HOW PROBLEMS OF ORGANISATIONAL GROWTH IN FIRMS AFFECT INDUSTRY ENTRY AND EXIT*

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Many newly emerging industries show similar patterns of development regarding entry and exit dynamics. This paper argues that several features of exit and new entry into industries through diversification and spinoff formation can be related to problems arising within firms when their organizations grow during the industry's life cycle. Drawing on earlier work, the growth-induced learning and coordination problems of the firms are outlined and their impact at the industry level is discussed.

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1. Introduction

The emergence, growth, and eventual decline of industries is a pervasive feature of modern capitalist development. It is important to understand developmental patterns at the industry level because they have substantial implications both for the competitive process in the respective industries and for growth and employment in the whole economy. In the past, research on industrial dynamics has made much progress in identifying and explaining the development of industries. In a nutshell, the majority of industries develop along a life cycle pattern that can be characterised by the following stylised facts (Klepper, 1997). Both entry and exit of firms peak early, soon after an industry's beginnings. A pronounced shakeout in the number of firms occurs while the market is still expanding. The importance of process innovations relative to product innovations increases over time. Early entrants tend to perform better than later ones, indicating the presence of first-mover advantages. In addition, the pre-entry experience of entrants is crucial for their survival and performance. On average, diversifying entrants with a background in related industries, and those that are founded as spinoffs by former employees of industry incumbents, do significantly better than other entrants (e.g. the survey in Helfat and Lieberman, 2002).[1]

Increasing returns to process innovations have been suggested as an explanation for these observations, and particularly the shakeout phenomenon (Klepper, 1996). Larger firms can spread development costs over a larger output base, which allows them to maintain and possibly expand their initial size differential. First-mover advantages for early entrants and the shift from product to process innovations follow naturally from this account. However, firm growth does not only allow for efficiency increases, it also challenges the firm's organisational capabilities in coordination and learning. It is by no means evident that all firms, regardless of the size they already have attained, cope equally well with these challenges.

With respect to entry there is robust empirical evidence from a variety of industries that diversifying entrants (i.e. pre-existing firms entering from outside the industry) perform better than the average firm entrant (Klepper and Simons, 2000; Klepper, 2002; Thompson, 2005). However, it is not clear what kind of capability transfer is behind this superior performance, what it is that motivates firms to diversify into another industry, and at what stage in their own development firms engage in diversification moves. Similarly, with respect to the underlying causes for the formation of spinoffs, a variety of explanations has been proposed. Some focus on the effect of asymmetric information between employer and employee, which gives rise

1. Some industries, particularly those where sub-markets are served by different suppliers and new sub-markets allow for sustained entry into the industry, deviate from these stylized facts. In these industries, turnover resulting from new entry and exit can remain significant, the number of firms can remain high, and product innovation can remain a key element of industry dynamics. No first-mover advantages to early entry are then observed (Klepper and Sleeper 2005, Buenstorf 2005).

to opportunistic behaviour (cf. the survey in Klepper, 2001). Others suggest that incumbents may be unable to exploit all opportunities, thus allowing for profitable entry by spinoffs (Agarwal *et al.*, 2004). Yet another hypothesis has been proposed by Klepper and Sleeper (2005) using a model in which incumbent firms may choose not to preclude all profitable entry opportunities for spinoffs. Again, none of these explanations account for organisational transformations inside incumbent firms and how they may relate to spinoff activities at industry level.

In this paper we explore the intra-organisational processes of change together with their implications for explaining the stylised facts of industry evolution. In drawing on earlier work on organisational development by Witt (1998, 2000) and Rathe and Witt (2001) we argue that growth-related changes inside firms may trigger both the formation of new entrants through spinoff formation and diversification and the failure of incumbents. The paper is organised as follows. In section 2, we examine the knowledge and coordination issues in the entrepreneurial firm and discuss the changes in both these dimensions resulting from firm growth. Section 3 suggests that the internal organisational dynamics triggered by firm growth help to explain the diversification of firm activities, the entry of existing firms into new industries, and the formation of spinoffs. Section 4 presents some conclusions relating to firm growth and development on the one hand, and exit and shakeout dynamics at the industry level on the other.

