

The Politics of Management Science

An Inaugural Lecture

By

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Executive Summary

In recognition of the critical traditions of this university I propose to devote my inaugural lecture as a professor of management to a trashing of my subject. I begin, not quite innocently, with an executive summary. As we know from experience, executives are people who can take in only the barest outline of what we have to say, not because they are incapable of understanding our arguments in their fullness, but because their minds are fixed upon larger issues.

In contemporary teaching and research, I shall argue, management is thought of as a generalisable practice, a body of knowledge and techniques which is applicable without substantial modification to all activities at all levels and in all settings. Driven and sustained by powerful institutional pressures within management education and practice, this essentialist conception of management typically produces situations where persons who know only 'management' must control processes of which they have only a lay understanding. The executive summary, then, is symptomatic.

It is also metaphorical, in that the specialist 'manager', can engage with concrete processes only at a level analogous to that of the executive summary. Processes, in other words, must be modelled so that they can be comprehended by generalised management and engaged by its techniques. Inevitably, as compared to the process as experienced by practitioners, the process of modelling involves simplification and distortion. Because of the political power behind the managerial imaging of process, moreover, this simplification and distortion may work as a self-fulfilling prophecy. Through management, processes may be degraded in actuality so that they come to approximate to the managerial image of them. In other cases the consequences may be more unpredictable. Generally, however, the consequences of management will not be those anticipated in management science, since they are not played out, not within its theatre of images, but in a larger world of practice.

I will argue this thesis through three examples. The first is an attempt to develop a means of managing product aesthetics using the techniques of market research. The second is the use of a technique called activity-based cost management to manage staff departments. The third concerns management as it is practised at the level of government - the current attempt by the Blair administration to promote the development of science-based industries through the stimulation of 'entrepreneurship.'

Management: Generalised and Abstracted

Acknowledged as the founders of management thought, both Frederick Winslow Taylor and Henri Fayol would have been astonished at some of the inclusions and omissions in today's teaching and research on management. Begin with the omissions: Importantly Taylor's 'revolution in management', was also a 'revolt of the engineer' (Layton, 1971), a revolt against 'ordinary management' which, in Taylor's view, had forfeited its claim to authority because it lacked expertise in the productive process. As with the motive, so with the practice. The re-design of production processes which lay at the heart of Taylor's Scientific Management depended heavily on the expertise of the mechanical engineer, a profession of which Taylor was himself a distinguished member. For Taylor, then, the competent management of a process was inconceivable in the absence of expertise in that process. So it was with Fayol.

Although the work translated by Lyndal Urwick as 'General and Industrial Management' (Fayol, 1949) was concerned to set out the general principles of efficient administration, it was also an expression of Fayol's experience as a mining engineer. Although his principles were subsequently appropriated by Urwick as the knowledge base of a decontextualized management science, Fayol himself took it for granted that they would be applied in the light of a thorough knowledge of production processes.

Very early in the history of management education, it became clear that the pressure of educational markets would prise apart this primordial unity of management and process knowledge. Harvard University's first venture into management education was a 1908 course on Railroad Management. This included such sector-specific topics as Railroad Operation, Railroad Accounting and Railroad Organisation and Finance. The pattern of electives chosen by students, however, quickly revealed a demand for topics of more general application, such as Industrial Organisation, and Factory Management (Copeland, 1958: 21 ff.). By 1912, the trend towards generality in management courses was decisively under way, driven by factors which would still be operative today. Courses which promise a generality of application appeal to a broader market than those which are sector-specific. They also promise a wider range of career options since the end-qualification is portrayed as portable. The underlying assumption - largely tacit at this stage - was that management is always and everywhere the same - of which more in a moment.

Driven by the logic of competition and predation, meanwhile, capitalism itself was changing. Messily but inexorably, the era of family capitalism was giving way to that of entrepreneurialism, and this, in turn was giving way to managerial capitalism. In consequence, the range of managerial practice was extending into functions previously reserved for ownership, such as finance, marketing strategy and company policy itself. As early as 1911, Harvard had responded by introducing a course in business policy, 'to develop an approach to business problems from the top management point of view.' (Copeland, 1958: 42). By the early 1920s, Harvard's courses had re- focussed on 'certain broad functions of the business enterprise': business policy, business law, statistics, marketing, accounting, money and banking, corporate finance and social factors in business.

Again one can discern the not-very-hidden hand of the market. Though the managers who practice the corporate-level functions are few indeed, what student, especially what student from Harvard, would opt for a course which does not include them? To do so would be to declare at the outset the modesty of one's ambitions. Driven by these twin tendencies - the detachment of management from expertise in the managed process, and its identification with corporate-level functions - the modern conception of what counts as management science was already emerging.

