However, when interrogated, auditors themselves seemed to be in doubt of the express need for their profession to re-skill in order to address this issue and it is to this evidence that we now turn.

6. The need for and acquisition of IT knowledge and skills

6.1. The importance of IT knowledge and skills to financial auditors

When asked about the importance of IT knowledge and skills when auditing e-businesses, the majority (88.5%) of respondents indicated that they were either very important or important, with a mean response of 4.30 using a 5-point Likert scale. Respondents were also asked why they thought financial auditors should acquire IT expertise. As Table 4 indicates, all reasons received a mean rating of more than the neutral rank of 3.00 and a standard deviation of less than 1.00, indicating a high level of agreement across the respondents.

While the most important reason was seen as the need to fulfil technical audit work requirements, other reasons including the need to meet client's expectations about the IT literacy of financial auditors were seen as being almost as important. Such skills would equip the auditor with the competence required to put the issues that confront them into a proper context or

Table 6
The most suitable place to develop each of the IT expertises.

	N	Pre-practice	During practice		
			Professional education	Continuous development	Total
Physical and hardware components of IT systems	83	61.4%	21.7%	16.9%	38.6%
Communication supported by IT	86	48.8%	26.7%	24.5%	51.2%
General IS concepts	85	44.7%	35.3%	20%	55.3%
Protocols, standards, and enabling technologies	85	40%	23.5%	36.5%	60%
Networks and electronic data transfer	84	39.3%	33.3%	27.4%	60.7%
Systems software	85	30.6%	42.4%	27%	69.4%
E-business systems and applications	84	23.8%	40.5%	35.7%	76.2%
E-business risks	81	23.5%	54.3%	22.2%	76.5%
Applications software	85	22.4%	48.2%	29.4%	77.6%
IT strategy	82	19.5%	50%	30.5%	80.5%
IT management	83	19.3%	54.2%	26.5%	80.7%
IT audit solutions	82	15.9%	61%	23.1%	84.1%
Online transactions handling in business systems	85	15.3%	57.6%	27.1%	84.7%

perspective and to judge their materiality in relation to the audit objective (Flint, 1988). Equally importantly, such specialist IT expertise is essential for enhancing the confidence of e-business clients and the general public. An auditor's judgment will only be accepted if it is believed that the audit has been carried out competently and that auditors are capable of understanding the unique features and complexities of the organisation being audited (Flint, 1988). This also helps to explain why professional development was ranked as the third most important reason for financial auditors in an e-business environment to develop a higher level of IT competence. The findings suggest that respondents perceived that creating competitive advantage and enhancing professional status were also contributory factors. What can be concluded from these findings is that the continual evolution of the auditing function places an obligation on audit professionals to constantly redefine their knowledge and skills not only to be able to carry out their audit tasks efficiently and effectively but crucially also to maintain their status and authority in the society in which they operate.

6.2. Types of IT expertise areas needed for financial auditors

A list of 13 IT knowledge and skills areas was developed and respondents were asked to rate the importance of each of these for financial auditors working in an e-business environment.[21] As can be seen in Table 5, mean scores ranged from a low of 2.88 for physical and hardware components of IT systems to a high of 4.18 for e-business risks. Six of the 13 areas received a mean rating of more than 3.50, suggesting a relatively high level of agreement across respondents regarding the importance of these areas, namely: e-business risks; IT audit solutions; communication supported by IT; IT management; general information systems concepts; and, e-business systems and applications. On the other hand, only two areas were ranked as relatively unimportant, with a mean score of less than 3.0, namely: protocols, standards, and enabling technologies and physical and hardware components of IT systems.

