Innovation and Entrepreneurship:
Schumpeter Revisited

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In a large part of the literature on Schumpeter one finds that attention is paid to either his early contributions, with reference to the role of the entrepreneur as the personification of innovation, or to his later contributions, stressing the role of large companies as main drivers of innovation. This paper complements some recent contributions to the assessment of the influence of Schumpeter on economics and social sciences in general. It demonstrates that a careful reading of his writings reveals that there is no simple dichotomy between the 'old' and the 'young'. Entrepreneurial activities play an active role in understanding the dynamics of innovation throughout Schumpeter's theory.

1. Introduction

In the literature on corporate entrepreneurship, innovation and capitalist development one finds two streams of research: one line of work emphasizes the importance of new ventures by individual entrepreneurs, the other line stresses the role of corporate entrepreneurship and intrapreneurship in the renewal of large firms (Burgelman, 1983; Guth and Ginsberg, 1990; Stevenson and Jarillo, 1990). As far as the first line of work is concerned, the contribution by Schumpeter is frequently mentioned as a source of inspiration. In that context most of the attention on Schumpeter seems to concentrate on his early work or, more accurately, on the English translation and slightly rewritten version of some of his early work (Schumpeter, 1934). In the related industrial organization literature attention paid to Schumpeter follows a dichotomy where the 'early' Schumpeter (1934) is placed opposite the 'older' Schumpeter (1942). The so-called 'Schumpeter hypotheses' on market structure, firm size and innovation deal with questions on the different roles played by small entrepreneurial firms and large, science-based firms.

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The present paper investigates the roles that innovation and entrepreneurship, both in small and large firms, have played throughout Schumpeter's academic career. Given the contemporary interest in developing theories of entrepreneurship, innovation and corporate renewal, an 'exegesis' of one of the leading theorists on these subjects seems appropriate. With this particular emphasis the current paper complements some recent evaluations of Schumpeter's theoretical development and his contribution to economics as found in Santarelli and Pesciarelli (1990) and Scherer (1992). In particular, this paper pays attention to aspects in Schumpeter's work that receive somewhat less attention in Stolper (1994). This latter publication is to be seen as an extremely valuable study of Schumpeter's contribution to economics, social sciences, political science and politics and policy-making. It presents a rather unusual but attractive combination of a biography and a scholarly analysis, linking Schumpeter's work to, amongst other things, contemporary economic theory as well as to modern economics based on non-linear dynamics. Complementing Stolper (1994), I will in particular stress the relevance of innovation and entrepreneurship as key topics for business economics and management studies, and as such the focus changes somewhat from Schumpeter's contribution to economics and social sciences in general to business studies.

In the following, innovation and entrepreneurship are seen as clearly interrelated as the role of 'the' entrepreneur in Schumpeter can only be understood if it is placed against the background of his theory of innovation. That contribution not only has relevance for the understanding of modern developments but is also a truly seminal contribution as it is one of the few early attempts to understand, in combination with entrepreneurship, some of what is nowadays known as the 'black box' of technology (Rosenberg, 1982). As discussed more extensively below, Schumpeter not only emphasized the role of the entrepreneur in his earlier work but continued to struggle with his concept of this agent of change and innovation throughout his academic career. Given the focus on Schumpeter's theory of entrepreneurship and innovation, this paper abstracts from a large number of other topics in Schumpeter's work, such as his broader theory of economic development, the future of capitalism and socialism, and market structural aspects of innovative capabilities and business cycles.¹

