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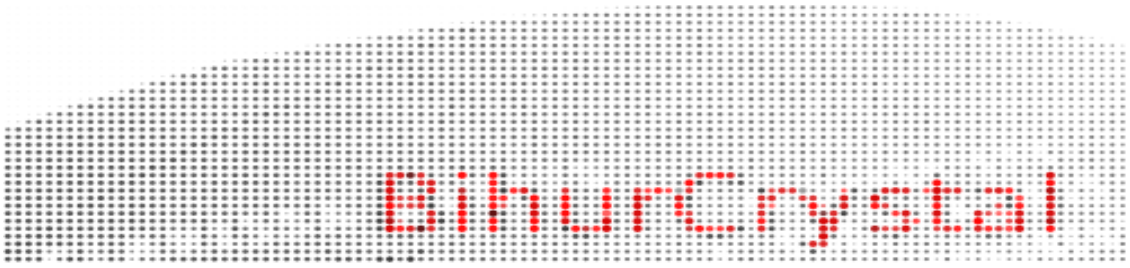
Final project:

Marketing plan of the company Bihurcrystal in order to commercialize a new product called “curved crystals”.



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1. INTRODUCCIÓN

1.1 Justificación

Cada día, miles de experimentos de diferente índole son llevados a cabo en el mundo científico con el objetivo de encontrar diferentes soluciones a los problemas y limitaciones que existen hoy en día el área científica, concretamente en el área de física de superficies. La rápida velocidad con la que está avanzando la tecnología tiene consecuencias directas en el trabajo realizado por los científicos, ya que amplía sus horizontes y les permite realizar estudios y análisis antes impensables.

Estas nuevas posibilidades que abre el avance de la tecnología, junto con la globalización de los mercados, hace que las compañías tengan que ajustar su rango de producto, así como su estrategia, para comercializarlos. La complexidad de los productos va en aumento, expandiéndose a los mercados internacionales además de los nacionales.

Bihurcrystal es una compañía cuyo rango de productos son los productos de alta-tecnología. Su principal producto son los cristales curvados, un producto actualmente inexistente en el mercado, lo cual da a la compañía un gran valor añadido.

Hasta ahora, todos los estudios de física de superficies se han realizado en cristales planos. Cada una de las muestras tiene una estructura atómica diferente dependiendo de la forma en la que estén cortadas. Es por ello por lo que los cristales curvados suponen una gran mejora, ya que solamente una muestra tiene más de una estructura atómica. Esto permite a los científicos estudiar la física de la superficie usando solamente un cristal curvado para realizar varios experimentos, en vez de usar un cristal plano para realizar cada experimento.

Debido a la innovación que supondrá este producto en el mercado científico, Bihurcrystal necesita elaborar un marketing plan para comercializar los cristales curvados y abarcar toda la cuota de mercado que le sea posible.

El plan de marketing tiene que tener integrados las estrategias de marketing que Bihurcrystal tiene que seguir si quiere comercializar los cristales curvados exitosamente y afianzarse así en el mercado. También ha de contar con un análisis del mercado que determine la posición de Bihurcrystal (el ya conocido análisis DAFO) en al mercado, así como la estructuración interna de la empresa y sus posibles opciones de financiación.

1.2 Objetivos

1.2.1 Objetivos generales

Diseñar un plan de marketing para Bihurcrystal, una compañía especializada en fabricación de equipamiento de alta-tecnología para la investigación experimental, con el propósito de planear y estructurar todas las acciones que se van a llevar a cabo para comercializar con éxito su producto principal.

1.2.2 Objetivos específicos

- Realizar un "macro-análisis" y un "meso-análisis" para analizar el entorno y la situación en la que se encuentra la compañía.
- Establecer un marketing plan en el que las estrategias de comunicación estén determinadas.
- Identificar las posibles fuentes de financiación.

1.3 Metodología

Es una investigación descriptiva, donde las características del mercado, los clientes, los competidores y las diferentes opciones de financiación son analizados.

La información ha sido recopilada mediante fuentes primarias y secundarias:

- Reuniones con los miembros de Bihurcrystal.
- Páginas Web.
- Libros.
- Documentos.
- Revistas científicas.

Respecto al idioma de las fuentes, la mayoría de ellas están en Español, exceptuando unas pocas que están en Inglés. A pesar de que el Español sea la lengua primaria de las fuentes, este trabajo de fin de grado se ha realizado en Inglés (exceptuando la introducción y la conclusión), por lo que dichas fuentes han sido trasladadas y recopiladas en Inglés.

1.4 Estructura

La estructura de este trabajo de fin de grado está dividido en diferentes partes, en las cuales han sido incluidas conceptos tanto teóricos como prácticos.

- Parte 1. Una breve introducción del tema.
- Parte 2. Descripción de la empresa Bihurcrystal y su rango de

productos.

- Parte 3. Análisis sobre el entorno de Bihurcrystal:
  - Macro-análisis.
  - Meso-análisis.
  - Mercado potencial.
  - DAFO análisis (SWOT analysis).
- Parte 4. Descripción de diversos conceptos teóricos de marketing.
- Parte 5. Explicación de las estrategias de promoción de Bihurcrystal.
- Parte 6. Descripción de la política de precios y la organización interna de Bihurcrystal.
- Parte 7. Análisis de las diferentes opciones de financiación para Bihurcrystal.

Por ultimo, después de llevar a cabo los diferentes estudios mencionados anteriormente, la conclusión sobre la viabilidad del producto y, por tanto, el de la compañía es dada.

1.5 Elección del tema

La principal razón por la cual escogí realizar un marketing plan para Bihurcrystal es debido a que realicé unas practicas en el departamento de marketing de dicha empresa durante 6 meses, desde enero hasta junio del 2014.

En este periodo, me comunicaron su intención de lanzar un nuevo producto al mercado: los cristales curvados. Me informaron de que se acababan de constituir como empresa, ya que habían visto un gran potencial en los cristales curvados como posible producto para el mercado científico. Así, Bihurcrystal se creó inicialmente con la idea de introducir los cristales curvados en el mercado. Por ello, necesitaban realizar un plan de marketing para poder analizar la viabilidad del proyecto.

Me pareció una muy buena oportunidad para poner en práctica todo lo aprendido y ver como funciona internamente una empresa real hoy en día, así como ampliar mis conocimientos en el área de marketing.

1. INTRODUCTION

1.1 Justification

Each day, thousands of different experiments are carried out in order to create a solution to a specific scientific problem or to come up with an innovative breakthrough that will suppose a significant achievement for the scientific world. The high speed in which technology is advancing is an undeniable fact that has direct consequence to the scientists, as it gives them the opportunity to overcome their barriers and make new accomplishments.

With these new technological possibilities and the current globalisation of markets, companies need to adjust their product range as well as the strategy to commercialize their products. The appearance of new products with higher complexity is a very likable scenario from now on, spreading into international markets besides from the national ones.

Bihurcrystal is a company that has a product range of high-technology products that is planning to launch into market. Furthermore, it has a main product, which is nothing like anything that currently exists in the market, giving the company a huge added value: Curved crystals.

Up until now all the studies in surface of physics have been made in plane crystals. Each of the plane samples has a different atomic structure depending on the form they are cut. That is why curved crystals suppose a huge improvement, because one sample has more than one different atomic structure, which allows scientists to study the physics of a surface using only one sample (one curved crystal) to conduct several experiments, instead of having to use one for each experiment.

Due to the creation of this innovative product, Bihurcrystal needs to elaborate a marketing plan to commercialize curved crystals and gain as much as market share as it possibly can.

So, a marketing plan for Bihurcrystal has been made, which integrates strategies and approaches that the company should take into account in order to succeed in commercialize the curved crystals and settle in the market. It also contains a SWOT analysis of the market, as well as the structure of the company and the possible means of financing.

1.2 Objectives

1.2.1 General

Design a marketing plan for Bihurcrystal, a company focused on manufacturing high-technology for experimental research, with the purpose of planning and structuring all the actions that are going to be carried out in order to achieve the define objectives.

1.2.2 Specific

- Perform a macro-analysis and a meso-analysis to analyse the environment and situation that the company is in.
- Establish a marketing plan in which the chosen communication strategies are determined.
- Find the most adequate financial aid.

1.3 Methodology

It is a descriptive research, where the characteristics of the market, clients, competitors and financial aids are analysed.

The information will be recruited though first and second sources:

- Meetings with the members of Bihurcrystal.
- Web-pages.
- Books.
- Documents.
- Scientific magazines.

Regarding the language of the sources, most of them where in Spanish excepting some webpages that were in English. Despite Spanish being the primary language of the sources, this paperwork has been made in English, so all the Spanish sources have been translated to English.

1.4 Structure

The structure of the marketing plan has different parts in which both theoretical and practical concepts have been included.

- Part 1. A brief introduction of the topic is made.
- Part 2. The company of Bihurcrystal is described as well as its product range.
- Part 3. An analysis of the market of Bihurcrystal is carried out.
    - Macro-analysis.
    - Meso-analysis.
    - Potential market.
    - SWOT analysis.
- Part 4. Several theoretical concepts of marketing are described.
- Part 5. The promotion strategies that Bihurcrystal will use are explained.
- Part 6. The price and type of organization chosen by Bihurcrystal are settled in the following part.
- Part 7. The different options of financing that Bihurcrystal might ask for is specified.

Last, a conclusion based on the information given in the paperwork is made, clarifying the viability of the product.

1.5 Topic choice

The main reason that made me choose the topic of marketing plan for Bihurcrystal has been the realization of an internship in the marketing department of this company for 6 months, from January until June of 2014.

In this period, they communicate me their intention of launching a new product into the market. They informed me that the company had just been set up because of the potential that they have seen in curved crystals as a product. So, BIhucrystal was set up with the idea of introducing curved crystals into the scientific market. In order to do this, they needed to carry out a marketing plan. I though it was a very interesting task that will also be very beneficial for me by helping me to increase my knowledge both in the field of

marketing and in the different aspects of a company.

Being as it has been, a changeling task that has given me the opportunity to use all the skills acquired during my studies and a the experience of working in a real company, I had no doubt that this would be a very interesting and adequate topic to choose.

2. THE COMPANY

2.1 Bihurcrystal

Bihurcrystal provides curved crystal surfaces for experimental research. It is a very complex product that will be explained more accurately afterwards.

The company was born as a start-up project with the support of the Centre of Physics Materials and the Donostia International Physics Centre. It has received financial support under the Entreprenari Program of the SPRI agency of the Government of the Basque Country and has been awarded twice: first with the Manuel Laborde Werlinden Prize in 2012 for the best technology-based business initiative; and secondly, with the Prize in the category of Business Ideas/Project of Toribio Echeberria awards in 2013.

2.2 Origins

Bihurcrystal is the result of large experienced researchers of the group Nanophysics Lab of the Centre of Physics Materials (CFM), in San Sebastián. This background gives the members a complete and privileged perspective regarding the present and future needs of a specific sector within the Science of Materials: Surface Physics.

Besides, the intense interaction of Nanophysics Lab with several members of the industrial and technological sector of the Basque Country gives the company the advantage of being able to develop the manufacturing techniques capable of contributing to the improvement of the quality in key products highly demanded in surface science.

2.3 Members

All the members of Bihurcrystal have a scientific background and wide range of trajectories in the field of R&D:

- Enrique Ortega: He is the CTO at Bihurcrystal. He has set up and leads the Nanophysics Lab of the UPV/EHU located at the Centre of Physics Materials (CFM). He got his Degree and PhD in Physics by the "Universidad Autónoma de Madrid" and later completed his background with a post-doc stay at IBM Labs in Yorktown heights (New York).

