

■ Research Article

CFOs in E-Business: E-Architects or Foot-Soldiers?

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Both the role of the CFO (chief financial officer) and the discipline of accounting can be viewed as being in transition due to developments in the e-Business world. One perspective suggests that CFOs are becoming 'e-process architects'—an alternative suggests that the CFO role is becoming commoditized to 'foot-soldier' status with other roles such as CIOs (chief information officers) and CTOs (chief technology officers) staking a claim to its traditional accounting space. In this paper we present some preliminary evidence relating to this e-architect/foot-soldier question, and on levels of e-Business activity, based on data obtained from over 120 CFOs in the Irish ICT sector. Copyright © 2004 John Wiley & Sons, Ltd.

INTRODUCTION

From the 'lost relevance' debate of the 1980s (Johnson and Kaplan, 1987) through the rise of ICT (information and communications technology) mediated e-Business in the 1990s both the role of the CFO (chief financial officer) and the discipline of accounting can be viewed as being in transition. There is as yet, however, little clarity in the literature on what specifically this emerging CFO role is, or where exactly the discipline of accounting is likely to be positioned in the corporate e-Business world.

One perspective suggests that CFOs are being asked to act as 'process architects' for their organizations (Hoffman, 2001). This idea of 'CFO as e-Biz Architect' was also the guiding theme at the 10th Annual Business Week Forum of Chief Financial

Officers (Business Week CFO Forum, 2001). Deise and his colleagues' (2000, p. 205) suggestion that 'the role of the CFO is not just to be the architect of the up-front plan, but to be the navigator of the company's course as he or she executes that plan' is typical of leading consulting-oriented discourse in this area. This proposed CFO role focuses on internal processes that cut across different business functions in an attempt to ensure that customers, suppliers and other e-Business partners are linked together throughout the entire e-value chain. Morgan's (2001) elaboration on this emerging CFO role as 'architect of the enterprise in the information age' (see Figure 1) is illustrative here.

Morgan (2001) proposes a dramatic reduction in the time spent on transaction processing and control activities by CFOs due to developments in ICT-enabled systems such as ERP (enterprise resource planning). With the time gained he suggests a concomitant increase in more strategic process support activities for CFOs such as establishing economic growth targets, portfolio investment priorities,

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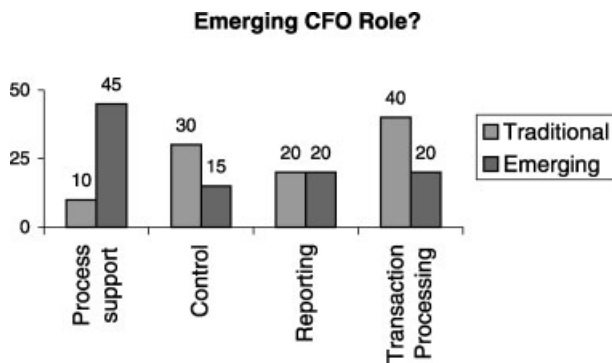


Figure 1 Architect of the enterprise? (Adapted from Morgan, 2001)

strategic planning, EVA (economic value added) analysis and decision-making, and greater involvement in the development and monitoring of performance metrics and change management. Parker (2001, p. 438) suggests that the opportunities for information systems oriented accountants in e-Business are vast in areas such as:

... access to new markets and customers, closer links and new alliances with business partners and suppliers, improved communication, internal organizational process efficiencies and cost savings, improved supply chains, electronic procurement of inputs and supplies, electronic data interchange and electronic funds transfer.

From this glowing perspective, the CFO is becoming a central player in assessing, selecting and implementing e-Business enabling infrastructure, technologies and processes; developing scaleable strategic partnerships; redesigning legacy business models; and creating a culture that is open to the rapid disruptive change that becoming an e-Business requires (Deise *et al.*, 2000; EIU/Accenture, 2000a, 2000b; Hoffman, 2001; Parker, 2001; Morgan, 2001; Cronk and Fry, 2001).

An alternative and starkly contrasting perspective, partly originating in the 'lost relevance' debate (Johnson and Kaplan, 1987), suggests that accounting is becoming commoditized with a consequent downgrading of the CFO role to 'foot-soldier' status. 'Foot-soldiers', according to Jack Prouty of KPMG, 'make for bad e-Commerce executives' (Banham, 2001). The primary research question addressed here, based on data obtained from over 120 CFOs in the Irish ICT sector in mid 2001, is to ascertain where individual CFOs are positioned on this e-architect-foot-soldier continuum. A secondary focus is to gain some preliminary evidence on levels of e-Business activity within the Irish ICT sector itself.

The structure of the remainder of the paper is as follows. We first provide a brief review of recent research, with particular emphasis on the ICT sector.

We then provide some background on the Irish context and on the research methodology employed. The findings on perceived levels of organizational implementation in six key e-Business areas and the personal level of involvement of CFOs in the implementation process are then presented. We tentatively conclude that although there is evidence of significant e-Business activity in this particular ICT sector and of CFO involvement, there remains quite some distance to be negotiated before either CFOs or their accounting functions can claim to be strategic leaders or e-architects in the e-Business arena.

