

Obstacles of innovation among the entrepreneur: An empirical study

Samia Fakhri and Abdelaziz Bahoussa

Laboratoire d'Analyse des Systèmes de Traitement d'Information et du Management Intégré,
Ecole Supérieure de Technologie,
Université Mohamed V Agdal, Maroc

Copyright © 2014 ISSR Journals. This is an open access article distributed under the *Creative Commons Attribution License*, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT: Research on the innovation has traditionally focused on the determinants promoting innovation and R&D in SMEs. However, an approach to study the barriers and the decision to innovation among entrepreneurs, seems it never been studied before. Our goal is to focus on this approach. Thus, through a qualitative study using focus groups with entrepreneurs, researchers, and government actors, we were able to identify the main barriers faced by entrepreneurs to innovation. A quantitative study was subsequently possible to draw up an inventory of the situation and generate results to conclude that the main obstacles studied vary according to the type of creation and the phase in the creative process. Finally some managerial implications were discussed towards the end.

KEYWORDS: obstacles to innovation, innovation décisions, entrepreneur.

1 INTRODUCTION

Since Schumpeter has made his first work on innovation, the latter is considered as a complex phenomenon that requires the involvement of all actors. It is the main source of the pulse of the economic system and the assurance of a long life for the company. Innovation potential of an economy depends heavily on the company; therefore the OECD has published manuals standardizing the definition of innovation and methods of investigation appropriate to innovation studies. This had used to trigger a series of studies analyzing the determinants and the drawbacks of many industrialized countries.

And if developed countries exploit the results of their innovations thanks to a combination of experiences, studies and empirical research yet, in several developing countries, studies on innovation is still relatively rare, either because of the weak capacity of innovation in their companies, of the lack of information and statistical surveys to conduct research, or because of the very lack of a national strategy of innovation.

In newly industrialized countries, such as Turkey (Pamukçu and Cincera, 2001 Singapore Wan et al., 2005) countries have sought to understand the phenomenon of innovation in their countries, through case studies, and raise similarities and field action through comparative studies. In other developing countries, Morocco for example, strategic orientation has begun to give importance to innovation through the implementation of various programs and legislative actions to promote innovation both in the public or private sector. With the joint establishment of a program to upgrade the company, several units have joined the project to promote innovation. However, more than a decade of experience, the results of these measures have remained unknown due to lack of availability of detailed and reliable statistical information.

On the academic side, the concepts of the innovation system (Edquist 1997, Lundvall 1992, Nelson 1993), the national innovation capacity (Furman et al. 2002), barriers to innovation (Ben Moussa et Zaiem, 2013) are actively studied to provide a mapping innovation policies in developing countries.

In this context, and while these countries have not stopped enjoying the benefits of technological innovation over the centuries, can we hope to expect that Morocco will be growing as fast as developed countries? To achieve this aim, in my case that they will overcome a number of pitfalls among them the barriers of innovation.

This article argues fill this gap and provide an analysis of the barriers to innovation among entrepreneurs, a supposed to be the main driver of innovation in a country according to the writings of Schumpeter population. Thus, the objective of this paper is to define and analyze the determinants and the constraints of innovation decisions in a sample of entrepreneurs.

To this end, a first paragraph introduces a synthesis of the literature on barriers of innovation. The second paragraph explains the methodological choices. The third section focuses on the results of the survey and the last paragraph discusses the results and presents the decisional implications.

2 LITERATURE REVIEW RELATED TO CONSTRAINTS OF INNOVATION

Research on innovation have studied in detail the drivers and sources of innovation, paying particular attention to technological and organizational capabilities that companies need to develop to become innovators (Schumpeter 1950, Von Hippel 1988 Dosi et Al 2000).

However, this literature has dealt with less obstacles that hinder innovation. The previous research made on innovation, were mainly interested in the study of economic and strategic value and its impact on the performance business of the company (Savignac, 2008).

