

**WORK, KNOWLEDGE AND TECHNOLOGY: PHENOMENOLOGICAL
PERSPECTIVES**

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1.INTRODUCTION

The question about the ontological foundations of many concepts with which we tackle the tasks of organizational analysis and design, such as strategy, structure, technology etc. is not of a purely philosophical interest, or the exclusive hunting ground for post-modern thinkers. The whole issue is being settled in a negative way (i.e. foundations are indeed shaky or non existent) by the dynamics of modern, high tech firms and industries, the workings of knowledge intensive organizations, and the impacts of modern information technologies. The author can just mention in this respect a few studies conducted in the nineties on the emergence of strategic alliances in IT industries (see Ciborra, 1999); on the use of groupware in large multinationals (Ciborra, 1996b); and the dynamics and diffusion of global, corporate information infrastructures (Ciborra and Hanseth 1998).¹

Schematically, what has emerged from these studies is an evidence of the following flavour:

- the linear sequence between strategy and structure is in reality a scrambled one: business in high tech industries is dictated by surprises, bets and improvisations;
- the waterfall models governing the development of new technologies in large organizations are worth the foyles on which they are burned. Actual development projects are characterized by surprises, opportunistic moves and bricolage;
- strategy and planning are carried out, but the number of opportunistic twists and moves to adapt them to rapidly changing circumstances show that in reality bricolage rules “ueber alles”;
- learning by doing and learning from mistakes are at least as frequent as limited learning, or no learning at all. Thus, incremental innovation is intertwined with inertia and vicious circles. As a consequence, organizational structures and processes become an inextricable multi-layered maze of old and new practices.

¹ Self reference in this context is not dictated by narcissism but by a matter of simplicity: in the publications mentioned readers will find abundant literature which points to similar empirical results and lines of thought.

More in general, the concepts taken for granted by organizational analysts and designers, together with those coming from management science, obtain the status of mere “appearances”, that have little to do with the organizational phenomenon being observed, or worse being acted upon. Instead, the researcher, and the practitioner, are surrounded by lots of sudden, and unexplainable “apparitions” (such as strategy is bricolage; plans get diverted; technologies drift etc.). On the other hand, all this does not seem to worry the practitioner and the researcher: business goes on as usual within the (well divided) respective domains of competence. This schizoid attitude benefits both: it avoids the effort to seek for explanations in front of the puzzles; it reinforces the generation of management fads; it keeps the legitimation of management consultants and their methods. Unfortunately, it does not foster the progress of the discipline and leaves most of management literature (from research, to models & methods, to prescriptions) sealed in a sort of a revival of middle age dogmatism. In the realm of practice, it creates frustration, defiance and skepticism towards what the theory and the models can offer, besides being that source of legitimation invoked to justify ex post decisions made on other (which ?) bases.

In the new economy, the economy of recombination (Romer, 1986) and of positive feedback (Arthur, 1996), we probably have to give up those conceptual tools that have proven to be so useful from Frederick Taylor on. But ,where to look for new ones? In this paper we report on one possible line of exploration which is comforted by both philosophical and empirical underpinnings. The idea is that in an age of no (traditional) foundations, one has to go back to the organizational phenomena “as they are”, as they encounter us, once we have cleaned the field from the old constructs. This is puzzling, for the organizational “things in themselves” are just the mundane events that punctuate the everyday life of any organization (and the high tech ones are definitely no exception in this respect). So, the new “foundations” have to be looked for inside a thin surface indeed: the “obvious” of organizational life. Second, recent empirical studies ranging from the work organization within IT companies (Brown and Duguid, 1991) up to the way alliances and new product development are

managed in the biotech industry (Powell et al., 1996) point to the fact that mundane work practices, emerging, informal knowledge communities, temporary networks, ephemeral arrangements constitute the platform to run any business, the more the business is knowledge intensive and high tech. Hence, the programme for this paper is to seek new foundations for organizational analysis and design in the informal, obvious, transient and taken for granted of organizational life. From this point of view, what is required is a re-launch of the phenomenological approach to the study of organizations initiated by Zimmerman(1971), Bittner(1965) and lately pursued by Suchmann, (1987). In the following we focus on the aspects of knowledge, work, & technology, while for the study of organizational structures with no structure we suggest the reader to turn to Ciborra (1999).

