The Form of the Firm

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Introduction

This is an essay in postclassical theory and modelling, and more specifically an attempt to think about organisation and management. Our focus is on cognition and communication, not on objectivity or causality. We look for operations based on distinctions and their contexts, not for identities, forces, causes and effects (see Korzybski 1933; Bateson 1972; von Foerster 2003; Luhmann 1984; Baecker 1994; Baecker 2002). We model the organisation of a firm selectively using organisation theory (Simon 1997; March/Simon 1993; Weick 1979; Luhmann 1995a), the historiography of business organisation (Sombart 1987; Chandler 1977), economic theories of the firm (Coase 1988; Gutenberg 1983; Jensen/Meckling 1976; Aoki 1984; Williamson 1985), and the sociology of the firm (Zukin and DiMaggio 1990; Grabher 1993; DiMaggio 2001; Guillén et al. 2002).

We do not try to integrate a wealth of approaches already present, but instead make a new start by relying on social systems theory (Parsons 1978; Luhmann 1995b) combined with social networks theory (White 1992). We use the mathematical calculus of distinctions (G. Spencer-Brown 1994) to cut through the different approaches to a theory of the firm and begin by looking at the operations that actually make up the organisation of a firm. By doing so, we are able to develop a twofold perspective on the firm, taking in both its internal organisational structure and its external environment. Any one operation of the firm, bringing it forth and reproducing it, must be able to both distinguish it from its environment and re-embed it within that environment. The mathematical calculus of distinctions developed by Spencer-Brown helps us to understand how operations can be simultaneously distinguished and re-embedded. Our approach is a sociological one since the operation that is capable of distinguishing and re-embedding the organisation of a firm is a communication which produces a certain reality of the firm, while selectively taking into account the contexts of that communication.

We draw on Niklas Luhmann's theory of social systems (1995b, 1997a, 2000) as a model for our approach since it effectively demonstrates how the closure of systems and their structural

coupling to their environment complement rather than contradic each other. Luhmann's sociology is highly imaginative in showing how states and features of social systems produce structures of dependent communication out of structures of independent and contingent communication. Resolving the problem of reproduction, these systems, insofar as they do resolve the problem, produce their own structures of reference and retain these structures as long as this reference is ambivalent enough to address both the states of the system and the states of the environment. This switching back and forth provides the system with an idea of the reality in which it operates.

Luhmann's sociology is possibly the most radical attempt in all of systems theory to show that the states of social systems have to be considered and analysed in terms of operations and events. States actually do something. They appear and vanish again, thus reproducing, for the system, the very problem they enable it to resolve. Yet Luhmann (1991) also considered the possibility that the development of a form theory may be the next step beyond systems theory, because it offers an even more abstract perspective on how, by constantly appearing and vanishing again, operations produce states that both provide a reference point and leave open whether and how the next operation relates to that reference point. However, the state produced by the operation is not an indifferent but a different state of the world in that it has an asymmetrical structure: It offers the choice of either connecting to some mark that is both valued and qualified, or else to repeat the whole process of marking, valuing and qualifying on a completely new account. That, of course, emphasises the advantage of any structure consisting in just being there to rely upon.

Some day Luhmann's theory of social systems may be seen to have paved the way for a sociological analysis of the interdependency of independent states brought together – or, as we will say in this paper, "arranged" with respect to one another and "knotted" to each other – by operations drawing on previous operations and on possible next operations. At the same time, however, we shall probably see that both aspects of Luhmann's work are necessary to go on to the next step: It is his systems theory that leads to the appropriate understanding of operations being two-sided (and three-valued) distinctions, and it is his sociology that has the necessary sensibility to show how any one state of society is informed by other states to which it relates in working on its distinction and re-embedding it among all others.

In the pages that follow I shall try to flesh out a model that shows how we can make a *communicational* analysis of a specific social system, a firm or company, as the case may be, in order to be able to observe operations being reproduced as a result of distinctions being drawn.

Communication here means the variation and selection of all kinds of utterances (verbal and non-verbal) that reproduce the very society in which they occur.

1. The Theory

1.0 A *theory* is a device to cultivate an interest in a phenomenon (Weick 1987). It expands on the expectations we conventionally, being a product of our own practice, cherish. It helps us to know what exactly we are doing when we look at a phenomenon. It helps us to recognise and to choose a perspective, the metaphors we use and the extent to which we are prepared to accept ambivalence with respect to the attribution of insights, doubts and questions about either the observer or the phenomenon, an ambivalence that comes naturally with any observation.

1.0.1 Our theory is based on *five suggestions*, tries to accomodate *one problem* and proposes the still unusual but helpful *device* of operational, structural and contextual analysis.

1.0.2 The introduction of, and reflection on, the observer is a central element of the model and the analysis we are going to develop. The observer appears at least twice, as the object, i.e., the firm, and as the subject, the analysis being done by an analyst, who in our case is a sociologist. Self-entanglement is intentional, self-exemption is forbidden.

The five suggestions are the following:

History

1.1 Any organisation of a firm, an authority or a cultural or other institution *has its own history, which is known only to itself and is only partially known to itself*. That history begins the very day the organisation is set up. It is not identical with what a business historian may discover with hindsight and may describe with care. Rather, it is what members, files, data, procedures, machinery, and architecture of the organisation embody, without anybody specifically looking at these features of the organisation in terms of their being the product of its history. Both members and observers of the organisation only encounter that history when they try to propose further action that somehow does not fit with what the history or rather the many histories of the organisation had led them to expect and to be prepared for. Somehow the behaviour of its members becomes is out of line, files cannot be updated without major adjustments , procedures

and machinery fail to operate, and the architecture seems to be out of shape. This is when members and observers know that times are changing and either recall history in order to enforce a history that maybe only then gets any shape, or recall it in order to at least know what it is they are leaving behind.

1.1.1 The history of the organisation is *embodied* in its procedures, its statutes, its written and unwritten rules, its technologies, its buildings, its mission, ideals and ideology, its people, its knowledge, its management, its markets, and its networks. Evidently, such a history is memorised and forgotten in very *different ways*, depending upon who is doing the memorising and the forgetting.

1.1.2 The history of the organisation makes the organisation *non-trivial*. The "non-triviality" (Heinz von Foerster) of the organisation means that the organisation not only consists of a transformation function which obediently transforms input into output in a given way. It also features a state function which adds the whims, fears and desires of the day to the states of the transformation function. These whims, fears and desires are not necessarily just personal or human ones. They also consist of the mood, atmosphere and morale of the markets, the network and the culture.

1.1.3 The history of the organisation makes the organisation *intransparent*. Intransparency is a true bugbear to any management bent on knowledge and control. For us it is actually a blessing because of the undeniable *complexity* (Morin 1974) of even the most apparently simple organisation. Complexity means that *control* is only possible if and as long as management forgoes complete knowledge and understanding and instead develops both its own memory of desired states (purposes) and its ability to watch and counter deviations from these states (Ashby 1958; Vickers 1967; Luhmann 1997b). A better paraphrase for this kind of "control" is "checking on the other by checking on oneself", since it does not help one to dominate the other, but rather to select one's own behaviour in response to the behaviour of the other. True, the selection of behaviour may also prompt others to behave in a similar – or contrary – manner which may look like domination. And one may end up with power if there is any. Yet this kind of control embeds and entangles itself within the world. There is no way to control whatsoever if that very control does not accept to be controlled in turn by what it tries to control (Glanville 1987).

