Tacit knowledge in rapidly evolving organisational environments

It will be argued here that phenomena which have appeared in two widely differing organisations suggest that parallel evolution is occurring in different contexts conditioned by the wider context of ICT development and other trends associated with the concept of Post-Modernity. The outcome of these developments is that constant updating of the self-image and self-knowledge of the organisation becomes part of the day-to-day knowledge-in-use of front-line practitioners and that in combination with these practitioners’ client-centred approach this process in turn feeds back into the evolution of the wider organisation, the phenomenon designated by Claudio Ciborra as Drift.

Post-modernity is taken to be the abandonment of the model of society as moving towards a rational division of labour aimed at meeting the natural needs of rational Man. This model was associated with an assumption of the fixity of a number of social spheres and economic sectors which were based on the centrality of different principles or technologies. In retrospect these phenomena can be seen as products of the clustering of various subsidiary functions around central functions as a result of problems of spatial and temporal co-ordination and transaction costs. Associated with this were product-centred enterprise and the assumption that organisational change primarily arose from technological advance within different sectors.

ICTs had the initial effect of bringing into prominence the concept of the Value-Chain. This means that different technological platforms in the process from raw materials to finished goods and services can be linked on the basis of profitability and criticality while lower transaction costs and despatialisation allow out-sourcing of staple inputs. This paradigm has spread from for-profit to not-for-profit sectors because of its benefits in cost-reduction and responsiveness to final outcomes. A further twist in this process takes place when organisations abandon all concept of a central product and instead define themselves as providers of solutions. We draw on the experience of two 'solution-providers', one for-profit and one not-for-profit. The subordination of all of the products and services offered to the concept of a solution or transition leads to a greater role for the front-line practitioner in deciding what inputs are required and how to source them. This can only take place within a context of ICT-mediated communication and in a context of standard-setting and information sharing.

The necessarily personal use of tacit knowledge is a factor in the inescapable element of drift which arises in this context. The need for practitioners to consider every individual case drawing on their individual knowledge of the accessible competencies and capacities of the organisation means that a succession of choices between the possible solutions to the client’s problem's has unpredictable outcomes for the dynamics of the wider organisation.
Tacit knowledge as understood in management and organisation theory

Tacit knowledge has been discussed within management theory in a contrast with explicit knowledge. In this context explicit knowledge is usually itself under-defined. If we look at an organization top-down, we can expect to find a wide array of legal, technical, commercial and insurance-related documentation of the ownership, property, machinery, goods and contractual relationships of the organisation, and descriptions of its processes and the roles of individuals in those processes. So ostensibly the organization has a body of explicit knowledge which describes what it does and how it does it. If we look at explicit knowledge bottom-up, we could find that a starter in the organization is immediately confronted with a highly signed environment, with a wide range of traffic and safety signage, departmental and personal nameplates, and maps and diagrams of work procedures and flows. We need to ask, how do these masses of texts and signs become knowledge? Obviously only by being read, and by being read and understood, and by being read and understood as relevant to a particular context.

Explicit knowledge is thus always specific to the ability and habituation of the user to acquire and absorb information from the media used. This generally requires literacy, in one specific language, and even when signage is designed without script, it still assumes a basic familiarity with some conventions of signage itself.

There are a number of reasons why explicit knowledge may be fully explicit both in terms of being codified and expressed in a common language, and may actually be talked about on a day-to-day basis, and yet may come to be posited in fact on a whole number of assumptions and presuppositions, the taken-for-granted-ness of which is lost sight of by the participants. This is one of the forms of so-called 'tacit' knowledge analyzed by Boisot, namely that of an in-group idiolect which does not question its own assumptions until forced to do so by organizational change or co-operation with another organization. Once uncovered, this phenomenon may also turn out to simultaneously be an instance of the second of Boisot's categories, that of knowledge which can be made explicit but only at a non-negligible cost.  

