

## **E-Business Audit - Potential For A Contested Professional Territory**

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### **Abstract**

This study attempts to provide further understanding of the potential changes to the expertise and roles of financial audit professionals and the possible jurisdictional disputes with IT audit specialists resulting from the increased implementation of e-business systems. Building on a series of semi-structured interviews with accounting academics, financial audit practitioners and IT audit specialists; a questionnaire survey was developed and administered to a sample of ICAS, ICAEW and ISACA members. The results show that e-business should not be viewed solely as a driver of technical change to conventional financial audit practices. Instead, it also has a direct impact on the social and political systems in which auditing and auditors operate. This paper concludes that the traditional authority enjoyed by financial auditors will be increasingly challenged by IT audit professionals. Overall, we argue that to ensure the future of financial audit professionals, in an e-business environment, they will need to redefine or hybridise the base of their expertise in order to maintain their jurisdictional claims over e-business audit services.

**Keywords:** E-business; e-commerce; information technology; auditing profession; jurisdictional disputes; deprofessionalisation

## **1. Introduction**

It has been widely acknowledged in the professional literature that the boundaries of auditing practice and the profession are undergoing considerable changes. In particular, there is a broad debate on the possible impacts of the electronic business (hereafter, e-business) systems on conventional financial audit practices. More specifically, e-business is a new driver of change that has been taking the audit function in new direction. The most obvious aspect of this change is the extensive use of information technology (IT) based techniques when conducting technical audit work. This is likely to result in the commodification and standardisation of many auditing practices. At the same time, given its highly technology-centric nature, e-business audits require specialist IT expertise that has not always been a significant part of auditors' education or training. This opens the door to rival professions, primarily IT audit professionals, to take on much of the financial auditor's role in conducting and leading the audit process. This loss in monopoly over e-business audit has the potential to result in the deprofessionalisation of financial auditors.

The two central objectives of this paper are, firstly, to provide a theoretical understanding of the likely social and political implications of e-business for financial auditors as a professional group; and secondly, to explore the empirical evidence of resultant changes to the audit profession. The importance of this study originates from an apparent paradox. On the one hand, every aspect of the business world, including the audit profession, has been or will be, influenced by e-business. On the other hand, the review of relevant literature revealed that the impact of e-business on auditing is relatively under-explored, with a lack of empirical studies addressing not only the technical effects, but also the social and political impacts, of e-business on auditing practice and the audit profession.

The next section outlines a theoretical foundation structured around Abbott's [1] model of the system of professions. In the following section, the research methods used in the study are described. This is followed by a discussion of the findings from the interviews and questionnaires, while the final section draws some conclusions.

## **2. Theoretical foundations and literature review**

The possession and control of a specialist body of knowledge is the strategic basis upon which a profession rests its professional status and jurisdictional claims [26, 31]. However, as Abbott [1] argues, once such knowledge becomes fully programmed and codified, it can be embodied in commodities that can be easily utilised by other professional groups,

potentially resulting in the profession's power and economic rewards declining. Such commoditisation therefore poses a threat to the successful advancement, or social reproduction, of the profession. To prevent this, it is essential for the profession to continually redefine its body of knowledge and to widen its jurisdiction over new areas of expertise, by, inter alia, drawing upon the boundaries of other professions and acquiring some of their knowledge and skills [1]. Such a process of the loss of social power and consequential redefinition of the profession's body of knowledge can be interpreted through the processes of '*jurisdictional disputes*' [1], '*deprofessionalisation*' [30, 44], and '*hybridisation*', [1, 31] as highlighted briefly in the following section.

### *2.1. Jurisdictional disputes and deprofessionalisation*

In his seminal work on "the system of professions", Abbott [1] argues that the history of the development of professions is driven by the history of jurisdictional disputes through which professions seek to defend and/or expand their jurisdictional claims over areas of work. He suggests three processes - disturbances, jurisdictional contest, and transformation - lead to a balance between the work done by members of a professional group and their jurisdictional claims over such work<sup>2</sup>. According to this model, a profession's jurisdiction might be challenged because of new technological and/or organisational developments (external sources), or because of developments in vocational knowledge or skills (internal sources). Through a process of 'transformation' these contests are absorbed either by the professionalisation (reproducing social mobility by developing new knowledge and skills to create new jurisdiction or sustain an existing one) or deprofessionalisation<sup>3</sup> of a group or by its absorption by one or more existing professions.

