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Connectivity and Judgement – complexity skills for high performance organisations

Background

The background to this paper is one chapter of a report I wrote three years ago and published by the Department for Education and Employment [DfEE], now the Department for Education and Skills [DfES]. That much larger work was based on research I undertook amongst employers largely in the English speaking world, although some European and Asian employers were also involved. The National Committee of Inquiry into Higher Education [the Dearing Committee] received an early draft.

That apart, this specific paper has been presented at other conferences but otherwise remains unpublished. The reason is none other than a need to ensure some exciting and timely ideas should first be critically scrutinised by colleagues. I need to be clear I have got the argument right, and that something substantial is being said here. So I welcome this opportunity to share my thoughts with colleagues familiar with the language of complexity.

On previous occasions, I have used the title: “What Employers’ Really, Really Want” which of course dates those earlier events to a time when the Spice Girls were singing about their own urgent preferences. Sadly, I cannot think of a more catchy title for this paper.

A personal digression

Next, let me say a few words to establish my provenance and authority in these matters. I do not describe myself as a systems scientist, although I am very familiar with systems analysis. I am a social scientist with a background in political economy. My bias is towards public policy concerned with education and training, workforce development, and with labour markets and economic regeneration.

That said, a broader interest in political economy does compel interdisciplinary researchers like myself to engage with complexity analysis. One benefits in the research context from integrating processes of learning, lifelong personal development, information management, forces of global change, and the operation of modern complex organisations.

To improve my own understanding of these connections, I recently completed a Masters in Strategic Information Management, an experience that led me into the fertile world of chaos theory and complexity analysis. Frankly, as a social scientist, I had only been dimly aware of this field before, but this course now changed my life – or at least the way I now get to grips with problems.

Let me share a personal anecdote that has bearing on my argument here. I offer it in honour of the person who, even though everything in my life appeared settled, and my national reputation in my field reasonably secure, still managed to shatter how I perceive and understand the world.

Lorraine Baric, a professor at the University of Salford, was a tutor on one particular part of the course. At first, I thought she was just another poorly organised tutor in an academic profession not known for its pedagogic precision. After two weeks of apparent shambles, I was high on my vanity, almost at the point of saying that her mode of tuition really did not count as a learning experience for which I had paid good money.

What was my problem? She would come into a room and throw books from her suitcase somewhat carelessly in a heap on the table. Thinking this was a rather inefficient way of providing a reading list, I dutifully wrote down the titles as the seminar proceeded. Later, I would buy some and read others from the library.

To be honest, I struggled with these books. I immersed myself unguided in apparently disconnected material derived from mathematics and physics, on weather systems on the one hand, on neural Darwinism on the other. These would be mixed with books on military leadership, art criticism, systems and information in modern organisations, computer design, and theories of IQ and Artificial Intelligence. What was I, a lonely political economist adrift on this unfamiliar ocean, supposed to make of this?

One day, the penny dropped. I was reading something by John Casti of the Santa Fe Institute and, at the same time, something on neural Darwinism by the Nobel Prize-winning biologist, Gerald Edelman. Slowly, and unprompted by any formal direction from Lorraine, I began to understand what she was nudging me towards. It seems so obvious now that I am embarrassed ever to have doubted her tuition style.

In her non-directive manner (because the point at stake could hardly be ‘taught’), Lorraine Baric was leading her students to make sense of the diverse but [once the penny dropped] highly convergent literature on complex organisations – on the brain, computers, weather systems, formal organisations, decision-making and judgement in different contexts of war and peace, stock market behaviour. She was inviting appreciation of the connectedness of the various elements that constitute material, psychological and social space, to work with matters which were *emergent* in the literature. In short, I was beginning to grapple with the distant outlines of a unified theory of complexity.

Many systems analysts working in this field, those engaged in knowledge management, the informational economy, the development of systems and so forth, will realise that the field is no longer theirs alone. Social scientists have moved onto its margins; economists have been playing the field for longer. They have moved in not least because they are attracted to the problem driving us: how do we understand and manage the grossly complex, the hugely turbulent? How do we manage, for example, the movement of liquid through a pipe; or cash through a stock market; or crowds through a station concourse? Or how do we manage information flows through a network of relationships in an organisation, let that organisation be Government, for example?