2.KNOWLEDGE & WORK PRACTICES

We abandon the safe, high grounds of the world of formal procedures, but also the more (supposedly) modern world of processes of BPR methodologies, or data of the structured systems methodologies.(Schoen, 1983) The formal diagrams, with boxes and arrows used to offer an entative illusion that the disenchanting observation of high tech companies has irremediably challenged. What do we find instead ? Mundane activities: taking care of breakdowns, working at the functioning of a procedure; acting with tools; informal, communications; shortcuts; ad hoc improvisations; rules of thumbs and recipes. The closer we get to the core of the avant-garde enterprises of the end of the century (applying new technologies in the office of the future; diffusing and managing multi-layered information infrastructures; operating the MIR space station; fixing the troubles in Apollo XIII, designing new sophisticated public and private buildings; analysing and recombining DNA) the more ubiquitously these activities can be retrieved. The fact that both the academic world and the consulting firms insist on teaching, spreading and applying the structured methodologies, systematically ignoring such mundane practices might well be a sign of they being

prisoners of an industrial age mindset. This should be of any particular concern here, except for one thing. Their insistence on a dead track points to what is at the heart of their being blind and trapped. The industrial age methodologies are methods of control. Science and method also in management (and why not in research about management) are at the service of the idea of control.(Beninger, 1986). Progress in administration, through computers or more sophisticated management models, is all about being able to forecast, anticipate, learn, etc. in order to better control complex (and recently even chaotic) organizations and markets.

The due respect for the informal practices together with the contemplation of the practical difficulties in which many methodologies end up (and in general, their low level of use testified by repeated surveys in a number of management domains) invites a different perspective that can be summarized as follows: “The more we approach knowledge intensive/high tech businesses, the narrower the scope for (management) control. All this can be looked at as the outcome of the reflexive dimension of modernity(Beck (1992); Giddens(1990)). To be sure, reflexivity is a typical of all human action. In all societies human action is accompanied by the reflexive monitoring of the same action. Traditional societies, and to a certain extent industrial organization with its emphasis on procedure, repetition and adherence to the one best way have curbed the open outcome of learning coming from monitoring.. Beck and Giddens point out, instead, that the reflexivity of modern social life feeds upon incoming information in an uncontrollable way: ”Modernity is constituted in and through reflexively applied knowledge, but the equation of knowledge with certitude has turned out to be misconceived. We are abroad in a world which is thoroughly constituted through reflexively applied knowledge, but where at the same time we can never be sure that any given element of that knowledge will not be revised.” (Giddens, 1990)

Following De Certeau (1988) and Ciborra (1999) one can submit that plans and methods belong to the “high grounds” dominated by the notion of “space”, where time is clock time (ie, the fourth

dimension complementing the ones of three dimensional physical space). It is in this space that the flow diagrams, activities and sequences maps are currently expressed.

Down in the “swamp” of everyday organizational life we find bricolage and improvisation. These activities can hardly be hosted (ie, find a meaningful context in) by the large spaces of the high grounds. They are local, short, sudden, and do not exist outside the specific situation where they appear. They belong to the opaque, shapeless (boxless...) world of the swamp, where time is liquid and out of joint. The contrast could not be sharper.

Procedures unfold according to clock time and their execution relies upon pre-packaged knowledge, lying in front of the actor as deadlines, goals and planned actions.

On the other hand, improvisations occur in the Augenblick and are expression of deep seated memory/experience of the actor. The former can be ordered and sequenced, and can be reproduced in a procedure. The latter can only be recounted as stories which have more an inspiring value, cannot be reproduced and actually belong only to the counting of the story itself, to its situated, performed narrative.

