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Shape of things to come: From the 'laws of form' to management in the post-growth economy

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abstract

Departing from George Spencer-Brown's *Laws of form* and the works of German sociologist Dirk Baecker, a formal model of the firm in the post-growth economy is developed. In following a post-classical approach – and some reference to system theory by Niklas Luhmann as well as the works on autonomous systems by Francisco Varela – we, first, show the explanatory power of Spencer-Brown's indicational notation for conceptualizing organizational and managerial problem situations, thus contributing a novel approach to the theory of the firm. Secondly, model insights about the nature of the firm, its management, and its relation to a changing environment with limits to economic expansion and increased societal demands are contrasted with existing strands of more classical managerial research and their findings. Thus, it is possible to theoretically substantiate new perspectives on the future 'hard core' of management practice around the notions of ethics, values, and collaboration, while also describing the scope and direction of changes in the firm's societal, economic, and ecological environments.

Introduction

This paper is an experiment about the future of organization and management theory as well as its changing contexts. We use a post-classical and model-oriented approach that takes its point of departure from Dirk Baecker's *Form of the firm* (Baecker, 2006a), expanding it towards a comprehensive framework for management in what we call the 'next economy'. Paying reference to Peter Drucker's *Next society* (Drucker, 2001), the next economy is described as emerging from technological changes that enable new forms of organizing and co-creation of value (Belova et al., 2008; Brafman and Beckstrom, 2008; O'Hern and Rindfleisch, 2010; Pitelis, 2009) as well as changes in the natural environment of business, signalling an 'End of growth' (Gilding, 2012; Gordon, 2012; Heinberg, 2011). This next economy is actually a 'post-growth economy' (Demailly et al., 2013; Marglin, 2013; Speth, 2009) – an economy that by and large has seen the best of economic growth in its past. The next economy thus appears exceedingly stationary (Mill, 1848) as regards capital, production, consumption and population. We do not normatively postulate the necessity or desirability of a post-growth economy or advocate degrowth policies (Demaria et al., 2013; Kerschner, 2010; Latouche, 2004; Martínez-Alier et al., 2010); instead we construct a general model of the firm using the notational language of the *Laws of form* (Reichel, 2011a; Robertson, 1999; Spencer-Brown, 1969), contrasting theory with empirical instances from contextual changes in business, technology, the natural environment and society. In the course of this study, this exercise will then lead to the emergence of the form of the next economy that, in the words of Spencer-Brown (Spencer-Brown, 1969: 57), *can be confused with* a post-growth economy, and with the precise form of its firm and of its management.

This paper has two goals. First, it seeks to develop and demonstrate the explanatory power of Spencer-Brown's indicational notation for conceptualizing organizational and managerial problem situations; secondly, it outlines the future of management under radically different economic, social and ecological conditions that comprise an economy beyond growth. We will start with a short overview of the laws of form and their possible application in the social sciences. We then present a revision of the original form of the firm as developed by Baecker, contrasting his model with other works on the nature and form of the modern economy. This adapted form of the firm can then be changed step by step by introducing minor changes in the contexts of the firm and by postulating how these changes might be interpreted from the perspective of the firm's core purpose: its product (Beer, 1970). The changes are connected to existing strands of organization and management research in order to explain the heuristic value of this approach.

Laws of form

There is hardly any publication that stirred the systems and cybernetics community in the way that *Laws of form* (Spencer-Brown, 1969) did. Both the 'father' of management cybernetics, Stafford Beer (Beer, 1969), as well as the 'Socrates of cybernetics', Heinz von Foerster (Foerster, 1969), gave the book enthusiastic reviews. In one sentence, *Laws* can be described as a conceptual inquiry into the origins of mathematics as well as a mathematical inquiry into the origins of concepts – summarized in the form of a question: How to inquire? The answer Spencer-Brown gave was simple: draw a distinction and create a universe. Drawing a distinction is a threefold operation consisting of the *distinction* itself, that which, for example, separates a sheet of paper into two distinct sides; the *indication* that is made, i.e. distinguishing 'this' side of the sheet of paper from 'that' side, thus labeling them; and the *continence* of all aspects of the operation that are bound together by itself into the *form of distinction*. Figure 1 shows the notational device used in *Laws*, the so-called token or cross that stands for both the operation of distinction and its sign. Drawing the distinction on a blank sheet of paper means inscribing it into an 'unmarked space' *n*; the space on which it is inscribed then becomes a 'marked space' *m*. Not only can you call the space marked when you see the cross, but it is also possible to tell the history of turning unmarkedness into markedness by indicating the two sides of the distinctions with *n* and *m*. What we are looking at here is the spatial expression of a temporal unfolding of the operation of distinction, that which Spencer-Brown calls the 'form of the distinction', containing everything created by it (Spencer-Brown, 1969: 3). This idea of continence strongly resonates with ideas of systemic closure, the distinction of an inside as opposed to an outside (also in an organizational sense), and autonomy of operations arising from such a closure, e.g. the ability to decide within an organization, thus enforcing its autonomy and opportunities for self-identification, in opposition to an operationally excluded environment (Reichel, 2011a: 649-651).

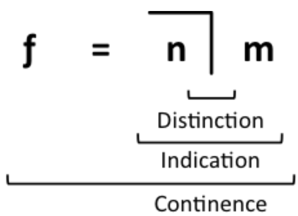

Figure 1: The Form of Distinction (Author's Description).

With these very simple ideas and the trinity of the form of distinction, two axioms can be derived. It is important to keep in mind that the cross is both operator and operand. It is a *description* of a cross in a marked space (telling you 'this is a cross') as well as an *injunction* to cross into that marked space (demanding from you to 'cross!'). The first axiom, then, is the 'Law of calling'. If you draw a distinction, you describe the marked space, e.g. drawing a cross on a blank sheet of paper. Drawing this distinction again, e.g. drawing a second cross next to the first one, means to describe it again as marked. 'Calling' the markedness of the space again does not change its markedness; it only reinforces it. Thus, you can *condense* the different callings into one, e.g. draw only one cross.

If I tell you that the sun is shining, and after a few seconds, I tell you again, nothing has changed in your state of awareness of it. In a Batesonian sense (Bateson, 1972: 386), where information is understood as a difference that makes a difference in a later event, you can argue that calling the same information again and again does not make any more differences than calling it the first time.

Figure 2: Law of Calling (Condensation), (Author's description).

The second axiom is the 'Law of crossing'. Here, the injunctive aspects of the cross are important. Drawing a cross, and thus a distinction, is not only the act of describing that something has been marked. It also demands a crossing from unmarkedness into markedness. This points to the temporal aspect of Spencer-Brown's indicational notation. When you demand another crossing, you can only cross into unmarkedness again, as these are the two states that are available. Notationally, you write a cross under a cross. The result, however, can also be written with a blank space, the 'void', because with an even number of so-called nested crosses, all crosses are *cancelled* out.

