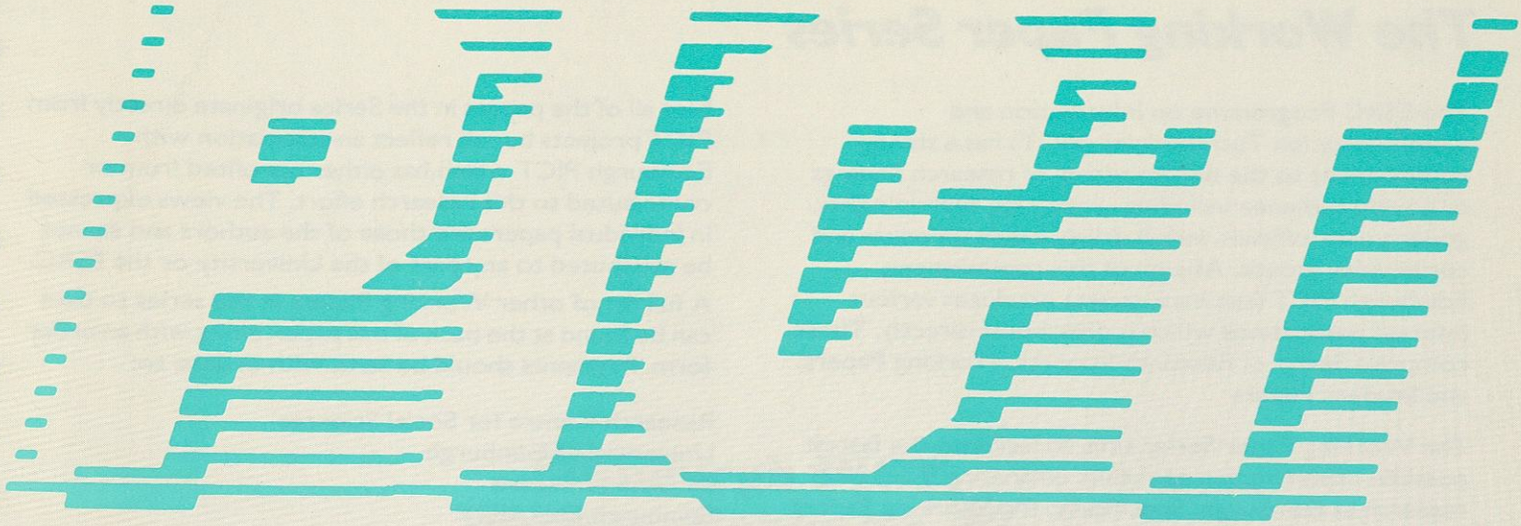

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# NEGOTIATING A SOFTWARE CAREER: INFORMALITY AND 'THE LADS' IN AN IRISH SOFTWARE INSTALLATION

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UNIVERSITY OF EDINBURGH

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# NEGOTIATING A SOFTWARE CAREER: INFORMALITY AND 'THE LADS' IN AN IRISH SOFTWARE INSTALLATION

**Margaret Tierney**

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# Negotiating a software career:
# informality and 'the lads' in an Irish software installation

Margaret Tierney*

**Abstract**

Despite the glamorous imagery attached to software work, this paper looks at how software workers are not universally equipped to turn their expertise to best effect in pursuing a career in software. It addresses how and why stratified access to key software jobs is critically shaped, and reproduced, by the local social networks of the office. By analysing a detailed case study of an Irish software installation in terms of its recruitment and promotion practices; its informal work environment; and the structures and devices by which staff become identified as 'good material', the paper explores how 'the lads' in the office are best placed to successfully negotiate a rewarding software career.

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**Introduction:**

The social imagery attached to software work in Ireland is glamorous: it is billed as 'the business of the future' with benefits for the state, for employers and for software workers alike. As an industry, it sounds like a capitalism with no sting in the tail for success is premised on the quality of its labour, whose combined education and ingenuity can bypass the structured inequalities of Ireland's peripheral dependency within the international division of labour. As an occupation, it promises a new social order based on knowledge and ability rather than on class and gender. And, of course, it is one of the fastest-growing international industries. Software seems to epitomise work which has prizes for all. It is wealth-generating, meritocratically informed, and expanding.

In the context of this powerful imagery, to be a holder of technical expertise would seem to guarantee that the worker will gain the power over the course of a career to enter local and international labour markets at whim. Yet we know from empirical studies, that software work has become polarised into a range of high-skill and low-skill jobs (Markusen:1985, Kraft:1977); that high-skill software jobs, especially, have become fragmented into a pecking order of sub-specialisms (Friedman:1989, Tierney:1991); that software is as much 'organisational' as 'occupational' work, since most employers of software-skilled staff demand that the practitioner acquire expertise in applying their technical skills to unique organisational application fields (Tierney and Williams:1991). Thus, in terms of both the precise technical knowledges brought to bear in skilled software work, and the tradeability of those knowledges in internal and external labour markets, software workers are not universally equipped to turn their specific expertise to best effect in pursuing a *career* in software. This paper addresses the question of how software careers are differentially negotiated in the context of the social networks which pertain in an office.

As a scene-setter, we begin by summarising the context within which software development work proceeds in Ireland. This will include a brief account of the efforts of the Irish IDA (Industrial Development Authority) to generate software jobs, and of the country's reorientation of third level education to meet the needs of high-tech industries. Next, we consider why the career is a useful concept for exploring how differential access to better jobs is critically shaped (and reproduced) by the local social networks which pertain in an

office. We then turn to a detailed case study of a medium-sized Irish software development installation. By looking at the firm's recruitment practices, its division of labour, and the structures and devices by which staff become identified as 'good material', we explore how certain skilled staff, most especially 'the lads', are better placed than others to successfully negotiate a rewarding career strategy in software.

**The Irish Context for Software Development Work:**

The high-tech industries - most especially electronics and software - have enjoyed centre stage in Ireland's strategic industrial planning since the early '70s. For the IDA (Industrial Development Authority), they constitute a central plank in attracting multinational investment into the country (Killeen:1979). They (together with pharmaceuticals and fast food) have been selected as 'target sectors' for IDA activity since they possess both high growth rates and a strong technological base. As a nation without a historically strong industrial base, these sectors have been perceived as the best and fastest means for Ireland to attract foreign capital and to provide employment for some of the well-educated young population who would otherwise emigrate.

What is most interesting about the IDA's activities throughout the '70s and '80s in targetting the high-tech industries, is that it has not only sought to attract electronics and computer firms into the country, but has actively sought to *popularise* these industries in the public imagination (Gibbons:1988). No other sector has had its export figures, its future employment projections or its infrastructural educational requirements for expansion, publicised in a comparable way (Murray and Wickham:1982). By the late '70s, fostering the high-tech industries by means of attracting foreign firms to establish branch plants in Ireland was widely understood as meaning the same thing as 'national economic development' (O'Brien:1985). As Murray and Wickham (1982) have documented in relation to the electronics industry, "high technology, high skill, labour intensity, propensity to expand, good working conditions, environmental acceptability, low transport costs and low energy have been cited as the....combination of attributes embodied in..electronics", which are understood as being uniquely suited to Ireland's needs and resources.[1]

[1] In his paper which explores the IDA's extensive promotional activities for 'modernising' Ireland's profile, Gibbons (1988) notes the success of its slogan that the Irish people are "the young Europeans". Its series of ads celebrate Ireland's abundance of a youthful well-educated workforce (eg. "In a 16th Century Irish University: 21st Century Knowledge") and the advantages to be gained from its lack of an outdated manufacturing infrastructure (eg. "Missing The Industrial Revolution Was The Best Thing That Ever Happened To The Irish").