FROM E-BUSINESS IN GENERAL TO CFOs IN PARTICULAR

There are few empirical studies and little theoretical clarity on what specifically this new CFO role is, or where exactly the discipline of accounting is strategically positioned in the emerging cross-functional and e-value chain based e-Business world (Ray *et al.*, 2001; Sivabalan and Booth, 2001). CFOs are advised to automate transaction processes and leverage the time gained to substantially increase their process support activities (Deise *et al.*, 2000; Morgan, 2001). Control activities are further enabled by ERP systems, and a much broader focus on information, value, and market intelligence reporting is envisaged for the CFO. Bob Verheecke, CFO at CacheFlow Inc., claims that 'It's the ability to turn data into real information, collecting it and distributing it to users so they can make decisions. In my role as CFO, I'm stepping further into that role of information architect' (Chabrow and Hayes, 2001). The implicit logic here is that CFOs who fail to take on this broader process support role, for whatever reason, risk being sidelined to foot-soldier status.

The comprehensive International Data Corporation (IDC) eWorld survey (Gantz, 2001) finds that large businesses are increasing their spending on e-Business by 20–30%, and hoping to grow online revenue by up to 50%. This study, conducted in the first half of 2001, obtained data from 13 000 CIOs and IT managers in 27 countries via telephone, and 2000 online responses from Internet executives in 12 countries. This study demonstrates that e-Business has passed through the transition from the Phase 1 'dotcom' era to Phase 2, the 'infrastructure build-out' era, a finding broadly substantiated by the recent European Commission (2002, 2003) on e-Business.

According to the EIU/Accenture (2000a, 2000b), however, many CFOs believe that their organizations lack the necessary structure and culture to account for e-Business effectively, and are struggling to redesign their finance functions and

accounting methods. This study, conducted in 2000, obtained responses from CFOs in 276 major corporations in North America, Europe, and the Asia-Pacific region (EIU/Accenture, 2000a, 2000b; Enos, 2001). Daniel T. London notes that this particular survey indicates that many CFOs:

...doubt the ability of traditional metrics to evaluate key elements of operating in the new economy...e-commerce is changing the rules of the game and broadening the role of financial officers. New business models and innovative technologies are requiring greater levels of finance leadership to ensure long-term viability and success...Transforming brick-and-mortar companies to e-commerce players requires CFOs to reassess their approach to capital investment and rates of return. They are being asked to evolve at e-speed and, in several instances, reorder their priorities. (Enos, 2001)

Almost two-thirds of companies had had an e-Business strategy in place for 2 years or less, with almost 60% stating that their e-Business strategy is reviewed on an *ongoing* rather than on an annual basis. Echoing the continuing applicability of the 'lost relevance' debate, only 17% of CFOs believe that new revenue/cost streams can be accounted for 'very effectively' by established processes—almost 60%, however, continue to apply traditional evaluation techniques when considering capital investments. This survey confirms that, in most firms, the CEO is usually in charge of overseeing e-Business activities but that many CFOs serve on cross-functional senior teams. This top team structure offers CFOs direct participation in ongoing strategy formulation and such CFOs are certainly much more than mere foot-soldiers. This survey, however, suggests some disparity, especially in larger organizations, with respect to the perceived role of the CFO. Whereas CFOs view themselves as strategy facilitators, they are often viewed by senior management as primarily investment appraisers (EIU/Accenture, 2000a, p. 8). This report leans towards the 'e-architect' end of the continuum in advocating the following strategic CFO actions:

- Balance the customer value proposition with shareholder returns.
- Facilitate interactive corporate performance measurements.
- Web-enable the finance function with interactive, scalable solutions.
- Foster the entrepreneurial culture necessary to succeed in an e-Business world.
- Benchmark the state of readiness for e-Business against others in their industry.

- Implement performance measurements that react more quickly to the pressures of e-commerce.
- Prioritize technology initiatives that accelerate the speed of transaction processing and closing.
- Provide the market intelligence necessary for more customer-driven enterprises.

Compared to these challenging imperatives, the present-day reality is probably somewhat different for most CFOs—Hoffman (2001) reports that many CFOs attending The 10th Annual Business Week Forum of Chief Financial Officers in the United States (February 28–March 2, 2001), especially in *old economy* organizations, continue to be 'wary about braving the e-Business waters'. In a poll of more than 100 attendees, 24% of the respondents report that their companies were not involved in *any* kind of online business activity—even including such relatively mundane business functions as electronic invoicing.

Similar evidence is available in an Irish context. In the Deloitte-Touche/Enterprise Ireland (2000) survey of 200 CEOs in leading Irish businesses, 65% of CEOs stated that e-Business *should* be their responsibility. Marketing, however, at 43%, emerged as the function most likely to be responsible for e-Business, ahead of finance at 39%. Fifty-eight per cent of CEOs claimed to have an e-Business strategy, while 25% were preparing an e-Business strategy. The figures reported here for e-Business strategy, customer care, logistics/distribution and e-HR in the general Irish industrial population are, however, quite low.

Moving from the general to the more specific, the Deloitte-Touche survey of almost 100 CFOs in Irish companies (Finance, 2001) provides further evidence that there is significant distance yet to be negotiated in the journey if CFOs are to achieve e-architect status. Fifty-four per cent of these CFOs stated that they did not understand the concept of ERP, 31% did not understand many budgeting/reporting tools and 39% stated that they had no real understanding of e-Business. Over a third were not satisfied with their financial systems and a 'surprisingly large number' (Finance, 2001) did not understand concepts such as activity-based costing (ABC), financial process redesign, value-based management and the balanced scorecard. In view of the research linking many of these activities to performance (Kennedy and Affleck-Graves, 2001) the levels of understanding reported here are not particularly impressive.