We are talking about the ability to make sense of the apparently turbulent and to give some meaning and shape to it. Economists may be motivated to understand the cyclical passages of cash through a stock market. Social scientists would like to understand the nature of collective but currently intractable human behaviour – the behaviour of crowds for example - which does not involve reductionist or purely psychological explanations. Scholars in other fields are now borrowing the language of chaos theory and complexity theory, not always precisely perhaps, but for reasons which systems analysts would support.

Complexity and modern times

Some analysts of the modern condition suggest we now live in an age of ‘super complexity’. Frankly, we don’t. We live in an age where the distribution and circulation of information has been hugely accelerated; its volume has increased. But the idea that we live in an age of ‘super-complexity’ is a modern conceit. It is largely a historical inaccuracy too.

The connections we need to make between different aspects of information remain complex despite increases of speed and volume. The Victorians had to accommodate an entirely new theory of biological evolution, the development of transport and telegraphic systems which accelerated personal mobility and increased the density of human interactions, and new forms of energy production and utilisation. Today, the world seems complex to us, but I suspect no more complex than to my father born nearly 90 years ago, nor to his grandparents who would have moved from an agrarian to an industrial and information-rich society.

So we need to be aware that the term ‘complexity’ is used by some in a looser sense than that adopted by complexity theorists to describe informational dynamism in complex systems. In this paper, I would like to draw upon both uses of the term to explore some relevant dimensions of the problem.

Skills, complexity and the changing organisation of work

The research upon which this paper is based arose from my attempts to find out what employers internationally were seeking from their employees by way of skill.

The literature has a lot to say about what employers want in general terms. National surveys of employer opinion confirm that they need people to read properly, work well in groups, communicate fluently, be technologically competent, and be reasonably attentive, presentable and show up on time. These have been well-recorded as the ‘core’ or ‘key’ skills of the modern age. Frankly, as I set about the research, I was not expecting to find much else. But what I found did surprise me.

Before I share that surprise, let me share with you what employers internationally complain about when discussing higher level skills. I am not talking about intermediate or lower levels of skills here. Rather, I am talking about skills for exceptional leadership, skills that equip employees in globally active firms to work in the complex networks and markets they have created nationally and internationally.

Employers criticise universities as the bodies responsible for generating high level skills, skills which they believe universities inadequately reflect in their teaching and practices. Employers see universities as lacking adaptivity, being slow to change, for expecting public support without adequate accountability. They see universities as self-referential, defining problems on their own terms, and not those of employers. Critically, and germane to this discussion, employers take the view that universities are hide bound by discipline.

For example, one Board member of a German company explained: “Whenever we take a problem to a university, the university spends as much time deciding which department the problem should be sent to than it does actually addressing the problem. But our problems don’t come in department-size shapes. They don’t fit the fault-lines of faculties and departments; the problems are much fuzzier than this”.

Employer surveys in America, also in Australia, confirm the view that universities are victims of their own success. They are trapped in a disciplined bound view of knowledge and are now ‘behind the curve’, i.e. behind the way in which knowledge and information is developing in the world outside the academy.

Organisationally, universities have conventionally structured the distribution of resources within discipline-based compartments. Many of these compartments of the academic body remain defined by 19th century definitions of the way in which the world was conceived. In my own university and elsewhere, sociologist shall not speak unto psychologist, nor share modules or course components together for fear of ‘contamination’. The same can apply to sociologists and economists, but can also apply between mathematicians, physicists and engineers, and between biochemists and medical scientists. Whatever the arguable merits of these disciplinary squabbles, employers find they impede effective treatment of their problems, and can limit the skills high-flying employees need to develop.

Academics have equally forceful criticisms of business as well. Employers have difficulty knowing what skills they truly need. At times, what they mean by ‘skill’ is so general that anything could count as a skill. Moreover, by the time universities finally understand what employers want, employers have changed their mind and moved on.

The employers, it seems, want the best of both worlds. They want high level general skills that equip employees to manage complex tasks, but they complain if students lack proficiency in specialist professional tasks. If universities produce a greater level of expertise, employers then complain that students are insufficiently adaptable for the modern workplace.

Frequently employers complain that universities should do more to facilitate the free transfer of information between disciplines. But universities respond that employers have an overly commercialised view of knowledge outputs, something universities cannot work with and at the same time retain their independence.

Complexity skills for high performance

When I asked about skills workforce high performers required, I began to get more interesting responses. The tone began to change when I mentioned the type of ‘core’ or ‘key’ skills I referred to earlier. A form of weariness spread across my respondents. Yes, they said, we need all those skill but frankly we take them for granted when looking for high performance employees.