Also in place was its rationale: the doctrine of managerial essentialism which justifies both the decontextualization of the management syllabus and the inclusion of corporate level functions in courses at all levels. Here it is expressed in the 1968 edition of a popular management textbook which, together with its successor volume, has now run through ten editions:

. . . managers perform the same function regardless of their place in the organisational structure or the type of enterprise in which they are engaged ... getting things done with or through people. The implications of this principle are several. In the first place it means that anything significant that is said about the

functions of one manager applies to all managers ... In the second place, the principle implies that management knowledge and experience are transferable from department to department and from enterprise to enterprise.

Koontz and O'Donnell, 1968, p. 54

Spectacularly illustrating this doctrine, the syllabus for Lyndall Urwick's course in management for company directors was identical to that of his World War Two crash-course in industrial supervision.

How, then, do management thinkers account for the very obvious differences between the work of managers at different levels? Beginning with Fayol himself, the tendency has been to see these as differences of quantity rather than quality. On this view, lower level managers, do the same things as higher management, but less of them. The matters which occupy the rest of their time, it follows, do not count as management:

Every manager does things which are not managing. He may spend most of his time on them. A sales manager makes a statistical analysis or placates an important customer. A foreman repairs a tool or fills in a production report. A manufacturing manager designs a new plant layout or tests new materials. A company president works through the details of a bank loan or negotiates a big contract - or spends dreary hours presiding at a dinner in honor of long service employees. All these things belong to a particular function. All are necessary and have to be done well. But they are apart from that work which every manager does whatever his function or activity, whatever his rank and position, work which is common to all managers and is peculiar to them.

(Drucker, 1955, p. 343)

Hence the universalization of the management syllabus. Supervisors need to learn about company strategy, not just to encourage the belief that their studies might one day get them into a position to influence it, but because supervisors *do* company strategy, albeit in a miniaturised form.

It is not only educational institutions which have shaped and have come to depend on this view of management. It is, firstly, a condition of existence of the kind of generalised textbook in which the foregoing quotations appear (*Principles of Management, The Practice of Management*). It is also a condition of existence of those characteristic figures of Anglo-Saxon capitalism, the management consultant and the job-hopping senior executive. The credibility of both depends on the belief in a context-independent managerial expertise. It is therefore a belief-system sustained by massive intellectual and institutional interests, which is precisely why academic researchers ought to be prodding it for rust-holes. Such is the compartmentalisation of academic life, unfortunately, that most of those in a position to do so are 'management researchers', a sub-species whose intellectual field of operation is defined by exactly the belief in question.

The control of operations by a context-independent managerialism also resurrects Taylor's problematic of 'ordinary management', that of how processes are to be controlled by those who do not understand them. Whilst it is one thing to teach management to people with experience of the process to be managed, today's schools of business and management turn out tens of thousands of graduates who have been taught *only* management. Even the MBAs, who enter their courses on the basis of practitioner experience, exit them determined to distance themselves from that

experience. In the words of the one-time manufacturing director of Lucas, 'a whole generation of M.B.A. students . . . will not go near a manufacturing strategy . . . they want to be in at the gin-and-tonic end with the financial strategy.' (Parnaby, 1985)

Where Taylor's solution depended on the acquisition (or appropriation) of process expertise *by* management, much of modern management science consists of techniques which *substitute* for knowledge of the process. If one cannot understand what people are doing, one can try to motivate or lead them. Failing that one can set and monitor budgetary targets. Failing that, one can survey the consumers of their work, internal or external. Every one of these control techniques corresponds to one of the disciplines of management science - managerial psycho-sociology, management accounting and market research. The question is: are they *good* substitutes for knowledge of the managed process?

Every one of them, first of all, articulates with the managed process, not as a practitioner would understand it, but in a simplified and modelled form. This is not to say that practitioners themselves – or any human beings – fully understand what they are doing. Humankind cannot bear very much reality and professionalism, it has been truly said, is a way of not seeing as well as a way of seeing. As envisaged by the generalised control techniques of management science, however, the image of the managed process is subject to further losses of scope and detail. Motivation theories, such as that of the once influential Fred Herzberg, are a case in point. Still popular with those for whom social science is a matter of 'learning about the properties of humans' (to quote a former student of mine), theories of this kind offer an automatized view of the organisational subordinate, in which increased effort is a reflexive response to the 'enrichment' of jobs. Contrast this with the view of the managed person, 'I don't feel enriched, just knackered.' This remark, made by a unskilled worker during a research on which I was engaged some years ago (Nichols and Beynon, 1977), has reverberated down the years as a commentary on the adequacy of Herzberg's model of the human being - and on its practical consequences. Through management's capacity to operationalize insult, injury is added – back injury in this instance.