For the most part, where electronics multinationals have established branch plants in Ireland in the last 15 years, these have been located in rural areas[2], offering employment in the form of semi-skilled computer assembly jobs (Murray and Wickham:1982, O'Brien:1985, Wickham and Murray:1987). Foreign-owned computer firms, in contrast, have tended to cluster in the cities, close to the universities and technical colleges from which they draw their staff (Tierney and Wickham:1987). The jobs offered by these firms tend towards the maintenance or tailoring of systems which have already been written by software staff located in the parent office. Indeed, even indigenous Irish software firms - which are typically small and heavily grant-aided by the IDA - tend to specialise in the marketing (and consequent maintenance) of a single package rather than in extensive new development (Tierney and Wickham:1987). In sum, the IDA's attempts to generate new Irish jobs in electronics and software, based primarily on a strategy of encouraging foreign investment in Ireland, have been significant though most of these could not be characterised as being 'high skill' jobs (O'Brien:1985, Wickham and Murray:1987).

However, central to the claims being made for encouraging high-tech industries to locate in Ireland is that electronics and software are seen almost exclusively as high skill industries (Murray and Wickham:1982). Thus, the profile of *actual* demand-side activities has fallen short of the promise implied by a 'greening' of Silicon Valley. What is interesting, however, is that this 'high-tech promise' so successfully argued for by the IDA was mobilised by the government, thoughout the '70s, to produce a major revamping of third level education so as to generate a pool of technically competent Irish workers who could meet the needs of these new industries.[3]

[2] The IDA's efforts to locate branch plants outside the major cities have been part of a larger national programme for stimulating local economies, thus encouraging young country men and women to 'remain on the land' rather than migrate to the cities or, even more likely, emigrate to Europe and the USA.

[3] A new body - the Manpower Consultative Committee (MCC) - was established in the '70s to assume strategic control over matching educational investment to the specific needs of industry. One of the main priorities of the MCC was to address the shortages of labour in skilled occupations, most especially the new technical ones. The MCC was instrumental in forming the Programme of New Educational Opportunities, introduced in

On the supply side, the Manpower Consultative Committee (MCC) suggested in 1979 that without positive educational investment in producing formally qualified engineers and computer scientists, Ireland could not hope to capitalise on the IDA's attempts to generate high-skill technical jobs. A rapidly assembled series of 'conversion courses' for non-technical graduates was put in place, together with a massive expansion of engineering and computer science degree and diploma courses (see, Murray and Wickham:1982).

Thus throughout the '80s Ireland has experienced the anomaly of a need, on the demand side, to fill relatively mundane programming and technician positions. Yet on the supply side, we find a sudden flowering of technical graduates with extremely high expectations of the sorts of jobs they can expect to hold. Even as early as 1980, it was becoming apparent that Irish technical graduates would not easily find 'appropriate' jobs within the country[4] and the MCC recommended the removal of special financial support for those wishing to do conversion courses for computer programming and analysis (Curtin:1980, McAleese:1986). The fine tuning of the educational system to the projected needs of high-tech industry was - as many other dependent economies have experienced - either aggravating an expensive brain drain of Irish talent to Europe and the US, or was leading to the chronic underutilisation of the skills of those who chose not to leave (see, Irizarry:1980 or Ukaegbu:1985).

In addition, the government's promotion of the high-skill technical occupations at the level of the popular *imagery* surrounding how high-tech work is organised and managed, contribute to a second disjunction between reality and expectation. Forester's account of software workers as the 'jelly bean people' is the most dominant image of software work held in popular Irish consciousness (Forester:1985). This is a world where skilled workers flit lucratively from job to job, always calling the shorts by dint of their labour market power, reliant solely on their talent and their education, and unhindered by their sex or their class. In contrast, as Murray and Wickham

1979, part of which attempted to anticipate industrial demand for formally qualified engineers and computer-skilled professionals into the 1990s.

[4] For instance, almost half of the graduates of the Computer Science Diploma conversion course of 1980 offered by University College Cork emigrated in order to find work (Murray and Wickham:1982).



(1982) document, the restructuring of the Irish technical education system was justified on the grounds of 'national recovery' rather than on 'equality of opportunity'. As had been the case before the new Programme was established, most graduates come from the middle classes, and in most of the technical disciplines they remain predominantly male.

Interesting, however, software degree and diploma courses (as opposed to all the engineering disciplines, including hardware and systems engineering) have attracted most of the women who *do* enrol in this field. The Higher Education Authority (HEA) reported in 1987 that women take up over 30% of total computer science graduate output, and this percentage is rising.[5] Thus, while software may remain a privileged occupation, it is one to which middle-class women - the beneficiaries of third level education - are neither 'debarred' nor 'repelled' to borrow from Cockburn's terminology (1983). However, we find clear signs of a gender-based fragmentation within Irish software work, with women concentrated in training or programming work, while men cluster in the customer-oriented design, analysis and sales work (Davies:1985, Sterne:1986, Tierney and Wickham:1987).

In this peculiarly Irish context for software development work, it becomes interesting to track how computing work is organised and managed as managers balance between accommodating the immediate task demands of the work and answering the aspirations of their educated and highly-expectant work force. As we see in the next section, the concept of the 'career' is a useful means of capturing the issues surrounding both an organisation's software work practices and their employees' attempts to optimise their chances of progression within their occupational field.

**Thinking about Software Careers:**

It is useful to consider the organisation of labour as consisting of three major components: the structuring of tasks into jobs, the structuring of those jobs in relation to each other into a sequence, and the allocation of particular people to do particular jobs in that sequence. Considering the last two components particularly, the single most valuable negotiable resource an organisation offers its skilled employees is 'the career', ie. the routes and devices by means

[5] Personal communication from Mary Armstrong, HEA, Dublin August 1987.

of which particular people are allocated to do particular jobs, and the subsequent linking of those jobs into a chronological sequence.

We may start from the premise that not all workers have a 'career' while working (Crompton and Sanderson:1986). Some stratification theorists hold that careers "provide a means by which high status groups maintain their position and engineer change in order to preserve the essential features of the existing stratified order" (Portwood:1985, p.452). Careers, by this kind of definition, would appear to accrue only to those who are already in positions of power. In contrast, we find writers such as Edwards (1979) arguing that the creation of organisational careers is an identifiable bureaucratic *control* strategy by means of which management retain potentially wayward workers. The careers of the computing occupations seem to take place at an interesting intersection between these two formulations. That is, in computing careers, we can observe through the practices of initial recruitment into computing and in the subsequent sequencing of computing jobs,
a) how key groups within the computing occupations *themselves* stratify who is allowed to gain access to the best jobs, and
b) how internal organisational structures, such as an internal labour market, create 'the golden handcuff' of the company career.

Before we consider recruitment and career development in any particular software installation, we need to schematise what comprises a 'software career'. Heimer (1984) offers a useful account of how the career is a *jointly negotiated* resource:
"No one controls a career as such...Career development depends on a series of factors some of which facilitate individual control and others of which facilitate organisational control..When we talk about control over a career we are really talking about control over a series of elements that determine whether a person's abilities are developed, whether such development is noted and recorded, and whether the person has access to information about jobs, and potential employers have access to information about him or her" (Heimer:1984).

She isolates these career 'elements' as being:-
- getting a (full-time) job in the first place, since without jobs careers cannot develop.



- having access to information about relevant jobs. For instance, a job such as software consultancy requires the worker to meet with clients who could well become potential future employers. Thus, this kind of job is more likely than, say, back office programming to yield information about employment opportunities elsewhere.
- being in an organisation which structures jobs into a sequence. The clearer such structuring is, the better. A clear ladder allows workers to *plan* their career in the sense of knowing what training they possess or lack, or what activities or skills carry more kudos than others.
- occupying jobs which may (or may not) enable them to learn the skills that will lead to promotion. A good 'career' job would be one which, though it may itself be highly routinised, places the worker in close *social* proximity to jobs which are more diffcult, varied or responsible. In such a job, the worker finds many opportunities, both formal and informal, to learn on-the-job.
- getting the requisite credentials to occupy the job in the first place. If a graduate barrier is in place (as is often the case with technical jobs) a career in that area is effectively ruled out.
- being able to negotiate how information about the worker's abilities, training and experience is *collected* by the organisation and is made available to others both upwardly and laterally.