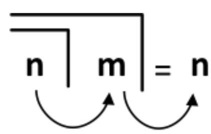

Figure 3: Law of Crossing (Cancellation), (Author's Description).

These two basic laws of the form give rise to both a simple arithmetic, a system of rules how to operate with the cross and turn markedness into unmarkedness and vice versa, as well as to an algebraic system denoted as Brownian algebra, a system that allows calculating with unknown variables according to the rules derived from the ideas of distinction, indication, continence and the two basic laws of form. It is one of the simplest origins of mathematics that starts with nothing, the void, and then adds a distinction to create something (Robertson, 1999: 53).

One aspect of such a Brownian system is how it embraces paradox. Classically, a paradox arises from the condition of *tertium non datur*: a third is not given, something cannot be its opposite, *a* cannot be *not-a*, a pipe can only be a pipe, despite René Magritte's famous painting '*Ceci n'est pas une pipe*'. Spencer-Brown's laws of form however can cope with paradoxes and pipes quite well. First, we have to create a paradox with the indicational notation in order to see how we can work with it. Let f be an expression in the Brownian algebra in the form as shown in Figure 4.

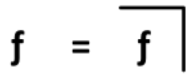

Figure 4: The Form of Paradox (Reichel, 2011a: 651).

The expression f is here to be taken equivalent to f under a cross. In Spencer-Brown's terms (Spencer-Brown, 1969: 57), the expression f can be confused with f under a cross. The first step is to take the cross for f, i.e. f equals the cross equals markedness m. The second step is inserting a cross for f under the cross on the right-hand side of the equation. Due to the law of crossing, this will cancel out the expression on that side and leave only the void, i.e. f equals the void equals unmarkedness n. And this is a paradox: we take $f = m$ and arrive at the conclusion that $f = n$. You can easily see that if we start the other way round, we also create the paradox: starting with f as being unmarked, we come to the conclusion that it is marked. Some-thing is no-thing and from no-thing there is some-thing (Robertson, 1999). The notation and the very basic two axioms of the 'Laws' allow for one thing being its polar opposite. Here we have to remember that drawing a distinction is not just an operation in *space* – to draw a distinction somewhere creating this somewhere while naming it. But it is also an operation in *time*: there is a before and an after of drawing a distinction. If we now think of f as being a recursive expression, so that the output of its past operations are fed back into its future operations, we arrive at an oscillating behavior, a *temporally unfolding* of unmarkedness turning into markedness, turning into unmarkedness, turning into markedness… and so forth. Inserting the distinction within itself is called *reentry* of the distinction into its own indicational space. Figure 5 shows the notation of reentry, with the hook attached to the cross depicting from what position the reentry is observed.

Spencer-Brown's calculus of indication was picked up by Francisco Varela and expanded into a calculus for self-reference (Varela, 1975) that can be viewed as the groundwork for giving a formal notation for describing complex system-wholes that are autonomous against their environment, autopoietic, and determined primarily by their own operations (Reichel, 2011a).

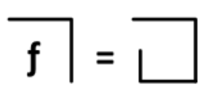

Figure 5: The Form of Reentry (Reichel, 2011a: 652).

Despite the initial turmoil and euphoria that *Laws* caused – most notably experienced in the American University of Masters conference where Spencer-Brown left after only two days (AUM, 1973) – it has had no lasting impact on either systems research or organization theory today. The only exception is found in the works of German sociologist Niklas Luhmann (Luhmann, 1995, 2006b) and his former student Dirk Baecker (Baecker, 1999, 2002). Luhmann used only one concept of the *Laws* in his own system theory of society, the form of reentry. Social systems operate with reentries constantly. The creation and management of their own paradoxes is what defines and drives them. Luhmann starts his system theory not with the notion of unity, of a system-whole, but with the notion of difference. A system is first and foremost defined by what it is not: by what is excluded from it, by the fundamental distinction between the system and its environment. Drawing this distinction creates the system, and the constant production of the distinction with intrasystemic means ensures the system's viability: without distinction there is no reproduction. At the same time, the system can observe this distinction in operation and in its outcomes. It reenters the distinction between itself and its environment within the system through observing how it is drawing the boundary. In a social system perspective, reentry is thus understood as a *self-observation of the system within the system*. This is the origin of reflexivity, of the ability of being aware of oneself, of what you are, of what you become. In organizations, this process can be observed as strategic thinking, as envisioning, and in organizational change projects. Hoogenboom and Ossewaarde (2005: 616-617) argue that organizations can only become cohesive and thus viable through building reflexivity via self-interpretation and self-observation. For Luhmann, the dominant task of management is not a simple plan-do-check-act but a rather ambiguous balancing of self-references within an organization and the provision of means for self-description for organizational members (Luhmann, 2006a: 433).

In social systems, communication is the means by which systems observe themselves and what is going on. A new business strategy in a company, a decision about new product development, or the hiring of new employees becomes real by communicating it across and/or beyond the organization. As long as they remain inside the head of a CEO or within the board of directors, these ideas or thoughts cannot be observed by the organization. Communication as the basal operation of all social systems, from interaction groups to society, can be observed as the unity of the distinction between understanding, announcement and information. Information has to be announced, this announcement has to be understood as a communicative effort, and the information announced also needs to be understood. In using the English term 'announcement' for Luhmann's German original '*Äußerung*' over 'utterance', we follow Moeller (2005), who argues that 'utterance' hints at its psychological motivations and something beyond communication, whereas 'announcement' is more technical and restricted to communication.

Only when these three 'selection processes', as Luhmann calls them, occur simultaneously and form a synthesis – a unity – can we speak of communication (Luhmann, 1992). Figure 6 shows the form of communication in the indicational notation. You can see the three distinctions and different forms of reentry: i.e., observations within communication of information, announcement and understanding. Note that any distinction can be observed from any other distinction, depicted by the various hooks attached to different crosses. The reentry from information into announcement means that the announcement of one particular information is weighed against the announcement of all other information. Announcement reentering understanding denotes that this particular announcement is relevant against a backdrop of all other announcements (that are deemed irrelevant). Information reentering understanding implies that the announced information is understood regarding its context. From how we described this, it is clear that all these reentries have to be taken simultaneously in order to establish communication; they are context to each other, without which no meaningful synthesis could be achieved. The narrative descriptions above can be depicted rather economically in the form of communication.