A number of instances of inter-professional competitions between accountants and other professional groups have been discussed in the accounting literature. For example, the relationship between accountants and lawyers was not an easy one and evidence of a series of enduring jurisdictional battles between them has been observed [see 1, 17, 18, 50, 51, 54, 59, for detailed analysis]. These battles arose over the provision of a range of services including: insolvency and bankruptcy; taxation and tax law consultancy; the development

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<sup>2</sup> Abbott [1, p.60] describes the link between a profession and its work as a 'jurisdiction'. He further adds that the success of a profession in maintaining its social status is largely based on its ability to have effective control over its jurisdiction.

<sup>3</sup> The idea of deprofessionalisation is due to the work of Haug [28, 29, 30]. Haug defines deprofessionalisation as "a loss to professional occupations of their unique qualities, particularly their monopoly over knowledge, public belief in the services ethos, and expectations of work autonomy and authority over the client" [quoted in 44, p.20].

and interpretation of the company law in relation to the proper method of accounting for business combinations; and issues concerning off-balance sheet finance. Similarly, a jurisdictional battle arose between accountants and engineers [1, 8] over “whether knowledge of actual production processes was more important than knowledge of cost allocation in determining reasonable output and wage standards” [1, p.231].

Furthermore, the relationship among the accounting professionals is rife with conflicts. Given that the accounting profession had gained effective control over the task areas of control and cost accounting at the expense of neighbouring professions such as industrial engineering and operations, management accountants struggled to become recognised as an independent profession distinct from financial accounting [56]. Recently, the professional field of internal auditing has been characterised in the USA by “a heated dramaturgy of exchange relations” [16, p.323] among the Big Five accounting firms (currently Big Four), AICPA, IIA, and SEC.

More recently, a number of studies have referred to instances of jurisdictional disturbances to the accounting field due to the impact of Enterprise Resource Planning systems (ERPs) on the expertise and roles of both financial and management accountants [see, for example, 11, 12, 23, 47, 58, for detailed analysis]. Many of their traditional practices have become transferable to non-accountants and consequentially accounting professionals have had to redefine their expertise (e.g. analytical and interpretative skills and IT skills) and reshape their roles (e.g. design and management of IT systems) [12, 23].

## *2.2. Hybridisation*

Hines [31] points out that a wide range of accounting services are based on knowledge that is not uniquely accounting knowledge. For example, management accounting was established using tools and techniques borrowed and adapted from other disciplines such as economics and engineering [11, 32, 47, 48]. More recently, with the adoption of business risk based audit approaches, audit professionals have increasingly become business advisors rather than assurance providers [41, 55, 57]. Looking to the future, given that technology advancement is freeing much of the time and energy of accounting professionals within companies, they might find themselves involved in other areas of business such as the design and management of IT systems [12, 23].

This ‘hybridisation’ phenomenon could perhaps be best understood as a means by which a profession reproduces its social status [43, 49]<sup>4</sup>. Specifically, hybridisation is not a matter of developing a new professional identity, turning, for example, doctors into accountants [43], nor simply a matter of acquiring a new body of knowledge and skills. Instead, it is a process by which professionals seek to maintain their control over their professional work and to settle any jurisdictional disputes with any other professional groups.

In light of the above, we argue that e-business and its associated technical changes to audit practice can be viewed as a disturbance to the balance between the auditing profession and its work. As audit work becomes more IT-based, many activities belonging to financial auditors are increasingly becoming standardised and so more easily accessible by other professional groups such as IT audit specialists, while, in contrast, financial auditors find it relatively difficult to carry out these tasks because IT expertise has not traditionally been a core part of their education or training. However, by hybridising their knowledge and skills to cover new areas of IT expertise, they may be able to settle jurisdictional disputes and find a new balance between the auditing profession and its work.