1.1.4 Intransparency thus promotes the development of an intelligence which assumes that necessary information is always elsewhere and which devises ways of gathering it. Intransparency due to the history of the organisation is thus a way of assuming and accepting

the *distribution and dissemination* of the relevant knowledge about the organisation throughout the organisation and its markets and networks.

Business

1.2 The *business* of a firm consists both in its endeavours to produce its products profitably and in its attempts to reproduce itself. It is not self-evident that production and reproduction go hand in hand.

1.2.1 The firm is a *social system*, which consists of people who forgo certain interests (to spend their day as they would prefer, for instance) in the interests of the organisation and who accept rules of behaviour that would surprise anyone observing such behaviour outside the organisation. Both conditions put a certain strain on the organisation, which once again turns it into a non-trivial system and causes it to deviate from the rational efficiency of business. At the same time, only strain (or apparent irrationality) turns the organisation into an innovative and creative work setting. It is apparent irrationality that motivates people (Peters and Waterman 1982; Brunsson 1985) and not self-evident rationality (which only fatigues).

1.2.2 The firm nevertheless pursues its business, subject to a host of conditions, purposes and justifications that may or may not be reflected in the design of the product. They are in no way directly related to any needs expressed by customers or to the kind of sensibilities entertained by markets. The business of a firm consists in an *enactment* (Weick 1979) of the needs and sensibilities of its environments which are not necessarily identical with those needs and sensibilities. To be sure, as long as the firm successfully reproduces itself, it constantly feeds back experiences with its environments to its construction and enactment of those environments (Weick 1995). But fortunately this does not mean the firm loses its capacity to deviate from the reality of the environments and to envision its own.

1.2.3 A prominent aspect of a firm's business is *economics*. Despite being taken to be self-evident in companies, economics rarely stands on its own. It demands the development of notions like costs, benefits, assets, debts, capital and profit to get its bearings on the procedures and decisions of the organisation. And it demands ways to take these notions seriously, for instance, by treating accounting, auditing and controlling as management devices in steering the firm. Yet accounting, auditing and controlling are just aspects of the self-observation and self-thematisation of the firm. Pride in products, high aspirations for human and intellectual capital,

perseverance in questions of received wisdom and proven technology are as important as economic categories but are seldom considered in terms of assets and liabilities. Thus, questions of economics have to constantly re-assert themselves among the procedures and decisions of the organisation. And nothing short of the eventual bankruptcy of the firm will guarantees that economics is given the priority it deserves.

Culture

1.3 Every organisation features a *culture* that gives it an *identity* in perpetual *comparison* with other organisations.

1.3.1 There is some debate in social and management sciences as to whether an organisation *is* or *has* a culture. The question is whether in time the organisation becomes identical with its culture which accordingly should be respected as such and indeed is perhaps even the very precondition of its social and economic efficiency and sustainability; or else it has a specific kind of culture that does or does not fit social or economic needs and accordingly should be changed by appropriate management measures (Smircich 1983; Sathe 1985; Schein 1985). This question is undecidable, which means we are free to opt for either possibility. The important point however is that the culture of an organisation, like the culture of any social system, is the product of a self-understanding and self-description that typically evolves when the organisation discovers that other organisations behave differently (Baecker 2001a). The *identity* of an organisation is the product of the culture it chooses in selecting the way it treats, and is treated by, other organisations or other social partners. Its *authenticity* is expressed by the behaviour which other organisations or partners are in some way bound to accept or even to embrace.

1.3.2 Paradoxically, this constitution of organisational culture both makes it unattainable for management and turns it into a chosen field for management (Martin 1992; Luhmann 2000). It is unattainable because everything that happens condenses into a memory which assumes that comparable things will happen again. This works without any management involvement. It is simply the organisation accumulating its own history in a highly selective and sometimes whimsical manner. Understandably, Darío Rodriguez Mansilla (1991, p. 141), therefore, described organisational cultures as consisting of "undecidable and undecided premises", which means it was never and could never be decided upon, but nevertheless it works. A culture consists of the memory of beliefs, values, rules and assumptions taken to be valid since they are thought of as having proved to be successful. Everybody in the organisation or belonging to its

network works to produce its particular culture. This means that managers and management have exactly the same chance as everybody else to shape the culture of the organisation. The only condition that can prevent management from influencing the culture are the particular means an organisation develops to divest them of all influence. Certainly, because management has to insist on economic factors, it faces stronger immune reactions from the organisation than do other employees who are more in touch with the complex and ambivalent purposes of the organisation. Yet once they have overcome this specific kind of resistance, even managers can change the culture of the organisation by providing it with beliefs, values, rules, assumptions and experiences deemed to promise success. Yet they can only do so when they give the organisation what the organisation wants (Martin and Siehl 1983).

1.3.3 The culture of an organisation is tantamount to its *strategy* (Weick 1985). As with the firm's history, its culture too embodies both the experience and the envisioned future of the organisation. Analysing the culture of an organisation therefore means ascertaining how it enacts itself (through personnel, technologies, procedures, leadership), its markets, its networks and the society in which it operates. A "strategy" therefore is quite literally the way an organisation relates itself, its resources and its purposes to the different "strata" (or aspects) of its environment. The culture of the organisation identifies these strata by relating itself to them, so that by simply reading that culture we are able to know a little better how effectively or ineffectively the organisation might operate.

Management

1.4 We suggest *management* to be the various ways of reintroducing the organisation's environment into the organisation, while – rather ambivalently – both accepting and changing the existing states of the organisation itself (Baecker 1993; Baecker 1999; Baecker 2003).

1.4.1 Management's task is to maintain, not to destroy, the organisation when realigning it to relevant states of the environment. It does so in order for the organisation not only to survive but to be successful. However, it is important to recognise that management's habitual search for opportunities in the organisation to optimise its products, procedures, people and purpose is tantamount to their *constantly trying to change the organisation*, i.e., to modify its received identity by developing one which is deemed more appropriate. Any attempt to optimisation depends on the prior identification of sub-optimal conditions. Yet these are the conditions the organisation is actually is and to which it is accommodated. The fact that management sciences

of all kinds, including German *Betriebswirtschaftslehre* (Gutenberg 1983) take pride in teaching management to go for optimisation, efficiency and effectiveness is proof of their vicariously taking care of the economy of society. That economy, however, does not go naturally with organisations. Organisations are probably more interested in law, politics, the sciences, religion, education or the arts, all of them being different aspects and conditions of society.

1.4.2 Thus, there are at least *two social calculators* at work inside any firm. The first one is its organisation, consisting of procedures, people (including managers), products and purpose, constantly trying to accommodate the organisation to its social and natural environments. This first calculator comprises many aspects, as well as many false assumptions and some ignorance as well. There is a second calculator called management, which specifically accounts for economic constraints and opportunities. Economic constraints and opportunities figure more or less prominently in the social environment of the organisation, but they are not the only factors and not even the most important ones. Again, this means that management is at odds both with the organisation and with the environment. As a result, the organisation is subject to *structural tension*, which more often than not turns it into a viable and even innovative and creative social system. It may be added that this perspective on management implies some scepticism about non-profit organisations being managed as successfully as business organisations. Has it ever been proved that management is just as capable of aiming schools at education, universities at science, political parties at politics, administration at the law, churches at religion or the military at war and peace, as it is of aiming companies at the economy? A societal theory of organisation and management is still a long way off (Stern and Barley 1996; Baecker 2003).