- Frederik Schiller: He is a scientist at the Nanophysics Lab and a scientific

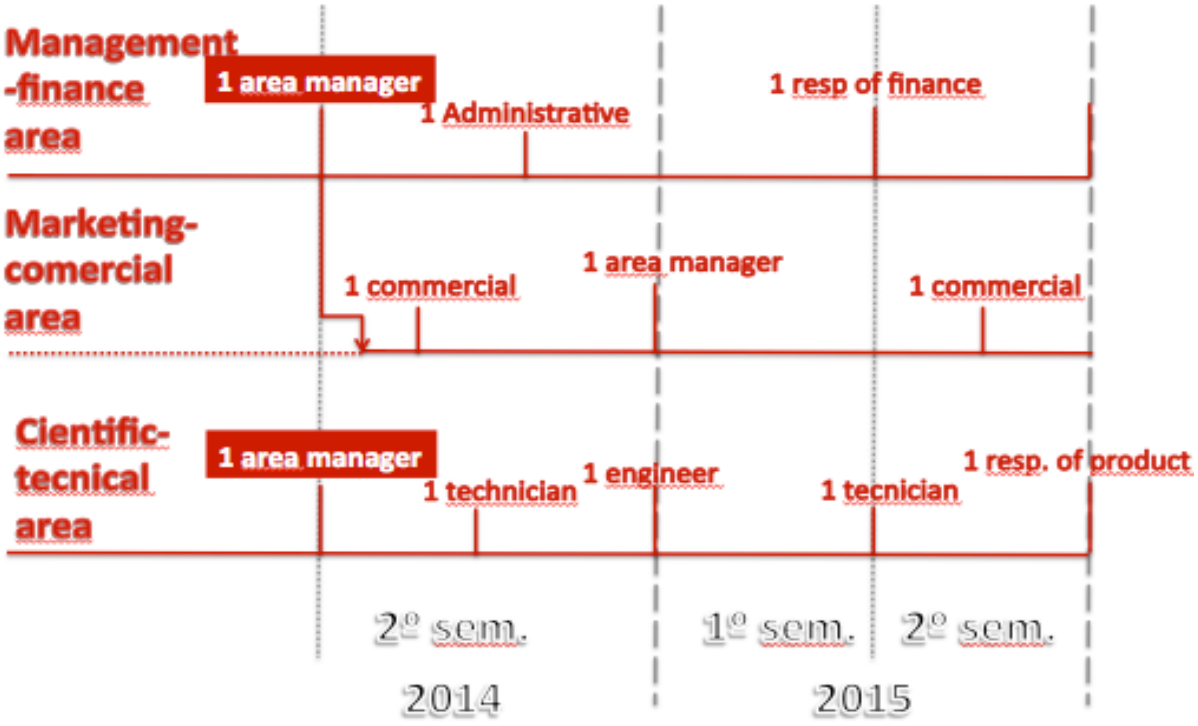
advisor for Bihurcrystal. He got his PhD at the University of Dresden working on metallic quantum Wells.

- Rubén Gonzalez Moreno: He is the CEO at Bihurcrystal. He got his Degree in Physics by the "Universidad Complutense de Madrid" and his PhD by the "Universidad Autónoma de Madrid" in surface science and nanotechnology. He is a very important asset to the company as provides the company with a deep understanding of the manufacturing technologies required as well as the logistic and necessary internal structure.

- Francisco López Gejo: He has a degree in Physics by the "Universidad de Valladolid", and later did his PhD studies at the "University College London". He has experience in the field of science and industrial research as well as in the creation and management of projects of R&D, particularly in the ones financed by the European Union.

Besides the mentioned members that actually constitute Bihurcrystal, the future growth of the company requires more workers in order to be able to satisfy all the clients' requirements. That is why Bihurcrystal has decided to amplify the personal structure of the company by hiring new members.

Image Nº1: Amplification of the personal structure of Bihurcrystal



(Source: Own elaboration)

2.4 Mission, vision and values

The mission of Bihurcrystal consists on integrating curved crystals as samples to use while going through experiments in surface physics. Being the core of the company, it provides Bihurcrystal with an innovative scientific product that no other company has. That is why the objective of Bihurcrystal is to reach out as much clients as possible, mainly constituted by public centres, and domain this new market.

The vision of the company is to be established in the market within 3 years, first in the European market because of its closeness and lack of entry barriers, and then expand to further markets. The expansion of Bihurcrystal into other markets, such us America, Asia, Canada etc. depends on the market share it gets from the European one. If the results are no good in Europe, Bihurcrystal will not expand and it will focus on improving its turnover.

Besides from setting up the mission and vision of the company, it is also very important to decide which are the values the company will rely on. The values of a company are the ethic principles from where the culture of the company settles, so choosing the appropriate ones is vital.

The values of Bihurcrystal are the followings:

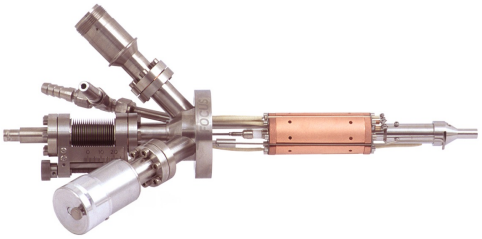
- Professionalism and seriousness at all levels.
- Closeness and good treatment to clients.
- Commitment to clients when solving any issues they might have.
- Originality: Always innovating both in products and as well as in production processes.
- Teamwork: Sharing the expertise and knowledge with all the members of the company.
- Excellent post-sales service.
- Quality: All the products that Bihurcrystal offers must be high quality products (within the scientific world this is highly valuated).
- Honesty: The Company meetings have to be useful to solve any problems that might have arisen.

2.5 Product description

As mentioned before, curved crystals constitute the core of Bihurcrystal. However, the company has decided that having only one product increases the risk of not being profitable. Consequently, it has spread its product range into three more products:

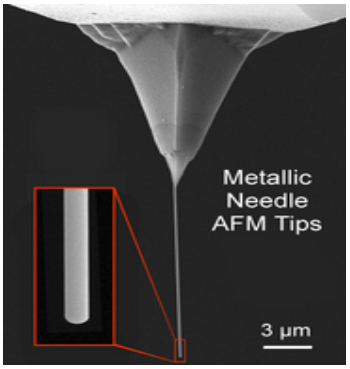
1. Evaporators

   Is the instrument used to evaporate (sublimate) molecules in an Ultra High Vacuum environment.



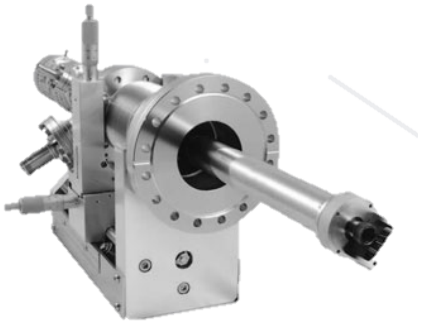
2. AFM Tips

Among all AFM components, tips are the responsible for being in direct contact with the sample that one wants to study. Thus, the tip provides either topological or electronical information of the sample becoming the main feature of an AFM machine.



3. Cryogenic manipulator

Is a type of manipulator that can be cooled down to -200ºC.



These products are scientific equipment that already exists in the market, but Bihurcrystal has included some improvements that makes them better than the ones that currently exists. However, these products are not as far ahead as the curved crystals regarding the manufacturing process, which is why they are long-term products and do not have relevance in this paperwork.

Curved crystals are very complex scientific products, which could be very beneficial to the companies or public institution that make research in surface of physics. In order to understand these benefits it is essential to understand what the product is and how can it be used.

Surface Physics is interested in the chemical reactions that have place in the surface of a material when it makes contact with other substances. The essential characteristics of this chemical reaction, like for instance the amount of energy that is absorbed or released, depends on the details at atomic scale.

What happens at atomic scale has relevant consequences in real life matters, like for example the efficiency of a fuel cell or knowing at what temperate does an adhesive come off. This is why the experimental techniques in surface physics are focused on achieving an atomic resolution.

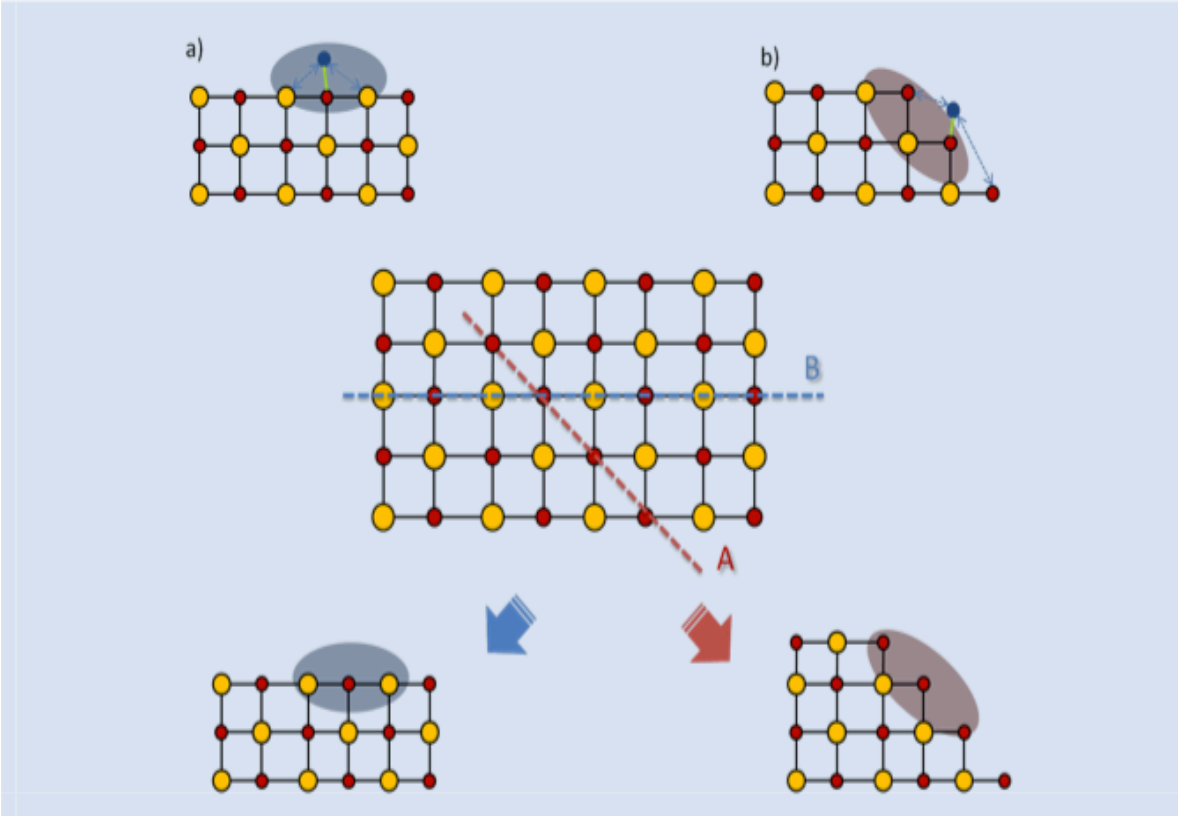
All the experimental analytic techniques, as well as the samples used, need to be exact at the atomic level. For this reason, the Science of Materials uses as samples crystals, as they have an arranged atomic structure.

