
Changing Cognitive Frames—Changing Organizational Forms: An Entrepreneurial Theory of Organizational Development

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This paper discusses the notion of development in firm organizations on the basis of a comparison with ontogenetic phenomena in nature and offers a behavioral foundation that highlights in particular the impact of bounded rationality, cognition and social learning. On this basis the paper explores the role of entrepreneurship and its cognitive underpinnings, particularly with regard to the nucleus (multi-person) firm, i.e. a newly started entrepreneurial business. If the entrepreneurial venture is successful and grows, the increasing business volume requires that the firm organization also be expanded. Its size then sooner or later reaches a stage where the cognitive underpinnings of the firm change qualitatively in a way that forces the firm into major restructuring. At this point developmental paths can branch off in quite diverse directions, some of which are briefly highlighted.

1. Introduction

The backbone of the incessant restructuring of modern economies—the unending (re)organization of production and trade—is entrepreneurial ventures. For the most part such ventures are carried through by organizing and reorganizing firms. The emergence and the development of firm organizations thus reflects the deepening of specialization and the division of labor in the economy. The contention of the present paper is that, despite great variance in the individual cases and a manifold of contingencies, the emergence and development of firm organizations is not entirely a unique historical event. There are some regular patterns in the development of firm

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organizations from their founding to their eventual disappearance, and these regularities can be related to systematic changes in the entrepreneurial role.

Speculations about systematic patterns of development in firm organizations are far from being new. Marshall (1920, book IV, chs. XII, XIII) had already recognized the developmental dimension in the entrepreneurial process of (re)organizing production and trade within, and by means of, firm organizations. He even chose a metaphor—the lifecycle of trees in the forest competitively struggling upwards, some standing in full vigor, but all eventually giving place to new ones to come—that suggests an ontogenetic interpretation of firm development. However, for several reasons (see Loasby, 2000) these ideas failed to impress the discipline. The efforts of Penrose (1959) and Richardson (1972) to take up the issue several decades later in the framework of the growth of firms and industries were more or less isolated attempts. (An exception is the important work in business history which clearly underlines the relevance of the developmental approach, e.g. Chandler, 1962, 1990). Only with the recent emergence of the so-called competence perspective on the firm (cf. Foss, 1993, 1996; Langlois and Robertson, 1995) have the developmental aspects come up again.¹

In the few existing contributions, developmental regularities are usually assumed to arise from the growth of the firm organization and/or from a systematic coevolution of firms and their markets. Penrose (1959), for example, identified the growth of the firm with systematic changes which she attributed to basically two factors: the development of the firm's capabilities (specialized services which become available as experience grows) and spare managerial capacity. For Penrose a major contingency in the development of the firm is whether, at critical points in the expansion process, an adequate subdividing in managerial structure can be attained (Penrose, 1959, ch. VIII). For Langlois and Robertson (1995), to give another example, development is more a matter of coevolution between firms and markets. Depending on whether innovation-driven changes favor capabilities available inside the firm or capabilities obtainable in the markets, the boundaries of the firm relative to the market shift systematically. Accordingly, development here amounts to paths of vertical integration or disintegration which affect and transform the individual firm as much as an entire industry. Organizational development is contingent on, and therefore cannot easily be separated from, technological development.

What seems to be lacking so far is a systematic, behavioral foundation of a

¹ Even in these recent discussions it is not entirely clear, however, whether interests are directed at the (static) question of organizational form—market versus firms—or at elaborating on the process oriented, developmental, issues (cf. Rathe and Witt, 2000).

developmental approach to the firm. The present paper tries to fill this gap. It argues that a developmental approach to the theory of the firm follows quite naturally, if two intertwined features of incessant economic restructuring—usually neglected in organizational economics—are acknowledged: the role of the entrepreneur and the cognitive underpinnings of business organizations. Developmental regularities can be derived, it will be claimed, from a few basic constraints which the entrepreneur's internal promotion of specialization and division of labor cannot escape. These constraints originate from regularities in human cognition. They become relevant when the entrepreneur tries to coordinate the members of the firm organization on what will be called here her/his 'business conception'. For new opportunities for production and trade to be organized by (and within) a firm, notions of how to do it have to be conceived in the first place. This is a crucial entrepreneurial input. Any endeavor of seeing through new opportunities by setting up and running a firm organization is guided by at least a rudimentary entrepreneurial 'business conception'. In a world of bounded rationality, the imagining of what business is to do, the available knowledge on how to do it, and newly gained experience are based on interpretations that emerge from a cognitive frame provided by the business conception. The problem is how to convey it to the members of the firm organization, and how to induce them to adopt it as a basis for acting in their respective domain of discretion so that coherent organizational behavior can be achieved. As will be argued, these problems at the cognitive level—and the way in which they are, or are not, resolved—have a decisive influence not only on a firm's performance but also on its development.

The paper proceeds as follows. Section 2 prepares the ground by identifying the entrepreneurial role in specialization and the increasing division of labor and, inextricably related, in shaping and reshaping of firm organizations—an aspect much neglected under the currently dominant transaction costs approach. Section 3 figures out what precisely 'development' may mean in the context of firm organizations. A comparison with development in the sense of ontogeny in nature is helpful as it reveals the significance of entrepreneurial business conceptions which 'unfold' in the development of firm organizations. In Section 4 the role of the entrepreneurial business conception is explained in more detail within its proper context, the cognitive underpinnings of a firm organization. Related to this, Section 5 highlights the impact of social learning processes—a natural concomitant of bounded rationality where, as in a firm organization, constrained information processing is molded in social interactions. Section 6 draws together the various theoretical arguments in order to derive regularities and contingencies of organizational development.