Heimer stresses that workers and organisations are joint collaborators in the formation of careers. In the Irish context, we might also add that the state is a third significant player. We have seen that it is the primary training provider; in this sense, it is the Irish state which provides one of the essential career elements that Heimer identifies - that of the worker needing to possess the qualifications to get past the graduate barrier in the initial recruitment process. Less directly, the state's grant-provision to both foreign and indigenous high-tech firms is extremely high; without that provision, many Irish software installations would not exist since the domestic market for software products and services is too small for 'free market forces' to provide sufficient pay-back for wholly independent entrepreneurial activity. Finally, the government is itself a major Irish employer of computer-skilled staff.

In a field such as software, new entrants - as fledgling professionals - expect to have a career. They expect to be able to negotiate over time the kinds of activities they do; and they expect to be able to enhance and alter their expertise so as to make themselves more valuable to their employer and to

increase their potential power to trade themselves on the external labour market. In this context of high employee expectations, the employer is more likely to model his/her general style of management control over the work on the apparent informality of 'responsible autonomy' rather than the formal close intervention of 'direct control' (see, Friedman:1977, for a discussion of these opposing management strategies).

In addition, an employer is typically seeking staff who have not merely formal qualifications - a sort of computing knowledge 'in abstract' - but an expertise in applying that knowledge to the immediate organisational tasks of the company and the immediate needs of that organisation's clients. On that account, s/he is also more likely to prefer informal word-of-mouth recruitment strategies (Jewson and Mason:1986, Winstanley:1986) and informal promotion strategies based on gradual observation of an employee's abilities to work with team-mates and with clients (Campbell:1983, Kanter:1984, Ginzberg and Baroudi:1988, Carlyle:1989, Causer and Jones:1990). Thus, in the important 'negotiation sites' over the formation of a software career, viz. the recruitment, promotion and managerial practices of the organisation, *informal* rather than formal and obvious graded pathways, are more likely to be in evidence. If this is so, the *social networks* which pertain in a software installation become an extremely important site for workers to demonstrate their worth; gain a reputation; acquire new forms of expertise; and so advance their careers.

For the remainder of this paper, I will consider the relationship between formal and informal work practices and emergent software careers by means of one detailed casestudy, conducted in a software installation in Dublin in 1987.

**The Case Study:**

The company, established in 1974, is the Irish office of a multinational hardware company and in this respect is typical of the kind of firm the IDA has attracted to Ireland over the '70s. It is an appealing casestudy for our purposes since it is relatively *large* in Irish terms: its operations refer to the development, marketing and support of the firm's machines for the mini and micro computer product markets within the country. It employs about 120 technically-skilled staff (50 in its Engineering Division, 20 in its Sales Division, and over 50 in its Software Development Division).



In addition, the work undertaken by its software staff offers a more extensive *range* of job tasks than is found in many Irish software sites: its activities include training, new development, maintenance of packages, business analysis activities, together with a small Software R&D unit. This firm actively seeks 'quality' software labour, since its staff must be both technically knowledgeable about the firm's products, languages, design standards, coding formats and so on, as well as conversant with handling client organisations across many different industrial sectors. Thus, on account of both its size and its range of software activities, this casestudy offers us scope to look at a hierarchy of software job-holders at different stages in their careers. In this firm, we can not only look at how software staff deploy their expertise in relation to their customers, but also at their jockeying for position within the firm's internal organisational structure.

In this company, the software division is split into four sections. First, there is a small group of Pre-Sales Support staff (5 men in their late '20s or early '30s), established in 1986, bidding for a large telecommunications project. These people are in the closest relationship to the Sales Division. Sales interpret what it is the client wants and, at their behest, this section is writing a large and complex technical proposal to match. Two of the men had been promoted into the section from Engineering (both of them with degrees in engineering); one had been head-hunted from a competitor's sales team (with a university night-time diploma course in Computer Science); two had been promoted from within the Software Division (one with a science degree and 3 years experience as an applications programmer with the company, the other with his Leaving Cert and 7 years applications experience).

Second, there is the Customer Support section, with a staff of 25. Their main work is on the company's micro which was designed as a general business system for small companies. There are about 300 of these sold already, each with different packages, the most common being a payroll package. It is in this section that most of the customer training goes on with 3 permanent trainers (2 women and 1 man). These women are the only ones in the section other than the 2 secretaries. This section is the most geographically dispersed across various Irish cities. Apart from the trainers, 7 of the Dublin staff are applications programmers who update the specifications on the packages already sold (about 80% of the business here is repeat business) or who design

new small business packages. These people are all recruited directly from a local third level technical college. The remaining 3 are systems programmers who are re-designing the micro's operating system, bringing all sold machinery up to the same level of technical proficiency. These people have all been directly recruited within the last two years as university Computer Science graduates.

Third, there is the R&D section with a staff of 8 (7 men and 1 woman), all of them university Computer Science graduates. All of their work (on operating systems) refers directly to the multinational's head office. Unlike the other three software sections, they do not have regular work links with any of the other units within software.

Lastly, there is the Software Supply and Development section, which is where I was based. They have a staff of 20 of whom 4 are women (2 secretaries, 1 programmer and 1 Technical Support). It is this section which deals with large customer projects, either at the proposal, development or maintenance phases, though when I was there, 7 of them were not attached to teams but continued to work as maintenance programmers on small business micros. The largest team at the time was a group of 8 who were installing 30 distributed minis for a large government department. This section had the largest mix of people of differing experience and formal qualifications. Most of the direct recruits were from a 'graduate conversion' course, or from the local technical college. The two contract staff had no formal credentials though both had had lengthy experience in systems design from working in small software houses in England. The Project Manager of this section had 18 years experience in various local software houses before moving to this company, and had supplemented his experience with a night-time university diploma course in Computer Science.

The culture of this firm's software division is premised upon maximising informality, so long as that does not jeorpardise the company's image to clients. The rhythm and rhetoric of the office feels like the very apotheosis of the clean, advanced, skilled and meritocratic workplace advanced by the IDA and other key state institutions. To the observer, for instance, the main social division of this office is not centred around a distinction between management and staff. Managers do not have separate offices: all routinely work in the same open plan area as staff do, and managers and staff have



equal access to the division's private interview/seminar rooms, as needed. Again, there is no formal requirement for staff to 'dress smart' or to be 'nine-to-fivers'. Providing the worker is not due to meet clients that day (though, in the context of the work done here, this is quite an important proviso), s/he may wear jeans and may choose to work any hours which suit.[6] Staff and managers share one large comfortable canteen which serves the whole company, and help-yourself coffee tables are located on every floor for common use.

A kind of gung-ho ambition is openly celebrated in this installation. For instance, amongst the profusion of plants and objets d'art, there is a series of posters placed at intervals along the walls. One is a picture of a group of young men around a terminal with jackets off and sleeves rolled up with the slogan, GO FOR IT! A second is a picture of a young gauche man sitting opposite a genial older man with the caption, THE ONLY DISTANCE BETWEEN YOU AND ME IS YOUR AMBITION. In the speech and mannerisms of the staff, assertiveness is more apparent than modesty. The work matters. It takes up most of the conversational space in the office, the canteen and the pub. The senior management of the company like to see their staff as 'go-getters': "Our guys have to be hungry for work. We won't take less".

Reflecting this company's approval of this kind of 'hungry ambition', most managers do not adopt a closely interventionist strategy in monitoring software work: Ultan, the Senior Project Manager of the Software Supply and Development Section, described his staff as "real thoroughbreds. Just give them a nudge and they're off. They eat and drink the business." He rarely intervenes directly in setting out minutely-itemised work targets nor does he use work sheets as a mean of measuring the productivity of his programmers.[7] Instead, all the members of a team on a given project meet weekly to establish (jointly) the task objectives for the following week, and their spatial proximity to each other ensures that "we're talking to each other

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[6] Since staff and managers are frequently obliged to make unscheduled visits to client sites, the company provides lockers and showers and most of the staff keep a suit in the office. In addition, staff are expected to work 'similar hours' to normal business, since they must be available to respond to client requests for help.