2. Entrepreneurship, Cognitive Coordination and the Growing Firm

New firms do not emerge spontaneously. Their creation is a willful, entrepreneurial act. It presupposes a concept of business and how to run it (Witt, 1998). The pursuit of the underlying business conception by the founding entrepreneur(s) is a highly idiosyncratic process (Shane, 2000), and the cognitive foundations of individual firms differ in two (interrelated) dimensions. First, based on the entrepreneur's prior education and experience each new firm has a specific knowledge base from which its capabilities derive. Second, even when holding the same set of knowledge, agents will differ in the way they interpret this knowledge, the contexts they relate it to, and the usefulness they attach to the individual items.

The knowledge base of the firm has received much attention in the existing literature. In the present context, the 'internal' generation of new knowledge based on prior experience is of particular import. New knowledge is acquired by both entrepreneurs and managers through the repeated execution of tasks. Learning from experience enhances the performance of firms (Penrose, 1959; Arrow, 1962). Penrose (1959, pp. 52-53) suggests that experience-based knowledge stems both from better understanding of the internal workings of the firm and from superior conceptions of the "productive opportunity" it faces. She argues that experience frees the cognitive capacities of managers and entrepreneurs, as

repeated tasks and processes require decreasing levels of individual attention. In this way, experience-based learning can expand the firm's cognitive resource base. This interpretation is in line with the cognitive psychologists' stage model of individual skill learning (Anderson, 2000). With increasing experience in the resolution of a particular class of problems, agents adopt increasingly domain-specific, efficient, and automatic heuristics. As a consequence, experience-based learning frees cognitive capacity (less active deliberation is involved in problem solving), but the agent also becomes less able to control, verbalise and adapt her problem solving.

In contrast to the knowledge base of the firm, the role played by the entrepreneurial business conception in interpreting productive opportunities and coordinating the firm's internal activities has only recently gained the attention it deserves. A business conception starts from the idiosyncratic, subjective way in which the entrepreneur frames the entrepreneurial opportunity and the mission of the nascent firm. It is to a large extent tacit in nature. In mostly non-verbal processes based on the entrepreneur's role model and observational learning by the other members of the firm (Bandura, 1986), the business conception can be shared within the firm— at least as long as the firm is sufficiently small. Through "cognitive leadership" (Witt, 1998), the entrepreneur essentially provides a social model of behaviour for firm members, and channels their attention through agenda-setting effects. She is thus able to spread among the employees fundamental premises relating to the nature of the firm, its objectives and its strategy, possibly without even being aware that she is doing so. To be effective, the non-verbal communication processes underlying cognitive leadership require face-to-face interactions and direct observation of the entrepreneur's activities. Moreover, the success of cognitive leadership hinges on a variety of factors, including the intrinsic profitability of the business conception as well as the social skills of the entrepreneur.

Diffusion of the business conception through cognitive leadership serves important coordination functions in the entrepreneurial firm. Based on an internalised business conception, firm members come to possess knowledge about what the firm does, how it does it, and to what ends, even though they may not be able to explicitly pinpoint the firm's mission. In addition to firm routines, which allow employees to form expectations about how other firm members will likely behave in particular situations, the shared business conception provides them with an understanding of the meanings underlying these routines. It also provides guidance for how to behave, and what to expect from others, in situations where no explicit guidelines or established routines exist. The cognitive commonalities created by a shared business conception thus enhance the coherence of activities within the firm, particularly when the firm faces uncertainty or changing environmental conditions. A shared business conception also helps in updating and adapting firm routines to a gradually changing environment.

Successful sharing of the business conception with employees also serves a motivational function, as it provides firm members with a positive

interpretation of the firm and its activities. If firm members are persuaded by this interpretation and adopt it to frame their own role in the firm, the business conception helps motivate employees to contribute to the firm's objectives. Given that the human cognitive apparatus can only adopt a single cognitive frame at a time, the entrepreneurial business conception— if adopted by an agent— crowds out competing framings that might induce her to pursue objectives less conducive to the good of the firm, such as minimising her own efforts or even trying to do harm to individual co-workers, superiors or the entire firm.