To begin with, it cannot be denied that the diffusion of computers and methods create a situation where formalized knowledge is very diffuse. But a closer observation of everyday reality in business would reveal these systems regarding, work, monitoring, processes that are based on formalized knowledge, are kept alive only by continuous caring and coping of people trying to bridge the smaller or big breakdowns.(earlier reminders of this phenomenon was provided by Barnard in his essay ”Mind in everyday affairs” in 1936, and by Hayek in the famous article “The use of knowledge in society” of 1945) This happens because reality is too complex, the world is too turbulent. The procedures, systems and models are kept alive (i.e. endowed with essence and existence) only thanks to the action of bricolage, tinkering and conversation. (Suchman, 1987) Any of our constructs are the “frozen” results of a long cold chain of activities, artifacts and human

interventions, where if something goes wrong, the apparently firm existence and essence immediately go lost.(Latour, 1999).

A closer look would show that the characteristics of these practices are very troublesome, because they are unrelated to the characteristics of formalized knowledge, methods, and procedures. One of the main characteristics of these practices, and the knowledge they embed, is that they occur in time. It is the moment, it is the situation - e.g. you have to fix this, you have to intervene to adjust that, there is a little breakdown here.... It is the occasion of what we call the “appropriate time” (in Greek, kairos). These practices have nothing to do with the proper space. All the emphasis in consulting, or in system design, is to find proper space for the layout of boxes and tables, in space. These micro practices, instead, are about time, but not “clock time”. They are about the right practice, the immediate time, the moment of delivery. In a way, they are impossible to represent; they tend to escape. Instead, we focus on drawing diagrams, procedures, data flows, processes and activities, so we try to find a proper space for everything in a timeless, metaphysical view of organizations.

Consider further differences. Models & belong to those strategies (of (Western)military, before than scientific, origin) that focus on space in multiple ways pursuing:

- -“neatness”: they establish a “proper” space for activities to be performed orderly;
- - “structure”: they elaborate theoretical places (systems and totalizing discourses)
- - “articulation”: they identify appropriate physical spaces, from the overhead transparencies, to the screen estate throughout the office buildings and laboratories.

In this way, “they attempt to reduce temporal relations to spatial ones, through the analytical attribution of a proper place to each particular element and through the combinatory organization of the movements specific to units or groups of units” (De Certeau, 1988).

On the other hand, tactics, ruses, improvisations are contingent procedures indexed by the “here and now”,(Hayek, 1945) and they would be meaningless outside a specific time-tagged situation. Given a linear, pre-planned procedure made of a sequence of actions, tactics are precisely those scrambling interventions, multiple variations, those contingent creative acts that transform the expected neutral situation into a “favourable” or “pleasant “.

Plans, stable procedures that compose models and methods want to defy time by robustness and stability: they announce organizations as pyramids. Tactics are rapidly moving, their nomadic interventions dictated by and forcing the seizing of the moment. The former bet on space and order. The latter on the appropriate time and the contingent (favorable) situation. The former adhere to a solid track. The latter are condemned to be ephemeral and transformative.

These two modes of operating are clearly, and have been, co- existing, and complementary, at the same time excluding each other (recall the case of BPR wanting to eliminate improvisation...) and supporting each other (tactics grow like lichens over procedures and models when put in use; large systems and generalisations take off only if surrounded by a regimen of tactics that fills the gap between the big procedure and the “floating world” of complex organizations and turbulent economies).

However, *globalisation* (Giddens, 1990) of technologies and economies has brought a dramatic change. Tactics used to be engaged in creative uses of time, but spatially limited by the communities of practices (the fishermen; the tribe; the guilds). Today, the extension of infrastructures and the spread of large applications and methodologies connect communities and cross boundaries. Thus, “ tactics are more and more going off their tracks. Cut loose from their traditional communities that circumscribed their functioning, they have begun to wander everywhere...(hence) Consumers are transformed into immigrants...(and) There is no longer an elsewhere.” De Certeau (1988)

The net result is, to say the least, paradoxical. For example, consider the implications of what has been discussed so far in the field of knowledge management. The knowledge expressed through the mundane moves and tactics is of the order of what the Greeks used to call metis. It is a knowledge of the appropriate time and circumstance: the knowledge that allows you to row on a kayak in a rough sea without capsizing. It is embodied knowledge, very hard to “know”. It can be discerned after the fact, by interpreter and structured by the expert. To be sure both interpreter and expert can say something interesting about that knowledge outside the situation where it has been expressed, but they hardly “own” it (and thus they cannot transfer it effectively). For those who exercise it, finally, it is tacit, unconscious, thus escapes their reflection during action. It belongs to no one, thus it cannot be “managed”.

