Signs of Convergence? Images of the University in the Management of R&D

KEITH RANDLE

ABSTRACT *This paper examines the adoption of university images in a pharmaceutical R&D company, arguing that this may be intended to bring benefits to management. The author finds some irony in this, identifying tendencies within the UK higher education system to draw on the images and the practices of business and commerce in its own management. Drawing on empirical data from interviews at Pharmco, the paper argues that, in practice, the image cannot be sustained and competition in the pharmaceutical sector is leading to a disparity between the projected image and management practice. Management in both types of organisation, it concludes, are responding to their respective environments by tightening control.*

Keywords: pharmaceuticals, management, research, university, scientists, organisational convergence.

Introduction

The literature on the management of research and development has frequently suggested, either explicitly or implicitly, that those who work in this area have much in common with university academics in that they are both creative professionals employed within organisations.[1] Some commercial organisations seeking to exploit the expertise of these employees have adopted a set of working practices aimed at emulating the academic environment, where relatively low financial rewards for many are coupled with a high degree of self-management and creativity. At Pharmco, a pharmaceutical research and development company, efforts to incorporate features of the university were identified during a study designed to explore the management of innovation amongst scientific researchers.[2] This effort was reflected in working practices and in the design of the workplace. This paper argues that this has emerged out of the continuing endeavour by managers to resolve contradictions faced in managing commitment amongst professional scientists.

For academics this may seem ironic as, increasingly, we can identify management strategies and techniques drawn from the commercial world which are being introduced into the university sector. Those reflecting upon developments within higher education recently have variously chosen to refer to institutions of higher education as the McUniversity, the neo-Fordist university, or as education factories.[3] Academic staff, in turn, have been described as de-professionalised or proletarianised.[4] One analysis

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suggests that we are witnessing a convergence of academic and commercial organisations:

> Universities may become more like commercial organisations while at the same time many industrial and commercial organisations may become more like Universities in adopting some of the general characteristics of professional, knowledge based organisations.[5]

Research and development in the pharmaceutical company which forms the subject of this study is subject to powerful pressures in a highly competitive world. Developments in the sector have caused large companies to realise that the future may not be in generic products but in further breakthroughs in 'blockbuster' compounds.[6] This will require them to think less about sales and marketing strategies and more about the management of the innovation which can lead to the development of such compounds, emphasising the importance of harnessing the creative skills of scientific workers. At the same time, a greater understanding of the genetic basis of disease has led to more rational approaches to the identification of potential drugs and away from the laborious screening of thousands of compounds in a process of elimination.

In the first stages of the project reported here, all divisional heads in the Research Division at Pharmco took part in semi-structured interviews which lasted for an average of 1 hour and were tape recorded. A sample of six research project leaders subsequently went through the same process. The interviewers also attended several half-day meetings of project teams where group interviews were carried out. In addition, the Head of Research, Director of Personnel, the Personnel Manager responsible for the Research Division, and a representative of the Architectural practice responsible for the new research facility were interviewed. Later stages of the project have involved further semi-structured interviews with 25 research scientists and several senior human resource advisers with responsibilities within the research division. The project is currently in its final stage, in which all previous interviewees are being approached to take part in follow-up interviews. The research team had access to a range of in-house journals and internal documentation. This paper examines the evidence from Pharmco and the university sector of convergence amongst knowledge-based organisations.

Creativity in the Research Process

Between 1992 and 1995, Pharmco was engaged in a project requiring the multi-million pound development of a greenfield site in the south-east of England and the re-location of hundreds of research scientists. Research in the company was to be separated from development and clinical trials. It was generally accepted by the senior managers interviewed at Pharmco that central to the process of effective modern drug discovery is the organisation of scientific research. This raises questions about the nature of management control of the labour process in pharmaceutical research and development. Amongst the managers interviewed, direct controls were generally viewed as inappropriate and contrary to effective research activity. This has been reflected in the management literature, where there has been a continuing interest in the management of innovation and of so-called 'gold collar' (talented) workers.[7] Management in organisations employing such individuals seeks to build creative environments by developing strong cultures emphasising commitment, excitement, competence, value of ideas and action, risk taking and team work, as well as individual freedom.[8]

A senior manager described how the move to the research-only site afforded the company opportunities to change working practices and to create a distinctive research culture:

> I mean, when you move house you are awfully conscious of the fact that you've got a lot of things in the loft or in the top of the garage that you don't actually have a use for any longer and you get shot of them, or you take them down to the tip, or you send them to a jumble sale.