2. Innovation, New Combinations and Economic Development

The basics of Schumpeter's theory of innovation are found in his economic model of the circular flow (see Schumpeter, 1934). This circular flow describes a stationary situation of equilibrium and perfect competition similar to a so-called Walrasian state of equilibrium. Every firm is in perfect equilibrium: costs equal income, prices equal average costs and net profits are zero. The circular flow follows from continuous adaptations to small external changes which are 'absorbed' through routine company behaviour. It is important to note that this particular notion of circular flow is not identical with the notion of stationary state as it was frequently applied in classical political economy. Smith, Ricardo and Mill had developed, albeit quite different, theories of the stationary state that pictured this economic equilibrium as the far or nearby 'ultimate' destiny of the economy (Dobb, 1981). The stationary state in Schumpeter's circular flow is far from any ultimate destiny of the economy. In the words of Stolper (1994, p. 41), Schumpeter thought that 'the capitalist economy was a system constantly in motion which never reached an equilibrium'. In Schumpeter's theory the notion of general equilibrium is applied to contrast and explain economic development after a change in existing routines of companies takes place through innovation. Also, equilibrium is not a direct reflection of economic reality as some authors (see, for example, Smithies, 1951; Stolper, 1981), assume. Equilibrium is much more a simple theoretical norm introduced to explain the disequilibrium effects of innovation. Through innovation—for practical purposes defined at this stage as the successful introduction of new products and processes—the economic system is driven away from the 'neighbourhood of equilibrium'. Then gradually, as the effects of innovation 'wear off', a new neighbourhood of equilibrium is restored again (Schumpeter, 1939, pp. 68–71). In the end the complexity of different interacting cycles and the disequilibrating force of innovation in Schumpeter's theory generate a theoretical framework for understanding a dynamic economic system that seems to come close to some sort of non-linear and dynamic growth model 'avant la lettre' (Stolper, 1994).

In explaining the change-over from routine economic growth to 'dynamic' economic development, Schumpeter introduced the notion of so-called 'new combinations'. These new combinations refer to the introduction of a new product or a new quality of a product, a new method of production, a new market, a new source of supply of raw materials or half-manufactured goods,

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1 However, as already indicated in the above, in Stolper (1994, p. 41) it is stressed that equilibrium in Schumpeter's theory is seen in the context of the analysis of a turbulent capitalist economy.

2 This holds for Schumpeter's treatment of the subject in Schumpeter (1934, 1939). In Schumpeter (1942) 'perfect competition' and 'equilibrium' are no longer applied to explain economic development.
and finally implementing the new organization of any industry (see Schumpeter, 1934, p. 66; 1939, pp. 84–85). Although Schumpeter referred to innovation as new combinations in most of his writings, he also defined innovation 'as the setting up of a new production function' (Schumpeter, 1939, p. 87; see also Schumpeter, 1954, pp. 1026–1053). Whether this reference to production functions is helpful remains doubtful. In that context it is worth noting that Schumpeter introduced three broad definitions of production functions, i.e. as the given technological possibilities as seen by producers, blueprints with 'cost neutral' technical alternatives, and a 'realistic' production function constructed on the basis of factual observations distinct from the 'logically pure' production function (Schumpeter, 1954, pp. 679, 1031–1032; Heerste, 1977, p. 100).

It is obvious that all definitions of innovation given by Schumpeter, whether related to new combinations or production functions, are rather broad and vague, reflecting his 'struggle' to understand the complexities of technological development. Therefore, it should come as no surprise that Schumpeter's attempt to define innovation has been criticized by many authors. These criticisms of the different definitions as developed in his writings range from 'fuzzy' and too broad on one extreme to too narrow, as it only relates to new firms and new entrepreneurs, on the other (see Clemence and Doody, 1966, pp. 39–50 for an overview of criticisms).

The criticism that it is a narrow definition, restricted to new firms and new entrepreneurs, seems inappropriate if one considers Schumpeter's description of innovation in the broader context of his subsequent writings. This criticism might, however, have some relevance to the concept of innovation in Schumpeter (1934), where he referred to the role of new firms as innovators, although even there Schumpeter explicitly referred to that role in 'competitive capitalism' and not to the later stages of what he referred to as 'trustified' capitalist development (Schumpeter, 1934, p. 67). In his later publications large, existing companies became more important as innovators in modern capitalism. Thus, in general, Schumpeter did not only refer to new companies as the main source of innovation.