Up until now, all the experimental studies that have been carried out have used crystal samples in which the surface that was being studied had a single crystal plane. However, the different reactions that occur in the surfaces depend on the atomic structure that it has, which is different in each crystal plane.

The plane surface allows doing an experiment in the simplest way possible, but does not allow studying the dependency of the phenomena regarding the atomic structure of the surface. That is why Bihurcrystal came up with the idea of curved crystals, which allows researchers to experiment physic-chemistry processes in its surface changing the orientation.

The objective of the next image is to understand which of the positions (a or b) is energetically more favourable for the chemist reaction. For that, two samples will be necessary, cutting the crystal as it is shown in the central part of the picture, following the directions A and B.

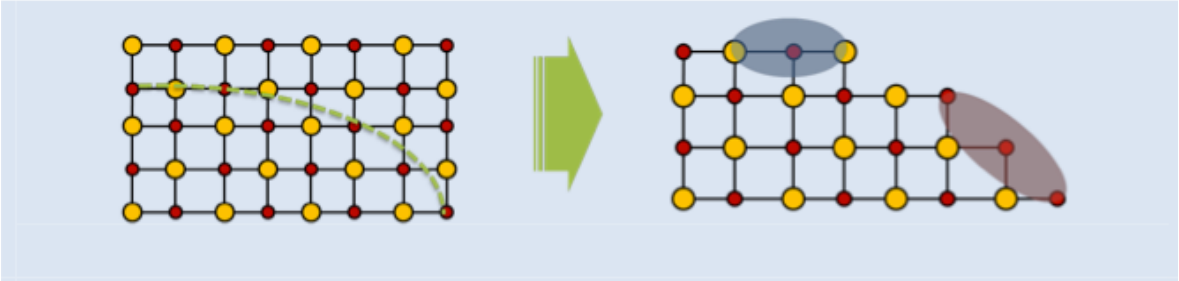
Image Nº2: Example of a study of surface physics.



(Source: Bihurcrystal)

Bihurcrystal has though about preparing a sample following a curved path, making the details at atomic scale different depending on what position of the surface the observation is made as it is shown in the following image.

Image Nº 3: Atomic structure in curved crystals.



(Source: Bihurcrystal)

So, instead of needing two different samples to research the surface reaction, companies could only use one single sample, which makes them save a high amount of money in buying samples.

2.6 Product timeline

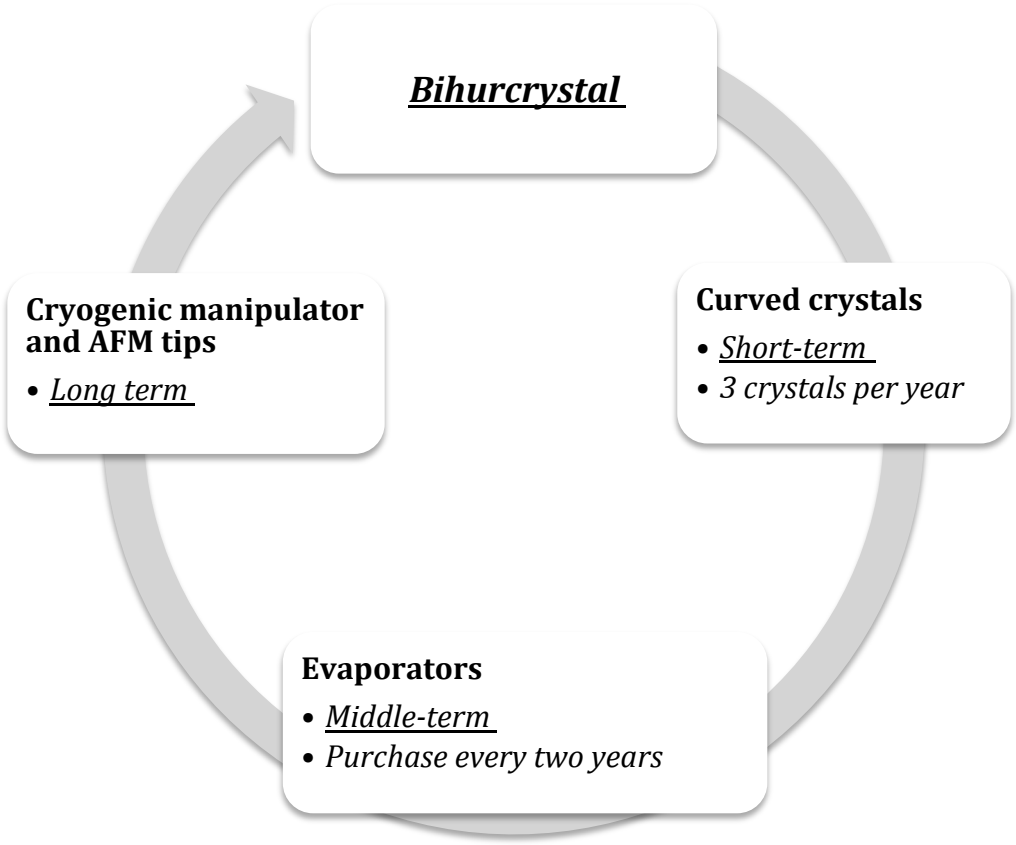
Having a wide product range forces Bihurcrystal to elaborate a strategy to decide which will be the adequate timing to sale each one of the products. Besides, as mentioned before, not all the products are in the same phase, meaning that some are more developed than others.

From one hand, curved crystals are already being produced in a regular basis, which makes them ready to be sold in the market. That is why Bihurcrystal has decided to make a marketing plan and have the entire scientific world know about their innovative product.

Evaporators on the other hand, are not being produced currently. There are many types of evaporators that Bihurcrystal could made, each of them with a lot of accessories that the company can decide to include or not. As the market of evaporators is a market that already exists, Bihurcrystal has to do a market research that will enlighten which type of evaporator will success the most.

Finally, the cryogenic manipulator and the AFM tips are the ones that Bihurcrystal thinks of in long term. They are ideas that need to be developed and concreted more so that they result in profitable products.

Image Nº 4: Timelines of the different product range of Bihurcrystal



(Source: Own elaboration)

2.6 Curved crystal's life cycle

The life cycle of a product is a very important aspect to keep in mind when planning a marketing strategy. It has 4 different stages (Cohen, W. 1991):

1. Introduction: In this stage, the company faces high costs due to the marketing. The fact that the company manufactures products in small amounts that require specialized work also have repercussions on the costs. Besides, in this stage the company has not convinced the buyers to acquire the product regularly yet. The only good thing about the introduction stage is that there are few or none competitors.

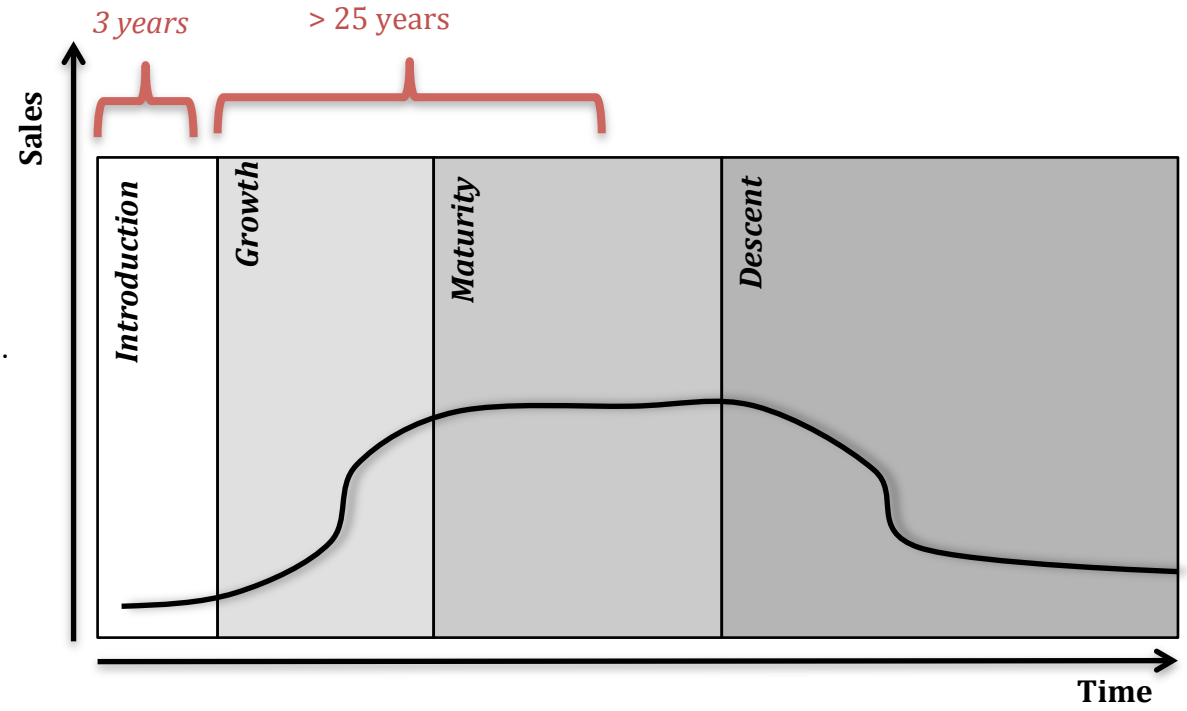
2. Growth: In this stage, the company has already been established in the market and is successful. Sales increase progressively and consequently new competitors enter

the market. The costs of marketing are still high but the manufacturing ones have reduced due to the switch to the massive production. The company achieves the highest profits on this stage.

3. Maturity: In this stage, the competence is fiercer. The company has achieved the highest profit that it could achieve and the manufacturing costs reduce considerably. A lot of companies used to reduce their prices in order to throw the competence out of the market.
4. Descent: There are few competitors in this stage. The profits fall as well as the sales, which forces the company to liquidate the stock in one point in the future.

Regarding the life cycle of curved crystals, Bihurcrystal has performed an estimation based on the data correspondent to plane crystals. This estimation relies on the fact that curved crystals are offered as an alternative to the plan ones, providing more benefits.

Graphic Nº1: Curved crystals life cycle



The lifetime of a curved crystal is different depending on what research it is used for. From one hand, some concrete experiments are particularly more harmful to the crystals and can cause their lifetime to be shorter. In that scenario, the researcher will have to buy the product more often. But from the other hand, there are also experiments that are innocuous to the crystals, making their lifetime to last longer.

2.7 Situation

Up until now, the activity of Bihurcrystal has been focused on R&D, in order to develop the new concept of a crystal with curved surface. This has required working out the manufacturing processes and, in particular, acquiring and handling the necessary technology to prepare the surface.

Currently, Bihurcrystal is able to manufacture curved crystals keeping up with the quality standards of the plane surface crystals.

First of all, before performing a market research, it is important to decide in which category should Bihurcrystal be. Although a part of Bihurcrystal is undeniably R&D, as involves the creation of a new product and a new production process, the best category that Bihurcrystal fits in is in the "high-technology company" category.

Bihurcrystal uses and develops different scientific instruments that are considered high technology. These instruments are necessary in order to manufacture all the range of products that Bihurcrystal offers, not to mention that these products are also considered high-technology products.

All the equipment that Bihurcrystal uses, as well as the products that they will offer, are high technology. Because of that, the marketing research will be based on Bihurcrystal being a high technology manufacturing company.