Economists, who are interested in innovation, have tended to concentrate their analysis on the determinants of innovative activities and their impacts on economic and technological performance of companies. Others are concerned whit understanding the process by which an innovation emerges. Opportunities and modes of innovation are the result of motivations and interactions in economic system stimulating or constraining the ability of the process of innovation in a company (Silva et al., 2008 Hewitt-Dundas 2006 Foxon & Pearson 2008). Chaminade et al. (2008) define the factors that hamper innovation and reduce the opportunities for firms to engage in interactive learning and innovation at the systemic level (see also Chaminade & Edquist 2006). Hewitt-Dundas (2006) shows that differences in innovation may be due to differences in the background resources.

The most investigated factors are firm size, degree of competition, the technological opportunity and the capacity to appropriate the benefits of innovation (Cohen 1995, Kleinknecht 1996)

Hadjimanolis (1999), Dalkey and Helmer (1993) distinguish between internal barriers (endogenous) and external barriers (exogenous). Indeed, Hewitt-Dundas (2006) shows that differences in innovation may be due to differences in the background resources. Maurer (2006) distinguishes four categories of barriers to innovation: cost factors (cost of funding and availability of funds), knowledge factors (lack of qualified staff, lack of technological and commercial information), market factors (competition and demand) and regulatory factors (government regulations and European regulations). In addition to these barriers to innovation, SMEs are faced with the problems of incompatibility of internal resources and lack of expertise (Hadjimanolis, 1999). Freel (2005) suggests four categories of constraints related to the ability of small companies to innovate: finance, management and marketing, the work factor, and information. D'Este et al. (2007, 2008, 2009) studied the factors that reduce barriers to innovation by distinguishing between companies which face daunting barriers to innovation (non-innovative companies) and companies which face revealed innovative barriers to proven innovation (innovative companies). The results found support the conclusion against-intuitive (in much of the literature on barriers to innovation based on innovation surveys) indicating the positive and significant impact of constraints and obstacles on the likelihood of innovation Sophie Reboud et Tim Mazzarol, Mohnen & Röller 2005 Savignac 2008). Thus, the pieces of research that has dealt with the issue of barriers to innovation and innovation behavior were mainly directed towards the determination of the relative importance of these barriers and measuring their impact on SMEs in developed countries developed. (Freel 2005; March-Chorda et al., 2002; Hewitt-Dundas, 2006).

However, for Schumpeter, the central actor of innovation is the entrepreneur. He highlights the important role of innovation in the impulsion, the prosperity of the economy under the action of the entrepreneur. He is with this in mind, we chose to focus our study on the behavior of the people, whose innovation directly affects the dynamics of innovation of Moroccan SMEs.

3 METHODOLOGY

The perception of obstacles depends on the conditions and business characteristics and varies according to socio-economic and institutional context in which these are located (Rahmouni,2011) research often evoke variables such as the size the sector and the firm age as determinants factors of innovation (Maurer 2006 Lim and Shyamala 2007).

Jesper Sorensen B, Toby Stuart (2000) and Sylvie Laforet (2008) state that organizational skills acquired over the years, facilitate its orientation towards innovation. Thus a nascent company finds more obstacles in innovation than an older one. But does a new-born firm find less obstacles than a firm in the start-up phase or the pre-start-up one. Hence our first hypothesis:

H1: Barriers to innovation are influenced by the stage in the entrepreneurial process, depending on whether the contractor is in pre-startup or growth

Thus, Vega Jaider Jurado (2008), Sylvie Laforet (2013) showed that the internal factors of innovation vary in accordance with the firm sector of activity. As well Similarly Larson and Lewis (2007) showed that organizational innovation is related to the industry of the company. Thus, our second hypothesis is therefore as follows:

H2: Barriers to innovation are influenced by the nature of creation, depending on whether the contractor is accompanied or not.

The goal of our research is to evaluate the impact of these two factors on the innovation behavior of entrepreneurs. Thus a mixed approach combining qualitative and quantitative studies allow us to better understand the influence of obstacles on innovation.