The case of motivation theories suggests that there might be a more general tendency for abstracted and generalised management to degrade the processes to which it is applied. The instance of budgetary controls reinforces the impression. Controls of this kind image process outputs as a series of performance indicators. Agreeing that the approximate character of these indicators encourages distortions of practice, the literature is split on the question of whose fault this is. Is it 'gaming behaviour' on the part of the managed, or is it 'the folly of hoping for X whilst measuring Y' on the part of management?

The rest of this lecture consist of an exploration of further instances from my recent researches on design management, activity-based cost management and on the promotion of entrepreneurial cultures. Whilst they do not add up to proof, their very diversity strongly suggests that there is a case to answer.

Accountable Design

My first example concerns the management of product aesthetics. For managerialism, labour processes of this kind may be the final frontier. It is here that the Roman march of rational planning enters the Druidic thickets of tacit skill, sub-articulate intuition and artistic temperament. It is here too, where the labour process is at its most opaque,

that the attempts of managerialism to subordinate it to corporate policy are at their most revealing.

Why is product design important, or, more pertinently, how can it be represented as important by interested parties? The story begins with an observation, or an assertion, that there are now fields of product market competition - consumer electronics has been cited as an example - in which the technology has reached a stable plateau (Evans, 1990, p. 396). Competitive advantage, in consequence, depends on the ability of the product's physical form to invoke particular images and lifestyles – at least so say the designers. For corporate managements who buy into this view of things, the problem is one of ensuring that the 'creatives' do indeed connect with the target market, whilst allowing them sufficient freedom to do so more effectively than the competition.

At the moment the usual solution involves a kind of mixed-media negotiation between the client (management) and the design team. In one study in which I was involved (Tomes, Oates and Armstrong, 1998), graphic designers began by boiling down the text of the design brief into a (still textual) 'concept' – a kind of mantra which would be invoked as a means of keeping subsequent work on track. This concept would then be expressed in a number of 'vehicles' – sketched visual expressions of the concept which would then be shown to the client. This would then set in motion a process of 'conjectures and refutations' (Broadbent, 1984) in which the designers' sketches and the client's comments would converge on a mutual understanding of what the other party 'meant'. In processes of this kind, the 'realisation' of a design brief involves a partial surrender of control on the part of corporate management. Competitive advantage through design, on this pattern, can be secured only through the uncertainties involved in experiencing its seductions.

Given the costs of tooling and promotion involved in many product launches, not to mention an anal drive to control everything in sight, researchers in management science see a ready market for means of eliminating the risks involved in competing through product aesthetics. The project is to assure in advance the semiotic connection with markets, to ensure that the product speaks to the consumer as management intends. The terms on which this is to be achieved tell us much about the manner in which management science images the workings of design.

The key move is a tacit assumption that the visual and tactile languages of design are nothing more than approximate ways of communicating verbally-defined feeling states. Formulae of this kind often emerge from meetings on corporate marketing policy. In 1994, for example, Thompson Consumer Electronics declared that all of its entertainment products must be engaging, foster a sense of discovery, and eliminate fear.

A study of the 'communication effectiveness' of consumer packs by Bruce and Burrill (1995) illustrates how this view of design is underpinning the development of a form of audit based on the techniques of market research. In this particular instance, interviews with the designers of the packaging for frozen vegetarian meals were used to establish that they believed that their design communicated an image of 'wholesome, natural, imaginative and home-made products from the sponsor's country kitchen'. These claims were then tested against the perceptions of representative consumers. Semantic differential questionnaires and focus groups revealed that the messages actually received differed considerably from those 'intended' by the designers. A key conclusion of the paper was that 'The

questionnaire provides reliable data that clearly indicates the strengths and weaknesses of attributes of the design.'

The prospect is enticing. In place of the acts of empathy involved in reading design as one thinks the market will read it, managers can now call upon objective measures of the meaning conveyed to the target audience. The messages conveyed by design can be controlled, it seems, at least after the event.

Notice first of all how this construction of accountability depends on manoeuvring design onto the terrain of management science. Participative and open-ended in appearance, the interviews with designers are actually constrained by the assumption that the visual and tactile can be adequately described in terms of verbal abstraction. By this means, designers can be represented as claiming that their work communicates messages which are equivalent to English sentences. The communicative claims of design are thereby displaced onto a territory on which such instruments of audit as the semantic differential questionnaire can operate. This is a landscape of feeling-states divided up into administrative units which are labelled by verbal abstractions ('wholesomeness', and so forth).

Notice too that the researchers made no attempt to engage with design, either as an end product to be experienced, or as a practice to be appreciated. Instead, they required the designers themselves to translate their work into a form controllable by management technique. Politically speaking, the tactic depended on turning professional expertise against itself. The judgement of the designer was employed as a means of eliminating managerial dependence on that judgement. That this kind of research is uncritically accepted as a contribution to the study of the design process speaks volumes for the intellectual hegemony of managerialism within the wider research community.