6.3. Developing IT expertise

The final issue addressed was where (at which point) in the education and training process auditors should acquire these IT skills. Respondents were asked to indicate the most suitable place for providing financial auditors with each of these IT knowledge and skills. They were given a list of the same 13 IT areas of expertise and asked to indicate their preferred option from three educational choices, namely: pre-professional education (e.g. university education); professional training programmes (including private sector colleges); and, post-professional education (e.g. on-the-job training programmes and continuing professional development programmes). Overall, as reported in Table 6, the results strongly suggest that professional education is of prime importance. Thus, for only one area, physical and hardware components of IT systems, did the majority of respondents feel that new entrants to the profession should already have the necessary skills or knowledge. However, in the UK a rather unique situation exists with respect to the education of accountants as the profession "has not developed its training, education or certification within the university sector" (Annisette and Kirkham, 2007, p. 1),[22] this means that entrance to the profession is not limited to accountancy or business studies graduates. Indeed the majority of entrants do not have a relevant degree (POB, 2008), suggesting that many entrants will lack these skills and knowledge. Given the wide range of academic disciplines of entrants to the UK profession, it is not surprising to find that the majority of respondents felt that the profession should be responsible for delivery of the required education and skills training.

[21] This list was mainly informed by IEPS No. 2.1 (IFAC, 2007) and findings from interviews.
[22] This has historically been the case, although most university programmes are now accredited and endorsed by the various professional accounting bodies. This means that the professional institutes do now have some influence over the design of university curricula. In addition, audit firms also sponsor or pay fees for students taking undergraduate courses.

Not only did the majority of respondents indicate support for skills acquisition during practice, in all cases except protocols, standards and enabling technologies, there was more support for this taking place during initial training rather than in continuous development.

7. E-business and the professional associations

In accountancy, the course of professionalisation has been founded upon the development of its knowledge base alongside a transforming jurisdictional domain (Abbott, 1988). Albrecht and Sack (2000) have argued that the real question is whether accounting bodies, practitioners and educators are recognising the change and adapting quickly enough to new environments. Professional accounting bodies have a critical role to play through issuing standards and guidelines and through the modernisation of their training programmes. Indeed, such endeavours are the means by which jurisdictional claims are enforced and disputes settled.

In the international arena, since the publication of IFAC's[23] International Education Guideline 11 in 1995 (IFAC, 1995), several rapid IT changes and developments have taken place, resulting in revisions to IEG 11 in June 1998, January 2003, and again in October 2007, when IFAC released a new education practice statement (IEPS) No. 2, *Information Technology for Professional 'Accountant*. This practice statement sets out the core IT knowledge and skills areas and competency elements that all professional accountants require. While much of the standard is concerned with general IT issues applicable to most traditional businesses, it also explicitly deals with e-business and requires an understanding of e-business enabling software, internet protocols and the application of intranet e-commerce business models and processes. However, it recognises that more training would be needed before accountants could work in complex IT-related areas, but the standard sets out the knowledge and skills needed to formulate questions to be answered by specialist IT auditors and to understand the outcome of the activities of such specialists.

Most of the comment letters received on the exposure draft addressed the importance of this practice statement as an essential step for advancing the quality of business-technology services provided by accounting professionals. For example, the ICAEW (The Institute of Chartered Accountants in England and Wales) commented

> "The exposure draft is on the whole good, if too detailed, but rightly emphasising the increasing importance of IT related knowledge and development across the accountancy profession" (IFAC, 2006)

Similarly, Ernst and Young – UK argued that:

> ". . . Formulating such expectations is certainly one of the necessary steps to improve quality and maintain the public trust in the accounting profession" (IFAC, 2006)

In 2008, IFAC released a new International Education Standard (IES) No. 8, *Competence Requirements for Audit Professionals*, effective from July 2008 (IFAC, 2008). This standard aims to prescribe competency requirements necessary for audit professionals in the areas of financial statement audit, financial accounting and reporting and information technology. Importantly, it refers to the guidance on the IT competencies for audit professionals set out in the IEPS No. 2 and it is expected that audit professionals in an IT environment should develop and apply these knowledge and skills at a broader and deeper level than that expected of other professional accountants. However, IES8 did not explicitly mention e-business, suggesting that many of the more complex issues would need to form part of post-qualification training as required:

> "It is not practicable to prescribe the additional knowledge required of those operating in specific industries. IFAC member bodies, individual professional accountants and audit organizations share the responsibility for ensuring that audit professionals have the required competence for their roles"
> (IES8, para 80)