3. MACRO-analysis

3.1 Demographic factors

It is very important to know the demographic location that the companies with the same profile as Bihurcrystal have in order to have a general picture of which areas are the most frequented ones.

In 2010, the total sum of the number of high-technology manufacturing enterprises was 48,100 in the EU-27. Within this 48,100 enterprises, Germany was the country which the highest amount of enterprises, 8,975 to be exact. Following Germany there was Italy (6909 enterprises), United Kingdom (6,831), Czech Republic (3,958 enterprises) and France (3,403 enterprises).

Although Spain had not the highest number of high-tech manufacturing enterprises between 2008-2011, is located between the top 10 of the European Union countries.

Analysing the development in those four years, it is clear that the amount of enterprises has being decreasing in almost all the countries as years go by. In Spain, there was a decrease of 263 high technology manufacturing companies between 2008-2011.

It is not a coincidence that the decrease of the companies goes hand in hand with the economic crisis that has hit Europe. The cuts that the governments have made regarding the investment done in science has had its repercussion in high technology manufacturing companies reducing their number considerably.

Laying aside the impact of the crisis, the information that Bihurcrystal needs to keep is that Germany is the country where most high-technology enterprises are located, followed by United Kingdom, Italy, France and Czech Republic.

Table №1: Location of high-technology manufacturing companies (2008-2011)[1]

HIGH-TECH. MANUFACTURING COMPANIES	2008	2009	2010	2011
European Union (27 countries)	49,621*(e)*	48,808*(e)*	48,100*(e)*	:
Belgium	:*(c)*	826	:*(c)*	:*(c)*
Bulgaria	448	448	424	407
Czech Republic	3,737*(p)*	3,822	3,958	3,477
Denmark	641	638	630	664*(p)*
Germany	7,79	8,759	8,975	8,536
Estonia	126	121	118	114
Ireland	186	177	166	184
Greece	:	544	:	:
Spain	3,219	3,037	3,027	2,956
France	4,538	4,264	3,403	3,155
Croatia	845	886	795	748
Italy	7,379*(i)*	6,909	6,68	6,272
Cyprus	14	13	:*(c)*	:*(c)*
Latvia	110	110	131	136
Lithuania	162	150	153	149
Luxembourg	11	11	10	10
Hungary	2,684	1,737	1,749	1,688
Netherlands	1,348	1,425	1,592	1,633
Austria	672	645	648	649
Poland	2,382	2,939	3,097	3,106
Portugal	546	498	479	466
Romania	1,309*(r)*	1,187*(p)*	1,092	951
Slovenia	326	323	325	323
Slovakia	268	:*(c)*	818*(b)*	830
Finland	627	597	597	603
Sweden	1,975	1,917	1,875	1,843
United Kingdom	7,479	7,436	6,831	6,569
Norway	343	342	321	331
Switzerland	:	1,764*(i)*	1,718*(b)*	1,678
Turkey	:	797	:	:

(*Source: Eurostat)*

[1] (c) confidential; " : " not available; (b) break in time series; (p) provisional; (r) revised; (e) estimated; (i) see meta data.

3.2 Economic Factors

The relevance that the economic factors have over the companies is very high. They could affect companies in both positive and negative ways, which is why companies must always be aware of the economic factors related to their market. Being such as important aspect as it is, economic factors are analysed into 3 different parts in this analysis.

First of all, there is the part where the turnover, production value and the added value of high-technology manufacturing enterprises is analysed. Secondly, there is a graphic showing the external trade of high-technology products of Spain, where the trade balance can also be seen. Last, the total Venture Capital Investment (VCI) of European countries is shown.

As mentioned before, in 2010, the European Union had almost 50,000 enterprises in high-tech manufacturing. Germany had the highest quantity of high-technology enterprises between 2008-2011. United Kingdom, Italy, France and Czech Republic had also a significant amount of enterprises of high technology settle in their countries.

The table also gives economic information related to these companies. In terms of turnover in high-tech manufacturing enterprises, the turnover generated by German enterprises (EUR 109 billion) represented one fifth of the EU-27 turnover (over EUR 522 billion), and far ahead of France (EUR 71 billion), Ireland (EUR 47 billion), the United Kingdom and Italy (almost EUR 46 billion each).

The value added, which is equivalent to revenue less outside purchases of materials and services, was distributed in a similar way, with the highest contribution coming from Germany (nearly EUR 38 billion), followed by the United Kingdom (EUR 21 billion), France (EUR 19 billion), Ireland (EUR 16 billion) and Italy (EUR 13 billion).

So, once again, considering the economic information, Germany is the leading country of high-technology manufacturing enterprises.

Table Nº2: Economic information about high-technology manufacturing enterprises[2]

	Number of enterprises	Turnover (EUR million)	Production value (EUR million)	Value added (EUR million)
EU 27	48,100	522,408	:	163,649
Belgium	826	12,731	13,418	5,363
Bulgaria	424	:	:	:
Czech Republic	3958	12,123	11,663	1,220
Denmark	630	11,614	11,344	5,108
Germany	8,975	108,936	98,505	38,432
Estonia	118	956	935	121
Ireland	166	47,100	46,541	15,774
Greece	544	1,813	1,663	781
Spain	3,027	20,946	18,405	5,954
France	3,403	71,151	58,242	19,199
Italy	6,909	45,682	43,010	13,319
Cyprus	13	180	177	55
Latvia	131	:	:	:
Lithuania	153	324	310	92
Luxembourg	10	:	:	:
Hungary	1,749	20,890	18,024	2,628
Malta	:	:	:	:
Netherlands	1,592	22,096	14,683	5,444
Austria	648	8,397	7,356	3,281
Poland	3,097	15,123	13,166	2,759
Portugal	479	2.885	2.604	697
Romania	1,092	3,567	3,399	706
Slovenia	325	2,040	1,910	822
Slovakia	818	7,124	6,940	958
Finland	597	32,326	16,655	3,902
Sweden	1,875	:	:	:
United Kingdom	6,831	45,923	42,866	21,127

(*Source: Eurostat)*

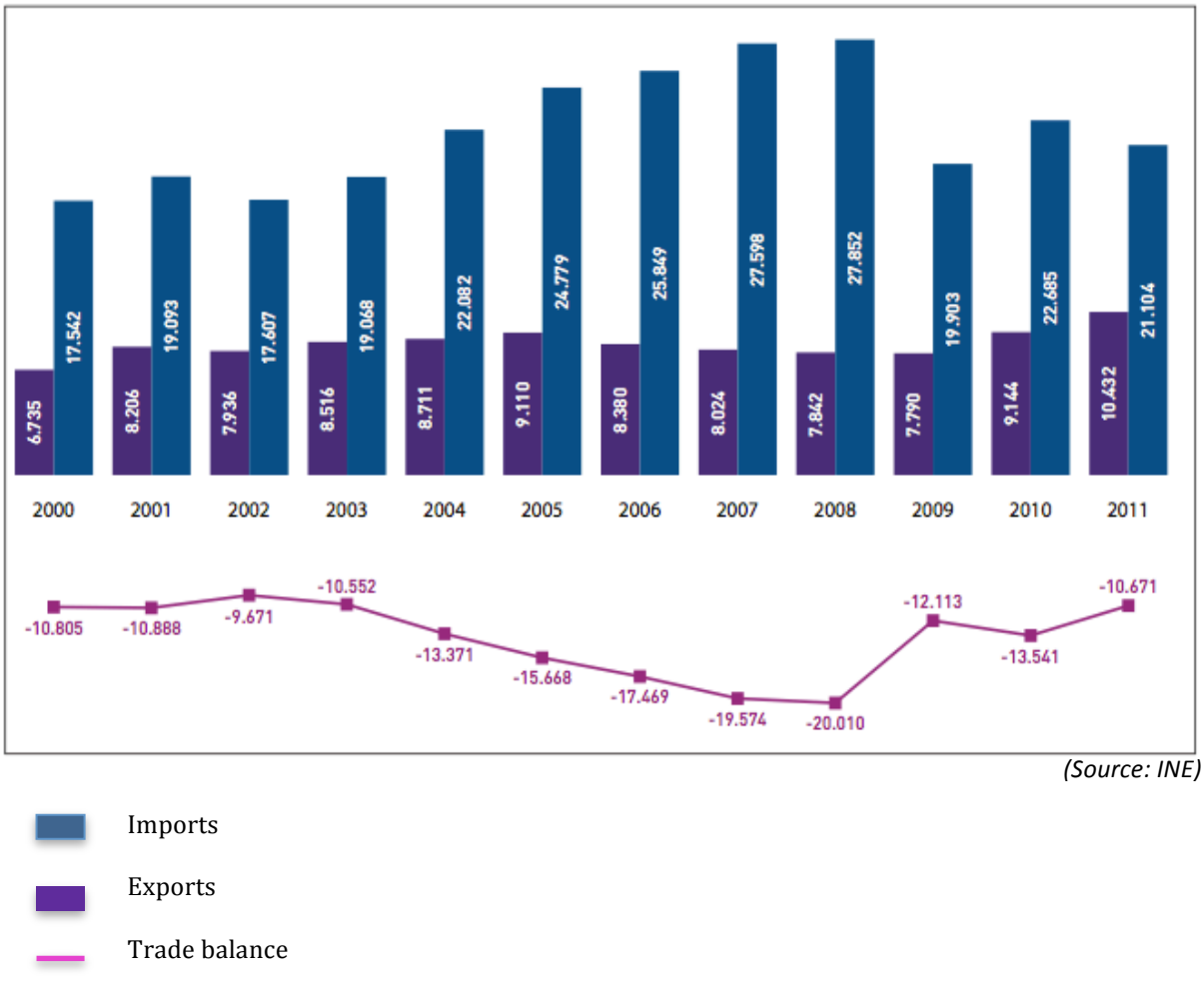
[2] " : " Not available

The second part of the economic factors that need to be taken into consideration is focused on the trade balance.

The graphic below shows that, each year, between 2000-2011, the amount of exports of high-technology products has been much inferior than the amount of imports. Because of that, the trade balance during this period has always been negative. The trade balance reached its lowest value in 2008, with the value of -20.010 million euros.

Regarding the imports, there was an ascendant tendency during 2002–2008, up to the point of reaching 27.852 million euros. It is also obvious the decrease that the imports suffer in 2009, which was nearly 8.000 million less than in 2008, as the consequence of the beginning of the economic crisis.

Graphic Nº2: External trade of High-Technology products (million EUR) (2000-2011)



(Source: INE)

The last part of the economic analysis is the Venture capital investment (VCI). It is a subset of a private equity raised for investment in companies not quoted on stock market and developing new products and technologies. It is used to fund an early-stage (seed and start-up) or expansion of venture (later stage venture).

Private equity can be further used to expand working capital, to make acquisitions, to strengthen a company's balance sheet and for buyouts. Several stages can be distinguished in the expansion, post-venture stage of fundraising: growth, rescue/turnaround, replacement and buyouts.

The table below gathers in information about 15 European countries between the periods of 2007-2011. The consequences of the economic crisis within these countries were very remarkable in the amount of VCI as there is an astonishing difference between the years 2008 (VCI = 51,105) and 2009 (VCI= 21,806).

Regarding the difference in the VCI between countries, United Kingdom has a much higher Venture Capital Investment than the rest, with approximately 34,500 million EUR in 2007 and 19,500 in 2011. France will be the second most important country referring VCI with approximately 9,000 million EUR in 2011, followed by Germany (4,000 million EUR approx.) and Spain (2,000 million EUR approx.).