In the foreword to a recent major European study on e-Business (European Commission, 2003, p. 5) Erkki Liikanen, the European Commissioner for Enterprise and the Information Society, notes that:

In order to reap the real benefits of investing in ICT, companies need to take further steps beyond simply 'going digital'. They need to improve both employers' and employees' skills, as well as to integrate ICT into their business processes. The focus has now to be shifted from basic connectivity and electronic commerce transactions to conducting business electronically. This emphasis on the productive use of ICT all along the value chain is reflected by the term 'e-Business'.

Further commenting on the findings of this seminal study, which we comment on below, he notes that:

... the remarkable differences observed sometimes at the national level, may have to be attributed to a large extent to the specificities of the particular economy and its structure... another lesson is that the full implementation of e-Business solutions is still in its infancy, in particular for most SMEs.

The main findings of the European Commission study on e-Business, following the conceptual fra-

mework proposed by the OECD (Colecchia *et al.*, 2000), are presented in Table 1. European firms are making significant progress—which, in turn, is having a significant effect on how European firms operate.

Firm size (Table 2) and sector are found to be the main differentiators, with the Electronics and ICT services sectors (Tables 3 and 4) noted early adopters.

Of particular interest to management, particularly financial management should be the impact that adopting e-Business has on the business of doing business. Taking the ICT Services sector as one example, we note in particular the much higher adoption rates (Table 3) and the changes taking place in internal work processes and in ways of conducting business (Table 4).

In a very substantive contribution to research on e-Business adoption, Zhu *et al.* (2002), based on their analysis of survey data from over 3000 firms and more than 7500 consumers in eight European countries (Germany, United Kingdom, Denmark, Ireland, France, Spain, Italy and Finland), find that:

Table 1 e-Business activity in Europe in 2002

e-Readiness ICT infrastructure and skills development	e-Activity e-Commerce (frequency and intensity)	e-Integration Business processes within and between firms	e-Impacts Effects of e-Business activities on firms
<ul style="list-style-type: none"> • Connectivity • Bandwidth • Remote/wireless access • Demand for IT staff • Skills development • 94% use computers • 83% have access to the Internet, but 28% of those still use a dial-up modem to connect • 71% use the WWW • 29% have a company internet • About 12% of staff are mainly occupied with IT maintenance • 13% searched for IT staff in the past 12 months • 83% of employees work in firms supporting IT training schemes 	<ul style="list-style-type: none"> • Online marketing and sales • Online procurement • B2B marketplaces • 52% have a web presence • 13% make online sales; 42% of those for more than 2 years • Company website is the main channel for online sales (85%) • 70% report that online sales account for <10% of total sales • 34% make online purchases • 62% report that online purchases account for <10% of total procurement • 5% trade on B2B e-marketplaces 	<ul style="list-style-type: none"> • Processes within the firm • Processes of the extended firm • Technologies for e-Business integration • 10% use online technologies to track working hours and production time • 12% use e-learning technologies • 9% of firms selling online say online sales are fully integrated with backend systems • 42% exchange documents electronically with suppliers • 13% collaborate with business partners online in designing products • 7% use customer relationship management (CRM) software 	<ul style="list-style-type: none"> • Impacts of online procurement and selling • Overall impacts • Satisfaction • Planned expenditures • 12% say e-Business constitutes a significant part of how they operate • 27% of all businesses say that e-Business has changed their internal work processes; 24% customer relationships • 14% are 'very satisfied' with their e-Business activities; 74% 'fairly satisfied' • 32% planned to increase their e-Business expenditures in 2002-3; 60% wanted to maintain level • 45% think that large firms will mainly benefit from e-Business; 35% say SMEs and large firms will benefit equally

Adapted from European Commission (March, 2003, p. 11).

Table 2 Diffusion of sophisticated e-Business solutions by company size class (% firms)

e-Business solution	Adoption rate by All firms (percentage)		
	Small firms (0-49)	Medium firms (50-249)	Large firms (250+)
CRM	7	13	31
SCM	2	4	13
KM	6	9	18
ERP	6	21	38

Adapted from European Commission (March, 2003, p. 29).

Table 3 ICT services: Current and planned usage of specific e-Business solutions

solution e-Business	All sectors	ICT Services			
		All ICT firms	Small (0-49)	Medium (50-249)	Large (250+)
CRM	7	22	22	40	53
SCM	2	3	3	4	12
KM	5	18	17	29	19
ERP	7	8	8	37	51
e-Learning	12	30	30	30	44
EDI	9	12	12	27	40

Base: EU-4 (D, F, I, UK), all firms. N=403 (for ICT services), n=5917 (for all sectors).

CRM: customer relationships management; SCM: supply chain management; KM: knowledge management; ERP: enterprise resource planning; EDI: electronic data interchange.

Adapted from European Commission (March, 2003, p. 214).

