
Editorial

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1 Introduction

The literature of economics, as well as that of management, has so far sought to define innovation according to its subject (product, process, organisation, *etc.*), its intensity (marginal, radical, technological systems or technological revolutions), or even the degree of coordination it requires (stand-alone or systemic) (Freeman and Perez, 1988; Teece, 1988; Freeman, 2004). However, this same literature has had rather less to say about innovating technological projects that involve high risk. It is true that this subject is more complex because in a sense, it is a case of double innovation: the new technology is borne by a new company that has specific modes of functioning.

The innovation process is a complex one which can be broken down into three phases: R&D, introduction of new products to the market, and the dissemination of innovations into the productive system (Muldur, 2001). In international comparisons, the analysis of R&D investment raises questions of an institutional nature: the relative under-investment of Europe can be explained by insufficient budget (European Commission, 2003) and by a gap in financing which corresponds to the needs of high-tech start-ups (Hall, 2002).

2 Financing young technology-based companies

The institutional approach to financial systems traditionally deals with two opposite types of economy: those which rest on financial markets (*e.g.*, UK, USA), and those dominated by the banks (*e.g.*, continental Europe) (Zysman, 1983; Black and Gilson, 1998; Rajan and Zingales, 2001; Guilhon and Montchaud, 2006). Starting from this market/bank typology, can we talk of the superiority of one type of financial system over another in the context of financing the innovating projects of start-ups?

Two answers are possible. The first considers that market-based systems favour the arrival of radical innovations (Amable *et al.*, 1999). The second dissociates into the different stages of the innovation process and makes a crossover across the sources of financing (market versus financial intermediaries) and the financial instruments (own funds versus debt). From this point, it is possible to identify the most appropriate form of financing for each stage of the innovation process:

- Venture Capital (VC) is proposed for the R&D stage
- stock-exchange markets should finance the innovation introduction phase
- banking and bond debts seem appropriate for the period of innovation dissemination in the form of gross fixed capital formation.

The evolution of financing structures corresponds to the profound modifications which have affected industrial structures. Since the early 1980s, large firms have dismantled their production apparatus and concentrated on core competencies. Besides this, the vertical specialisation of companies is growing and can be seen both in the sphere of material production and that of knowledge (Lamoreaux *et al.*, 2002; Langlois, 2003; Coombs *et al.*, 2003). This process seems to correspond to the progressive establishment of a new model of innovation, illustrated by the presence of knowledge-intensive firms and by extensive vertical specialisation between one industry which is specialised in exploring new technologies and seizing opportunities in innovation, and another industry specialised in their exploitation (Arora *et al.*, 2001; Guilhon, 2004). In certain cases, high growth technology-based firms take charge of the whole value chain and market innovations which they have created themselves (Gans and Stern, 2003).

These firms possess intellectual assets and scientific or technological knowledge, however they lack operational and product development funds. In order to provide appropriate funding, a venture capital industry has been developed providing money for young high-growth firms that have viable business plans and good market prospects. Venture capital appears to be the most efficient form of bringing original solutions to the problems encountered by innovating companies (Lerner, 2002; Gordon, 2004).

3 Characterising VC financing

Three elements appear to be important (Guilhon and Montchaud, 2003):

- target: innovative projects, particularly in industries of high technological intensity (*e.g.*, software and internet technologies, biotech), with high growth prospects accompanied by high uncertainty; hence a considerable amount of risk
- involvement in the business: active, in the form of monitoring, follow up, advice
- method of remuneration: remuneration fixed ex-post by eventual increase in value of investment (capital gains) at the time of exit (IPO, trade, *etc.*).

From these three considerations, it becomes apparent that venture capital investors are able to evaluate innovating projects more precisely than bankers (Ueda, 2004). The relationship between the VC funds and entrepreneurs is thus crucial: it is present throughout the three phases which constitute the 'metier' of a venture capital provider: pre-investment, conception of contracts, and monitoring of firms (Sahlman, 1990; Gompers, 1995; Kaplan and Strömberg, 2001; Hart, 2001).

4 International comparisons

This new mode of financing is spreading more or less rapidly throughout a large number of countries. International comparisons indicate that the total EU – 15 Venture Capital investments (seed, start-up, and expansion) is only equal to 48.7% of US investment in 2002. The gap is smaller for the early stage phase, but the expansion phase mobilises huge sums both in Europe and in the USA. Within Europe, countries like Sweden, Denmark, and Finland seem very dynamic. Thus, even if economic variables are important, the influence of institutional contexts cannot be discounted (Gompers and Lerner, 2001). Within each economy, it is the sum of all these elements which conditions the greater or lesser extent of risk for innovation projects and which determines the specific orientation of VC industry development.