They confirmed that, in the main, they had few problems with those types of skills. One respondent commented: “Students have never been better prepared. Frankly, we don’t think there is a skills crisis of that nature in people coming out of university. They are astonishingly well equipped in terms of subject and knowledge skills – better than we were. What they lack is the ability to work in the modern economy. They simply can’t function at the higher levels of contemporary business organisations.” So I began to explore what it was these employees lacked. What emerged is the subject of the rest of this paper.

First, I must enter one note of caution. To do justice to my respondents’ efforts to explain their problem, I adopt the language of complexity theory. Clearly this is not the language my respondents were using. Yet the terms and categories of complexity theory come closest to capturing what employers are wrestling with when they appeal for a different set of high performance skills.

Linearity and non-linearity

Students, they observed, were coming forward for employment in high level positions well versed in ‘linear thinking’ - the conventional, rational model of problem-solving and problem identification. The systematic pursuit of solutions via a linear sequence had its place but, respondents suggested, what was happening in the world required students to think in a non-linear manner, to break out of that type of familiar linearity. Events do not proceed in an organised linear and predictable manner in modern high performance business. Employees at this level need an ability to roam intellectually

Negotiating turbulence

To borrow from rugby or American football to explain the point: it is the ability to operate in ‘unstructured play’ where the coach’s manual has broken down. In ‘broken play’, the best players thrive. Employers felt this was lacking in students. They had been well prepared to think logically and systematically but not to manage non-linear or disrupted patterns. For this reason, such employees found it difficult to manage turbulence.

Respondents regarded the ability to manage turbulence as an essential and indispensable quality to be possessed by those who would go on to succeed with transnational corporations in the global economy. You could not employ people who were only comfortable understanding their niche or place in a career hierarchy.

Managing ambiguity

Respondents also claimed students were poorly equipped to manage ambiguity. In fact, they tended to confuse ambiguity with irrationality whereas for corporations at this level, ambiguity was the essence of everyday organisational life. Events were often contradictory; business alliances no longer followed simple sequences. An ally in one market could be a competitor in another. Even within the same organisation or budget centre, similar ambiguities apply.

In the context of the research, I was alert to developments in the international telecommunications industry. In Australia, problems of ambiguity and contradiction were working themselves out in this market. I interviewed executives from Optus, Telstra, which was in competition with Singapore Telecom, and Vodafone from the UK. Other players were entering the market as well.

The problem in the telecoms industry at that time was that BT had just entered a global alliance with AT&T from America (that alliance has subsequently foundered). At the same time in Australia, BT and AT&T were vigorous local competitors in the telecoms market. America and Europe were competitors in Australia each bidding with Cable & Wireless, Singtel and Vodafone for shares in the new mobile market. There was no such thing as a stable set of business relationships which senior level employees of the company could rely upon. It was 'broken play'. Firms and their employees had to adjust their stances depending on whether they were engaged with allies in Europe, or competitors in Australia and the Asia-Pacific region. In other words, the respondents reported, it was impossible to depend upon people who lacked familiarity with contradiction and ambiguity in networks and alliances of this nature.

Connectivity and complexity

If ambiguity is one dimension of the modern world students fail to cope with, employer responses suggest that students were also poorly prepared for understanding connectivity, or the joined up nature of things. This point relates to the question of rigidity in the university curriculum mentioned earlier.

Events in the world are at the same time shattered and joined up, fragmented and linked together. Organisations break themselves up, and recombine in new patterns for fresh purposes. Employers say they no longer work with linear business structures or networks. Companies have been 'dissolved' and dispersed; some say they have been 'hollowed out'. Students now and employers in the future need to be able to understand how to make connections out of a seemingly haphazard collection of events that circulate and drift about in their environment. And having made connections, what conclusions should they draw?

So issues of connectivity and judgement become quite critical here. Employers believe they are describing high performance skills in that respect.

Recognition of the characteristics of complexity was held to be lacking in new employees. Students were poorly adjusted to reading signals coming in from different sources. Organisational members will receive different types of inputs, some of it false, some of it accurate, all information to be managed in order for decisions to be

taken. In other words, the complex nature of the decision effect, the way in which decisions get taken in business becomes something that demands sensitivity to the complexity of inputs that constitute the decision process. It is more than simply a 'black box' input-output model. The 'black box' is in fact the world the high performing employee inhabits.