Table 4 Perceived Impact of e-Business on firms in ICT services sector

e-Business has significantly changed ...	All sectors	ICT services			
		All ICT firms	Small (0-49)	Medium (50-249)	Large (250+)
Organizational structure	6	10	10	8	21
Internal work processes	10	14	14	11	15
Relationships to customers	8	13	13	11	13
Relationships to suppliers	7	15	16	6	9
Offers of products and services	7	13	13	21	29
Way of conducting business	8	17	17	16	17

Base: EU-4 (D, F, I, UK), all firms. N=403 (for ICT services), n=5917 (for all sectors).

Adapted from European Commission (March, 2003, p. 216).

(1) Technology competence, firm scope and size, consumer readiness, and competitive pressure are significant adoption drivers, while lack of trading partner readiness is a significant adoption inhibitor. (2) As (e-Business)-intensity increases, two environmental factors—consumer readiness and lack of trading partner readiness—become less important. (3) In high (e-Business)-intensity countries, e-Business is no longer a phenomenon dominated by large firms; as more and more firms engage in e-Business, network effect works to the advantage of small firms. (4) Firms are more cautious in adopting e-Business in high (e-Business)-intensity countries, which seems to suggest that the more informed firms are less aggressive in adopting e-Business. (Zhu *et al.*, 2002, p. 2)

We now turn our attention to the Irish ICT sector—a sector composed of both small indigenous Irish firms and multinational subsidiaries.

RESEARCH CONTEXT AND METHODOLOGY

The Irish ICT sector, which accounts for almost one-third of Irish exports and one-sixth of Irish GDP (Lillington, 2002), is a suitable site for conducting e-Business research. Ireland is now the largest software exporter in the world, due mainly to the presence of most of the major global players. Employing over 100 000 people, it is, along with the pharma-chem sector, a leading driver of the high GDP growth rates experienced in Ireland in recent times. Further, the ICT sector has grown at 18% per annum, double the impressive GDP rates, between 1993 and 2000. Indigenous Irish firms play a very significant role, employing over half of the 30 000 people working directly in software, for example—its fastest growing segment. These indigenous firms are fully integrated into the global network and their success appears to be due to targeting international niche markets.

Over 600 firms were identified by the research team as operating within the ICT sector in Ireland. It was decided to target those with at least 10 full-time employees, a criterion met by 503 firms. Of the 503 questionnaires posted in mid-June 2001, 200 responses were received from CFOs. Telephone and e-mail follow-up techniques were used to boost response rates. Of these, 77 CFOs indicated either that their firms did not meet the parameters (ICT hardware, software or services) or were unwilling to participate, leaving a total of 123 usable responses and an effective response rate of 24.5%, which can be considered reasonable for

this type of research. Of these, 90 relate to indigenous Irish firms with the other 33 represented multinational subsidiaries.

As part of the research design we sought information on levels of organizational implementation of e-Business activities and the degree of involvement of CFOs in this process. There appears to be little specific empirical academic research published in this field. Following a review of the general literature (Bontis and De Castro, 2000; CIMA, 2000–3; IFAC, 2001–3; Lucking-Reiley and Spulber, 2000; Pellissier, 2000; and Willcocks *et al.*, 1997), commercial web sites of leading e-Business vendors were also reviewed. Four key generic areas were initially identified—e-finance, e-information, e-infrastructure and e-process—and following pilot and focus group discussions, two more, e-HR and e-market orientation, were added (see Figure 2).

Average CFO age is 37 years; 83% are male; and 95% are of Irish nationality. Their average industrial experience is 9 years, with an average of slightly less than 5 years specific in-firm experience. Educational/professional data is mixed—almost 80% have at least a college degree-level education, almost 40% have postgraduate qualifications and slightly less than half report professional qualifications in accounting, finance or taxation. This latter figure is probably due to the fact that in small emerging indigenous companies either the CEO or other senior director is responsible for the finance portfolio. Almost 55% of CFOs are board members, 28% are founding members and 95% consider themselves to be members of the top management team (TMT). The power position is slightly higher for indigenous CFOs—60% are board members and one-third are founding members.

Turnover figures, in millions of euros, are as follows: All firms (avg. = €26 million, SD = 88, *n* = 84); Irish-owned firms (avg. = €12 million, SD = 57, *n* = 69); Multinational subsidiaries (avg. = €87 million, SD = 159, *n* = 15). These firms report an overall 12% growth in employment over 2000 (*n* = 114). Average number of employees is 91 (SD = 143, *n* = 114). Indigenous Irish firms are smaller (avg. = 53, SD = 72, *n* = 84) than the multinational subsidiaries (avg. = 198, SD = 220, *n* = 30). Most Irish firms here can be classified as SMEs (small to medium-sized enterprises).

FINDINGS AND DISCUSSION

This preliminary data analysis (*n* = 123) was carried out using SPSS for Windows (Version 10). Data for levels of organizational implementation for the six e-Business activities is summarized in Table 5.

A repeated-measures analysis of variance (ANOVA) was carried out to investigate whether there was a significant difference between the mean levels of organizational implementation for each of the six e-Business activities. The difference between the means was statistically significant (*p* < 0.0001). Contrasts were then used to investigate which means differed. The mean level of organizational implementation for e-human resource management (e-HR) was significantly different from all other e-Business activities (*p* < 0.05).