The third of Boisot's categories is that which he considers to be Michael Polanyi's own use of the term. In our view unfortunately, he considers this to be knowledge which is irretrievably 'tacit', in the sense of necessarily implicit. In his system there is a hard core of knowledge which cannot be made explicit. This is a serious limitation of Polanyi's insight. When Polanyi says that "we know more than we can tell", does not simply mean that there are things we, personally, tacitly know but cannot express. How people ride bicycles or swim, or walk and eat, are things which some people can perfectly well explain and which anyone can begin to learn about. Polanyi would agree that what we tacitly know is infinite and thus inexhaustible. In fact this is also true of what we explicitly know and all the inferences which we could draw from it. However, the more immediate point of Polanyi's statement was that there are two ways of 'knowing' and that what we tacitly 'know' can be paralleled and communicated by explicit knowledge and explicit knowing without this ever replacing the mode of tacit knowing.

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1 See Boisot 1998 pp.56-57.
We will explain the full details of Polanyi's concept later, but for now the important point is that tacit knowledge and explicit knowledge are not divisions of a single container of knowledge, so that when one grows the other shrinks. They are two modes of knowledge. Knowledge is information. Both tacit knowledge and explicit knowledge can be duplicated. Explicit knowledge can be duplicated in a variety of media, but tacit knowledge can only be duplicated in human beings through the processes known as apprenticeship in the widest sense. The recovery of explicit knowledge from its material embodiment in printed or digital symbols is itself a process requiring tacit knowledge of systems of language, literacy, propositional thinking and symbolism. There are also systems of apprenticeship in these skills.

Automation was a leading factor in creating an assumption that productivity improvement was a management-led top-down process. In recent decades the importance of the transfer of tacit knowledge by the movement of workers has been highlighted by the literature on clusters, which has drawn on Marshall's older work on industrial districts. Silicon Valley and Central Italy have been seen as examples of areas within which new technical knowledge has been rapidly diffused and has served as a basis for competition to be concentrated on product design, boosting the competitive advantage of the cluster as a whole.

**Tacit knowledge within new contexts of market responsiveness**

Interest in clusters as sources of competitive advantage has combined with wider policy trends towards privatization and the use of market forces to lead many large corporations to introduce market principles into their internal arrangements. These processes somewhat parallel the way in which large Japanese corporations have out-sourced some of their inputs to firms with which they maintain cross-shareholding and developmental information sharing. This means that the dichotomy between Western and 'Eastern' (actually largely Japanese) approaches to the value of tacit and explicit knowledge (in whatever sense) has been softened by a convergence towards more complex relationships between and within large organizations and supplying contractors.²

An example of the drive to introduce market principles into both the working of a government service and its relationships with its users is the UK government Connexions service. The aim of the service is to facilitate the transition from school to work for all 13-19-year olds in England, with equivalent services in the other parts of the UK to converge on this model in time. All personal, family, sexual, legal, drugs, disability, housing, educational and training problems are to be dealt with by a one-stop service oriented to the individual, with co-operation between all kinds of professionals and a reduction of the stigma arising from the need for help in more sensitive areas since the service is universal.

² Nonaka and Takeuchi 1998 investigated this East-West dichotomy in the appreciation of Tacit Knowledge. For a case study and an introduction to the wider literature see Lincoln & Ahmadjian 2001.
The Connexions service has been organised around the concept of the Connexions Advisor. This is a new professional profile which is intended to unify the roles of careers advisor, family support workers and young people’s support workers. These advisors are themselves each seen as possible ‘one-stop-shops’ in that a young person may in the first instance establish contact with any advisor through a number of institutions, hotlines, or outreach projects, and this advisor will then begin to set in motion whatever processes are necessary to address the young person's problems. While individuals with particular profiles of problems may be attached to an advisor who is a specialist in these problems, most should be able to maintain a relationship with the first advisor with whom they come into contact.