In the UK, The Chartered Institute of Internal Auditors (IIA) seems to have taken the lead on e-business audit issues. Aspects of e-business audit are explicitly included at both its initial and its continuing professional training.[24] In 1988, it launched a post-qualification computer audit credential – Qualification in Computer Auditing (QiCA) which was designed specifically for those who contribute to and lead on computer audit tasks. In response to technological changes in the business environment, in 2009, the IIA replaced this with a new certificate in IT auditing for internal auditors who carry out hands-on IT audit projects:

> "Successful IT auditors need core internal auditing skills as well as specialist IT knowledge. The new certificate . . . will enable the internal auditor to plan and lead an IT audit and to provide appropriate assurance on IT to the audit committee. [And] to identify when an IT specialist is required and to utilise that resource effectively" (IIA, 2008, p. 2)

[23] The International Federation of Accountants.

[24] Including: how organisations join together and streamline functions and processes, including the creation of shared services and offshoring, and the associated risks and mitigating controls; the main software and hardware components of ERP and e-commerce facilities and the associated risks and mitigating controls; the risks associated with network connections including internet, wireless and broadband and appropriate mitigating controls; and, the internal and external threats to information systems, including computer fraud and abuse, malicious software and viruses, spyware and keystroke loggers, attack and phishing toolkits (IIA, 2009).

However, the focus of the IIA is internal audit and this study is concerned with the skills and knowledge of those leading the external audits of e-businesses. In marked contrast to the IIA, other British professional accounting bodies such as ICAS; ICAEW; and ACCA[25] have been less proactive, as an analysis of the IT content of their education programmes shows. ICAS, for instance, includes general knowledge and understanding of IT and IT risk assessment including e-commerce risks and control systems amongst the topics covered in the Assurance and Business Systems paper in the Test of Professional Skills (TPS) (ICAS, 2010). There seems to be even less coverage in post-qualification training in this area. While information technology is one of ten categories of CA business courses, with one exception, that of IT risk management and control, all the available courses cover basic skills in areas such as Word, Excel, PowerPoint, use of macros and, project management.[26] Likewise, the professional syllabus of ICAEW includes relatively little on IT or its implications for technical auditing and accounting work in an e-business environment. The ICAEW syllabus includes reliance on IT controls amongst the topics covered in the Audit & Assurance module at the Professional Stage. In addition, the Business Reporting module and Business Change module respectively at the Advanced Stage include: (i) assessment of IT and e-commerce controls; and (ii) developing business and information strategies in e-commerce and e-business. In a position similar to that of ICAS, while the ICAEW offers a wide range of specialist qualifications and programmes at the post-qualification level, neither IT in general, nor e-business in particular, are prominent. Similarly, the ACCA qualification also gives limited coverage to IT knowledge and skills within its 17 exam papers across all levels. For example, information technology knowledge (e.g. CAATs and the use of IT in audit process administration), only briefly feature within the two audit and assurance papers at the fundamental level and professional level.

The data presented in this study sheds light upon the external threats to the profession from a relative lack of investment in IT training. New technologies will continue to change the picture of the auditing practices and techniques, thus increasing demands for specialised IT expertise by auditing professionals. Another very recent example is the use of eXtensible Business Reporting Language (XBRL) by Her Majesty's Revenue and Customs (HMRC) for business and company tax filings in the UK.[27] For returns delivered on or after 1 April 2011, businesses were mandated to send their company Tax Returns 'online' using XBRL for accounts and computations, rather than using hard (i.e. paper based) or soft (i.e. PDF attachment) formats. Curtis et al. (2009, p. 92) comment that the XBRL adoption has left auditing professionals "*scrambling to define their role in the presentation [and assurance] of financial statements via XBRL-tagged documents*". Supporting this view, the results of a recent ACCA research report (Dunne et al., 2009) indicate that generalist external auditors appear to have low, if any, knowledge or experience with XBRL and its usage in businesses.