[7] Actually, work sheets are filled in by staff and managers alike, but their purpose is to act as an aid for costing out a piece of work, rather than as a productivity measure.

all the time". Ultan said: "You know, I trust them. I must trust them. It's the only way to get work done here." A responsible autonomy control strategy is practiced even over the most junior staff whose typical work, such as running test data or writing documentation, is already sufficiently deskilled to be readily amenable to direct control techniques (Friedman:1977,1989).

In addition, this company attempts to encourage a 'professional' labour process by means of minimising the number of formal authority chains between junior and experienced staff. Thus, in place of a highly-visible series of graded steps which would serve to denote the salary, rank and status of staff relative to each other, there are instead only three identifiably fixed grades in this office:
(a) junior staff, who will have the pre-fix of 'Trainee' before their job title, a tag which is dropped after they have served a year or two with the company.
(b) experienced staff, whose job titles may either reflect the kind of work they normally do (eg. 'Programmer', 'Technical Support') or which reflect the image the company wishes to present to clients when these staff are out on the job (eg. titles such as 'Software Co-ordinator' or 'Customer Service Executive' appear on the business cards of staff who would otherwise just describe themselves as programmers).
(c) managerial staff (ie. with a supervisory function over a group) whose titles contain the term 'manager', (eg. 'Project Manager', 'Pre-Sales Support Manager').
These three grades serve to provide the basic parameters within which individual negotiations over salary, job content and responsibilities are conducted. Thus, for example, a 'Trainee Programmer' will not earn more than the upper parameter set for his/her grade, though s/he may be earning considerably more than a fellow 'Trainee'. Likewise, experienced staff members may be made fully responsible for the successful completion of a piece of work, and bargain for the salary and status which ensue from that, without being managers per se.

This is "a crisis-run office" as the senior project manager of the software division told me, though the work itself seemed orderly, manageable and unrushed in the period I was there. However, the feverish *culture* of the office seems to reflect how managers and staff understand themselves as occupationally mobile workers: "Software is more open than, say, being a doctor or a lawyer. We can move around a lot. I think any new technology



thing that needs brains and flair mainly...Well, that's what makes us different from the common pack" (Frank, 32, Programmer).

Whalley and Crawford (1984), conducting a cross-national study of English and French engineers argue that the boundaries on mobility are set by the degree of permeability that exists between 'ruler' and 'ruled' over the course of a normal career. In this respect, any permeability in this company is less likely to be overtly found in the form of a shift from 'staff' to 'manager', than in the covert forms of other social ties - principally within the network of 'the lads'.

We can see that this company - in common with most software installations - uses formal educational credentials as a screening device at the recruitment stage, though the exact *kind* of credential (eg. degree, diploma, conversion course, etc) varies between the different sections of the division. If this is a kind of 'pre-market' segmentation based on educational achievement (Ryan:1981), we also find - quite markedly - a 'screening out' of women in this particular company. Both Rubery (1978) and Blackburn and Mann (1979) discuss this phenomenon more generally, in terms of how women workers are marginalised out of the best jobs by the joint collaboration of incumbent workers and their management.

This need not take the form of a particularly conscious discrimination against women: rather, if the incumbent workers and managers are mainly men, it expresses itself in terms of assumptions 'the lads' may make in assigning particular people to do particular jobs (see, Collinson and Knights (1985) for an interesting discussion of 'jobs for the boys' in insurance sales). For example, in this company, the (untypically) low number of female software staff was, indeed, remarked on by members of staff. One said: "I was very surprised when I came here to find so few women. Granted that computers is male-dominated. But in most places there is a tendency to have a certain quota of women. I suspect that management find that it improves the working area and improves the atmosphere. The programmers like having women around." (Fergus, Customer Service Executive). As we see, his surprise is couched in terms of how the presence of women normally improves the office for the workers - the (male) programmers. Women are women, and nice. Programmers are men, and workers.

Assumptions of this kind become critically important in regulating both the quality and the amount of work-related information trading done in the normal course of doing software work. If - as is the case in this company - that work is conducted with a minimum of formal authority chains and an overtly 'arm's length' managerial control strategy, the resultant informality of a labour process of software peers can become a minefield for those who do not fit comfortably into the dominant local *social* network. Let us turn now to the detailed organisation of software work in this company, so as to monitor what Ryan (1981) terms its 'in-market' forms of stratification which shape how particular workers manage to enhance (or fail to enhance) their opportunities for upward or lateral movement over the career.

**Doing Software Development Work:**

Software development as conducted in this company roughly encompasses three different types of work activity. The first stage of work is the 'business specification'. Fergus, a 27-year-old with the title of Customer Service Executive, is primarily employed to work on this area. When an in-principle sale has been made, Fergus establishes in broad outline what Sales have promised to deliver and he ensures that the client understands clearly what exactly they are buying for their money. His liaison work with Sales involves writing detailed 'internal' and 'customer' costings for the project - costings which are quite frequently arbitrarily arrived at, since they depend on a feel for how much a client may be persuaded to pay, and which programmers will be available for assignment to the project.[8] Thereafter, his work with customers means going over the details of how the user firm is run, and how the technical project could be best accommodated into the firm's practice. This, too, is a highly skilled job which demands a feel for the business, based primarily on not over-selling the client on the improvements that can be expected.[9]

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[8] There is normally quite a large discrepancy between these two types of costings. Where the project involves selling a product or service which has already been developed by the company, the customer costing will be higher than the internal costing. When the company is trying to break into a new industrial sector (eg. selling EPOS systems to retail stores) some of the cost of the initial development work (ie. the internal costing) will not be passed on to the customer, as it would then have been too expensive for the client to accept the company's competitive bid.

[9] Correctly gauging how to pitch the benefits of a new system to a client is fundamental to the profitability of the Software Division. If too much is promised, the client will badger the company, long after implementation, for extra enhancements and maintenance work which quickly escalate the internal cost of the project. This 'truth' about software



This aspect of the software business is a skill acquired gradually and usually only by painful experience. Hence, the Customer Service Executive post carries great kudos within the company and post-holders such as Fergus command enormous respect from managers and staff alike. As a more detailed picture emerges of the requirements of the user firm, Fergus then writes a feasibility study, based on a guesstimate about the amount of programmer-hours needed to develop the specification, and the project moves along to the second stage of detailed design work.

This kind of business specification work - that of responding to a client's decision to buy - is not the only type of 1st Phase software work. Tom, for instance, is an ex-engineer who joined the company after a 6-month graduate conversion course. His title is Trainee Analyst/Programmer, and he was employed for the specific purpose of developing the company's PABX system in a direction which their telecommunications client has not directly asked for. The development idea - an encryption system for regulating the security of the switch-boards in large organisations - came directly from Sales, who were looking for a new hook upon which to sell the company's PABX product range. Tom works alone without reference to anyone except the Senior Project Manager. His task is to flesh out the encryption idea, producing various detailed options which the senior management of Sales and Software may (or may not) later act upon. This kind of 1st Phase work - though interesting - places Tom is a relatively marginal position within the software division: " I don't know which option they'll go for. I'm not too concerned. Things are dictated by the market and I find the market really boring. I suppose I'll never really make it big here because this place is completely market-oriented. You rarely get a chance to do something really radical. I suppose I come closest to the ideal...like, I've been left to my own devices a bit. But we're not in the business of coming up with new ideas really. Just making someone else's ideas more efficient".

The second phase of software development work refers to the production of the systems specification for a project. For the large government project, the

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is routinely taught on the company's week-long Induction Course for new recruits: "Our first business is to sell computer systems. Remember never to promise the customer everything. He, too, is a business man and will respect your realism" (Extract from the "Welcome to the Team" handout).

spec was put together over six months by 15 different people, about 10 of whom work primarily as analysts. It's a weighty tome - about the thickness of a PhD - and is subdivided into six sections; an overview of the hardware and software being used, followed by five chapters on the modular break-down of the database. Where business specifications typically involve staff in direct negotiations with the senior Finance and Accounts managers of client firms, 2nd Phase work means talking to middle management or junior users in the client firm, who have the detailed knowledge to answer specific queries about the work practices the technical project affects.