The Connexions service presents itself as a product brand which appeals to potential users as a service to which they are entitled and which they should take up. This general trend in presentation of all government services is more extreme in the Connexions service because of the age of the target group and the corresponding assumption that they are more likely to use the internet, mobile phones and texting than older groups, and that they are subject to a wider range of alternative claims on their attention which the Connexions service must challenge on the common ground of consumerist culture and media styles.

Parallel investigations of the use of competency and personal development systems within the Connexions service and within a major IT company gave rise to interesting and surprising parallels. Despite the obvious differences between a profit-oriented corporate business serving principally other corporate clients and a government-provided service aimed primarily at individuals, a number of similarities could be observed in the processes which arise when the individual units of large organisation may take differing steps to adjust their responsiveness to client demands. Knowing the location and relevance of clusters of expertise within the wider organisation becomes an important aspect of the tacit knowledge of each section, while the old methods of spreading best practice become problematic since the different units may be applying their practice in significantly different contexts.

**The UK Connexions Service Context**

The Connexions partnerships are thus an example of a general trend in UK public services sector delivery and a precursor of wider developments in the same direction. The main components of the service are:

a) An on-line one-stop advice shop
b) A universal service offer for all members of the target group, in this case, all young people aged 13-19, and,
c) A range of deeper services, some available on demand, others taking over statutory roles when required, which deal with all of the problems of the target group in moving towards the goals set by policy

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The objective is that all young persons despite any disability, personal problems, family problems, or problems in relating to institutions, should make a successful transition from full-time education into the labour market either directly or through further and higher education.

The aim of the one-stop shop approach is to include as many as possible of the special services which young people may require within the blanket service and thus reduce all stigma arising from labelling. Since the career service is a universal institution that does not in any way stigmatise its users, it was regarded as the most appropriate service to provide the wider context within which the specialist advice, help and guidance is provided.

This change is not merely cosmetic but gives rise to a fundamental redefinition of the occupational roles of all those involved. Those previously in the careers service were always oriented towards pastoral guidance for those who found entry into the adult world problematic but now the normal and the problematic cases are regarded as a continuum. Conversely, those advisers previously occupied with help, support and guidance for individuals with specific problems are finding that they are operating within a framework with a definite goal, the successful transition of all individuals from education into the labour market by age 20.

In this context there has been some concern about the cut-off point of age 20 and what may happen to the more vulnerable individuals after the Connexions service ceases to be responsible for them. A general criticism of target and goal-based systems is that they distort priorities and produce a manipulation of targeted outcomes which may not be effective in the long-term. In the case of the UK Public Employment Services, this led in some cases to the placement of individuals in employment which was predictable to be short-term. While there are arguments for keeping individuals in touch with the labour market even if only on a short-term basis, overall this kind of system has been seen as responding to perverse incentives and wasting resources which should be devoted to preparing the individuals for more secure employment. The 19-20 cut-off is seen as a potential danger due to the possible production of equivalent perverse incentives to rush individuals into non-permanent placements in work or training in the run-up to the end of the service’s responsibility for them.

The Connexions service currently operates through 9 regions in England. Within these regions are 47 areas where 151 partnerships are operating. Human Resources management is located at the area level and each area can employ between 500 and 1000 personal advisers. The Connexions Partnerships are of two kinds, Direct Delivery and Sub-contracting. The latter breaks down into two sub-groups, the ‘Basket of Services’ model and the ‘Thematic Support’ model.