### **3. Research design**

Given that this issue is both relatively under-explored and complex, semi-structured interviews were initially conducted with ten subjects in the UK<sup>5</sup>. These were supplemented by a further six interviews in Egypt<sup>6</sup>. All took place in the period from early May 2006 to early January 2007<sup>7</sup>. An analysis of the interviewees’ details is set out in Table 1.

Insert Table 1.

Building upon these interviews, a postal questionnaire was developed and sent to a sample of ICAS, ICAEW and ISACA qualified financial and IT auditors at the largest 20 UK audit

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<sup>4</sup> Generally speaking, hybridisation could be defined as a phenomenon produced out of two or more elements normally found separately [49]. The term ‘hybrid’ has widely been used in the sociology of professions literature. The notion of ‘hybrid profession’ refers to expanding knowledge base of a profession as a result of the possession of new knowledge derived from other professions [43].

<sup>5</sup> Exceptionally, interviewees ‘I’ and ‘J’ were interviewed in a single interview.

<sup>6</sup> Finding UK respondents willing to be interviewed proved extremely difficult, it was thought that the views of practitioners from the international audit firms in Egypt, where one of the researches has access to big four, could be explored to enhance the scope and depth of data. Given that the interviews were primarily concerned with the implications of e-business for the expertise and roles of financial auditors, it was not felt that there would be systematic differences between the views of practitioners from different countries. Analyses of the transcripts supported this belief

<sup>7</sup> One interview was via phone and one via e-mail. The rest were face-to-face and were taped.

firms<sup>8</sup> in ten large cities in the UK<sup>9</sup>. The combination of these two data sources was employed to improve the reach and robustness of the resultant claims made and to overcome the perspectival problems normally associated with using a single data method. After initial pilot testing<sup>10</sup>, the questionnaire was sent to a sample of 1179 financial auditors and 142 IT auditors in late September 2007 with a follow up in early November 2007, resulting in a final usable sample of 90 or a response rate of 7%, as shown in Table 2<sup>11</sup>.

Insert Table 2.

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. Table 3 reports on the demographics of the respondents. The typical respondent was an experienced auditor (58% 11 or more years) with a professional qualification (87%).

Insert Table 3.

#### **4. E-business audit jurisdiction: a move to non-financial auditors**

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 [52]. More importantly for this study, also by 2007, 19.3% of all UK businesses (68.9% of those employing at least a 1,000) used automated data exchange, 17.8% (50.3%) automatically integrated orders received and their accounting system while 12.8% (48.5%) did the same for orders placed with suppliers.

Matthews [45] indicates that technical audit work shifted from manually checking entries in paper-based accounts in the 1960s to clicking the mouse on a computer in the 1970's. Now, it can be argued that, due to the unique features of e-business: total reliance on IT

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<sup>8</sup> According to Accountancy Magazine Rank in 2007

<sup>9</sup> London, Manchester, Birmingham, Leeds, Liverpool, Newcastle, Southampton, Cardiff, Edinburgh, and Glasgow

<sup>10</sup> The initial questionnaire was pilot tested by four accounting academics (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.

<sup>11</sup> 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.

controls; uncertainty; use of real-time systems; and security [42], auditors would be expected to use audit software while auditing e-businesses. Indeed, some go as far as to argue that the increased implementation of e-business systems will result in the complete dominance of IT audit specialists:

“...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” [9, p.36].

While such complete convergence may never occur, it is clear that rapid advances in the Internet and the web, and the increased ease of interaction with consumers and business partners brought about by the use of web-based models, mean that the use of internet-based business models will continue to grow.

However, there are a variety of available internet-based business models, from one extreme the use of the web only to build awareness amongst stakeholders, to, at the other extreme, the use of 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 will obviously crucially impact 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, 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. Furthermore, interviewees L and N clearly 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”

In light of the above, it can be argued that financial auditors need to expand their expertise to encompass areas that have not commonly been part of their education or training [10, 53]. For example, interviewee F was concerned about the need for auditors to have new types of IT knowledge and skills:

“In internet-based business, there are new aspects that auditors did not deal with in traditional audits even in computerised systems such as security technologies, networking technologies, integrated information systems, web pages, conducting 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, from an academic perspective, interviewee B 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”

These comments suggest that IT specialised roles will become increasingly important so driving the need for specialised IT technical knowledge and skills. This concern was also echoed by interviewees C and Q. For example, C 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 stressed the need for a 'hybrid' auditor, when he responded:

“... 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 went further, when he said:

“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...”