This is the kind of work done by Alan (31) who is 'Technical Support' for the minis being installed on the government project. In writing Chapter 2 of the systems specification, he built up notes on the break-down of clerical operations involved in his particular area of responsibility. For each discrete clerical task, he then drew up flow-charts to indicate the operation's logical sequence. In his terms, "a good systems analyst is just somebody who is well-organised and knows what questions to ask". As we would expect, this kind of skill is one which is only gradually learnt on-the-job. Indeed, in this company, 'Systems Analyst' is not a discrete job title, but reflects the kind of work which many of the more senior 'Programmers' engage in.

Part of the task of being 'well-organised' is to document the specification so as to make it accessible to everybody concerned, ie. the relevant government personnel whose systems are to be automated, and the analysts who will design detailed programs on the basis of the spec. But if documentation means making the design skeleton very explicit, it is also a contentious aspect of the job. Most programmers hold that it is "a real bore" or "a bit of a waste": "Nobody wants to leave their fingerprints all over every tiny bit of work they do." (Michael, 25, Programmer). In practice in this company, most documentation of either systems or, later, programming specifications, are left to just one or two people - usually the newest recruits (Ann and Sean).

Ann and Sean were both employed at the same time as Tom and were recruited from the same graduate conversion course. They had been preceded a month before by Ultan, the 'Senior Project Manager'. Ultan (36 and married with 4 young children) was engaged in turning the spec into a working set of linked computer installations. For him, this meant delegating someone to train the government staff; getting the operating system tested and installed;



and getting the individual pieces of application software designed, developed, tested and then accepted by the client. He allocated Ann to do the overall systems documentation and all the necessary training of users. Ann is 34 and married with 3 children. She is an engineering graduate but found it difficult to get full-time engineering work. Once her first child arrived, she turned to part-time lecturing in a local technical college in the evenings. Her title in the company is 'Trainee Programmer', as is Sean's who is 19. Like Ann, he has not yet done any 'real' programming work. His job is to document the programs designed by the more experienced programmers in the team - Michael, Declan and Fintan.

It is these last three who are mainly doing the 3rd phase development work - the program specification. The program specification is the longest and most detailed part of the three phases, where each separate operation is coded into a inter-linking set of programs. Though in many software installations this detailed level of design work can serve to isolate programmers from the users since, in principle, this kind of work can be turned into a wholly back room function (Kraft:1977, Greenbaum:1979, Friedman:1989), this is not the case in this 'collegiate style' office.

So as to enable all their programming staff to acquire experience in systems analysis and business specification activities, 3rd Phase programmers enjoy frequent work interactions both with the client and with those colleagues who have been allocated to 1st and 2nd Phase tasks. Fintan told me: "There's this myth that analysis is meant to be the interesting bit and programming the drudgery. That we're just the drones who write it down. But that's not so. We all program first and do the analysis afterwards!" Michael described his programming style as being "like composing or something. It's like doodling on the piano and you get a tune out of it."

In this context of considerable discretion being allowed for 'bottom-up' programming, Sean's documentation job frequently involves him in retrospectively changing the systems spec so to reflect what the programs actually do. Thus, though he is as junior in the company as Ann, he is in a strong position to gain very close exposure to the work done by his 2nd and 3rd Phase programming colleagues. He said: "Between documenting and chasing other people's bugs, I haven't done much programming myself. But I will in a few months. Ultan's promised me."

Meanwhile, the 3rd Phase programmers are frequently required to go visit the client while the first wave of computers are being installed and user tested. Thus, Michael, Declan and Fintan are 'key workers' not simply as far as the company are concerned, but also as far as the client is concerned. For instance, for the purpose of site visits, Michael's business card carries the title of 'Software Co-ordinator' though he is "just a sort of a programmer" in the office. The structure of, say, Michael's job has enabled him to *blur* the distinction between the machine-oriented activities of writing programs (what we might loosely term a 'programming occupation') and the customer-oriented activities of dealing with implementation hitches on site visits.

In sum, though software development work as conducted in this company is roughly divided into three phases of activities - with distinct skills being brought to bear for each phase - we can see how the loosely-specified tasks of business and systems programming and analysis provide opportunities for staff to over-lap their work with each other. Sales spills into business specs which in turn spills into systems specs and so on: the boundaries of distinct jobs are unstable (Baron and Bielby: 1980). In this company - as in many others with a similar collegiate style of management - there is no coherent way to define what, say, a 'programmer' does, since the definition changes depending on the role of the person who is doing the defining (Pettman:1975). In the absence of a standard meaning for what a job is worth (in terms of its salary, status and task content), it becomes interesting to monitor how hierarchies of skill nevertheless come about. For this, we need to look more closely at the division of labour, with respect to the firm's main business.

**The Division of Labour and the Structuring of Software Jobs:**

Three of the company's four software units are 'market-oriented' to use the buzz word I was surrounded by. The exception is R&D. These 8 people are undoubtedly the most isolated software group, since they report directly through one senior manager to the parent head office. The work they do is technically interesting and highly skilled, yet nobody - including Tom who was the nearest thing to a 'pure techie' in Software Supply and Development - envied them their isolation. Mary, for instance, 'Technical Support' for the operating systems on the company's micros said:- "I really enjoy technical stuff but it's a really closed environment up there (in R&D). It's not good for



a lifetime. Granted, the guys up there are really excellent, and there is that mystique attached to it, there's that bit of admiration. Most of us are a wee bit awed by them. But they don't pay you that well for it. And R&D people find it difficult to negotiate. All they have is their brains. No flair. No experience to talk of. No exposure. Sales and Marketing, now that's different. They don't get too much admiration but they get lots of money and lots of responsibility. That's where the action is."

The 'action' for this company - as for most Irish-based software firms - lies in finding and developing software product and service niches (McAleese:1986). The 'best' jobs in a company such as this are those which provide the most opportunities for acquiring and exercising skill as market-oriented technical problem-solvers. Since this kind of business know-how can only be learnt on the job (Evans:1982), Mary's comment that R&D staff get "no exposure" and have "no flair" is especially pertinent. Her perspective bears out a repeated finding of US research on the consequence to technical workers whose expert labour is radically divorced from the main business activities of the firm. That is, the content of their work may be intrinsically satisfying, and their expertise may exactly match the highly specialised contours of the jobs they hold. Such jobs and such job-holders may even be indispensable to the firm - both R&D and the provision of user training are good examples of this - but so long as they are 'marginal' (ie. overhead) rather than 'core' (ie. profit-producing) activities, the job-holders may find it difficult to climb a 'skill hierarchy', either vertically towards management, or horizontally towards more 'core-type' work within the firm's internal labour market (Bailyn:1977, Kraft:1977, Griffiths:1981, Kanter:1984).

Amongst the other three software sections, it is harder to find a single pattern which describes the company's 'typical' division of labour. Within the Software Supply and Development Unit, projects are held distinct from each other, though many of the programming staff may be quickly moved into (or out of) any given project, depending on the pressure of work. Thus, the 'organisational map' of who is working on what is unstable, changing somewhat from week to week. Mary, for instance, as Technical Support for the company's micros, has spent the last four months flitting between various small, short-term projects for individual micro customers. But, prior to that, she was one of the analysts involved in putting together the systems specification for the government contract. To take another example, Jack (23

years old) is a programmer who had worked extensively with Michael, Declan and Fintan on the early stages of the government 3rd Phase program spec. The week I arrived in the company, Fergus (the Customer Service Executive) had asked Ultan for "somebody good" to help him put together a 1st Phase business spec for a new EPOS project, and Ultan had allocated Jack to the new job. Again, while I was there, a junior programmer, Conor, was told to abandon his normal micro maintenance job, so as to run emergency test data on the telecommunications project at the request of the Pre-Sales Support Manager. And so on.

Meanwhile, though, we find clear exceptions to the supposed looseness of staff movement across projects. Ann and Tom, as we have seen, were specifically employed to work on the exact tasks they were assigned to, on the basis of their specific competence in a particular area: Ann was nominally employed as a 'Trainee Programmer' but is actually employed as the trainer on the government project as a result of her lecturing experience; Fergus and Jack thought it unlikely that either of them would budge from the EPOS project for at least another six months - Jack, in particular, expected to be working exclusively on it for as long as it took to have the system installed.