In Direct Delivery areas, a single organisation takes the contract for the delivery of all Connexions services. In these areas, the local Connexions partnerships are divisions of the area partnership. The management services of the partnership and the face-to-face delivery of the services to clients are all carried out by the Direct Delivery organisation.
In **Sub-Contracting Areas**, the face-to-face services to clients are carried out by sub-contractors working for the area Connexions partnership. The way in which this is organised can take two forms.

a) In the areas operating the ‘Basket of Services’ model, the local Connexions partnerships contract to provide the Connexions service for a local district within which they are responsible for all services to clients. Some of these contractors are local organisations which developed out of government service providers. Others are purely commercial organisations which submit multiple tenders for services in a number of different areas and localities. The Connexions partnership for the area is responsible for ensuring that these sub-contractors deliver the services and for providing them with a number of management services including human resources.

b) In the areas operating the ‘Thematic Support’ model, sub-contractors do not provide area-based services but specialist services such as careers guidance, drugs advice, or specialist workers for the hard-to-reach clients. The area-based Connexions partnership remains the provider of general services for the whole area.

These different business models cut across distinctions of urban and rural settings and also do not correlate to the number of partnerships within an area.

Connexions Direct presents itself as a website which offers advice through web-chat, texting and telephone communication on an 0800 number. Advisers will also ring out to users who text or email their telephone number. Connexions Direct began operating before the Connexions partnerships were fully established. The relationship between Connexions Direct and local Connexions partnerships is probably very uneven nationally and determined by the perceived strengths and weaknesses of the different agencies in different places.

Connexions Direct is not the only Connexions website. Most of the area Connexions Partnerships have developed their own websites and use these to communicate directly with their local target audience and to provide services to their users. These websites are very varied in their visual design and approach.

Many Connexions advisors are located in schools where they exercise a variety of functions. Schools have a Connexions budget which is intended to be allocated locally in consultation to provide a mixture of full-time and part-time, generalist, specialist and outreach services. Schools have begun to complain that careers advice for the entire school population has begun to suffer as a result of the skewing of both budget provision and the actual take-up of Connexions resources towards problem children and special needs.

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4 e.g. Ward 2005. It seems unlikely, however, that any future restoration of a dedicated schools career advice service would result in the abandonment of the wider Connexions advisor approach.
The National Occupational Standards (NOS) for Connexions are clearly derived from the Functional Map for the service. The functions which the organisation is statutorily required to carry out have been mapped and the occupational profile is a direct iteration of this mapping. More precisely, there is a mapping of the common and shared functions which are common to all professions providing support services for children, young people and their families. The professionals were consulted on the mapping of these functions but within a context which ultimately derives individual functions from the organisational imperatives.

The National Occupational Standards work from the Key Purpose of the organisation through a number of Key Roles, which are themselves broken up into units and elements. Within each Element there are Performance Criteria, a Knowledge requirement and a Range indicator.

Connexions Advisers will generally be qualified at NVQ 3 or NVQ 4 level in a relevant or related area of work before beginning their work with Connexions. They will progress through the Introducing Connexions course which is a short overview of the service and its relationship with other services and then progress to the Understanding Connexions course which will bring them up to an NVQ 4 level on the wider system of Connexions. Those working with harder-to-reach young people will generally be expected to undertake the Connexions Diploma, which is an H.E. Diploma also on level 4 of the NVQ system.

The Connexions service has been given the responsibility of developing a common language and a secure database for the sharing of data on the cases of children and young people between the various agencies involved. However, part of the problem of developing systems for competency mapping and performance mapping of the individual advisors and units within the Connexions service is that much of the data concerning problems and outcomes of individual cases is client-confidential. Such data is therefore not directly available to the personnel departments for detailed assessment.

Part of the role of the Connexions Adviser is to be aware of the resources available to help them in carrying out their tasks. This implies that keeping up with a wide variety of legislative, scientific, procedural and market knowledge is an essential part of the occupation. This knowledge will be disseminated within Connexions by a variety of bulletins, seminars, and websites, but the onus is on the individual adviser to take advantage of this information and know how to find and interpret it.

However, the Connexions Adviser will also need to be aware of what skills and knowledge they can call upon from colleagues in their area. This is not a simple matter. Connexions Advisors work through a variety of modalities. Some are full-time, some part-time, and some work part-time for a number of different Connexions services or partner organisations making up a full-time job. Most are employees but many are freelance. A single large school may contain three or four Connexions advisors employed on different systems and with different remits. Schools and other qualifying bodies such as youth clubs may have a budget for Connexions advisors which is renegotiated each
year. Colleagues may be working together who belong to statutory organisations, charities, commercial contractors, municipal offshoots working under commercial contract, or bodies in the process of privatisation.