The necessity for the entrepreneur's personal involvement in face-to-face interactions with the employees in a successful cognitive leadership regime has important consequences when the organisation grows. Statistical evidence shows that most firms stay small over their entire lifetime (Bhidé, 2000). However, when a firm grows, this produces both advantages and problems. A growing sales volume is beneficial as it enables the firm to reap economies of scale and scope, commonly present in industrial activities. From a dynamic perspective, moreover, growth opens up new potential for learning based on the increased intra-organisational specialisation of tasks (i.e., the realisation of efficiency effects based on the division of labour that were already addressed by Adam Smith). Insofar as these effects are significant, the growth process may feed on itself. On the other hand, the growth of the firm is accompanied by the expansion of its organisation, which is likely sooner or later to strain the entrepreneurial ability to coordinate activities through cognitive leadership (Witt, 2000). The crucial bottleneck for cognitive coordination, the need for ongoing face-to-face interaction between the entrepreneur and her employees, becomes an increasingly severe constraint in the growing firm. Instead of the original business conception that provides guidance for variable and often unforeseen situations and challenges, the leadership of the firm increasingly has to resort to specific, and typically much less flexible, behaviour guidelines. Reduced direct interaction moreover leaves room for rival frames and conception to take over in parts of the firm's organisation. Accordingly, coordinating the activities of employees in line with the original conception, becomes increasingly difficult. In addition, where the business conception has previously provided orientation for employees' actions, allowing, for example, newly hired employees to make sense of their co-workers' behaviour and their own role in the firm, its diminishing effectiveness now impairs the firm's internal coherence. At the same time, the business conception also becomes less effective in motivating employees. As rival business conceptions emerge and spread throughout the firm, they have adverse implications for the coordination and the motivation dimensions.

There are a number of ways in which the firm can attempt to alleviate the effects of growth on cognitive leadership, which cannot be discussed here in detail. The two options that we briefly refer to both amount to the

introduction of a multidivisional organisational form.[2] They differ fundamentally, however, in the style in which this organisational division is coordinated and run. The first option can be characterised as the ideal type of an "intra-organizational subdivision of entrepreneurship" (Witt, 2000). Essentially, it consists of adopting a multi-level system of cognitive leadership. In this approach to coordination, the 'principal entrepreneur' assigns the role of subordinate entrepreneurs to entrepreneurially talented employees and focuses on coordinating this peer group in relation to her or his overarching business conception. These subordinate entrepreneurs become the role models in their respective departments. It is their job to communicate the business conception in their day-to-day interaction with other employees. In a group of strong, entrepreneurial personalities, rival conceptions and deviating behaviours can, of course, never be excluded. To successfully enlarge the cognitive leadership regime through divided entrepreneurship, it is crucial that the principal entrepreneur is able to have an impact on the communications within that group. Personal characteristics and capabilities that are conducive to propagating the principal entrepreneur's overarching business conception as well as being a suitable model of behaviour, become important for coordinating the group of the subordinate entrepreneur. In organisations that have grown very large, successful cognitive leadership may therefore be exerted more easily by entrepreneurs who are charismatic. And accordingly, charismatic individuals are more likely to lead large organisations.

It is not hard to find real-world examples of coordination regimes that fit the characterisation of divided entrepreneurship. In the historical rise of the German dye industry, the successful division of entrepreneurship in the leading dye producer Bayer (and the failure to switch to such a regime by its eventually outperformed competitors) has been documented in detail by Murmann (2003). The history of IBM rising to become a world market dominating firm under Thomas J. Watson is another case in point (Olegario, 2000), as is the fast-growing US low cost carrier Southwest Airlines.[3] Higgins (2005) provides yet another striking example of the effects of divided entrepreneurship in her recent account of the emerging US biotechnology industry.[4]

2. For a study of the painful organizational development from which the multidivisional form historically emerged in the North American industry see Chandler (1962, ch. 6).