In addition, we find variation not just in the division of labour but in way in which software development jobs are structured. On one hand, the development section roughly follows a 3-phase approach to large-scale development work: the jobs built around large-scale projects involve different combinations of staff working on distinct phases - some doing analysis, some programming, some documenting, and so on. On the other hand, small projects are 'wholly owned' by the programmer assigned to them. All four of the section's free-floating micro programmers - Frank, Conor, Dave and Peter - undertake applications for their individual small business customers, from beginning to end. That is, they each design, write, code and test the application under their care.

It is the crucial issue of experience which illuminates what might seem an erratic policy on how labour is divided and jobs are structured. Those who were directly recruited for their 'relevant experience' (eg. Ann for her lecturing experience, Tom for his Access Control thesis at college, Ultan for his managerial experience) are not generally shifted around across projects. In contrast, programmers who entered the company with various formal



credentials but little or no work experience, are frequently shifted between projects, and/or the tasks they are assigned to offer a mix of design and programming work.

There would appear to be three major patterns of job structuring within this company. The R&D jobs are dependent on recruiting highly specialised graduates into very specific 'occupational' job niches, in the sense that the R&D jobs are structured to exploit the graduate's wholly technical expertise (Hacker:1983). This kind of job-holder has few opportunities for 'learning the company's business' (ie. incorporating an 'organisational' component into their skill base). If such as job-holder wishes to progress his/her career, s/he will probably need to leave the company for a similar (though, presumably, better) specialist 'occupational' job elsewhere.

The second pattern of job structuring is evident with recruits (normally coming in at middle or senior rank ports of entry) who are hired for their specific skills and competences in various aspects of 'the business' outwith their immediate technical knowledge, eg. Ultan for his managerial experience gained in other software houses; George, a ex-technical sales rep from a rival company, joining Pre-Sales Support). These *particular* workers (and no others) come with a *particular* kind of know-how which makes them valuable to the company. They are not a general resource - unlike, say, contract staff or junior programmers - but possess a career track record, which the company can exploit. Thus, their jobs, in a sense, are custom-built to fit them.

The third pattern of job structuring most typically characterises the organisation of work in the Software Supply and Development Section. Here, most of the staff have been recruited through a single junior port of entry. Though most of them initially carry the same job title - 'Trainee Programmer' - the kind and quality of work experience they gain is dependent on which projects they are assigned to (eg. part of a team in a large-scale development, a singleton programmer on a small micro project, and so on). These jobs, which are designed to facilitate a gradual process of learning-by-doing, are the most interesting for the purposes of this paper.

We have seen that in this company, access to doing a more skilled form of work (ie. one which demands a greater combinatory range of technical and

business competences) such as business specification, only becomes available through a silent career route which begins with programming: it is the worker's gradual acquisition of appropriate experience which guarantees their eventual allocation to doing analysis-type work. Thus, in this quiet context of 'learning-by-doing' in a company which eschews formal graded promotion steps, the seemingly arbitrary *allocation* process of any available junior worker to any necessary job becomes immensely important in shaping the worker's subsequent career chances. In this sense, we can understand Althauser and Kalleberg's (1981) claim that in looking at how jobs are structured, we can observe how occupations are themselves 'mini labour markets'.

**Informality and 'the lads' in the Formation of Software Careers:**

Though management control over the labour process is premised on responsible autonomy strategies, there is always more than one way for control to be exercised over the way work is done. Storey (1985) holds that the structures and means of control are socially produced, and are conditional upon management *and* workers continuing to reproduce them. In an overtly informal, collegiate workplace such as this company espouses, one potent means of 'invisible' control, unproblematically assumed by management and staff alike, refers to the social relationships which are 'brought into' the workplace from outside (Collinson and Knight:1985). The social ties between 'the lads' - transplanted quite 'naturally' into job-related networks - provides them with a resource for shaping their present and future work which is not available to those outside the magic circle. Usually without any conscious discrimination, it is nevertheless the lads who do best at strengthening the 'organisational' component of their skill base over time.

As we would expect, the lads are easy to identify - in this office, we find Fergus, Jack, Michael, Declan, Fintan, Dave and Peter - but hard to define. They are young and single (or, at least, childless), though not all young men belong to the lads: Frank is excluded (he is too odd - "a bit of a wally") and Sean is struggling on the perimeter (he is socially awkward, a teetotaler and he does not play sports). Conor is being groomed for entry (he was recently invited by Fergus to join their lunch-time poker school - a sure sign of admittance). They enjoy mutually good relationships with the managers (most of whom are ex-lads anyway) and with the women they collectively like (Mary and Louise especially). Their conversational style is bantering and



frequently witty (Declan, Michael and Jack are the usual 'performers', while everyone else is the 'audience'). They move in a group. They eat lunch together, either outside or in the canteen, but never issue general invitations to anyone to join them. At lunch, they are passively welcoming if some of the women go to sit with them, but they themselves would never voluntarily join a women's table. They drink together one or two evenings in the week, they play poker, and most play soccer or rugby regularly (though not necessarily with each other).

The lads constitute the dominant grapevine through which crucial pieces of seemingly 'extraenous' bits of work-related information is traded. One example is the negotiation of the worker's performance bonus. Since the company is organised as a 'professional' office, nobody is paid official overtime, though quite considerable amounts of overtime are done. Instead, staff and managers are paid a performance bonus every six months. They have little idea of how much that bonus will be, since it is dependent on the half-yearly audited profit position of the company as a whole. However, for each individual, it is also dependent on how their own project has been orginally costed out. As Fergus pointed out: "Not that many people know exactly how those costings are done. I mean, I'd tell the lads here and that. But it doesn't go up on the notice board or anything. Anyway, my bonus is always good. I mean, I know how the sales costings are done - sure, I *do* them half the time! - and they always wrong. They are just guesses and estimates. If they tried to cut my bonus for some whacky reason like that a project had gone over its estimated cost, I'd kick up murder." But not everyone knows (or can successfully argue) that the costings are whacky. Only Fergus - and whoever he chooses to tell.

The Employee Appraisal provides another example of how the network of the lads offers 'extra' information to its members, in negotiating their working conditions for the upcoming year. For each person, appraisal sessions are usually held once or, at most, twice a year. They are presided over by the company's General Director, who acts as the 'referee' in a bargaining session between the worker and his/her management. The three people independently fill out a performance sheet for the person being appraised. It looks like a school report, detailed into specific sections like COMMUNICATION SKILLS: Excellent/Good/Fair, and so on, with a blank space on the end for general comments. The person's salary, job position, job

title and possible work transfers are decided on the basis of the three of them comparing notes.

One morning over coffee, Jack and Michael were filling Conor in about how to go about doing it (Conor's first appraisal with the company was due to happen the following week). Their advice was for him to "go in and give them hell. That's actually what they expect. Disagree when they offer you 8 grand. Pitch for 10 or 11 and come down." But if Conor was getting help from the lads who had done the appraisal before, people like Frank or Ann or Sean were not. Fergus - who, by now, had been through the appraisal process a number of times - explained: "It's a really good system in the end. OK, you're in there on your own for maybe three hours, and it's just one of you against two of them. But it keeps you on your toes. Like, it's a test of how well you can negotiate. Like, I usually work about 60 hours a week. For 10 weeks last summer, I worked over 100 hours a week for that whole period. But I wouldn't look for a special one-off payment or anything like that. It would weaken my career in the long run. I'd lose my flexibility. Instead, I go up there and I say 'I want a 20% pay rise'. They say 'Why?' I say 'I've worked an average of x hours over this time, and I've done this and that and the other. How do you intend to recompense me?' If I'd settled for a bonus, they'd say 'But we've paid you already'. This way, they must acknowledge me. They can see for themselves how I can bargain, negotiate and so on. They can see what I am worth to them out in the field. It really sorts out the men from the boys."