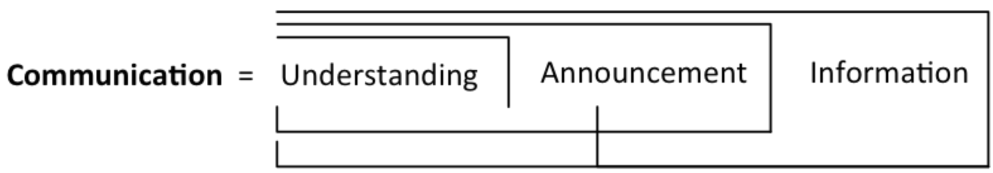

Figure 6: The Form of Communication (Reichel, 2011a: 659).

This is one particular way of using the laws of form in social science research: to simplify complex social phenomena of self-referentiality. The laws of form then become a descriptive language for describing a facet of the social in a different way, sensitizing researchers to reentry relations and asking new questions. Steffen Roth's work on alternatives to capitalism was influenced by form theoretical reasoning, using Spencer-Brown's ideas as a heuristic for understanding the observational standpoints of capitalism (Roth, 2015). In asking for the distinctions necessary to be drawn in order to observe capitalism, i.e. understanding its form in form-theoretical language, Roth was able to define capitalism 'as an (maybe politically motivated) observational bias to the economy at the cost of a lack of observation of science, art, religion, law, health, education, sport and the mass media system' (Roth, 2015: 119). Fritz B. Simon went further, applying the indicational notation as a formal descriptive language for understanding the different management styles of stockholder companies as opposed to family-owned businesses (Simon, 2005). This enabled Simon to focus on changes in self-descriptions and reality construction of management depending on the type of organization. Using the indicational notation of Spencer-Brown in such a way can be regarded as the first step in exploring organization and management studies with a formal description language. Either we can try to reformulate established theories in these fields in a Brownian notation; or we can apply its perspective directly to empirical phenomena and formulate them accordingly in order to construct new theoretical insights (Reichel, 2011a: 662). Here we will attempt to combine the two approaches by starting with social systems theory and the works of Dirk Baecker, expanding it to recent empirical occurrences with organizations, management and the wider economic environment.

The form of the economy

In his works on economic sociology, Baecker (2006b) uses the notational form of the 'Laws' to visualize the different contexts of the core economic question of scarcity. Scarcity is the central problem of the economy, of economic thinking and economically oriented organizations. Whatever one wants to achieve, means and resources are scarce, and because they are scarce, you have to economize on them. The result of the economic process is then a temporary relief of scarcity – for the price of a different kind of scarcity in the future. To overcome the scarcity of not having enough to eat, you mobilize resources and create food, but these resources are then no longer available for other uses. It might well be that scarcity is a very fundamental principle of the *conditio humana*, the rock that is pushed upwards, yet keeps rolling down again. From a Luhmannian perspective, the economy then observes scarcity and the activities connected to it and communicates about it e.g. via means of prices expressed in the medium of money and goods traded on markets. Figure 7 depicts the form of the economy (Baecker, 2006b: 45). Going beyond Baecker's construction, we also explored the most likely reentry observations – understood as self-observations within the economy.

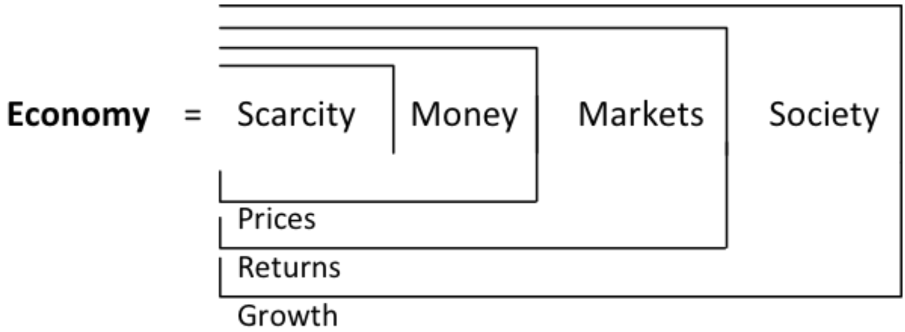

Figure 7: The Form of the Economy, adapted from Baecker (2006b: 45).

Scarcity is the fundamental operation and problem for the economy (Tellmann, 2015: 23-28). The distinction between scarcity and money can be read as money *being the context against which* scarcity *can be evaluated*. The reentry between money and scarcity, the observation of the distinction between the two from the viewpoint of scarcity, is achieved by the formation of prices. The price *relates* money and scarcity, tells you where scarcity, measured in prices, resides, and economization is both necessary and beneficial. This is another reading of the reentry operation: relating what is distinct through (self-)reference (Spencer-Brown, 1969: 57). Markets are another context, related to scarcity through monetary returns on investments. Money is directed onto those markets where the highest returns can be realized for overcoming scarcity. The overarching context of the society in which economic action takes place is the containing context of all economic operations and their contexts. The notion of growth, expressed in the increase of the sum of all traded goods according to market prices, enables the observation of how scarcity is relevant to society. In this observational form of the economy, economic growth is the predominant means to overcome scarcity via investing in markets with optimal returns and trading monetized goods via the price mechanism. With this self-observational form of the economy of modern society, it becomes clear that we are dealing with a growth economy – economic growth is hegemonic and orients all economic activities towards more growth (Schmelzer, 2015). It should be added that we are dealing with the form of the *modern* economy, an economic system unfolding over a period of several hundred years and coming into full force in the 20th century (Luhmann, 2012). If we wanted to observe the economy in pre-modern times like the economy of Roman Europe, it would look rather different. Markets how we come to know them were nonexistent before the 11th century (Casson and Lee, 2011); money in the modern form of bank money was unknown (Ryan-Collins et al., 2012). Most likely, the economy was not at all independently observable from the rest of society, leaving markets more to social institutions like a ruler's court. Instead of money, we would probably see property of both land and people as the contexts of the problem of scarcity.

In using the Brownian notation, we can formalize, in a single picture, very precisely what is happening in such a complex system like the economy without having to explain the whole story in detail in sequential sentences. Whoever is familiar with this notation understands what is shown. At the same time, the core ideas of the cross, being both a description of what is there as well as an operation to move from one side of the distinction to the other, enables us to understand this form of the economy as a dynamic interplay of contexts, referring to each other and changing each other simultaneously. One is the context of the other, yet all influence each other. You can, of course, focus on a specific sequence; e.g., focusing on how prices allocate investments in search of returns or how growth shapes new markets. There is no causality assumed in form theory. Rather, it offers analytical flexibility when applying the indicational notation.

Revisiting the form of the firm

In his 2006 article on *The form of the firm*, Baecker (2006a) continues drawing crosses around organizational issues, thus giving a form-theoretical model of a company.