At first sight, the form of accountability created by this exercise leaves the actual process of design untouched. It appears to offer a post-hoc evaluation of output rather than the prospect of intervention in the production of design. Once it is assumed that the expressive forms used by designers are equivalent to ordinary language, however, it becomes possible to think of design as the manipulation of a relatively stable vocabulary of 'precedent form.' Market research techniques can then be used to build up a dictionary of correspondences between physical form and its verbal equivalents. It then becomes thinkable that designs might be assembled so as to communicate given messages by exposing designers to an appropriate diet of precedent form (Pasman and Muller, 1995) or by drawing on an established databank of product semiotics (Kawama, 1987).

Moves of this kind aim at mapping the territory of design onto that of the marketing slogan, so that the one can be controlled by controlling the other. They are, of course, based on a simplistic image of the workings of design. Only the very worst of design, like the worst of art, works by substituting signs for textual messages. The fact that designer and consumer attach different phrases to a designed object tells us no more than the fact that art critics will use different words to describe a painting, and neither tells us much about whether and how either design or art has 'communicated'.

Nor does design depend on a 'visual language', if that term is understood to imply a relatively stable lexicon and syntax (Benveniste, 1985; Langer, 1985). Whilst it is true that certain stylistic cues may, through emulation, may achieve a temporary semiotic significance – in motor styling the unbroken bonnet-windscreen line which signals

(stylish and expensive) ‘people-carrier’ rather than (cheap and nasty) van is an example – design does not, for the most part, work through the syntactical ordering of context-independent elements. Blue may be ‘the very colour of heaven’ (Keats on the iris of the human female) but it is also ‘the colour of distant hills, and boy’s overalls’ (Auden on Houseman). In consequence, the notion that the colour of a computer case might be chosen so as to convey such complex textual messages as ‘Highbrow individuality, creation of a new tradition, intellectual elitism, androgynous sense of beauty, mental ecstasy, interest in the inner world’ (Kawama, 1987 describing a project at Sharp electronics), is somewhat forlorn. The shade of grey actually chosen in this instance, plus the hard-shell texture, might just as well signal ‘Hide like a rhinoceros.’

The irony is that design, when it works, is considerably more effective than allowed for in the representations of management science. Communication at the sub-verbal level is also communication beyond the reach of rational critique. Whilst the pronouncements of the Seymour Powell Consultancy may be far from disinterested, they are also much more convincing as an account of the way in which design can create and connect with potential consumers than those offered by management science:

The X-factor in the product is its essential personality, its desirability quotient, if you like - those intangible, emotional features, over and above function and efficiency, that make one product better and more desirable than another. It's the first thing that strikes you and it often makes itself felt in an immeasurable fraction of a second. It's the "I like it, I want it, what is it?" element in a product. We're constantly searching for that elusive iconography, the psychological bridge between consumers as they are and consumers as they'd like to be.

Seymour Powell (n.d.)

Activity-Based Cost Management

My second example concerns activity-based cost management (ABCM), a technique which is at a much more advanced stage of development than accountable design. Energetically promoted by all of the big five accounting firms as well as by professional bodies on both sides of the Atlantic, many in this audience are about to discover more about these techniques than they might wish to know. The Higher Education Funding Council will shortly be requiring activity costings of all academic activities and the management of activities in the light of this cost information will surely follow (<http://www.hefce.ac.uk/news/hefce/1999/transrev.htm>).

The problem which gave rise to ABCM is one which has evaded a definitive solution throughout the 120 year history of cost accounting: the allocation of indirect costs. Accountants have no problem – or think they have no problem – with the costs of materials, labour and equipment degradation directly consumed in a production process. The difficulty arises in how to allocate those costs which are not directly connected to a product. The costs of departments such as Research and Development, Marketing, Human Resources, Finance and Public Relations, for example, all have to be recovered through the sale of products, and the question is how they can be ‘equitably’ assigned to those products.

Before activity-based costing, the usual solution was to allocate these indirect costs on a single ‘allocation base’ – often direct labour costs, but sometimes the total of direct

costs. Taking a typical level of indirect costs and a typical production volume, indirect costs would then be distributed as a percentage mark-up on the costs which serve as an allocation base.