This latter finding on e-HR, albeit the lowest level reported, probably represents an increase on the 12% on e-HR in the more general Deloitte–Touche (2000) survey of Irish CEOs and the 12% on e-learning reported in the Chambers of

E-BUSINESS: Please indicate with a number between 1 and 7 the extent to which your **organization** has implemented the following e-Business activities, and the level of your **personal** involvement. 1 represents **no** activity and 7 represents **full implementation/involvement**

	Level of organizational implementation	Level of personal involvement
<ul style="list-style-type: none"> • e-Process Management to seamlessly manage business <i>processes</i> within and across the extended enterprise. • e-Information Management to cohesively manage vital business <i>information</i> and leverage it for new opportunities. • e-Human Resource Management to attract, recruit, train, develop, monitor and remunerate employees using <i>e-HR</i> and <i>e-Learning</i> systems. • e-Infrastructure Management to keep the core e-Business <i>infrastructure</i> up, running and secure while connecting customers, suppliers, partners and employees. • e-Financial Management, the extent to which you use EDI, electronic banking, billing and others to manage <i>financial</i> affairs through electronic means. • e-Market Orientation, the extent to which (first) your organization (and then yourself) focuses on customers, competitors and <i>market</i> shifts in your business sector. 		

Figure 2 e-Business research items

Table 5 Levels of organizational implementation

e-Business activity: Organisational levels of implementation	N	Mean	SD
e-Process management	116	3.8	1.80
e-Information management	118	4.0	1.66
e-Human resource management	116	2.8*	1.76
e-Infrastructure management	118	4.1	1.94
e-Financial management	119	4.3	1.71
e-Market orientation	117	4.3	1.81

Likert scale: 1 = none, to 7 = full implementation.
 Difference between the means statistically significant ($p < 0.0001$).
 *e-HR significantly different from all other activities ($p < 0.05$).

Table 6 Levels of CFO personal involvement

e-Business Activity: Level of CFO Involvement	N	Mean	SD
e-Process management	113	3.2	1.91
e-Information management	115	3.5	1.94
e-Human resource management	114	2.5	1.95
e-Infrastructure management	115	3.0	1.90
e-Financial management	117	4.6*	2.07
e-Market orientation	114	3.4	1.98

Likert scale: 1 = none to 7 = full involvement.
 Difference between the means statistically significant ($p < 0.0001$).
 *e-Finance significantly different from all other levels ($p < 0.05$).

Commerce of Ireland (2001, 2003) surveys of e-Business and e-Learning in Irish SMEs. e-Recruitment and perhaps some automation of administrative aspects of the HR function probably account for this level of implementation, and there is now

significant evidence (European Commission, 2003) that e-learning activity is increasing in this sector. These CFOs explicitly recognize the contribution of human capital (Bontis, 2001) in the creation of intellectual capital (Bontis and Fitz-enz, 2002) in this sector (see O'Donnell *et al.*, 2003; O'Regan *et al.*, 2001).

Data for levels of personal CFO Involvement in implementing the six e-Business activities is summarized in Table 6. A repeated-measures ANOVA was carried out to investigate whether there was a significant difference between the mean levels of personal involvement for each of the six activities. The difference between the means was statistically significant ($p < 0.0001$). The mean for personal CFO involvement in e-financial management was significantly different from all other activities ($p < 0.05$). Given that the sample consisted of finance directors/controllers, accountants or high-level directors, the high level of personal involvement in e-financial management should not be surprising here.

We suggest that the difference between organizational-level implementation and the level of CFO involvement provides some insight into the e-architect—foot-soldier question. e-Architects would be expected to report high involvement levels, probably in advance of the level of e-Business implementation at the level of the firm.

Figure 3 graphically illustrates the differences between the mean level of organizational implementation and personal CFO involvement in each of the six e-Business activities. Multiple paired *t*-tests were carried out to investigate whether significant differences exist between the level of organizational implementation and personal CFO

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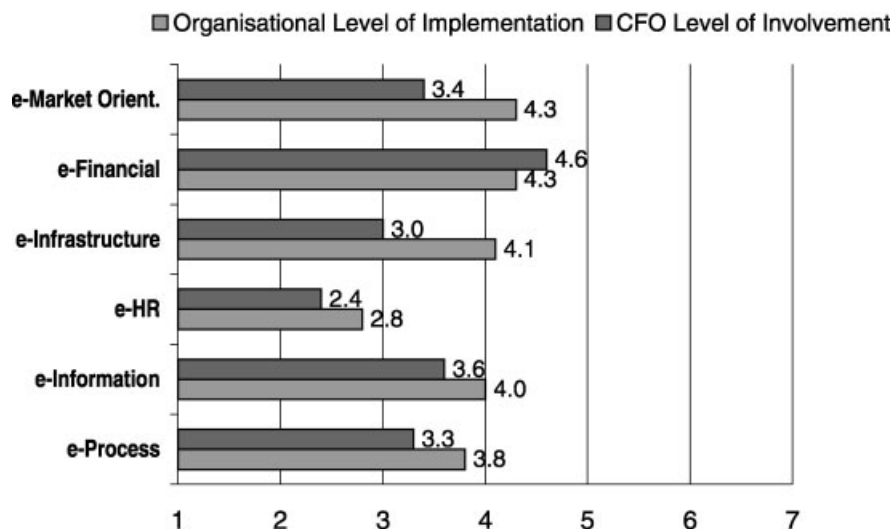


Figure 3 CFO Involvement and organizational implementation

involvement for each of the six e-Business activities. After adjusting for multiple testing, the mean difference between the level of organizational implementation and CFO personal involvement was statistically significant for e-process management, e-information management, e-infrastructure management and e-market orientation ($p < 0.05$).