3.1 QUALITATIVE METHODS: FOCUS GROUP

The methods of focus groups aim to highlight convergences of views and to identify some consensus on specific subjects. This is a quick way to gather information and views on the chosen theme.

In our study, the objective is to obtain information about opinions of the entrepreneurs, attitudes and experiences of goshawks about innovation in their business project, participants in this phase of the study were mostly active in the field of entrepreneurship, some are entrepreneurs in the Schumpeterian sense, other are a creators of a new business.

In order to maintain a certain range, we made up our groups according to several criteria including the age, sex and area of activity (entrepreneurs, coaches entrepreneurship, public actors in innovation, researchers in entrepreneurship or in innovation.

Our groups are made up of:

- 8 women: including 6 entrepreneurs, 1 public actors, and one researcher;
- 8 people: 4 entrepreneurs, 2 researchers, 2 public actors;
- The age of participants varies from 24 years to 45 years;
- All enterprises employ no more than 10 employees.

These interviews lasted an average of one hour and a half, aimed to understand the perception of innovation among new entrepreneurs interviewed and identify barriers to innovation and people who influence the entrepreneur innovation decision.

3.2 QUANTITATIVE METHOD: THE QUESTIONNAIRE

In the light of the qualitative study, we generated a set of items, which have helped us refine the questions of the quantitative study. The latter aimed to evaluate the importance of each of the identified variables consisted of three main parts: the entrepreneur and innovation, barriers to innovation, the decision of innovation.

Thus, the informant tells us about his judgment on the weight of each item based on his experience. Responses are spread over a Likert scale of 5 points.

- 1 = unimportant obstacle
- 2 = slightly significant obstacle
- 3 = moderately significant obstacle
- 4 = major obstacle
- 5 = very important obstacle

This construction technique of attitude scales is more manageable than other techniques developed for reasons of consistency and duration of the questionnaire. Each statement provides information on the subject's attitude. It is the accumulation of information that characterizes the subject's position on the scale.

3.3 DATA ANALYSIS

In our study, the most appropriate technique seems to be:

- Firstly the classical statistical analysis (classification, average, standard deviation and correlation coefficient);
- In the second step we used ANOVA method to examine the effect of the phase in the creative process and the type of creation;
- In the third step, the test of comparison of means to understand the influence of the variables on the decision of the innovation.

3.4 THE SAMPLE

During this study, we have investigated 274 entrepreneurs on the barriers that prevent them to innovate. The target population includes informants from different backgrounds and different sectors.

To be more subjective approach in our process of research, we separated the results of the classification of the degree of severity of barriers by three categories of entrepreneurs carrying a business project at the start-up stage.

- The auto-entrepreneurs are dependent creators. They named their businesses autonomously. Some were trained in entrepreneurship, or participated in competitions for starting a business, but have never received counseling or support entrepreneurial approach. We will call them "auto-entrepreneur".
- Accompanied entrepreneur. They set up projects receiving support in the creative process from the part of institutions supporting entrepreneurship institutions (incubator, association, foundation, private or public company).
- The third category, are entrepreneurs with business creation project in the pre-startup stage. These entrepreneurs are programs entrepreneurship graduates, and they are present in almost all the events that deal with the subject of entrepreneurship.

4 RESULTS OF THE STUDY

4.1 PERCEPTIONS OF BARRIERS TO INNOVATION: A DESCRIPTIVE ANALYSIS

The descriptive statistics presented in Table 1 show that the most important barriers are related to financial factors: the cost of financing and the degree of risk for these vulnerable business. Another obstacle mentioned the difficulty of finding a partner to engage in the innovation process.

This is due to the access to adequate information difficulty (on technological opportunities in the market), and the absence or inadequacy of support services and government policy.

In addition to these obstacles there is the weight of the regulatory rigidity and lack of training. Finally, comes the obstacle due to the change resistance and the issue of an innovation culture that are in fact the consequences of all previous barriers.