Focus is on the small, newly founded business—the nucleus of a firm organization—where the relationships between entrepreneurship and the cognitive underpinnings of the firm can most easily be grasped. Section 7 briefly elaborates on the further development. If the nucleus firm-venture is successful and grows, the size of the organization will sooner or later reach a stage where entrepreneurship needs to be subdivided. Success or failure in the corresponding restructuring determines, it will be argued, the conditions under which a mature, large firm organization can emerge and survive. Section 8 presents the conclusions.

2. The Entrepreneurial Role in Specialization and the Organization of Firms

Specialization, an increasing division of labor, and economic growth have been frequently acknowledged as being intimately related. Raising the degree of specialization and the division of labor by appropriate (re)organization of production and trade—often accompanied by technical innovations—is a source of a special kind of ‘increasing returns’. This insight appeared crucial to Marshall (1920, book IV) who drew on Adam Smith (1979, book I). To be precise, ‘increasing returns’ in this sense (sometimes attributed to ‘technical progress’) differ from increasing returns to scale. The latter are based on the notion of a production function defined over a set of factors of unchanging quality, while the very essence of the notion of specialization is that the quality of at least one factor involved in production changes. Moreover, specialization refers to a process in which the current state of capabilities hinges on experience gained in the past (a phenomenon partially captured by so-called learning curves). Over time, merely by reorganization and by improving capabilities through specialization, a higher level of output can be reached. The time and effort saved can be used for a systematic searching for, and developing of, new ways of acting, i.e. innovations. The latter allow renewed access to natural resources, more sophisticated technology, and further improvement of the organization of production and trade. All this, in turn, yields even more ‘increasing returns’ and closes the autocatalytic cycle of modern economic growth.

Despite powerful arguments propounded by Knight (1921), what is less often recognized is that the driving force in organizing specialization and the division of labor is entrepreneurship. People are needed who conceive of new opportunities and who take measures to realize them in the form of business

ventures. These people are entrepreneurs.² Even though, in the pursuit of business ventures, it is economical over a wide range of activities to build up and use a complex network of market exchange contracts, exclusive reliance on this contractual form (as in a one-person firm) is an exception rather than the rule. Most of the (re)organization of production and trade is achieved by setting up multi-person firm organizations in which the 'internal' division of labor is a matter of direction given to employees on the basis of employment contracts. The reasons for choosing one form over the other are several: transaction cost differentials between them (Coase, 1937; Williamson, 1985); differences in their capacity to allow the accumulation of intangible assets, like knowledge, which entail economies (Foss, 1993; Teece *et al.*, 1994); the difficulty of contracting the crucial entrepreneurial input of judging the judgement capacity of others (Knight, 1921, ch. 10; Langlois and Cosgel, 1993); different degrees of cognitive identification with, and adherence to, the entrepreneurial business conception in long term engagements (Witt, 1998a). In any case, if the resources employed and/or the purveyors of the contracted goods and services are compensated at a fixed (competitive) rate, profits accrue to the entrepreneur when 'increasing returns' from (re)organizing production and trade can be realized. Without these prospects there would, in fact, be little systematic incentive to undertake such ventures in a competitive economy (except for the rent perhaps accruing to an innovator from introducing new, and better, products and services).

However, with the increasing dominance of transaction cost considerations, both entrepreneurship and increasing returns from organizing specialization and the division of labor have gradually disappeared from the agenda of the theory of the firm. The question of the organizational form—market or firm—has become the defining issue. Yet, the ontological and theoretical difference between the two approaches can hardly be underestimated. The question of why firms are used for coordinating economic transactions suggests a comparison between 'the firm' and 'the price mechanism' which lends itself to a static analysis of alternative equilibrium

² Whether entrepreneurs are employed or self-employed is less decisive than the question of how powerful they are in commanding resources into the actual (re)organization of production and trade. In her definition of the term 'entrepreneur', which can be adopted here without modification, Penrose (1959, pp. 31–32) referred '... to individuals or groups within the firm providing entrepreneurial services, whatever their position or occupational classification may be. Entrepreneurial services are those contributions to the operations of a firm which relate to the introduction and acceptance on behalf of the firm of new ideas, particularly with respect to products, location, and significant changes in technology, to the acquisition of new managerial personnel, to fundamental changes in the administrative organization of the firm, to the raising of capital, and to the making of plans for expansion, including the choice of method of expansion. Entrepreneurial services are contrasted with managerial services which relate to the execution of entrepreneurial ideas and proposals and to the supervision of existing operations. The same individuals may, and more often than not probably do, provide both types of services to the firm.'

states.³ In the work of Williamson (e.g. 1985), the concept of transaction costs has been systematically related to the fact that economic agents act on the basis of bounded rationality—a fact difficult to accommodate within a general equilibrium framework. Nonetheless, Williamson's concern is not with any procedural, dynamic implications, but with the relationships between bounded rationality and opportunism (see e.g. Williamson, 1985, pp. 58, 78, n.7). The core idea of bounded rationality (cf. March and Simon, 1958; Cyert and March 1963; Simon, 1972, 1978)—that, because of the limitations in information processing at a given point in time, human behavior unfolds under the influence of learning and adaptation—is basically sacrificed for a static mode of reasoning.⁴ To take human non-omniscience seriously, by contrast, means that knowledge has to be acquired through experience and observational learning in a process likely to affect behavior in an adaptive way. Moreover, non-omniscience also means that behavior can change in an innovative way as a consequence of new information being created or discovered (Shackle 1979). Both influences are significant for the entrepreneurial process of (re)organizing production and trade by means of, and internal to, firms. And both require a dynamic perspective to be taken.