5 The contribution to this issue: the organisation of a new mode of financing innovation

The emergence and development of a new industry is the expression of a conjoint evolution of technology, industrial organisation and institutions (Nelson, 1994). When considering the themes proposed in this special issue and the responses to the papers, we felt it was important to give a particular place to the theme of organisation, which in a sense envelops the other two. In fact, the papers in this issue can be grouped into two main areas:

1 Organisation of the VC industry

The relations between actors. The organisation of this industry is first and foremost rooted in the behaviour of the agents, *i.e.*, the coordination mechanisms they use to improve the industry's performance. From different sized VC funds, it is important to analyse the evaluation mechanisms, the transfer of information and the methods of involvement set in motion to create more effective relationships between investors and entrepreneurs.

2 Organisation of the VC industry

The institutional dimensions. The institutional context influences the orientation of venture capital, the phases of intervention and the proliferation of public schemes. More generally, institutional and national particularities affect the dynamic of this form of intervention.

The article by Mirjam Knockaert, Andy Lockett, Bart Clarysse, and Mike Wright belongs to the first area. They propose an analysis of post-investment behaviour of VCs in early stage high-tech investments. Among the results, they demonstrate the fact that neither human capital nor the characteristics of the VC fund influence monitoring. The institutionalisation of monitoring in Europe results in the application of standard procedures. On the other hand, these two variables play a significant role in value-adding activities aimed at improving the results of investment. The VC fund is therefore more highly involved in these activities.

Katleen Baeyens, Tom Vanacker, and Sophie Manigart analyse the selection process set up by VCs in biotech ventures. By putting themselves on the supply side in the investor-investee relationship, the authors come to the conclusion that a high-quality technology is only one of the necessary conditions for attracting investor attention. The entrepreneurs must also be able to present to venture capitalists a solid strategy in terms of IP rights, a sound market analysis and a realistic financial plan. Besides this, European countries must seek increased coherence with one another in order to eliminate the regulatory market fragmentation which results in a competitive disadvantage *vis-à-vis* their US competitors.

Tobias Kollmann and Andreas Kuckertz investigate how for young unlisted companies, especially in the early phase, personal and individual contact with a small manageable circle of investors is the main focus of finance communication. Investors seek investor relations that are interactive. They can thus contribute effectively to the company's development and create added value through their consulting activity. This is another way of formulating the problem of asymmetry of information: companies should not underestimate investors' needs for information.

Rolf Wüstenhagen and Tarja Teppo analyse the process of extending venture capital to new industries, especially to the European technology sector. The different behaviour of VCs between this sector and other typical VC sectors (information and communication technologies, biotech) can be explained by three facts: the perceived risk of investments in energy technologies, the perceived returns in energy VC investments and the degree of maturity of the analysed sector from an evolutionary perspective.

Dietmar Grichnik and Robert D. Hisrich identify the investment behaviour of German and Israeli VCs to gain insight into how the industry works. Their results are doubly significant. Firstly, their evaluation of investments focuses on the entrepreneur's capabilities. Secondly, the more active the boards of VC-backed firms, and the higher their involvement, the better the performance of the company portfolio; this confirms results previously obtained for US firms.

Holger Patzelt, Dodo zu Knyphausen-Aufseß and Ilona Arnoldt's paper aims to understand how diversification of industry-specialised portfolios in life sciences can contribute to macro risk reduction strategies of VC firms. The author emphasises which factors might influence portfolio diversification. One of the results is highly interesting – the possibility of spreading risk over less capital intensive and risky industries (such as IT), enables VCs to follow riskier strategies within their life science portfolios.

The contribution of Pascal Petit and Michel Quéré belongs to the second research area. These authors compare the US and the European VC industries, and they emphasise the importance of national context which has a profound influence on the function of intermediation covered by VC. The particularity of this function can be seen through the analysis of the productive and institutional dimensions of the country concerned. One of the paper's important conclusions is that the US VC industry cannot be used as a proper benchmark for the European industry.

Bernard Guilhon and Sandra Montchaud insist on the idea that this new principle of organisation in financing innovation requires institutional arrangements which cater both to the specifics of different national frameworks and to the trend towards homogenisation. The modelisation they propose highlights the role played by institutional factors and the strong influence exerted by exit mechanisms on European VC investments.

Mannie Manhong Liu, Jiang An Zhang, and Bo Hu examine the differences in sector orientation of the VC investment between the Chinese domestic VC industry and its foreign counterparts present in China. They show that the domestic VC industry serves multiple goals: not only acting in the same way as traditional VCs, but also acting as an alternative financial mechanism to bank financing. One of the conclusions of this paper is that VC industry organisation depends strongly on the maturity of an economy's financial system.

Finally, Christian Le Bas and Fabienne Picard analyse the decision criteria relative to the financing of innovation projects at early stages, set up by a public VC organisation. Three elements arise from this paper expressing how far VC is rooted in a specific institutional context: careful management of IP assets, careful management of firms' external relationships with public research institutions and users of the technologies, and careful management of knowledge or human capital.