Crude and simple, such a method of cost allocation was acceptable (so runs the founding myth of activity-based costing) so long as indirect costs were a small proportion of the total and product markets were slack enough to allow for a margin of error on prices. Over time, however, both of these conditions were eroded. Firstly, an increase in the capital intensity of production processes, meant that the indirect costs could be many times the base of direct costs onto which they were loaded. Secondly, there was an intensification of product market competition, particularly from the Far East. The first exposed the arbitrariness of single-base cost allocation (persistently and tendentiously misrepresented as ‘inaccuracy’ by the advocates of activity-based costing). The second made it important to identify which of a company’s products remained profitable when margins were being squeezed. Management science had identified – or created – a market for a ‘more accurate’ means of allocating indirect costs (see, for example, Cooper and Kaplan, 1991)

Taken literally, this was an expotition in search of an oxymoron. If costs are truly indirect, there is by definition no correct way, even in principle, of allocating them to products. Consequently there can be no standard by which the accuracy of any practical method might be judged. It is not the way of management research, however, to let philosophical niceties stand in the way of scientific advance. The ambition of activity-based costing was to identify the costs of the *actual* activities which were performed ‘for’ products and, in its more overweening versions, to distribute *all* company costs according to the consumption of those activities in production processes (e.g. Kaplan, 1987). In other words all costs were declared henceforth to be direct - since they were, or ought to be, the direct costs of the activities which go into products. More politically circumspect advocates recognised that such items as the chairman’s company car, not to mention his salary and secretarial support might be difficult to justify in such terms. These ‘moderates’, which by 1988 included Robert Kaplan himself, proposed to except such essential ‘period costs’ from the scrutiny implied by activity-based costing.

Allocating the costs of support activities in this manner, the advocates of activity-based costing had little difficulty in producing product costs which differed radically from those produced by single-base absorption costing. Disarmingly, these differences have repeatedly been presented in the literature as ‘proof’ of the greater accuracy of activity-based costing, as if any discrepancy were automatically to the discredit of absorption costing (e.g. Innes and Mitchell, 1990, p. 14). In particular, many of these schematic calculations ‘demonstrated’ that the use of direct labour as an allocation base loads indirect costs disproportionately onto labour intensive processes, thus inflating their apparent cost and leading firms to abandon competition in the world’s mass markets. For American capitalism, these were weighty matters and I would not wish to minimise the achievement of the activity based costing movement in destabilizing costing tradition. My concern here, however, is not with its merits as a system of cost allocation, but with the technique of cost management which developed from it.

Once the activities which connect indirect costs to products have been established for the purposes of cost allocation, the potential for actually managing them is obvious. Firstly, those indirect costs which cannot be justified in terms of such activities may

be eliminated, a process of organisational eugenics which is dignified in management science as 'value analysis.' Secondly, the volume of at least some of the support activities may be varied in line with any variations in the volume of production. Thirdly, the exposure of the activities which are paid for by the indirect costs loaded onto products and processes, may enable the managers of these products and processes to press for the elimination of those services they feel they can do without. All three of these potentials have been amply realised in case studies of activity-based cost management (e.g. Cooper et al, 1992). The result, so say the advocates, is a leaner, meaner organisation which is totally focussed on customer value. What could be more sensible?

The crucial question is that of what is eliminated, and this in turn depends on how the activities performed 'for' products are identified. Treated as a secondary matter in the literature, one of operationalization, this actually lies at the heart of activity-based cost management. In every case I have read, the procedure depended on interviews with the heads of staff departments conducted by an ABCM implementation committee consisting of line managers and management accountants (e.g. Cooper et al, 1992). In these interviews, the heads of departments were required to list the activities through which their departments contributed to the productive processes of the organisation, to estimate the proportion of staff time and other expenditure consumed in these activities, and to agree an easily detectable proxy for a unit occurrence of each of them (as an act of materials purchase is signalled by a requisition). The procedure, we are told by prominent advocates of the technique, is complete only when the whole of staff time and equipment usage is accounted for (Innes and Mitchell, 1990, p. 8.)

Clearly these interviews are something of an inquisition, given that the stakes are not difficult to discern. Like the interviews with product designers, they use the expertise of the staff manager as an instrument with which to demystify the inner workings of the department. And it is in these interviews – not in the programmatic intentions of activity-based costing – that its image of the staff department is created. It is an image which allows for no independent contribution of the staff department to the objectives of the organisation. It is seen as *service* department, one which exists for no other purpose than to support the productive process. These services, moreover, are assumed to consist of repeated activities, so that a unit cost can be established for each. The end result is an image of the staff department as a mass-producer of repeated – and therefore routine – acts of service. And it is seen in these terms because this is the only way in which its 'activities' can be used as a basis of allocating its costs.

This might not matter if cost allocation were all that was at stake, but what happens when this information is used as a means of *managing* indirect costs? Here we are short of data. There has been a considerable number of case studies of the introduction of activity-based cost allocation, all of them predicated on the assumption of its technical superiority, but many of them reporting the failure or abandonment of the project. Lacking, however, are studies of the long-term consequences of 'successful' systems, in which the activities, as identified, are used as an instrument of management as well as cost allocation. We must fall back on an examination of the logic of the system.