Table 1 shows the results by type of entrepreneur

| | auto-entrepreneurs | Accompanied entrepreneur | pre-startup stage |
|-------------------------------------|--------------------|--------------------------|-------------------|
| The concept of risk | 25 | 22 | 48 |
| Innovation cost | 33 | 29 | 32 |
| Difficulty to access to information | 29 | 31 | 31 |
| Difficulty of finding a partner | 31 | 29 | 24 |
| Government policy | 34 | 28 | 22 |
| Lack or inadequacy of supervision | 27 | 27 | 28 |
| Rigidity of the regulation | 26 | 20 | 28 |
| Training inadequacy | 23 | 26 | 24 |
| Networking knowledge | 22 | 26 | 24 |
| Innovation culture | 27 | 23 | 18 |
| Change resistance | 22 | 17 | 24 |

Tests of the effect of the phase dependence of the creation on innovation barriers have been verified by an analysis of variance.

H1: The obstacles vary depending on the nature of creation

The results show that the phase of creating impact:

- the concept of risk $F = 6,281$; $p = 0.000$
- lack or inadequacy of supervision $F = 14,689$; $p = 0.002$
- difficulty to access to information $F = 9,536$; $p = 0.000$
- rigidity of the regulation $F = 13,536$; $p = 0.000$
- difficulties to realize partnerships $F = 11.621$; $p = 0.000$

In fact, the entrepreneur in starting activity perceives more risk, feel a lack of supervision is more important and more constraint to access to information.

While entrepreneurs have a stronger start perception constraints related to rigidity of the regulations and the difficulties to realize partnerships either with other companies, or public agencies.

H2: The obstacles vary depending on the type of design

Similarly, the ANOVA results show that the type of establishment of the company has an effect on other categories of barriers to innovation:

- change resistance ($F = 9.297$, $p = 0.000$),
- rigidity of the regulation ($F = 12,705$, $p = 0.000$).
- difficulties to realize partnerships ($F = 10,849$, $p = 0.000$)
- difficulty to access to information ($F = 12,489$, $p = 0.000$)

Indeed, entrepreneurs supported by supporting entrepreneurship institutions (incubator, association, foundation, private or public company) perceive more barriers to innovation related to resistance to change resistance and rigidity of the regulation.

For their part, dependent companies perceive more constraints in finding a partner, and lack of information access.

4.2 THE DECISION OF THE INNOVATION

To approach this aspect, we have chosen to identify prescribers in innovation decision, otherwise, know where the contractor turn for advice on strategic choices, we have proposed a list of potential advisors, we asked them to rate the importance of their opinions in an innovation decision. (Table 2)

Table 2 shows frequently advisor in innovation decision

| | |
|---|--------|
| customers | 89,60 |
| Fairs, exhibitions, industrial exhibitions, conferences | 82,70 |
| Internet and databases | 78,50 |
| Experienced employees in your company | 73,10 |
| suppliers | 66,40 |
| Other professionals with whom you are in contact | 63,60 |
| Specialized publications | 56,40 |
| Advisors and consultants | 49,90 |
| patent documentation | 51,40 |
| Members of your family (spouse, parents, relatives) | 47,30 |
| Accountants | 46,40 |
| Bankers or lenders | 43,30 |
| Family and friends | 43,30 |
| competitors | 36,80 |
| Programs governments | 25,20% |
| universities and research laboratories | 18,20 |

Not surprisingly, customers are favored, which confirms other research. The direction committee also appears very mentioned (when it exists). It is more surprising to financial and universities find in the wrong place.

Government programs information are the sources of information which are less consulted due to the absence or delay in the spread of information according to entrepreneurs.

A study of the difference among samples allows us to go a little further. (table3) The effect of the phase and the dependence on creation on obstacles to innovation has been verified by a comparison medium test (CMT). We see that even though they are not mentioned as frequently as customers, companies in pre-startup stage and auto- entrepreneurs consult largely their family, expert accountant and their banker more than accompanied entrepreneurs.