Second, metis expresses itself through micro, opportunistic improvisations. Improvisations are far from being superficial responses to changing circumstances. On the spur of the moment, and very fast, large domains of past experience are retrieved to try to re-register the world, our body, our actions to achieve a novel solution. Improvisation is thus linked to access memory in serendipitous, and deep ways, and bring to the surface through the workings of memory (recalling and at the same time altering) new knowledge (innovation).

3. TECHNOLOGY DRIFTING

A closer look to the glossy black walls of the “technology box”(Rosenberg, 1982) would reveal that they are made of all sorts of shades of grey. And the box itself is a makeshift one. Our thesis is that technology tends to drift when put to use. Moreover, the idea emerges of a certain degree of autonomy and inner dynamics of the technology, both as a drifting system and as an organism to be cultivated.(Dahlbom and Janlert, 1996)

The traditional conception of technology, which originated with Aristotle (Hood, 1983) is that technology is a human development or arrangement of tools, machines, materials and methods to

serve the attainment of human purposes. In other words, technology is a "passive" and neutral set of means to achieve some ends. This perspective lies implicitly at the core of most management and economic literature in good currency.

As a logical system (a set of beliefs about cause/effect relationships – Thompson (1967)) technology possesses its own tendency toward perfection and systematisation. On the other hand, consider the definition of technical infrastructure given by the science studies scholars: (Star and Ruhleder, 1996)

- it operates through standardisation and extension of linkages;
- it is sunk into other social arrangements, institutions or technologies;
- it is invisible and transparent in supporting the execution of tasks;
- it is embedded in a set of conventions of practice;
- installed base: infrastructure does not grow de novo; it wrestles with the inertia of the installed base and inherits strengths and limitations from that base.

A closer look at the internal dynamics of IT infrastructure would show that: (Ciborra, 1998b)

- many actors are involved in its establishment or development, so that it cannot be controlled by only one actor;
- the issue of standards becomes paramount. Battles of standards involve the setting up and management of complex coalitions of actors and technologies (David, 1987);
- history, path dependency, unique events punctuate the development of infrastructure and have an irreversible influence on its configuration at any given moment.

Such phenomena can be observed, for example, when looking at the dynamics of the "installed base". As a consequence, a totally new idea about what alignment is can emerge: it is an alliance between humans and non-humans, where non-humans (the architectures, the operating systems, the standards) seem to have a say as important as the humans. (Latour, 1999) Specifically, alignment would correspond to the successful translation of the interests of one actor into the behaviour of another actor, within a complex network of actors and intermediaries.(Callon, 1991)

Let us take, at this point, a closer look at the everyday occurrence of what drifting is. Drifting is about situated technology. It is about technology in use as experienced and seen from the swamp of contingent situations and practices, and not from the chilly, cristal-clear high grounds of method. (Schon, 1983) A model of drifting must be based on those "modes of operations" that make up the fabric of the world of practice. (see above; De Certeau(1988)) Drifting connotes the dynamics of an encounter, of pasting up a hybrid composed of technology, organisations, people and artefacts. It is about the general laws of movement and composition of the world (the ready at hand) and existence into it (Dasein).(Heidegger, 1927) Drifting is a way to capture the unfolding of the intrinsic openness of such a match. The territory on which such an unfolding takes place is the swamp of the everyday life in organizations.

To begin with, drifting reveals that technology and artefacts possess affordances. Normann(1988) defines affordance in terms of a psychology of everyday things: what people perceive artefacts can do: i.e. those fundamental properties that seem to tell us what the things can do for us. Actually, Heidegger(1927) suggested earlier on, that our knowledge and basic way to encounter the world obtain through the use, and not the scientific description of objects. The world is a never ending assemblage of affordances, rather than "things" or de-contextualized objects.