3. As Gittell (2003) has shown, early in its history the leadership of Southwest Airlines was strongly centred on its founder who emphasised the importance of interpersonal relations in the firm. When the firm's performance was challenged by growth-induced coordination problems, Southwest Airlines reacted by strengthening the positions of frontline supervisors at the various airports. Moreover, the airline put strong emphasis on the recruitment and training of these supervisors, thereby ensuring that they were able to convey the company's vision to their subordinates.

4. In her book on the role of former managers of a single firm, Baxter, in the emergence of the biotech industry, Higgins (2005) suggests that Baxter's leadership instilled an "entrepreneurial career imprint" on the firm's young executives by giving them demanding, risky and largely autonomous field assignments. When successful in their jobs, the young executives at Baxters (later known as the "Baxter Boys") acquired the capabilities as well as the confidence needed to assume leadership positions in the young biotech industry with its highly uncertain future prospects.

Dividing entrepreneurship is, of course, not without hazards for the firm. It puts the subordinate entrepreneurs in a position of far-reaching autonomy in their respective departments, allowing them to enhance their own knowledge, skills and judgment. Some of their on-the-job experiences may lead them to question aspects of the original business conception, and to call for modifications or amendments to be made to it. Often, these challenges from subordinate entrepreneurs will help the principal entrepreneur to update and adjust the original business conception. However, as not all requested modifications may be compatible with the original conception, any adaptations need to be balanced against the safeguarding of the overall coherence of the firm mission. Some, perhaps all, of the modifications suggested by subordinate entrepreneurs may have to be rejected— with possible negative motivational effects on those subordinate entrepreneurs. Being the most ambitious and committed employees they may easily become frustrated in their initiative.

An alternative reaction to the problems arising as a result of the growth of an organisation is to become more formal and adopt bureaucratic forms of interactions within the firm. In contrast to the ideal type of divided entrepreneurship, the firm's leadership may try to achieve intra-organisational coordination through detailed directions and procedures, usually based on a hierarchy of giving and taking directions and a corresponding monitoring of employee performance. (In reality, the two types of intra-organisational coordination may of course co-exist in large, divisionalised corporations.) However, introducing bureaucratic forms of interaction also changes the work motivation of the employees. Where employees lose their room for individual initiative and judgment through their activities being tightly monitored, their intrinsic motivation tends to be lost. The opportunistic behaviour assumed by principal-agent theories of the firm is then likely to prevail. In this sense, bureaucratisation is costly for the firm both because the rules and instructions have to be devised, communicated and monitored, and because this induces decreased flexibility, creativity and employee motivation.[5]

3. New Entry into an Industry: Diversification and Spinoffs

The empirical literature on industry evolution shows that many entrants into an industry are not new ventures, but are well-established firms with

5. In the worst case, the growth of the firm's organisation leads to a serious slump in both the coordination and the motivation of the employees. In this case, lack of coherent performance and opportunism among the employees may eat up the economies of scale connected to the firm's growth and eventually threaten its existence. The founding entrepreneur(s) may then prefer to sell the firm and to cash in, rather than to wrestle with organisational re-engineering. Empirically, it is indeed frequently observed that when the operations of the going concern become increasingly routinised, 'habitual' entrepreneurs set up new firms rather than growing the old one. Alternatively, mature businesses may be sold whilst the 'serial' entrepreneur starts a new venture. The different skill requirements over the development path of the firm help to account for the widespread phenomena of habitual and serial entrepreneurship.

a long tradition of activity in other, often closely related industries. Related diversification is essentially a form of firm growth and may, as such, be mandated by the limited size of individual markets, which frustrates attempts at further growth. It may also be motivated by product life cycle considerations, which force the firm to find replacements for activities that are becoming obsolete. Diversifying entry into related industries is often explained as the outcome of organisational learning and routinisation of firm activities. It is attractive to a firm when cognitive resources set free in the learning process can be profitably redeployed outside the scope of activities in which the firm is already involved.[6] Empirical evidence suggests that diversifiers with backgrounds more intimately related to the newly entered market tend to perform better than others bringing less specific knowledge (Helfat and Lieberman, 2002; Thompson, 2005).