This is very relevant in my own field of public policy. One of the most important characteristics civil servants have to learn is that every policy produces unintended consequences. In fact Murphy's law in policy-making proposes that unintended consequences will have greater impact than intended consequences. Of course anticipating the unintended consequence of a policy is likely to atrophy the policy-making process altogether. If you believe that the unintended consequence of a policy will have more impact than the intended consequence, it engenders a fear that slows down policy momentum and decision-making. Critically the impact on commercial organisations of the unintended consequences of decisions is something which business strategists have to factor in at every point. Hence a complex process is rendered more complex.

Provisionality and emergence

An appreciation of provisionality was a further high performance skill in short supply. High performance employees were well adjusted to understanding the way things are. They were poorly adjusted to the provisional character of reality, that things will change, that nothing is given. Whether it be the qualifications they possess, the expertise or confidences they currently now enjoy, the configuration of relationships in the economy, or the wider policy environment, everything is relatively temporary. Things will shift and move around, and one's own orientation has to change in time to gain an advantage over the world in which one is active and seeks to control.

Something of what I am striving to explain here can be captured by the very useful term 'emergence'. I have to say this was not a term my respondents used but one that will be familiar to anyone dealing with complexity theory. The concept of emergence, the process of becoming, of equilibrium within dynamism, is Greek philosophy revisited. The river in front of you is always moving past you; hence it is never the same river. Things are always emerging, changing and shifting. The vitality of the concept of emergence lies in the notion of dynamic equilibrium, that chaotic systems retain shape and character, emerging from the underlying noise of babble and chaos.

If one can find the order emergent in chaos, one may have a way of understanding the social world as well. But mundanely at the level of employers and organisations, the relationship between the provisional and the emergent, 'permanent' formations never quite collapsing into chaos, is important. High performance employees may never know the fixedness that gives comfort to people in terms of rooting their reality in fixed points of reference. Events and circumstances are rarely like that at the high-flying end of the business world.

Self-organisation

One response to the management of provisional and emergent conditions, according to respondents, is to encourage employees in self-organisation. Sometimes this amounts to little more than a prosaic commitment to self-motivation or self-starting behaviour by which employers confirmed they sought people who did not rely on hierarchies for permission to seek solutions. Many respondents were very forthcoming. I regularly asked at this point: “what skill above all would you have high performance employees possess?” Often with a laugh, respondents would say that the one sought after by all companies was the ability to predict the future.

Behind the wry comment lies a serious point. Senior executives need to ‘know’ what lies ahead. They need to be able to predict the future in some form, with some degree of certainty. If senior organisational members do not know what lies downstream, they can hardly tell subordinates how best to act. What they therefore rely upon is the skills of self-organisation or individual adaptability as people orientate themselves towards problems as they arise. This requires people to be sufficiently unwedded to a particular solution that they are able, at a moment’s notice and without shame, to think of an alternative because systems, networks or circumstances have changed. In other words, permanent attention to adaptivity and self-creativity is a benchmark of high performance.

Global cultural confidence

The one skill employers volunteered as necessary for success in a global economy was the ability to work with different cultures. There is a rich literature on different cultures both within organisations, between them, but the respondents to my research emphasised a radically different point. They stressed the need for employees to accept cultural difference as normal rather than alien.

For example, when an Australian company sends a senior executive to Japan, the company knows the executive is intellectually equipped for the task ahead. That executive will also be aware they do things differently in Japan compared with Australia. But the skill being chased by employers is the one that not merely notices things are different in Japan, but accepts as legitimate the way the Japanese do things. Employers become frustrated by an absence of this type of cultural sensitivity in high performance recruits. They complained that such employees fail to strip out all sense of ethnocentricity or cultural baggage. Instead they needed to work on the fact that the unfamiliar is normal, strange is normal; it is legitimate.

This is not the end of the matter of course. I asked some respondents what they would expect when sending an executive to work where the expectations of public or business probity were not as demanding as one might find in the West. Do we have a right to impose allegedly ethically superior standards of public conducts on host countries? Now one might say that if the alleged corruption in the country is based on family or clan connections, and so forth, and it compromises Westernised meritocratic models of a business conduct, then we would expect executives to take an ethical stance. That is to say, there are certain forms of conduct one would be unwilling to accommodate or legitimate because of differences of culture.

In short, these are fuzzy and difficult areas where it will be quite difficult to determine the appropriate course of action. That said, the principle being addressed still stands. Organisations working within a global economy, American-led or otherwise, are likely to find themselves facing business and social norms that are at variance with Western practice. When that happens, responses to the specific complexity have to be engineered and negotiated.