3. *The Meaning of Development*

Unless the development of each firm, from its founding to its eventual disappearance, is considered a single, historically unique case,⁵ there is both room and a need for theoretical speculations. What generic features characterize the development of firms? How are they caused? The question of how regularities are generated is significant for any developmental theory as is known from other sciences, e.g. developmental biology. It is instructive, therefore, to note what development means, and how it is explained, in such a science. Developmental biology, to take that example, focuses on the processes that govern the ontogeny of the individual organism from birth to

³ Such a mode of argument is not accidental. As Loasby (2000) has pointed out, by the time Coase (1937) had raised the question, economic theorizing had gradually adopted a general equilibrium interpretation of the price system and was using it for the attempt to demonstrate a superior capacity of the market mechanism in achieving coordination.

⁴ The dimension of behavioral dynamics is even more aligned with the formalized variant of transaction cost economics, the incomplete contracts literature (see Foss, 1993). It is little wonder, then, that in a world of bounded rationality, the fact that the size of transaction costs depends on entrepreneurial skills yet to be experienced, and to be worked on, in pursuing a venture, is totally ignored in that literature. But transaction costs indeed develop (Langlois, 1992), and the way they do so cannot be explained in the domain of transaction costs, but must be derived from hypotheses about the cognitive underpinnings of the processes of experimentation and collective learning.

⁵ This is, apparently, not even the general presumption where it would most easily be accepted: in business history, see Chandler (1992).

death, i.e. the ‘unfolding’ of a basically fixed construction plan contained in the organism’s genetic program. Of particular interest are the morphogenetic processes of an orderly differentiation and growth of the organism by which a competitive, i.e. successfully reproducing, physical body is built up that gives phenotypic expression to the underlying genes. Because the processes are genetically programmed, and because genes replicate with comparatively little variation in the short run, there is a great regularity in the ontogenetic development of the organisms of a species. Over their lifespans the features, functions and capabilities of the organisms take characteristic forms in chronological order—sometimes, as in the case of the metamorphoses of a butterfly, stunningly different ones. However, the genetic program only defines a potential. To what extent this potential can be realized in the actual development of an individual organism hinges critically on such particular environmental conditions as habitat quality and competitive pressure within and between species. These contingencies not only affect the organism’s life expectancy (and in some cases the speed of development), but also specific properties, such as size, weight, and fertility, that the individual organism attains at different life stages.

Compared to these conditions, the processes of organizational development are, of course, different. The developing entities—the firms—are neither so obviously identifiable as in the case of biological organisms, nor do they necessarily maintain their identity as unambiguously over their lifespan. Furthermore, in the development of firm organizations there is no element directly comparable to genetic programs. What ‘unfolds’, if anything, in the process of organizing production and trade in a firm—albeit on the basis of a much different mode of effect—is the entrepreneurial ‘business conception’. Each venture that is undertaken by an entrepreneur (or a team acting in the entrepreneurial role) is informed by some notions of what business to do, how to do it, under what constraints, and how to work on those constraints over time. These notions need not be made explicit or even elaborated, though this may well also occur. In any case, in a world of bounded rationality these notions are far from being based on perfect information, rational expectations, and optimal control. They rather reflect the subjective entrepreneurial imaginings of the way the venture might be carried through—‘the imagined deemed possible’ (Loasby, 1996)—and of what could be achieved with it.⁶

⁶ It may be noted that the notion of entrepreneurial judgement on uncertain business prospects that is central to Knight’s theory of entrepreneurship (see Knight, 1921, chs. 9 and 10; and the lucid discussion in Langlois and Cosgel, 1993) is compatible with, but not identical to, that of an entrepreneurial business conception as developed here. Judgement, taken literally, refers to given alternatives although they may be highly uncertain and difficult to assess, while a business conception refers to creating new ways of acting by imagination. Moreover, in Knight, judgement is the exclusive capacity of the entrepreneur not shared

A business conception guides the concrete steps undertaken by an entrepreneur towards organizing the internal division of labor in order to create competitive, revenue-generating and organized actions. Yet it is not a formal blueprint for financing, investing, hiring, assigning tasks, producing, purchasing, and marketing as it is in business strategies and formal planning discussed in the management literature (e.g. Mintzberg, 1994). To provide orientation while at the same time allowing for, and relying on, decentralized problem-solving capabilities of the firm members in a potentially growing firm organization, a business conception must be sufficiently general and un-specific. In view of the turbulent environment of modern firm organizations it would be disastrous if a business conception were as complete and invariable a plan as a genetic program is. It must rather be able to codevelop with the unfolding business venture in order to cope with its uncertainties and the initial lack of experience. The outcome of learning and the discovery of unforeseen problems and their solutions can, and often enough do, mean rearrangement or even an entire reconceptualization of the underlying notions. In addition, in the case of the firm, development is a matter of entrepreneurial direction which interacts, and sometimes interferes, in an unpredictable way with the employees' own free will (which is the reason, after all, why there may be incentive/governance problems). Therefore, the execution of an entrepreneurial business conception can never be as regular as the stereotypic realization of the genetic program in biological ontogeny which is effected by chemical processes controlling the growth, maintenance, and decay of the individual organism. A business conception may be said to guide development, but unlike a genetic program, it is subject to variation in direct feedback from the development which it induces.