Virtually every staff function in the modern corporation has its professional and academic arms. The Chartered Institutes of Marketing, Purchasing and Supply, and Management Accounting, as well as the soon-to-be Chartered Institute of Personnel

and Development, all of them see a much larger role for themselves than the supply of low-level services to production departments. Every one of them, moreover, sees its mission as one of promoting its potential contribution to company strategy, with commensurate rewards and career prospects for its practitioners. Whilst there may be much in this of self-interest and self-important puffery, few of us are in a position to dismiss these claims out of hand, and certainly not the line managers and management accountants of an ABC implementation committee. And yet this is precisely the logic of its analysis of activities. Building up strategic information on potential product markets, creating value through the supply chain, engineering workforce commitment and gathering information on competitor costs for the purposes of strategic management accounting: *none* of these are direct services to production function (some of them, indeed, threaten its established routines), and none of them are reducible to repeated and routine actions. The implementation of ABC, therefore, creates pressures for their elimination. That pressure may be resisted, of course. In general the outcome will depend on the relative influence of the function in question and the ABC implementation team. The pressure is always there in potential, however, and is likely to intensify when profit margins are squeezed and all expenditure with long-term and indeterminate payoffs comes under scrutiny.

The general point is that activity-based cost management depends upon, and therefore operationalizes, a degraded image of the staff functions. Under conditions which favour its promise of containing indirect costs – in general those of financial stringency – this image will tend to operate as a self-fulfilling prophecy. Staff activity may indeed be reduced to the provision of low-level, routine services. Meanwhile the activity-based cost management consultants will be able to point to short-run cost savings, whilst the consequences of lost capabilities will only work through the system when they are long gone.

Enterprising Science

My final example concerns the promotion of entrepreneurial cultures as a means of energising various managed processes. Currently fashionable within management science as means of purging the bureaucratic lethargy from middle level and middle-aged management, it is also the UK government's current solution to the problems of technology transfer. Since this too poses the question of how expertise might be directed by those who lack it, I will concentrate here on the governmental, rather than the managerial problem. I would not like to be read as suggesting that the tendency to imagine problems in a preferred form is confined to managerialism.

According to the anthropologist Clifford Geertz, indeed, this tendency is fundamental to the human condition (Geertz, 1993). Ideology, he suggests, should be regarded not in a negative sense, as a distortion which conceals material interests, but as a positive means by which people make sense of their world and represent it as amenable to purposive intervention. This Winchian view of cultures as hermetically enclosed meaning systems gives rise to a number of interesting puzzles in philosophical anthropology. A certain tribe, for example, does not believe that the human body contains internal organs. Can members of that tribe die of appendicitis? More to the point for many of us, can they do anything about it?

Currently, the tribe of policy-makers we call 'Blairite' believes that the 'science-base' of UK research is competitive with any in the world, and that its failure to give rise to science-based industries is due to a shortfall of entrepreneurship. Operationalizing this

belief, eight 'Centres of Enterprise', funded to the tune of £50m have been established by consortia of UK universities. The facilities to be offered are to be closely modelled on the 'business incubators' which have mushroomed on university campuses around the world, whilst the motivation to make use of them is to be supplied by teaching entrepreneurship across the entire undergraduate and postgraduate curriculum. In a somewhat unedifying scramble of supply after demand, chairs in entrepreneurship are being created, advertised and filled on almost a weekly basis.

How, then, does the diagnosis of enterprise deficit represent the problem of technology transfer as intelligible and tractable? Logically, one would expect it to be grounded in a reasonably clear idea of the personal qualities and acquired capabilities which go to make up entrepreneurship and of how these might be applied to the problem of developing science-based products. Instead, we encounter something of a quagmire. Like the human body of our mythical tribe, the concept of entrepreneurship turns out to be somewhat lacking in internal structure. I first began to suspect that this might be the case early in the life of the Thatcher Regime, during a BBC given by Sir Keith Joseph, then Trade and Industry Secretary and a founding guru of the enterprise culture. Asked to explain *how* the government's encouragement of entrepreneurship would arrest the growth in unemployment, Sir Keith's reply was that it was not for you or I to understand how entrepreneurs create jobs. It was, he explained, a mysterious process not to be apprehended by people who were not themselves entrepreneurs.

At one level no more than the evasion of a politician who had not yet thought up a plausible answer, this extraordinary statement tells us much about enterprise ideology. At its heart there lies more of mystification and less of certainty than one might suppose. In many of its assertions, the concept of enterprise seems to function not as a descriptor of identifiable acts, but as an occult potency knowable only through its effects. Consider the following extracts from Peter Mandelson's White Paper on the 'Knowledge-Driven Economy':

'We also need entrepreneurial individuals with the vision to turn new ideas into winning products and processes. Entrepreneurship is the lifeblood of the new British economy . . . '

(Department of Trade and Industry, 1998, p. 2)

And

Entrepreneurs sense opportunities and take risks in the face of uncertainty to open new markets, design products and develop innovative processes.