References

- Amable, B., Paillard, S. and Petit, P. (1999) 'Finance and innovation: venturing on the risk frontier', *Report to European Commission*, TSER Program, Research Directorate General, Brussels.
- Arora, A., Fosfuri, A. and Gambardella, A. (2001) *Markets for Technology*, Massachusetts: MIT Press.
- Black, B.S. and Gilson, R.J. (1998) 'Venture capital and the structure of capital markets: banks versus stock markets', *Journal of Financial Economics*, Vol. 47, No. 3, pp.243,277.
- Coombs, R., Harvey, M. and Tether, B.S. (2003) 'Analysing distributed process of provision and innovation', *Industrial and Corporate Change*, Vol. 12, No. 6, pp.1125–1155.
- European Commission (2003) *Towards a European Research Area: Science, Technology and Innovation: Key Figures 2003–2004*, Brussels.
- Freeman, C. (2004) 'Technological infrastructure and international competitiveness', *Industrial and Corporate Change*, Vol. 13, No. 3, pp.541–569.
- Freeman, C. and Perez, C. (1988) 'Structural crisis of adjustment: business cycles and investment behaviour', in Dosi *et al.* (Eds.) *Technological Change and Economic Theory*, London: Pinter Publishers.
- Gans, J.S. and Stern, S. (2003) 'The product market and the market for "ideas": commercialization strategies for technology entrepreneurs', *Research Policy*, Vol. 32, pp.333–350.
- Gompers, P.A. (1995) 'Optimal investment, monitoring, and the staging of venture capital', *Journal of Finance*, Vol. 50, No. 5, pp.1461–1489.
- Gompers, P. and Lerner, J. (2001) 'The venture capital revolution', *Journal of Economic Perspectives*, Vol. 15, No. 2, pp.145–168.
- Gordon, R.J. (2004) 'Why was Europe at the station when America's productivity locomotive departed?', *Working Paper*, NBER, No. 10661.
- Guilhon, B. (2004) *Les Marchés de la Connaissance*, Economica, Connaissance de la Gestion, Paris.
- Guilhon, B. and Montchaud, S. (2003) 'Venture capital in the new economy', in D.C. Jones (Ed.) *New Economy Handbook*, Elsevier, San Diego: Academic Press, pp.671–697.
- Guilhon, B. and Montchaud, S. (2006) 'The difficulties of financing innovation in Europe', *International Journal of Entrepreneurship and Innovation Management*, Special Issue on 'Financing SME innovation: venture capital and other practices in Latin America and Europe', forthcoming.

- Hall, B.H. (2002) 'The financing of research and development', *Oxford Review of Economic Policy*, Vol. 18, No. 1, pp.35–51.
- Hart, O. (2001) 'Financial contracting', *Journal of Economic Literature*, Vol. 39, No. 4, pp.1079–1100.
- Kaplan, S.N. and Strömberg, P. (2001) 'Venture capitalists as principals: contracting, screening, and monitoring', *Working Paper*, NBER, No. 8202.
- Lamoreaux, N.R., Raff, D.M.G. and Temin, P. (2002) 'Beyond markets and hierarchies: toward a new synthesis of American business history', *Working Paper*, NBER, No. 9029.
- Langlois, R.N. (2003) 'Vanishing hand: the changing dynamics of industrial capitalism', *Industrial and Corporate Change*, Vol. 12, No. 2, pp.351–385.
- Lerner, J. (2002) 'Venture Capital', in B. Steil *et al.* (Eds.) *Technological Innovation and Economic Performance*, Princeton University Press, pp.327–346.
- Muldur, U. (2001) 'Is capital optimally allocated in the overall process of European innovation?', *Revue d'Economie Industrielle*, No. 94, pp.115–153.
- Nelson, R.R. (1994) 'Evolutionary theorizing about economic change', in N.J. Smelser and R. Swedberg (Eds.) *The Handbook of Economic Sociology*, Princeton University Press, pp.108–136.
- Rajan, R.G. and Zingales, L. (2001) 'Financial systems, industrial structure, and growth', *Oxford Review of Economic Policy*, Vol. 17, No. 4, pp.467–482.
- Sahlman, W.A. (1990) 'The structure and governance of venture capital organizations', *Journal of Financial Economics*, Vol. 27, No. 2, pp.473–521.
- Teece, D.J. (1988) 'Technological change and the nature of the firm', in Dosi *et al.* (Eds.) *Technological Change and Economic Theory*, London: Pinter Publishers.
- Ueda, M. (2004) 'Banks versus venture capital: project evaluation, screening, and expropriation', *Journal of Finance*, Vol. 59, No. 2, pp.601–621.
- Zysman, J. (1983) 'Governments, markets and growth: financial systems and the politics of industrial change', *Working Paper*, Cornell University.