It would appear that the professional education and training at three of the main British professional associations are orientated mainly towards subjects such as accounting and auditing, business law and business ethics, whilst developments in IT and their implications for accounting and auditing practices warrant only minimal coverage. While it is argued that it is rare in the UK to find accountants criticising their professional bodies in public (Velayutham and Perera, 2008), there are clearly some who see this as an omission potentially opening the door for other professions to benefit in this area of work at the expense of financial auditors:

> And in a future corporate world where finance has been totally automated and assurance and analytical software has been embedded into standard operating systems, we may see IT companies providing some of the accountancy profession's traditional services, or accountancy firms with significant global IT operations as a core offering. (Les Clifford audit partner and CFO programme leader, Ernst & Young) (Accountancy Age, 2009).

8. Conclusion

Abbott (1988) viewed the creation of professions as the outcome of conflicts centred on the border of a jurisdictional space – a system where occupational groups are constantly striving to expand their own jurisdictional territory at the expense of neighbouring groups and are, therefore, effectively permanently under siege. Abbott's conceptualisation of profession focuses not only on the tasks performed within a jurisdictional space but also on the possession of an abstract knowledge base that is applied to particular cases alongside the instruction of new entrants in the modus operandi of members. In many of the cases seen in the literature, and indeed in the cases offered as examples by Abbott himself, usurpation often involves discord and dispute. Based on the evidence presented here and elsewhere (Samuel et al., 2005), we would suggest that a slightly more nuanced view could be adopted and that professional rivalry does not necessarily always involve a direct challenge or conflict but, rather, there is sometimes potential for a much more subtle usurpation, for instance (as in this case) when a foreign occupational group is invited into a jurisdictional space.

As stated earlier, in the study of such cases Abbott asks us to consider: what the external disturbances were and their effects on professional demand and performance; the ensuing changes in knowledge, structure and competitive position; and how stabilities are achieved. In the scenario described in this study, financial auditors have already achieved the right to practice and promote their jurisdictional claim within the field of external audit, having harnessed both public opinion

[25] ICAS (The Institute of Chartered Accountants of Scotland); ACCA (T**he** Association of Chartered Certified Accountants).
[26] As detailed on ICAS website May 2010.
[27] XBRL is a world standard electronic business language for handling communication and representation of business financial data to allow users throughout the world to access real-time, accurate and relevant financial information from world-wide business organisations (XBRL UK http://www2.xbrl.org/uk/).

and legal ratification and successfully monopolised a specialised knowledge base appropriate to this field. In this study, we identify the disturbance as being the rise in e-business and the demand for very specific IT skills for conducting the external audit of these e-businesses. In e-business audit, it would seem that rapid developments in IT and its use have superseded developments in the training and education of auditors in a relatively short period of time and has, to some extent, diminished the competitive position of financial auditors. The evidence presented in this study suggests that such skills do not currently fall within the cognitive domain of financial auditors, and in response to this demand IT audit specialists have been invited into this particular jurisdictional sub-space to conduct essential audit-related tasks.

Turning now to the issue of how stabilities are achieved. Samuel et al. (2005, p. 253) comment that "jurisdictional ties between a profession and its work drive the rise and demise of professions". In e-business audit, at least, it would appear that this link has been significantly compromised, as auditors are not necessarily equipped to undertake key aspects of the work, even though they maintain overall legal jurisdiction in this space. So for the present, financial auditors retain authority in this jurisdictional sub-space, even though they do not and cannot always perform the tasks required. A resulting temporary stability is maintained via the co-existence of two different occupational groups within the same space.

Abbott suggested that "most occupations fight for turf, but only professions expand their cognitive domain by using abstract knowledge to annex new areas" (Abbott, 1988, p. 102). In this study, we present a scenario in which it is the absence of expert knowledge in the area of e-business audit that has created an opening. Whilst IT audit specialists may fill this opening presently in what is essentially an advisory role, we concur to some extent with Abbott's view that "where there is advice today, there . . . will be conflict tomorrow" (p. 76). Although accountants have become a powerful social and economic force in society, imbued with influence and status (Cooper and Robson, 2006; Macdonald, 1995),[28] this does not mean that their jurisdictional space is impervious. The knowledge base of the IT audit experts is currently inaccessible to financial auditors, sanctioning them power in the advisory relationship and allowing them to perfectly occupy the jurisdictional opening created by fast moving IT developments.