The IBM Context

IBM has evolved from a business machine manufacturer to a computer manufacturer, then to a computer system developer, and now identifies itself as a computer system consultant. Its business consists in finding and implementing solutions to client's needs using new technologies on the interface of communication, data management, and process management. In 1994 it began implementation of the Customer Relationship Management system (CRM). This means that development of an answer to a business opportunity becomes the responsibility of a single individual, the Opportunity Owner, who takes responsibility for carrying out the whole project. They will then have the responsibility of using the entire IBM Information Warehouse to find the necessary collaborators to process the development. As part of a general trend towards supplying consultancy rather than hardware or software, this means that they will be seeking individuals with knowledge and skills in the areas of processes and products similar to those of the particular client in order to develop a complete business solution for the client organisation. This change has influenced the skills mapping and the professional template used within IBM as it has become necessary to co-ordinate skills within the organisation with the processes of clients rather than with the contours of IBM-internal production and development processes.

In 2003 IBM's $36 billion turnover was composed of 45% services, 34% hardware, 16% software, 4% financial services, and 1% other services. The expansion of the services share of turnover is expected to continue.

The framework for skills management in IBM comprises IBM Foundational Competencies which are common to all employees, Basic/soft skills, of which 16 are used, divided into three groups, Business, Leadership, and Relationship skills, and Professional Core skills, which are each specific to a particular profession or job roll and of which there are more than 25,000. IBM currently has some 319,000 employees globally, distributed 167,000 in the Americas region, 100,000 in the Europe, Middle East, Africa region, and 49,000 in the Asia Pacific region.

The competency profiles of individual employees and working groups are databased and provide a pool of information which can be used as a resource to draw up a pool of potential collaborators in any new undertaking. However, it is recognised that even this level of mapping of competencies does not provide an immediate match for the relevance of experience in one area for application in another. Therefore the Opportunity Managers and Opportunity Owners are encouraged to make their own investigations of exactly what competencies and knowledges are present in other parts of the organisation. One facility to encourage this is the Intranet Customer Room, where experience with particular clients is pooled between different Opportunity Owners. It has been realized that central

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production of a compendium of these things would merely create a rapidly dating resource which could become an obstacle to the development of new and possibly creative encounters between different units and individuals. Instead there is a database of solutions, which is not to be used simply as a document of what has been done in the past but should lead to communication between units to compare experience and to discuss the relevance of past solutions to new problems.

The outcome of these steps is that Opportunity Managers and Opportunity Owners should not be reliant on higher management to delegate tasks within a development project or to pass on historical knowledge about similar cases. It is part of the work of the Opportunity Managers and Opportunity Owners themselves to find the right people and to exchange information about the client or about other comparable development processes. This is in part because a global organisation of the size of IBM could not rely on purely informal exchanges to produce sufficient information flow simply because of the large number of units and employees. But it is also a recognition of the value of the tacit knowledge which is built up through both success and failure and which cannot be captured by any compendium.

**Tacit knowledge as a navigational tool within complex changing organisations**

The two case studies, originally undertaken in order to investigate the value of competency mapping tools for the organisations concerned, gave rise to a realisation that there was a new kind of tacit knowledge arising within large organisations of ostensibly quite different types arising from the parallel processes of internal organisational complexity and the need for small units and individual professionals to work in a client-centred way within the constraints of a number of differing outcome requirements. As a first approximation the two organisations investigated appear to display the following common characteristics:

1. The practitioners operate within a context of tension between the wider goals of the organisation and the immediate needs of the clients they are directly in contact with. In a general sense this may always have been the case but managing the tension between these potentially conflicting goals is increasingly filtering down to become a direct responsibility of the front-line practitioner.  