1.4.3 It is generally assumed that management is about the designing, monitoring and governing of organisation *from within*. At the same time, however, we should not neglect the importance of designing, monitoring and governing organisations *from the outside*, most notably through the auditing process (Power 1997). We firmly believe that these ways of acting from the outside should also be discussed under the heading of management. Yet the management we will be talking about in the pages that follow consists of managers who are at the same time employees (seldom owners) of their organisations. This is an important point since most management sciences somehow assume organisation to be the means to organise a business from the outside. Planning and control is assumed to be done by managers who are not part of the organisation they plan and control. Thus, an important feedback loop between management and organisation is neglected by this form of management science. Managers do not themselves experience the outcome of their measures; and organisations have no way of telling them, or of refusing to tell them, about these outcomes. A great deal of management philosophy in the manner of Peter

Drucker, Tom Peters or Charles Handy and a good part of the recent leadership discussion is necessary simply because the philosophy of management and leadership puts managers back into their organisations. It makes them see what they have to see if they are to manage these organisations successfully. Our assumption is that managers are part of the system of organisations. Yet we do not turn to philosophy in order to be able to take this point seriously but rather to the social sciences and specifically to second-order cybernetics and social systems theory, i.e. including postclassical thinking (which, in its way, is certainly not without a philosophy of its own).

Systems References

1.5 Any organisation should be analysed, and designed, with respect to *systems references* and their distinction.

1.5.1 We introduce systems references in order to go beyond a form of thinking in organisation theory which is locked into an oscillation between the *assumption of rationality* on the one hand and the *deconstruction of rationality* on the other. Management sciences and economic theories of the firm (Coase 1988; Jensen and Meckling 1976; Williamson and Winter 1991; Jensen 1993) generally assume the principle of rationality, albeit with some interesting ambivalence we cannot go into here. In contrast, much organisational research (March and Simon 1993; Cyert and March 1992; Beer 1981; Baecker 1993; Baecker 1999; Baecker 2003; Weick 1995; Weick 2000) recognizes the deconstruction of rationality in one form or another.

1.5.2 The introduction of systems references helps to shed light on the question of how an organisation produces and reproduces itself by distinguishing itself from its environment, while distinguishing and monitoring different kinds of environments and while distinguishing and monitoring other systems, sometimes comparable to an organisation that operates in those environments. The introduction of systems references thus means that the analysis has to include the question as to which system we are specifically looking at (Parsons 1951, Luhmann 1995b). Note that this may be taken to be the whole point about systems theory in general and systems theory in particular, be it in sociology or in organisation research: Make sure which systems reference you use in order to watch and analyse a phenomenon; and observe how your analysis changes as soon as you change your systems reference.

1.5.3 Systems are taken here not just to be analytical devices introduced by an external,

academic or scientific observer. They are understood to be synthetic devices employed by life, consciousness and communication in order to be able to reproduce. The question is how to address, as an external observer, the systems references entertained by the systems themselves.

1.5.4 External observers have to be distinguished according to whether or not they are aware of the difference between the systems references they assume in order to monitor states, events and operations of other systems and the systems references assumed by the observed systems themselves. Academic or scientific observers tend to be aware of that difference. Other external observers, such as, for instance, the political system, the system of the mass media and the systems of religion or art, are often oblivious of this difference. The aim of *empirical observation*, accepted by the sciences and social studies alike, consists in being able to distinguish between one's own system's reference (in order to be able to put it in brackets) and the object's system's reference (in order to be able to address it). However, how such an empirical observation is possible at all is the object of *epistemological dispute*. Edmund Husserl's (1980) idea of *epoché* is still one of the most forceful ideas with respect to attempts to self-observe observations and to develop an awareness of just what it is we are looking at and what has to be left aside.

1.5.5 While we cannot go into this epistemological dispute here, we strongly believe that a *constructivist epistemology* is helpful in resolving the conflict between objectivist and deconstructivist epistemologies. Constructivism is an effective way of allowing the academic and scientific methods of observation interfere with social practice (Latour 2003). Constructivism is tantamount to an awareness of the possibility and even necessity of distinguishing between systems references.

1.5.6 The theory we propose is characterised by two distinctive features. First, it assumes an *ecology of systems* with no super-system co-ordinating them all (Bateson 1972; Latour 1999). And second, it therefore opts for the possibility and necessity of distinguishing between systems references. It is unnecessary to retain a reference to the economic system when analysing organisation, as most of management science and economic theory of the firm generally do. And there is no need to drop all systems references in order to reach out for "reality". Instead, we may switch between systems references and ascertain which one is most helpful in analysing and designing organisations. Weick's and Sutcliffe's book *Managing the Unexpected* (2001), for instance, is a very convincing example of a fruitful switch to the systems reference of the *awareness of the individual* in analysing the communication of the *social system* of high-reliability organisations.

Context

1.6 The *problem* we want to be able to address is that of *putting organisation and management back into their social, including cultural, context*. We take this task to be both a theoretical and a practical one.

1.6.1 The problem of context has already been implicitly addressed by all of our four suggestions. Yet it is also to be addressed explicitly. We do not live in a one-fold (Comte 1854), two-fold (Marx 1993), three-fold (Steiner 1999) or even four-fold world (Parsons 1978), but in a *many-fold world* (Deleuze and Guattari 1980; Luhmann 1995b; White 1992). In this world there are no phenomena, events or operations that are not contextualised by networks of co-dependent production (White 1995a; White 1995b). It is an exaggeration to say that everything is connected to everything, since there are plenty of distinctions separating and even isolating phenomena, events and operations from each other. Worlds are small, yet still many (Watts 1999). We can never be sure what exactly is connected, and in what way, to what else. Surprise is ubiquitous.

1.6.2 The problem following from this insight into a many-fold, i.e., a connected and a differentiated, world is the question of how we can conceptualise *action and communication* inside that world. Nothing is as simple or as complex as we might be inclined to think, so action and communication are both possible and necessary. They are possible because complexity only paralyses the observer, but not necessarily the actor. And they are necessary because the world is not simple enough for men to lie back and contemplate how it self-evidently orders itself.

1.6.3 The problem is that we have to conceptualise action and communication in a way that takes *networks of co-dependent production* into account. That is, while we are selecting our action and communication, indeterminate others are doing so as well. And they are doing it simultaneously, such that there is no possible way to control them, or for them to control us. We end up with the necessity and possibility of action and communication that draw selectively on others, as the action and communication of others draw selectively on ourselves.

1.6.4 This is why we are looking for a way to conceptualise action and communication that takes into account both the loose couplings (Orton and Weick 1990) of phenomena, events and operations of all kinds *and* the ability of these to reproduce in a way that everybody recognises some identity between them. The many-fold world does not end up in states of indistinguishable

entropy, but rather in states that resemble *knots*. Knots are entangled, even complex; they are caught up in themselves, yet there is still a mathematics that is able to describe their particular structure (Kauffman 1995).