In much of the literature it is generally agreed that "the knowledge monopoly forms the basis of professional power and the core of the concept of profession" (Haug, 1977, p. 217). In e-business audit, the delegation of duties by financial auditors has serious implications for the audit opinion as they are relying on IT specialists but must themselves be adequately competent in the field in order to come to a view on the delegated work. Although, in other areas, auditors do routinely rely upon the work of specialists (for instance, expert valuations), in an e-business environment the degree of reliance is magnified as the amount of IT-related audit work rises. This then has the potential to bring into question the degree to which the financial auditor is able to ultimately accept responsibility for the audit opinion. To date, the chief method employed by accountants (financial auditors) for preserving authority over this space has been public and legal legitimation and the claim to expertise via a monopolised knowledge base. However, given the recent growth of e-business and e-business audit and the inability of the financial auditors to perform some audit tasks without the support of IT specialists (who already have access to this market and some of whom already have training in accounting and audit),[29] there is a very distinct possibility that such authority may be open to challenge. Such a conclusion also falls in line with other authors who suggest that professions can lose the predominance that they have earned if jurisdictional boundaries are blurred (Abbott, 1988; Walker, 2004).

This study occupies a unique position in the literature as it analyses a scenario in which there is the potential for professional usurpation in this jurisdictional space, although there is also still an opportunity to influence the outcome – a point to which we now turn. Whilst Abbott refers to the "fall of a profession" and others have referred to "deprofessionalisation" (Haug, 1977), this study stops short of such dramatic conclusions. However, given the growth of e-business and the lucrative nature of the audit market, the question one might well posit is: how well are accountants equipped to defend their jurisdictional space if required to do so? The outcome is, by no means, inevitable. Either IT auditors are set to dominate in the e-business audit environment or the accountancy profession must address the issue by renegotiating the existing knowledge and skills base of financial auditors. Abbott (1988) noted that in claiming a jurisdiction, a profession is asking society to recognise "its cognitive structure through exclusive rights". However, if its cognitive base is perceived to harbour deficiencies in an area over which it is claiming a jurisdiction, then the profession must act to plug those deficiencies if it is to maintain the status quo. This raises the question of why the UK profession has, thus far, not proactively taken steps to address this perceived shortfall. The reasons for this are multifarious and it would be more meaningful to deal with them in a separate future study, although the issue was touched upon by one of the interviewees (Interviewee B): "It is generally perceived that the members lead the UK profession, not the other way round. Any major shift by the profession would be expected to start and develop following pressure from members. My perception is that in the UK, the Big-4 are global operations and that they will and do compete with each other in seeking to grow their markets. The next tier is far less interested and seems to be waiting before investing heavily in them [skills and services] . . . and [they] are not doing much

[28] An element of "mastery–mystery" has traditionally been associated with professions in general, and accountancy in particular, as illustrated through rites of passage related to entry to the profession, such as certification and examinations. However, increasingly accounting-related knowledge has become more accessible to the public though rising levels of general education and the use of computer software, resulting (to some extent) in a "demystifying" of the expertise traditionally associated with accounting knowledge (Haug, 1977).

[29] In the big accounting firms it may be an issue of knowledge transfer or "workplace assimilation", that is where non-professionals learn on the job a given version of the profession's knowledge system whilst lacking the theoretical training that justifies membership of that profession (see also Abbott, 1988, p. 66).

to engage with it. Professional accountants in practice earn a lot already. Why should they worry about learning new tricks? It will be interesting to see when the UK CCAB wake-up and drag their members into the 21st century."

