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Outsiders: an exploratory history of IS in corporations

Abstract

This paper is an exploratory study that provides a brief history of information systems (IS) in corporations that are not part of the Information Technology (IT) sector, such as retailers, banks, government agencies and so on. It looks at the development of the IS function and the changing roles of IS practitioners in such organisations over the past 60 years, and assesses how they perceived themselves and were perceived by their peers, by business colleagues and by others. It uses the testimony of successful IS practitioners to provide a grounded perspective on the history of the IS worker over this time.

The research identifies a trajectory of a gradual diminishment in the role and status of the IS worker in the corporation over the lifetime of the discipline. It observes that the IS worker has experienced changed fortunes: from a position of influence at the outset, leading to a peak of status and reward in the years up to the millennium; and to the present day where the occupation has a much lower profile. It ascribes this to the increasing commoditisation of IS, manifested by phenomena such as end user computing, outsourcing and cloud computing.

The paper is of relevance to academics who are interested in IS in the corporate organisation; to business professionals, who are sometimes bewildered by their IS colleagues; and to those who work in IS. The research is presented as an interpretative study and is intended to help future researchers frame questions and design research projects. It also aims to inform and witness, and provide a perspective on a currently neglected part of the business world.

Keywords: IS practitioner; history of computing; IS function; IS trends; history of IS

1. Introduction

Information Systems (IS) are recognisable to most people in the developed world. Hardware devices like personal computers and smart phones are almost as prevalent as televisions in the modern home, and software programmes like Facebook and Google are commonplace. IS in the corporate world are just as pervasive. This is a more rarefied domain, and while Google and Facebook have a presence here, they have until recently been less important than ‘enterprise’ applications – the complex computer programmes that underpin the operation of most large businesses. To operate, these software programmes require computers to run on, networks to transmit and receive information, and a wide range of ‘peripheral’ devices like screens and printers to accept input and present outputs. All of these ‘infrastructure’ components are in turn controlled by specialist ‘systems’ software. This collection of applications, infrastructure and systems software are used everywhere in industry, and they are customised and operated by specialist technicians. This paper concerns these specialists, whose history differs from that of their counterparts in the IT sector.

The distinction between IS workers in the corporate world outside the IT sector, and those within the high-tech sector is not obvious. In this paper, the IT sector refers to companies where manufacture of IS products or provision of IS services is the main line of business. For such companies, the output is an artefact such as an iPad, word-processing software like Microsoft’s Word, or SAP’s enterprise resource planning suite of software products. Companies that provide IS services to design and implement IS (such as Accenture), and to transport digital information (such as BT) are also by this definition in the IT sector. Such companies are IS *manufacturers*: they provide the hardware, software and services that are used by consumers and by corporations in all industries. These organisations are for many the visible face of IT – the poster children of the silicon valleys and glens across the world.

This paper is concerned with the less visible consumers of IS products and services in industry. This comprises IS staff in banks, in government departments, in retail companies – in short, IS specialists in companies outside the IT sector. These specialists play an essential role in modern business: they provide services without which most firms could not operate and in some instances, create innovative and intelligent solutions that allow companies to thrive. While such companies sometimes create IS products (practitioners in consumer organisations invented the HTML protocol that helped create the world wide web, for example), this is not their primary line of business.

Although the history of corporate IS has been overshadowed by the more exciting and glamorous narrative of the information revolution, it is worthy of research for several reasons. First, while it is new in comparison to professions such as engineering, medicine and law, it is large: originally a niche occupation, it is now a major part of modern industry, and comprises approximately 663,000 IS workers in Britain alone (e-skills UK, 2010). Second, it changes rapidly, perhaps more than any other engineering discipline, and has experienced dramatic swings in fortune in its short existence. From its beginning in the 1950s, IS attracted the brightest engineers, mathematicians, enthusiasts and problem solvers. Between 1970 and 2000 the IS profession was respected and well rewarded and - in the run up to the millennium – very much in the public eye. After this time, corporate IS suffered a decline in prestige and popularity and now, IS skills are increasingly commoditised. For example, companies seldom build their own IS, but buy them off the shelf in increasingly packaged, customisable forms. In many companies, the corporate IS role is viewed as unenviable and dull. It is a back-office function, located somewhere in the corporate basement, as often literally as metaphorically. It is frequently out of sight and out of mind, and often regarded with suspicion and frustration by business colleagues. Such characteristics make the study of the IS function an interesting one for many, including business professionals, IS practitioners and academics.

2. Research method and empirical data

Orlikowski and Baroudi (1988) note the importance of adopting "...a historical approach which links the present state of affairs to the past and the future." One way of doing this is to talk to those who were there. This research therefore seeks to enliven observations in the literature with narrative from long-serving IS practitioners who have experienced IS in corporations almost from the beginning. Their stories constitute a first-hand record of the IS practitioner in non-technical corporations, and provide insights and anecdotes that illuminate our understanding of the past and the future in IS. The paper distils the narrative into a summary of the historical trajectory of the IS discipline, and comprises the main contribution of this exploratory paper.

The IS Practitioners

The ten participants were chosen for a variety of reasons. First, and most important, all have first-hand experience of working as IS practitioners in organisations outside the IT sector. Several have progressed from non-technical backgrounds into the discipline, while others have come into IS following a computer science or engineering degree. Second, their experience is extensive, ranging from over 40 years for the oldest practitioner to more than 27 years for the youngest. Such durations mean that their perspectives are well informed, and provide insights at most stages of the development of the IS discipline in the corporate world outside the IT sector. Third, the scope of industry experience for the participants is wide, covering government, retail, pharmaceutical, banking and charity sectors among others. The functional and technical skills of the interviewees is equally broad, ranging from expertise as a specialist developer in early stage programming languages to experience in design and installation of telecommunications links. Finally, all participants were accessible to the researcher over the duration of the data gathering exercise, and were generous and forthcoming with their time.