The objection to the broad character of Schumpeter's definition can be related to both the production function and the new combinations approach. A well-known and older criticism of Schumpeter's definition of innovation as the setting up of a new production function has been made by Lange (1943). Lange argued that there is always a large number, even possibly an infinite number, of ways of changing existing production functions. According to

4The reference to production functions is, however, quite understandable from the perspective of Schumpeter's attempt to keep his work acceptable to the neo-classical economic paradigm of that era.
Lange, only those changes that will lead to an increase in the maximum effective profit are relevant (Lange, 1943, p. 21). It appears that Lange understood the issue in precisely the way Schumpeter apparently meant to avoid. The latter stressed that his definition is not 'equivalent with "change in method" or "change in technique" of production' (Schumpeter, 1939, p. 87). In other words, Schumpeter's definition of innovation did not refer to the economic notion of a shift along the production function but a shift of the production function itself. Also, Lange is clearly mistaken in assuming the availability of an almost infinite number of changes of production functions. Technology does not refer to an infinite set of options and solutions to technical problems. As shown by many authors who study technological change, in practice these options are, given 'path dependencies' of technological development, limited in general and even more restricted to individual companies (see, for example, David, 1985; Dosi, 1982; Dosi et al., 1988; Freeman, 1984; Nelson and Winter, 1982; Rosenberg, 1982).

Nevertheless, Schumpeter's reference to new production functions as an illustration of innovation was an unfortunate choice. Regardless of the general benefits that production function analysis might have for economics, it has not been very successful in explaining the details and both the irregular and regular character of technical change in process innovations, let alone product innovations. Furthermore, Schumpeter's definitions of production functions are somewhat vague compared to more generally accepted definitions, which only adds to the confusion in attempting to understand innovations as new production functions.

As mentioned above, Schumpeter's definition of innovation as 'new combinations' is also rather broad as it relates to technical, marketing and organizational aspects of the subject. All three aspects are important for understanding the complexity of innovation, but it could be useful to keep them separate. A preliminary qualification can be made by 'narrowing' the concept by separating organizational and market structure related elements. Innovation would then be limited to new goods or an improvement in the quality of a good, and new or improved methods of production—in other words, product and process innovations. These 'technical' innovations have to be separated from organizational innovation and changes in the market.

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3The subject of production functions as such is beyond the scope of this paper as it touches upon a different debate in economic theory as, for instance, found in the Cambridge controversy, with only limited relevance for business studies. As explained in detail by Blaug (1983, p. 491), a micro-economic meta-production function that includes both innovative activities, such as R&D, and shifts in the production function itself indicates costs in terms of information which undermines some of the basic assumptions behind the very concept.
structure, although it is obvious that these phenomena are related and influence one another.

Schumpeter's focus on innovation as a new combination without too much attention for pre-market conditions of technological development resulted not only in the abstraction from early phases of technology; it also meant that minor technological changes were somewhat neglected. Furthermore Schumpeter's understanding of innovations as more or less radical changes with a great impact on sectors of industry and business cycles made minor day-to-day technical improvements apparently less important. In particular, in Schumpeter (1934) technical changes based upon existing routines were seen as irrelevant. In Schumpeter (1942) routinized innovation becomes a more important factor in the role large companies play, but the issue as such is not discussed thoroughly. In that sense, compared to modern theories of innovation, Schumpeter's concept of innovation is also too restricted as it abstracts from subsequent steps of technical improvement once an innovation has been introduced. In that context one can also point at a wide range of theories that address learning capabilities in companies that affect both the pre-introduction and the post-introduction period of innovations. Building on Arrow's (1962) seminal contribution to the theory of learning by doing, recent theories of innovation stress the importance of organizational learning as 'learning-by-learning, learning-by-doing, learning-by-using' through which companies develop knowledge that is broader than just R&D. These learning economies associated with the innovation process within firms are characterized by their cumulative, continuous and collective nature (Lazonick, 1991). Such a broader conceptualization of organizational learning pictures the process of accumulation of knowledge within companies, the interaction with their environment, and the organizational dynamics of the knowledge-generating process (see Rosenberg, 1976; Dosi, 1988; Cohen and Levinthal, 1989; Dodgson, 1993). In that sense these recent theories of innovation supplement Schumpeter's theory of innovation when stressing the dynamics and spillovers of innovative activities introduced and developed within companies.