1.6.5 The last aspect of the problem, an aspect which is actually essential in dealing with the problem, is that the contexts of phenomena, events and operations are constantly changing (Baecker 2001b). *Time* now enters the equation and this means that not only do simultaneous action and communication prevail, but that memory and expectation also step in to lend *structure* to what is prevailing (Luhmann 1995b, chapter 8). This structure always has to prove itself. It is helpful in distinguishing and identifying action and communication. It only determines them by calling for action and communication. But to be at all effective, it must be called by actors and communicators. And even then, actors and communicators differ in their preferences for which structure to call. Structure nevertheless and only in that precarious shape provides resources to situations which remove degrees of freedom and thus constrain what is bound to happen, or at least what is bound to be perceived as relevant.

1.6.6 The structure we will use in order to introduce references to time horizons (past and future) into our model, both as a resource and a constraint, is the *structure of recursive operation*. In other words, we assume that whatever happens in giving the world some kind of structure is bound to happen again in order to be able to do so. As Heinz von Foerster (2003) suggested in one of his most powerful ideas, as soon as we observe a phenomenon from the perspective that it has to reproduce itself somehow or other, any ending we may look at must also be considered a beginning. This is why the postclassical thinking of systems theory and second-order cybernetics fosters the notion of *closure* of the systems to be considered (Varela and Goguen 1978). Any phenomenon, event or operation has to somehow come back to itself to assume any identity at all.

1.6.7 If we add to this the idea that such a structure of recursive operation is still dependent on networks of co-dependent production, we end up with the perturbing insight that coming back to oneself in order to assume and reproduce identity is impossible because the world has already changed and everything has changed with it. But that is exactly why the notion of identity has been developed. Identity is a monitoring device with which to relate a constantly changing world back to some structure that gives it shape. Recursion once again. But a perturbed recursion (Andersen 1998) which gives systems theory its basic idea (Baecker 2002, pp. 83-110).

Put into graphics, that basic idea looks as follows:
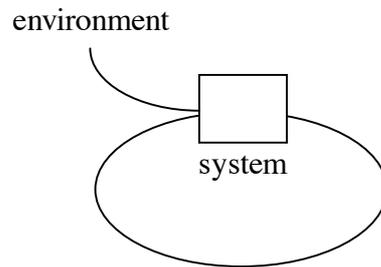
The Idea of Perturbed Recursion

Here we have a recursive loop of operations reproducing the system and a constant and unforeseeable inflow of environmental events. The system can only reproduce by taking *both* into account. And it can only reproduce by deciding, on the basis of its very reproduction, which environmental events to take into account when and how this should be done. That is why systems theory is insistent on distinguishing the self-referential closure of the system from its other-referential opening. A system that is unable to distinguish between itself (self-reference) and anything else (other-reference) is bound to lose itself in the entropy of the environment. In fact, such a system is impossible, since its very existence depends on its ability to distinguish itself from its environment, to set up an appropriate boundary, and to watch that boundary with respect to all kinds of events crossing it.

Put mathematically, that basic idea reads as follows:

$$S \neq S, \text{ if } S = S\,(S, E)$$

That is, the system, *S*, is and is not itself, as soon as it is able to rely on itself, *S*, to reproduce, as a function of itself, *S*, and its environment, *E*, both as perceived by the system.

The most perturbing idea of systems theory is the paradox of the identity of the system not being identical to itself and only in that way, relying on time, being able to be identical to itself. Before the days of systems theory, only Hegelian dialectics were able to consider this paradox of identity (Adorno 1973). Yet systems theory turns the paradox into a device of social studies, cultural studies and cognitive sciences with which to unravel the knots of the world.

Form

1.7 The basic idea how to model the knots of the world demands much complex thinking, yet

once spelled out, it is readily understandable. The breakthrough has been to consider *any operation inside the world as an observation* and *any observation as an operation inside the world* (Von Foerster 2003; Maturana and Varela 1980).

1.7.1 The idea challenges our objectivist thinking because it violates the Aristotelian, i.e., "classical", notion of a fundamental distinction between the world being what it is on one hand, and human beings' thinking about the world on the other. In this respect, Plato's Allegory of the Cave proved to be one of the most effective inventions of human history (Latour 1999). Instead of providing humans with the useful distinction between the world and their thinking about it, such that nobody equates the latter with the former or, put differently, instead of introducing a useful piece of epistemology, the Platonian and Aristotelian notion makes it impossible to travel between world and thinking. At best, it allows only philosophers and, faithfully following their trail, scientists to go back and forth between world and thinking. We, ordinary people, simply err, are amazed and drivel on.

1.7.2 Systems theory and second-order cybernetics draw upon the calculus of form developed by George Spencer-Brown (1994) to invent a kind of cognitive studies, which takes the operation of a living, mental, social or artificial system to be a *cognitive operation*. The idea, which draws on Spencer-Brown's *Laws of Form*, is that such an operation is to be considered *a distinction* which separates states and selects one side of the distinction, not the other, for further operation. That distinction is called an observation.

1.7.3 Systems theory thus draws on Spencer-Brown to consider distinctions as the fundamental operations, i.e. elements, of systems. Indeed, as we have already seen, it is the distinction between system and environment which is the constitutive distinction of a system. And it draws on second-order cybernetics (Von Foerster 2003) to consider any operation to be *first-order observation* (distinguishing states), and any of these operations/observations being at the same time the possible object of *second-order observations* (distinguishing the distinctions an operation is using). The model we present combines these two ideas into the one notion that the knots we describe are *self-reproducing and self-observing distinctions*.

1.7.4 The *notion of form* presented by Spencer-Brown then follows almost naturally. If any operation is

- a first-order observation and

- the possible object of second-order observations and

- going on inside a system that depends on the context of networks of co-dependent production,

then we need a notion which describes that co-dependence of operation, observation and context. This notion is the notion of "form" (Spencer-Brown 1994, p. 4): "Call the space cloven by any distinction, together with the entire content of the space, the form of the distinction." The notion of form thus means that a second-order observer, in watching distinctions being drawn, may become aware of the context in which these distinctions are drawn while and when producing their specific closure.

1.7.5 The notational device introduced by Spencer-Brown (1994, pp. 4 and 6) is called the *mark of distinction* or, with respect to its operation, the *cross*:

<div align="center">

m ⌐ n

cross

</div>
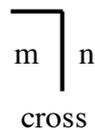
It marks the asymmetry of a distinction, indicating the inside of the distinction as its marked state, *m*, and leaving the outside of the distinction unmarked, *n*.

A second-order observation then is the peculiar distinction and operation that looks at the "form" of the distinction discovering its two sides (inside and outside) and its three values (first, the marked state; second, the unmarked state; and third, the distinction):

<div align="center">

d

m ⌐ n

f
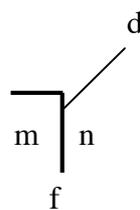
distinction *d*,
marked state *m*,
unmarked state, *n*,
and form, *f*.

</div>

Since the third value, the separation of the two sides, is neither marked by the indication nor left unmarked by the distinction, but is the very operation which brings the two of them forth, we may interpret it as the mathematical equivalent of the (methodo-)logical device invented by

Jacques Derrida (1968) and called "la différance". The third value hides the observer who is drawing the distinction, and it also hides the operation of the distinction such that both first-order and second-order observer are inclined to look at the states marked and at the world left unmarked instead of at their doing the drawing of distinctions. That is why "deconstructivist" and "constructivist" epistemologies shares an interest in watching the operation of observers, the first taking it to be "impossible" (because one never succeeds in marking it without producing a new state which is neither marked nor left unmarked), the latter taking it to be "improbable" (yet made probable by evolution).