The flexibility of business conceptions has significant implications for the development of firm organizations as compared to organisms whose unfolding is bound to follow an invariant genetic program. First, that flexibility allows much more rapid response, and hence the creation of innovative solutions, to problems emerging during development. The reverse side of the coin is that greater innovation also means greater uncertainty about proven fitness and, thus, potentially greater chances of failure. In nature, the program that controls the development of an organism is itself the result of another (long-run) process of natural selection between competing variants in the gene pool of a species, and is therefore likely to be fairly well adapted. By selective reproduction between generations the composition of genetic traits in a population is changed so that the adaptation of the average phenotype,

with other firm members, while an entrepreneur's business conception is, ideally, perceived here as the commonly shared cognitive frame within the firm organization.

which develops according to the ontogenetic principles described above, to long-term environmental conditions is gradually improved.⁷ Such a ‘filter’ of an additional, natural selection-based adaptation process is lacking in the economic domain so that business conceptions with no proven adaptive value whatsoever may be entered and tried out—and may fail to deliver, and thus fail to develop.⁸

The second implication of the flexibility of business conceptions is the dramatic increase in the number of contingencies, compared to that in natural ontogeny, on which actual development rests. A genetic program has been said to define a potential. The extent to which this potential can be realized in the actual development of an individual organism hinges critically on the particular environmental conditions. Similarly, the unfolding of a business conception is contingent on a huge number of external influences (e.g. market development and local economies, level of aggregate economic activity, entry and behavior of competitors) and internal conditions (e.g. motivation and efficiency of hired personnel, realization of scale economies). However, due to the malleability of business conceptions, there are additional contingencies implied by the learning processes, by success or failure in solving unforeseen problems, and by possible reconceptualizations on the part of the entrepreneur(s). However, with respect to the development of the firm organization, all of these provisions come down to two basic contingencies: whether or not the firm is capable of generating flows and funds that allow it to survive; and, if so, whether flows and funds suffice, and are used for, attaining growth. The greater variability and manifold of contingencies notwithstanding, the claim in this paper is that there are still regularities in the development of firm organizations that justify a systematic theoretical treatment.⁹

⁷ By genetic recombination and mutation new variants of genetic traits are created which participate—in a kind of genetic trial-and-error procedure—in the phylogenetic adaption process according to the constraints imposed by natural laws on what has happened to evolve as the organism’s specific design in the past.

⁸ The fact that distinct levels of short-term and long-term organizational dynamics comparable to those of phenotypic development and genotypic evolution in nature do not exist is usually glossed over in approaches implicitly favoring a phylogenetic analogy for organizational dynamics (cf. Witt, 1998b, for a discussion). They either derive their hypotheses from natural selection arguments (Nelson and Winter, 1982) or, at a more aggregate level, from population ecology arguments (Aldrich and Mueller, 1982; Hannan and Freeman, 1989). However, the timescale of change is much shorter in organizational dynamics—external and internal conditions are much less inert—than would be required for selection forces or population dynamics to have a chance to produce systematic effects.

⁹ On the methodological level, greater variability unfortunately implies that less regularity is to be expected in the organizational development of firms when compared to the development of organism in nature. This fact may render the empirical observation and classification the prototypes of organizational development a problem of its own.

4. *Entrepreneurship and the Cognitive Underpinnings of Firm Organizations*

Whenever a firm organization is created, it is, it has been argued, part of the ubiquitous (re)organization of the economy. Guided by entrepreneurial business conceptions, specialization and the division of labor are driven further. As in the case of all specialization and division of labor, firm organizations have to rely on knowledge dispersed among several agents and on the agents' motivation and skills to use it properly. Two distinct problems can be identified here. First, there is a knowledge coordination problem: how do the relevant agents come to know exactly what contribution they are supposed to make according to the entrepreneur's business conception? An entrepreneur uses a firm organization to accomplish her/his business conception by drawing on individual skills and knowledge dispersed among the employees. The entrepreneur can achieve her/his goal more effectively the better the decisions, that the firm members make within their respective area of discretion, fit the entrepreneurial business conception. Second, there is the incentive (or governance) problem well known from transaction costs economics: how can those agents be induced by the entrepreneur to do as well as they can? In the case of the firm organization, the employment contract provides a legal basis for establishing claims which the firm holds against its employees who have been hired in order to make their knowledge and skills available. Yet, the legal contract by itself solves neither the knowledge coordination problem nor the incentive problem. To understand how the two problems can be resolved, a short digression into the cognitive underpinnings of human behavior in general, and the constraints which they imply for coordinating organizations in particular, is useful.

It was organizational economics (Simon, 1949; March and Simon, 1958; Cyert and March, 1963) that first introduced the idea of bounded rationality to economics because what happens inside firm organizations is difficult to understand on the basis of the fiction of omniscient decision-makers. This is no less valid in, and therefore a crucial ingredient to, a developmental approach to the firm. Powerful as the human cognitive apparatus and memory are, they face constraints that necessitate a selective processing of sensory information on the basis of discriminative attention processes. Attention processes, in turn, operate by means of cognitive cues.¹⁰ The cognitive cues that help memorize patterns and discriminate among the incoming information are themselves

¹⁰ For a good survey, see Anderson (1990, ch. 3). Incoming information is screened on an associative basis to check whether it fits patterns that already exist in the memory. If familiar configurations cannot be easily identified in the incoming information, or if existing patterns cannot be easily extended to encompass it, the information is ignored.

organized into larger and more complex systems called cognitive frames. Cognitive frames support classificatory activities and thus allow knowledge to be represented in a meaningful way (Anderson, 1990, ch. 5).¹¹ Although different cognitive tasks may be pursued on the basis of different cognitive frames, it is important for the present discussion that at any time no more than just one particular cognitive frame is in operation. The fact that mental activity is constrained by selective cognitive frames thus affects the capacity to imagine and reflect on alternatives for action. Some particular courses of action are more or less clearly conceived and carefully thought through, while others that are feasible or could, in principle, be imagined are not even recognized.