Consequently, out of date and/or bureaucratic practices, inappropriate to research and hampering the creative process, could be dispensed with. Using an analogy to illustrate the importance of constructing a creative research environment within which the process of innovation can occur, another senior manager at Pharmco described how he saw his own role:

> Most of our management is done through science. You don't want a heavily structured or heavily organised environment if you want people to be creative. I always say it's like running an opera house. . . .You've got to make sure that the toilets are clean, you've got to make sure that the tickets are sold, the ice creams are there in the interval, your gin and tonic are available, but if the fat lady don't sing, it's all a waste of time. And it's [about] generating an environment where ultimately the *prima donas* perform.

The changes senior managers thought necessary to produce such an environment were reflected in the design of Pharmco's greenfield site. Early references to the project by senior managers and the architect responsible for the site mentioned a 'campus' environment, and Pharmco's *Key Facts* handbook of 1993 echoes the same description. The landscaped site is designed to provide what the company brochure refers to as "a cohesive, motivating environment". New working practices were also designed to reflect a less bureaucratic approach to the research process. A senior manager described the image he wanted the site to convey:

> something modern, young, not a factory, not an office, something that looks exciting to go to . . . the sort of thing that reflects what we're trying to do, what we are as a company, modern, flexible, innovative.

Project leaders reflected similar views when asked what expectations they had of the new site, with one describing it as 'almost like a university campus' and another, reflecting on the rationale for the proposed use of the term 'campus', suggesting that it would be a popular choice because 'it falls back on people's academic roots'. A third project leader felt that there was an attempt to create a 'university atmosphere', with a modern lecture theatre and well-equipped library, and another suggested that attempts to construct this atmosphere could be traced to the company Chairman, whose philosophy was that the site should be similar to a university environment.

The move towards practices familiar to those within the academic world is illustrated by recent developments in monitoring attendance within the company. From the mid-1980s, through to the early 1990s, the system evolved from flextime to what was initially known as 'trust-time', but is now described as 'flexible working'. This approach is not unique to Pharmco. Research in the 1980s suggested that agreements of this type were fairly common amongst research, scientific, academic and other specialised staff, and earlier research suggests that this had been the case for some time.[9] It may be that Pharmco is relatively late in adopting the 'trust' approach.

Pharmco's original flextime system allowed employees to bank hours, which could then be coverted into days off, to a maximum of twelve per year. In the late 1980s, Pharmco reduced the maximum number of flex days from twelve to six. Flextime is now, however, believed by management to be inappropriate to a research setting insofar as it simply measures attendance rather than activity or commitment. The impending move

to the new site provided the stimulus for a change to the system. A senior manager stated his opposition to attendance monitoring:

> I'm quite keen on looking at flextime. Twenty years ago, we adopted flextime as a liberalising influence, everybody getting in at 8.45, signing, a line drawn across the page. With flextime, that was a big step forward, but then a whole business of time recorders and people signing that they had done so many hours and then haven't had the opportunity to have days off, you know. What I'm saying [is] 'Do you really, as creative people, as professional people, at the beginning of the next century, want all this paraphernalia associated with time, because it doesn't get us any new drugs and I'm not bothered about it, you know?' What I want is for people to feel committed and want to work towards this end.

Attempts are being made at Pharmco to construct a research-based promotion structure, parallel to the more traditional management career path. As is the case with non-monitored attendance, dual career ladders are not a new technique for rewarding professional expertise and managerial responsibility with some equivalence.[10] Again this reflects the university environment, where staff can be rewarded by titles, such as professor or reader, which do not necessarily carry any management responsibilities or additional financial rewards.

Managers at Pharmco stated that loosening management control was important if scientists were to behave in a creative manner. They should be able to follow up ideas tangential to their main projects and not be subject to constraints on their freedom of investigation. One divisional head explained:

> Obviously, it's a question of balance, balancing people's ability to chase their own ideas for a bit, not having to go through a heavyweight justification for every damn thing that they do scientifically. I mean, it's just that open-minded scientific creativity requires you giving people who you think are good, the opportunity to express themselves scientifically without having to get full justification.