In the year 2009, there was a big decrease in the VCI in all countries consequence of the economic crisis. The total VCI of total 15 European countries decrease from 51,105 million euros to 21,806 million euros, the lowest number of that period.

So, in this section of the economic analysis, United Kingdom is the one with the most positive results, followed by France and, as usual, with the presence of Germany. Nevertheless, these are no bad results for Bihurcrystal, as Spain occupies the forth place regarding to the VCI.

Table Nº3: Total Venture Capital Investment (VCI) (million EUR) (2007-2011)

	2007	2008	2009	2010	2011
EU 15	69,357	51,105	21,806	39,713	42,977
Belgium	1,011	667	1,048	482	583
Bulgaria	39	15	6	5	11
Czech Republic	70	36	61	38	193
Denmark	1,197	505	493	436	378
Germany	8,144	7,100	2,412	4,804	4,397
Ireland	321	76	59	48	51
Greece	90	232	41	10	9
Spain	2,759	1,601	913	2,471	2,253
France	12,105	8,517	3,445	5,939	9,249
Italy	1,705	3,222	1,415	895	1,185
Luxembourg	43	368	78	85	221
Hungary	51	34	191	45	78
Netherlands	3,498	1,707	764	1,318	2,048
Austria	356	217	138	127	124
Poland	781	727	480	504	689
Portugal	211	396	299	201	367
Romania	156	123	83	80	48
Finland	840	482	388	419	420
Sweden	2,543	3,270	1,261	3,114	2,164
United Kingdom	34,533	22,746	9,052	19,365	19,526

(*Source: Eurostat)*

To sum up, the economic part of the macro-analysis shows that Bihurcrystal should bear in mind the following statements:

- The leader in the number of high-technology manufacturing companies, as well as one that generates the highest turnover is Germany.
- United Kingdom, Ireland, Italy, Czech Republic and France are also countries relevant countries to keep in mind regarding the number of companies and turnover that they have.
- The imports of high-technology have always been higher than the exports between 2000-2011; consequently, the trade balance has always been negative.
- High decrease in imports, as well as the CVI, in the year 2009 due to the economic crisis.
- Regarding Capital Venture Investment, United Kingdom is the country with the highest CVI, followed by France and Germany.

So, Bihurcrystal needs to pay special attention to the markets of Germany and United Kingdom, as they both have a high number of high-technology enterprises located there and also a high Capital Venture investment, which makes them both very competent markets.

Furthermore, the analysis has shown that the economic crisis has had a very strong impact in the world of science, making the imports of high-technology and CVI decrease. Although it has been several years since the crisis started, companies have no recover their full potential and some still have difficulties to carry on. Bihurcrystal should stress out the point that acquiring their main product companies will save a huge amount of money.

3.3 Socio-cultural factors

Within the socio-cultural factors, the employment in the sector of high-technology is analysed. As Bihurcrystal intents to enter into an international market, it is relevant to know the rates of employment that the EU countries have, because it will give Bihurcrystal a closer idea of the potential that the high-technology industries have in these countries.

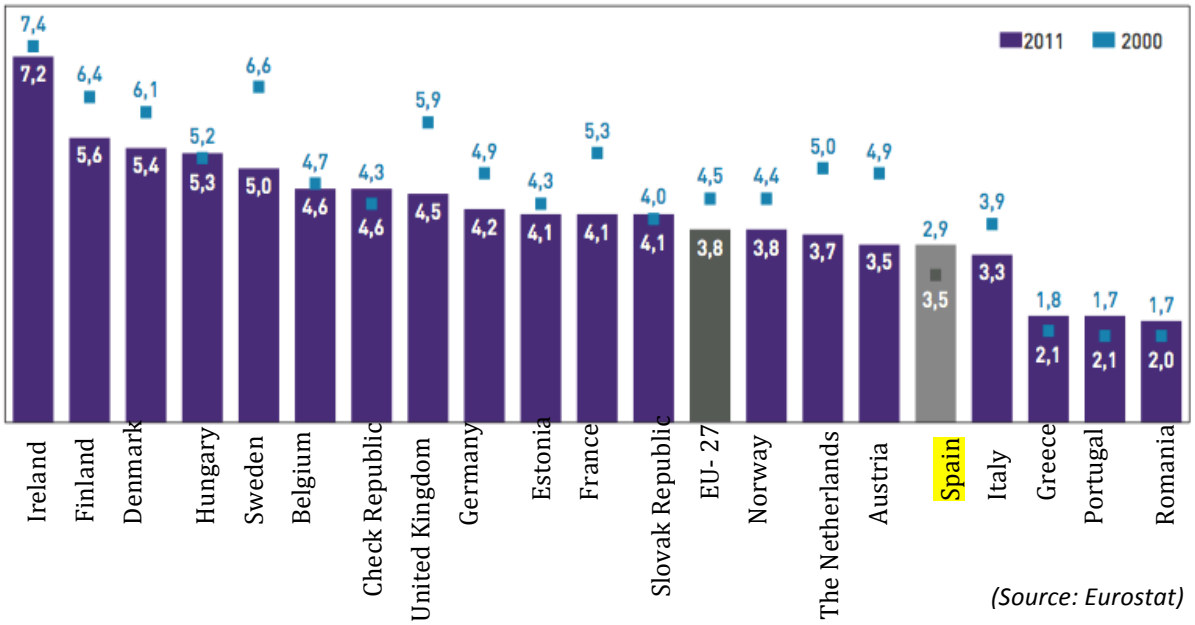
The following graphic shows the percentage of employment that high-technology industries have over the total employment in each of the European countries. Countries are organized from the left to the right in a decreasing order of percentage of employment in the year 2011, starting with Ireland, which has the highest percentage (%7.2) and ending with Romania (%2.0).

The average percentage of high-technology employment of the EU was %3.8 in 2011, and as it is shown in the graphic, Spain was below this percentage in 2011 (%3.5).

Regarding the comparison between the employment rate between the 2000 and 2011, in most of the countries, the employment percentage was higher in 2000 than in 2011.

Nevertheless, there are some countries such as Spain, Portugal, Greece or Romania among others, in which the employment rate of high-technology sector has increase.

Graphic Nª3: People employed in the sector of high-technology in EU countries (percentage about the total employment)



(Source: Eurostat)

So, Ireland is also another country that Bihurcrystal has to pay attention to because of the high employment rate that it has in the high-technology industry. Besides, it is also one of the countries that have the highest value added, as the economic analysis has shown.

The low employment rate of Spain shows that the weight of the high-technology enterprises on the Spanish market is not as high as it is in other countries of the European Union. This fact is definitely important to Bihurcrystal because it is established in Spain; therefore its closest market is the Spanish one.

3.4 Technological factors

Within the technological factors, the government plays a very important role, as it has developed a State Plan for Scientific Research, technology and innovation that affects directly to Bihurcrystal. It is a plan that is supposed to be implemented between 2013-2016.

The government has planned several strategies to develop and broadcast the key enabling technologies (Tecnologías Facilitadoras Esenciales) to companies such us photonic, microelectronic, nanoelectronic, nanotechnologies or biotechnology.

In the framework of this programme the following actuations will be financed according to the Spanish Government and the ministry of Economy and competitiveness:

- Projects of R&D&i executed by one or several companies. These projects can have the collaboration of public agents of R&D for the execution of concrete aspects within the planned objectives.

- Projects of innovation and technology modernization to increase the capacities of technological absorption of companies, especially PYMEs, throughout the adaptation and active assimilation of knowledge, as well as the technological modernisation through the incorporation of technology in different sectors.

This is be very important for Bihurcrystal because having the government finance their project will ease them to purchase all the required machinery and will help them to develop as a company.

3.5 Ecological factors

Even though sometimes ecological factors are forgotten, the importance that they have is quite high. Due to global warming, companies are closely watch regarding their disposals in order to reduce the contamination, which is why a lot of money is spent in order to protect the environment. Nevertheless, the economic crisis has also reach the ecological sector, reducing considerably the amount of industry expenses in this matter.

The total amount of expenditure in environmental protection was 2.389 million of euros in 2011, increasing 0,2% regarding the previous year. The ordinary expenditures destined to environmental protection increased in 5,3%. Conversely, the investment registered a decline of 10,6% in annual rate.

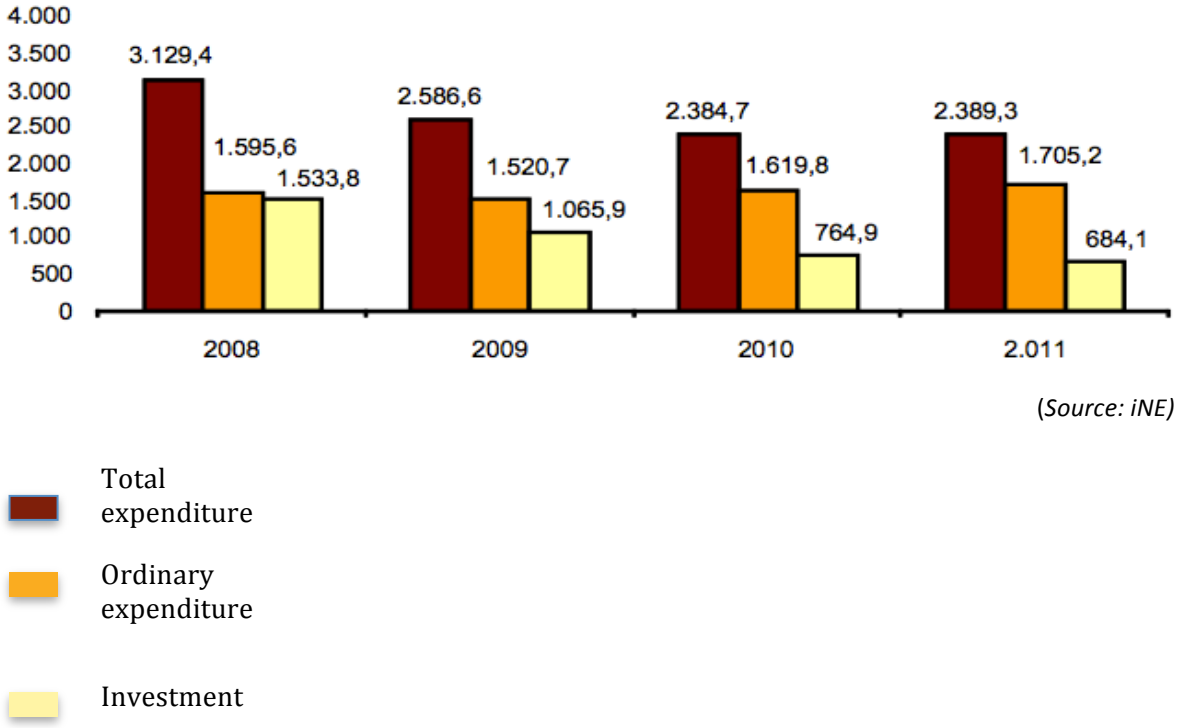
Table Nº4: Industry expenses in environmental protection. (2011)

	Amount	% of total	%annual variation
Total expenditure	2,389,333.1	100%	0,2
Ordinary expenditure	1,705,233.7	71,4%	5,3
Investment	684,099.4	28,6%	-10,6

(Source: INE)

In one hand, as the next graphic shows, the ordinary expenditure in environmental protection has always been more than the investment during 2008-2011. From the other hand, the oscillation of the amount of ordinary expenditure is very small, whereas the amount of investment has decreased considerably in that period, being approximately 684.000 euros in 2011 even though it was nearly 1.534.000in 2008.