The selected interviewees come from various backgrounds, summarised in Table Two at Appendix One. Two of the participants, Tim Lane and Bob Stevens, started their working lives in the early 1960s and having become IS practitioners almost by chance, rose to senior IS management positions in global retail banks. Another, John Handby, started in the civil service in the UK at the same time, but changed career to become one of the most prominent IT directors in the UK in the late 1980s and 90s. Phil Reed responded to an advertisement for computer operators and joined the National Westminster bank in the UK in 1969, thus starting on a career that has involved most aspects of IS work, including several high-profile CIO and IT director roles around the world.

Almost a decade later, Clive Haswell started his career as a mathematics teacher in Wales, and in the course of his working life has experienced IS both as a consumer (in his role as country head for Standard Chartered Bank (SCB) in Sri Lanka) and as a provider (in his current role as CIO of SCB's Middle Eastern businesses). Nick Pilbeam and Mike Parfitt - both from an engineering background - started work in the late 1970s and spent the majority of their careers in the IT department of Shell Oil.

Tim Parlett and Russell Craigie have had careers in IS that were shaped by their early experiences in Arthur Andersen and Co. (now Accenture): both have worked as IS specialists in many industry sectors since the 1980s. Alan Millard chose an IS career because it was the most exciting option available. He began his career in Wang in 1982, later moving to an IS management role in Glaxo (now GlaxoSmithKline), and currently works as a chief operating officer at a UK insurance company.

Research Method

Data gathering took place between October 2011 and September 2012 and comprised a series of semi-structured interviews (one for each participant, lasting between one and a half to two hours). Half of the interviews took place face to face, and all were recorded digitally. Prior to the interview,

the participants were sent a topic sheet to provide some structure for discussion, and to inform the conversation. The topic sheet used for all interviews is included at Appendix Two. Five of the interviews were followed up by further *ad hoc* conversations to validate points of fact and to obtain clarification and a further set of questions were mailed to respondents to solicit responses on issues that had emerged in the course of the preliminary analysis.

Data analysis comprised a thorough review of the interview transcripts, with the emphasis on the narrative history rather than on interpreting underlying or hidden meaning. Of particular interest was the identification of common themes, events, and milestone phenomena in the IS history as perceived by the interviewees. Preliminary data analysis took place over an elapsed period of two months, between November and December 2011, and a further brief phase of analysis took place in September 2012.

The output of data analysis was an analytical framework representing (necessarily at a very high level) four main stages of development of the IS discipline from 1950 to the present day. Aspects of IS ranging from organisation and skills to representative projects and developments were identified to provide recognisable examples at each stage. The analytical framework is represented in Table One. From subsequent analysis of the data emerged the key themes from the research, and these are described next.

Insert Table One here (file: JIT_Gannon_Outsideers_Table One_final)

3. A short history of IS in corporations

Ceruzzi describes the history of computing as a series of computer ages:

“Computing after 1945 is the story of people who at critical moments redefined the nature of the technology itself. In doing so they opened up computing to new markets, new applications, and a new place in the social order...

The “computer age” - really a series of “computer ages” – was not just invented; it was willed into existence by people who wanted it to happen.”

(Ceruzzi, 1998)

This research similarly describes a series of ‘ages’, from 1950 to the 2010, each covering a period of 15 years. This is a convenient and surprisingly neat way of describing the development of commercial computing, and serves as a workable framework. The first age occurred roughly between 1950 and 1965 and covers the early days of corporate computing, starting with the landmark LEO Bakery Valuation job in the UK and ending with the launch of the IBM System/360 series of computers. The second age, from 1965 to 1980, covers the establishment of the IS department and the IS practitioner in the mainstream of the corporation. During the third age (approximately 1980 to 1995), the IS department grew in scale and matured to the extent that it could be outsourced to specialist technology corporations. In the fourth age (from 1995 to now), the role of the IS worker in the corporation has experienced continued high growth, particularly before the year 2000, and subsequently has diminished in scale and importance as corporate computing has become increasingly consumerised and distributed.

Clearly, the framework is designed for generalisation, and does not set hard and fast boundaries.

For example, it does not dwell on the pre-history of corporate computing, which is important. Many

early IS practitioners learned much of their craft in O&M departments or in running unit record outfits in corporations (Land, 2000; Land, 2006). Further, it aims not to pinpoint the invention or introduction of specific devices or phenomena, but to highlight approximately when they started to have an impact on corporate computing. Thus, for example, while the first PCs had emerged well before 1980, they were not widely used in corporations until the middle of that decade. Similarly, while the Internet predated 1995, it was almost unknown in large corporations until the late 1990s.

Each age is discussed in more detail in this section of the paper, and covers variously the organisation, technology, process and main themes that applied to corporate IS in the period.

Pioneering: 1950 to 1965

After a 'shaky start', Ceruzzi notes that:

“By 1960 a pattern of commercial computing had established itself, a pattern that would persist through the next two decades. Customers with the largest needs installed large mainframes in special climate-controlled rooms, presided over by a priesthood of technicians.” (Ceruzzi, 1998)

The people who programmed these large computers were highly-skilled and specialised technicians – the 'priesthood'- respected, well rewarded and intelligent. They were also somewhat of a mystery: the first IS workers themselves barely knew what a computer was, and had almost no formal training in computing. There was no such thing as an IS or computer person: at Lyons, David Caminer, the Programming Manager, was originally an office management trainee and (like many of the original Lyons team) spent time in the armed forces during the Second world War. Others included Leo Fantl (from the Labour Planning Office); John Grover and Tony Barnes (both management trainees); and T.R. Thompson (a mathematics graduate and Chief Assistant Comptroller) (Caminer *et al*, 1998). At Aer Lingus, the Irish national airline, Tim Lane joined as a

management trainee from high school. At Bendix, Bob Stevens was recruited because he had a background in mathematics:

“...Bendix ... were looking for math majors to learn this thing called ‘programming’. I was hired as a summer intern and given a manual on FORTRAN and a manual for operating an IBM/360 computer; and given some specs to write little utility programs to compute some very complicated scientific formulas.”