Another senior manager maintained that 'there's a lot that goes on you don't see. If I don't see it, I'm glad I don't see it. It's sort of skunk working.' However, while managers at Pharmco appear to be trying to emulate academic life, actively avoiding images of the factory or the office, management in academia can be seen adopting a vocabulary and a practice more traditionally associated with business organisations.

The UK University System—a Model to Emulate?

In recent years, the UK University system has seen the introduction of bureaucratic controls in the form of appraisal systems, performance related pay, quality systems and quantifiable research outcomes. The incorporation of the ex-polytechnics in the late 1980s has been accompanied by a market orientation, intensifying competition between institutions for student numbers, and a drive to develop commercial short course and consultancy activity. The franchising of degrees, which could be seen as a form of outsourcing, and orientation on the overseas student market are further manifestations of a commercial approach, particularly apparent in the new university sector.

Increasingly, the language of business and commerce is entering the academic vocabulary with 'profitability', 'customers', 'products', 'quality' and 'marketing' replacing the concerns traditionally associated with the academic community. Wilson notes that this is not unproblematic.[11] Use of the language of management strategies, such as

'mission statement' and the term 'customers' for students, has been a source of conflict within academia.

Notwithstanding the re-definition of students as customers, working practices in education are changing in order to facilitate the 'processing' of students in a manner that owes much to a Taylorist vision of efficient manufacturing. In the new universities, productivity has increased dramatically, the result of increasing student numbers without a commensurate increase in the staff establishment. Miller reports his own experience at Aston University, where staff–student ratios increased from 1:10.3 in 1980 to 1:12.9 in 1985–6 and 1:15 in 1988–9.[12] In the author's own organisation, a business school in a new university, the 1993–4 ratio was 1:26. The typical student experience is now of large lectures, limited mainly by the size of lecture theatres (although video technology is removing even this constraint) and of seminar/tutorials in which opportunities to participate become ever more remote.

There has been an increasing casualisation of academic labour in the new universities. Wilson points out that the number of academic staff on short term contracts doubled between 1980 and 1991 while the number of part-time staff trebled.[13] This is not an issue simply for those employed on short-term or part-time contracts, or the students they teach, but also for full-time, permanent academic staff. Some of the responsibility for the management of the increasingly large casual group is pushed down onto permanent staff members, making them responsible, for instance, for dealing with student enquiries concerning courses taught by part-time staff with limited availability. Wilson, in examining a hypothesis that academic labour is being proletarianised, at least in terms of objective elements such as pay and conditions, concludes that in both universities and the ex-polytechnics there is 'less trust and discretion, a growing division of labour; stronger hierarchies of management control; greater conflict; growing routinisation; bureaucratisation; worse conditions and facilities; above all a steep decline in relative pay'.[14] Though maintaining that a much fuller discussion of class relationships is required, he goes on to suggest that a broader kind of proletarianisation, including such subjective elements as changed class identification and different ideological outlook, may also be taking place.

The terms 'Fordism' and 'neo-Fordism' have been applied to the production and dissemination of knowledge in higher education. Parker and Jary suggest that there is a danger of higher education becoming a 'fast food outlet', producing only those ideas that its managers believe will sell, while Ritzer has referred to processes of rationalisation and standardisation taking place in higher education.[15] There is a tendency for degree courses to move away from being coherent and integrated study designed by academics, to being a selection of modularised 'theory-bites', selected from a menu and put together into whatever package the customer chooses. Academic staff, in the process, lose professional autonomy. The desire for standardisation is illustrated by the intervention of a previous Education Secretary in the development of individual mission statements by higher educational institutions.[16] John Patten wished to see broadly comparable standards for degrees, policed by the Higher Education Quality Council. One reason was to further the exploitation of foreign markets in such countries as Singapore and Malaysia, although the *Times Higher Education Supplement* was of the opinion that "academic salesmen, carpetbags bulging with brochures and cut-grade entry offers, are regarded with growing distaste and contempt".[17]

Examining the changing management of universities within an historical context, Willmott concludes that:

> Universities have been transformed from up market finishing schools catering exclusively for the progeny of the church and the aristocracy, where instruction

> centred around a craft or tutorial mode of delivery, into education factories based predominantly upon a lecture mode of instruction. Academics have been converted from self-employed and entirely self-regulating providers of educational services working in the colleges of ancient universities into salaried employees whose activities are increasingly regulated by external agencies.[18]

The author, describing a long run transformation in the nature of higher education, is referring to the pre-1992 universities, now commonly known as the 'old' universities. However, there is symbolic significance invested in traditional rituals. While the new universities did not emerge from the tradition described above, the adoption of many of the trappings of the old universities—Vice Chancellors, distinctive robes and coats of arms—seeks to obscure this fact and to ignore the changes the old universities are undergoing.[19] The new universities claim this tradition as their own, the better to capitalise upon it.