When entrepreneurship and cognitive coordination are taken into account, additional aspects of the diversification process come into view. Just as more closely related diversification in terms of the firm's existing resources and knowledge base appears to be more promising, the direction of related diversification also has to accord with the business conception guiding the firm. Some diversification moves that would appear suitable based on resource or knowledge base considerations are frustrated because the business conception guiding the firm is incompatible with the market to be entered. For example, a firm based on conservatism, traditional workmanship and strict adherence to high-precision manufacturing methods (such as found, e.g., in some high-end consumer goods markets) may find itself unable to diversify into fast-changing fashion markets. The reason may simply be that the required quick reaction to environmental change required there, and a willingness to accept quality compromises, would upset the basic premises of the firm's business conception, thus creating coordination and motivation problems. In other cases, diversification moves may be more easily understood in terms of the underlying business conception than in terms of the firm's knowledge or (tangible) resource base.[7]

From the point of view of a cognitive leadership regime, firm growth in a given market and growth by diversifying into a new market have different implications. The latter form of growth is particularly applicable to firms adopting a divided entrepreneurship regime. Diversification allows for creating divisions within the firm that are less interdependent than would be possible in other forms of growth, where divisions would mostly have

6. The redeployment of cognitive resources through related diversification can be rationalised as the exploitation of economies of scope (Panzar and Willig 1981, cf. also Teece 1980). However, the static concept of economies of scope does not help in understanding how an organisation acquires idle cognitive resources and how it puts them to new uses.

7. Easyjet's recent diversification into mobile telephone services seems a suitable case in point. Note that while the dimension of cognitive coordination discussed here is closely related to issues of branding and customer goodwill, it refers to interactions and activities *inside* the firm rather than to its relations to the external environment.

to proceed along functional or geographic boundaries. The weaker interdependence also allows for high levels of autonomy for the subordinate entrepreneurs. Even more important, while the cognitive leadership of the individual divisions has to remain compatible with the leadership of the entire firm, there is much less need to mutually coordinate the individual divisions because interdependencies are largely bilateral rather than multilateral in nature. As a consequence, the various modifications to the business conception proposed by the individual sub-entrepreneurs are less likely to be mutually inconsistent. Accordingly, they can more easily be accommodated by the principal entrepreneur. It may therefore be expected that firms whose coordination is based on a cognitive leadership regime are more prevalent in the set of diversifying entrants than in the larger set of all firms active in the industry in which they originated.

Another important class of industry entrants is made up of firms originating inside the industry itself: spinoff entrants organised by entrepreneurial founders whose prior employer is active in the same industry. For conceptual purposes different types of spinoffs can be identified, depending on the founders' motivations for switching from employee to employer. From the perspective of the individual agent, the decision about whether to start a new firm or to seek employment in an existing business amounts to gauging the expected profitability of self-employment (as well as any expected non-pecuniary benefits from running one's own business) versus the expected income from being employed. The relative attractiveness of starting a new firm depends on the agent's subjective assessment of the quality of the own business conception, even if only vaguely perceived, but also on her assessment of her leadership skills. At the aggregate level, individual decisions about whether or not to start a firm amount to a process of self-sorting into entrepreneurs and employees (Witt 1998). This sorting is likely to be imperfect and its outcome may therefore not be stable. Agents who initially decided to become employed may reconsider their decision. If they indeed revise it and start their own firm in the same industry, this is a case of a spinoff entrant. The different motives for taking that step, identified here by the different types of spinoffs, are typically triggered for different reasons at different stages in the development of the original employer's firm.

The first type of spinoff results from employees who fear being, or who actually are, laid off by their employer. These employees may feel forced to reconsider their self-sorting decision. The (threat of) lay off may be the consequence of a crisis in the development of the employer firm as sometimes occurs after a phase of rapid expansion. In addition, the efficiency increases caused by organisational learning and the routinisation of tasks constitute systematic hazards of job losses. For the affected employees, one possibility of making a living is to start their own new firm. In this case, the empirical evidence suggests that former employees who

decide to become entrepreneurs frequently enter the same industry that their former employer is active in (Shane 2003). Organisational learning that increases the parent firm's efficiency accordingly constitutes a first, simple, channel through which spinoff entry in an industry comes about. We refer to these entrants as "crisis-induced" spinoffs.