It is in view of these particularities of the human cognitive system that the significance of entrepreneurial business conceptions as a cognitive frame can best be demonstrated. The limitations of the human mind prevent the entrepreneur, as much as everyone else, from imagining all possible moves that unfold into the future. There is always new information that needs to be classified and assessed with respect to its implications within the existing interpretative framework. A business conception can furnish such a framework, provided, as already mentioned, it is sufficiently general and non-specific to accommodate that which is non-anticipated. Where this is the case, a firm organization can attain a high level of cognitive coherence among its members if the latter share the entrepreneurial business conception as their own cognitive frame for their firm-related activities, because, as just noted, at any point in time the human mind operates on the basis of just one prevailing cognitive frame. In this way, coherent individual interpretations of what is going on can be ensured and dispersed knowledge and individual endeavor can be coordinated most effectively.

Moreover, if the entrepreneurial business conception were shared by the firm members as a cognitive frame, this would also help to at least attenuate the incentive problem. From the motivational point of view, it makes a great difference whether or not people adopt the attitude of contributing to a common goal. Their task perception tends to be framed in such a way that their attention is devoted more to solving problems in the interest of the firm's goals than to pursuing private short-term inclinations and separate interests. Conversely, it may be concluded that individual knowledge and

¹¹ By their very nature these cognitive frames are idiosyncratic features of the individual mind. On the basis of a limited number of probably genetically coded cues, a lifelong process takes place in which increasingly extended associative chains with increasingly more complex sets of frames are formed and stored in long-term memory. Against the current state of the cognitive cues and frames the human mind selectively utilizes information and identifies meaning, intuitively as well as at the level of deliberate reasoning. These cognitive frames can lead to fairly rigid mental conceptions and interpretation patterns.

efforts are not well coordinated if rival business conceptions are pursued within the firm, or if all firm members follow just an opportunistic conception of extracting some form of short-term benefit for themselves. From a cognitive point of view, the possibility of coordinating individual motivation and dispersed knowledge on the basis of a socially shared cognitive frame can therefore be a crucial part of what makes the firm organization an attractive alternative to the market mechanism (cf. Witt, 1998a).

5. *The Role of Social Learning Processes*

The straightforward questions that arise at this point are: how can the entrepreneurial business conception be communicated to the firm members? And how can they be induced to adopt and follow the entrepreneurial business conception as a cognitive frame for their firm-related activities so that the knowledge coordination problem and the incentive problem are simultaneously resolved? These questions point to serious difficulties. First, cognitive frames are largely tacit and thus only indirectly communicated. Second, it is usually not possible to make employees adopt the entrepreneur's business conceptions by order. In fact, the formation of cognitive frames is a fairly complex process in which social learning plays a crucial role. For this reason, social learning deserves closer examination here (if not because it is a general implication of bounded rationality where, as in the organizational context, the individual decision-maker cannot reasonably be portrayed as an isolated, entirely autonomously acting agent).

Constrained information processing is often—certainly in the case of firm organizations—molded in social interactions. The formation and change of the individuals' cognitive frames then hinge on social learning processes (for a comprehensive treatment, see Bandura, 1986). Communication, particularly of the non-formal kind that occurs in socializing with other agents, enables people to observe, and make comparisons with, the behavior of others and their rewarding or non-rewarding experiences. The more frequent and intense the latter observations are, the more likely there are some similarities in the subjective representation of knowledge. In this way, not only socially shared interpretation patterns can emerge, but also common tacit knowledge of facts, hypotheses, practices, skills and actions, including socially shared knowledge of rewarding or penalizing experiences. These cognitive commonalities partly emerge from intuitive, mutual observational learning. To some extent, collectively shared interpretative frames result from the fact that, in intense interactions, the involved agents' selective information

processing is occupied with much the same topics which, in a sense, are processed in parallel, while there is simply no attention left for other topics. This means that within intensely interacting groups the attention of the group members, and hence their selective perceptions, are subject to an agenda-setting effect.

To be sure, individual cognitive frames are idiosyncratic in nature and, as a result of each individual's unique cognitive history, there are likely to be considerable differences between them. Yet, intense communication within social groups does induce certain tacit cognitive commonalities. One kind of common experience in social learning processes, which is particularly relevant in the context of the firm, is recognition of how to behave in social interactions. Through observing, and communicating about, selected features of the behavior of other individuals (who may be members of the same organization or noticeable other individuals whom people tend to compare themselves with), 'social models' of behavior can spontaneously emerge (see Bandura, 1986, ch. 2).¹² Within intensely interacting and communicating groups such models tend to be common knowledge, while other forms of potentially relevant behavior remain collectively unnoticed. In the form of prevailing social models of behavior, the results of correlated individual learning processes within a group can intuitively be grasped by newcomers.

Individual behavior can, of course, deviate from established social models. If so, this is likely to arouse more attention among group members the more the existing models of behavior are thus challenged. The observed vicarious success or failure of deviating behavior provides the other agents with information that enables them to assess their current behavior in the light of the alternative not previously noticed: vicarious reward tends to induce adjustments by imitation, while vicarious loss tends to inhibit imitation (Bandura 1986, ch. 7). Depending on the circumstances, observational learning can thus either strengthen or weaken the tacit, socially shared constraints on what is individually perceived as the choice set. In the latter case, it may cause a switch in social interactions from one social model of behavior to another one.