Gottliebsen (1998, p. 17) forewarned ". . . [Financial auditors] will need to invest in the latest technology and have a better knowledge base. If they fail to do so, they too will disappear along with the clients that did not adapt". In North America, the response has been to endow financial auditors with competence in IT in order to reduce their reliance on IT specialists, particularly in the e-business arena, or at the very least be in a position to make informed judgements about their work.[30] Urged by IFAC (1992, p. 2), the UK-based professional accounting bodies might do well to consider the possibility of following suit.

References

Abbott A. The system of the professions. London: University of Chicago Press; 1988.
Accountancy Age. Future shock – what next for accountancy? Accountancy Age 2009 December.
Accountancy Magazine. Top 100 UK accounting firms. Accountancy Magazine; 2007 July.
AICPA. Statement on Auditing Standards (SAS) No. 11. Using the work of a specialist. New York: American Institute of Certified Public Accountants; 1989.
AICPA. Statement on Auditing Standards (SAS) No. 73. Using the work of a specialist. New York: American Institute of Certified Public Accountants; 1994.
Albrecht W, Sack R. Accounting education: charting the course through a perilous future. Accounting Education Series 16. Sarasota: American Accounting Association; 2000.
Annisette M, Kirkham L. The advantages of separateness explaining the unusual profession-university link in English Chartered Accountancy. Critical Perspectives on Accounting 2007;18(1):1–30.
Arena M, Jeppesen K. The jurisdiction of internal auditing and the quest for professionalization: the Danish case. International Journal of Auditing 2010;14:111–29.
Armstrong P. Changing management control strategies: the role of competition between accountancy and other organisational professions. Accounting, Organisations and Society 1985;10(2):129–48.
Arnold V, Sutton S. The impact of enterprise systems on business and audit practice and the implications for university accounting education. International Journal of Enterprise Information Systems 2007;3:1–21.
APB. E-business: identifying financial statement risks. London: Auditing Practices Board; 2001.
APB. International Standard on Auditing (ISA) no. 620. Using the work of an auditor's expert. London: Auditing Practices Board; 2004.
AARF. Electronic commerce—effect on the audit of a financial report. Sydney: Australian Accounting Research Foundation; 2002.
Bagranoff N, Vendrzyk V. The changing role of IS audit among the Big Five accounting firms. Information Systems Control Journal 2000;5:33–7.
Bedard J, Chi M. Expertise in auditing. Auditing: A Journal of Practice & Theory 1993;12:21–45.
Bierstaker J, Burnaby P, Thibodeau J. The impact of information technology on the audit process: an assessment of the state of the art and implications for the future. Managerial Auditing Journal 2001;16:159–64.
Brazel J. How do financial statement auditors and IT auditors work together? The CPA Journal 2008;78:38–41.
Bromwich M, Bhimani A. Mangement accounting: evolution not revolution. London: CIMA; 1989.
Bromwich M, Hopwood A. Accounting and the law. London: Prentice-Hall; 1992.