3. Entrepreneurs and Innovation

Schumpeter's concern for the role of the entrepreneur can be seen in a long-standing academic tradition that paid attention to entrepreneurial functions in economic development. His ideas are in particular influenced by a wide variety of economists such as Marshall, Wicksel, Clark, Bentham; the Austrians Say and Walras; and early French economists (Schumpeter, 1949,
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pp. 64ff; Johnson, 1986; Marco, 1985). In the literature Schumpeter's theory of modern economic development is frequently differentiated into two periods: a period of entrepreneurial capitalism and a period of modern, trustified capitalism where entrepreneurs lose their function (Philips, 1971; Freeman et al., 1982; Kamien and Schwartz, 1982). However, in Schumpeter's own theoretical development it seems there is a much more gradual change in the role that is played by entrepreneurs. In Schumpeter (1934) it is already recognized that in modern capitalism large companies were becoming more and more important as innovators. These different roles for the innovating entrepreneurial companies and the 'great combines' in stimulating innovation were seen by Schumpeter as 'the water-shed between two epochs in the social history of capitalism' (Schumpeter, 1934, p. 67), i.e. that of 'competitive' versus 'trustified capitalism'. In one of his last and relatively unknown publications, Schumpeter (1949) returns to the topic of entrepreneurial activities, but now in the context of the role of the entrepreneur within large companies. These remarkable changes in the development of Schumpeter's theory of entrepreneurship, which seem somewhat neglected in Stolper (1994), justify some further attention.

Schumpeter's theory of capitalist development in the entrepreneurial era, which probably coincided with the nineteenth century, is most clearly presented in Schumpeter (1934). There, entrepreneurial activity was seen as a third factor of production, next to labour and land. In the explanation of the circular flow labour is differentiated by its direction: creative labour is of a higher order than directed labour (Schumpeter, 1934, p. 20). Differences between other categories of labour, such as intellectual and manual labour or skilled and unskilled labour, are all neglected as irrelevant to Schumpeter's analysis. The decisive element of creative labour is embodied in the entrepreneur. The entrepreneur can be described as the only agent of economic change in the circular flow. In a sense the entrepreneur is the personification of innovation, i.e. the individual who carries out new combinations. It is important to note that, according to Schumpeter, entrepreneurs are by definition neither inventors, capitalists nor a social class. Although all three can be combined in one person, this combination is unnecessary. Therefore Thirle and Rutran (1987, p. 3) are mistaken if they understand Schumpeter's (1934) entrepreneur to be an inventor. At that stage of Schumpeter's theoretical development, invention itself is seen as an exogenous factor, only the concrete innovation and the innovative capacity of the entrepreneur count as endogenous factors of economic development. Elliott, in his otherwise valuable contribution, also misses the point in stating that '... successful entrepreneurs “become” capitalists in Schumpeter's
analysis' (Elliott, 1983, p. 286). According to Schumpeter, successful entrepreneurs might become capitalists but they stop being entrepreneurs once they fail to continue to innovate and (re)turn to capitalist routines (Schumpeter, 1934, p. 78).

