MANIPULATED ENTREPRENEURSHIP IN THE RENEWABLE’S ENERGY INDUSTRY: A NEW MODEL

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ABSTRACT

Entrepreneurship is the process of discovering new opportunities for entrepreneurial action that increase value and profit for the company and the entrepreneur. These opportunities are created by market needs, and entrepreneurs strive to meet these specific needs.

This paper examines the Renewable Energy Sources (RES) business sector in Greece. In this research, we investigate the operation of the energy market and the structural framework that laws, policies and administrative decisions create. With respect to research methodology, we introduce a new theoretical model that describes the entrepreneurial process in the RES field. We define this new model as “Manipulated Entrepreneurship” and attempt to prove its significance through a quantitative survey of Greek companies in the field of renewable energy. The empirical results of the survey confirm the validity of our theoretical model and highlight the existence of two distinct axes that describe business activities in the RES market.

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INTRODUCTION

This paper investigates the business sector of renewable energy sources in Greece by following the steps outlined immediately below.

i) We conduct an analytical study of market functions (institutional framework, financial mechanism, and market).

ii) We create a theoretical model describing the business process.

iii) We conduct quantitative research to confirm the validity of the theoretical model.

The significance of this paper is that it conducts primary quantitative research for the first time in this specific market in Greece. Thus, with a comprehensive sample of firms operating in the industry, this paper attempts to describe the procedures of entrepreneurial action. The main element of differentiation identified in the entrepreneurship of this specific industry is the origin of the entrepreneurial opportunity. The analysis of the unique birth process of business opportunity attempts to highlight how a new theoretical framework of entrepreneurship study may be developed.

Many studies in the literature have been undertaken concerning the terms of entrepreneurship and entrepreneurial opportunity. Characteristically, Venkataraman (1997) and Petrakis (2008) define the meaning of entrepreneurship as the process of investigation, evaluation and utilisation of entrepreneurial opportunities.

Bruyat and Julien (2000) introduce a distinction based on the term of entrepreneurship. They highlight two types of entrepreneurship, entrepreneurial actions by the executives of established enterprises that are called intrapreneurship and the creation and growth of a new enterprise (a start-up enterprise) by individuals who are called entrepreneurs.

Several studies have attempted to investigate the basic traits of the entrepreneur and to sketch the entrepreneurial personality. The theories of the personal characteristics of entrepreneurs that were developed in the middle of the past century [Catell (1956), MacClelland (1961)] highlighted five characteristic traits that are often part of the entrepreneurial personality, including the need to achieve high objectives, the ability to self-monitor, creativity, a sense of independence, and a tendency to undertake dangerous activity.

Schumpeter (1942) and Brazel and Herbert (1999) noted that creativity is the ability to produce something new. Similarly, Shaver and Scott (1991) and Kilhstrom and Laffont (1983) noted the dimension of dangerous undertaking as part of the entrepreneurial spirit. Other researchers have studied the effect of the level of education as a characteristic that propels certain individuals into entrepreneurship [Timmons (1994)]. Most of the literature agrees that higher levels of education lead to a greater probability of becoming an entrepreneur.

Similarly, Evans and Leighton (1989) attempted to investigate the relationship between entrepreneurship and previous experience in the market. Moreover, other interesting research has addressed the economic abilities of future businessmen and has shown that individuals with greater economic abilities are more likely to be activated in individual entrepreneurial actions because it is easier for
them to address problems of liquidity constraints. Therefore, the main conclusion is the fact that financial healthier individuals find it easier to become entrepreneurs [Holtz and Eakin (1994), Blanchflower and Oswald (1998) and Hurst and Lusardi (2004)].

Moreover, entrepreneurial opportunity also represents the entrepreneur’s ability to satisfy a new need in the market. Therefore, a creative combination of the resources that remain unexploited is required to produce a better product that will cover this new need [Ardichvili, Cardoso and Ray (2003)].

Petrikis (2008) discusses terms of uncertainty and entrepreneurial danger and defines this as the “Dilemma of the Entrepreneurial Opportunity”. Thus, he supports the idea that “the answer in the dilemma is related to the degree of the danger that the entrepreneur is willing to undertake”. Similar studies have been undertaken by Birley and Macmillan (1995) and Reynolds and White (1997).

We can define entrepreneurial opportunity as the combination of the comprehension of consumer need and the simultaneous recognition of unexploited resources. This combination leads to the activation of the future businessman who detects and develops the entrepreneurial opportunity.