Graphic Nº4: Ordinary expenditure and investment in environmental protection of the industry (EUR millions)



(*Source: iNE)*

In conclusion, Bihurcrystal has to keep in mind the relevance that the protection of the environment has nowadays. Although the expenses in this matter have decrease due to the crisis, the amount of total expenditure was 2.389,3 million euros in 2011, which is a considerably high amount.

3.6 Political factors

The objectives established in the Spanish Strategy of Science, Technology and Innovation have an important need of resourcing from the R&D&i activities. The Spanish Strategy covers the following points:

- Increase the grade of implication and participation of the private sector in the investment in R&D&i in Spain.

- Increase substantially the fundraising, mainly through the participation in the programmes established by the European Union as well as attracting investment of R&D&i from multinationals and foreign companies.

- The commitment of Public Administrations to maintain the effort made in the financing of R&D&i activities sustainably over time. The aim of the European Union of achieving a 3% of expenditure in R&D&i over the PIB by the year 2020 implies the mobilization of an important private investment in R&D&i, which has to be specified regarding the different characteristics of each of the member countries.

After having a deeper look into the Spanish Strategy, the final objective that Spain intent to achieve by the year 2020 is to obtain an investment in R&D&i of %2. The following table shows the main indicator associated to the Spanish Strategy as well as the values that are desired to acquire in 2020.

So, in this case, political factors can be very beneficial for Bihurcrystal. If the strategy is carried out correctly and it achieves the objectives that the Spanish Government has aimed, it would suppose a huge help for Bihurcrystal.

Table Nº5: Effort indicator of the Spanish Government and its strategy

Effort Indicators	2010	2016	2020
Expenditure in R&D over PIB (%)	1,39%	1,48%	2,00%
Expenditure in R&D of private sector over PIB (%)	0,60%	0,73%	1,20%
Ratio between private and public finance of expenditure in R&D	0,86	1,06	1,70
% of the foreign finance of expenditure in R&D	5,7%	9,6%	15,0%
Graduated doctors between the age of 25-34	0,9%	1,2%	1,6%
Companies that make technologic innovation over the total amount of companies (more than 10 employees)(%)	18,58%	20%	25%
% of PYME that make technological innovation over the total PYME	14,6%	16%	20%
Nº of companies that make technologic innovation in collaboration with public centres and universities	23%	30%	45%

(Source: Spanish Government)

4. MESO-analysis

During the "meso analysis", the different market forces are mentioned, in which are included the suppliers, customers, strategic alliances and competitors.

4.1 Bargaining Power of Suppliers

The bargaining power of suppliers is relevant for Bihurcrystal as it could suppose an issue for the company. In order to create curved crystals, Bihurcrystal purchases "plane crystals" to suppliers.

The number of suppliers of "plane crystals" is very reduced in the market, which means a high volatility of prices, as companies such as Bihurcrystal do not have any other suppliers to go to.

These suppliers can take advantage of the situation and, at a certain point, increase considerably their prices. That is why, in this case, the bargaining power of the suppliers is really high.

4.2 Bargaining Power of Customers

The bargaining power of the customers is not as relevant for Bihurcrystal as the bargaining power of the suppliers. As it is a new product in the market, customers do not have any references regarding price or use of a similar product.

Customers can consider plane crystals to compare them with, but as curved crystals suppose a huge advantage and can save them a substantial amount of money (as you can conduct several experiments in the same crystal), the higher price is totally justified.

Therefore, Bihurcrystal has to consider that commercializing an unknown product can suppose some trust issues for some research centres, which should required to make some discount or price reductions.

4.3 Threat of Substitute Services

The substitute services that might arise once Bihurcrystal is well established in the market are undeniable. In the field of science the plagiarism of competitors is inevitable. It does not take long until the competitors figure out the production process of the new product, or come up with a new one on their own.

That is why the company has taken into consideration to join forces with Surface Preparation Laboratory (SPL), one of its competitors. Because of the characteristics of the company, which will be explained later, and the close contact that the members of Bihurcrystal have with the company members, SPL is considerate an adequate partner to cooperate with.

4.4 Threat of New Entrants

As mentioned before, curved crystals are new and innovative product that Bihurcrystal is introducing into the market. There is not anything like curved crystals currently in the market.

Nevertheless, as it is a scientific market, there is the possibility that once the product has been commercialised, the competitors could find out the process behind it and copy it. This would take away the exclusivity of selling a unique product.

Furthermore, apart from the risk of other companies finding out the process behind the curved crystals, the possibility that other companies will enter the scientific market has to be taken into account. It could haven that PhD doctors or other people related to science see the potential that curved crystals have and decided to start a new company based on them.

New entrants could affect Bihurcrystal in a negative way; meaning that they could attract customers that otherwise would be Bihurcrystal's. If that happens, Bihurcrystal would have to face a much harder situation to gain customers.

4.5 Competitive Rivalry within an Industry

Nowadays, the market of crystalline samples for the studies of surface physics focuses exclusively in the products with plane surfaces. Regarding crystalline samples with enough quality to do research studies, the market is dominated with two main companies:

4.5.1 Surface Preparation Laboratory (SPL)

It is a company settle down in The Netherlands with more than 30 years of experience in the field. It is specialized in creating well-prepared and well-characterized single crystal surfaces. SPL has worked in the field of crystal and surface preparation since 1984 and is very aware of the needs and requirements of the scientific community.

On 1999, René Koper set up SPL as an independent company that provides the scientific community with the high-quality crystal.

Surface Preparation Laboratory offers no "standard" products. All SPL's products are tailor made. SPL encourages their customers to formulate their demands as explicitly as possible, via the *"request quotation form".*

The company has 2 employers, one of them the owner, and offers plane crystals to a very high price. The approximate invoice was around 413.000€ in 2011 with a market share between 25-40%.

The strength of SPL is the high quality of crystals that it offers as well as the high experience that has in the field.

4.5.2. Material-Technologie & Kristalle

MaTecK was founded in 1993 and is located in Juelich, Germany. It is a leading producer and supplier of innovative research materials, which offers crystalline samples of moderate quality but competitive prices as a part of a wider catalogue that encompasses several products for the scientific market.

It has an online shop that offers more than 4.000 products and detailed description of the elements properties.

Their goal is to supply with the highest possible quality, competitive pricing and short delivery times. MaTecK has 7 employees and its total invoice (of all the products) was 1.7M in 2011.

5. TARGET ANALYSIS

In order to find out the profitability that curved crystals can offer, it is essential to know the market and the potential clients that operate in it. That is why, in this chapter the market of Surface Physics and the possible targets that Bihurcrystal has to reach are described.

Bihurcrystal has the aim of achieving the 100% of the market share, as curved crystals are a new product that is going to be introduced in the market and Bihurcrystal is going to be the only one providing them.

5.1 Potential market

All the data that mentioned underneath is an estimation done by Bihurcrystal with the aim of getting a general idea of what its market and clients are. Although being estimated, the information is highly reliable due to the high knowledge of the field of Surface Physics that the members of the company have, especially Enrique Ortega.

According to the estimation done by Bihurcrystal, there are approximately 5.000 surface science institutions around the world. Most of these groups are public organisms of research like for instance CSIC (Consejo Superior de Investigaciones Científicas).

Nevertheless, there is also a small amount of companies related to industry that Bihurcrystal must take into consideration. An example of this is Shell; a very important multinational that produces oil and gas and with the headquarter in La Haya, The Netherlands.

Bihurcrystal estimates that are nearly 5.000 scientific institutions. However, some of these institutions are formed by theoretical groups, which are not potential clients of curved crystals. Furthermore, not all the scientific groups are going to need the product.

So, the amount of scientific institutions that are potential clients is reduced considerably to 3.000 institutions.

An institution can use approximately 2 or 3 curved crystals per year, which will result on:

$$Total\ crystals\ in\ the\ world: 3{,}000\ x\ 3 = 9{,}000\ crystals$$

$$Total\ (€) in\ the\ world: 9{,}000 crystals\ x\ 3{,}000€ = \ 27{,}000{,}000€$$

This means a market of 27,000,000€ in the whole world (taking for price 3,000€ per crystal).

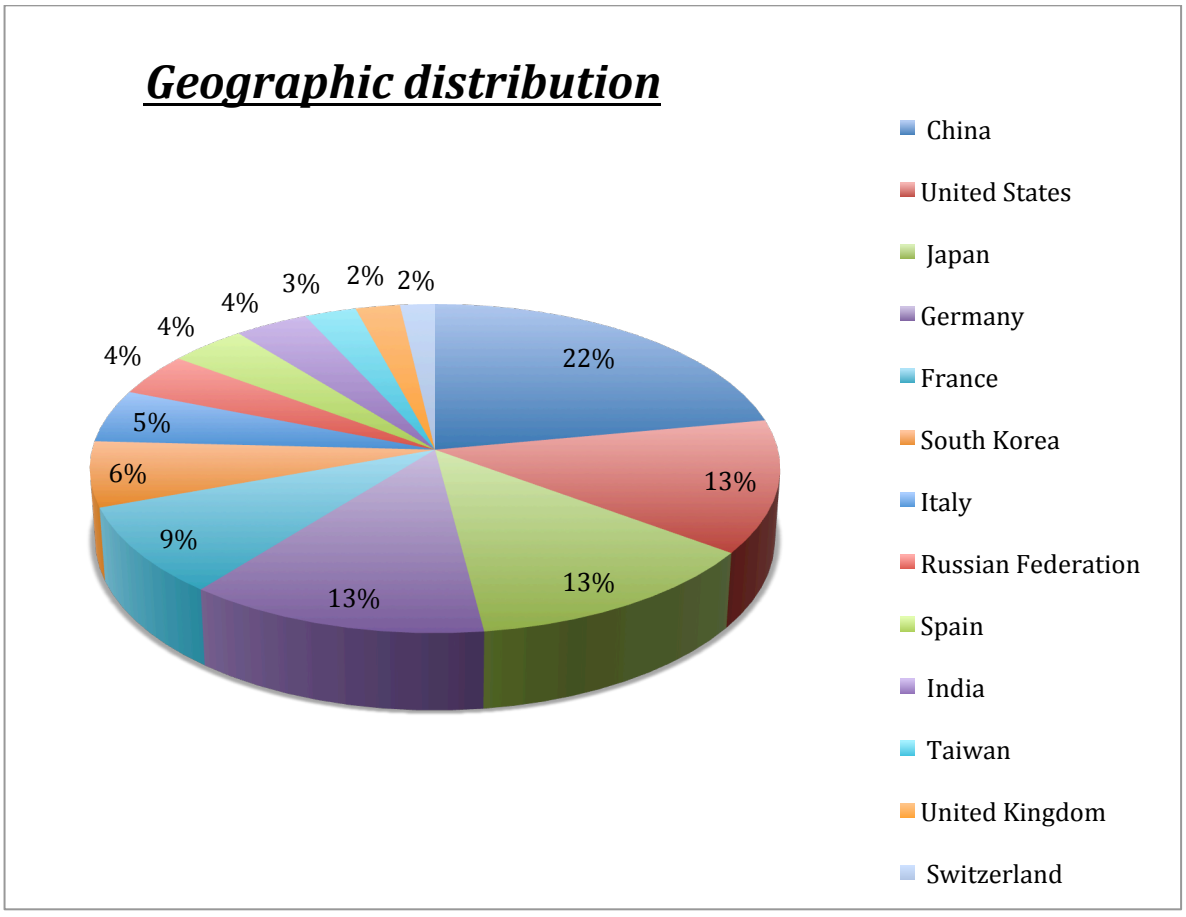
Despite the potential future growth of this market, which will be explained later, it is obvious that is quite a small market, which makes things harder for Bihurcrystal because of the limited clients and the small margin of error. That is why they have decided to amplify their product range and sell other products as well as the curved crystals.