The results, classified according to the frequency of positive responses are found in table 3:

Table 3: frequently advisor in innovation decision b y type of entrepreneur

| | auto-entrepreneurs | Accompanied entrepreneur | pre-startup stage |
|---|--------------------|--------------------------|-------------------|
| customers | 38,27 | 31,29 | 30,44 |
| Fairs, exhibitions, industrial exhibitions, conferences | 34,52 | 34,68 | 30,80 |
| Internet and databases | 34,65 | 32,30 | 33,05 |
| Experienced employees in your company | 34,51 | 34,31 | 31,18 |
| suppliers | 37,47 | 33,89 | 26,64 |
| Other professionals with whom you are in contact | 34,73 | 34,14 | 31,13 |
| Specialized publications | 33,49 | 31,75 | 34,76 |
| Advisors and consultants | 32,33 | 34,89 | 32,78 |
| patent documentation | 34,35 | 32,78 | 32,87 |
| Members of your family (spouse, parents, relatives) | 36,13 | 24,25 | 39,62 |
| Accountants | 37,89 | 25,47 | 36,64 |
| Bankers or lenders | 37,68 | 23,52 | 38,80 |
| Family and friends | 34,63 | 30,45 | 36,18 |
| competitors | 32,74 | 30,70 | 36,56 |
| Programs governments | 33,66 | 32,08 | 34,26 |
| universities and research laboratories | 30,97 | 33,52 | 35,51 |

5 CONCLUSION

In developing countries, a particular attention begins to give innovation and the promotion of innovation and its role in economic growth.

The propagation behavior of innovation among SMEs largely depends on the establishing of a culture of innovation in the world of entrepreneurs. The innovation behavior of firms is affected by the appreciation of their founder's obstacles and difficulties encountered in the innovation process. This perception of obstacles has been studied extensively in the literature, and it is clearly linked to the experience and learning of the company (Ben moussa et Zaem , 2013).

In our research, we have tried to check up whether the perception of the factors preventing innovation could be affected by the position in the creative process and the nature of creation or selected by the contractor.

Thus, we have concluded that the barriers may be less pronounced for entrepreneurs supported and most important for entrepreneurs seed which are subject to high pressure created leading to a higher perception of barriers. Economic risk is one of the main barriers. More than half of companies (55.86%) reported problems of economic risk and financial constraints with a large proportion corresponding to independent contractors and seed. This can be affected by the lack of source information, but also a collection of technical and technological innovation. Institutes or agencies of government support should develop new mechanisms to encourage alternative sources of innovation activities (Freel, 2000).

The effect of type of design influences the perception of obstacles to innovation. Indeed seed firms suffer from a lack of access to information and need more guidance while startups perceive more barriers to regulation and partnership.

In decision-making innovation, companies in pre-startup, and self-seeking entrepreneurs solicit much more their family, accountant and banker entrepreneurs together.

To overcome barriers to innovation related to information gaps, our propose improving action in the promotion of innovation and public participation in the share capital through the strengthening of links between structure public and private, and the promotion and encouragement of university-business synergies.

Morocco now goes through a phase transition, it must imperatively eliminate, if not reduce barriers to innovation in assisting these companies to reduce the economic and financial risk and encourage its institutions and public agencies to confirm in the field innovation through the implementation of an effective strategy to promote innovation as well as the ease of access to finance, the enactment of tax incentives, through the development of links between universities and companies and public-private cooperation. Programs have been designed to support the dynamic evolution of innovation, but are still insufficient to ensure advantageous dynamic medium and long term.

Note that in this study the focus was on personal variables related to the entrepreneur. It would be interesting to include, in future research, other variables such as: innovation project started, the innovation strategy, external environment, and especially study the specific barriers to each type of entrepreneurs.