The conclusion that can be drawn from the above is that being an experienced professional auditor is not enough on its own to successfully audit highly integrated e-business models. The highly technology-supported nature of e-business requires ever-higher levels of IT expertise which has not been a core area of expertise of financial auditors [15, 53]. This in turn 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 taken over by IT auditors [9]. This concern was referred to by interviewee E, when he observed that:

“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 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”

However, it is important to note that 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. Rather, it has also crucially been due to their social and political role as a professional group serving the public interest [33, 46]. In this sense, it can be argued that the steady increase in the importance of IT auditors is likely to also challenge the social identity of financial auditors.

## **5. Financial auditors, IT auditors and e-business audit**

While it is clear that members of the professions of IT and auditing have worked in apparent harmony and jurisdictional disputes between the two have been uncommon, the emergence of e-business presents significant new challenges to financial auditors. Drawing

upon Abbott's [1] model, this section describes and analyses how the potential for resultant conflicts between the two professions.

### *5.1. The jurisdictional contest*

Auditing standards generally recognise that financial auditors are not expected to possess expertise in other fields. For example, SAS No. 11, '*using the work of a specialist*', and its revised version: SAS No. 73 [4, 5] provided guidance to auditors when utilising the work of a specialist in undertaking a financial statements audit. The specialist might be a member of the audit firm or an outside specialist; in either case the specialist is a member of the audit team and should 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 [61].

The auditing standards are therefore premised upon the view that the role of the IT specialist is largely just to add support to the financial auditor, particularly in investigating and evaluating computer-based internal controls. The same view was echoed by an IS auditor interviewed by Bagranoff and Vendrzyk [9] when he/she was asked to describe the relationship that existed in the 1990s between IT audit and the traditional financial audit, he/she responded:

“The IS audit was a fly on the back of a giant gorilla [financial audit]”

Turley and Cooper [60] when explaining the limited use of CAATs by financial auditors also reflected this view:

“... field auditors are not usually sufficiently competent to run such programmes [CAATs] successfully and may be over reliant on assistance from either the client's staff or the firm's own computer auditing specialists”  
(quoted in 45, p.116)

Conversely, in an e-business audit scenario, the role of IT specialists is expected to be entirely different. A wide range of new and complex technologies are expected to influence the e-business entity's systems and applications, and in turn audit practice. This has led Zhao *et al.* [62, p.399] to ask “who will be the ideal job candidate for an auditing firm in five years.” In other words, many believe that if auditors continue to delegate most IT-

based audit tasks to IT specialists then IT auditors will drive the financial audits of e-business in future [9].

Similar concerns were also voiced by interviewee E, when he responded:

“... 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”.

Furthermore, he warned that:

“... If they [financial auditors] do not get prepared for this change ... I can expect that they will not have any role and other professionals such as IT specialists will take it [financial auditing service] over ...”

In order to explore the type of IT auditors that are employed by accounting firms, the questionnaire respondents were given three possible descriptions and asked to indicate which best describes the IT auditors employed by their firm. From this list, as shown in Table 4, 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 and, taking the opposite position. In contrast, the use of financial auditors was very much less common. 8% of firms only employed financial auditors with an IT professional qualification while a quarter of respondents indicated instead that IT auditors at their firms included both types.

Insert Table 4.

To further explore the extent to which audit firms train their financial auditors in IT 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, including 18% of IT auditors indicated that this was not included in audit training, while 47% indicated that less than 25% of training was devoted to this issue (44% of financial auditors and 66% of IT auditors). In contrast 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 IT training was indirectly echoed by interviewee P, an IT manager:

“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”

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 5. Mean statistics for almost all items are above 3.00 and the large majority of respondents (75% or above) indicated a strongly agree, agree, or neutral response to almost all the statements. This suggests a high degree of consensus across the respondents. It appears that they clearly expect that there will be increase in the number of IT specialists employed by audit firms as well as an increase in IT training for financial auditors. These expectations were also expressed by interviewee G:

“... 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 these knowledge will increase ...”