2. The drive to provide the client with a one-stop shop or a single contact for a product development puts the practitioner under the obligation to constantly review the degree to which they can manage the interaction within their existing skills and whether the resolution to any problem is to extend their skills or draw on the skills of others.

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6 Failla 1996 displays an earlier stage of this process within the evolution of IBM. The shift of the RNSL software production unit from producing bespoke software for individual clients to adapting one of four 'mega-products' to client needs increased the complexity of the task of the client interface while reducing the complexity of the internal development and production processes.
3. The professional needs to have and constantly update a map of the availability of skills and competencies within the organisation. A complete explicit map of the availability of skills is of relatively little use here, because (A) both the level and the location of available skills is under constant evolution and (B) the need for this knowledge cannot be satisfied by reference to an encyclopaedic reference work, since any such compendium necessarily abstracts from the specifics of the use of skills, which is precisely what is relevant to their application to a new problem.

This is the context within which we will return to a deeper investigation of the ideas of Michael Polanyi in order to develop an approach to the interaction between tacit knowledge and explicit knowledge, specifically to how practitioners make use of the massive bodies of documented or databased explicit knowledge about their own organisation and the skills and competencies of its members.

Implications of the continual interaction of explicit and tacit knowledge

Michael Polanyi was fully aware that there is a continual interaction of tacit and explicit knowledge. The clearest expression of this is his discussion of the process of learning to interpret pulmonary X-ray images. The medical student progresses from seeing nothing but a few shadowy ribs to being able to intuit the implications of subtle spider y patterns for the health of the lungs. This is not done by a process of dumb induction, simply comparing the images with real lungs and implicitly developing a mapping of characteristics from one medium to the other. It is mediated by language, so that every development of explicit knowledge through verbal instruction is linked with the display of actual cases while the student is also only able to follow the verbal instruction because the examples give substance to what is initially incomprehensible jargon.⁷

Tacit knowledge is not a special stock of knowledge alongside explicit or implicit knowledge. It is knowledge in activation in a particular context and under the imperative of achieving particular goals. It is this which makes tacit knowledge 'ineffable' or inexpressible: not any hidden quality of the knowledge itself, but the fact that it only comes alive and makes sense in an active context of goal-directed action. To make this entire context explicit would be an infinite task. But tacit knowledge is not simply implicit knowledge either. Large parts of tacit knowledge may have originated in explicit knowledge and may be reproducible as explicit knowledge, but in use this knowledge becomes tacit by being backgrounded while the individual focuses on the goals they wish to achieve. The attunement of the individual to the achievement of these goals within the given context is inseparable from the person's commitment to that particular context as one of their contexts, and it is this attunement which can only be acquired by action.

Polanyi begins from the fact that the greatest part of our knowledge is subservient to our goals and actions. It is in the background but is not called on in the form of statements. Most of what we do, we do on the basis of routines which are familiar and within which

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⁷ Polanyi 1958 p.101. The following exposition draws mainly on Polanyi 1958, but Polanyi 1966, Polanyi 1969, and Polanyi & Prosch 1975 have been consulted.
we follow established patterns and familiar heuristics of interpretation of what is taking place. We cannot focus on the knowledge necessary to accomplish these actions without detracting from the performance itself, ‘putting ourselves off’. When we have to concentrate on a skilled action we are mostly focusing on what could go wrong rather than on the positive components which are necessary but which can be taken for granted.