In many cases, IS workers at this stage comprised volunteers and bright mathematically-minded staff from other departments. They were picked from the ranks of management trainees, the curious, and those looking for adventure: this was a pioneering time, when people were prepared to forsake predictable and secure careers in respectable stable organisations for an assignment of unknown quantity. The reward was good, and the work enjoyable, but it was nonetheless uncertain. Computer people were adventurers, and quickly became a breed apart from the mainstream of the corporation. Ceruzzi describes them as a ‘priesthood’: at First Maryland Bank (FMB), Bob Stevens describes his colleagues as ‘wild-catters’ living apart in the ‘computer room’.

“Well, first of all, everybody in the bank at that stage was nice to me and others in IT. In relationship to the bank people, we were totally, completely overpaid because there was a lack of skilled people... so it was really a “wild catting” time, I always say. The rest of the organisation ... left us totally alone. We were in this “Computer Room”.

At Allied Irish Banks (AIB), where Tim Lane ended up, IS practitioners were known simply as ‘The Outsiders’:

“It was really well-known that we were outsiders - we’re still known as the Outsiders! We were very much outsiders in the early days, as far as we are treated.”

In the corporate organisation, computer personnel were usually part of a ‘data processing’ department, often small, with staff numbers of less than 20. The ‘IS department’ did not exist, and IS practitioners described themselves as computer programmers, computer operators or business analysts. In Texaco, for example:

“(The IT department) was named the Computer Services Department in 1967, the Computer and Information Services Department in 1979, IT Department in 1987, and has been Global Information Services since 1997. Judging by IT’s reports, the name changes mirrored popular trends and failed to describe its actual tasks.” (Porra *et al*, 2005)

The technology environment in the pioneering age was dominated by hardware concerns and limitations, and a desire to use the expensive hardware in the most efficient way:

“The job of the moment is to use up the capacity of the existing computer.”
(Nolan, 1973)

Until IBM redefined the landscape with the launch of the System/360 series of computers in 1964, most organisations bought a large mainframe and wrote their own programmes. In the UK in the early 1950s, J. Lyons built its own mainframe but by the early 1960s a recognisable industry had come into existence to supply commercial computers. Most organisations wrote their own customised programmes usually starting with administrative but numerically intensive processes, and although there were some rudimentary ‘off-the-shelf’ programmes available, many organisations chose to build their own applications:

“During the 1950s and 1960s, study after study showed that users would not use off-the-shelf packages for payroll, inventory control, accounts receivable, etc. The requirements were too specialised, the case-to-case variation too high.” (Brooks, 1995)

Some firms turned away from acquiring computer skills at all, and turned instead to external specialists to provide them with software. This gave rise to a market for software contractors and ‘software houses’ that expanded rapidly in the 1960s. Budgets for computing were still modest as a percentage of overall corporate expenditure:

“In 1965, according to data from the US Department of Commerce’s Bureau of Economic Analysis, less than 5 per cent of the capital expenditure of American companies went to IT.” (Carr, 2004)

Nonetheless, by the time the System/360 series arrived and IBM had been forced to unbundle its software from its hardware, the data processing department had become a permanent fixture in the corporate structure, something that had not always been envisaged, for example at AIB as described by Tim Lane:

“There was an expectation that we would be there for a short duration of time. There were a couple of jobs to be done, like Branch Accounting and Cheque Clearing, but we were expected to be moved on in a couple of years’ time.”

IS in the corporation certainly did not go away: on the contrary – it underwent an extraordinary expansion in scale, scope and capability. By 1965, IS practitioners had already started to develop a distinctive identity: the Association for Computing Machinery (ACM) was founded in 1947 (its stated purpose “to advance the science, development, construction, and application of the new machinery for computing, reasoning, and other handling of information”) and the British Computer Society

(BCS) was founded ten years later. The International Federation for Information Processing (IFIP) was established in 1960, marking the development of an international IS community mainly, though not exclusively, confined to the academic community. From the point of view of the IS practitioner, the golden age of computing – corresponding with the ‘go-go’ years for computer stocks – had begun.

Growth: 1965 – 1980

The period from 1965 to 1980 involved the widespread deployment of computers and applications in industry. Computer hardware became more sophisticated and affordable, the demand for computer specialists soared, and a software product and applications market was created. Computing in the early part of this growth phase was still the preserve of a relatively small number of specialised technicians, although computer science courses started to appear in colleges and universities. Starting with Curriculum '68, the ACM published guidelines on a computing curriculum, and updated these as the technology and practice changed (Cougar, 1973; Nunamaker *et al*, 1982).

Nonetheless, in 1970, the computer operators at National Westminster, a British bank, were still mostly non-technical to start with, according to Phil Reed who joined as part of a large recruitment campaign by the main banks:

“No one was an expert technologist. At Nat West, almost everyone in the shift had come out of the (bank) branches. To a man (and a woman), I’d ask them how they got there and they’d say: “A memo came around saying that banks are doing this thing with computers. Would you like to apply for the job?” So they just applied and I think they went through some sort of aptitude testing. Essentially, the test was all about ability for logic and there was no training as such.”

Some elements of computing remained curiously archaic. Even in the late 1970s, the Shell UK computing centre at Wythenshawe (near Manchester in the UK) boasted a team of 'key to disk' operators: an all-female typing pool responsible for 'keying' data directly onto computer disks.

According to Nick Pilbeam:

"It was filled with about 60 girls, and they used to bash all the invoices and sales data, I suppose, into the computers."

Salaries for IS staff remained high relative to other professions: Clive Haswell noted that he received an increase of over 50% when he moved to computer operations from his teaching job in 1978.

Over the course of this period, practices for managing and operating large corporate information systems were put in place. IS moved gradually from what might be described as a cottage industry peopled by mathematicians, operations specialists and enthusiasts to a formal occupation with its own hierarchy of skills and roles, its accredited practices and most important, to a permanent position in the corporate structure, even if it remained somewhat suspect in the eyes of workers outside the IS department. For example, John Handby's bosses in the UK Treasury in 1974 viewed IS as a dead end:

"...they (the Civil Service HR department) said: "You're one of the rising stars and you can't be in a *cul de sac* like IT." It's interesting that's how IT was viewed at that time."