A Process of Convergence?

At this point it is pertinent to examine some of the themes and ideas which are raised by the hypothesis that what we may be seeing is a process of organisational convergence. The paper continues by first considering the question of what we understand by 'university' in ideal-typical terms. It then goes on to explore the nature of research activity within Pharmco.

The traditional university has long been viewed as a model for effective research, allowing, as it does, relative freedom of investigation and disinterested exchange of ideas and knowledge. Indeed, an editorial article in the *Higher Education Supplement* locates the development of many modern, progressive and 'people-oriented' management ideas within the universities themselves:

> There is much union criticism of university managers for trying, in such initiatives as the Fender report, *Promoting People*, to import into universities management techniques from the business world which the unions claim are inappropriate. Yet modern management concepts, concerned with fostering collaboration and commitment, flexibility and training, flat hierarchies, bottom-up quality improvement and ownership of processes by skilled and knowledgeable staff were forged in academia and not just as academic ideas. They reflect the way universities have traditionally operated.[20]

While this opinion seems to suggest common organisational characteristics, Middlehurst *et al.* identify six 'cultural images' of universities.[21] Of these, the idea of the university as a collegium would seem to represent the popular image of the ideal-typical university. Here we would expect to find that status differences are based on seniority within the institution and the acknowledgement of expertise, rather than position within a hierarchy. The system will stress consensus, shared power and participative government, with members of the collegium interacting as equals. Professional and intellectual, rather than legal, authority will shape the behaviour of participants. This brief analysis suggests that what are commonly understood to be the characteristics which epitomise the university as an organisation represent only one model among several that have been identified. It may be that "the community of scholars concept remains a myth of considerable strength and value in the academic world".[22]

If we look at the evidence arising from the study of Pharmco, we find that the idea that managers act in the way that they appear to believe that they should act, or even

in the way they say they act, may constitute another myth. There is a contradiction between what they say about the management of scientfic research, and the elements of the system actually in place. Control appears to be tighter than they say it should be. Argyris has explained this in terms of 'espoused theories' and 'theories in use'.[23] The former represent the rational view of the manager—in this case the idea that scientific creativity requires loose control and autonomy amongst scientific workers. Theories in use, however, may be operated subconsciously and refer to the individual's need to remain in control. Thus, managers may actually be operating, in practice, a theory which denies real autonomy amongst scientific workers and ensures that they are able to retain tight control over their staff.

Pharmco's new site was subsequently called a 'Medicines Research Centre' and the word 'campus' was discarded. The association with academia had not been accidental and the subsequent decision to adopt the new description also appears to have been purposeful. This may have been influenced by the need to project a positive image in the local community which could counteract the negative propaganda of animal rights groups and concerns about the impact of the plant on the locality. At the same time, the campus image appears to have failed to convince the scientists that there was a valid comparison with their perception of university research, free from the tight control devices that require frequent reporting of progress and closure of projects on a financial, rather than a scientific, basis. In the project group interviews we carried out, bench scientists did not appear to find the university image credible in giving meaning to their work.

Applied, rather than basic, research forms the bulk of Pharmco's activity. However, while downstream research in the pharmaceutical industry (which consists of developing drugs within the constraints imposed by the government's regulatory framework) is clearly applied rather than basic, research in the higher reaches may be more difficult to characterise. It may be legitimate to characterise certain types of research institutions (those involved predominantly in downstream, applied work, for instance) as 'research factories'. The changes in the nature of pharmaceutical research, brought about by advances in scientific knowledge, influenced Pharmco's move towards the establishment of thematic groups of researchers who, it is suggested, would work in a setting free of the tighter controls to which other employees were subject. This may indicate changes in the labour process leading to a greater division of labour between creative scientists with a high degree of autonomy, and those carrying out the more routine work of screening compounds further downstream.