This is tacit knowing but what is tacit knowledge? If we looked at our knowledge from the point of view of logical implication our knowledge could be said to be infinite. Linguistics tells us that we can generate an infinite number of sentences. Does that mean that we ‘know’ how to do this? Knowledge of classes of things can likewise generate infinite propositional statements. In Polanyi’s way of thinking there is no ultimate distinction between ‘knowing that’ and ‘knowing how’. Knowing how to carry out a skilled performance of any action includes having the capacity to generate a potentially infinite stock of judgements about the progress of the action and the possible risks and causes of failure.\(^8\)

For Polanyi the process of ‘From-to’ knowing is always part of a process of achieving something. Polanyi considers that there are two stages in the tacitness of knowledge. When we are engaged in any action we focus on the aim and we background all of the conditions of success of the action unless a problem arises. But we also focus through the object of our action on the ultimate aim for which the action is undertaken. Whether the action is proceeding adequately is not generally determined by a fixed idea of what the physical form of the outcome should be but on whether it is an adequate basis for the next stage of a continuous chain of actions. In modern society we have become accustomed to see action through the paradigm of the manufacture of a series of almost-identical and interchangeable objects. This is a misleading paradigm for the teleology of most human action, which is not driven by a blueprint but by adequacy to a goal. This final goal is itself subject to shifting conceptions of what success would consist of and how to achieve it. Connexions and IBM are examples of the move away from the old paradigm.

Polanyi uses the word ‘commitment’ to signify the fact that in order to meaningfully doubt any particular thing, we must make prior commitments to the validity of a wide range of other things. We can never question and investigate the vast range of assumptions on which our life is based. There is a further stage of commitment, which is indwelling. Indwelling means accepting a particular context as a context which defines us and which will continue to be involved with us. As we develop our goals and aims, and the habits and heuristics which we need to achieve them we become embedded in and determined by the contexts which we choose. We can only develop our powers and aptitudes in adjustment to particular contexts, which are not neutral environments. Because they are human creations they embody human teleologies and in becoming part of them we absorb the aims and goals of our context. The process of achieving goals is also a process of formation in which the understanding of how to achieve goals can lead to a process of redefining goals and of what would count as achieving them.

\(^8\) “These two aspects of knowing have a similar structure and neither is ever present without the other. This is particularly clear in the art of diagnosing, which intimately combines skillful testing with expert observation.”, Polanyi 1966 p.7.
We have a fund of knowledge about objects and processes which is embedded in our commitment to values, contexts and goals. Personal knowledge is thus a process of continual development and discovery which is also a continual process of adjustment of the individual to their contexts.

The tools which we use, both physical and mental, become extensions of our body. In the case of tools, we adjust our propio-sensory settings so that we process the information received as being ‘out there’ as we do with sight and hearing input. In the case of heuristics we also make the reality of their postulates part of our world, like assuming the solidity of floors and chairs, and we experience an equivalent shock when they are invalidated. This is another part of commitment, which arises because we cannot constantly check all parameters and values. We must take some things for granted in order to be able to apply ourselves to action.

The information from prostheses, the blind person’s stick, the rower’s oar, the carpenter’s screwdriver, the punter’s pole, a bent probe used to investigate an inaccessible recess, are not experienced as events in or on the user’s hand and fingers but as data about what is really there in the appropriate part of space. This is not surprising as we also locate our own hand not solely by information from the hand but from the entire arm and body. We learn to interpret the messages from our nerves as being ‘about’ our hands and fingers only by patterns of correlation between visual and kinetic information of grasping and manipulating objects. We learn to interpret a particular pattern of pressures on our fingertips as being ‘about’ something six inches away or a pattern of pressures on the palms of our hands as being ‘about’ something six feet away. We have simply become accustomed to associate this pattern with the feel of the screw encountering hard, soft or rotten wood, or the pole encountering stone, clay or soft mud.

Polanyi considers that our heuristics work in the same way. We have expectations about the likely future actions of rocks and chairs, trees and animals. We each have a differently tuned set of these expectations based on our experience of these things. This affects both the expectations we have and the way in which we classify things into classes giving rise to different expectations. The heuristics of higher level skills are similar. Such heuristics are an extension of the self into the world. We experience the same feelings of shock and harm when our most familiar heuristics do not ‘work’ as when we sit on a chair and find that it collapses. Our reasonable and normally reliable map of the world and our place and potential for action within it are suddenly upset. Heuristics are thus the limit case of how body and mind work together to produce and experience tacit knowledge.