Thus, as a rule, social learning processes have an impact on the emergence of socially shared cognitive commonalities among the members of a firm organization, and this is of direct relevance to the entrepreneur and the fate of her/his business conception. The legal basis of the employment contract provides the entrepreneur with the power to define and control the agenda of

¹² The significance of such models, and the 'observational learning' about them, lies in their vicarious nature, i.e. the fact that their rewarding or non-rewarding consequences can be grasped by observation rather than own experimentation.

formal communication within the firm by direction. However, there is little institutional support for the entrepreneur to shape the informal communication processes within the firm organization and the resulting agenda-setting effects. On that level, conceptions and social models preached and practiced by the entrepreneur (if any) may well be contested by rival cognitive frames and social models both on the level of the individual employee and on that of subgroups or coalitions. Failure to prevent rivaling frames and models from tacitly taking the lead in the firm's informal communication can have far-reaching consequences for organizational coherence and for the firm's performance. Therefore, for the entrepreneur to succeed in shaping informal communications in a way that is advantageous to the propagation of her/his business conception (and for defending the prevalence of her/his business conception against potential contestants), a particular capacity is required. That capacity may be called 'cognitive leadership' (Witt, 1998a).

For that capacity to be successfully exerted, several prerequisites must be satisfied. One condition relates to the intrinsic features of the entrepreneur's business conception. A conception that is too complex and sophisticated, or obviously unsuited for the imagined business, is unlikely to be adopted by the employees. Likewise, if a conception lacks soundness and appeal—not the least in terms of career options, remuneration, qualification enhancement and working conditions for the employees—it is difficult for the entrepreneur to make employees adopt it. Another crucial condition is the personal social skill of the individual entrepreneur, including communicativeness, persuasiveness, and persistence, as well as fairness, credibility and appreciativeness.¹³ Agents who assume the role of an entrepreneur may as wildly differ in the extent to which they command these skills as their business conceptions may differ with respect to the appeal of their intrinsic features. Yet, it may be conjectured that, for any individual combination of skills and features, the chances of the entrepreneur succeeding in cognitive leadership improves the smaller the number of employees. It is easier to master the task of 'integration', i.e. coordination of cognitive frames and social models of the organization members on the entrepreneurial business conception, the fewer members there are.

¹³ Furthermore, the nature of the social models that an entrepreneur can help to establish within the firm organization matters. As is well known from social psychology, the work motivation of the agents in the firm heavily depends on whether social models emphasize task commitment, cooperative problem-solving, fairness and frankness. Such attitudes can keep in check intra-group frictions and individual frustrations (Weiss, 1978; Mullen and Goethals, 1987; Paulus, 1989).

6. *The Nucleus Firm and the Contingencies in its Development*

It is precisely this condition of ‘smallness’ that is characteristic of the situation in the newly founded, nucleus firm—the ideal type entrepreneurial startup venture. All interactions between entrepreneur and employees are taking place on a face-to-face basis. Informal agenda-setting effects and social models can, in principle, be kept under close scrutiny by the entrepreneur. Obviously, a systematic change that can easily be identified during the development of the firm is the loss of these features when the size of the organization grows. Cognitive coherence, which may be easy to achieve within the nucleus firm, becomes a problem in the firm that grows large. Before the problems that arise here can be discussed, however, one needs to clarify under which conditions a nucleus firm will indeed enter such a development. There are several contingencies in the unfolding of a business conception from the small, nucleus firm to the mature, large organization. A first, trivial contingency is implied by the intrinsic features of the entrepreneurial business conception discussed above, which can simply make it fall short of being able to generate sufficient revenues for the firm to expand or even to survive. In that case it may be of secondary importance whether or not the entrepreneurial skills suffice to master the task of integration.

The more interesting contingencies arise where the intrinsic features of the business conception would, in principle, generate sufficient revenues and would continue to do so if the business were to expand. In such a case, failure actually to generate the revenues may have to do with a lack of cognitive leadership, and the question may be raised as to what is happening then. If an entrepreneur fails to implement or to uphold the entrepreneurial business conception, and some supportive social models of behavior, as the prevailing cognitive regime among the member of the firm organization, other conceptions will spread and take over. The employees will then tend to adopt cognitive frames and corresponding social models of behavior which rival the entrepreneurial business conception or invite opportunistic reflections. As a consequence, the firm organization is likely to perform in a significantly less efficient and coherent way and, hence, profitability is negatively affected. Once such a situation prevails it is difficult, if not impossible, for an entrepreneur to (re)gain cognitive leadership.

However, whenever cognitive leadership is not attempted (e.g. because of a self-assessed lack of corresponding skills on the part of the entrepreneur) or where it fails to be exerted, there is another mode for running the firm organization. The entrepreneur can try to counter the inevitable tendency towards incoherence and inefficiency and declining work effort on the part of the employees by introducing a monitoring regime, i.e. by detailed

supervising of all actions and/or subjecting them to approval. To try such a regime is, in principle, always an option.¹⁴ However, a high price has to be paid for running an organization on the basis of a monitoring regime (Witt, 1998a). Monitoring curbs individual creativity and the intrinsic motivation in problem-solving (Williams and Yang, 1999). Furthermore, coordination through detailed directions, regulations, authorization, and tight control causes frictions and is slow and costly in terms of time resources. The larger the firm, the more these negative effects tend to lower its efficiency. Administrative costs increase more than proportionately as monitoring becomes a matter of hierarchical control and the well-known ‘managerial dis-economies of scale’ (Mueller, 1972) result.