Despite the clear differences that remain between the old and the new universities, there is a process of change within the UK higher education sector as a whole which has major implications for its future shape. In the case of the industrial R&D company referred to in this paper, we would have to ask further questions about the nature of its research in order to categorise it accurately. In questioning the universality of the term 'research', we can identify differences within the organisations that carry out this type of activity. Neither university, nor R&D company can offer us simple monotypic models of organisation. We should seek to identify what is distinctive about these organisations we investigate and what forces are present in the dynamics of change which both surround and emerge from within them.

Collapse of the University Image at Pharmco

The evidence from group and individual interviews with bench scientists at Pharmco suggests that the university image does not relate to a shared understanding of

experiences within the company between themselves and members of the management. Interviewees at Pharmco were able to draw clear distinctions between their own experiences at university and those in industry, which shared tighter control and greater accountability.

> There's certainly more pressure in doing research in industry than in academia, so your immediate manager keeps closer tabs on you, if you like, but that obviously depends on the individual. They are doing their job, I guess, but certainly you do feel the pressure. I mean that there are more formal presentations to make every month. You account for your work every month, which you don't have to do in academia.

In general, the younger the scientist the more recently s/he is likely to have emerged from an academic environment. Active researchers also maintain close contacts with scientists within academia as part of the research process. While they are aware of the disadvantages of working within such an environment, they also recognise that, as far as research activity within the university goes, academic scientists exercise greater autonomy over their work. This is a relative matter; it does not deny assertions that such autonomy within universities may be being eroded, but recognises, nonetheless, that a gap exists between the experiences of those working within the two environments. That such a gap between the experiences of industrial and academic scientists is not a recent phenomenon is underlined by empirical work undertaken some 25 years ago.[24] We can identify at least three ways in which the experience of scientific work at Pharmco can lead to conflict between the perception of the company as sharing features in common with a university and the daily experience of scientific workers.

Project Closure

Projects may be closed on the basis of commercial rather than scientific criteria. There was general agreement amongst the managers we interviewed that managing research was about allowing scientists the freedom to use their creative skills. However, a tension exists between the nature of scientific research work and the drive for profit. Managers maintain that freedom of investigation, through relatively loose control structures, is vital in promoting an atmosphere within which research can take place. But set against this is the pressure to produce profitable ethical drugs. This pressure requires careful monitoring of projects to make sure, first, that sufficient progress is being made, and secondly, that progress is being made in a direction that might produce a marketable molecule. This second consideration can mean that projects are closed down on the basis of decisions that have little to do with the science involved. Either a rival has got there first, or the marketing people do not feel that the area has sufficient prospects to warrant further development. Success in pharmaceuticals, it is argued, is based on an ability to combine such activities as running clinical trials and marketing with research. Therefore, marketing managers talk to researchers to direct them towards the illnesses for which a product could be designed. Developers talk to marketing people and researchers to determine which treatments regulators would approve speedily, and researchers brief marketers and developers on technological possibilities. Management has to balance the perceived necessity of freedom of investigation with market driven monitoring—reviewing and dropping projects on a monthly basis. This is borne out by what we were told by senior managers within the company:

> I just closed down a project not an hour before you arrived. I had the two project

> leaders in . . . I didn't close it; they closed it. . . . I asked them if they would like to close it and we've actually stopped a project which at one time actually had about sixty or seventy people working on it . . . because I and other people, having sounded the merits of the market, etc., have come to the conclusion that, at the time at which we will bring this compound forward, we will be competing with compounds in a very similar area.

Performance Related Pay

The performance related pay system is designed to shape the behaviour of scientists. At Pharmco, individual performance is rewarded through a system of performance related pay and is monitored through a pay review and appraisal system. Pay review and appraisal are linked, but take place at different times of the year and can be carried out by different people. Pharmco aims to position itself in the upper quartile of appropriate salary league tables for each major occupational category. However, the outcome of the review is vital as it is the sole source of pay rises. Little guidance is given to managers on the criteria that are to be adopted in assessment for performance related pay. This contributes to the subjective nature of the assessment process, allowing line managers a considerable degree of discretion in determining the category in which each employee is placed. The explanation for this vagueness appears to lie in two distinct areas. First, management perceives commitment to the team and to the project as essential to the success of the company. Attitude, contribution to the team, and motivation are the central elements defining the individual's PRP grading where measurable outcomes are difficult to isolate. Project leaders cannot define in detail what is to be done.

