

## **Patent as a motivation of starting a new entrepreneurial activity of high potential**

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### **Abstract**

*This paper entitled “Patent as a motivation of starting a new entrepreneurial activity of high potential” based on a research that was held by the Greek Industrial Property Organization (O.B.I.), investigates the fate of Patents that the organization granted to residents of the country during the period 1995-2005. Attempts to reveal the ways of exploitation of the patents by the inventors and tries to answer the question whether the patent can be a strong motive for the patentee to start a new venture. The main results summarized as follows: 1) a significant number of patentees started a new business with most of them being optimistic of new job creation, 2) a smaller number of patentees transferred or sold their patent rights to third persons directly contributing to the technological upgrade of established enterprises or, indirectly, to the advancement of entrepreneurship in Greece, 3) the biggest proportion of the patent holders remained inactive, without any exploitation of their patent, alleging several reasons for that.*

**Keywords:** Entrepreneurship, Patent Rights, and Innovation

**JEL classification:** L26, O31, O34

### **1. Introduction**

Today, perhaps more than in any other period of development of the economic system and the formation of international economic co-operation, the role of entrepreneurship and innovation in the formation of economic conditions is supported, discussed and judged, as well as their consequences in the field of employment and income distribution internationally.

Economic policy designers acknowledge the significant role played by entrepreneurship in economic growth (Baumol, 1990; 2002; Audrech and Thurik, 2001). The European Union (E.U., 2003) as the best mechanism of enhancing competitiveness has evaluated the innovative enterprises. In the Green Book about competitiveness, the E.U. has set a goal and been committed to shaping a fertile environment of entrepreneurship aiming at the increase in the number of new, successful and innovative enterprises (E.U., 2003). However, how the above-mentioned goal is feasible for each member-state and what sort of ventures could be implemented through?

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The present study focuses on demonstrating the way in which the patentee manages to utilize his patent, as well as the possible outlets in the exploitation of intellectual property in a small economy, Greece. Our study is based on facts arising from a survey carried out by the Industrial Property Organization (O.B.I.). For the needs of the present study, we use a small fraction of the results of the above-mentioned survey. We use statistical methodology in order to evaluate the factors that prompted the patentees to establish a new venture (“exploitation of patent”, “market study” and “subsidy exploitation”) and the impact of those factors on the expectation of the new entrepreneur to establish high potential enterprise<sup>1</sup>.

This paper is organized as follows. The first part offers a literature review. The second part discusses methodology and facts. The third part presents and discusses the results of the statistical analysis. The fourth part offers some concluding remarks and some policy implications regarding the formation of political support to the entrepreneurship of the patentees.

## **2. Literature Review**

Entrepreneur is defined as the individual who can create or distinguish the opportunity whose exploitation he pursues, regardless of the possession of the required means for its implementation (Timmons and Spinelli, 2007).

The factors which seem to influence entrepreneurship are (Autio, 2005; 2007; Schreyer, 2000; Berger and van Winden, 2007) are the following: the satisfaction from the acquisition of the patent certificate, the opposition to the idea of entrepreneurship, the inappropriate business environment, the lack of recognition of entrepreneurial activity, the insufficient institutional framework to protect patent holdings, the inadequate infrastructure of exploitation of patent holdings, the potential funding to establish a new venture, the tax motives for starting and maintaining the new venture, the difficulty in technology transfer, the absence of mechanisms to support the entrepreneurial activity, the lack of opportunities or gaps in the market for starting the entrepreneurial activity and finally, the immaturity of the market regarding the patent exploitation.

Individual entrepreneurship, according to Global Entrepreneurship Monitor (IOBE, 2004), leads either to the direct employment of the entrepreneur, because of his need for work (self-employment), or to the exploitation of the opportunity for higher income and to the quest for outlets of his own creativity. Individual entrepreneurship may also lead to an increase in total employment through the creation of additional jobs and incomes. This last possibility can lead to high potential entrepreneurship, which seems to be the utmost objective of every society (Autio, 2005) so that it could satisfy its members' need for employment.