Detecting the entrepreneurial occasion has been the subject of study by many researchers, including Kirzner (1973), Gagllo and Taub (1992) and Kalsh and Glad (1991).

Several researchers have recognised that previous knowledge is essential to detect opportunities. Characteristically, Cressy (1996) defines accumulation of past knowledge, learned dexterities and experience as “human capital”, which is an important factor in the creation of new enterprises. Similarly, Bygrave (1997), Vesper (1996) and Kao (1989) posit “an important element for the success of an entrepreneur constitutes his experience and his past knowledge”.

These basic features of entrepreneurship, entrepreneurs and entrepreneurial opportunity will determine the scope of our study that it is focused on the renewable energy sources market. This paper introduces the “Manipulated Entrepreneurship” model to the literature.

The rest of the paper is structured as follows. The next section describes the global and European RES environments. Section 3 introduces the theoretical model and the basic hypothesis. Section 4 presents the methodological issues and section 5 provides the empirical results. Finally, the paper concludes in section 6, which describes the implications of this study.

Global and European Renewable Environment

2.1 International and European market

It is widely accepted that energy is a key factor in determining the quality of life and of all human activities in modern societies (Martinez and Ebenhack, 2008) (Zhelev, 2005). Currently, on a global basis, we consume approximately 30 billion kgs of oil and approximately 3 trillion m³ of natural gas annually; there are certified reserves of approximately 1350 billion kgs of oil and a certified inventory of 190 trillion m³ of natural gas (Kaldelis et al., 2009a). Consequently, we are consuming the planet’s valuable energy reserves and leaving a rich and inexhaustible potential of renewable energy sources untapped (Lightfoot and Burchell, 2004).

The total worldwide installed electrical generation capacity is approximately 5000 GWe, whereas the consumption of energy approximates 20.000TWhe, on annual basis. Specifically, there has been an over doubling of installed electricity capacity in the last 30 years (2000 GWe 1980). In the U.S.A., the installed capacity exceeds 1000 GWe, whereas the participation of RES does not exceed 120 GWe. In Europe, the installed capacity exceeds 900 GWe, and the participation of RES reaches 250 GWe; in China, installed capacity approaches 900 GWe, and the participation of RES is 220 GWe. At present, 2/3 of the installed electrical power capacity in the world is supported by thermal plants (coal, gas and oil), 19% is from hydro plants, 8% is from nuclear power stations and only 3% is generated by wind-powered plants (Kapsalis and Kaldelis, 2011).

Therefore, the conclusion drawn from the results of all international studies on the RES market is that RES is expected to play an increasingly important role in the energy markets and will be the fastest growing form of energy production in the coming years; it is predicted that the share of RES electricity production will grow to 23% globally by 2035.

With respect to international and European policies on renewables, the United Nations signed an agreement on climate change in December 1997 known as the "Kyoto Protocol". Consistent with the Kyoto Protocol, the European Union published the Directive 2001/77/EC in 2001 on the promotion of electricity production from renewable sources that contained individual targets for each EU Member State. According to the directive, the target for Greece was that 20.1% of its domestic energy consumption in 2010 would be derived from RES.

Furthermore, the new EU directives passed in 2009 (Directive 2009/28/EK, 2009/29/EK Directive), adopted the binding target of 18% of total energy consumption by 2020 to be derived from RES.

More specifically, these directives established the "golden rule" of 20-20-20 for all EU states for 2020, which is specifically described in the following three measurements:

a) A reduction of 20% in emissions of greenhouse gases (GHG) from 1990 levels (Directive 2009/29/EK).

b) Participation of at least 20% renewable energy sources in final energy consumption (Directive 2009/28/EK).

c) Primary energy savings of 20%.

2.2 The Greek market

2.2.1 The Greek power system

The Greek National System for the production of electricity is divided into two broad categories, depending on the type of energy sources used. These categories are production based on conventional fuels (fossil) and production based on renewable energy.

The only domestic source of energy in the category of solid fuel is lignite that is used exclusively for the production of electrical energy. The use of lignite accounted for 50.5% of total electricity needs in 2008. Because annual coal production is approximately 100 million tonnes, lignite will continue to be the country’s chief national fuel until 2050.