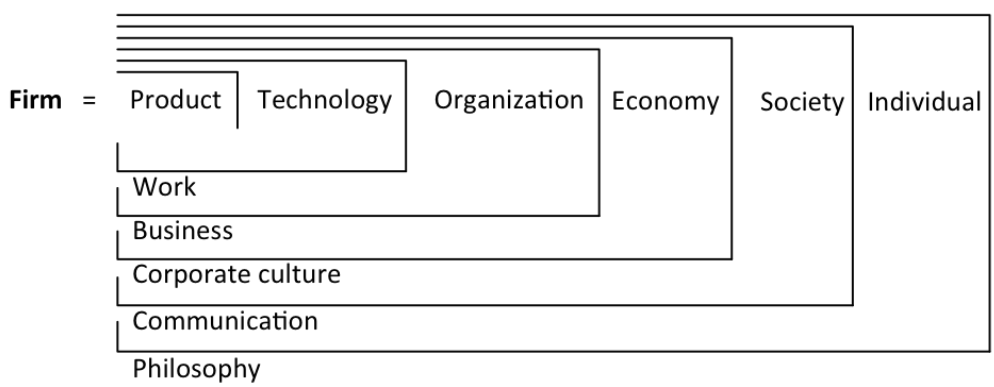

Figure 8: Baecker's Form of the Firm, adapted from Baecker (2006a: 128).

In order to establish a point of departure incorporating the contextual changes already underway in the economy, we chose to reconstruct the form of the firm slightly differently, placing more emphasis on the economic contexts detailed in the form of the economy. In doing so, we enable the form of the economy to change along the lines of other contextual changes in business, technology, the natural environment and society, revealing the nature of the post-growth economy. This requires us to zoom in and replace 'economy' in the form of the firm with 'scarcity', 'money' and 'markets'. This will also change some of the reentry operations; that is, it changes the foci of observations in the economic reasoning of a company. Think of Baecker's form of the firm as a mathematical equation in which 'economy' is a variable X that has its own underlying equation given with the form of the economy, as shown in Figure 7. We substitute X with its own underlying equation, thus changing the equation for the form of the firm. This is a generative step, though nothing truly new is added. We merely rearrange the form of the firm with a stronger focus on the economic contexts between the organization and society. The following description shows how this rearrangement unfolds, step by step.

First, we start with the product as the basal operation of the firm. Any firm, be it predominantly economic or not, aligns itself around the production of its product. This defines the firm more than anything else. In Stafford Beer's words: 'The purpose of the system is what it does' (Beer, 2002). Production of the product then implies technology as the context of the product. There is no product without technology, even a 'non-technical' product like a bank account needs some form of *techné*, of craftsmanship and instrumental knowledge that are inseparable to the definition of technology. The distinction between product and technology is reentered i.e. observed from the perspective of the product via the means of work. Through work, technologies and technological knowledge are oriented towards the creation of a product and, moreover, demanding some form of organization as the context of work (Scheiber, 2012). Organization, understood as a nexus of decisions that is distinguishable from other nexuses of decisions i.e. other organizations (Blaschke et al., 2012), structures product and technology via work, thus giving rise to the well-known form of Taylorist scientific management. Work in the modern economy is always work in a, more or less, hierarchical organization that defines goals, outcomes and operations of the work process. The entire field of operations research is focused on the relation of technology and product in an organizational setting (Schmenner and Swink, 1998).

Drawing the next distinction enters the economy into the equation. We have chosen to start with scarcity as the core problem of the economy, thus making scarcity the core problem in the environment of the organization. The question of scarcity is translated into the question of the business case of the product. How can we sell the product that is our business? If you view the interrelation of product, technology and organization from a business perspective, you construct the form of strategic management. Strategic management is then clearly visible as the reflexive operation that converts scarcity into business.

Reentering scarcity into the product creates the need for accounting as self-observation (Ahrens and Chapman, 2007). It is interesting to note that accounting is not as fundamental as organizing for work or developing a business strategy. In the hierarchy of nested contexts in the form of the firm, however, accounting is hovering above all of them. This dominance of accounting in the form matches the empirical world of companies and their decisions quite accurately, where there is a dominance of accounting over most other functions (Burns and Vaivio, 2001; Kaplan, 1992). The difference towards money as the medium of economic transaction and the relation to the product via prices is sheer necessity. Only from an environment of monetary calculations can accounting derive its importance, only through accounting money, calculating costs and prices, can the product be made sensitive to a resource-scarce environment.

Where do all the products go? The next distinction answers this question: markets, understood as the inner environment of the economy in which all communication about exchange of goods and the valuation of their property rights occur (Viskovatoff, 2004). The prices with which accounting relates scarcity to products are negotiated on markets, and through this process, investment decisions become both necessary and meaningful. Through calculating returns on investments, a company can decide what products to develop and manufacture for what markets. Return-oriented thinking, be it internal to the company or external via investment funds and banks, even trumps accounting in the firm of today. Products then become the vehicle for investments, while organizations are mere containers of investment processes and their associated returns.

Introducing society as the final distinctions, we observe that it most likely does not relate to the company and its product by corporate culture, as Baecker suggested, but by plain and simple growth. Growth of sales, growth of market share, growth of accounting and investment measures, most prominently cash flow and return on investment follow logically from the form we constructed here. The form of the growth economy inserted into the form of the firm leads to companies that are obsessed with growth, just like the rest of society (van Griethuysen, 2010). The final distinction drawn by Baecker, extending somewhat the form of the economy, is the human individual. The individual here can be the customer, the NGO activist, the worker, the manager or whatever individual or group might be a stakeholder, even the most distant relation (Freeman, 2010). Instead of philosophy being the reentry here, thus reminding us about everything that is not economical or firm-oriented, we relate it to the firm and its product via consumption. Within a firm of the growth economy, the individual cannot be observed outside a consumptive relation with it. Individuals consume as workers, as activists, as managers, as politicians from the actions of the firm. In the firm of the growth economy, philosophy is replaced by consumerism (Miles, 1998).

The revised form of the firm can then be depicted as in Figure 9 and used as an analytical device for understanding corporate reality. You can zoom in to certain context like the relation of product, technology and organization when you are concerned with OR issues, keeping in mind the other context that may influence decisions about reorganizing the firm; or the relation of markets, money and scarcity in order to make sense of investment decisions, pricing strategies and accounting measures; or the seemingly distant relation between the individual, your organization and scarcity, thus understanding that all business strategy has to aim for a business case fixed on consumption of a product.