However, when the data is segmented and analysed by nationality of ownership, a different set of relationships emerge. For Irish companies ($n = 90$), only the mean difference between the level of organizational implementation and CFO personal involvement for e-infrastructure management and e-market orientation was statistically significant ($p < 0.05$). For multinational subsidiaries ($n = 33$), the mean difference between the level of organizational implementation and CFO personal involvement was statistically significant for e-process management, e-information management, e-human resource management, e-infrastructure management and e-market orientation ($p < 0.05$). Segmented data is shown in Table 7 and an attempt is made in Figure 4 to visually illustrate the contrasting perceptions of CFOs on implementation/involvement from the indigenous SME and multinational subsets of the data.

MULTIVARIATE ANALYSIS

Some exploratory multivariate analysis was undertaken to investigate the relationship between the outcome variables (mean rankings for the six e-Business activities) and the following explanatory variables: turnover, nationality (1 = Irish, 2 = Multinational), sector (1 = software, 2 = hardware, 3 = services), age of the organization, percentage of share capital that is Irish owned

(0–25; 26–50; 51–75; 76–100), CFO membership of the top management team (1 = yes, 0 = no), level of education of the CFO (1 = certificate, diploma or degree, 2 = postgraduate, 3 = none), gender of the CFO (1 = male, 2 = female), accounting qualification of the CFO (1 = yes, 2 = no), broad access to information in the firm (three items), benchmarking (two items), and the percentage of managers who undertake web-based training.

The first multivariate model investigated the relationship between the explanatory variables sector, nationality, share capital, age of organization, turnover, access to information, benchmarking and the percentage of training on the web and the outcome variables (mean rankings given for organizational implementation for the six e-Business areas). None of the variables were statistically significant predictors of the six e-Business outcomes.

The second model used an overall mean value for organizational implementation for the six e-Business areas as the outcome variable and the following explanatory variables: sector, nationality, age of organization, turnover, access to information, benchmarking and the percentage of web training. Turnover and the percentage of web training were statistically significant predictors of the mean organizational implementation (Adjusted $R^2 = 18\%$).

The third model used the mean value of CFO involvement for the six e-Business areas as the outcome variable and the following explanatory variables: education, membership of the TMT, accounting qualification and gender. Only education was a statistically significant predictor (Adjusted $R^2 = 4\%$).

The final exploratory model used the mean value of the difference between organizational implementation and CFO involvement for the six

Table 7 Differences between organizational levels of e-Business implementation and CFO involvement (Likert scale, 1–7)

	ALL Firms			Irish-owned firms (SMEs)			Multinational subsidiaries		
	Org. imp.	CFO involve.	Diff.	Org. imp.	CFO involve.	Diff.	Org. imp.	CFO involve.	Diff.
e-Process	3.8	3.2	-0.6*	3.6	3.3	-0.3	4.2	3.1	-1.1*
e-Information	4.0	3.5	-0.5*	3.9	3.7	-0.2	4.4	3.1	-1.3*
e-HR	2.8	2.5	-0.3	2.6	2.5	-0.1	3.5	2.4	-1.1*
e-Infrastructure	4.1	3.0	-1.1*	4.0	3.0	-1.0*	4.5	2.9	-1.6*
e-Finance	4.3	4.6	+0.3	4.4	4.6	+0.2	4.2	4.5	+0.3
e-Market orient.	4.3	3.4	-0.9*	4.1	3.3	-0.8*	4.7	3.4	-1.3*
Aggregate (Avg. of 6)	3.9	3.4	-0.5	3.8	3.4	-0.4	4.25	3.2	-1.0

*Difference between Org. implementation and CFO involvement significant ($p < 0.05$).
Likert scale: 1 = none to 7 = full implementation/involvement.