Notwithstanding, the IS department and its inhabitants possessed a certain mystique: it and they were different. They remained outsiders, apart from the mainstream of the business, a separation that became enshrined in the description of those outside the IS department as 'the Business'. IS were decidedly not part of the 'business', even though in this period they often exercised more influence over the shape of the business than any other discipline.

The headcount in IS departments rose dramatically, reflecting both the increased demand for services and also increasing complexity of the systems and tools. IS specialisms started to appear and become institutionalised in the IS department. Nick Pilbeam had to learn about new devices:

“I had to start from scratch and learn how modems worked – quadrature amplitude modulation!”

The change in name from ‘Data Processing’ department to ‘Information Systems’ department reflects this change in status, as does the title of the manager of the department, who became more commonly known as the IT Director, or VP of Computing. The main line of demarcation in the IT organisation was usually between applications development and operations. Usually IS activity in the corporation was centralised and served primarily a ‘manufacturing’ role:

“This typically involved configuring and operating a production facility consisting of large scale hardware and systems software as well as establishing and maintaining a sizeable in-house application software development group.”

(Zmud, 1984)

Most of the activity of the IS group involved the large scale automation of basic business processes. In addition to horizontal business processes like payroll and general ledger automation, most organisations had automated large parts of their industry-specific processes. Thus, by 1980 most banks had deployed branch banking automation; manufacturing and retail companies had automated inventory control and distribution; airlines had sophisticated reservations systems and so on (Ceruzzi, 1998).

This period also saw the rise of the professional IS services firms, who industrialised the business of corporate information technology. Their role in commercial computing is often overlooked, but they

were both catalysts and agents of profound change in how corporate computing was designed, implemented and deployed. This was unsurprising: Arthur Andersen had been involved in corporate computing from the early 1950s, and Joseph S. Glickauf, a senior manager at Andersen, had led the implementation of the GE payroll system, one of the flagship computer projects of that decade. Russell Craigie, who worked at Arthur Andersen in the early 1980s, observed the importance of professional services firms in commercial computing:

“I think a key event, though, was the rise of the large professions service organizations. I can remember feeling very mixed about it at the time: I came from an engineering background and computing was an engineering discipline. Yet suddenly the companies that were making all the headway in the news were accounting companies that had somehow found their way into my field. I remember actually having a sense of mild resentment about that: accountants didn’t know anything about computing! They certainly didn’t know anything I knew, had never been a course in language design. And yet, they were the ones in the stories you read about in the press. Eventually I joined them and many wonderful things came out of that, but it wasn’t obvious at that time. So the fact that the accountants somehow brought the business discipline into computing was a huge contribution.”

From a technology perspective, the choice of hardware was still relatively narrow. A significant corporate IS development was the widespread use of databases. Although this term had been around since the early days of computing, it was only in the late 1970s that database technologies began to dominate the corporate IT portfolio. Equally significant was the proliferation of mini-computers, which led to the emergence of what was termed ‘end-user computing’ (EUC) in larger corporations. Although large mainframes still resided in data centres, performing the heavy-duty work of the corporation and managed by the priesthood of technicians set apart from the business

workers, computing had begun to spread outside the data centre. This represented the beginning of the 'amateurisation' of IS, as users began to realise that they could do 'computers' themselves. When the personal computer (PC) arrived, this tendency became widespread.

Distribution: 1980 – 1995

By 1980, there was no longer any doubt about the value and permanence of the IS department and IS practitioners. IS was the profession of choice for the brightest graduates, and admissions to computer science course in universities peaked (UCAS, 2011). This was the 'time' for IS, as described by Alan Millard:

"It (money) wasn't a big consideration. It was more about having a career and following the way the world was changing. It was the big thing of the moment. I think there are themes of what's important as time goes by and I think in the '80s it was IT, which culminated in the frenzy around the year 2000 So, we were at the vanguard of the revolution in technology!"

Tim Parlett brought an historian's perspective to bear, likening the computer age to a new steam age:

"No, I'd never touched a computer before in my life, because they didn't exist in those days. There were mainframes tucked away in labs or something, I don't know. I was thinking about computing in the context of "this is equivalent to the steam engine for the current age"..."

By the time Alan and Tim had started their careers, the amateurisation of the IS practice had already begun. The availability of mini-computers allowed engineers and enthusiasts outside the IT department to develop programmes. The advent of the personal computer in the mid-1980s further exposed computers and computer programming to the masses, and in doing so diminished the

currency and status of IS workers. Like the opening of any closed shop, there was something humbling for the IT specialist to encounter knowledgeable IS groups forming in business departments, and to watch as these groups became providers of information systems to business colleagues. It also generated more, not less, work for IS departments. Porra describes the impact of EUC on the IS department at Texaco:

“... the computer user base explosion - was the first environmental shift directly targeting Texaco IT. Hodges, the IT leader at the time, was optimistic that end-users would relieve IT's workload taking care of most programming tasks using easy-to-use applications and fourth-generation languages. He believed IT could focus on the development of complex, large-scale transaction processing systems while users took care of their own information needs.

Hodges was wrong. Putting PCs on users' desks actually generated more work for the department as measured by increasing end-user contact hours (Texaco 1984). For example, IT delivered more than 50,000 training hours to nearly 85 per cent of the firm's personnel in 1982. This alone increased each IT employee's workload by an average of 55 hours for the year. Interactive computing was the primary environmental force propelling the department into an untenable position of exploding user demands.” (Porra *et al*, 2005)

Notwithstanding the spread of EUC across the firm, central computer departments continued to expand in scale. At AIB – a relatively small European bank - there were over 300 application programmers and a similar number in computer operations across the Group. At Standard Chartered Bank, where Phil Reed was Chief Technology Officer, there were almost too many to keep track of:

“Well, when I ultimately inherited Group IT Technology, there were eleven hundred people on the IT operations side and more on the development side. We probably didn’t end up counting them all...”