Approximately 13% of total electricity production is produced from oil, which is mainly used to produce electricity in the Greek islands that are not connected to the
national electricity system. Finally, electricity production fuelled by natural gas – which is mainly imported from Russia via pipelines and from Algeria in liquid form – accounts for approximately 22.5% of domestic electricity production. The National Electricity Company is the largest consumer of natural gas for electricity production. In addition, many private gas stations have been installed with a total installed capacity of approximately 1.200 MW.

Therefore, it is clear that Greece depends on imports of oil and natural gas to a much greater extent than the average European Union Member State.

2.2.2 Renewable Energy Sources (RES)

National Law N 2773/1999 describes the production of electricity from renewable energy sources, including production from wind and solar power, biomass or biogas, geothermal and small hydroelectric plants.

The production of electricity from renewable energy sources has increased in recent years in Greece by a significant percentage, which has been primarily the result of wind, small hydropower, biomass and photovoltaic projects. Therefore, renewable energy sources were involved in the production of electricity at a rate of 10.5% by 2008 (4.300MW). Table 1 presents the data from the Ministry of Energy until September 2009, which shows an increase in the installed capacity of renewable energy projects over the last decade in Greece.

The rate of installed RES power plants (wind and small hydro) has remained approximately 20% on average. Photovoltaic projects (PV) have acquired a significantly increased installed capacity and the largest growth rate (200% in the last two years).

Table 1: The progress of installed capacity of RES over the past decade.

<table>
<thead>
<tr>
<th>Installed Capacity of Electricity (MW)</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydroelectric</td>
<td>42</td>
<td>45</td>
<td>50</td>
<td>59</td>
<td>64</td>
<td>77</td>
<td>95</td>
<td>15</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>Photovoltaic</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>9</td>
<td>12</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Wind</td>
<td>226</td>
<td>27</td>
<td>26</td>
<td>37</td>
<td>47</td>
<td>49</td>
<td>74</td>
<td>84</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Biomass</td>
<td>1</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>24</td>
<td>24</td>
<td>39</td>
<td>40</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>269</td>
<td>33</td>
<td>35</td>
<td>44</td>
<td>55</td>
<td>58</td>
<td>85</td>
<td>98</td>
<td>12</td>
<td>13</td>
</tr>
</tbody>
</table>

2.2.3 National strategy in the field of renewable energy

The National Action Plan for Renewable Energy prepared to be consistent with European energy policy aimed at the further penetration of renewable energy into the energy mix. Thus, with Law 3851/2010, the Greek government increased the national target for the proportion of RES in final energy consumption to 20%. More specifically, the national target for 2020 is approximately 13,300 MW of electricity from RES compared to the 4.000 MW that are installed today from all the available technologies (7.500 MW from wind power, 3.000 MW of hydropower and 2.500 MW from PV modules). Table 2 presents the desired ratio of installed capacity per RES technology for the period 2014 to 2020, according to the Ministry of Energy.

Table 2: Greek goals for installed capacity (MW) per RES technology

<table>
<thead>
<tr>
<th>Greek targets for the Renewable Energy</th>
<th>2014</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydroelectric projects</td>
<td>3700</td>
<td>4650</td>
</tr>
<tr>
<td>Small (0-15MW)</td>
<td>300</td>
<td>350</td>
</tr>
<tr>
<td>Large (&gt;15MW)</td>
<td>3400</td>
<td>4300</td>
</tr>
</tbody>
</table>

Table 3 shows the progress of RES projects in Greece through June 2010. The table includes requests for authorisation of projects in each technology, the progress of the authorisation process and completed projects already operating.

These data show that Greece has experienced delays in relation to the implementation of projects and a significant deviation from the goals of 2020. It is important to note that the rate for Greece to install renewable energy projects must exceed 50% to achieve its goals on time, whereas the EU average is only 17.5% per year.

Table 3: The progress of RES projects (June 2011)

<table>
<thead>
<tr>
<th>Technology</th>
<th>Projects with application for licence (MW)</th>
<th>Projects with Licence (MW)</th>
<th>Projects in Operation (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>65.395</td>
<td>18.432</td>
<td>1.432</td>
</tr>
<tr>
<td>Biomass</td>
<td>1.517</td>
<td>362</td>
<td>43</td>
</tr>
<tr>
<td>Hydroelectric</td>
<td>340</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Photovoltaic</td>
<td>225</td>
<td>931</td>
<td>205</td>
</tr>
<tr>
<td>Heliothermic</td>
<td>3.871</td>
<td>1.947</td>
<td>341</td>
</tr>
<tr>
<td>Hybrid</td>
<td>1.928</td>
<td>382</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>77.736</td>
<td>22.382</td>
<td>2.021</td>
</tr>
</tbody>
</table>

2.2.4 The Institutional and Licensing Framework for RES projects in Greece

The first law on the inclusion of RES in Greece was enacted in 1985 (Law 1559/1985), which gave the National Electricity Company (PPC) the right to build 24 MW of RES-based productions in small wind farms and photovoltaic projects. Until 1994, the private sector was left out of the field of renewable energy.