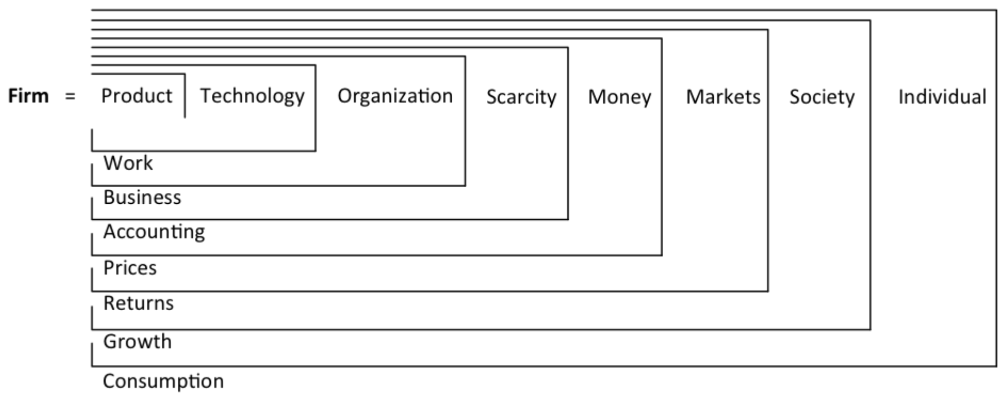

Figure 9: The Revised Form of the Firm (Author's description).

Changing contexts, changing form

As helpful the form of the firm is for today's business contexts, these contexts are changing. They have been changing for quite a while, with the development of information technology and the deregulation of global markets. At the same time, ecological aspects from the natural environment have been marked in communication as limits, barriers, new forms of scarcity, as well as new business opportunities in the guise of green and clean tech. Especially the advent of the computer, understood as a system of connected networks of algorithmic computing capabilities, most notably the internet, has stirred discussions about a new economy beyond mere speculative bubbles (Kline, 2015). The buzzwords of the past decade are 'Wikinomics' (Tapscott and Williams, 2006), the 'Starfish

Organization' (Brafman and Beckstrom, 2008), 'Open Innovation' (Chesbrough, 2006) and 'Collaborative Peer Production' (Botsman and Rogers, 2011).

From a more conceptual and theoretical perspective, the underlying mechanisms of an emerging 'next society' (Baecker, 2007c, 2007d) – a term originally coined by management philosopher Peter Drucker (Drucker, 2001, 2007) – can be traced to a dominant new variation of a societal distribution medium. Just as the printing press and its dominance – supported by converging developments such as the Renaissance, Protestantism, the rise of new economic organizations like publishing houses and trading companies – enabled the creation of the modern age and laid the groundwork for the 'Great Transformation' (Polanyi, 1944) that brought about our growth economy, the computer as system might well entail the potential for changing society yet again. This is, of course, highly speculative, but it is an empirically substantiated and theoretically well-informed speculation. In other words, our speculation is the result of abductive reasoning (Queiroz and Merrell, 2005). The argument, based on Luhmannian system theory, is as follows: as society consists of and is driven by communication, any lasting changes in the dominant distribution medium will alter the process and content of communication and, following from that, will alter society and the way society is structured. The proliferation of printed books from 1500 onwards created an overflow of communication that was unprecedented. New forms of order emerged and engaged in a Darwinian struggle for the survival of an order that best fitted this new world of communication. Functional differentiation became the order of the day up to the present, society was structured in a heterarchical manner with separate yet connected realms of politics, economy, science, law, religion, education and so on (Luhmann, 1995).

Intra-organizational change and the notion of limits

If the buzzwords of the business and tech world have any meaning, they have it within such a theoretical framework. Can we guess abductively what the form of the firm, and therefore the 'next economy', will look like when we take these empirical incidents and the insights from theory seriously? Let us start with the inner core of the form of the firm, with its product, technology and organization. Organization, understood as the nexus of decisions that give form to the alignment of product and technology via work, is the classical form of economic order as exemplified with the 'Large-Scale Corporation' (Drucker, 1964) of Alfred P. Sloan's General Motors in the 1930s. This form has been dominant throughout the 20th century and continues to dominate in our day. However, the changes depicted by such labels as Wikinomics or Starfish point in a different direction. The drive towards fragmentation, outsourcing and cooperation is not new, in the classical industries this started over 30 years ago in sectors such as automobile manufacturing, with what are now global supply chain and production systems (Hätönen and Eriksson, 2009). But networks in the automotive sector are not networks in the next economy. When you fully incorporate the computer as system as the backbone of your organization, in fact as the very foundation on which all your value-creating activities rest, the logic of value creation itself changes (Afuah, 2003; Sytch and Tatarynowicz, 2014). The possibilities of connecting to new partners, new ideas, new customers; incorporating these customers as active 'prosumers' (Toffler, 1984); opening up all your processes to innovation distant from your old decision core, will shift the nexus of decisions away from the organization. The term 'organization' will no longer be appropriate as a way of making sense of how, why and where your value creation is taking place. Replacing 'organization' with 'networks', with diverse and heterarchical networks of value creation, makes the inner core of the form of the firm look very different (Baecker, 2007a). It is no longer work in the Taylorist sense we are looking at, but collaboration between value creators bound only by the idea of providing a specific solution. Some of these collaborators may be bound by traditional work contracts or similar formal agreements, but this most likely will not be the only type of arrangement (Paskewich, 2014). Collaboration becomes even more important, as the nature of technology also changes. When we speak of technology, we imagine installed hardware, the tangible results of technological processes. Today, however, technology is increasingly embedded into social arrangements, creating and shaping these arrangements while being recursively influenced by it (Reichel, 2011b). The potential of social innovation (Mulgan, 2006) can be utilized only through such a collaborative relation. Therefore, innovation, be it technological or social, understood as changes in social practices, will comprise the new context of the product. Reentering networks into the distinction between products and networks requires a different kind of observation than business. What is a business? It is a specific answer to a specific economic question dealing with scarcity. The specific answer of a collaborative effort in a diverse and dispersed network combining technology and social innovation will not just be about economics and scarcity. Diversity here means also diverse values and motivations to engage with the process of value creation. The entire field of social entrepreneurship (Beckmann, 2009) is oriented towards solutions to societal problems from which a business can be derived as a means to solve these problems. Business becomes a metaphor for problem solving; hence, we change the reentrant expression from 'business' to 'solution'.

Looking at this new inner core of the firm, as depicted in Figure 10, you can immediately spot the tensions of transformation from organization to networks; from work to collaboration; from business to solutions. If these tensions resonate with you and your organizational environment, you are on a trajectory of change that can hardly be fought, just dealt with. Contrast the classical form of the firm with this new inner core, and see where the tensions could be resolved. What is the solution you are aiming for? For whom is it a solution, and with whom do you have to collaborate in order to deliver? Where is the locus of value creation now, and what does this mean for your management skills and capabilities? The form-theoretical perspective and the indicational notation can be used as sensitizing devices for these changes and as a heuristic for asking the proper questions.