Phil saw himself as a businessman, running a £150 million business. In general, this perspective was not unique: computing was reputed to provide competitive advantage to non-technical firms and in some cases this was visible and demonstrable: McKesson, for example, was able to dominate the market for retail drug distribution to pharmacies in the Western US because of the Economost system it deployed in 1986 (Clemons and Row, 1988).

Organisationally, the IS department remained separate from the mainstream of the business, and IS workers were likewise a race apart. Regarded as a somewhat existential appendage, more often than not they continued to be located away from other workers, in their own building and campus. The challenge of aligning business and IS strategy, and by implication harnessing the capabilities of IS practitioners in step with other professionals in the organisation, emerged as a dominant theme in research. An ‘us and them’ culture – evident for more obvious reasons at the start of the computer era – became entrenched, and strained relationships and mutual frustration between business and IS were frequent.

Three technologies changed the face of corporate computing during this phase of evolution. The first was the database, which quickly became indispensable for storing and manipulating corporate data. The second involved the widespread deployment of Microsoft technology in the firm. Taken for granted now, it was only in the mid-to-late 1980s that Windows technology was deployed in scale in commercial organisations. Russell Craigie describes how he viewed Microsoft at the time:

“In the early days, I can remember being phenomenally excited by Microsoft products in a way that you just cannot imagine now. To load an early version

of Windows 3.1 on a machine that had only ever displayed text - was the most beautiful thing I'd ever seen - much like an iPod or iPhone now...

...In the early 1980s it mattered whether you ended up in an IBM shop or Honeywell shop or a Bull shop. This really determined what you learned. Nowadays, in the corporate world, you'll likely end up in a Microsoft shop or a Microsoft/web shop but even today, IT corporations are slow to move away from Microsoft."

The third and most pervasive phenomenon that emerged during this period was computer networking. This had a massive decentralising effect, both within the corporate campus through use of Local Area Networks (LANs) and across longer distances through use of Wide Area Networks (WANs). Mike Parfitt made his career in corporate telecommunications in Shell, starting as a network engineer connecting remote Shell offices, refineries and fabrication yards to computers in the Wythenshawe data centre. Having travelled the world in various telecommunications roles, he is now responsible for the deployment of advanced collaborative networking tools to Shell globally. The technology he has used in the scope of his career has changed greatly: his first telecommunications links operated at speeds of 2,400 bits per second. Now, the speed of the network is effectively unlimited.

Consumerisation: 1995 – 2010

Corporate computing in the mid-90s was somewhat of a contradiction. On the one hand, it was recognised as an essential component of business in every sector and commanded significant budgets, resources and influence. For example, John Handby - at this stage on his third major IT director role - felt he was truly a part of the top team, characterised by an open and trusting relationship with his chairman:

“We used to talk about everything... We discussed all kinds of aspects of running the company, and I really became a true member of the top team. In the journey of my career, I’ve seen an enormous change in where IT is positioned in the company. There is no doubt: the people running the comptometer operators wouldn’t have had the exchanges with a chief executive or chairman that I’ve had.”

On the other hand, corporate computing was regarded as a necessary evil: an expensive, complex appendage to the main business of the firm; a monopoly supplier of services that were slow, inefficient, and seldom what the customer wanted. In many cases it was the latter view that predominated. Some businesses sought to resolve IS problems by outsourcing them, a practice that had existed in some form or other since the beginning of the modern computer age. Campbell-Kelly (2004) describes the emergence of the contract IS worker in the 1950s but the real growth in outsourcing occurred later, accelerated by a seminal deal signed by ISSC, IBM’s services organisation, with Kodak in 1989 (Lacity and Willcocks, 1998). Outsourcing proved to be somewhat of a bogeyman for the corporate IS department even though it provided an opportunity for the IS worker to move into an environment where his skills were regarded as mainstream. More often it became synonymous with loss of status, prestige, and in many cases, a job, particularly when the outsourcer was in an offshore location. The practice of offshore outsourcing boomed in the late 1990s, driven by demand for IT resource in the years leading up to the year 2000, and the dotcom boom. The subsequent dotcom bust reinforced this growth, as companies in developed countries sought to reduce the cost of IS.

In the mid-1990s, a wide-ranging discussion concerning productivity – dubbed the productivity paradox – raised doubts about the value IS added to the corporation (Brynjolfsson, 1993). This controversy was not confined to academic circles and may have helped increase alienation between

business and IS professionals. Phil Reed remembers this topic being debated at management level in Standard Chartered Bank:

“We thought the argument was too limited in that while there were pros and cons around productivity, there was no question that automation was key in improving quality, especially environments with very high transaction rates. Automation of banking front and back office meant that data was more likely to be correct and speed back to the customer could be improved. “

Tim Parlett was aware of the debate also, but noted that it did not slow the general rush towards wholesale automation:

“There were significant debates about the value of any one particular IT investment, but these were by and large exercises in wishful thinking, rarely informed by any concrete feedback from prior experience and usually fuelled by one or more executives with a belief in the value of IT as a tool to compete.”

The apparent resolution of the productivity paradox in the late 1990s did not seem to raise the status of IS groups.

The Year 2000 (Y2K) bug proved contentious in the corporate world also. It was frequently perceived by the lay person as another instance of the business being held to ransom by the IS department - all because the technologists had been short-sighted in their programming practices in the early years of computing. This frustration was exacerbated by the arrival of the Internet in the late 1990s: businesses were unprepared for this phenomenon and blamed IS for not warning them about it. Nor could businesses quickly assess the impact of this new technology, and they worried

about its potential to destroy existing business models. In many instances the business turned to IS to answer these questions, and the response was on the whole disappointing.

The anti-climax of the year 2000 coinciding with the dotcom bust precipitated a huge loss of status and credibility for the IS department. Huge amounts had been spent on IS to prevent millennial catastrophe, and even more lavished on online services from which no business benefit had accrued. It was about this time that Nicholas Carr published his famous 'IT doesn't matter' article, arguing that IT was truly a commodity; that it simply did not matter because it had entered a stage of maturity where it had become pervasive and invisible, like electricity (Carr, 2004).