Burns J, Scapens R. The changing nature of management accounting and the emergence of "hybrid" accountants. IFAC Publications; 2000, http://press.dev.ifac.org/articles.
Caglio A. Enterprise resource planning systems and accountants: towards hybridization? European Accounting Review 2003;12:123–53.
Chan D, Vasarhelyi M. Innovation and practice of continuous auditing. International Journal of Accounting Information Systems 2011;12:152–60.
Chatzoglou P, Diamantidis A. IT/IS implementation risks and their impact on firm performance. International Journal of Information Management 2009;29:119–28.
Chou C, Chang J. Continuous auditing for web-released financial information. Review of Accounting and Finance 2010;9:4–32.
Coe M. Integrating IT audit into the AIS course. Review of Business Information Systems 2006;10:105–20.
Cooper D, Robson K. Accounting, professions and regulation: locating the sites of professionalisation. Accounting, Organisations and Society 2006;31:415–44.
Covaleski MA, Dirsmith MW, Rittenburg L. Jurisdictional disputes over professional work: the institutionalisation of the global knowledge expert. Accounting, Organisations and Society 2003;28:323–55.
Curtis M, Jenkins J, Bedard J, Deis D. Auditor's training and proficiency in information systems: a research synthesis. Journal of Information Systems 2009;23(1):79–96.
Dezalay Y. "Turf battles" or "class struggles": the internationalisation of the market for expertise in the "professional society". Accounting, Organisations and Society 1995;20(5):331–44.
Dezalay Y, Sugarman D. Professional competition and professional power. London: Routledge; 1995.
Du H, Roohani S. Meeting challenges and expectations of continuous auditing in the context of independent audits of financial statements. International Journal of Auditing 2007;11:133–46.
Dunne T, Helliar C, Lymer A, Mousa M. XBRL: the view of stakeholders. Research Report 111. London: The Association of Chartered Certified Accountants (ACCA); 2009.
El Sayed H. ERPs and accountants' expertise: the construction of relevance. Journal of Enterprise Information Management 2006;19:83–96.
Flint D. Philosophy and principles of auditing. London: Macmillan; 1988.
Gottliebsen R. The profession in 2018: looking to the long-term. Australia CPA 1998:17–8.
Haug M. Computer technology and the obsolescence of the concept of profession. In: Haug, Dophny, editors. Work and technology. Beverly Hills, CA: Sage; 1977.
ICAS. The knowledge and expertise to become the best: your guide to the ICAS syllabus 2010/2011. Edinburgh: Institute of Chartered Accountants of Scotland; 2010.
IIA. Auditing in an e-business environment. Information Technology Briefing Note. London: Institute of Internal Auditors; 2003.
IIA. Consultation on proposed new IIA certificate in IT auditing; 2008. <http://www.iia.org.uk/filemanager/root/site_assets/itac/itac_proposal_230408.pdf> [accessed 21.07.08].
IIA. IIA diploma in internal audit practice, syllabus, 2009/2012. London: Institute of Internal Auditors; 2009.
IFAC. Discussion paper on specialisation in the accounting profession. New York: International Federation of Accountants; 1992.
IFAC. Information technology in the accounting curriculum, international education guideline (IEG) no. 11. New York: International Federation of Accountants; 1995.