In the early version of Schumpeter’s theory capitalists are either owners of companies which maintain their existing routines or bankers who provide credit to the entrepreneur (Schumpeter, 1934). In Schumpeter’s ‘system’ innovations are introduced by entrepreneurs and financed through bank credit and not savings. Credit is important for economic development as a change from the circular flow. It enables the potential entrepreneur actually to become one and, as ‘the typical debtor of capitalist society’ to reorganize the existing combinations (Schumpeter, 1934, pp. 95ff). In stressing the role of the entrepreneur as innovator and debtor, Schumpeter presents a definition of the entrepreneur in which risk-taking is less essential as compared to other well-known ‘classical’ theories of entrepreneurship, in particular those in the tradition of Say and Knight (Marco, 1986). For Schumpeter the entrepreneur appears to be the true and only economically relevant change-agent of a pre-trustified capitalist society. The Schumpeterian entrepreneur is in the first place characterized by his/her proactive behaviour and not necessarily a strictly rational economically maximizing subject. Schumpeter’s entrepreneur is both a rationally and irrationally motivated economic agent who seems to be never satisfied by results based on existing innovations but who keeps searching for new opportunities (Elster, 1983; Santarelli and Pesciarelli, 1990).

In order to understand Schumpeter’s perception of modern capitalism the later version of his theory of the firm is more appropriate. Schumpeter (1942) pictures the diminishing importance of the entrepreneur who loses his/her function as the agent who changes existing routines. Economic development gradually becomes ‘depersonalized’ and ‘automatized’. Consequently, ‘innovation is being reduced to routine. Technological process is increasingly becoming the business of trained specialists who turn out what is required and make it work in predictable ways’ (Schumpeter, 1942, p. 132). The disappearance of the entrepreneur as the only change-agent in capitalism, as pictured in Schumpeter (1942), has significant consequences. Schumpeter, like Weber (1921), stressed that rationalization and bureaucratization had become major trends in modern capitalist society (Foster, 1984). A final consequence of these features of modern capitalism is that, according to Schumpeter (1942, p. 134), capitalism evolves towards a socialist society as the ‘bourgeoisie’ will lose its social and ideological defender personified in ‘the’ entrepreneur.
However, Schumpeter also mentions that in the world of large companies the entrepreneur is not necessarily an independent economic agent but can also be an employee of a large company with an entrepreneurial function (see Schumpeter, 1939, p. 440; 1942, pp. 74–75). This particular form of entrepreneurship in modern capitalism is discussed again in one of Schumpeter’s writings towards the end of his life (Schumpeter, 1949). Interestingly this important point appears overlooked in Stolper’s (1994) contribution where this elaborate and intriguing analysis of the role of these entrepreneurs, or intrapreneurs in modern management jargon, is not mentioned at all. As such it seems valuable to pay some attention to this little-known aspect of Schumpeter’s work.

In Schumpeter (1949) the role of entrepreneurial skills is stressed as part of a co-operative entrepreneurship in large companies instead of the ‘heroic’ creative labour of a single entrepreneur. In Schumpeter’s own words:

the entrepreneurial function need not be embodied in a physical person and in particular in a single physical person. Every social environment has its own ways of filling the entrepreneurial function. . . . Again the entrepreneurial function may be and often is filled cooperatively. With the development of the largest-scale corporations this has evidently become of major importance: aptitudes that no single individual combines can thus be built into a corporate personality; on the other hand, the constituent physical personalities must inevitably to some extent, and very often to a serious extent, interfere with each other. In many cases, therefore, it is difficult or even impossible to name an individual that acts as ‘the entrepreneur’ in a concern. (Schumpeter, 1949, pp. 71–72).

In other words, the role of the entrepreneur is analysed in terms of the function in a company and not necessarily as a physical person. Due to the growing separation of ownership and management the entrepreneurial function within the company lies, according to Schumpeter, with the executive function of management. This emphasis on the division of ownership and executive responsibilities is largely in line with his thoughts on the entrepreneurial function explained in earlier work, where, as mentioned above, owners of firms as such had no substantial part to play in economic development. It remains unclear to what extent Schumpeter realized that this ‘new’ collective entrepreneurial function affected his ‘pessimistic’ philosophy on the future of capitalism. Its implications for the management of innovation within large companies are quite clear and as such the parallel with modern

6Schumpeter (1949, p. 71) even mentions the possible innovative role for organizations other than companies, e.g. the role of state agencies, as collective entrepreneurial change-agents.
theories of corporate renewal that, among other things, stress the importance of organization-wide creativity and entrepreneurship, are noteworthy (Maidique, 1980; Bartlett and Ghoshal, 1993; Burgelman, 1993; Teece, 1993; Mintzberg, 1994).