If none of these contingencies prevent a nucleus firm from successfully operating, from earning revenues and investing, and, thus, from expanding the firm organization, a systematic development will be triggered that leaves the stage of the entrepreneurial nucleus firm behind. The systematic feature on which the present developmental interpretation focuses is rooted in the strain that an ever-increasing number of personnel puts on the entrepreneur’s capacity for exerting cognitive leadership, dominating the social learning processes, and coordinating the firm members on her/his business conception. It is easy to see that even the most skilled entrepreneur has to face an upper bound where, for the sheer reduction in personal interaction frequency, her/his capacity to achieve all this is exceeded. And it is for this reason that the organization of the nucleus firm cannot be expanded by simply multiplying business volume and the number of employees without facing, at a certain threshold, the need of qualitative restructuring. In a special sense, this is simply the entrepreneurial problem of deepening the degree of specialization and division of labor—now to be solved in a special way inside the firm.

A stage beyond the nucleus firm may thus be reached in the development of a successful firm organization in which serious challenges turn up. The entrepreneur, finding her/his capacity for integrating overstrained, may be tempted to counter the inevitable tendency towards incoherence and inefficiency and declining work effort by the employees which would lead to stagnation or even decline, by switching to the monitoring regime in running the firm organization. This would mean a bureaucratization with a hierarchy of managers controlling the activities of the firm members. The entrepreneur may thus be able to safeguard the benefits of the earlier investments in tangible and intangible assets (firm-specific capabilities and accumulated reputation in the markets), though at a high price as just explained. Trading

¹⁴ If the monitoring approach to the firm (Alchian and Demsetz, 1972) were right, it would indeed be the only available alternative to unconstrained opportunism within the firm.

efficiency losses from fading cognitive coherence and bureaucratization for those internal economies, the firm's further development hinges on how the balance between the two tendencies moves over time. If this is not expected or experienced by the entrepreneur to work well, what usually happens is that he/she puts up the firm for sale and takeover.

When a firm has grown to a size where the entrepreneur's capacity for integrating finds its limits, the more or less vague imaginings of the beginnings have indeed expedited a (re)organization of production and trade. It has been proved that the imagined enterprise could be turned in a revenue-generating business. The remuneration for having delivered the proof—a potential wealth increase—can be realized by selling the business. The 'increasing returns' from seeing through the (re)organization then materialize in the present value of the established expectations of future profits. But, to quit and to 'cash in' on the earlier investments may express more than just the desire to realize those profits. The entrepreneur may feel that the firm development has reached a stage where her/his comparative advantage in building up and expanding the nucleus firm is no longer relevant (a feeling sometimes encouraged by the entrepreneur's advancing age). The fact that resignation from the entrepreneurial role may occur at this point indicates that entrepreneurship itself can be subject to specialization—a kind of interfirm subdivision of entrepreneurship. Some entrepreneurs specialize in founding pioneering businesses and building them up to notable size. When they resign and offer those businesses for sale, this provides opportunities for entrepreneurs of a different kind who specialize in seeing through their imaginings of synergisms in the market of acquisitions and mergers. These entrepreneurial activities also are oriented towards reaping 'increasing returns' emanating from (re)organizing specialization and the division of labor, though this time it is not the setting up of a firm organization by which remuneration is thought to be obtained but the reshaping of already existing organizations. Quite likely, the cognitive underpinnings of that business are different from the case of entrepreneurship specialized in founding and building up firms, and deserve a separate treatment.

7. Organizational Expansion and the Subdivision of Entrepreneurship

There are, of course, other and more successful ways of making the transition from the small group-conditions of the nucleus firm to those of a large, and more anonymous, firm organization. For this to happen, what needs to be achieved is an intra-organizational subdivision of entrepreneurship while I

at the same time, maintain a sufficient degree of cognitive coherence within the organization. This requires, on the one hand, cognitive leadership being taken over by managers in separate divisions of the organization and, on the other hand, coordinating those managers with an entrepreneurial role in an overarching, socially shared business conception. Depending on the kind of business, a business conception may sometimes allow a compartmentalization of the underlying cognitive frame into separate, specialized but partially overlapping subconceptions on which such a subdivision of the entrepreneurial role may be based. This is, for example, the case where a firm produces different commodities with similar technologies and/or inputs and sells them in different, unconnected markets. In other businesses, this may not be possible, so that dividing the entrepreneurial role may mean entirely disjunct business conceptions (cf. the related discussion on modularity in Langlois, 1999).

In any case, the corresponding organizational restructuring of the firm has two implications. First, by leaving resources at the discretion of entrepreneurial employees to pursue a business conception on their own within the divisions of the firm organization, separate domains of responsibility and leadership are created, each with a nucleus firm character. Second, the problem of coordinating the subentrepreneurs on an overarching business conception for the entire firm emerges. This problem is independent of ownership and the organization of entrepreneurship, i.e. it arises whether entrepreneurship is exerted hierarchically with an entrepreneurial proprietor on the top, or whether it is exerted in the form of a peer group as in the management of many joint stock companies. The problem may be less serious in case of the compartmentalization of entrepreneurial subconceptions where the overlapping part may ensure sufficient cognitive coordination. Where entrepreneurial subconceptions grow out of the daily practices in a differentiation process within an existing firm, the overlapping part may then quite naturally be shared by the subentrepreneurs who have been socialized within the firm organization. It may, however, be difficult, or (because of a lack of motivation) even impossible, to acquire for entrepreneurial personnel hired from outside. In fact, this seems to have been the situation that Penrose (1959, ch. IV) had in mind when she argued that the availability of such personnel inside the firm is the true bottleneck for a firm's growth.