The likelihood of crisis-induced spinoffs depends on a variety of factors. At the firm level, the rate of growth is a decisive factor in whether or not new tasks can be found for all employees whose working capacity is reducing. Consequently, a sustained firm expansion that furnishes a sufficient number of new, satisfying jobs for the more entrepreneurially minded employees will reduce their motivation to start their own businesses. Based on this conjecture, one would expect to see fewer spinoffs in growing firms than in stagnating ones (all other things being equal). In addition, the viability of becoming an entrepreneur varies, of course, between industries. It tends to be highest in low-tech and service industries with low barriers to entry. In industries characterised by the life cycle pattern, entry opportunities dry up over time as the capability and resource requirements for new entry become insurmountable. Potential spinoff founders in these industries have to turn to other industries for entrepreneurial opportunities. If entry as a spinoff in the parent firm's industry is feasible, crisis-induced spinoffs are likely to enter the industry with products that are rather similar to those of the parent firm. Imitating techniques and products is a straightforward business conception if there are no better reasons for starting a spinoff than overcoming a precarious employment situation. Crisis-induced spinoffs thus tend to become direct competitors of the parent firms.

Another type of spinoff results from a re-sorting of employees who, in doing their jobs, have developed innovative ideas and want to pursue them through a a business conception of their own, as entrepreneurs in own firms. In the collective learning processes in the parent firm, ideas for improving existing products and processes and for developing new ones are often thought up. New market opportunities may also be discovered. In part, it is precisely the idling of their cognitive resources in the process of becoming more efficient on their current jobs that gives employees the space to discover such new opportunities. Where the parent firm does not welcome such initiatives or is unable to lend support to them, entrepreneurially minded employees may be motivated to leave employment and start a spinoff. The reasons for the parent firms' reluctance to pursue all new developments can be manifold. In some cases, it may simply be that the business conception being pursued by the parent firm prevents the entrepreneur(s) or the managers from recognising the value of the employee's proposals. In other cases, the limits of the resource base of the firm may imply a trade off between suggested new activities and already established ones, which is differently assessed by the firm's leaders and the employee. In yet other cases,

introducing innovations would have adverse side effects on the firm's established products providing a rationale for firms to turn down the employees' ideas to prevent cannibalisation of their existing products (Klepper and Sleeper, 2005).

The rejection of product and process ideas conceived by employees constitutes a classic motive for market entry by new firms, which we refer to here as 'innovation-induced' spinoffs. In these types of spinoffs both opportunity and motivation can be easily identified. While the (perceived) opportunity is provided by the employee idea, the motivation to start a new firm is likely to be enhanced by frustration stemming from its rejection by the parent firm.[8] Innovation-induced spinoffs tend to offer different product variants or different production methods to those in the parent firm. They are therefore less likely than crisis-induced spinoffs to become direct competitors of the parent firm, particularly if they are based on a product innovation. As regards the background of founders, those that base their firms on rejected new ideas will predominantly have a technical or marketing background. Similar to crisis-induced spinoffs, the likelihood of innovation-induced spinoffs can— for firms providing equal opportunities for employees to conceive of innovations— be expected to decrease the better the parent firm's sustained expansion record. Growth of the firm may be driven by new products, processes, or market opportunities developed or discovered by employees. The pursuit of employee ideas inside the firm reduces employees' motivation for revising their decision to become employees.

Like all entrants, innovation-induced spinoffs face increasing hurdles for entry over the industry life cycle. However, they may be relatively well-positioned to enter at later stages of the industry's evolution, as they are based on a differentiated product or process, and in addition bring industry experience. Entry of innovation-induced spinoffs should therefore be observable at a later stage in an industry's evolution than other kinds of entrants. They should moreover be particularly relevant in industries that are characterised by product differentiation and frequent emergence of new sub-markets.