A second salient fact is that the vast majority of projects initiated will not be successful, in the sense of producing drugs that will reach the market. Therefore performance cannot be measured in this way. One manager described the problem as one of finding ways to reward failure:

> You might have a target today of finding a new nasal spray to prevent the common cold, and two months later Wellcome publish a patent and there's no point in doing it any more. Your entire project switches to something new, and, of course, many researchers are in [this] position year in, year out—they produce a whole bunch of failures. I mean, when you think that one compound makes it out of every 10 000 compounds that are tested, one compound makes it to the market each year, and yet we've got 3700 people pursuing it, it's not surprising that you get a lot of people whose life is a whole bunch of failures, and the supervisor has the job of subjectively assessing how good they were at getting those failures out.

What is considered vital is active contribution to the work process, in this case the project team. This cannot be measured either in direct outcome terms, there being no guaranteed product, nor in time spent at work, insofar as attendance at the bench is no measure of what is actually done. The performance related pay system is not popular with staff. Both interviews with managers as well as initial group interviews with project teams confirmed this.

Trust Time

On the surface it would appear that the move from flex to trust time represents a move from direct control towards a system based more on responsible autonomy. This, in fact, is not the case. Flextime effectively gave employees rights to time off measured

independently and scientifically by the clock. Trust puts control of time off into the hands of management and securing it is dependent on exhibiting performance and commitment in the eyes of line management. The outcome, as far as the bench scientists are concerned, is two-fold: first, a reluctance to ask for days off, as this may be taken as indicating the wrong attitude; and secondly, the need to demonstrate in a highly visible way that work above and beyond that expected is being performed. The new system, then, would appear to have two benefits for managers: First, in the name of abandoning measuring attendance, they are achieving higher levels of attendance (in terms of days per year) than under flex. Secondly, who gets days off is determined subjectively by line management, which has the effect of pushing people to demonstrate high, and very visible, levels of performance. In the name of greater freedom, trust appears to have increased the intensity of work, while simultaneously increasing the number of days worked per year.

Converging Organisations?

The idea that Pharmco is moving, in any sense, towards an organisational form based on an ideal-typical notion of a university appears, at least from this evidence, to be largely unfounded. The problem for managers is to find usable tactics and strategies to maintain the commitment required to persuade highly qualified and creative scientists to use their skills to achieve the organisational goals defined as appropriate by senior managers.

The competitive world of pharmaceuticals offers substantial rewards for those organisations successful in harnessing the skills of research scientists and directing them towards the discovery of marketable molecules. However, such companies run the perpetual risk of losing the commitment required to achieve such success when, in tightening control, they reduce the autonomy perceived as necessary for generating creative work. Set in these terms, the tension between autonomy and control appears unresolvable. What might be resolved at the organisational level in terms of increased autonomy and managerial discretion is blocked when the organisation is set within the economic context of a world in which health care costs are subject to increased scrutiny by governments and where the requirements for the testing of drugs is increasing R&D costs and eroding patent lives.

The university image does not appear to give meaning to the work of scientists who have experienced, or remain in contact with, the academic world. It will not help resolve the tension described above. The decision taken by Pharmco to re-christen the 'research campus' as the Medicines Research Centre can be seen to focus on the company's contribution to improving human well-being. It had as much to do with a potentially hostile community and the threat to profitability from outside the perimeter fence, as with conditions inside.

The academic labour process has been subject to greater managerial control with reduced autonomy for staff, a less collegiate approach to decision-making and a more commercial orientation. The university system is also subject to influences in its environment which appear to be leading it in this direction. Miller sees changes in the academic labour process in terms of its relationship to the role of the state in regulating the economy and higher education, characterising this as 'an economic and political context in which throughout the 1980s government has underfunded universities and been critical of academics'.[25] A clear example of this attempt to regulate is the introduction of performance related pay in the old university sector in 1980 where "to qualify for funding a university must commit itself to the introduction of selective

payments in each of the professor and lecturer grades".[26] The new universities were similarly threatened with partial withholding of funds until they introduced performance-based reward systems, which they did in 1993. At the same time, there have been attacks on curricula for their bias against business, the introduction of targets designed to encourage certain disciplines and discourage others, pressure to recruit full-cost students, and the appointment of members of the business world on governing bodies.