REFERENCES

- [1] A. Hadjimanolis, "Barriers to innovation for SMEs in a small less developed country (Cyprus)", *Technovation*, 19, pp. 561–570, 1999.
- [2] Sophie Reboud et Tim Mazzarol « *Management de l'innovation dans les PME, une comparaison Franco-Australienne* », consulted in <http://cemi.com.au/sites/all/publications/Reboud-Mazzarol-communication%20revue%20AE09.pdf>
- [3] Baldwin, J. & Lin, Z., 'Impediments to Advanced Technology Adoption for Canadian Manufacturers', *Research Policy* 31(1), 1–18. 2002.
- [4] Nejib Ben Moussa & Imed ZAIEM: Les facteurs explicatifs des obstacles à l'innovation: investigation empirique dans les entreprises tunisiennes, , International Conference on Business, Economics, Marketing & Management Research (BEMM'13), Volume Book: Economics & Strategic Management of Business Process (ESMB) Copyright _ IPCO 2013 vol.2, pp191-195, 2014
- [5] Chaminade, C. & Edquist, C., From Theory to Practice : The Use of the Systems of Innovation Approach in Innovation Policy, in 'Innovation, science, and institutional change', Oxford University Press, USA, p. 141, 2006.
- [6] Chaminade et al.: Chaminade, C., Intarakumnerd, P. & Sapprasert, K. (2008), 'Measuring systemic failures in innovation systems in developing countries using innovation survey data : The case of Thailand', TIK seminars on innovation, University of Oslo. 2008
- [7] Chaminade, C. & Edquist, C., From Theory to Practice : The Use of the Systems of Innovation Approach in Innovation Policy, in 'Innovation, science, and institutional change', Oxford University Press, USA, p. 141. 2006.
- [8] Cohen, 1995 : COHEN, WM. , « Empirical Studies of Innovative Activities », in P. STONEMAN (éd.), *Handbook of the Economies of Innovation and Technological Change*, Blackwell Publishers Ltd., Oxford. 1995
- [9] D'Este Pablo, Simona Iammarino, Maria Savona, Nick von Tunzelmann, "What hampers innovation? Revealed barriers versus deterring barriers". *Research Policy*, 41, pp 482– 488. 2012
- [10] D'Este, P., Iammarino, S., Savona, M. & von Tunzelmann, 'Revealed versus deterring barriers to innovation : evidence from the CIS4', DRUID Summer Conference . 2007
- [11] D'Este, P., Iammarino, S., Savona, M. & Von Tunzelmann , 'What hampers innovation ? Evidence from the UK CIS4', SWEPS Electronic Working Paper Series, SPRU 168. 2008
- [12] D'Este, P., Iammarino, S., Savona, M. & von Tunzelmann,, 'Revealed versus Deterring Barriers to Innovation', DIUS Research Report 09-09; 2009.
- [13] Dosi, R. Nelson et G. W. Sidney, "Introduction: The Nature and Dynamics of Organisational Capabilities," *In: The Nature and Dynamics of Organisational Capabilities*, Oxford University Press: Oxford, pp. 1-22, 2000.
- [14] E. S. Lim et N. Shyamala, "Obstacles to Innovation: Evidence from Malaysian Manufacturing", *MPRA*, Paper No. 18077, 2007. [Online] Available: <http://mpra.ub.unimuenchen.de/18077/MPRA .2007>
- [15] E. Von Hippel, *The sources of innovation*, New-York, Oxford University Press, 218 p, 1988.
- [16] Edquist, C. *Systems of Innovation-Technologies, Institutions and Organizations*, London : Pinter Publishers. 1997.
- [17] Foxon, T. & Pearson, 'Overcoming barriers to innovation and diffusion of cleaner technologies : some features of a sustainable innovation policy regime', *Journal of Cleaner Production* 16, 148–161. 2008.
- [18] Freel M.S. « Patterns of Innovation and Skills in Small Firms », *Technovation*, n° 25, pp. 123-134. 2005
- [19] Furman, J. L., Porter, M. E. & Stern, S., 'The determinants of national innovative capacity', *Research Policy* 31, 899–933, 2002.
- [20] Hewitt-Dundas, N., 'Resource and Capability Constraints to Innovation in Small and Large Plants', *Small Business Economics* 26, 257–277. 2006