It is also noteworthy that more than two-thirds of respondents expected to see a substitution of IT auditors for traditional financial auditors in the e-business audit marketplace. Not only that, but they also indicated that IT specialists will have a wide range of roles in the audit profession and IT skills will be given priority when recruiting. 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. Rather, continuous audit techniques will be dominant. 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 will have higher positions in audit firm management.

Insert Table 5.

The above findings suggest that the auditing profession will continue 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. Such trends are expected to change the underlying relationship between financial auditors and IT auditors, leading to IT auditors competing with financial auditors over e-business audit service [24]. Thus, it can be argued that this indicates deprofessionalisation and a potential jurisdictional conflict between financial auditors and IT auditors. If the accountancy profession is to avoid such a

conflict, it will have to address this problem by renegotiating the existing knowledge and skills base of financial auditors.

## *5.2. Transformation and Settlement*

Once a profession's jurisdiction changes, modification of an abstract system of knowledge is required to support or legitimate this change [1]. Albrecht and Sack [2] argue that the real question is whether accounting bodies, practitioners, and educators are recognising the change and adapting quickly enough to the new environment. Professional accounting bodies have a critical role to play through issuing standards and guidelines, and through the continuous update of their training programmes. Indeed, professional endeavours can be seen as a means by which jurisdictional conflicts can be settled, leading to a balance between the work performed and the profession's jurisdictional claims.

In 1988, the IIA launched a computer audit credential – Qualification in Computer Auditing (QiCA). This qualification was designed specifically for those who contribute to and lead on computer audit tasks. In response to technological changes in the business environment, in 2008, the IIA proposed replacing the QiCA 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” [35, p.2]

In addition, the IIA waives part of the Certified Internal Auditor (CIA) exam for the Certified Information Systems Auditor (CISA) qualification<sup>12</sup> [34] as well as keeping its members up-to-date with the latest IT knowledge and skills through offering an extensive programme of training courses. In particular, it offers four courses with special focus on auditing issues in an IT environment.

In marked contrast to the IIA, the other three accounting professional institutions, ICAS; ICAEW; and ACCA pay very little attention to IT expertise in general and IT audit knowledge and skills in particular either within their professional training programmes syllabi or within the content of the their professional courses portfolio. For example, ICAS includes general knowledge and understanding of IT, e-commerce and IT systems controls

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<sup>12</sup> Certified Information Systems Auditor (CISA) is an audit professional certification sponsored by the Information Systems Audit and Control Association (ISACA).

among the topics covered in the subject of Assurance and Business Systems in the Test of Professional Skills (TPS). Information technology is also one of ten categories of CA business courses. Likewise, the professional syllabus of ICAEW covers relatively little on IT or its implications for technical auditing and accounting work. Indeed, while the ICAEW offers a wide range of specialist qualifications and programmes neither IT in general, nor e-business in particular, are included. As with ICAS and ICAEW, the ACCA qualification gives very little 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 a fundamental level and professional level.

Based on the above, it can be argued that the professional education and training at the three institutions are orientated mainly towards business subjects. The main focus is obviously accounting and auditing, however business law and business ethics are also of importance while recent IT changes and developments and their implications for accounting and auditing practices are not well covered. Since there has been no professional response, except the IIA endeavours, to developments in e-business, it can be argued that the UK auditing profession is reluctant or even ignorant of the potentially revolutionary impact of recent IT developments on the auditing profession. After more than four decades of computerisation, one would still conclude that the UK auditing profession mitigates the lack of IT expertise of its members through delegating IT audit practices to IT specialists, so enhancing the likelihood of tension between financial auditors and IT specialists, particularly in the e-business audit context.