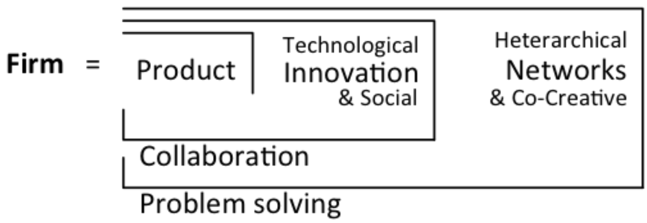

Figure 10: The Inner Core of the New Form of the Firm (Author's description).

Of course, this is not the end of the new form of the firm. There is another, even larger driver for change: the reintroduction of the natural environment into economic reasoning. From the 19th century onward, nature did not play a significant role in economic thinking; for business activities, nature was but a resource to exploit. Nature was an enabler, something to be taken and utilized for production. It was not until the 1960s that the coming economy of the 'Spaceship Earth' (Boulding, 1968) started to cast its long shadow. Today the overarching challenge of climate change and the need to transform our economy into a carbon-free economy, the societal demand for carbon disclosure and accounting of companies, and the growing resentment of customers and employees alike against ecologically 'un-sustainable' corporate activities represent a new economic reality. We introduce a new distinction between society and individual, leaving the individual as the final distinction, but creating a new context: nature. All firm activities now reflect concerns about the natural environment and how to deal with it (Robbins, 2001; Shrivastava, 1995). From the perspective of the company and its product, the means with which to observe this development is that of 'limits'. Limits are the bogeyman of economics and business development. Since the publication of the first report the Club of Rome in 1972 (Meadows et al., 1972), the discussion about limits – to growth, to human activity, to further development – has remained within the wider field of sustainable development. If we omit the changes made to the inner core and stick to the old form of the firm, the strategies of resource and energy efficiency as well as ideas about a 'Circular Economy' (Braungart et al., 2007) become apparent as dominant growth-enforcing and consumption-enabling moves in a limited natural environment context. If we stick to the changes made, with networks and collaboration, other strategies become understandable e.g. sharing and access solutions with collaborative use of products and resources. Depending on the contexts and their change, various aspects come into focus. Figure 11 gives the preliminary state of the form of the firm.

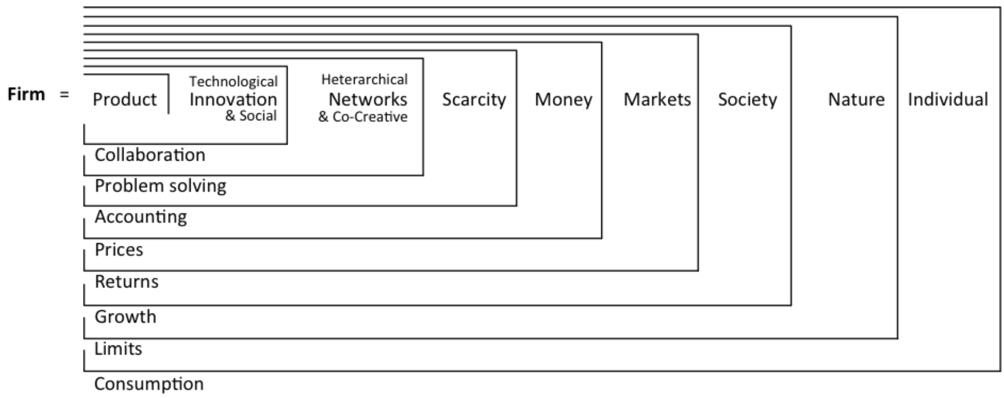

Figure 11: Intraorganizational Change and Ecological Limits (Author's Description).

By looking only at this form, even more tensions are made visible. Can limitations from nature really be aligned with consumption as an overall framework? Will solutions to social and ecological problems alter the way we interact economically (Newell and Paterson, 2010)?

From markets to networks

Another context that will most likely be transformed is that of markets. Markets are a cultural product of 11th century Europe (Casson and Lee, 2011) that evolved into what Luhmann termed the 'inner environment' of the modern economy (Luhmann, 1988; Viskovatoff, 2004). When the economy observes its own activities, thus drawing the distinction between itself and what it is not – its external, non-economic environment e.g. politics or law – it observes how resources are allocated, goods are produced and exchanged via the means of the price mechanism. These observations give form to markets as internal, economy-related environments. A company can then act with reference to markets and use these synthesized observations as input for its internal decision processes about allocation, production, and distribution of goods and services. If we consider the shift from organization as the nexus of decisions and ordering structure for relating products and technology towards diverse and dispersed networks, we can only conclude that markets of the economy will cease to be the single dominant environment for companies. Of course, markets will always be important in one way or another, but not all value creators in these networks will consider themselves economic actors, nor it is questionable that the economy will be the dominant system of reference for value creation in the 21st century. Collaboration and sharing, collaborative consumption (and production), and the 'Open' paradigm not only imply the involvement of different rationalities and motivations of value contributors at the inner core level of the company – the company's internal environment. These developments also imply that we become sensitive to a different internal environment society-wise. Instead of solely concentrating their observations on the inner environment of the economy, companies are starting to take into account *cross-sectoral market places* that span a wide array of societal spheres: market places of politics, of civil society, of science, of religion, of arts, of love and so forth (Baecker, 2007b). The term for this is 'polyphony' (Belova et al., 2008; Hazen, 1993) and it means, in system-theoretical terms, that a company will have more than one dominant system of reference. In fact, its new core capability will playfully balance different rationalities and utilize different sources of motivation in fulfilling its task (Roth, 2012) – a task that is also playfully negotiated within these new diverse and dispersed networks of value creation and across many different parts of society, not in a single system of reference, but in its totality. Investing in *reciprocity* will be the reentrant relation that will mediate between the product of this company and the cross-sectoral market places with whom it is dealing (Fassin, 2012). Stakeholder dialogue and management are then elevated into strategic relevance, becoming a *sine qua non* condition for survival.

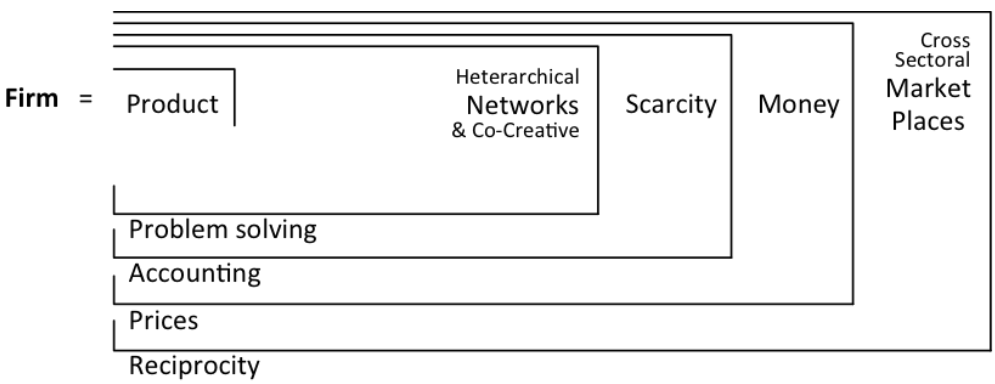

Figure 12: Networks as Intraorganizational and Intrasocietal Environment (Author's Description).