The attitude of the individual towards entrepreneurship, the desire for ownership of an enterprise, and the role of social and cultural environment, affect significantly the decision to start an entrepreneurial activity (Pfeffer and Salancik, 1978). In other words,

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1. High Potential Entrepreneurship or expectations, as it was initially defined by GEM (Reynolds et al., 2003) refers to that by which the entrepreneur expects to create over 19 jobs in the next five years or will expand his market share and will command a percentage of production abroad. Later, (Autio, 2005) the second part was withdrawn from the definition, perhaps because the need for increase in employment overshadows every other need.

entrepreneurship is incorporated within a social framework and it is formed and facilitated by the position of the aspiring entrepreneur within a network of relations and contacts (Freeman, 1996). The level of entrepreneurship varies depending on the region and the time it is expressed (Grilo and Thurik, 2004).

The support infrastructure and facilitation of entrepreneurial activity is essential for investment decision, whether domestic or overseas and hence influences the decision on undertaking entrepreneurial initiatives (Gartner, 1985; Verheul, et al., 2006). The supporting mechanisms of entrepreneurial activity are (Van den Berg et al., 2004) the provision of diagnostic services of the entrepreneurial idea and the cost and procedures of establishing a venture. The marketing support that the new established venture is not able to cover by its own resources (Hunger, et al., 2002). The advancement of co-operation between new and established enterprises and the quest for investment capital has an impact on the development of entrepreneurship (OECD, 2006).

The more opportunities or gaps in the market, the greater the expected entrepreneurial activity (Shane and Venkataraman, 2000) on condition, of course, that their exploitation is considered feasible. Equally important is the perception of the market opportunities in combination with incentives and exploitability (Bygrave, et al., 2002). The economic climate prevailing in the market defines the opportunities for entrepreneurial initiatives and the risks or the profits resulting from their undertaking (Verheul, et al., 2006). A barrier to entrepreneurship is the small spending power of consumers (Wong, et al., 2005; Van den Berg, et al., 2004) and the lack of well-trained executives in the market.

The existence of technological opportunity - that is to say, the possibility to supply products or services, or even processes, at prices higher than those of their cost of production - has an impact on entrepreneurship (Schumpeter, 1934; Shane and Venkataraman, 2000). How entrepreneurs and patentees discover and exploit these opportunities does not seem to be a subject of exhaustive research in literature (Shane and Venkataraman, 2000).

The individual inventor has defined as one of the greatest sources of radical innovations (Schumpeter, 1934; Dahlin, et al., 2004) and has considered contributing a lot to regional economic development (Astebro, 2003). The acquisition of a patent certificate seems to have an impact on the undertaking of entrepreneurial initiative by the inventor (Levin, et al., 1987). The entrepreneurs are based on the technical knowledge, with which they probably acquired their patent, begin their activity because they believe in the merit of their idea (opportunity driven entrepreneurship, Bhave, 1994) and are capable of transforming it into a commercially exploitable opportunity.

### **3. Methodology and Facts**

The present study is based on the data from a survey contacted by Organization of Industrial Property (OBI) the Greek patent office. The survey held through questionnaires sent by O.B.I. to 3,312 patentees -that have gotten their patent between 1995 and 2005- throughout the country, between 20 and 30 of March 2007. Of these, 2,890 were individuals who responded at a percentage of 15% (434) and 422 were enterprises and institutions who responded at a percentage of 13.27% (56).

The regional distribution of the patentees in the individual patentees' population and the corresponding participation in the survey are similar as Table 1 shows.

**Table 1: Patentee’s Region Classification**

Region	Country Individual Inventors		Participants	
	Number	%	Number	%
Municipality of Attiki	1658	57.37%	193	47.89%
Municipality of Thessaloniki	373	12.91%	55	13,65%
Rest of Country	859	29.72%	155	38.46%
<b>Total</b>	2890	100.00%	<b>403</b>	<b>100.00%</b>

The questions discussed in this paper constitute part of a more extensive questionnaire. The individual patentees firstly asked if they proceeded to the exploitation of their patent. Out of the 434 responded patentees, 148 (34.10%) reply that they established a venture following the acquisition of their patent certificate, 49 (11.29%) assigned or conceded their rights to other entrepreneurs and finally, 237 (54.61%) preferred not to proceed to any sort of exploitation of their patent.