The problem of cognitive coherence among the (sub)entrepreneurs in the firm is a more serious one in the case of the entirely disjunct business units and a corresponding tendency to develop unconnected—and potentially incoherent—business conceptions. But even here it may be resolved through intense communication and social interaction within the group of entre-

preneurs. As in other groups, observational learning may then give rise to socially shared cognitive frames and models of behavior. In a non-hierarchical group of entrepreneurial peers this process and its outcome may be entirely spontaneous. Where there is a superior entrepreneur who employs subordinate entrepreneurs it is again important for her/him to succeed in shaping communications within the entrepreneurial group in a way that is advantageous to the propagation of the overarching business conception, i.e. to develop ‘cognitive leadership’—now among subentrepreneurs. And here as well, the business conception and the desired social models are vulnerable to invasion by rival frames and models. Failure to prevent such an invasion in the communication and interactions in the entrepreneurial group can have far-reaching consequences not only for organizational coherence and for the firm’s performance as discussed before, but also for the firm’s staff continuity. Less integrated subentrepreneurs may increasingly redirect their attention to the possibility of breaking away and starting a business on their own account. If they do so, this may trigger a fissioning phenomenon as has often been observed particularly in highly innovative industries (Ziegler, 1985). Departing entrepreneurs usually try to attract employees from their old firm to their newly founded business in order to capture for themselves some of the otherwise non-transferable resources (capabilities) they have helped to accumulate internally in their old firms.

The restructuring of the firm organization in the form of an intra-organizational subdivision of entrepreneurship presupposes, of course, that entrepreneurial personnel can indeed be recruited either inside the firm or attracted from outside. Penrose’s diagnosis of a possible bottleneck that may occur here and the empirical evidence for the fissioning phenomenon have already indicated that this is not a trivial problem. The major reason is that, in principle, agents capable of envisioning entrepreneurial business conceptions can try to carry them through in an independent venture of their own. In order to prevent them from doing so, they must be made an offer that is attractive enough to induce them to either join the firm, or not to leave when already working for it. Abstracting for the moment from capital market imperfections that tend to discourage self-employed entrepreneurship, such an offer would have to match the imagined entrepreneurial income and possible non-pecuniary benefits accruing from an own venture—which may amount to substantial compensation requirements.

It appears that the number of contingencies relevant to the further development of the firm increases substantially as its organization grows beyond the stage of the nucleus firm, and it becomes increasingly tedious to enumerate all the possible cases. Nonetheless, at least two prototypic

routes of development deserve mention. One is further entrepreneurial expansion—the case where entrepreneurship can successfully be subdivided within the firm. This means that, at least in the majority of entrepreneurial divisions of the firm organization, each of the subentrepreneurs succeeds in assuming cognitive leadership and that, at the same time, coordination within the group of subentrepreneurs on an overarching business conception for the entire firm can be achieved. To accomplish all the prerequisites that must be met for achieving such a development is probably the most demanding challenge which entrepreneurship can face. This is so not least because of the imponderables implied by the outcome of the several informal within-group communications and interactions in which subdivided entrepreneurship is simultaneously involved in such a venture. It is therefore not surprising that successful entrepreneurial expansion that continues right up to the stage of large corporations is a rather rare case. If it happens, however, the persistent capacity of such a firm to create and pursue new business opportunities in an entrepreneurial fashion ensures a firm profitability and rates of growth way above average—and extraordinary public attention.

The other, more frequent, but less spectacular, route of development results quite naturally whenever the demanding prerequisites of an all entrepreneurial expansion cannot be met and the firm attempts to restructure according to the monitoring regime. Indeed, this is the more likely to happen the larger the firm grows and the more mature it becomes. Entrepreneurial leadership is then prone to fade and be challenged by rival conceptions on all levels of the organization where it has prevailed, though it does not necessarily disappear in all divisions of the organization. Where managerial governance takes over, the firm operates in much the way accounted for by the transaction costs approach to the firm. Opportunism spreads where it cannot sufficiently be controlled, and efficiency declines. In favorable cases, the size of the firm and the market position that has been attained may allow a compensation, or even overcompensation, for the increasing slack by realizing economies of scale and scope. However, this is not generally the case. If managerial governance is weak and/or adequate economies of scale and scope cannot be attained, the further development of the firm is characterized by stagnation and even decline.

This is particularly true where such firms compete in markets with entrepreneurial firms. Since monitoring and managerial governance tend to stifle the creation and pursuit of new business opportunities, the firm development may increasingly be cut off from new technologies and products and may lose market shares to more innovative, entrepreneurial competitors. As long as the economies of scale and scope are sufficiently high in large corporations,

management can try to prevent entering such a self-augmenting, declining development with the usually extremely costly strategy of investing, in a bureaucratic fashion, in R&D departments. Unless some entrepreneurship is still present in some of the firm's divisions, it may be difficult, however, to turn the output of the R&D department into a competitive advantage in the markets and to earn the returns on the investment.

8. *Conclusions*

Even though organizational change may in many instances be triggered by exogenous influences and may be subject to unplanned opportunities that turn up in an unpredictable manner, a developmental approach to the theory of the firm suggests looking for systematic change in the firm organization and its causes and contingencies. In this paper, the notion of development in firm organizations has been discussed by comparison with ontogenetic phenomena in nature. In search of the causes and contingencies of firm development, a behavioral foundation has been offered which highlights in particular the impact of bounded rationality, cognition and social learning. On that basis, the role of entrepreneurship and its cognitive underpinnings can be explored. The conditions of a nucleus (multi-person) firm, i.e. a newly started entrepreneurial business, are particularly telling. What happens at this stage in many respects sets the course for the further development of the firm. If the entrepreneurial venture is successful and grows, the increasing business volume also requires expansion of the firm organization. Its size then sooner or later reaches a stage where the cognitive underpinnings of the firm change qualitatively in a way that forces the firm into major restructuring. At this point, developmental paths can branch off in quite diverse directions, some of which have been briefly highlighted.

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