(ibid, p. 6)

Statements of this kind tend to auto-dissolve under the pressure of contemplation. What does it *mean* to say that entrepreneurs possess 'vision' or 'sense opportunities'? Is there any way *other* than the creation of new products and markets that these qualities might manifest themselves? If there is not - and this is the suspicion - what we are in effect being told is that entrepreneurs are needed to turn new ideas into new products because entrepreneurs are the kind of people who can turn new ideas into new products. At the level of logic the concept of entrepreneurship works as a pseudo-explanation, tacked on to successful business start-ups after the event. At the level of religion, it signifies the ineffable meld of science, capital and markets, which is due all the reverence claimed for it by Sir Keith Joseph. At the same time, through its very familiarity, the word conveys the *feeling* of understanding. It is understanding at the

level of taxonomy, however - knowing where to stick a label, as opposed to knowing what is in the box.

At the same time, there *are* independently verifiable qualities claimed for entrepreneurship. The problem here is that conscientious research has failed to verify them. Driven by ideological convictions that entrepreneurship *must* entail such behaviours and traits as creativity, risk-taking and an 'inner locus of control,' empirically-minded North American psychologists have been able to demonstrate these things only by the most blatant gerrymander of samples and definitions (McGrath, Macmillan and Scheinberg, 1992). In aggregate the result is as convincing a null finding as one is ever likely to get. The qualities of entrepreneurs do *not* differ from those of any plausible comparator population. A recent article in the respected *Journal of Business Venturing* (Begley, 1995) could offer only the wistful hope that, 'The attempt to profile the entrepreneur, in recent years thought to be futile, may yet prove viable.'

If the notion of enterprise is made up of mystery and myth in equal parts, how can such a concept represent the problem of technology transfer as amenable to purposive action? Quite easily. Whilst the ways of the gods may be beyond our understanding, their preferred patterns of consumption can be specified with surprising accuracy, especially if there is a priesthood around to do the specifying. The resolution of this apparent paradox is to be found within a core tenet of enterprise ideology: that enterprise is a natural expression of the human spirit. From this it follows that its absence is always due to its suppression, either by hostile systems of ideas, by regulative restriction or by a denial of the material upon which it feeds. 'Freeing the spirit of enterprise' (Morris, 1991) therefore, begins with an identification of these negative influences, an exercise which can be carried out with much greater precision than that of specifying the positive behaviours which go to make up entrepreneurship. For the Blair, as for the Thatcher government, the hostile forces to be exorcised include excessive taxation, legislative 'red tape', the risk aversion of banks and other sources of capital and a whole range of antithetical ideas broadly identified with collectivism, risk aversion and the so-called 'dependency culture.' From this hit-list, the policies follow: tax concessions for small business investment, de-regulation in the name of reduced 'compliance costs' plus a wide range of subsidies, mostly offered through the machinery of 'competition' so as not to offend the sensibilities of the individualistic self-starter. Meanwhile the supply of enterprise which is to take advantage of these enabling measures is to be unleashed by a continuation and extension of the Thatcher government's massive programme of 'enterprise education.' In summary, the conditions which favour enterprise turn out to be remarkably similar to those preferred by venture capitalists and those (publicly funded) consulting/advisory services which make up what John Storey (1994) has called 'the enterprise industry.'

As with my previous examples, the political power behind this vision of technology transfer will enable it to function as a self-fulfilling prophecy, particularly since it already incorporates ideas which allow for entrepreneurial failure to be interpreted as success. According to authoritative figures within the 'knowledge-driven economy' movement, a major part of the UK problem is our excessive stigmatisation and fear of failure. This attitude is unfavourably contrasted with that of certain investors in the USA, who, according to a Director of Amadeus Capital Partners Ltd will only put money into new companies if the managing director has previously failed in business at least once.

But how accurate is the diagnosis of enterprise deficit in the light of what we know about high-technology start-ups, and how relevant are the policies which derive from it? In a lecture of this kind I can only sketch out three reasons for suspecting the adequacy of the entrepreneurial model.

The first is the prevalence of the 'soft start-up.' According to the influential Segal Quince report (1985) an important condition of the growth of 'Silicon Fen' was the availability within Cambridge University of a low-risk route to company formation. Essentially this involved a progression from scientific consultancy, via the standardisation of an analytic or design service (drawing an academic salary the while), to the volume production of a new measuring instrument or software package. Only at this stage would the academic leave the university in order to create an independent business. The process is a cumulative one, of building relationships with customers and suppliers, developing expertise and gathering market intelligence, quite at odds with the entrepreneurial stereotype of decisive action in the face of uncertainty.