In the light of the previous information, we continue with the analysis of the reasons, which led the 148 patentees to establish a new venture. From their responses, it can be inferred that the patentees rank the “in order to exploit the patent certificate” first (47.30%). What follows, is “for other reasons” (39.19%), “the exploitation of development project” that means holding any subsidy (20.95%) and finally, “market study” (20.27%). The aggregation of the partial numbers of the responses shows that the size is bigger (189) than that of the patentees who established a venture (148), because, obviously, there was a combination in their tactical moves.

Next, the aim is to define whether the entrepreneur is new, that is whether he established the venture in the last three years and moreover, whether the new venture is characterized as of high potential, that is whether he intends to create twenty job positions within the first five years of its operation.

Focusing on the 37 entrepreneurs-patentees of our study who express high expectations of creating new jobs, we realize that as a percentage (75.51%) it is significantly higher compared to corresponding average percentage of European Union (9.1%) and that of GEM (9.2%). It should be noted that the percentage of both the E.U. and GEM concern the entrepreneurship resulted from any cause and not only from the patent itself. In our country, in particular, the percentage of high potential ventures is only 1.4% of the total entrepreneurship.

The percentage of GEM (9.2%) decreases to 0.5% for some members, Italy, Japan, Spain, Belgium, Finland and Greece. The new entrepreneurship, which represents something less than 25% of ventures, claims the creation of new jobs at a percentage of over 90%.

Out of the 434 patentees, 237 (54.61%) did not proceed to the exploitation of their patent. The reasons for this decision appear in Table 2, in a declining rank. There probably was a combination of ‘counter-motives’ which deterred them from undertaking the initiative, either of entrepreneurial nature or of an alternative way of exploitation of their asset.

**Table 2: Factors influencing entrepreneurship**

<b><i>a/a</i></b>	<b>Factors</b>	<b>Answers</b>	<b>Percentage</b>
1	Lack of Infrastructures	219	92.41%
2	Lack of Supporting Mechanisms	177	74.68%
3	Weakness of Financing	165	69.62%
4	Not Recognized Entrepreneurship	122	51.48%
5	Immature for the Exploitation Market	119	50.21%
6	Insufficient Patent Protection	111	46.84%
7	Lack of tax motives for the new business activity	93	39.24%
8	Technology Transfer Difficulties	92	38.82%
9	Disadvantageous Entrepreneurial Environment	83	35.02%
10	Opportunity Lack to start a new business	54	22.78%
11	Satisfied from the patent reception	38	16.03%
12	Opposition to idea of entrepreneurship	10	4.22%

Table 2 shows that the main reason for not exploiting the patent is the lack of infrastructure (94.41%) and secondly the lack of supporting mechanisms (74.681%). Literature has emphasized the significance of these factors to the decision for a new entrepreneurial activity and to the assignment or concession also of the utilization rights of the patent too. Financial is third in ranking (69.62%). The possibility of financing a new entrepreneurial activity is almost non-existent in Greece unless the individual patentee offers some collateral otherwise only the already established businesses are favoured by the Greek banking system. The creation of a technology market by bringing together patentees, ventures and investors or financiers may contribute to the financing of the entrepreneurial activity.

The society does not recognize entrepreneurship (51.48%). This cultural problem requires a constant effort on behalf of the state and the entrepreneurial unions to change the society's attitude towards entrepreneurship. Greek society anticipates a fairer distribution of income, which results from the entrepreneurial activity of others, regardless of its participation or not in the creation of the product to be, distributed (IOBE, 2006).

The 50.21% of the respondents consider that the market is immature for the exploitation of a patent. However, nobody is banned from seeking a better treatment of their patent in other markets so that he can achieve the most appropriate attention and exploitation. In addition, many people consider the patent protection insufficient (46.84%). At this point, government should pursue policies to enforce the appropriate inventions.

Some of the respondents (39.24%) attribute their inactivity to the absence of tax incentives for start-up business activity. In addition, patentees, like the established entrepreneurs, confront an almost erratic tax environment, which does not permit long run planning.

Technology transfer difficulties (38.82%), disadvantageous entrepreneurial environment (35.02%) and opportunity lack (22.78%) follow in the list of reasons that prevented the patentee from exploiting its patent.