In such a world of the everyday life, people move around like "ants", relying on an infinite variety of coping and care *tactics*. These are micro-interventions consisting of studied bricolage or quick

improvisations, dictated more by existential projections and designs than by any long range strategy.
(see above)

Tactics stay close to things and situations: they allow for a detailed reading of affordances and discover new ones. They stay glued to the terrain: they seldom raise their gaze out of the swamp. By staying in intimate contact with things and situations they discover their hidden “dispositions” (Jullien, 1995), ie their intrinsic potential for action. Things and artefacts become the springboard for new actions, for further tactics: the re-registering of the world through the unveiling of the dispositions (or hidden affordances) of things keeps the everyday world moving, and makes bricolage and improvisation sources of innovation.

Matching visible and invisible affordances with tactics leads to new uses; re-invention of artefacts and technologies and their shifting away from the assigned uses. The result is *drifting*.

Drift is thus the outcome of the match between two actants: technology and the humans in their various roles of sponsors, users and designers.

The image put forward identifies drifting as the outcome of a matching between an open technology and situated interventions of use. The danger of such a model is to replicate, though in a shifted manner, the sequence typical of planned implementation: goals guide activities which lead to results. In drifting, the difference would be that activities are other, and pulled by different goals. The reconstruction of drifting would then amount to the identification of the goals, actors and their interventions which may explain why a given system turned out to be used differently from the initial plans. Drifting would be regarded as the outcome of an alternative agenda to the one dictated by explicit plans and methods. The task for the analyst or scholar would be to unveil contents and dynamics of such an alternative agenda. Technologies drift because a set of goals/activities replaces the other. This is the way followed for example by Actor Network Theory, (Latour, 1993) when it searches for the detailed alignment between goals, actions and systems that can explain the de facto

unfolding of technology in organizations (approach for which ANT has been accused to be somehow “machiavellian. We submit, however, that drifting is not just planning and acting according to different goals, or the unfolding of an alternative strategy. To wit, drift can hardly be re-conducted to plan: one chases the other away, still being complementary to it. (Wood, 1998)

Hence, a more apt methodological challenge would be to interpret drifting in the terms of the swamp and not of the high grounds. Drifting belongs to the world of everyday practices: ubiquitous but anonymous; made of ruses and short cuts; improvised; marginal; relying on age-old, time-less skills. Finally, drifting is precisely one of the results of the reflexivity of modern organizations. The more complex the infrastructures and the systems, the more hacks will be required to take care of them, the more distributed learning and innovation will take place, the more knowledge will be accumulated at a collective level; but this higher amount of knowledge will be informal and improvisational, and will deliver at the end of the day less, not more, (centralized, corporate) control over the complex infrastructure itself.

4.CONCLUDING REMARKS

A phenomenological study of the key concepts of organizational analysis and design could be pursued further to cover the ideas of “strategy”, co-ordination, transaction, and so on. We hope to have shown the importance of indulging close to the micro-foundations of organizations. They rest on the mundane, the everyday and the obvious of the workaday, i.e. the only phenomena we get real access in organizations, both as researchers and practitioners. Going back and forth between the foundations in the obvious and the high grounds of abstractions can keep organization theory alive, open and closer to human existence at work.