Law 2244/1994 was the basis for the effective deployment of renewable energy. This law specified fixed prices for the sale of electricity produced from RES and required the PPC to buy such energy at this price. Many laws followed this in the organisation and regulation of the RES market in Greece.

Unfortunately, this sequence of laws resulted in a lengthy and highly bureaucratic licensing process that involved many intermediaries. The final result of this process has been delay in, and suspension of, the implementation of investments into RES.

2.2.5 The Financial Environment in RES

The financial framework for the implementation of RES projects is built on two main pillars. The first financial tool is to subsidise the cost of the investment, which comes from national and European funds. The second mechanism to support this market is the guaranteed selling price of electricity produced from RES, which is known as a feed-in tariff.

Regarding the first mechanism, the European Community funded projects with a total budget of 1.061 trillion euros by 2002. In addition to this financing, other European programs also support the construction of renewable energy projects, providing subsidies of 20% to 60% of total investment cost.

Conversely, the feed-in tariff (FIT) is a ubiquitous tool of European policy for renewable energy system to subsidise the price of energy produced from RES. The FIT is based on the mandatory purchase of electricity from the energy's producer. Thus, all electricity produced by renewable...
energy is purchased at fixed prices (the feed-in) at a minimum price per amount of energy produced (€ / MWh) (Resch, G., et al., 2007). As stated by Ragwitz, M. (2007), "Feed-in tariff is a price driven motivation". Consequently, the stability provided by a specific price – if it is high enough – can lead to a significant increase in the production of renewable energy.

2.2.6 “Manipulated Entrepreneurship”

The first basic outcome concerns Greece's dependence on mineral fuels and a pollution-generating power system. Expressed as a percentage of total energy production, this system relies on consuming domestic coal at a rate of approximately 50% and imported oil and natural gas at a rate of 40%.

The second main finding is the international trend in developed countries towards increasing the participation of renewables in the energy mix. European policy for renewable energy is based in this logic, which has resulted in explicit direction to all member states of the European Union with the 20-20-20 targets discussed above. Similarly, Greece's national policy in the field of renewable energy is designed with the lofty goal of installing approximately 13,000 MW RES by 2020.

The third main finding concerns the institutional framework of the RES market, which is a framework containing a plethora of laws and many stakeholders in the licensing process that has caused the delay and/or cancelation of major investments. Moreover, this institutional framework includes specific rules concerning the authorisation of power and has created a licensing process with two separate levels and, therefore, a two-speed entrepreneurship.

The fourth conclusion about the financial framework of constructing RES projects demonstrates the existence of a highly attractive business environment. This framework subsidises a substantial portion of the initial capital of the investment and provides guaranteed sales of all the electricity generated at a guaranteed price for a guaranteed period (N. Konstantopoulos, I. Kinias, 2010).

Therefore, it is clear that the circumstances and needs of the market that are not creating the business opportunity in this industry; instead, opportunity is created by the implementation of international, European and national policies. This new framework for entrepreneurial activity – "imposed" by exogenous factors – is defined as "Manipulated Entrepreneurship" in this study. The next section of this research presents the theoretical model that describes the term of "Manipulated Entrepreneurship" and the basic hypothesis to investigate.

3. Theoretical model

This section presents the theoretical model that describes the entrepreneurial environment and business strategies of the RES market in Greece and the companies operating in this sector.

As described above, the concept of entrepreneurship is fully integrated with the concept of business opportunities that reflects a market need. This market need motivates the entrepreneur to activate the appropriate resources to meet this need.

Conversely, we meet a completely different situation in the RES sector. First, it is striking that not one business initiative has yet been undertaken for electricity production by alternative energy sources, although Greece's national energy system is overly dependent on imported mining fuels.

The international trend to gradually reduce dependence on fossil fuels and the European strategy for renewable energy (with specific targets for each member country) changed Greece's national strategy and directly affected the business environment.