5.2 Client distribution

Throughout the contacts that the members of Bihurcrystal have with different research centres, a list of possible clients has been elaborated. The contacts of different research centres has informed Bihurcrystal of what type of experiments are being carried out in their centre, giving the company an estimation of which ones will be needing the curved crystals and, consequently, making them possible future clients.

Once all the contacts have given the information and the estimation has been done, Bihurcrystal has made a geographic distribution of these possible clients in order to have a clear image of where are they located and which are the markets with more force.

Graphic Nº5: Geographic distribution of possible clients



(Source: Own elaboration)

The strategic market and the first one that Bihurcrystal is planning on introducing is the European one. It's closeness and the better knowledge of the functioning makes the

European market a priority to Bihurcrystal. The graphic above shows clearly that the most important countries in Europe are Germany (13%), France (9%), Italy (5%) and Spain (4%).

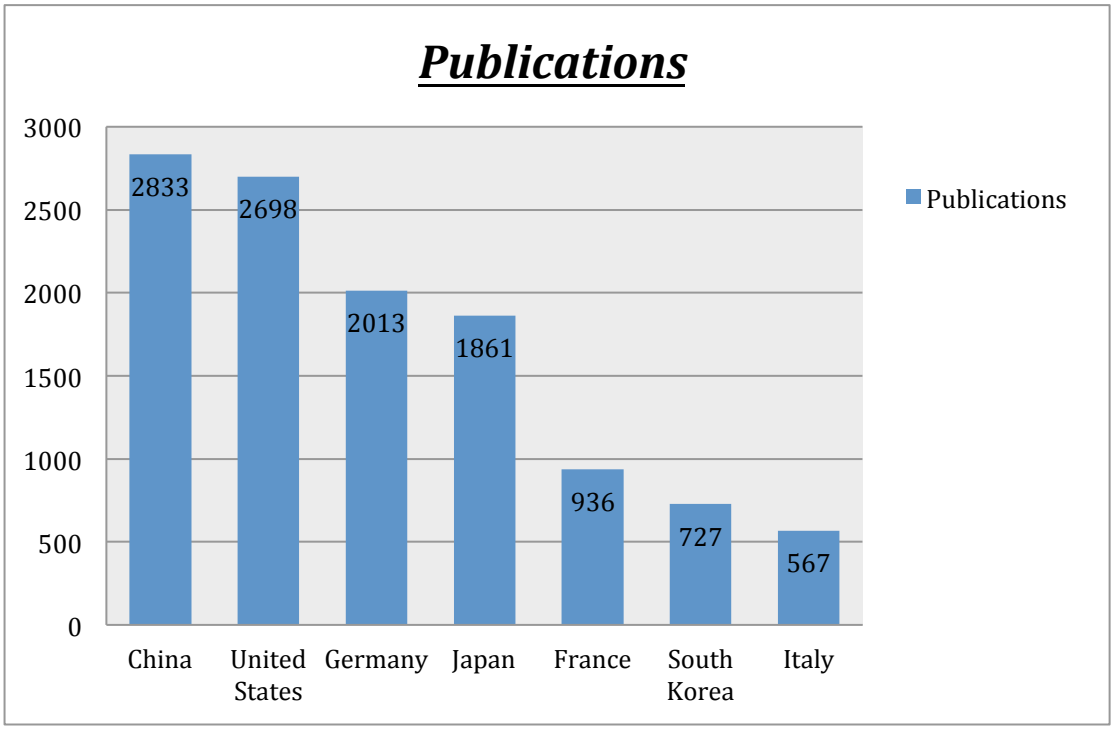
The biggest market share is located in Asia, concretely in China (22%) and Japan (13%). Besides the high amount of possible clients, Asia could be a potential market due to the big volume that it has, but the restrictions that exists in relation to entry barriers for foreign companies makes the introduction to the Asian market very difficult in short term.

United States (13%) is also a potential market that Bihurcrystal considers relevant and wants to get into it once it is established in the European market. Canada and Mexico are also potential markets that have been gaining relevance and strength during these last years.

Bihurcrystal has also study the scientific publications of researchers made by crystalline surfaces in each country to see the relevance and the demand that curved crystals can have in each of them.

Bihurcrystal has done an analysis of the existing institutions based on the scientific publications done in the area and has carry out a geographic distribution of those institutions in order to locate possible clients and decide a strategy accordingly. Between all the publications found (13.875), these are the countries that had made most publications from 2009 until now:

Graphic Nº6: Publications related to crystalline surfaces in each country



(Source: Own elaboration)

These results are similar to the ones obtained by the geographic distribution of potential clients. Asia has a huge relevance in relation to the publications made, with China (20%) and Japan (13%) in front. United States (15%) also is amongst the most important ones like the previous analysis has showed.

Regarding the European countries, the most important ones are Germany, France and Italy. This results match the results obtained in the macro-analysis part, which indicates that although being estimation, this data is also reliable.

5.3 Market growth

Nowadays the use of nanotechnology is very spread within the scientific market as well as in different industries. Due to the fast technological evolution and the development of new innovative processes, the fields in which nanotechnology is used have been expanded. Consequently, the market has growth substantially.

These are the fields in which nanotechnology is used:

- Catalysis/Electro catalysis
- Solars
- Hydrogen batteries
- Semiconductor physics
- Leds
- Microelectronic
- Photonic
- Tissue industries
- Oncology
- Carbon fibber

As the field of nanotechnology is developing, so it is its appearance in different markets, such as, for instance, the market of graphene. These last years the graphene market has gain strength and it has become very popular. Although currently there is not any developing project regarding nanotechnology in this field, there is a high chance that, in a near future, nanotechnology will be presence and will contribute to the growth of the graphene market.

5.4 SWOT-analysis

In order to complete the market research, an SWOT analysis is necessary. This analysis is useful for (Santesmases and Merino, 2009):

- Sum up the knowledge acquired.
- Stand out the most significant ones.
- Arrange the information in a way that is comprehensible for other people of the organization.

The four headlands that gather up the SWOT analysis are: weaknesses and strengths, that refer to the internal analysis, and opportunities and threats, belonging to sum up the most important founding's in the external analysis.

First, the most important ones are being explained because the relevance that they have is very high. Later on, a more explicit analysis is done, where apart from the most relevant ones, other concrete strengths, weaknesses, opportunities and threats are mentioned.

Strengths

As mentioned before, currently there are no curved crystals in the market. Being a completely new product offering a lot of benefits that no other product in the market offers makes Bihurcrystal a very strong company.

As the members of the company are regarded physicists with deep knowledge in the field of surface physics, the quality of post-sales services that they can offer is very high and reliable.

Weaknesses

Scientists with a deep knowledge of science have founded Bihurcrystal. However, they do not have any other necessary skills to run a business. So, Bihurcrystal needs people to work in the marketing department in order to commercialize successfully the curved crystals, as well as people with knowledge of finance, management, accounting etc.

Another aspect that needs to be reinforced is the production process. Currently, the production process is a laborious process that requires a high labour as well as many hours of work, ergo, is a non-automatized process.

The dependence that Bihurcrystal has over the suppliers is also worth to mention. In order to create curved crystals, Bihurcrystal has to purchase plane crystals to suppliers, which makes them dependable from them.

Opportunities

If the clients perceive the product as useful and beneficial for their purposes, Bihurcrystal could expand rapidly as it is the only provider of the products. That is why is very important to commercialize the product in a way that it is known amongst the entire scientific world, consequently increasing the demand.

Threats

Scientific markets are very special. For one hand, there is always the threat of the competitors finding out the process behind the new product and being able to produce the same product by themselves, taking away the exclusiveness of the product.

Bihurcrystal has not patented the curved crystals because they wanted to maintain the production process as a secret. This means that, if the competition finds out the production process, Bihurcrystal would not have any rights over it, which is why it constitutes a threat.

From the other hand, the quality standards of scientific products are very high. The quality of the products is required to be very high because the studies done with the products are on a very small scale.

Image Nº5: SWOT analysis

6. MARKETING

6.1 Definition

There is no unanimity when it comes to defining what the marketing is. Nevertheless, the definition that acquires the biggest consensus is the one that offers the American Marketing Association (AMA), which says:

"Marketing is the activity, set of institutions and processes to create, communicate, deliver and exchange products that have value to the consumers, clients, shareholders and, in general, to all the society."

6.1.1 The objectives of marketing

Determining the objective of the marketing plan is very important. Usually, the objective tends to be only one, although sometimes there could be several objectives as long as they are compatible.

Professor George A. Steiner, expert in strategy planning, advises to follow 10 rules when formulating the objectives. Following these rules assures that the objectives selected will benefit the global functioning of the company.

The rules are (Alet Josep, 2007):

1. Adequacy: The objectives must favour the purposes of the company.

2. Possibility of measurement of time: The objectives must say clearly what does the company want to achieve so that it can be measured during the execution.

3. Viability: The objectives must be reachable.

4. Acceptability: The objectives have to be acceptable for the members of the company.

5. Flexibility: The objectives can be modified in the case of incidents so they can adapt adequately to the environment.

6. Motivation: The objectives must motivate the workers.

7. Comprehensibility: The objectives must be formulated in an understandable language and in a clear and simple way, so that all people can understand.

8. Compromise: Once the objectives are established, the company has to make sure that all the people are working to try to achieve them.

9. Participation of the ones involved: Professor Stainer says that the best results are obtained when the responsible to achieve the objectives are the ones that are involve in their formulation.

10. Coherence: The objectives have to be coherent with the purpose of the company as well as the objective of its different sections.

Taking into account these 10 rules mentioned above, Bihurcrystal has fixed the objectives that wants to achieve:

a. Be the leader of the market.

b. Expand to international markets.

c. Obtain financing from different sources.

d. Increase the productivity.

e. Increase the assets.

f. Expand.

6.2 International Marketing vs. Domestic Marketing

In this chapter, International Marketing and the domestic one are differentiated. The definition of International Marketing is the following one (Cateora y Graham, 2005):

International marketing is the performance of commercial activities that are designed to plan, assign prices, promote and manage the flow of goods and services of a company to the consumers from more than one country with the aim of obtaining earnings.

Essentially is the same as domestic marketing with the unique difference that in international marketing, the marketing activities are conducted in more than one country.