A third type of spinoff arises from the re-sorting decisions of former employees who reassess their own business conceptions and/or leadership skills based on their experience of the entrepreneurial practice in the parent firm. The direct interaction with the entrepreneur (on which cognitive leadership is based) allows employees to compare and also to acquire entrepreneurial skills. Based on their observations, employees are able to

8. There is a second, inverse, variant of innovation-induced spinoffs less frequently discussed in the literature. If old products or processes are discontinued, employees who champion them over their new replacements may decide to leave the firm and start on their own, based on the technology to be discontinued. A good historical example is James Swinehart, the inventor of Firestone's original solid tyre design. He decided to start his own firm when Firestone went into the pneumatic tyre market.

conjecture about successful entrepreneurial behaviour. If they see themselves as equally or even better suited to the entrepreneurial leadership role, they may be inclined to reconsider their original sorting decision and to start their own firm. We refer to such spinoffs as 'comparison-induced' spinoffs. While for crisis-induced and innovation-induced spinoffs it has been argued that sustained growth of the parent firm tends to decrease the spinoff likelihood, the reverse can be expected to hold for comparison-induced spinoffs. As explained above, growth of the firm organisation beyond a certain level strains the cognitive leadership capacity of the entrepreneur and reduces the likelihood of attaining successful intra-organisational coordination. In response to the challenges that organisational growth poses to an entrepreneurial regime of cognitive leadership, a regime switch to either a divided entrepreneurship regime or a monitoring regime may be attempted in the parent firm. Such a regime switch, however, affects the motivation underlying comparison-induced spinoff activities.

Under a divided entrepreneurship regime, the situation of employees with the status of subordinate entrepreneurs is particularly interesting. Based on their autonomy and their deep knowledge of one of the firm's divisions or functional departments they are in a position to come up with qualified modifications to the firm's business conception. If conflicts over the business conception arise from such initiatives and cannot be settled, frustration and sometimes also reputational concerns may create a motivation for these employees to leave the firm and start up alone. Under a bureaucratic monitoring regime, the sources of frustration are likely to be different. Hierarchical controls and the curbing of initiative and creativity may lead ambitious employees to ponder whether they could do better than their employer. Starting their own business is an option for them to maintain their intrinsic motivation and to find job satisfaction. In addition, if they are able to convey their business conception to co-workers, they may easily provide a convincing and attractive alternative to the governance regime in place in the parent firm. This may enable the founder of the nascent spinoff to induce the migration of co-workers to the new firm (a phenomenon of organisational 'fissioning' sometimes observed in new industries, cf. Ziegler, 1985)

What general characteristics should comparison-induced spinoffs be expected to possess? First, the founders of these firms have likely held managerial positions in their previous employment. Second, the usefulness of their entrepreneurial skills will often not be limited to the industry in which the parent firm is active. Thus, we would expect a smaller fraction of them (relative to the two other spinoff types discussed) to enter the same industry. Third, if they do enter the same industry, there is no reason to expect that their products will systematically differ from those offered by the parent firm. Instead, we would primarily expect differences in management style or in the way the mission of the new firm is interpreted—i.e. in the aspects that the spinoff founders disagreed about in relation to the business conception of the parent firm.

4. Conclusions

In this paper we have attempted to link two strands of literature dealing on the one hand with the organisational development of firms, and on the other with industry evolution. In particular, we have tried to show that the research on industry evolution, which is dominated by theoretical and empirical work that focuses on technological factors, can benefit from integrating organisational aspects. We outlined a framework that allows for such an integration. In this framework, the growth of the firm organisation is a key variable. Unlike the common perception, the growth of firms is not only, and not necessarily, beneficial. It also creates potential hazards. An entrepreneurial regime of cognitive leadership with its face-to-face interactions provides an effective and inexpensive way to coordinate small start-up firms and can give them a unique advantage in the competitive process. However, in growing larger, firms coordinated on the basis of such an entrepreneurial regime sooner or later run into problems. To overcome these problems, growing firms can adopt different coordination regimes to replace cognitive leadership. Their ability to handle the transition is a major determinant of the firm's further (growth) performance.