In the downturn that followed the dotcom crash, the devaluation of IS skills and the declining influence of IS was apparent to Russell Craigie in a very obvious way:

"I think that's reflected in salary. For many years, I could match the pay awarded to a General Practitioner (doctor) and that felt right in terms of comparable years of education, level of expertise, and the fact that as a generalist I'm turning my hands to many different things. Perhaps, because I'm now working for a charity but more generally, I think would struggle to keep up with that so I feel that at one level my career has certainly not advanced in the way that it would have advanced in a more structured formal profession such as medicine or law. This is a relatively new development - over the last six or seven years (from 2004 to now)..."

A more powerful force exacerbating this downward trajectory in the late 2000s was the widespread consumerisation of information systems and increasing availability and affordability of mobile computing. Before 2000, it was uncommon for home users to have access to computing power that was comparable to that found in a corporation. By 2005, this had changed, and the technology

available in the home and on the move was perceived to be less expensive, easier to use - and in some cases more powerful - than slow, fixed and often cumbersome corporate IS. Further, corporate IS was seen as restrictive, since it often incorporated policies and devices to prevent access to online services. Tools became available that allowed people to become amateur programmers, causing further diminishment of the corporate IS profession. Russell Craigie said:

“Actually, many of the skills that IT people have now are essentially commodity skills. Now, if you’ve learned Prince II, you’ve learned project management. If you’ve done CCNA (Cisco Certified Network Associate), you know how to manage networks. There’s a whole raft of Microsoft skills, and most vendors will provide some level of certification. And for many people that’s enough, because it gives them a narrow bit of the IT field. But it’s not seen as a highly skilled knowledge: it’s specialist but it’s not a proper level of knowledge, not the skill and discipline other professions have. So to that extent, I see a diminishing of the IS profession over the last ten years rather growth in stature.”

The emergence of cloud computing, a form of outsourcing that uses the internet to deliver corporate applications to businesses, allows the business user to contract directly with the cloud (IS service) supplier, thereby bypassing the IS department. Now, some corporations have introduced a policy of ‘Bring Your Own technology’ (BYOT), which acknowledges that people rely more on personal (usually mobile) computing devices and services than on corporate IS services. This is attractive to many companies – it appeals to many employees and saves cost – but is fraught with sourcing, compatibility, legal and security concerns. Some see the impact of BYOT on the IS department as liberating and believe it will free the IS department to focus on high value activity. But this is the argument put forward in Texaco in the 1980s in response to EUC, which proved to be wrong. A more immediate (and poignant) example of the impact of consumerisation on the IS

worker is summed up in Mike Parfitt's daughter's 'so what?' response to his description of a project to deploy Microsoft's Office Communications Server (for IP voice and instant messaging) to all users in Shell. She had been using Skype for years.

Despite these diminishing trends, the number of IS workers in corporations is once more increasing. In the UK, for example, growth in the number of people working in the digital industries has run at twice the UK average over the past eight years and the sector workforce now accounts for one in eighteen people employed (1.5 million people). Over the coming decade it is forecast that growth will continue to outstrip that within the wider economy and even using a conservative post-recession scenario, the number of IT and Telecoms workers employed is expected to grow at an average of four times the average UK rate (e-skills UK, 2010).

Industry analysts vary in their opinions about the future of corporate IS. McKinsey, in a recent global survey of IT trends, concluded that the future looks positive for IS workers in corporations:

“Aspirations—and current expectations—for IT have never been higher. Executives continue to set exacting demands for IT support of business processes, and they see an even larger role for IT in a competitive environment increasingly shaken up by technology disruptions... Looking ahead, executives expect IT to create new platforms to support innovation and growth, help guide strategy with data and advanced analytics, and stay on top of possible new roles for mobile devices. For IT leaders, the good news is that along with these higher expectations, most respondents also see a greater willingness to spend more on IT.” (McKinsey and Co., 2011)

This optimistic view is countered by Gartner, another analyst firm, which sees the risk of greater marginalisation of the IS function in the corporation:

"As users take more control of the devices they will use, business managers are taking more control of the budgets IT organizations have watched shift over the last few years... The IT organization of the future must coordinate those who have the money, those who deliver the services, those who secure the data, and those consumers who demand to set their own pace for use of IT. IT departments need to adapt now or be swept aside..." (Gartner, 2011)

There are also regional variations. Clive Haswell emphasises the point that many people enjoy a structured, problem-solving environment that typifies the IS role in modern firms:

"If you go to Chennai and ask the question: 'is tech and operations interesting?' you'd get very positive feedback because that's what a big chunk of their economy is based on, and it's the aspiration of lots of graduates to work in that industry."

This clearly does not apply only to people in India.

4. Discussion and conclusions

The recurring motif in the historical description of the IS practitioner in the corporate world is summarised in Tim Lane's term 'outsiders.' From the beginning, IS staff have been regarded as standing apart from the main body of the organisation. This is understandable: IS for the most part are complex and - particularly in the early days of corporate computing - required specialist engineering skills to design and operate. It is only recently that IS has become accessible to the lay person, and this is partly because its complexity is obscured by good design. (Russell Craigie makes the point that at some stage in the 1980s, computers became invisible, and now they're visible to all). Porra highlights the theme, using the metaphor of IS as a colony:

“Top management may have seen IT as a colony because the unit had a professional identity since the late 1970s, when the first college graduates were trained in the field (Hirschheim *et al*, 2003).” (Porra *et al*, 2005)

A second theme in the narrative is the pattern of rapid growth to maturity of the IS function, with a very definite diminishment in status over time. Already in 1993, the sense of drift and diminishment had surfaced. In a paper discussing the gap between academic preparation and industry expectation:

“Respondents frequently discussed the decline of computer programming, an activity that has historically been at the core of the IT profession.” (Trauth *et al*, 1993)