The form in Figure 12 also reveals the challenges companies are facing when dealing with networks and market places on various scales as soon as the question of rewards and gratification comes up. In the Open Source community, for example, reputation, knowledge and social capital are just as important as money (Klewes and Wreschniok, 2009). In networks of collaborative consumption, e.g. energy or food cooperatives, the focus might be more on participating in the solution provided.

Money in the form of bank money and the dominant medium of economic action will still play a role, but it will lose its dominance, especially as polyphony replaces monophony and networks of value creation become more heterogeneous as regards motivations and participants' values. *Value* is the key term here, and value might provide the medium into which money can be subsumed, being only one specific realization of value. The abstract meaning of value, denominating something of absolute worth, of being valuable 'beyond doubt', is a direct reaction of modern society to the problem of contingency (Luhmann, 2008; Zak, 2010). Values can now act as new anchor points that cannot be questioned. From a system-theoretical perspective values act as a meta-medium, providing orientation for communication (Luhmann, 1996). Values allow communication to take certain assumptions for granted, providing a non-contingent communicative context, thus enabling the continuation of communication. In a way, values fill the gaps that modernity has created between the different function systems in society (Rasch, 2000). If we are now dealing with both diverse and dispersed networks of value creation in the context of cross-sectoral market places throughout society, then values become the currency of what Drucker and Baecker term the 'next society' (Baecker, 2007c; Drucker, 2001). And this next society has a different form of the firm than does modern society, for which Baecker himself developed the original form of the firm in Figure 8. Hence, with multiple values instead of money, the reentrant observation can hardly be expressed as prices. There are no unambiguous numbers attached to values negotiated and exposed in cross-sectoral market places, as prices have been attached to communicating about products sold on classical markets in the medium of money. What is attached is a certain *ethics*. Ethics observe values, their origin, function and also the conflicts caused by the presence of different values and how to resolve these conflicts (Baecker and Priddat, 2010). Management ethics, as a field, can draw its legitimation and future importance from becoming the study of how this particular reentry is achieved. Needless to say, such a management ethics is logically beyond and above economic or business ethics.

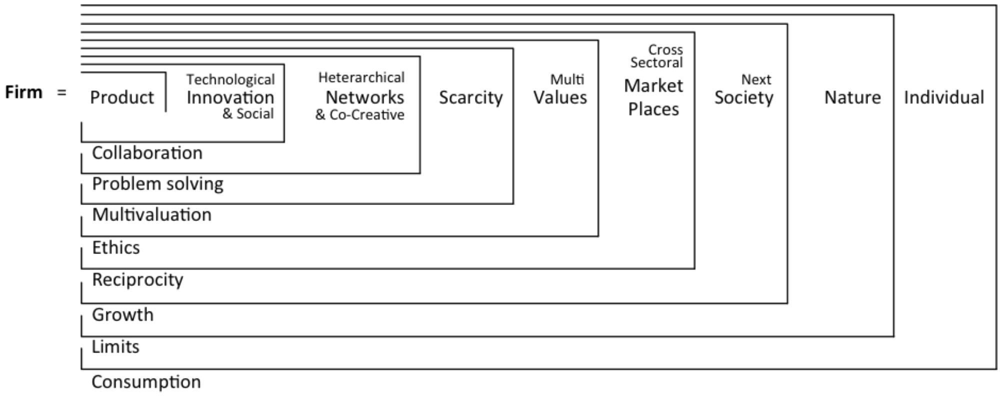

Figure 13: Values, Networks and Ethics in the Form of the Firm (Author's Description).

The narrative of the firm as depicted in Figure 13 unfolds along the lines of

i. collaboratively producing a product in combining technology with social innovation in diverse and heterarchical networks of value creation;
ii. managing by ethics and accounting for a value-based solution in a cross-sectoral arena;
iii. within a next society focused on collaboration,
iv. that is aware of natural limitations and bound by individual consumerism in order to overcome scarcity of needs.

Towards the next economy

There are several weak spots in this narrative. Accounting is one of them. How do we make an accounting of values? As values differ, products have to be related to them in an appreciative manner, offering a solution but not forcing it. The more feasible observation with which product and values can be related is by negotiation and appreciation of difference, by an open process of mutual and multiple evaluation of multiple values: *multi-valuation* of what is needed and what is provided. Traditional accounting, then, is a special case of this multi-valuation. The next weak spot, of course, is the relation between product and individual. Consumerism does not work well with limitations, values, ethics and so on (Chatzidakis et al., 2014). Also, the fixation on growth as the dominant motif of present-day modern society can hardly be dominant in the next society. It is clear, however, that both will have to change simultaneously, emerging from the interplay of diverse value creations, ethics, and collaborations. This points to the fundamental objective and problem of the economy: scarcity. The modern economy communicates scarcity with prices. What does the next economy do? Elinor Ostrom has provided insight on this issue when she was referring to the commons (Ostrom, 2010). If a resource is abundant, you do not have to deal with scarcity; if it is not abundant, you can pool and share the resource, and you also do not have to deal with scarcity. Scarcity is not a fundamental problem, especially not in a highly technological society with surplus farming and high levels of automation and productivity. It is a problem of the social organization of economic transactions. In markets, with money and prices attached to a product understood as a business, scarcity can hardly be ignored. But in cross-sectoral market places, with multiple values, negotiated evaluations and a product understood as a solution to a problem, scarcity is not central anymore. Given the greater context of reproduction and circularity, this next economy does not operate on and with scarcity but with *abundance*. The logic of abundance is thereby totally different from the logic of scarcity. Whereas scarcity forces the economy to overcome it via growth, abundance forces the economy to organize the 'plenitude' (Schor, 2010). It actually enables this next economy to relate its central issue, abundance, to the product of the firm as a problem of *enoughness* (Dietz and O'Neill, 2013).