This position is in marked contrast to that of other countries. For example, following the Bedford Committee [3], Elliott Committee [see, for example, 19, 20, 21, 22] and Albrecht and Sack [2], North American accounting professional bodies took up this challenge earlier and began not only to integrate IT expertise into accounting education and training programmes, but also to develop new IT credentials designed specifically for their qualified members.

In 1998, in response to forces impacting upon the accounting profession (e.g. an increase in non-CPA competitors, decline of new CPAs, and technological advances), AICPA issued the *CPA Vision Project - 2011 and Beyond*. The main purpose of this project was to help the CPA profession to stay on top of the change curve by gaining insights into future

challenges and opportunities for the accounting profession. The report argued that technology services are one of the five core services that the CPA would increasingly provide in the future while IT was one of the five core competencies that accounting professionals would need to possess in the future, so that CPAs should be:

“... able to utilize and leverage technology in ways that add value to clients, customers and employers” [6, p.11]

In 2007, in a significant move towards altering the profile of CPAs, the AICPA offered an IT credential, the Certified Information Technology Professional (CITP) that attests to a CPA’s understanding of a broad range of IT expertise. Importantly, this credential is granted only to those who hold a valid CPA certificate issued by a state authority:

“A CITP is a CPA recognized for their technology expertise and unique ability to bridge the gap between business and technology” [7]

It appears therefore that the new credential reflects the notion of ‘hybridisation’, as illustrated in the AICPA’s promotion of the new qualification:

“An increasingly competitive global marketplace has organizations [clamouring] for new technologies and the capacities, efficiencies and advantages they afford. While IT professionals have the technical expertise necessary to ensure that technology solutions are properly deployed, they lack the CPA’s perspective and ability to understand the complicated business implications associated with technology” [7]

In Canada, in 2001, the CICA significantly changed the CA qualification process by releasing the CA candidates’ competency map. One important feature of the new qualification process is that IT was integrated as one of the six main specific competency areas. As a further move towards hybridisation, in 2007, the CICA again adjusted the position of IT competencies, with them instead being integrated throughout all the competency sections. Not only does this approach reflect the fact that IT has become an integral part of most accounting and auditing activities but it also suggests that IT knowledge and skills are increasingly becoming a central part of their qualification.

As another movement in the direction of a hybrid profession, the CICA’s offers a specialist certification programme to recognise CA-designated IT specialists (or CA•IT). This certification aims to:

“... Encourage and recognize excellence in the provision of Information Technology services by Chartered Accountants ...” [13]

As with the CITP credential, the CA•IT designation is only for those who are already qualified as chartered accountants and who work in IT-related business areas and wish to become a designated IT audit specialist. The CICA defines those CA•IT specialists, while promoting this IT qualification, as:

“A CA•IT is a CA; who brings a business-oriented approach to IT strategy and implementation, who applies business acumen, strategic insight and understanding of IT to help organizations succeed” [14]

It should also be noted that the CICA and the AICPA created a joint task force to develop a CA•ITs and CITPs common competency map. Moreover, they accredit the ISACA as the only professional body whose CISA credential leads to recognition as a CA-designated specialist in information systems audit, control, and security.

Internationally, since the publication of International Education Guideline 11 in 1995 [37], several rapid IT changes and developments have taken place, resulting in revisions to IEG 11 in June 1998, January 2003, and finally in October 2007, when the 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 professional accountants, in different roles, require to enable them to ask questions of IT specialists and to understand the outcome of specialists' work. 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 and sustaining the survival of the accounting profession. For example, the ICAEW commented that:

“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” [38]

Similarly, Ernst & 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” [38]

Furthermore, in 2008, the IFAC released a new International Education Standards (IES) No. 8, *Competence Requirements for Audit Professionals*, effective from July 2008 [40]. This standard aims to prescribe competency requirements necessary for audit professionals. It prescribes the specific knowledge they require over three key areas:

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 should develop and apply these knowledge and skills at a broader and deeper level than that expected of professional accountants.

## **6. The UK auditing profession: ways forward**

### *6.1. Importance of IT expertise to financial auditors*

Not only does the UK profession appear to differ from the profession in North America or indeed, from IFAC, in terms of the importance it attaches to the acquisition of IT knowledge and skills, but it also appears to differ significantly from the questionnaire respondents. When asked about the importance of IT knowledge and skills, 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 is noticeable from Table 6, 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.