Note that by containing the two sides and three values the form also contains the space wherein the distinction is being drawn. That is why Spencer-Brown's notion of form is a self-referential one which does without the classical antonyms of matter or content. Note that self-reference here, as in systems theory and as in deconstruction, refers to a self that withdraws the moment it is referred to.

1.7.6 Any operation that is able to look at both sides of the distinction, i.e., at its form, is defined by Spencer-Brown (1994, pp. 56 and 65) as an operation of re-entry. It consists in re-entering the distinction into the distinction, thereby splitting the same distinction into one being crossed and the same one being marked by another distinction which is deferred. The notation reads as follows:


re-entry

The general idea of the re-entry is to note and to use that distinctions occur in two versions, one version is the distinction actually used, the other one is the distinction looked at or reflected upon. Of course, in order to look at a distinction the observer may actually have used the very moment before, he must apply a further distinction for which the same condition applies. Thus, the distinction being re-entered into the space of distinction is a distinction turned from a "marker" into a "cross" (Spencer-Brown 1994, p. 65).

This is the device we will use for our model. We make very sparing use in this paper of

Spencer-Brown's calculus, omitting his method of doing calculations inside the form, and referring instead just to his method of depicting indications (marked states) in contexts (unmarked states). We take contexts to be the unmarked states of the first-order observation, this one being, as it is, only interested in indications, and marked states of the second-order observation.

We thus propose a simple device which consists in picturing operations in contexts, these contexts being operations which themselves call further contexts. Note that linguistic research comes up with the helpful notion of "contextualization" to emphasize that contexts are not fixed ones, but flexible and reflexive ones, depending on the "texts" being "written" or operations being performed (Gumperz 1982; Auer and di Luzio 1992).

1.7.7 The device we will be using in our model thus reads as follows:

form = operation | context

re-entry
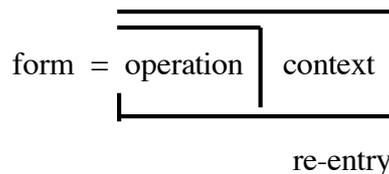
Depending on the perspectives introduced by different kinds of second-order observers, all of them communicating among themselves, further contexts are called to determine the distinctions that are drawn and are thought useful, thus and thereby introducing – in the very shape of contexts – further indeterminacies:

form = operation | context' | context'' | context''' | ...

re-entry'

re-entry''

re-entry'''

...
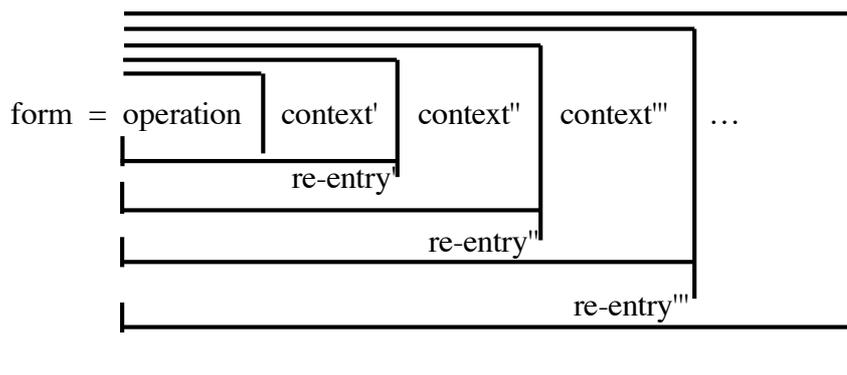
The device we will be using in our model combines determinacy, even increasing determinacy (note the five marks of distinction crossed by the first operation), with indeterminacy, even increasing indeterminacy (note the contexts adding to the contexts, eventually leading to the question "When is enough enough?", see Silverstein 1992).

Luhmann (1997b) speaks of the "control of intransparency" when describing the necessary combination of determinate and indeterminate states. It is a mode of control, which switches between different contexts to be called when states are to be determined. Any one of these contexts, let alone the choice between the contexts, is an indeterminate, if not ambivalent, state.

At any one step in the development of our model we will encounter this uncertain combination of determinate and indeterminate states anew. We will have to take decisions on which operations to choose, which distinctions to draw and which contexts to call. This is because in devising our model, we share a basic feature with our object, namely a certain subjectivity consisting in structure-determined systems (organisation and/or social studies) forcing its participants to decide upon the undecidable only thereby bringing forth (i.e., constructing) their reality. Any one arbitrary step in our model construction allows us to rediscover ourselves as observers who have to decide on the preferred type of interaction vis-à-vis their subject.

1.7.8 We assume the form of a distinction re-entering its own state of distinction to define asymmetrical attractor states constituting contingent neighbourhoods of other states in networks of co-dependent production. These attractor states define the *eigen*-values of the recursive function which produces and reproduces a system (Von Foerster 2003). This means that as a host of things will happen inside the system and to the system, which are sometimes expected and sometimes unexpected, the system must make sure that these states reoccur again and again. They are the states that mark and define the identity (history, procedure and purpose) of the system.

2. *The Model*

2.0 Our model is the *model of a firm*, i.e., of an organisation differentiated inside society by special reference to the economic system of that society.

2.0.1 The reference to the *economic system* is the principal reference of the firm. Yet this does not mean that it is to be considered an economic system in itself. On the contrary, the firm is a social organisation pursuing many different purposes. Nor does it mean that the reference to the economic system answers all questions with respect to the reproduction of the firm. The economy does not exist in some objective and unambiguous way such that it can directly order the firm. The economy is to be distinguished with respect to the society within which it is differentiated, such that its states are never without some aspects of inherent conflict with

society. The firm has to find legitimate ways to address this conflict.

2.0.2 The distinction of the firm, however, is a distinction which has to recursively prove its value with respect to

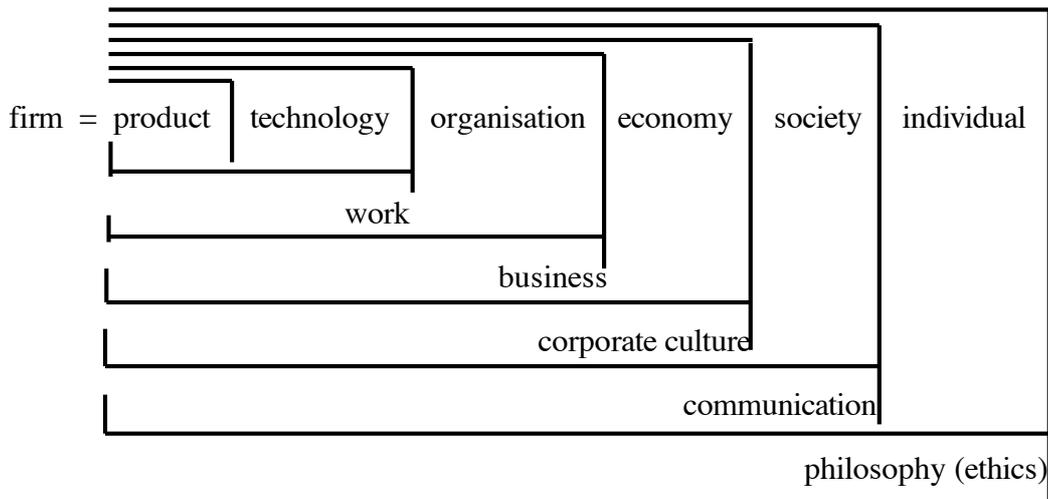- the *organisation* drawing that distinction,

- the *society* (including religion, culture, politics, education, and science) accepting that distinction, and

- all kinds of *individuals* (including employees, managers, stakeholders, shareholders, press agencies, and politicians) who have to live with that distinction.