The 16.03% of the respondents replied that personal fulfillment from the patent certificate granted is sufficient and they do not intent on further exploitation of their idea. In case the patentee contents himself with his personal moral satisfaction, or his social

recognition from the mere acquisition of the patent certificate, it is likely that these feelings can be enhanced when -in terms of suggested technology market- he adopts the practice of Creative Commons<sup>2</sup> (Papadopoulos, 2007) which constitutes a step to further diffusion of technology and knowledge (Von Hippel, 2005).

Finally, some of the entrepreneurs are opposed to the idea of entrepreneurship (4.22%) which, as regards Greece, is attributed to the fact that individuals are more reluctant to start a new venture after an old failure because of the society’s condemnation of failures that follows (IOBE, 2006), as well as to the Uncertainty Avoidance<sup>3</sup> (UA) –(Hofstede, 1980).

#### 4. Evaluations

In the statistical analysis we focus only to those respondents who started a new venture, we examine whether the three variables “patent exploitation”, “market study” and “subsidy exploitation” are independent to the variable “new entrepreneur” by using the methodology of contingency tables as shown in Tables 3, 4 and 5.

**Table 3: Patent exploitation and new entrepreneurship**

Entrepreneurs	Patent Exploitation		
	No	Yes	Total
New	17	31	48*
	35.42	64.58	100
Old	61	38	99
	61.62	38.38	100
Total	78	69	147
	53.06	46.94	100
Phi Coefficient		0.246184	
Cramer’s V		0.246184	
Contingency Coefficient		0.239046	
Pearson X <sup>2</sup> (1)		8.909143 (p=0.0028)	
Likelihood Ratio G <sup>2</sup> (1)		8.984498 (p=0.0027)	

\*one did not dictate any variable

As it is showed in Table 3, there is a correlation between the variable “new entrepreneur” and “patent exploitation” for the establishment of a venture through which he pursued its implementation. This finding is similar to those found in literature, which states that the acquisition of a Patent Certificate seems to have an impact on the undertaking of business initiative, by the patentee (Levin, et al., 1987; Bhave, 1994).

2. Creative Commons is a process and practice according to which, without selling out the rights of the patentee, provide their potential use to anybody who is interested and without any extra charge.

3. According to Hofstede who introduced this term in 1980, the tolerance or not to uncertainty or doubt shows the attitude of the individual towards its future.

Table 4 shows that that there is a correlation between the variable “new entrepreneur” and “market study”. In other words, it appears to function rationally, it does not develop selfishly or somehow arrogantly because of the consolidation of his patent, but it investigates the conditions prevailing in the market and seeks the chance or the proper environment of implementing his patent.

**Table 4: Market study and new entrepreneurship**

Entrepreneurs	Market Study		
	No	Yes	Total
New	34	14	48
	70.83	29.17	100
Old	82	17	99
	82.83	17.17	100
Total	116	31	147
	78.91	21.09	100
Phi Coefficient		0.137888	
Cramer's V		0.137888	
Contingency Coefficient		0.136596	
Pearson X <sup>2</sup> (1)		2.79493 (p= 0.0946)	
Likelihood Ratio G <sup>2</sup> (1)		2.695353 (p= 0.1006)	

From Table 5 we infer that there is a correlation between the variable “new entrepreneur” and “subsidy exploitation”. This finding supports previous literature that considers the support of the new venture significant, whether it concerns financing or subsidizing (Van den Berg, et al., 2004; Verheul, et al., 2006; Bates, 1995; Van Auker, 1999; De, 2006).

**Table 5: Subsidy exploitation and new entrepreneurship**

Entrepreneurs	Subsidy Exploitation		
	No	Yes	Total
New	30	18	48
	62.5	37.5	100
Old	89	10	99
	89.9	10.1	100
Total	119	28	147
	80.95	19.05	100
Phi Coefficient		0.327205	
Cramer's V		0.327205	
Contingency Coefficient		0.310981	
Pearson X <sup>2</sup> (1)		15.7383 (p= 0.0001)	
Likelihood Ratio G <sup>2</sup> (1)		14.83751 (p= 0.0001)	

Next, we test for independence between the three variables “patent exploitation”, “market study” and “subsidy exploitation” and the variable “high potential firm”.