Binding targets led to the creation of an institutional framework for the new industry and to the establishment of financial mechanisms to support investment. The two forms of pressure (institutional frame - objectives and financial incentives) are the main reason for the growth of this business sector.

Consequently, a new business sector was born as the result of pressure caused by international decisions and European and national priorities and objectives. This new business behaviour and process is defined in this study as "Manipulated Entrepreneurship".

We observe that the key features of this new form of entrepreneurship are developed in two parallel axes, mainly because of different licensing requirements. Therefore, we have a new entrepreneurial environment with two speeds in two distinct axes.

- **The entrepreneurship of “small investors”**.
- **The entrepreneurship of “large investors”**.

For these two axes, two types of entrepreneurship are observed with different operating characteristics. In the first pillar of "small investors", the creation of new companies (start-ups) is achieved through a simpler licensing process for projects with smaller installed capacities (mainly photovoltaic). In the second axis of "large investors", we find existing companies (established) pursuing more demanding authorisation to implement greater installed capacities by more complex technologies such as wind and hydropower. Thus, we tried to capture the size effect in our research.

The theoretical model of our study is shown in Figure 1. We presented above a theoretical model that describes the existence of a business environment in which two different business behaviours are developed. The main objective of this study is to empirically verify the existence of these two different lines of business and to recognise certain of their characteristics. For this reason, we first define the two groups of companies with the licensing procedure which they follow ("GROUP", and production licence or licence exception). Moreover, we define two groups of companies regarding their ages (start-ups and established), according to GEM definition. Therefore, in accordance with the definitions and the renewable technologies that the companies apply, we arrive at the following hypothesis.

**Hypothesis:** "As the complexity of a technology and the difficulty of the licensing process grow, the longer the business requires meeting business needs."
4 Methodological Issues

The methodological tool used to draw meaningful conclusions was primary research. Our survey was based on a questionnaire that collected information using descriptive questions (free text), multiple choice questions and questions using a Likert Scale. Our goal in designed research was the creation of a comprehensive questionnaire that could cover research purposes quickly.

The geographic dispersion of the quantitative research covers all of Greece. Consistent with the method of sampling at layers, the population is divided into homogeneous teams (layers) concerning certain characteristics; therefore, a small sample from each layer can account for the behaviour of the total population.

There are many different characteristics concerning the homogeneity of layers, such as geographic place, sex, age-related teams, etc. In this study, the characteristic for creating the sampling layers was the installed energy capacity by RES and the licensing process that the company followed.

In Greece, the law determines two different licensing procedures in the field of renewable energy sources and excludes certain productive units from certain stages of the licensing process; this discrimination finally leads to different technological choices for the companies. Therefore, we fix the following two groups for sampling:

- The companies that are obligated to obtain the energy production licence, which we define as the “team of the large investors”.
- The companies that are excluded from the energy production licence, which we define as the “team of the small investors”.

The sample selection was chosen from the total population of firms that had projects in operation in December 2009. From the team of large investors, there were 165 production units that were found in use at this time with a total installed capacity 1.068 MW; from the team of small investors, roughly 400 photovoltaic projects with total installed capacity 35 MW were found. These data are presented in Table 4.

For our research, we selected a sample of 80 firms, 40 from each group. Table 5 shows the number of individual projects of each company, their installed capacity and the market share that the firms hold.

The following provides information about participating companies:

- The 40 companies from the first group own 108 energy-productive units (projects) with a total installed capacity of 920,40 MW, which corresponds to 86,2% of the total installed capacity in the country.
- The 40 companies from the second group own 53 energy-productive units (projects) with a total installed capacity of 6,80 MW, which corresponds to 19,5% of the country’s total installed capacity.

<table>
<thead>
<tr>
<th>Technology</th>
<th>Projects in Operation</th>
<th>Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>68</td>
<td>842</td>
</tr>
<tr>
<td>Small Hydroelectric</td>
<td>83</td>
<td>177</td>
</tr>
<tr>
<td>Photovoltaic</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Biomass</td>
<td>6</td>
<td>41</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>165</strong></td>
<td><strong>1068</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Projects with licence exemptions (small investors)</th>
<th>Projects in Operation</th>
<th>Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photovoltaic</td>
<td>400</td>
<td>35</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>400</strong></td>
<td><strong>35</strong></td>
</tr>
</tbody>
</table>
The results vary according to each investment group. As shown in Figure 7, a considerable proportion of the group of large investors has been in operation for more than 10 years, and more than 85% of the large investor group are established companies. These companies have been active in other business sectors before the birth of renewables and entered the industry during the last decade.