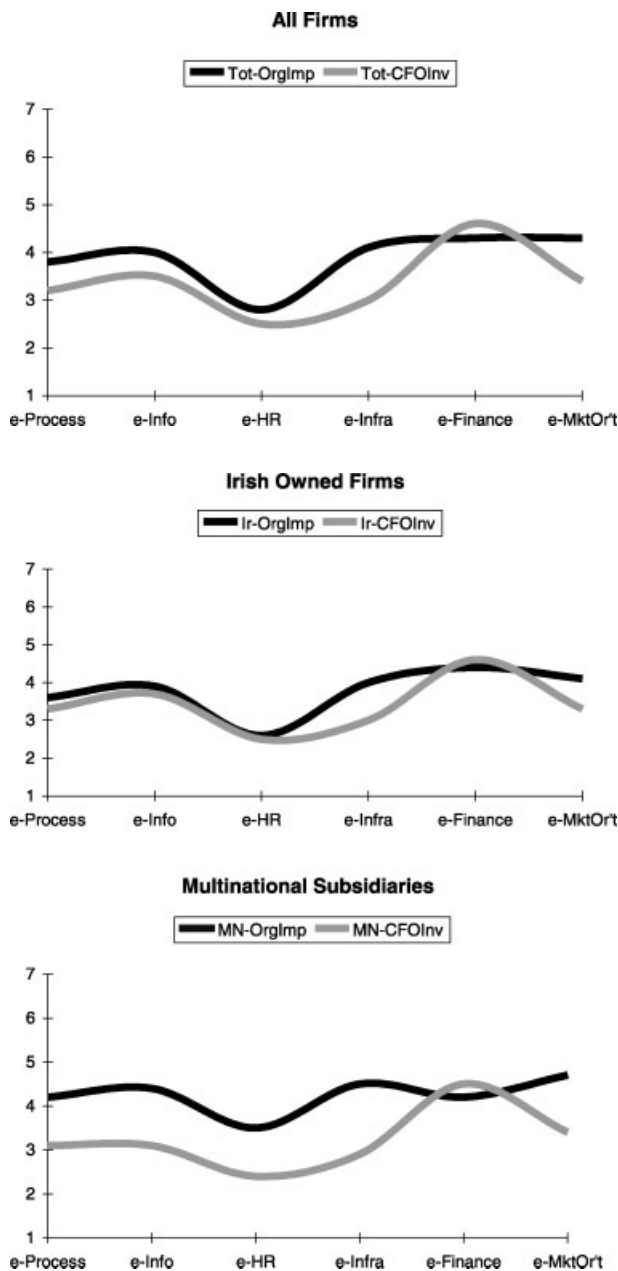


Figure 4 Differences between organizational implementation and CFO involvement

e-Business areas as the outcome variable and the following explanatory variables: education, nationality, turnover, age of the organization, access to information and percentage of training on the web. Only turnover was a statistically significant predictor (Adjusted $R^2 = 15\%$).

As nationality of ownership was not significant in the first model, and as turnover is really the only significant predictor identified above, we have to qualify discussion of multinational versus Irish-owned firms as we cannot definitively isolate nationality and size effects at this stage. As noted above, turnover in multinational subsidiaries for

which we have data is much greater than in Irish-owned SMEs. We must, therefore, emphasize the exploratory nature of these general findings. None of the models explain much variation in the outcome variables with R^2 values ranging from 4 to 18%. Notwithstanding these qualifications, and the usual limitations inherent in cross-sectional survey design, we tentatively suggest the following.

The research design utilized here appears to be capable of producing relevant general findings with respect to the two areas of interest: levels of e-Business implementation and levels of CFO involvement in the process of implementing such activities (differences between the means statistically significant for both organizational and CFO levels ($p < 0.0001$); range 2.4 to 4.7; 1–7 Likert scale).

The levels of e-Business activity reported in the Irish ICT sector are not insubstantial. In terms of an e-Business ideal (7), the overall sector is perceived to be almost half-way there (agg. 3.9). Multinational subsidiaries (agg. 4.25) are somewhat further along than indigenous Irish firms (agg. 3.8), their implementation levels exceeding the Irish on all (excepting e-finance!) areas. Size effects, as noted in the European Commission report (2003), are apparent here. However, as Zhu and his colleagues (2002) argue, perhaps e-Business is no longer a phenomenon dominated by large firms in e-Business-intensive countries such as Ireland; as more and more firms engage in e-Business (and these small Irish ICT firms are export and globally oriented from day one of their existence) then network effects may be working to the advantage of the smaller indigenous firms.

In terms of CFO involvement in e-Business implementation a main finding is that CFOs are at least keeping up with, if perhaps not moving very far ahead of, the game in e-finance. The mean for personal CFO involvement in e-financial management is significantly different from all other activities ($p < 0.05$), but the differences between implementation/involvement are not found to be statistically significant at any of the three levels of analysis.

In terms of CFO involvement in e-Business implementation in the other areas, however, the main finding is that CFO involvement lags the level of organizational implementation in all areas selected, excepting e-finance as noted above. This finding holds at the aggregate (–0.50), multinational (–1.0) and Irish-owned (–0.4) levels of analysis.

However, CFOs in the multinational subsidiaries appear to be less involved than their counterparts in the much smaller Irish firms. Excepting e-finance, this difference is significant ($p < 0.05$) for

all five e-Business activities in multinationals, but for only e-infrastructure and e-market orientation in Irish-owned firms, the two e-Business areas where this difference is statistically significant at all three levels of analysis. In terms of e-infrastructure we can suggest that the highly technical aspects of this area is the domain of the CTO (chief technical officer). We suggest that is the area where CFOs are probably least likely to act as e-architects, and perhaps more so in multinational subsidiaries (-1.6). On e-market orientation there is no evidence here that CFOs are providing the market intelligence necessary for more customer-driven enterprises as suggested in the EIU/Accenture (2000a, 2000b), although the organizational level of implementation in this area for multinationals (4.7) is the highest metric recorded. Market orientation refers to how an organization gathers, disseminates and responds to market intelligence. Various authors have found a positive correlation between the market orientation of the organization and various measures of success, such as ROI, sales growth and successful new product development (see Venter *et al.*, 2001).