2.03 That is why we look for a *communication model* of the firm. Communication means that organisation, society and individuals accomodate according to their respective *eigen*-dynamics how they both separate from, and refer to, each other (Ruesch/Bateson 1987). The firm is a state of information that has to accommodate with all kinds of other information entertained by society. And it is a state of information that has to be grasped by individuals even when they have innumerable ways to reduce complexity and to idealistically or romantically cherish the incomprehensibility (Schlegel 1967) of the world.

2.0.4 Any operation of the firm must be able to prove its value with respect to the networks of co-dependent production from which it is to distinguish itself and with respect to the individuals addressed by its communication. To be sure, there are *consenting and dissenting ways to draw a distinction*. Agreement and disagreement, co-operation and conflict, peace and war may also reproduce communication. Yet *some* way to address the value of the communication to be continued must be found. We take it that this is never an arbitrary way but that it will always reveal the complex history of previous communication.

2.1 Our model takes account of the form of the firm with respect to *six distinctions* and *five re-entries*. It thus constitutes a rather simple "arrangement" of distinctions in terms of Spencer-Brown (1994) or a "knot" in terms of Louis Kauffman (1995). This knot-like arrangement defines the prevalent attractor state or *eigen*-value (Von Foerster 2003) of the firm. It defines states consisting of distinctions in contexts to be reconsidered recursively, which the firm, while doing a multitude of other things at the same time, has to address again and again. The distinctions provide for self-determination with respect to selected operations and their contexts. The re-entries define the level of self-description at which the firm addresses these distinctions and their contexts.

```
firm  =  product │ technology │ organisation │ economy │ society │ individual
                 └──────────────────┘
                        work
                 └──────────────────────────────┘
                        business
                 └──────────────────────────────────────┘
                        corporate culture
                 └──────────────────────────────────────────────┘
                        communication
                                                        philosophy (ethics)
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The General Model of the Firm

It should be noted that our model is a *constructivist* model. We begin with *our* distinction, which is an arbitrary one, and try to become less arbitrary as we proceed. That is at least the way an observer relates to an object – or rather subject – and by doing so provides for a way of self-organisation (Ashby 1981). Our model is *analytical* in that it consists of distinctions which only we can draw. It is, however, *synthetical* in that we invite the reader to test these distinctions with respect to a firm of his choice and join us in constructing and enacting, i.e., designing and monitoring, that firm.

The Product

2.2 Our first distinction is the distinction of the *product*. Whatever else the firm may be doing, it has to recursively draw the distinction of which product it is to produce. This may be a material or an immaterial, a tangible or intangible, an easy or difficult to define product, but it has to be a product that tells employees, managers and clients alike just what the firm is about. It may consist of certain things, imaginary quality and symbolic prestige, usually in some not altogether readily detectable combination, whose name – but not necessarily the object itself – brings forth the desire, as Barthes (1967, p. 7) once noted. However, a product has to be indicated, thereby leading to the first distinction and the form that goes with it.

2.2.1 This is the most arbitrary distinction and the most unusual one. Nobody these days seems to look first at the product of a firm when inquiring about that firm's identity. Organisation

studies, management science and economic theory of the firm all hasten to reach, in the very first steps of their analysis, a level of abstraction that precludes the question of just what the firm is producing. It is as if the question of the product is both too self-evident and too complex to be addressed.

2.2.2 The distinction itself may be drawn implicitly or explicitly. Many of the non-profit organisations analysed by Peter Drucker (1990) proved to be rather inexperienced in consciously drawing the distinction of their product, even when they clearly knew there was one.

2.2.3 First-order observers of all kinds, employees, managers, clients, regulators and investors draw the distinction of the product. In doing so, they use their distinctions and there is no way to be sure that the product they mean has anything to do with the product others mean. It is only by risky procedures of self-reflection, sometimes called "strategic development" (Nagel and Wimmer 2002), that the differences between their distinction and a possible common denominator of these differences, may become evident.

The Technology

2.3 We have to bring in *second-order observers* in order to introduce consciousness or self-observation. Yet to be able to operate at all, these second-order observers must also be first-order observers. And they may well be identical with the first-order observers we named earlier. We assume that the distinction of a firm's product gets its form by being distinguished from its *technology*, ie., from both the technical and social procedures that are available to make the product. We assume a technology to be a practical compromise between the technical and social demands on a production process (Udy 1990).

2.3.1 The technology is part of the form of the first distinction. Indeed, it is the outside or the first context of the first distinction, as observed by a second-order observer who may be the first-order observer observing himself. This means that a firm distinguishes only those products for which it has, or hopes to acquire, the technology to make them. Second-order observers intervene as first-order observers, thereby presenting their own distinction to further second-order observation.

2.3.2 Technology here means all kinds of ways of making sure that we can do what we want to do. This includes material access to resources, knowledge of procedures, technologies, availability of people to do the job, and ways to convince society that you are doing what you are

doing in the proper way.

2.3.3 We speak of "technology" and not just of "procedure" because we try to understand the often prevalent attempts to turn all kinds of rather uncertain procedures into certain combinations of known effects and their causes. Technology suggests causality. And in that form even social or temporal procedures, ways of cooperation, say, or sequences of usual action, are seen as lending themselves to routines which are as easy to assure as causal mechanisms. We speak about technology because we want to be able to watch how this definition of routines is actually done and assured. Using Von Foerster's (2003, pp. 309-313) terminology, we can say that technology tries to turn the non-trivial organisation into a trivial machine.

Work

2.4 We add the assumption of *communication* between first-order observers who at the same time act as second-order observers. The firm observes itself. By *working*, it relates products to technology and technology back to products.

2.4.1 Sociology tells us that this in itself is a form of a distinction, which has historically proven apt to differentiate an enterprise inside society. This is because the *social behaviour* demanded by work in all known societies differs sharply from the social behaviour demanded by other interaction (Udy 1970). Enterprises beginning with hunting and progressing to assembly lines, bureaucracy and beyond exploit the distinction, if not conflict, between the physical exigencies of work and the social settings of behaviour. They define their own identity by inventively balancing the one with the other (and possibly violating both).

2.4.2 One of the ways to distinguish, by working, a reference to the product from references to possible other issues of interest consists in spelling out a causal relationship between necessary causes and otherwise impossible effects, which legitimises the technology used. Everybody then knows that the technology requires professional attention, even when producing a trivial control mechanism that compares both favourably and unfavourably (i.e., ambivalently) with the non-trivial contexts of the work. That is why working demands sensibility. In its division of labour it has to switch between the trivial and the non-trivial in order to absorb, in a professional manner, the uncertainty (March and Simon 1993) which nobody actually wants to acknowledge.

2.4.3 Note that all work involves transactions, i.e. interpersonal transfers of information and/or goods. These transfers become possible only by their embedding within networks of social

interaction which ensure their access to the information and/or the goods to be transfered by means of either coercion, compensation, commitment, or various combinations of them (Tilly/Tilly 1998).

The Organisation