Insert Table 6.

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. This suggests that without this expertise auditors would not have the competence to put the issues that they will be confronted by into a proper context or perspective, and to judge their materiality in relation to the audit objective [25]. Equally importantly, such IT expertise is essential for enhancing the confidence of clients and the general public. An auditor's judgment will only be accepted if it is believed that 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 [25]. This also helps to explain why professional development was ranked as the third most important reason for financial auditors to become IT competent. Other social and political aspects of the role of financial auditors were also significant, as respondents perceived that creating competitive advantage and enhancing professional status were among the important reasons why auditors should acquire IT knowledge and skills. 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 they work in.

### *6.2. Types of IT expertise areas needed for financial auditors*

A list of 13 IT knowledge and skills areas was developed and audit respondents were asked to rate the importance of each of these for financial auditors working in an e-business environment<sup>13</sup>. As can be seen in Table 7, 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.

Insert Table 7.

### *6.3. The development of IT expertise*

Given the apparently conflicting views between the profession and the respondents, a final issue addressed was where auditors believe that these IT knowledge and skills should be learned. Audit 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 expertise areas and asked to indicate one from three educational choices, namely: pre-professional education (e.g. university education); professional training programmes; and, post-professional education (e.g. on-the-job training programmes and continuing professional development programmes). Overall, as reported in table 8, 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. In contrast, the majority of respondents felt that the profession should be responsible for delivery of the required education in the other 12 areas.

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<sup>13</sup> This list was mainly informed by IEPS No. 2.1 [39] and findings from interviews.

Insert Table 8.

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.

However, it is also clear that there is no single way to prepare audit professionals and there was relatively little agreement over which of the three places is the most appropriate. Instead, the three educational choices can be better seen as integral components of an effective strategy to develop auditors' competency. University education can reflect on the technological developments in the business environment and the implications of these developments for accounting and auditing practice. However, the role of the university is not to provide the professional training required by auditors and the profession itself, whether thorough initial training or post professional training is the more appropriate place to provide audit professionals with knowledge and understanding of the practical aspects of these developments.

## **7. Conclusion**

This paper contributes to the existing literature in two ways. First, while most e-business audit studies focus on the technical impacts on auditing practice, the present paper is concerned with how e-business challenges the expertise and roles of financial audit practitioners. Second, this paper exploits Abbott's [1] model, not as is more common, to understand historical professional contests and the development of professions, but instead for exploring the possible jurisdictional contest between financial and IT audit practitioners in an e-business environment.

Due to its highly technology-centric nature, e-business has a direct technical impact on auditing practices leading to audit software being increasingly used in conducting technical audit work. As a result, IT specialised roles are becoming increasingly common and growing in importance so driving the need for IT knowledge and skills which have not traditionally been part of the financial auditors' education or training. This has led Gottliebsen [27, p.17] to warn "... [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 an e-business audit environment, what can be expected is a decline in the numbers and roles of pure financial auditors, especially in large firms, and the rise of hybrid auditors who possess a combination of traditional accounting and auditing expertise and a wide range of IT audit expertise. This suggests again the idea of specialisation in the accounting profession. In particular, the IFAC [36, p.2], in a discussion paper: *specialisation in the accounting profession*, considers the political role of the accounting profession and professionals is among factors that suggest specialisation in the profession is needed “to develop a leadership role for the profession in a rapidly changing business community, thus maintain the status of the profession”.

The future of auditing in an e-business environment lies in the need to renegotiate its abstract systems of knowledge because the number and roles of competing professional groups such as IT professionals are growing. Compared with countries such as the USA and Canada, it appears that the UK professional institutions (ICAS, ICAEW and ACCA) have hardly begun the transformation needed to prepare audit professionals for the e-business challenge. This lack of change might be explained by the unique status of the UK accounting profession. In particular, unlike the USA and Canada, the UK accounting profession is managed and controlled by six accounting professional institutions (ICAS, ICAEW, ICAI, ACCA, CIMA, and CIPFA). It can be argued that competition among these professional institutions also affects the content of professional education. Although the foremost objective of these institutions is to enhance the professional status of accounting professionals, the need to both keep their existing members and attract new members (or customers) specifically to their own institute rather than to one of the others are also leading objectives. Making training more difficult, time consuming or costly than that of competing institutions might adversely affect their short-term competitive position. However, UK audit professionals need to develop the expertise to deliver consistent, high quality audit services and maintain their jurisdictional claims in an e-business context, through educating and training financial auditors in the new IT-driven audit environment.