The second is the embedded situation of many small high-technology companies. Autio (1997) has pointed out that many such companies are not started up with the intention of competing in open markets at all. Rather they remain embedded in relatively stable networks, within which they supply and receive high technology products or services. The possibilities of expansion out of these niches are generally limited, risk levels are low to moderate and most of these companies are actually quite risk-averse. Autio's conclusion is that policies aimed at encouraging high technology firms to expand need to be targeted on those for whom this is possible. To this I would add that the fetishization of entrepreneurship, not to mention the investment practices of venture capital companies, implicitly disparages the economic contribution of spin-off companies which operate in such bounded markets, and it may also discourage the formation.

The third is important role played by public subsidy in the formation of many high-technology companies. Massey, Quintas and Weild (1992) comment on the example of Laser-Scan – a company which is frequently quoted as the archetypal model for a science park firm:

Its dependence on state expenditure is total. Its original R&D and product development were done in the Cavendish laboratories at Cambridge University, its original customers were universities, further product development was funded by the Ministry of Defence, it received technical support from the government funded CAD centre and its customers were virtually 100 per cent public sector.'

A less extreme example was described at the recent Congress of the Institute of Physics. Funded by the DTI for the nine years it took to develop a successful product, Bookham Technology moved out of the Rutherford Laboratories 'into the commercial world' only in 1997, by which time it employed about 50 people. Presented as an example of entrepreneurship in action, the case better illustrates the effectiveness of publicly funded R&D in developing new science-based products. As long as such projects continue, of course, their misdescription as enterprise affects only the not-insignificant question of who pockets the proceeds. The danger is that the ideologues of enterprise culture will start to act out their vision of the technology transfer problem, and rely on private investment to fund the development of science-based products.

Finally, my own, admittedly limited, research on science-based companies (Armstrong and Tones, 2000), suggests that the entrepreneurship paradigm works to obscure some important characteristics of the people who successfully found and run such companies. As with management, a core presupposition of research and teaching in entrepreneurship, is that it is largely context-independent. The case studies which I carried out with Anne Tones and Rosie Erol, however, suggest that the scientist-entrepreneur is characterised by a particular approach *to science*. Their conversation, in fact, reveals that it is something of an obsession, but it is an obsession with *effects* rather than with science as a picture of the natural world. They also exhibit a strong preference for acquiring new knowledge through networking with other scientists rather than private study. Coupled with a parallel tendency to network with users, the result is a constant ‘churning’ within their minds, of science-based effects against potential product applications. The outcome is a facility for innovation which, in its nature, tends to be attuned in advance both to scientific practicalities and market demand.

Whilst these observations are clearly tentative, they nevertheless open up the possibility that the UK's problem with developing science-based industries may lie deeper within its culture of scientific research and teaching than our policy makers would prefer to believe. Perhaps this culture disparages what many academics would regard as amateur and dilettante approaches to science, whilst our educational system, especially in the exam room, tends to discourage the practice using other people as sources of knowledge. The entrepreneurship paradigm deflects attention from this kind of question. As with the earlier examples of the engagement of managerialism with concrete processes, its clarity of purpose may be gained at the cost of mis-stating the problem.

Conclusions

The most general conclusion I would draw is the need to interrogate the assumptions and models with which we operate. Like the approximations of physics and engineering science, these have limits to their range of applicability, and it is all too easy to stray beyond these limits, forgetting that they *are* assumptions and models. Reflective work of this kind is intensely irritating to practical people, and this probably indicates that it is to their benefit in the long run.

The ground assumption behind virtually the whole of management science is the abstracted and generalised model of management outlined in the first part of this lecture. At the level of practical politics, the prospects for mounting a wholesale challenge to this model are forlorn indeed. As well as the vested interests of management education and consultancy, it is sustained at the higher levels of management by the capitalist mode of production itself, since the ultimate authority over the means of production in this social form lies with property rights, not expertise. Hence, perhaps, Taylor's antipathy towards ‘financiers.’

At the same time it should be possible, in principle, to explore the discrepancies between managerial and practitioner models of the managed process, and their consequences. As payoff which might be recognised by practical people, it may be possible to show that there are processes (like aesthetic design) for which negotiated relationships are more effective than attempts to manage as this is conventionally understood - perhaps on the half-forgotten model of industrial relations pluralism.

I doubt, however, that the enabling conditions are in place for the kind of research I have in mind. Most management researchers – and here I include the ‘critical management’ circuit – *also* buy into the abstracted and generalised conception of management, and do so for obvious reasons. Which final remark, perhaps, will also serve as my justification for attempting to vandalise the subject in which I have just become a professor.

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