- [21] Hewitt-Dundas, N., 'Resource and Capability Constraints to Innovation in Small and Large Plants', *Small Business Economics* 26, 257–277, 2006.
- [22] J. A. Schumpeter, "Economic Theory and Entrepreneurial History, in R. V. Clemence (eds)", *Essays on Economic Topics of Joseph Schumpeter*, Port Washington, NY: Kennikat Press, 1950.
- [23] Jurado Vega Jaider, Gutierrez-Gracia Antonio, Fernandez-de-Lucio Ignacio, Manjarres-Henriquez Liney, "The effect of external and internal factors on firms' product innovation". *Res Policy*, 37(4), pp 616–32, 2008.
- [24] KLEINKNECHT, A. (éd.), *Déterminants of Innovation : The Message from New Indicators*, MacMillan Press, Londres. 1996.
- [25] OECD, *Oslo Manual, Guidelines for Collecting and Interpreting Innovation Data*, Paris, 2005.
- [26] Laforet S. . « Size, Strategic, and Market Orientation Affects on Innovation », *Journal of Business Research*, Vol. 61, n° 3, pp. 753-764. 2008.
- [27] Laforet Sylvie « Size, strategic, and market orientation effects on innovation", *Journal of Business Research*, 61 (7), pp 753–764, 2008.
- [28] Laforet Sylvie, "Organizational innovation outcomes in SMEs: Effects of age, size and sector", *Journal of World business*, 48, , pp 490-502, 2013.
- [29] Lundvall 1992, Lundvall, B. A., *National Systems of Innovation. Towards a Theory of Innovation and Interactive Learning*, London, Pinter Publishers; 1992.
- [30] March-Chordà, I., Gunasekaran, A. & Lloria-Aramburo, B. , 'Product development process in Spanish SMEs : an empirical research', *Technovation* 22(5), 301–312, 2002.
- [31] Mohnen & Röller 2005, Mohnen, P. & Röller, L. H., 'Complementarities in innovation policy', *European Economic Review* 49, 1431–1450, 2005.
- [32] Mohnen P., Palm F.C., Schim van der Loeff S. et Tiwari A. « Financial Constraints and Other Obstacles: Are they a Threat to Innovation Activity? », UNU-MERIT, *Working Paper Series*, n° 2008-006, (2008).
- [33] N. Dalkey and O. Helmer, "An experimental application of the Delphi method to the use of expert", *Management Science*, 9(3), pp. 458-467, 1963.
- [34] Nelson R. « National Innovation Systems », dans : Acs, Z. (Ed.), *Regional Innovation, Knowledge and Global Change*, Pinter, London, pp. 11-26, 2000.
- [35] P. Larson and A. Lewis, "How Award-Winning SMEs Manage the Barriers to Innovation, Creativity and Innovation", *Management*, 16(2), 142-151, 2007.
- [36] Pamukçu T. et Cincera M. « Analyse des Déterminants de l'Innovation Technologique dans un Nouveau Pays Industrialisé: une Étude Économétrique sur Données d'Entreprises », *Économie et Prévision*, 2001/4-5, n° 150, pp. 139-158, 2001
- [37] Rahmouni, « Perception of obstacles to innovation, activities in Tunisian firms", Munich Personal RePEc Archive, 2011, consulted in <http://mpa.ub.uni-muenchen.de/18306/>
- [38] S. Maurer, "Other Business: Choosing the Right Investment Strategy for Tropical Disease Research," Bill Gates, *Who Bulletin (forthcoming)*, 2006.
- [39] Savignac, F. 'Impact of financial constraints on innovation : What can be learned from a direct measure ?', *Economics of Innovation and New Technology* 17(6), 553–569, 2008.
- [40] Silva, M. J., Leitao, J. & Raposo, M., 'Barriers to Innovation Faced by Manufacturing Firms in Portugal : How to Overcome it for Fostering Business Excellence', *International Journal of Business Excellence* 1, 92–105, 2008.
- [41] Wan D., Ong C.H. et Lee F. « Determinants of Firm Innovation in Singapore », *Technovation*, n° 25, pp. 261-268, 2005.