Similarly, Figure 3 presents the lifespan of the business groups of small investors. In this group, the most firms are between 1-5 years old. Therefore, we conclude that new entrepreneurial ventures have been developed in the group of young investors with many start-ups created in the last decade.

### Figure 3 Companies’ Lifetime

Table 8 shows that the majority of the companies address photovoltaic projects, followed by wind parks and hydroelectric units.

Moreover, it is useful to note that almost all the small investors engage in photovoltaic technology, whereas the team of large investors utilise wind and hydroelectric technologies. This is important but also expected, based on the economic capabilities of the companies in each entrepreneurial group.

### Table 8 The Companies’ RES Technology

With our empirical results, we attempt to prove the existence of two distinct axes developed in the area of “Manipulated Entrepreneurship”, and we defined three variables.

As discussed above, the production of electricity from each energy source requires a production licence that is granted by the Ministry of Energy. However according to specific laws, certain projects (geothermal energy up to 0.5 MW, biomass-biofuels up to 100 kW, and photovoltaic up to 100 kW) are exempted from the licensing process.

Thus, it is clear that this legislative framework creates two different licensing routes for renewable technologies. To describe these different licensing procedures and the different business groups, we introduced the variable

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**Table 5 Our Research Data for Projects**

<table>
<thead>
<tr>
<th>Projects in Operation</th>
<th>Projects in our Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>RES Projects</td>
<td>Installed Capacity</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Projects with licence (large investors)</td>
<td>165</td>
</tr>
<tr>
<td>Projects exempted from licence (small investors)</td>
<td>400</td>
</tr>
</tbody>
</table>

**Table 6 Companies’ Legal Form**

<table>
<thead>
<tr>
<th>Company Legal Form</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>39</td>
<td>48,8%</td>
<td>48,8%</td>
<td></td>
</tr>
<tr>
<td>SA</td>
<td>6</td>
<td>7,5%</td>
<td>7,5%</td>
<td>56,3%</td>
</tr>
<tr>
<td>LT.D.</td>
<td>22</td>
<td>27,5%</td>
<td>27,5%</td>
<td>83,8%</td>
</tr>
<tr>
<td>GP-LP</td>
<td>4</td>
<td>5,0%</td>
<td>5,0%</td>
<td>88,8%</td>
</tr>
<tr>
<td>Holding</td>
<td>9</td>
<td>11,3%</td>
<td>11,3%</td>
<td>100,0%</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100,0%</td>
<td>100,0%</td>
<td></td>
</tr>
</tbody>
</table>

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**3. Empirical Results**

The majority of companies are anonymous corporations (SA) or general partnerships and limited partnership companies (GP-LP). The remainder operate as holding companies; limited liability companies (LTD) or as self-employment companies (Table 6).

The variation in types of companies is interesting among small and large investors. As shown in Figure 2, the majority of companies in the group of large investors act in the form of anonymous corporation (SA).

It is important that holding companies have a significant share in this research group. It is interesting that nine well-known groups of companies operate in this market through their subsidiaries. It is also important that several of these groups are controlled by foreign businesses.

Figure 6 describes the legal form of business in the group of small investors, in which general partnerships and limited partnership companies (GP-LP) constitute the majority. This describes the geography of this business group, which includes companies with smaller sizes and capacities.

**Table 7 Companies’ Lifetime**

<table>
<thead>
<tr>
<th>Technology</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>41</td>
<td>51,3%</td>
<td>51,3%</td>
<td>51,3%</td>
</tr>
<tr>
<td>Photovoltaic</td>
<td>22</td>
<td>27,5%</td>
<td>27,5%</td>
<td>78,8%</td>
</tr>
<tr>
<td>Wind Energy</td>
<td>16</td>
<td>20,0%</td>
<td>20,0%</td>
<td>98,8%</td>
</tr>
<tr>
<td>Biomas</td>
<td>1</td>
<td>1,3%</td>
<td>1,3%</td>
<td>100,0%</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100,0%</td>
<td>100,0%</td>
<td></td>
</tr>
</tbody>
</table>

---

**Figure 2. Companies’ legal form**

Table 7 demonstrates the existence of two areas in which most businesses are placed. The first area includes businesses with lifespans of up to 4 years and the second includes companies with lifespans from 5 to 15 years. Consequently, the youth of the RES sector is clear from the survey results.
"GROUP" (1 is without production licence; 2 are with production licence).