**Table 6: High potential firm and patent exploitation**

Entrepreneurs	Patent Exploitation		
	No	Yes	Total
High Potential	11	26	37
	29.73	70.27	100.00
Not High Potential	68	43	111
	61.26	38.74	100.00
Total	79	69	148
	53.38	46.62	100.00
Phi Coefficient	0.273697		
Cramer’s V	0.273697		
Contingency Coefficient	0.263987		
Pearson X <sup>2</sup> (1)	11.08665 (p= 0.0009)		
Likelihood Ratio G <sup>2</sup> (1)	11.26272 (p= 0.0008)		

As shown in Table 6, there is a correlation between the variable “patent exploitation” and the variable “high potential”. In other words, the ability to utilize the patent creates an expectation in the new entrepreneur towards the establishment of a high potential venture.

**Table 7: High potential firm and market study**

Entrepreneurs	Market Study		
	No	Yes	Total
High Potential	24	13	37
	64.86	35.14	100.00
Not High Potential	93	18	111
	83.78	16.22	100.00
Total	117	31	148
	79.05	20.95	100.00
Phi Coefficient	0.201319		
Cramer’s V	0.201319		
Contingency Coefficient	0.197359		
Pearson X <sup>2</sup> (1)	5.998346 (p=0.0143)		
Likelihood Ratio G <sup>2</sup> (1)	5.547452 (p=0.0185)		

Table 7 shows that the variable “high potential” correlates with variable “market study” and Table 8 shows that the variable “subsidy exploitation” correlates to variable

“high potential”. Hence, the existence of subsidies enhances the expectation of the new entrepreneur towards the creation of a high potential venture.

**Table 8: High potential firm and subsidy exploitation**

Entrepreneurs	Subsidy Exploitation		
	No	Yes	Total
High Potential	20	17	37
	54.05	45.95	100.00
Not High Potential	99	12	111
	89.19	10.81	100.00
Total	119	29	148
	80.41	19.59	100.00
Phi Coefficient	0.383294		
Cramer's V	0.383294		
Contingency Coefficient	0.357904		
Pearson X <sup>2</sup> (1)	21.74326 (p=0)		
Likelihood Ratio G <sup>2</sup> (1)	19.34669 (p=0)		

The findings of this paper lead to the view that a focused public policy to support the above mentioned parameters, which appear to affect positively the perspective of creating new jobs by the patentees who establish new ventures and especially high potential ventures. For instance, “market study”, (the investigation of the prevailing market conditions, the existence of any chance or proper environment) which is correlated with the establishment of high potential businesses, could be carried out by small and medium enterprises supporting institutions. These institutions could foresee future opportunities and direct new entrepreneurs to sectors of more efficient exploitation of their patent. In addition, patentees should be encouraged and supported in their effort to establish a new venture, through development projects, which is correlated with high potential employment instead of subsidizing unemployment. This policy, like the aforementioned examples, could encourage a lasting effort for innovation and an intentionally transformation of innovation to a new business venture.

## 5. Conclusion and Suggestions

This paper uses statistical techniques in a sample of individual patentees participated in a survey contacted by Organization of Industrial Property in Greece. The 148 out of the 434 patentees, respondent to the survey undertook a new business initiative. The 49 are new entrepreneurs and 37 of them expect to create several jobs, that is they are characterized as dynamic entrepreneurs.

From the empirical findings it appears that 34.10% of patentees proceeded to the establishment of a new venture with the aim of exploiting the patent certificate, another 11.29 % assigned their rights to other people and 54.61% of them preferred not to proceed to any sort of exploitation.

The government should apply a more focused policy in order to promote entrepreneurship in the patentees' population. The encouragement for patent exploitation, owned or bought; the secure conditions and means of exploitation; the proper orientation of technology or products and services, dictated by increasingly up-to-date studies and market analyses, and the robust and realistic funding by means of appropriate projects should comprise the basic elements of that policy. The basic aim is the employment's increase through entrepreneurship's growth. Achieving this means that the policy tools should include among others the following: a) Higher subsidies and funding with more favorable terms than those received by general entrepreneurship. b) Patent's exemption from any extra charge to keep it valid. c) Conducting best patent competitions. d) Subside the cost of buying the rights or the development of the patent. e) Establishment of a technology market analogous to the secondary bond markets, which facilitate the corresponding transactions between inventors, entrepreneurs and investors.

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