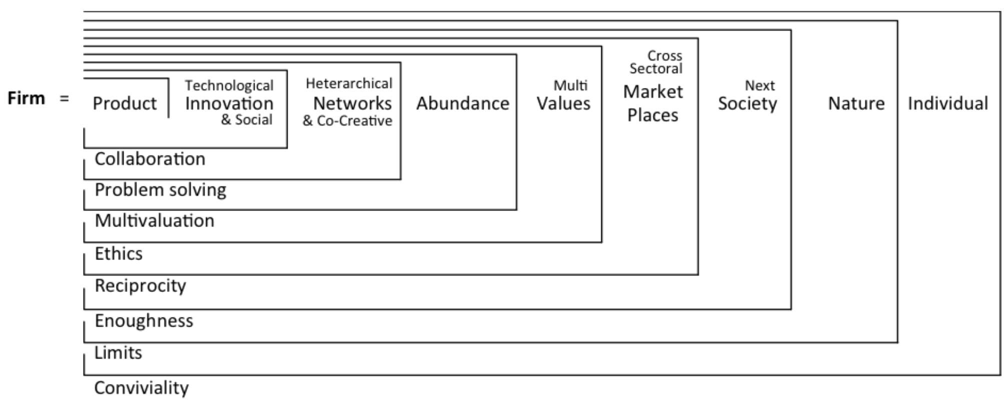

Figure 14: The Form of the Firm in the Post-growth Economy (Author's Description).

Enoughness is not a slow and tender economic context for the firm; on the contrary, it is revolutionary, maybe even more so than the scarcity that preceded it. Whereas scarcity produced a never-ending growth economy, enoughness has the potential to produce an oscillatory economy of novelty within the confines of a limited planet. This elevates the relation of the individual to the rest of the firm and its economy beyond consumerism, towards what Ivan Illich termed *conviviality*. Conviviality, as opposed to consumerism, is 'autonomous and creative intercourse among persons, and the intercourse of persons with their [natural] environment' (Illich, 1973: 11). Enoughness, multiple values, cross-sectoral market places, products and solutions for convivial lifestyles now give rise to the form of the next society's economy, which can observe itself as a post-growth economy: an economy beyond the growth imperative, beyond scarcity, and beyond consumerism.

Implications for management

The form of the firm in the economy of the next society i.e. in the post-growth economy, as depicted in Figure 14, can be used in various ways. It is a description of the shape of management to come, should all contextual changes described here materialize in full swing. It has been argued that this transformation is in fact already underway, and the form of the firm of yesterday, as described in Figures 8 and 9, is experiencing extreme pressures. Of course it is management and organizations that suffer from these pressures. In contrasting Figures 8/9 with Figure 14, different levels of change in different contexts can be focused, for example how the diffusion of the nexus of decision into diverse and heterarchical networks challenges the way management defines and exerts control over the value creation process. In fact, the new form of the firm 'in-forms' management that control itself has to be dispersed, enriched with values from the firms internal and external environment and guided by a managerial ethics dealing with collaborative evaluations of what kind of value is created, why this particular value should be created, and who benefits from it and in what form. Highlighting collaboration points towards the shortcomings of those portions of the supply chain and other partnerships that fail to take into account the systemic nature of collaboration (Neumann, 2012). Change can be traced and focused with the form, but it also provides a sensemaking device for management (Weick, 1995; Weick et al., 2005). If the old form of the firm made strategic management visible as an interrelation of product, technology and organization from a business perspective, turning scarcity into business, the new form provides managers with a different understanding about the future of strategic management in the post-growth economy: post-growth management will be mostly about how to relate product, social and technical innovation with each other as well as with diverse and dispersed networks of value creation from a solutions oriented perspective, thus providing for abundance – of whatever kind that 'enough' may be. The theoretical core of strategic management will then cluster itself around ideas first expressed in Dyer and Singh's work on the 'relational view' (Dyer and Singh, 1998; Dyer et al., 2008), but it will extend towards a management by ethics undertaken by diverse stakeholders (Carroll and Buchholtz, 2014; Carroll, 1991; Freeman, 2010) under the overarching framework of abundance and enoughness, thus deconstructing the customer from consumer to active prosumer and co-creator of convivial value (Le Ber and Branzei, 2010; Pitelis, 2009; Rocchi, 2005). Strategic management and management ethics can be confused with each other in the future.

But there is more to be gained. When management turns inward, to the value creation and its immediate environments, everything beyond cross-sectoral market places is omitted in order to focus on the relation between operations management – who should and how to collaboratively create a product from social and technological innovations – and strategic management as described above. When management turns outwards, everything between the product as core operation and abundance as core orientation is omitted. From the context of abundance towards the individual and the relating operation of conviviality, this reentry reassures the firm of why it is doing what it is doing. This is the realm of normative management and organizational sensemaking. If you now look at these two sections of the firm, you notice there is a mediating core between them. In the next economy, this mediating core of product, abundance, values, and cross-sectoral market places, along with their reentrant relations, becomes the hard core of management of the firm. In other words: it is the form of management in the post-growth economy. It is the era of post-growth management.

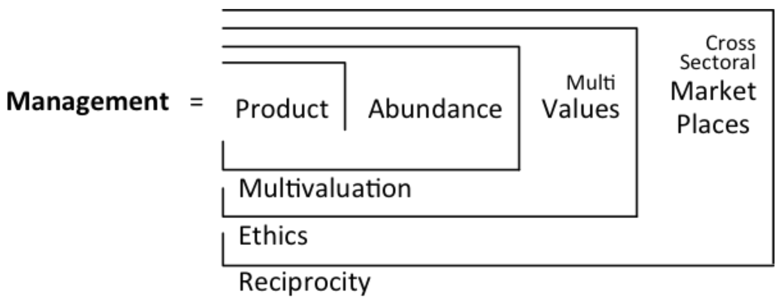

Figure 15: The Form of Management in the Post-Growth Economy (Author's Description).

Management, then, consists of all the activities that establish the relation of the product in providing for abundance via evaluation in the medium of multiple values, interpreted and negotiated by ethics from a cross-sectoral arena that is triggered by and rewards collaboration. Switching back the contexts, we discover that management used to be about all the activities that established the relation of the product in dealing with scarcity, interpreted via accounting in the medium of money and oriented by prices on markets that triggered and rewarded investments.

Conclusion

Our model of the firm in the post-growth economy gave rise to a new perspective of the emerging next hard core of organization and management practice. It also provided an example of how seemingly 'soft' issues in organization and management theory can be formalized with the indicational notation developed by Spencer-Brown. By strictly applying this notation and using it as some form of 'abductive heuristics', the story of the firm in the post-growth economy, the emergence of that new kind of economy, and the management of a firm immersed in its contexts unfolded almost by itself, with various connections to existing research and empirical observations. Of course, the results of this experiment should be taken with extreme caution. It is not what will happen. It is what is consistent within the framework of Luhmannian system theory and Spencer-Brown's calculus of indication. We suggest the forms developed here be taken as epistemic devices for checking against unfolding empirical backgrounds in the reality of organization and management.

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