2.5 Any enterprise, firm or company has to find a way to *organise* itself, which simply means being able to communicate its own way of work with respect to the identity of the firm *and* the social and natural environment.

2.5.1 The organisation introduces *process* and *hierarchy* to be able to integrate, at any step, the specific exigencies of its own work with the criteria any society may use when more or less benevolently monitoring what is going on inside a firm. In other words, an organisation is inherently a societal device used to give shape and pattern to a kind of work that differs from everything society is used to outside organisations.

2.5.2 Our form now reads: Inside a firm there are observers who accommodate the work necessary with the social context within which that firm exists. They do so by giving the firm an organisation.

2.5.3 The kinds of hierarchies, formalised procedures, professional competencies and associational modes of communications which a firm adopts (Mintzberg 1979), are co-dependent on the work it is doing. In other words, it is co-dependent on the technology involved in making a product on one hand, and on a yet unspecified social context of the firm on the other.

2.5.4 Note that such a double reference to society and organisation with respect to the determination of a product is not only valid for companies but for other organisations (in the general sense) as well. Schools, theatres, armies, churches and authorities alike must be able to specify their product with respect to technology and organisation in order to relate it to their social context.

2.55 Note also that we can count the number of crosses determining the product in order to see the constraints bearing on that particular product. Our model of the form of the firm so far has three crosses which mark the product. The first one identifies it as the product. The second one spells it out as a possible product of an available technology. And the third one specifies it as the

product of a possible organisation of work. It goes without saying that the more we proceed with our model the less arbitrary the product, i.e. the arbitrary first distinction of our model, becomes. We take this feature of our model to be isomorphic to the reality of a firm. Also isomorphic is the fact that the first distinction remains arbitrary nevertheless. That of course should not come as a surprise. "Choice is originative", says G.L.S. Shackle (1979, p. 28).

The Economy

2.6 Reference to the *economy* is extremely useful. There is no better way to convince both the organisation and society of what has to be done with respect to the organisation of the work.

2.6.1 The distinction of the economy introduces the notions of markets and clients, of costs, benefits and profits, of assets and debts. Note that there is no single or double accounting as long as there are no economic facts and notions to be re-entered into the firm. In fact, a firm does not properly exist without a distinction of the economy from, and into, which it is differentiated. This distinction, as business history shows, is done by the means of *ratio* (accounting), *firma* (legal binding) and *ditta* (credit) (Sombart 1987).

2.6.2 We may try to *generalise the model* with respect to organisation in general by considering ways to "rationalise" the organisation that exist outside the reference to the economic system of the society. If accounting is the way the reference to the economic system is translated into a distinction (assets/liabilities) and re-entered into the organisation (Baecker 1992). What distinctions are used by an army, a theatre, a university when they break (i.e. rationalise) their principal outside reference into a code constraining their behaviour? Victory and defeat (Clausewitz)? Imitation and performance (Brecht)? Research and teaching (Von Humboldt)? Are these distinctions equally capable of defining the wealth and performance of an organisation as the distinction between assets and liabilities?

Business

2.7 The economy is the fourth distinction enabling a second re-entry to operate. That second re-entry somehow tells the organisation: "Don't ask what is going on here, just look at the business we are in when trying to work on a product." It defines *the business* the firm is in.

2.7.1 Business means that by now the product of the firm is determined four times, i.e.,

- as the product a firm is able to identify,

- as the product a firm has (or, in some respects, lacks) the technology to bring forth,

- as the product for which an organisation is able to define the work processes involved in its making, and

- as the product possibly to be marketed to the society's economy.

To do business means to travel back and forth between these determinations, exploring their scope or *spielraum* and again and again inventing re-combinations of product (identity), technology (quality, reliability), organisation (evidence, service), and economy (prices, markets).

2.7.2 To do business re-enters the distinction of the firm from the economy into the firm. It constitutes its double closure, whereas single closure simply means that the firm is somehow able to reproduce itself, i.e. to drift along. Double closure is the precondition for the firm not only to operate but also to *regulate* its operation (Von Foerster 2003, pp. 225 and 6; Baecker 2003, pp. 126-168). Its business defines its reflexive level.

Double closure here means that the firm looses exactly two degrees of freedom in order to gain the operational flexibility and structural plasticity it actually has. The first degree of freedom lost means that any operation, whatever it consists in, must at least lead to a next operation that is acknowledged as an operation of the same firm. The second degree of freedom lost means that any regulation – including a regulation that defines the exceptions from the rule (Ortmann 2003) – must at least refer to some previous regulation and to some possible next regulation.

The reflexive and regulatory level is not a luxury in which the firm indulges when it has time "on its hands", but it is the very level at which the strategic decisions of the firm are to be taken. It is at this level that the firm envisions its range of possibilities and selects those of them which it deems promising.

Society

2.8 The introduction of the systems reference to the economy goes a long way towards distinguishing the society in which the firm operates. And for much of economic theory,

including management studies, it is the be-all and end-all. Yet the model we propose aims, as we said, at the possibility to distinguish between systems references in general and between references to social systems operating inside society in particular.

2.8.1 Thus we have to acknowledge the fact that the economy is only one of the social and functional systems operating inside society (Parsons and Smelser 1984; Luhmann 1988; Baecker 1988). We must distinguish *society* as consisting, for instance, of various perspectives on the differentiation of the economy (i.e., "capitalist" or "socialist", "local" or "global", "old" or "new") which shape the behaviour of companies. Society has to find a way to accommodate the fact that companies invent new products which nobody at first considers useful, offer jobs and almost withdraw them at the same time, exploit natural resources that can never be replaced and so on. Religion, culture, education, politics, art all have their own societal shape and their own view of the economy's hold on society. And companies have to accomodate the way society is able to sceptically make its peace with them. The economy has to fight over its differentiation, has to watch its boundary, which guarantees its autonomy (Agnew 1986), and has to legitimate itself in terms of wealth, progress, civility (i.e. "doux commerce", see Hirschman 1982), and efficiency.

Corporate Culture

2.9 We take *corporate culture* to be the means by which the re-entry of the distinction between the economy and society into the firm actually takes place.

2.9.1 The corporate culture defines the way the firm *compares* itself to different social contexts both of other organisations and of other social systems which it observes operating in its environment and *identifies* itself with respect to that comparison. All identity is constituted by comparison, i.e., by distinction. Only when forced to compare itself to other assessments of its product, to other organisational models, to other ways of doing business and to other ways of behaving in a more or less civilised manner, does the firm develop its identity. Only then does it explore "authentic" (i.e., unmistakable and always legitimated) ways of presenting its identity both to itself and to others and of investing more or less appropriate care in it, calling it its culture.

2.9.2 We think of both "cultural heritage" and "agrarian cultivation" when considering the literal meaning of culture. Many different ethnological descriptions are applied to cultures, developing

some kind of folk identity as well as biological and technical interests in yeast and similar things to develop a culture.