REFERENCES

- Argyris, C. and Schön, D.A. 1996 *Organizational learning II*, Reading, MA: Addison-Wesley.
- Arthur, B. 1996 Increasing returns and the two worlds of business, *Harvard Business Review*, luglio-agosto.
- Barnard, C.I. *Mind in everyday affairs in The Functions of the Executive*, Cambridge, Mass. Harvard University Press.
- Beck, U. 1992 *Risk Society*, London, Sage.
- Beninger, J.R. 1986 *The Control Revolution. Technological and Economic Origins of the Information Society*. Harvard Univ. Press, Cambridge., Mass.,
- Bittner, E. 1965 The concept of organisation, *Social research*, 32, 3: 239-255.
- Brown J.S. and Duguid, P. Organizational learning and communities of practice, *Organization Science*, 2, 1: 40-57.
- Callon, M. 1991 Techno-economic networks and irreversibility in Law, J.(editor) *A Sociology of Monsters. Essays on Power, Technology and Domination*, London, Routledge.
- Ciborra, C.U. 1996 Introduction in C.U. Ciborra (editor) *Groupware & Teamwork*, Chichester, J. Wiley.
- Ciborra, C.U. 1999a *La Piattaforma Organizzante*, *Studi Organizzativi*, 2: 161 – 194.
- Ciborra, C.U. 1999b Notes on improvisation and time in organizations, *Accounting, Management and Information Technology*, 9: 77 – 94.
- Ciborra, C.U. 1998 Crisis and foundations: An inquiry into the nature and limits of models and methods in the IS discipline, *Journal of Strategic Information Systems*, 7: 5 – 16.
- Ciborra, C.U. and Hanseth, O. From Tool to Gestell, *Information technology and People*, 11, 4:305-327.
- Ciborra, C.U. (a cura di) 1998 *Infraglobe*, Milano, Etas Libri.

Dahlbom, B. and Janlert, L.E. 1996 *Computer Future*, University of Göteborg, Manuscript.

David, P.A. 1987 Some new standards for the economics in the information age, in P. Dagupta et al. (eds) *Economic Policy and Technical Performance*, Cambridge, Cambridge University Press.

De Certeau, 1988 *The Practice of Everyday Life*, Berkley, University of California Press..

Dreyfus, H.L. 1994 *Being-in-the-World*, Cambridge, MA: the MIT Press.

Giddens, A. *The Consequences of Modernity*, Oxford, Polity Press.

Hayek, F.A. 1945 The use of knowledge in society, *American economic review*, settembre: 519 – 30.

Heidegger, M. 1977 *Sein und Zeit*, Frankfurt a.M., Klostermann.

Hood, W.F. 1983 The Aristotelian versus the Heideggerian approach to the problem of technology, in C. Mitcham and R. Mackey (editors) *Philosophy and Technology*, New York: The Free Press.

Husserl, E. 1970 *The Crisis of European Sciences and Transcendental Phenomenology*, Evaston, IL: Northwestern University Press.

Jullien, F. 1995 *The Propensity of Things*, Cambridge, Mass.: Zone Books.

Latour, B. 1999 *Pandora's Hope*, Cambridge, Mass. Harvard University Press.

Latour, B. 1993 *We Have Never Been Modern*, Cambridge, Harvard University Press.

Mintzberg, H. 1980 *The Nature of Managerial Work*, Englewood Cliffs, NJ, Prentice-Hall.

Norman, D.A. 1988 *The Design of Everyday Things*, New York, Basic Books.

Powell, W.W., Koput, K.W. and Smith-Doerr, L. 1996 Interorganizational collaboration and the locus of innovation, , *Administrative Science Quarterly*, 41: 116-145.

Romer, P. 1986 Increasing returns and long-run growth, *Journal of Political Economy*, 94: 1002-1037.

Rosenberg, N. 1982 *Inside the Black Box*, Cambridge, Cambridge University Press.

Schoen, D.A. 1983 *The Reflective Practitioner*, New York, Basic Books.

Star, S.L. and Ruhleder, K. 1994 Steps towards an ecology of infrastructure, Proceedings of the CSCW '94 Conference: 253-264.

Suchman, L. 1987 Plans and Situated Actions, Cambridge: Cambridge University Press.

Thompson, J. 1967 Organizations in Action, New York: McGraw-Hill.

Wood, M. 1998 Agency and organization: Towards a cyborg-consciousness, Human Relations, 1209-1226.

Zimmerman, D. 1971 The practicalities of rule use, in Douglas (a cura di) Understanding everyday life, Londra, Routledge.

Zuboff, S. 1988 In the Age of the Smart Machine, New York, Basic Books.