4. Conclusions

The understanding of innovation as a major disequilibrating force has not only remained central to Schumpeter's theory, it can still, as indicated in the above, influence modern analysis of business development. The introduction of new products and processes plays an important role in reshaping competition in the domestic as well as in the international marketplace. It has both short- and long-term effects on consumers, companies and nations through the creation and redistribution of economic welfare in a gradually expanding economic space.

Although details of Schumpeter's vision on the effect of innovation did change somewhat during the evolution of his theory, these modifications should not be overestimated. Many reinterpretations, e.g. those related to the role of large firms, partly reflect what Schumpeter saw as objective developments with large science-based companies playing a much more prominent role in the twentieth century than they could possibly play in earlier phases of economic development. An important side-effect of Schumpeter's understanding of the role of technological development is that it became an endogenous factor in the explanation of competition and economic development. Stolper (1994) pays particular attention to the influence of these Schumpeterian and evolutionary topics in modern economic thought through the contribution by Nelson and Winter (1982). However, the endogenous character of technological development returns in many other modern theories, in particular in evolutionary economics and business theory (see Dosi et al., 1988).

Elaborating on the above, I would like to stress that one could add to Stolper's (1994) analysis that there seem a number of similarities between Schumpeter's discussion of innovations and modern 'heterodox' theories of innovation. In the early 1980s a growing number of publications began to discuss innovation in the light of so-called technological paradigms, technological regimes, basic designs and the like. Rosenberg's (1982) meta-production function, Nelson and Winter's (1982) technological regime and natural trajectories, Dosi's (1982) technological paradigm and technological trajectories, Freeman's (1988) techno-economic paradigm, and Sahal's (1981) technological guideposts are all notions that attempt to catch
the cumulative nature of technological development and the set of heuristics that guide the process of search within technologically mediated knowledge. Each of these concepts appears to have something in common with Schumpeter's meta-production, function-like understanding of innovation in terms of 'technological possibilities within the horizon of producers'. However, the recent work appears richer in its analysis of the internal dynamics of the process of innovation, as shown by many case studies, industry surveys and historical analyses, than the still somewhat abstract treatment by Schumpeter.

Furthermore, it should be emphasized that, as discussed above, Schumpeter did not demonstrate a great interest in either the early phases of technical change, the inventive activities of economic actors, the pre-market developments of technology, or the diffusion of technological knowledge and minor technical changes as such. In that sense one can follow Heertje (1988) who argues that 'technical change, in the sense of the development of new technical knowledge and possibilities, and the diffusion of knowledge are almost wholly absent from his exposition' (Heertje, 1988, p. 82).

In accordance with Stolper's (1994) contribution, one can conclude that the role of entrepreneurial activities in understanding the dynamics of innovation throughout Schumpeter's theory are important features that are worthwhile considering in modern theories of innovation. However, it should be added that these entrepreneurial activities within firms in modern capitalism can range from a single-person economic agent to a collective entrepreneurial function in large companies. The emphasis on the creativity of collective entrepreneurial functions aimed at proactive strategies ties in with a growing number of publications on modern theories of the firm, organizational economics and business studies that reflect firm-specific advantages created through innovative capabilities (see Dosi and Teece, 1993; Kogut and Zander, 1993). In that context collective entrepreneurship is not a magic phenomenon or a deus ex machina but primarily an endogenous factor that combines the application of innovative capabilities based on tacit knowledge with well developed internal search routines, firm-specific skills and organizational learning.

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