2.9.3 There are two useful notions to take into account when considering the importance of a corporate culture. The first is the notion of the "two jobs" (Deal and Kennedy 1982) which any one person performs inside an organisation. The first is the "official" one, defining a person's place and competence within the job system of the organisation, the result of some kind of work division. The second is a job with which every employee is entrusted inside an "unofficial" and "informal", yet very real network of "storytelling" about what is going on in the firm and on its markets. The jobs here are the jobs of storytellers, spies, priests, prompters, schemers and their listeners, clients, believers, actors and intriguers. The network of second jobs is permanently in operation to facilitate the sensemaking (Weick 1995) inside the firm and with respect to its markets which no official strategy, no manual of standard procedures and no listening to customers and regulators can ever provide.

2.9.4 Nothing of course could be more useful since it links the firm back to the society in which it operates, while having to address both the markets of the economy and the organisation of its work. A corporate culture may pacify the *tensions* that result from the differentiation of the firm from society. It may also build and rebuild, strengthen and elaborate on these tensions. Usually it does both – but this gets noticed only by experienced managers.

The Individual

2.10 To go on from the so-called biggest to the so-called smallest context reference, from macro-considerations to micro-considerations, from society to *the individual* seems odd. We do so not just because we want to add a "human" touch to our model or to give it a "psychological" foundation. We do so because we believe there is no society which does not have to adapt to the ways individuals are able to handle its sense-making, its structural constraints, and its various stress factors. Contemporary society may be among the most complex ever. It still has to address the knowledge and ignorance, the fears and dreams of individuals. It still has to attend to their "desire to play" and "desire to win" to use Warren McCulloch's (1989) idea of the two (and only) necessary feedback mechanisms necessary to generate and maintain social life.

2.10.1 To be sure, the individuals addressed by companies come only in *certain shapes*. Companies are very restrictive in their reference to employees, suppliers, clients and other

individuals. Yet even so, these shapes have to fit what people offering their work, money or capital are prepared to accept. Thus, any sensemaking with respect to products, technology, work, organisation, business, the economy, corporate culture, and society ends up being confronted by people looking at it and accepting it or even enhancing it, or by others who reject it.

2.10.2 This is why one of the most fruitful ways to consider organisations, Weick's and Sutcliffe's (2003) idea of "high-reliability organisations", proposes the notion of "mindfulness" as a core concept. Mindful work or management means that the individuals doing the work or the leading bring with them their vision, their listening, their smelling, their tasting, and their feeling to the organisation of the work. They do not just pay attention, but they somehow actively incorporate the firm in their way of behaving and interacting such that at any moment they are able to ensure, and improve on, its operations. These are some of the least evident things going on in organisations. Consider the routines an organisation ordinarily tries to define in a way that no individual ever has to interfere with it sense-making. Of course, no organisation research has ever proved able to confirm that dream of technically assured routines (Malsch 1987).

Communication

2.11 The notion of *communication* is perhaps one of the most enigmatic ones to have been introduced in Twentieth Century sciences. Precursors to this notion are rhetorical ("communicatio") and theological communication ("idiomatum communicatio"), but these do not help unless considered closely. For our purposes, we shall simply note two important aspects of the scientific notion of communication (Shannon and Weaver 1963; Ruesch and Bateson 1987):

- The first aspect is that any communication is a selection of information out of a space of possible other information, which is to be taken into consideration simultaneously, oscillating, as it were, between the selected information and the space of possible information. It goes without saying that the space of possibilities imagined by the "source" of one piece of information is not identical with the space of possibilities imagined by its "destination". Thus, the communication contains a more or less fruitful misunderstanding even when the selected information seems (to whom?) to be the same. Indeed, any possible understanding entertained by communication has to be – and can only be – nurtured due to the misunderstanding being pervasive, because, as

Shannon (1963, p. 68) put it, it is the correction of the communication that assures its possible identity to an observer.

- This means that communication works on redundancy (Bateson 1972, pp. 406/7). Thus, the second important aspect is that communication deals with a paradox. It accepts *as information* only what is new, i.e., features some element of surprise. Yet at the same time it can only accept that information by turning it into information already known and by making the communication fit into familiar patterns of communication. There is a complex, i.e., an inherently knotted and networked way of balancing variety and redundancy whenever communication occurs.

2.11.1 This inherent complexity is why communication is the core term of the model (Baecker 2005). By re-entering the distinction between individual and society into the organisation of the firm, communication makes the firm participate in the difficult yet unavoidable states of society with which we are dealing (Luhmann 1997a). Any attempt to avoid this must take recourse to a technical isolation of a mechanism and can thus only work as an automaton, not as communication.

2.11.2 The inherent complexity of communication, however, is broken into the fractal structure of any communication having to re-link social states to individuals who are or are not prepared to receive them. This is the self-similarity of society which contemporary sociology is ready to consider (Turner 1997; Fuchs 2001), instead of the earlier distinction between micro and macro levels of society. Sociological systems theory describes individuals consisting of body and consciousness as constituting not society but its primary environment such that they are free to do and think whatever fits their *eigen*-dynamics. Taken to be the primary environment of society, however, includes individuals into the form of the society.

2.11.3 Communication re-entering the distinction of individuals into the organisation of the firm is difficult for traditional management. At the same time, however, it proves radically innovative in reconsidering the way in which people gather to relate to each other.

Philosophy

2.12 We may thus conclude our model with the notion of *philosophy* (or, *ethics*) that re-enters the whole model into itself and reminds us that even a complex model like ours still describes a form which may be distinguished with respect to anything it excludes. There is an unmarked state accompanying the distinction between society and individuals, which perhaps, depending

on the philosophy applied, relates to the overall ecology, i.e. the self-organising neighbourhood, of our world.

Conclusion

Our model of the firm is based on a theory of social systems that looks for operations generating and reproducing the social system and interpreting these operations in terms of indications and distinctions that mark states and do this, as a second-order observer may perceive, by drawing on contexts. We employ a constructivist epistemology, as we wish to provide observers with an idea of his or her means of approaching a firm, both from inside or from outside, in a situation that is richer than usual in potential. We look at employees, clients, managers, consultants, investors, and regulators as possible instances of observers for whom such a model may be an interesting device. We therefore introduce five suggestions, i.e., history, business, culture, management and systems references, and one problem, context, as the pillars of our model. We use the notion of "form" as introduced by George Spencer-Brown in order to look at the indications of marked states, the distinctions used to back these indications, and the space of possibilities produced and exploited by these distinctions. Note that we try to phrase our model in terms that somehow reflect the notion that information is the selection of a message out of a set of other possibilities as developed by Shannon's mathematical theory of communication. We did not go into this theory in this paper, yet further stages in the development of our model should be able to show that the mathematical theory is not actually about transmission and not about pre-selected sets of possible messages but about the recursive production of redundancy and variation and about the exploration of an indefinite space of possibilities. Suffice it here to say that our model of the firm frees organisational theory and research from any constraints of economic or management theory, while enabling it to look closely at the contribution of these theories to the form of the firm. Our model hereby continues in the rich tradition of social science studies of organisation. Maybe the next step in that tradition, while drawing on the sociology of Niklas Luhmann, will go on to envision a kind of contextual mathematics as a means of analysing phenomena and constructing observations as a contribution to organisational practice.

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