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**Table 1**  
Interviewee demographics

Interviewee Reference	Category	Position	Firm/University	Location	Years in Profession
A	Academic	Lecturer	Post-1992 university	England	20
B	Academic	Professor	Post-1992 university	Scotland	23
C	Academic	IT Lecturer	Pre-1992 university	England	18
D	Academic	Senior Lecturer	Pre-1992 university	Scotland	23
E <sup>14</sup>	Academic	Associate Professor	N/A	Egypt	27
F	External Auditor	Senior Audit Manager	Medium-Size Firm	England	28
G	External Auditor	Partner	Medium-Size Firm	England	-
H	Internal Auditor	Head of Internal Audit	Building Society	Scotland	29
I	Internal Auditor	Head of Internal Audit	Investment Manager Company	Scotland	23
J	Internal Auditor	IT auditor	Investment Manager Company	Scotland	14
K	Training Professional	Assurance & Business Systems Training Manager	Professional Institution	Scotland	14
L	External Auditor	Partner – Head of IT Audit	Medium-sized Firm	Egypt	32
M	External Auditor	Partner – Head of IT Audit	Big 4	Egypt	26
N	External Auditor	IT Audit Manager	Big 4	Egypt	10
O	External Auditor	Director	Big 4	Egypt	14
P	IT Professional	IT Manager	Oil Consultant Company	Scotland	8
Q	IT Audit Professional	IT Audit Senior Manager	Big 4	Egypt	15

**Table 2**  
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 <sup>15</sup>	100	7%

<sup>14</sup> This interviewee falls into two or more of the subjects groups. She/he is an academic and at the same time she/he is a partner in an auditing; consultations; and training company. Due to economic aspects of the Egyptian society, Egyptian academics, relatively more often than in the UK, seek different jobs and sources of income at one time. However, the main status for this cross professional accounting interviewee is to be the academic one. Additionally, although it was planned to not interview Egyptian academic staff because of differences between education systems in the two counties - Egypt and UK, interviewee ‘E’ was chosen owing to her/his expertise in academia, auditing practice, and in providing training programmes in e-business audit settings.

**Table 3**  
Demographics of the respondents

	Frequency	
	No.	%
<b>A. Audit Firm Type</b>		
Big four	55	61
Another international firm	21	23
Regional/Local firm	6	7
Firm with offices over the UK	8	9
<b>D. Experience in Profession</b>		
1 – 5 years	11	12
6 – 10 years	27	30
11 – 15 years	12	14
16 – 20 years	11	12
> 20 years	29	32
<b>E. First Degree</b>		
Accounting Degree	41	45.5
Not Accounting Degree	41	45.5
None	8	9
<b>G. Accounting Professional Qualification</b>		
ICAS/ICAEW	78	87
Other	7	8
Combination	2	2
None	3	3
<b>H. IT Professional Qualification</b>		
CISA	11	12
Other	3	3
None	76	85

**Table 4**  
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%

<sup>15</sup> The total number of returned questionnaires is 110, but 20 questionnaires were excluded including: 18 respondents were not longer employed by contacted audit firms; 1 respondent has not any e-business clients; and 1 questionnaire was not valid to be used.

**Table 5**

Potential consequences for the auditing profession of e-business

	N	Strongly Agree /Agree 5-4	Neither 3	Disagree/ Strongly Disagree 2-1	5-Point Mean	Std. Dev.
Number of IT specialists used by audit firms will increase	90	80%	16.7%	3.3%		
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 6**

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	Disagree/ Strongly 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 7**

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 & 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

**Table 8**

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 & 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%