Seen in this light, the coordination problems created by organisational growth complicate the learning dynamics in Klepper's (1996) model of industry evolution. The Klepper model can then be interpreted as a best-case scenario, whereas in the real world, not all firms are equally able to solve their growth-induced organisational problems. Coordination problems in growing firms do not help to explain the causes or the timing of shakeout. They may, however, contribute to understanding its rapid character, since differences in the capacities of firms to cope with organisational growth are particularly relevant during the shakeout. In addition, recognition of coordination and motivation aspects provides guidance to empirical efforts to sort out the winners from the losers in shakeouts.

Another implication from the discussion in this paper is that small firms may have a coordination-based advantage over larger competitors that may partially or even completely offset their disadvantages in terms of scale and scope economies. If the coordination-based advantage is relevant empirically, small-scale firms should be able to survive alongside larger competitors. In a maturing industry, oligopolistic tendencies frequently, albeit not always, lead to decreasing competitive pressure. From a coordination perspective, firm growth in an industry with low-intensity competition is compatible with bureaucratisation and a monitoring regime at the firm level. If large incumbents are indeed characterised by bureaucratisation and monitoring, small firms able to maintain a cognitive leadership regime may be able to survive in the industry. Based on these considerations, a U-shaped pattern of survival can be expected, with both small-scale and very large firms being in an advantageous situation relative to medium-size producers.

Exit of incumbent firms frequently occurs in the form of their acquisition by, or merger with, other already existing firms. Acquisitions and mergers among firms active in the same industry are indeed commonplace. In terms of firm development and cognitive leadership, they create intriguing challenges. Not only do they increase the size of the firm— with all the implications for coordination and motivation suggested above. Acquisitions and mergers also bring together two entrepreneurial coordination regimes. In the case of mergers among equals, both firms may come with workable business conceptions. To make them fit or to extend one of them to the entire firm organisation is far from easy if not next to impossible. It may appear less problematic to impose a superior business conception on a poorly performing incumbent acquired by a superior competitor, but some problems can still be expected in this kind of situation. The weak performance of the acquired firm may in part have been caused by a lack of cognitive coordination and motivation hazards. If it were easy to implement a new business conception and an accompanying corporate culture to get rid of the established 'bad habits' of opportunism, shirking, and indifference among the employees— then one might ask why the original firm leadership did not thus do this, and averting the firm's acquisition. Furthermore, the attempt to impose a post-acquisition cognitive leadership regime is likely to be even more complicated when— as is typically the case— the acquisition results in lay offs of employees who have become redundant in the new firm.

Exit of firms can also be a source of new entry. Serial entrepreneurship is often provoked by the acquisition by a competitor of the entrepreneur's current firm. Based on previously discovered opportunities, and the funds provided by selling the old firm, the entrepreneur is in a good position to re-enter the industry. Likewise, the failure or acquisition of industry incumbents frequently gives rise to spinoffs *post mortem*. Employees of the exiting firms may be able to re-enter based on a single activity that still seems promising to pursue, possibly on a smaller scale, which allows the earlier adverse effects of growth on coordination to be resolved. In the case of acquisitions, the acquiring firm often discontinues some of the activity lines of the acquired firm. Again, this potentially triggers the formation of spinoffs by former employees of the acquired firm. Conflicts caused by changes made to the business conception of the acquired firm may moreover lead to the formation of comparison-induced spinoffs. In line with these conjectures, the empirical evidence suggests that a larger number of spinoffs is generated at times of leadership changes or when incumbents are acquired by other firms.

By focusing on the dimension of cognitive leadership, we have tried to give a detailed account of one aspect of organisations, and its implications for entry and exit in industries. Clearly, our discussion only begins to analyse the role of organisational factors, and many other aspects need to be examined to provide a more encompassing picture. Furthermore, the hypotheses relating to diversifying entrants and spinoffs proposed here call

for systematic empirical testing. Our discussion has focused on the effects of organisational growth on industry evolution. The reverse causal relationship— i.e., the effects of industry evolution on firm development— has been largely neglected. We have put forward some conjectures as to how the entry chances of different types of spinoffs vary over the industry life cycle. However, it must be remembered that incumbent firms are also affected by the changes brought about by industry evolution. These effects need to be analysed and discussed in more detail to move from the disjunct theories of organisations and industries to what seems to be a more coherent characterisation of the underlying dynamics: the *co*-evolution of firms and industries.

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