According to GEM (Global Monitor for Entrepreneurship) definitions, there is a difference between established firms and start-ups concerning the company's lifetime (established firms are in existence for more than 42 months, new start-ups are in existence for less than 42 months). Based on that, we define an extra variable "Age" (1 is start-up; 2 is established). Finally, we defined one more variable as "RES Technology" (1 is photovoltaic; 2 is wind and hydroelectric energy).

Thus, we formulate the following hypothesis.

**Hypothesis:** "A positive cross-correlation is expected between the entrepreneurial group and the RES technology that is applied in companies that are activated in the RES sector and their lifetime (Age)."

The correlations are presented in Table 9 below.

### Table 9 Basic Hypothesis

<table>
<thead>
<tr>
<th>Basic Hypothesis</th>
<th>Group</th>
<th>Age</th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Group</td>
<td></td>
<td>Pearson Correlation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>RES Technology</td>
<td>Group</td>
<td></td>
<td>Pearson Correlation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

The empirical results indicate a high correlation between the company's lifetime (Age) and the licensing process that it follows (Group). Thus, only the established companies with powerful entrepreneurial and technical histories can be activated in projects with significant installed capacities that also require a more complex licensing process.

Additionally, we observe a significant correlation between the licensing process followed by companies and the RES technology they implement. Thus we find a correlation between the exemption from licensing and photovoltaic technology.

We conclude that photovoltaic technology dominates small-scale projects more than other renewable technologies because of the licensing and financial frameworks required for specific RES technologies.

The continuous legislative intervention for the promotion of photovoltaic technology (mainly for projects up to 150KW) and the significant differences in feed in tariffs create the impression that photovoltaic technologies are the only choice for small-scale projects. Thus, with respect to tariffs, hydraulic, wind and geothermal production is subsidised at 87,84 €/MWh, whereas photovoltaics are subsidised at 404,20 €/MWh.

Conversely, the financial figures for implementing large projects in wind and hydroelectric energy production limit the field to established and powerful companies, which is shown in the correlations results in Table 9.

These results suggest that political priorities within a particular licensing framework are encouraging a rapid expansion of photovoltaic technology in the European country with the most sunshine. Nevertheless, our research indicates that this policy creates specific and manipulated entrepreneurial fields of action either by complicating or helping entrepreneurial groups with easier or more difficult licensing procedures.

This framework recommends the "Manipulated Entrepreneurship" model with two separate axes. In the first, medium- or large-sized established firms are activated mainly in wind and hydroelectric energy projects that face difficult licensing processes. The entrepreneurial activity of these companies resembles a parallel internal entrepreneurship that is theoretically defined as "entrepreneurship". In the second axis, we meet new start-up companies that mainly apply photovoltaic technology and face an easier licensing process.

### CONCLUSIONS

Our literature review presented the entrepreneur as someone who undertakes dangers, organises productive factors and seeks strategies for profit achievement. His action begins with the identification of a business opportunity arising from the desire to fill a need or a gap in the market with a new product. Consequently, the terms entrepreneur and entrepreneurial opportunity may be considered as two pillars on which rests the concept of entrepreneurship. It is, therefore, clear that the conditions and needs of the market generate business opportunities and those entrepreneurs are able to recognise and evaluate these opportunities to create business.

However, our research shows completely different functions in the renewable energy market in Greece. A sequence of national objectives, political decisions and financial tools creates a fictitious business opportunity that may be exploited by the entrepreneur. This business opportunity has nothing to do with the production of energy and the country's energy needs. Unlike a business opportunity, it is linked with a bloated business profit resulting from high subsidies on the prices of electricity produced from RES. This framework verifies the existence of a new model of entrepreneurship that is introduced in this paper as "Manipulated Entrepreneurship".

This study demonstrates the way that a market may be controlled by external factors. In this case, the need for installed renewable energy sources and the accompanying political decisions primed the specific business activity. The entrepreneurs are pushed through specific financial incentives to invest and operate with unusually large profit. However, what might be the progress of these business plans if these political priorities and motivations changed and became obstacles?

Finally, our research presents a new mechanism in the birth of entrepreneurship and offers paths to further academic research by adding new factors into the theoretical framework of entrepreneurship.

### REFERENCES


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