Porra’s observations have resonance across the discipline:

“The story of Texaco’s IT function is typical of many centralized IT organizations (Willcocks and Lacity 1998) that have lost their status and had their functions transferred to business units, third-party enterprise solutions, and outsourcing firms. This erosive process motivates many questions—for instance, what factors lead to the erosion, and what outcomes arise from the erosion (Carr 2003; Earl and Feeny 1994; Enns and Huff 2000; Harvard Business Review 2000.” (Porra *et al*, 2005)

The poor impression and low status accorded to the IS worker in the present day is summed up in a quote – not atypical – from a review of the Steve Job’s biography in *Private Eye*, a satirical British magazine:

“People who work in the film industry, in advertising, in newspapers, often tend to believe that their own world is intrinsically more glamorous and fascinating than anyone else’s. But things have come to a pretty pass when

the downtrodden biro-chewers who work in IT start to think they are a bit special too..." (Private Eye, 2011)

Nevertheless, an alternative view emerges from the research. This affirms that the history of the IS practitioner is profoundly under-rated, and that it represents a quiet triumph. Much of the work done in corporate IS functions is now mainstream in that the IS function is a recognised and permanent part of the corporate hierarchy. The occupation has been well rewarded and certainly interesting for its practitioners over its history, and there is no denying the profound impact that corporate IS has had on daily life.

There is unanimity across all of the respondents in this research: each has enjoyed a rich and rewarding career characterised by change, innovation and complex problem solving. All declared themselves satisfied with their choice of career. It has provided opportunities for travel, novel experience and most of all, a sense of being at the cutting edge. This resonates with the profile of IS over the past 60 years as being a frontier discipline, full of challenge and reward. Despite having reservations about how successful IS has been in meeting business expectations, Tim Parlett sees IT as a career that is constantly changing, new and exciting. Tim Lane was unequivocal about his foundational role in Allied Irish Bank:

"It's been a pretty satisfying career. It was always changing - the whole time - and you won't get bored. The pay is very satisfying. You can see the end results of what you do."

Bob Stevens was equally positive:

"It's been damn good to me! I got in at a stage where you could make what you wanted of it! It was exciting, especially in the scientific arena! I worked on a program to calculate the X and Y prime, double prime and triple prime of

the tilt of the earth! I hadn't a clue what these guys were talking about, but I knew how to put together the FORTRAN to make it work. I found it fascinating in the business world too!"

When asked how his IS career at Wang and IBM compared with his IS roles in Glaxo, Deutsche Bank and SABMiller, Alan Millard saw the transition from tech to non-tech as empowering:

"There was a perception that it was a step up to move from a technology company into an end user company. You could earn more, you could have more influence and you can use your specialism to greater effect. In a technology company, you're one of hundreds of technology people, but when you join - as in this case - a pharmaceutical company, you're suddenly a specialist who's recognized for their specialism. It has more power and influence."

Clive Haswell also preferred to stay on the non-tech side, noting that he had turned down a sales role in Amdahl in the 1980s. His assessment of his IS career was consistent with other respondents: corporate IS has offered him opportunity and reward throughout his career.

Corporate IS has also offered an identity to IT specialists. Being perceived as an 'outsider' has resulted in most of the respondents identifying more with the profession than the employer. That is not to suggest any disloyalty, or lack of application, by the respondents on behalf of their various employers. Rather, it is a manifestation of the uniqueness of the role of an IS specialist; an acknowledgement that while the employer may change in the course of a career, the priesthood or profession remains central to the individual identity. In response to a question on whether he viewed his first loyalty as being to profession or to employer, Tim Parlett and John Handby responded unequivocally in favour of the profession. Russell Craigie and Phil Reed were more circumspect, but concurred. In Russell's words:

“These are not mutually exclusive, although part of the answer depends on your role and skills. An infrastructure specialist probably does not care what industry he/she is in. I am more business focussed and have always tried to understand the structure and dynamics of the industries I am working in. Fundamentally though I am an IS person with skills that are transferrable between industries.”

For Nick Pilbeam and Mike Parfitt, and for Tim Lane, who have spent almost all of their careers with Shell and AIB respectively were in no doubt that their first loyalty was to their employers. Nonetheless, across all respondents, there was a clear sense of identity with the IS profession – and for most a shared view of the sense of operating as an outsider.

5. Limitations and areas for further research

This research presents a broad and brief history of IS in the corporation. It has not covered all significant related themes, several of which are worthy of further historiographical analysis. For example, there is the history of women in corporate computing, of relevance not least because few women work in corporate IS departments (Croasdell *et al*, 2011; Ahuja, 2002).

Second, such a small sample of interviewees limits this research. For example, while several of the interviewees have worked in different locations across the world, all are Anglo-Saxon in origin, and their experiences have been formed mostly in Anglo-Saxon corporations and cultures. This presents a potential bias in outcome, and highlights an area for future research.

It would be of value also to use a historiographical lens to assess the issue of professionalism in IS. Although the successful practice of IS has always demanded extensive training and experience, some

question whether the IS discipline constitutes a profession (Orlikowski and Baroudi, 1988). In the UK the title and function of software engineer is not reserved, as it is in some states in the USA.

This is related to the issue of performance of the IS function over its brief history. Its record of success has generally been muted, while many high-profile examples of corporate IS failure have been analysed relentlessly in academic research. Again, history can help enlighten scholars and practitioners: for example, it is worth bearing in mind the point raised by Phil Reed, who has had a broad business perspective from within and outside IS, the failures often seem small when compared to the spectacular failures of non-IS business professionals, which have sometimes resulted in the collapse and bankruptcy of major global corporations.