But haggling - whether with customers or your own management - is a skill that is learnt. It is surely an advantage to find yourself in a network where you can quietly pick up tips about how to be 'one of the men' - tips which extend well beyond the immediate pay bargaining foibles of your own management. For instance, there is only a limited amount of in-service formal training for software people in this company. For the most part, exposure to learning how to solve novel or difficult problems comes in the form, as Michael says, of "RTFM or dig-out. RTFM means what it says - Read the Fucking Manual. Dig-out is different. You take the guy by the hand, and go over it together. And if you're going on-site, you'd maybe bring him with you once or twice so he can get the feel of it." The lads, who are buddies anyway, find it easier to receive and offer help of this kind.



Through devices and practices such as these, the lads act as an important, albeit informal, means of stratifying access to skills, rewards and job opportunities from within the internal labour market of the company. Since they are in the best position to *capitalise* on the firm's informal or semi-formal structuring of work, we can see why the absence of an extensive, standardised promotion ladder is an environment which they value, since for them it does not constitute a barrier.

**Career Moves and the Lads - Tearing along the 'Dotted Line':**

It is important to bear in mind that the informality which characterises software development work in this case study, is not peculiar just to this company (Rogers and Larsen:1984). Indeed, Kanter (1984) schematises career steps within and between high-tech firms as a series of 'dotted lines', rather than formal structures: she argues that the lack of acknowledged supervisory layers simply disguises alternative expressions of authority chains. For example, Fergus does not have any apparent managerial function in setting up the new EPOS project, yet it is emphatically 'his' work. He initiated it; he requested help from "somebody good" and got Jack - one of the lads - onto the job; he can exercise authority for overseeing how it is done; he can teach Jack, along the way, how to do it himself.

The 'dotted line' chains which characterise the structuring of software work will not only affect the shaping of career routes within a firm, but will also have implications for how a worker fares on the external labour market (Gabriel and Holzapfl:1981). For instance, two of the career resources Heimer (1984) notes are access to information about other jobs, and the dissemination outwards and upwards of knowledge about a worker's competences. The informality of exchanging news about jobs in a 'dotted line' occupational environment means that a network such as the lads can act as an important local power site in the giving - or withholding - of information about other jobs (Grieco:1985). In this company, for example, one of the programmers had gone on holidays to Australia and decided to call in to the company's branch office there.[10] He was promptly offered a job - and four other jobs as well. We can readily see how it was somewhat in his personal gift both to recommend certain other colleagues for interview, and to notify whomever he wanted

[10] The Irish offices of this multinational do not advertise vacancies in branch offices abroad.

that jobs were going. As it turned out, five people left in the one month to go to Australia, all of them lads.

The informal 'dotted line' network chains will also extend outside the company. Those who are marginal to the network will be less well placed to pick up word on the considerable number of jobs, mainly in small firms, which are not formally advertised (Granovetter:1984). This is especially the case for the hand-picked we-want-a-guy-with-relevant-experience type jobs (Winstanley:1986). Ultan, for instance, set himself up to be head-hunted into this company by telling his contacts in other firms that he was looking for a change since his firm's future prospects looked precarious. This company's senior management got wind of this - indeed, the grapevine is a most efficient recruitment channel (Stretton:1983, Winstanley:1986) since it is based on the trading of personal contacts (Preston:1986) - and Ultan was interviewed and hired. Since small high-tech firms are a major source of high-skill employment abroad, especially in the US and England (Anderson:1982, Hall et al:1985, Oakey:1984), those who are marginal to the dominant information network may be somewhat disadvantaged in gradually 'trading up' their jobs, based on a usual strategy in software of moving *between* firms to shape a career.

Since lateral moves between firms constitute a most important route for upward occupational mobility in software, an ironic situation can arise in the differential formation of software careers: namely, those who are marginal to the lads (viz. most women) may find themselves 'stuck' in primary jobs[11], while their male colleagues flit lucratively through a upwardly spiralling series of seemingly secondary peripheral jobs.[12] However, there are two major provisos to be made against this kind of general proposition.

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[11] Primary labour market jobs are typically 'good' jobs. They are steady, pensionable and permanent, located as they are within a firm's internal labour market, providing the worker with opportunities for advancement from within (Rubery and Wilkinson:1981).

[12] Secondary labour market jobs typically hold poor prospects for the worker. They are based on offering casual or contract posts (eg. contract cleaning or catering) which are frequently poorly paid and offer little status, security or opportunities for advancement. However, in economies moving towards privatisation, secondary jobs are not only on the increase, but we find a new kind of skilled secondary work emerging which - though insecure - is well-paid and interesting and offers *indirect* means of career advancement, eg. research posts in universities, software contracting and consultancy, and so on (Rubery and Wilkinson:1981, Brusco and Sabel:1981).



First, women are not, of course, consciously excluded from giving or receiving job-related information through the social networks of the office. The lads do not constitute a conspiratorial network. However, women's position in the skilled software labour force differs from men's in that they are typically less able to exploit any information they *do* receive about better jobs elsewhere. Campbell (1988) documents how female programmers' participation in US software 'old boy' networks is constrained: (a) by their forming fewer *work-based* friendships than male programmers (regardless of whether they are single or married)[13], (b) once married, by their greater propensity to change jobs due to their *spouse's* mobility, rather than their own, and (c) once they have children, by their choosing not to enter into a *mobile* career pattern where that is avoidable (Campbell:1988).

Second, in an Irish context, moving into a small *Irish* high-tech firm does not necessarily mean that either the quality of the job, or its future advancement prospects, go without saying. As we saw in the opening section, most Irish software houses are somewhat fragile entities. Typically they do not engage in extensive development work, but specialise in the marketing and maintanence of a small suite of packages. Thus, the possibilities for an individual to garner a broad range of software skills by moving to other Irish houses are limited. In addition, as Irish software companies are heavily grant-aided, these firms are highly vulnerable both to changing national technology policies and to competition in a small domestic market. Bankruptcies are common. Thus, the most attractive jobs in Irish software are precisely offered by firms such as this case study company. So long as the individual has a personal commitment to remaining in Ireland rather than emigrating, the 'dotted line' job information grapevine runs *towards* - rather than away from - the multinational Irish branch offices. It was fear of redundancy which prompted both Ultan and Mary to want to leave their respective small companies for this one, with Ultan coming through the grapevine, and Mary through an employment agency.

Even with those two provisos, the basic point remains: the 'insiders' to the dominant job-related information network have better chances of hearing about job opportunities, and equally important, of being heard about (ie. of

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[13] Women's networks are more likely to be kinship-based (Campbell:1988).

gaining a reputation) amongst the managments (including their own) who have the authority to recruit and promote staff.

The insiders are also better placed, as we have seen, to pick up the quiet 'tricks of the trade', which augment the skill range of the worker over time. Within this company, one of the most important 'tricks' to pull off, is to acquire direct experience of the necessary business know-how for the successful pricing, design and implementation of technical projects. The concluding section of this paper looks at the differential chances of some of the staff in this company in acquiring just such an component to their skill base, and in being recognised and rewarded for having it.

**Learning-by-Doing , Sponsorship, and The Lads:**

Jack provides a nice example of a young lad who is being groomed by both Ultan and Fergus to become a key member of the company's programming staff. When Fergus had first proposed the risks and benefits of pursuing the EPOS project to his senior management, his presentation had included that "assigning somebody good" was essential if the project was to pay off eventually. He had specifically asked for either Jack or Dave to work with him (it was Ultan who decided that Jack was easier to release at the time). Jack, for his part, was "really glad that Fergus managed it wangle it". He said: "I'm..well, I suppose I'm an applications programmer. But now I'll get a chance to step back from the nitty-gritty of programming. Of course, you can't step back from it completely, but when you learn to do business specifications and all that...well, then, you're really a designer after that, and then you can go anywhere."