A concluding practical example in the management of complexity

Let me end with an interesting example that ties together much of what I am searching to explain here.

I spoke to at length by interview and e-mail to a board member of then Glaxo, now Glaxo Smithkline, a pharmaceutical company. At the time, before the later merger with Smithkline Beecham, they were undergoing the merger with Wellcome Trust which is a big funder of scientific research. The merger with the Wellcome Laboratories brought into the new Glaxo-Wellcome company a raft of drugs developed within the Wellcome tradition of a charitable foundation. Glaxo itself had emerged out of a very hard-headed commercially-driven pharmaceutical culture. So two traditions merged, but the Glaxo model won out.

Nevertheless, the new company inherited the drugs Wellcome had been developing, including a number targeted on Africa as a reflection of its charitable work. One of those drugs was a highly effective anti-malaria treatment that had been expensive to develop but was now cheap to manufacture. Of course, there is no significant commercial demand for anti-malaria treatment in the developed countries where pharmaceutical companies make their money. But demand is high in Africa where malaria remains depressingly common place.

So Glaxo, not wishing on commercial grounds further to develop the anti-malaria programme, nevertheless felt that it should maintain production of the treatment at minimal cost for humanitarian reasons. It resolved to donate one million units to Kenya, a country chosen as a trial in consultation with the World Health Organisation. The drugs were packaged and delivered to Kenya where they sat in warehouses for several months, unopened. It transpired that the Kenyan authorities objected to the trial.

Now why would a country like Kenya, beset by malaria, refuse one million annual doses of free and effective anti-malaria vaccine? Imagine one has to present a report on the situation to an incredulous Glaxo board, explaining why the Kenyan authorities are blocking a philanthropic gesture. Does one shelter behind racial or 3rd World stereotypes? Or blame bureaucratic muddle? Or tell it like it is, and help the company to manage the complexity?

But what is the truth of the matter?

To begin with, the Kenyan authorities are suspicious of the offer. They believe if they accept anti-malaria treatment for free, it will establish a market for Glaxo-Wellcome products. The next thing they expect to hear, once the market has been primed by low-cost and no-cost drugs, is for Glaxo to announce the end of the 'free' programme,

and the introduction of charges which an impoverished Kenyan health budget could not meet.

So Glaxo provides the Kenyan government with all the bona fides necessary, a ring fence deal with no commercial attachments, a genuine charity. But the boxes of drugs remain unopened at the airport warehouses. A natural inclination is to blame the inefficiency of the local Kenyan transportation system, or the lethargy and corruption of its officials, or the labyrinthine nature of the bureaucracy – stereotypes that fit one image of developing countries like Kenya.

That would be wrong in this case; the situation is altogether more complex. Down in the warehouses, the Kenyan authorities are having problems deciding who gets the treatment. Three million Kenyans have malaria or are susceptible to it. So which million get treated? Then there is a medical problem. In order to maintain immunity to malaria you have to take the complete course of treatment, say, ten pills once a month for ten months. If one takes fewer pills, one remains vulnerable to infection, thereby wasting the earlier scarce doses. So the Kenya is required to have systems that not only select individuals who can most benefit from the doses, but those systems must also maintain individual medical records over ten months. No such medical record system exists in Kenya.

Lower down the hierarchy of control, further problems arise. Out in the rural villages, pills of any kind are a scarce commodity. And in times of scarcity, people share. So if someone was offered a dose of ten pills over ten months, it would be common practice in such villages to share medicine amongst the family. Moreover, people left to themselves will get a pill, maybe save it until later when they might get malaria, or give it to their wife or children. Suddenly a medically-monitored treatment programme looks far from reality. Then one discovers a black market has developed in the sale of the pills. They are scarce commodities; there is high demand; and pills can be used as proxies for currency. Suddenly the well-intentioned philanthropic gesture that emerged from the boardroom of Glaxo Wellcome begins to look hugely awkward down at ground zero in the nest of complex decisions and interactions that place there.

Let me end by saying that, in practical terms, it is not merely the theoretical exploration of skills for complexity that should concern us. Systems thinking and systems management is concerned with the practical consequences of managing information and decisions along the line to the point of impact. From the moment of policy formation, through a range of signals and information of various kinds, through a welter of contradictory and ambiguous conditions, decision-makers in government or business are obliged to produce a set of viable commercial or policy outcomes. This is the stuff that concerns everyone in their different ways: political economists, pharmaceutical executives, employers in global markets, and of course systems analysts.