There is also the question of what will become of the corporate IS function and its workers in the future. Alan Millard believes the traditional IS department – responsible for keeping the core systems operating – will disappear. However, he maintains a very positive view of careers for IS practitioners, seeing them as essential as any other business professional for ensuring the effective operation of businesses. He believes the role of the corporate IS practitioner role will change radically: far from being in the basement, IS professionals will operate at a much more strategic level, working closely with business colleagues, advising on matters relating to general business enablement, and essentially having the same voice as peer professionals:

“It’s (the IS function) becoming more sophisticated and morphing and integrating. The isolated IT is disappearing – the IS department of the past. The IS professional now and in the future will be increasingly up in the value chain.”

Whatever the future holds, the view of the past is consistent: IS in corporations has involved constant and dynamic change, largely for the benefit of its practitioners. It is taken for granted by

consumers of IS in corporations, and is ubiquitous, low-cost and mostly reliable, much like the telephone or electricity network. This is perhaps the most startling achievement of all – that in a relatively short period, IS in the corporation has moved from an experimental and pioneering activity to a reliable and invisible quasi-utility.

Further, it looks like there will be a demand for IS specialists for some time to come. At the time of the introduction of BT's first digital telecommunications line (the 64kbps Kilostream service) in the mid-1980s, Nick Pilbeam recalls a computer operator telling him: "Well, we won't be needing network support once we've got these in!" Fortunately for Nick and his IS colleagues, history proved the operator wrong.

As an exploratory study, the paper is entirely descriptive and does not provide any theoretical framework which might explain the findings. While this would no doubt have added to the paper's value, the conclusions and observations are valid without a theoretical underpinning. Also, in such an exploratory study, it is important to assess the value of the research, and to ask whether the objective and intent were realised. In this instance, there are a number of reasons that this can be answered in the affirmative. First, framework that emerged from the discussions is a useful tool for framing further research questions. It is not complete, nor is it definitive, but it is a useful vehicle for prompting further research and discussion. Second, the interviews with informed practitioners proved enjoyable, and in some respects resembled an archaeological and detective effort. The discussions with knowledgeable practitioners had the effect of making the history come alive: there is deep satisfaction to be derived from contact with practitioners whose professional lives helped shape and were shaped by the rapidly-changing, relentless waves of new technologies, business ideas and processes, and game-changing phenomena like pervasive networking. In this respect, this research provides a tangible validation of the value of historiography in IS.

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7. Appendix One – Summary of participants in the research

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8. Appendix Two – Topic Sheet for Interviews

Context of research

This research is about the IS profession (and the IS professional) in the corporate environment – that is, not in high-tech firms but in other industries – in banks, in government departments, in pharmaceutical firms, in retail companies – in short, in the IS (or IT) departments of most companies. At the time of writing, this comprises up to one million people in Britain alone.¹

The starting point for the research is an assumption that – with some notable exceptions - the history of the IS profession in such organisations is poorly documented. There is extensive literature on the history of computing – in museums, libraries, corporate archives and so on – but this tends to emphasise specific artefacts (such as the hardware and software), phenomena (such as the Internet) or industry trends (such as outsourcing). Further, the individuals who are recognised as leaders in IS are those who have built machines (like Eckert and Mauchly); software companies (like Bill Gates and Steve Jobs); innovative software (like Linus Torvalds); or shaped the industry (like Tim Berners-Lee). There appear to be few famous or renowned corporate CIOs or IT Directors.

This is despite the fact that IS plays an essential role in modern business: it provides basic services without which most firms could not operate and in some instances, creates innovative and intelligent solutions that allow companies to thrive and profit. Moreover, it is pervasive in everyday life and of direct relevance to the individual, for example in providing continuous operation of life-saving systems in hospitals.

Nature of Interview

¹ BCS (Chartered Institute for IT), June 20 2010, <http://www.bcs.org/server.php?show=nav.11282>

As well as identifying historical sources in the literature where they can be found, the research seeks to incorporate the views of IS professionals who have experience of working in corporate IS roles. I therefore would like to ask you about your career as an IS professional, and to collate your experiences of corporate IS, particularly in the early days when the profession was taking shape. I would also like to gather your views on the IS profession generally.

The discussion will cover your background and education, and will be concerned mostly with your history as an IS corporate professional. Accordingly, I will solicit your views on a variety of related topics and ask some of the specific questions listed overleaf (not all questions may be relevant to you).

The interview will take 1 – 2 hours.

Specific Questions

Your view of your profession

- Why did you choose IS as a profession?
- What does IS mean to you? How do you describe to others what you do?
- What are your views on your profession?
- How do you view IS professional training? Are the right skills available in university? Elsewhere?
- What are your views on where IS fits in the modern corporation?
- How are/were you perceived by your business colleagues (that is, those outside the corporate IS department?)

Your experience as a corporate IS professional

- How was the IS corporate function organised when you started in IS? Size/structure/skills/scope? How has it changed over time?
- What technologies did you use in the early days? Methodologies? How did these change over time? What were the most significant events/innovations for you and your IS department in the course of your professional career?
- How did your organisation accommodate landmark IS events like the relation database; introduction of the PC; Y2K; outsourcing; the internet; structured programming?
- What was the status of the IS department and the IS professional in your organisation? How has this changed over time?
- How do you see the IS corporate entity changing in the face of trends such as Cloud computing; Web 2.0; Offshoring?

General questions

- Who are the role models in your profession? Who would you describe as the achievers in corporate IS?
- What do you regard as successes in corporate IS? Failures?
- What in your opinion are the main challenges facing any corporate IS entity? Has this changed over the course of your career?
- How do you think IS as a business function is perceived by those who work outside the corporate IS entities?

Supplemental questions (mailed to respondents in September 2012)

- In the mid-1990s, there was a good deal of discussion in academic circles around whether computers actually were driving productivity in business. Do you recall productivity being an issue in the business world? Were you aware of this productivity debate?
- In general in the course of your career, have you experienced much crossover or interaction between the business and academic world in IT?
- Would you regard your first loyalty being towards your profession or towards your employer? In other words, have you tended to view yourself as an IT professional first and foremost or a (say) AIB employee first and foremost?
- Were/are you familiar with any of the professional bodies associated with computing? Have you heard of IFIP (<http://www.ifip.org/>) or been involved in any of its activities/technical committees?