Our findings suggest that CFOs in small indigenous high-growth firms need to be perhaps more e-Business savvy and become more rounded in this area, particularly in e-process and e-information. In small firms this may be because, as one Irish CFO in an Irish software firm commented during the pilot phase related to e-finance, 'They have to!' Such CFOs do not have access to the global, and probably centralized, e-value chain expertise that exists within multinational corporations. This suggests one reason the levels of CFO involvement in multinational subsidiaries are significantly lower is that such decisions may be taken at corporate headquarters, with the e-Business solutions perhaps even implemented virtually by centralized coordinating units at corporate level. Or, as the multivariate analysis presented above suggests, we may simply be dealing with size (turnover) effects, the one variable in the history of structural contingency theory that has stood the test of time, and which is strongly supported in the European Commission study, and tentatively here.

It would be difficult to classify these CFOs as foot-soldiers based on the levels of involvement reported. On the other hand, if CFOs were acting as the leading e-architects of e-Business strategy in these organizations we might expect to see the involvement levels reported being in advance of the organizational levels of implementation. This is only the case in e-finance and is not statistically significant at any of the three levels of analysis. Some broadening of the traditional CFO role as suggested by Deise

et al. (2000), Morgan (2001), Parker (2001) and by the EIU/Accenture (2000a, 2000b) is supported here, especially in small Irish-owned firms, but whether this extends beyond investment appraisal or otherwise cannot be conclusively established at this stage.

Rather than focusing on the harsh dualism of an e-architect/foot-soldier continuum, perhaps current practice reflects the 'evolutionary' approach documented by Bromwich and Bhimani (1989, 1994) and further developed in their monograph *Management Accounting: Pathways to Progress* (1994). Coltman and his colleagues (2000, p. 3) also argue for an evolutionary perspective in this area, noting that 'e-Business has not suspended the laws of economics... (and)... that it is premature to categorize e-Business as revolutionary'. We concur. We have not even started here to touch on the complex set of relationships between actions, routines and institutions that may shape the process of change in this area (Brooke, 2001; Burns and Scapens, 2000; Di Maggio *et al.*, 2001; Fountain, 2001; O'Donnell and Henriksen, 2002; Pellissier, 2000; Puxty, 1993; Zhu *et al.*, 2002). Neoinstitutionalist theory (Dimaggio and Powell, 1983; Meyer and Rowan, 1977), to take one example, would suggest that existing organizational arrangements and power networks mediate the enactment of new e-Business technologies and processes (Fountain, 2001) and further that CFOs would be expected to influence such enactments in an attempt to at least maintain, if not increase, their power positions within organizational hierarchies. More in-depth case studies are required before we can unpack some of the preliminary findings on the changing nature and scope of the CFO role indicated here.

A recent IFAC (2002) report suggests that the CFO in the year 2010 will have a very different world of technology to deal with and the key issue will not be how to use it, but how to ensure that it fits and is integrated to the best effect right across the e-value chain. 'Beyond the reporting side', according to Heinz-Joachim Neubürger, Head of Corporate Finance and CFO of Siemens AG, 'looms the whole concept of e-Business. CFOs will have to have a single set of set-ups to build the infrastructure required by e-Business, ensuring that we have a consistent set of ERP/SAP installations, for example. Providing the infrastructure for e-Business beyond CRM, logistics, etc., is going to be a tremendous challenge for CFOs' (IFAC, 2002, p. 16).

CONCLUSION

In the Introduction we noted that both the role of the CFO and the discipline of accounting can be

viewed as being in transition. One perspective suggests that CFOs are becoming 'e-process architects'—with the alternative perspective suggesting that the CFO role is becoming commoditized to 'foot-soldier' status with others such as CIOs and CTOs staking their claims to its traditional space. Two research questions were addressed here; firstly, to gain some insight into the positioning of CFOs on the e-architect-foot-soldier continuum, the main focus of this paper; and secondly, to gain some preliminary evidence into the levels of e-Business activity in the Irish ICT sector.

The levels of e-Business activity reported here in the Irish ICT sector are not insubstantial. For most CFOs and their firms, however, there appears to be some distance yet to travel before 'frictionless' (Brynjolfsson and Smith, 1999) e-Business becomes a reality—although some progress is definitely evident here. With the exception of e-finance, the level of CFO involvement in the other five e-Business activities, however, lags the level of organizational implementation. The mean difference between the level of organizational implementation and CFO involvement is statistically significant for e-process management, e-information management, e-HR management, e-infrastructure management and e-market orientation for multinational subsidiaries; but is statistically significant only for e-infrastructure management and e-market orientation for small Irish-owned firms, suggesting a broadening of the CFO role in small, fast-growing ICT firms that demands certain levels of e-Business expertise. Turnover/size is found to be the only significant predictor of mean organizational implementation and also of the mean difference between organizational implementation and CFO involvement.

As the Business Week CFO Forum (2001) noted, there is unquestionably considerable scope for enlarging the CFO's concept of e-Business: from simply a tool for cost reduction and efficiency enhancement to an opportunity for business model redesign, precision supply-and-demand chain management, and real-time gathering and reporting of strategic information. This perceived broadening of responsibilities makes the future of the CFO position far from clear. Some observers suggest that conflict is inevitable as CFOs, CIOs, CTOs and others vie for influence and power in the e-Business arena—others envision a day when the CIO's responsibilities will be absorbed into those of the CFO—or vice versa. Either way, the complex evolving role of the CFO exemplifies the cross-functional intertwining of business strategy, finance, information and communications technology, HR and e-Business.

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