[30] Such a model of "hybridization" already appears in various forms in the accounting-related literature (Burns and Scapens, 2000; Caglio, 2003; Kurunmaki, 2004).

IFAC. Comments on proposed International Education Practice Statement (IEPS) 2.1, Information Technology for Professional Accountants. New York: International Federation of Accountants; 2006.
IFAC. Information technology for professional accountants, proposed international education practice statement (IEPS) 2.1. New York: International Federation of Accountants; 2007.
IFAC. Competence Requirements for Audit Professionals, International Education Standards (IES) No. 8. New York: International Federation of Accountants; 2008.
Janvrin D, Bierstaker J, Lowe D. An examination of audit information technology use and perceived importance. Accounting Horizons 2008;22:1–21.
Johnson HT, Kaplan RS. Relevance lost: the rise and fall of management accounting:. Boston, USA: Harvard Business School Press; 1987.
Kotb A, Roberts C. The impact of e-business on the audit process: an investigation of the factors leading to change. International Journal of Auditing 2011;15:150–75.
Kotb A. The impact of e-business systems and applications on audit practice and the profession and implications for university accounting education. PhD thesis. Aberdeen: University of Aberdeen; 2008.
KPMG. Continuous auditing and monitoring: are promised benefits now being realised? London: KPMG; 2010.
Kurunmaki L. A hybrid profession—the acquisition of management accounting expertise by medical professionals. Accounting, Organisations and Society 2004;29:327–47.
Laudon K, Traver C. Ecommerce: business, technology, and society. New Jersey: Prentice Hall; 2004.
Loft A. The history of management accounting: relevance found. In: Ashton D, Hooper T, Scapens R, editors. Issues in management accounting. London: Prentice Hall; 1990. p. 17–38.
Macdonald K. The sociology of the professions. London: Sage; 1995.
Manson S, McCartney S, Sherer M. Audit automation as control within audit firms. Accounting, Auditing & Accountability 2001;14:109–30.
Masli A, Peters G, Richardson V, Sanchez J. Examining the potential benefits of internal control monitoring technology. Accounting Review 2010;85:1001–34.
Matthews D, Anderson M, Edwards J. The rise of the professional accountant in British management. Economic History Review 1997;3:407–29.
Matthews D, Anderson M, Edwards JR. The priesthood of industry: the rise of the professional management accountant:. Oxford University Press; 1998.
Matthews D. A history of auditing: the changing audit process in Britain from the nineteenth century to the present day. London: Routledge; 2006.
Martens S, McEnroe J. Interprofessional struggles over definition: lawyers, accountants and illegal acts. Critical Perspectives on Accounting 1991;2:375–84.
Martens S, McEnroe J. Interprofessional conflict, accomodation, and the flow of capital: the ASB vs the securities industry and its lawyers. Accounting, Organisations and Society 1998;23:361–77.
Napier C, Noke C. Premiums and pre-acquisition profits: the legal and accountancy professions and business combinations. In: Freedman J, Power M, editors. Law and accountancy: conflict and co-operation in the 1990s. London: Paul Chapman; 1992a. p. 42–61.
Napier C, Noke C. Accounting and law: an historical overview of an uneasy relationship. In: Bromwich M, Hopwood, editors. Accounting and the law. A.G. London: Prentice-Hall; 1992b. p. 30–54.
Omoteso K, Patel A, Scott P. Information and communications technology and auditing: current implications and future directions. International Journal of Auditing 2010;14:147–62.
ONS. E-commerce survey of business. London: The Office for National Statistics; 2009, http://www.statistics.gov.uk/pdfdir/ecom1108.pdf [accessed 08.04.09].
Orlikowski W. The duality of technology: rethinking the concept of technology in organization. Organization Science 1992;3:398–427.
Pathak J, Lind M. Empirical assessment of effective e-commerce audit judgment; 2007, http://ssrn.com/abstract=977851 [accessed 20.02.07].
Pong C. Jurisdictional contests between accountants and lawyers: the case of off-balance sheet finance 1985–1990. Accounting History 1999;4:7–29.
POB. Key facts and trends in the accountancy profession. London: FRC, Professional Oversight Board; 2008.
Richardson A. Professional dominance: the relationship between financial accounting and managerial accounting, 1926–1986. Accounting Historians Journal 2002;29:91–122.
Robson K, Cooper D. Understanding the development of the accountancy profession in the UK. In: Cooper D, Hooper T, editors. Critical accounts. Basingstoke: Macmillan; 1990. p. 366–90.
Samuel S, Dirsmith MW, McElroy B. Monetized medicine: from the physical to the fiscal. Accounting, Organisations and Society 2005;30:249–78.
Shaikh J. E-commerce impact: emerging technology—electronic auditing. Managerial Auditing Journal 2005;20:408–21.
Shields G. Non-stop auditing. CA Magazine 1998;131:39–40.
Sikka P, Willmott H. The power of 'independence': defending and extending the jurisdiction of accounting in the United Kingdom. Accounting, Organisations and Society 1995;20(6):547–81.
Vasarhelyi M. The coming age of continuous auditing. The University of Melbourne and CPA Australia's Annual Research Lecture; 2010. <http://insights.unimelb.edu.au/04> [09.05.11].
Velayutham S, Perera H. The role of professional accounting programmes: towards a reflective practicum. International Journal of Management Education 2008;7:29–40.
Vendrzyk V, Bagranoff N. The evolving role of IS audit: a field study comparing the perceptions of IS and financial auditors. Advances in Accounting 2003:141–63.
Walker SP. Conflict, collaboration, fuzzy jurisdictions and partial settlements. Accountants, lawyers and insolvency practice during the late 19th century. Accounting and Business Research 2004;34(3):247–65.
Yang D, Guan L. The evolution of IT auditing and internal control standards in financial statements audits: the case of the United States. Managerial Auditing Journal 2004;19:544–55.
XBRL UK. <http://www2.xbrl.org/uk/>.
Zhao N, Yen D, Chang I. Auditing in the e-commerce era. Information Management & Computer Security 2004;12:389–400.