University research has been subjected to increased monitoring, selectivity of research funding and emphasis on the need for relevance to the market economy. Furthermore, the Advisory Body for the Research Councils suggested that universities should be placed in one of three categories: R2 (funded fully for research), X (some high-level research in less costly areas), and T (teaching centres with little real research).[27] If this is no longer the explicit reasoning behind the current regime of research assessment exercises, there appears to be a consensus among academic staff that the outcome, in practice, will look very like this three-tier system. While there is no intention in this paper of suggesting that research activity involves higher level skills than teaching, we can recognise a division of labour aimed at increasing the efficiency of the higher education system. There may be a parallel here with the way in which Pharmco re-organised research to produce separate groups of creative researchers, free from the tight controls imposed by regular reporting of progress towards well-defined targets. Miller concludes his analysis by asserting that the academic labour process is being subjected to the changes Braverman identified as taking place during the twentieth century within craft occupations. Managers are monopolising the functions of conception and organisation of academic work, and staff are losing professional control over work processes.[28]

Parker and Jary also identify greater managerial control and growing restrictions on academic professional autonomy as key elements in the changing higher education system. They adopt a neo-Fordist label to describe what they believe represents a move away from elite specialisation with strong professional control towards a mass production arrangement in universities where "unmitigated careerism, credentialism and managerialism could leave little space for critical scholarship or challenging teaching. Whether it can be resisted is a question that we are unsure about".[29] At the institutional level, therefore, we can witness in the changing character of the funding bodies, a transition in universities away from autonomy and towards greater state direction. Moves towards more flexible contracts and away from security of tenure can be seen to be bringing university employees closer into line with industrial and commercial practice. The issue of managerial control has become central to the academic labour process.

Conclusions

The picture which emerges is one of institutions moving towards tighter control, away from autonomy and towards restructuring to meet the requirements of a competitive external environment. This can be seen as convergence, but towards a point at one end of the continuum. Why is this happening? Willmott maintains that:

> . . . the key to understanding change in the organisation and control of academic work lies in an analysis of the trajectory of the distinctive organisation and dynamics of the capitalist society in which it is embedded, and not in the impersonal force of rationalisation or the capacity of individuals to collaborate in, or resist, its seemingly relentless advance.[30]

This paper argues that the key to understanding change in the pharmaceutical industry lies in the same trajectory and dynamic. However, dismissal of the capacity of individuals

to collaborate in, or resist, change in the organisation and control of their work is deterministic. Parker and Jary are unsure about the capacity for resistance to the changes they identify. In both Pharmco and within the higher education sector there exist tensions which continue unresolved and which provide scope for conflict. This may take different and unpredictable forms. It may be individual or collective, it may affect some parts of the system and not others.

Turnover is one type of response open to scientists seeking to end the discongruity between personal and organisational goals. Another type of response is to redirect effort into the communication of performance rather than into the task itself.[31] Within the higher education sector the likely response is again unpredictable. The prospect of collective action is perhaps greater as trade unions already exist for bargaining purposes. While there is no strong tradition of direct industrial action in universities, recent events within further education have shown how quickly conflict can crystalise into a bitter dispute involving all of the weapons of the traditional industrial dispute.[32] If the trajectory of the change is shared by both types of organisation, there is, nevertheless, a combined and uneven character to it which will ensure that the only certainty is in the continued existence of tension and continuing unpredictability of employee response. Equally indeterminate is the nature of management strategy when faced with the prospect of conflict. Hyman suggests that:

> changes in the external environment of corporate activity which in one sense narrow the range of strategic options may compel an internal restructuring which facilitates strategy within the area of choice which remains.[33]

Faced with the tension between the often conflicting goals of their employees and the organisation, managers of highly qualified workers have strategic choices to make. In any form that it may take, employee response to these conflicts will represent a continual challenge to management tactics and strategies. Empirical study has shown that there are ambiguities, tensions and contradictions inherent in the management of expertise, and that the conflicts involved in managing creative professionals who are culturally resistant to being managed may prompt managers to rethink their strategies for handling employees with these characteristics.[34] One element of this strategy can involve efforts to present the organisation in a way that may help to address these inherent tensions, although potential disparities between the image and the reality as experienced by employees seem likely to erode the value of this activity over time.

Notes and References

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