**Heuristics in the management of client-centred processes**

To unite our themes of the appearance of similar phenomena in two ostensibly widely different forms of organisation, and of the interaction of tacit and explicit knowledge, the heuristic is the actual form of operation of the ‘knowledge’ which is notionally embodied in the organisational mapping of an institution. Information systems only come alive...
when they are used by individual practitioners to develop their plan of action in meeting the needs of particular clients. There is already an analogy in the parallel by which the needs of a client may only be gradually disclosed so that a plan of action for meeting their needs may develop new branches or may be completely recenred by the emergence of new more pressing needs.

Against this target the practitioner has to put together a team of collaborators from a pool of colleagues and units which they know to be experienced or to be in the process of developing experience in particular fields of work. They also have to gauge the pressure of work which these individuals or units may be experiencing. The inherent technical knowledge of collaborators also has to be weighed against their experience in dealing with the particular problems of the particular kind of client. This in turn can involve knowing that one kind of client can often turn out to be a different kind of client as the process develops. In a context of compartmentalised provision there was always the last resort of referral to another professional or service. Manufacturers can always say, well, we don't make them. The system consultant and the one-stop shop practitioner no longer have these options.

The Connexions service has the remit to ensure the school-to-work transition of all 13-19 year olds in England. It will refer its clients to appropriate medical and legal professionals and services, housing or educational authorities but these referrals are never final. The service always remains responsible for monitoring the outcome of these referrals and ensuring their success. The service as a whole is thus the site of first and last resort for all of the problems of its cohorts. And within this context the total responsibility of the organisation as a whole is delegated to the individual advisor. They become responsible for mobilising all of the resources internal and external on which the service can call. They cannot do this by constantly referring to encyclopaedic reference books and directories. It is inevitable that one of the most important tasks of the advisor is to maintain a mental map of the most common pathways on which their clients will be travelling.

IBM has no legal responsibility to accept all business opportunities which arise. In fact one of the responsibilities of the Opportunities Manager within the CRM is to decide whether a particular opportunity flagged by a representative is worth pursuing. However, new opportunities presenting new problems may also present valuable data on the way in which business system needs are evolving. Having moved on from hardware to software and then to consultancy, IBM cannot dictate what kind of problems it will provide consultancy on without risking being left behind by newly emerging trends. Of course IBM has experience in managing the risk involved in open-ended development projects, and problematic client requests will be looked at by the relevant specialists. Nevertheless becoming a consultant inevitably means opening the organisation to the pull of external dynamics. IBM has put itself into a position where it will have to navigate these without the internal structure which was once provided by the existence of given product lines and by final higher decisions about new product development.
Claudio Ciborra argued that this drift could be positive and creative if it is experienced against a background of a platform such as is provided by the standards and systems which allow feedback on what is happening to be used creatively in the wider organisation. These examples may be seen as a paradigm of a new type of organisation which, within overall imperatives and standards, is open to drift generated by the expressed and elicited needs of its clients. Interestingly, this parallel seems to hold both for real paying clients, such as those of IBM, and for users who are given the status of clients as part of a strategy to make take-up of services part of a consumer culture and to banish the stigma of dependency. Within these organisations the need to bring together a range of professional advice and knowledge to provide a unitary response to the client's needs leads to the growing importance of the tacit knowledge of each individual on the interface with the client about the structure of the organisation and its component units and collaborators. The need to provide solutions to problems which arise in the course of the client relationship means that every such worker builds up a picture of the possible collaborations and referrals they can make. Precisely because the organisation is constantly evolving in response to new needs, the tacit knowledge generated by contact and collaboration in client-centred work becomes indispensable. It cannot be replaced by centrally disseminated data, but it is possible to create structures which facilitate the channels of lateral communication.

References

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