Both Ultan and Fergus were explicit in praising Jack's work as a programmer (he is "speedy", "inventive", "hard-working", "really on the ball on site visits"). Finding themselves in a position to reward him - to cultivate him in a way which can only enhance his career whether within or outwith this particular company - they were happy to assign him to the EPOS project, not because he was a lad, but because he was "a really good guy". Rightly, it was Jack's demonstrated talent and worth which provided the first basis for his selection as Fergus' apprentice. However, we could equally argue that Mary, too, is a 'really good guy' who demonstrates exactly the same verve, initiative and discipline which won Jack such favourable notice. But, Mary, for her part, feels a bit stuck.



She is an interesting instance of how a skilled and trusted staff member, working in a weak division of labour which encourages her to exercise her autonomy, is nevertheless thwarted in her career. Mary's 'official' job as Technical Support on the company's micros means updating the operating systems on all sold systems so that technically they are all brought up to par. The content of her job is only loosely specified - as is usual in this company - and like Fergus, or Jack, or Michael, she has used her job to find opportunities for shaping it in the direction she wants her career to go (in her case, Sales and Marketing). Yet unlike, say, Jack, the 'signals' she sends out to her colleagues and managers have not been picked up in a way which facilititates her transfer into a better job.

She said: "I didn't exactly choose to be in Technical Support, you know. It was more like them saying 'You be there!', and I didn't mind too much. Technical Support can often be a good stepping stone into Sales. Like, while I've just defined for you my job and what I do, I've really only defined about 30% of it. That is what I should do and only should do. But, within this area, and because I work very much on my own, I've cultivated a whole new angle. In my job as I do it, I do quite a deal of Sales Support as opposed to Technical Support. And that's very much my own choice, and very much the area I wish to work in. Like, I stormed the citadel to get into the Pre-Sales Support Group, but then you find you can force only a certain amount or you'll find yourself in hot water. I've created a niche for myself, as people *do* use the channels, and the sales angle here is the most important function. But it's extremely difficult to transfer. You have to be, kind of, *sponsored* by someone like Tony (a middle manager) or Gerard (a senior Sales manager). And that's the problem. They all guard their territory like bulldogs. If, like me, you're interested in the systems end - the operating systems for the financial sector or the manufacturing sector - then straightaway you're into a male domain and there's no way they'll promote you up beyond a certain point. They tell you that you just don't have enough credibility with the customers, but it's partly that you don't have much credibility with them either."

It would seem, then, that in Crompton and Sanderson's terms (1986) Mary has greater difficulties than Jack, or other lads, in forming a 'careerist' strategy within the company. If having the basic abilities is the first prerequisite for

moving on or up, being *sponsored* by someone higher comes a very close second. Here we find the crucial difference between Jack and Mary's career chances: her ability to disseminate knowledge about her extra-curricular sales competences in an upward or lateral direction is thwarted by the absence of a 'listening' patron. While her stature as a trusted worker gives her some autonomy over defining the terms of the work she will do, it does not follow that she will get credit for that work: "I've done considerable selling, if you want to call it that, by making myself available as a sales support person to the reps. And they use me. That's fine. I use them as well, to learn more about the selling business. But they get the credit on the sales. It goes into their bonuses, not mine. So, while I'm making sure I get the exposure to selling and the ups and downs that that involves, I still don't get the credit for it. It's as if I didn't have the exposure in the first place."

Ann, like Mary, could find herself being thwarted in her preferred career path. Like Mary, the issue of sponsorship is critical, though in Ann's case the 'patronage problem' expresses itself in a different way. She told me that, within a year or so, she expected to be moved from her de facto position as Trainer, and in her appraisal session she had asked to be transferred to learning functional or programming specification. Meanwhile, though, when I asked Ultan where he would like Ann to be positioned after the government contract was finished, he said: "Oh, Ann is a real gem. She has been wonderful on the training end of things. She's clear and coherent and she has a wonderful manner with people. She is probably the best trainer this company could hope to get. Who could replace her? I'd expect she'd stay training. That is certainly what I will be recommending."

Ann's manager and patron - Ultan - will most likely 'sponsor' Ann to stay put, because she is just too good to be moved. Like Mary, then, whatever other competences Ann manages to invent for herself in defining her job, she may not be able to *translate* those competences into a transfer out of training and into the 'action' areas, to use Mary's term. Training, as Davies (1985) has documented, poses a very particular problem in career terms: trainers tend to become marginalised within their organisations, for the training function is typically so specialised and so fragmented from the core business of the company that the opportunities for trainers to expand their range of skills become progressively narrower over time. Ann may well find herself highly-



valued in this company but, lacking a sponsor who will help her shift out of this territory, somewhat stuck in constructing a successful software career.

The three stories I have presented here are sufficient to make the point: providing a member of the lads can demonstrate that he has necessary drive and ability to become 'one of the men', the chances are high that he will receive positive sponsorship from his colleagues and managers to enable him to obtain an informal 'promotion' into learning software's core skills. In contrast, non-lads (Ann, Mary and, indeed, men like Frank "the wally") may suffer either from an absense of sponsorship (Mary, Frank) or sponsorship of a detrimental kind (Ann).

Since the lads can rely on exploiting this career resource which is 'invisible' in the sense that neither its power nor its practices find any *formal* expression in the structuring and management of software work, the lads 'just naturally' progress higher and faster through the skill hierarchy. Fergus, Michael, Declan, and even Jack are already more occupationally and organisationally mobile than their mundane job title of 'Programmer' would suggest. Their designing skills, business flair and client contacts favour their gradual emergence as 'Independent Mobile Professionals' in the external occupational labour market (Tierney:1991) and the key positions they occupy within the internal labour market suggest that they can easily achieve the shift from 'being managed' to 'being manager' over the course of their organisational career within this company. In this informally-organised and collegiate workplace, it is, disproportionately, the lads who emerge as the occupational winners.

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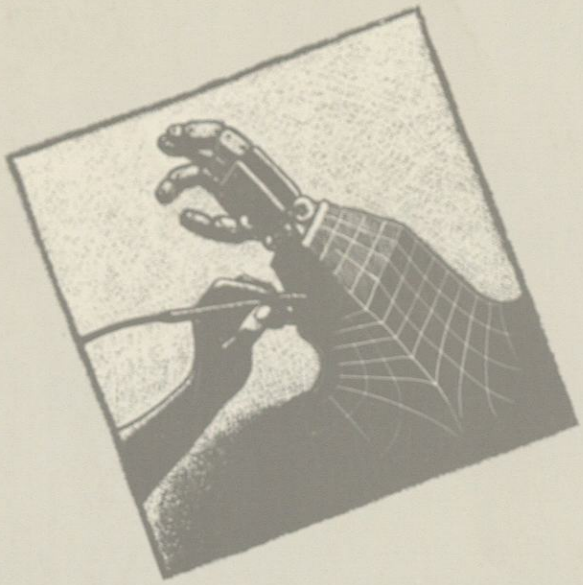

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The Programme on Information and Communication Technologies (PICT) is a major initative of the Economic and Social Research Council, which aims to explore social science perspectives on the rapidly evolving Information and Communication Technologies (ICTs) and inform policy debate in the field. The research is conducted by a network of six centres - Brunel University (CRICT); Polytechnic of Central London (CCIS); The University of Edinburgh (RCSS); UMIST (CROMTEC); University of Newcastle (CURDS); and University of Sussex (SPRU) - and coordinated from the University of Oxford.

Edinburgh PICT research is based at the Research Centre for Social Sciences and draws on expertise in the Departments of Business Studies, Economics and Sociology, as well as the Science Studies Unit. The group starts from the assumption that the development and implementation of new technologies cannot be wholly explained by technical considerations, but that complex social, political and economic factors are involved. The research effort therefore focuses on the 'social shaping' of ICTs , at the level of detailed technical design. It aims to elucidate the considerable scope which exists - for both producers and users of technology - to influence the direction and consequence of technological change. Much of the research involves building strong links with the policy community, in industry and in government.

Edinburgh PICT is part of a strong and growing base of socio-economic research on technology at the University, and runs a Doctoral Programme of Social and Economic Research on Technology within the Faculty of Social Sciences. Both teaching and research activities benefit from close links with departments in the School of Information Technology. In addition, members of the Edinburgh group collaborate with researchers in neighbouring Higher Education Institutions, and with other centres in the PICT national network.