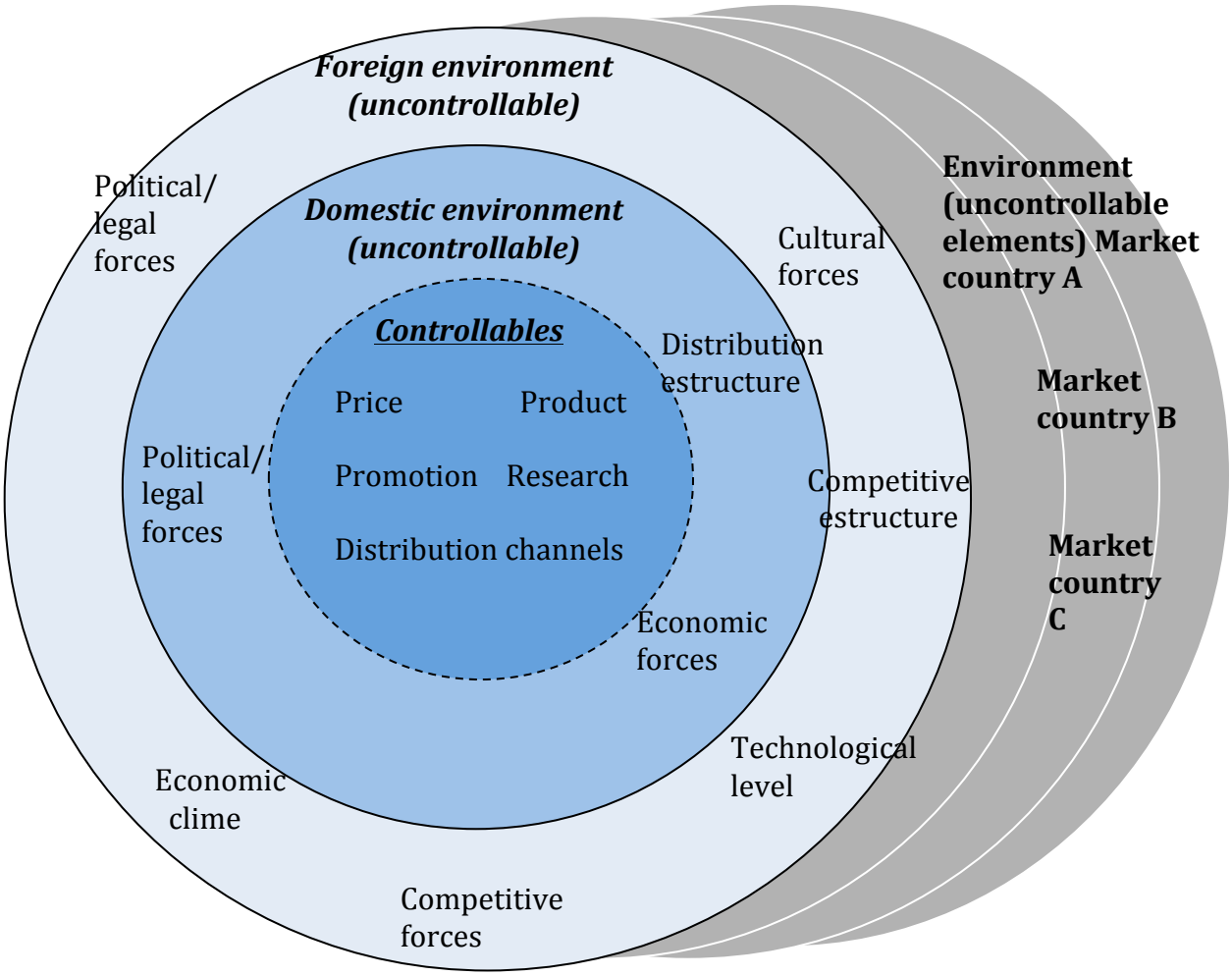
Although it might seem like a small difference, the truth is that it supposes a whole new level of unknown problems that could came up and a variety of strategies that are needed to face the uncertainty of foreign markets. This is why international marketing is much more complex than the domestic one.

It is important to differentiate the uncontrollable and controllable elements in order to appreciate the huge differentiation between international and domestic marketing.

From one hand, the uncontrollable elements, for instance, the economic clime, competition structure, political forces etc. can affect the results of the marketing plan. These elements cannot be controlled or influenced, which means that every marketing plan can fail. The only thing left is to be able to adapt fast to these circumstances.

The controllable elements on the other hand, are those elements that are companies' decision, such as price, promotion, distribution channels etc. The company has the total control over them and can change them when it considers convenient.

Image Nº6: Total environment of international marketing



(Source: Own elaboration based on Cateora and Graham, 2005)

The previous image represents the total environment of the international marketing. The intern circle describes the domestic controllable elements that establish the area of decision of the marketing plan.

The second circle describes the domestic elements that affect the decisions of the external operation and the external circles represent the elements of the external environment of each foreign market where the agent of marketing operates.

The exterior circles shows that each foreign market can show different problems related to some of the uncontrollable elements. Therefore, the more foreign markets Bihurcrystal access, the more variety of problems will the company have to face up. Frequently, the solution to the problem of the A market is not applicable to the problem of the B market.

6.3 Marketing plan

The marketing plan is essential for the good functioning of any company and an efficient commercialisation of any product or services. It provides a clear vision of the final objective and what the company wants to achieve in the process. Simultaneously, the marketing plan informs about the different stages that the company has to follow in order to achieve its goals.

6.3.1 Usefulness

A marketing plan can have different uses to the companies (Cohen, W. 1991):

1. **Serves as a map:** Indicates how can the company achieve the goal that has set up at the beginning. The marketing plan describes the market environment, economic conditions, technological situation, predicted demand, social and cultural factors, demographic factors of the market and the recourses that the company has.

2. **It is useful to control the management and to put the chosen strategy into practice:** Sometimes the chosen strategy cannot be followed because of exterior circumstances. Even so, as the marketing plan foresees the possible changes and plans different options that are necessary to overcome them, it enables the company to reach its goals.

3. **Inform the participants what is their role within the plan:** In order to fulfil successfully a strategy, a lot of actuations have to be coordinated. It is very important that all the participants know exactly what their responsibilities are and how do their duties and tasks fit within the strategy. The marketing plan describes the overview of performances, making clear for everyone their role.

4. **Allows obtaining resources for the elaboration of the plan:** The resources are always limited. The marketing plan is important to convince the investors to invest money, human resources and other assets to the project.

5. **Stimulates the reflection and a better use of the limited resources:** An adequate strategy helps to have the best use of the limited resources. That way, the company will have a vantage over its competitors. The researcher carry out during the marketing plan and the analysis of alternative strategies stimulates the reflection.

6. **Helps to organize, assign responsibilities and define terms:** The marketing plan assigns responsibilities very accurately, so that there is not any confusion. It guaranties that every task has a responsible that will carry it out in the appropriate moment and that all the elements and strategies are coordinated harmonically.

7. **Serves to realize the problems, opportunities and future threats:** The marketing plan writes down the problems, opportunities and threats that have been foreseen and helps to identify new ones. It allows to establish strategies and to consider what will the company do regarding future problems, opportunities and threats.

7. COMUNICATION (promotion strategies)

Communicating accurately with clients and giving them all the information they need to make their buying choices is very important for any company. As we have seen earlier, the market of Bihurcrystal is an international one, with potential clients all over the world. So, this means that the promotion strategy needs to be wide enough and strong enough to reach every single one of them.

In order to communicate with the client and influence them there are several tools that companies can use, which are described in the next table. Bihurcrystal does not have the resources necessary to carry out all of them, which is why it has selected the ones that will be the most beneficial to commercialize their product.

Table Nº6: Communication tools to get in touch with the clients

ONE-WAY COMUNICATION	⟷			TWO-WAY COMUNICATION
Advertising	**Public relationships**	**Sales promotion**	**Direct marketing**	**Personal sales**
Newspapers	Annual reports	Discounts	Direct mail/marketing with data base	Sales presentations
Magazines	Corporative image	Catalogues and flyers	Marketing via internet	Management of sales strength
Specialized magazines	Intern magazines	Samples, coupons and gifts	Telemarketing	Exhibitions and trade fairs
Directories	Relationship with the press	Competitions or contests	Viral marketing	
Radio	Public Relationships			
Television	Events			
Cinema	Politic pressure			
Outdoor	Sponsorship Activities			

(Source: Own elaboration based on Hollensen and Arteaga Ortiz, 2010)

The promotion strategy is based on the budget and size of the company, which is not big in either of the cases. Because of that, Bihurcrystal should only focus on the ones that would be most beneficial for the company.

7.1 Specialized magazines

Advertising is one of the most visual ways of communication. It is very spread amongst the society but the handicap is that is a one-way communication with the client, that is to say that companies do not receive any feedback from the clients, they only send their message without receiving any response.

The science market is continuously developing and changing because new discoveries are being made constantly. Consequently, the knowledge amongst scientists is increasing making the field to growth obtaining results never though to be possible.

This constant innovation requires to be updated to the latest discoveries and researches done, which demands scientist to always be informed about what are the latest news in

their fields. This is why specialized scientific magazines have so much relevance among the scientists and why it is important to Bihurcrystal to announce themselves on them.

There are a lot of magazines that are read in the scientific world, and more specifically, in the surface-science sector: Nature and science, nature nanotechnology physical review letter, ACS-nano, Nano-letters etc. Anyone of them will be a good mean to advertise curved crystals.

7.2 Discounts

Discounts are part of the sales promotion section. Sales promotion is related with the activities called BTL (below the line) such as flyers, free samples, promotions like two for the price of one etc. It is an effort made in short term aimed to reach the consumer in order to achieve different objectives (Hollensen and Arteaga Ortiz, 2010):

- Convince the consumer to try the product or buy it immediately.
- Carry the consumer to the store.
- Encourage the stores to offer the product.
- Encourage the retailers to use exhibitors in the point of purchase of the product.

Bihurcrystal has already sold a few curved crystals with the criteria of applying a discount of %25. The ones that it has sold were prototypes, as the production process is still not automatized. Furthermore, as it is not established in the market yet, the product is seen as something out of the ordinary and customers may have trust issues regarding it.

So, for the first few sales Bihurcrystal is applying to their current customers a %25 discount for each curved crystal that sells.

7.3 Marketing via Internet

The way of transmitting information, traditionally based on almost exclusively in the written press and books, is being complemented by digital means. During one or two generations, neither books nor the written press is going to disappear, but all the traditional means of communication are going to suffer multiple transformations in short-medium term. Therefore, companies need to innovate their communication strategies in order to be quicker in responding the future changes of the means.

The fast adaptation of the new social technologies has made Internet one of the most important distribution channels nowadays. Each day more consumers make the decision of buying products or services motivated by the information that they found on the Internet.

Because of that, Bihurcrystal has decided to create a website (www.bihurystal.com) to provide potential clients information about the company and the products that is offering.

The information is all given in English, as Bihurcrystal expects their website to have visitors from all over the world. It has different departments giving information about the company as well as the products that they offer. Furthermore, it provides customers with the option of ordering curved crystals online, with the opportunity of specifying the concrete measures that they want their samples to have.

The logo chosen by Bihurcrystal shows a curvature representing the main product of the company: Curved crystals.

Image Nº7: Bihurcrystal's Logo

Although the website already exists and its functioning correctly, Bihurcrystal is thinking about improving it by making it more attractive to the customers. In order to do that, the company must see it is a profitable idea, meaning that the customers that might get by improving the website will generate the company more benefits than the cost of rebuilding it.

That is why it has look into a website design company (http://www.lombokdesign.com/) and see an example of an invoice of creating a webpage:

LOMBOK DESIGN

Web design, layout and programming
Create a web of positioning and image of the company
Programing in html5
Purchase of the domain for a year
Purchase of some images for the web
Creation of accounts of social network, such as twitter and Facebook
Restore the corporative image of the company, modernizing it.
Realization of a photo session of different production processes.
Realization of photography's of products.

Total	3.000 €
I.V.A (21%)	630 €
TOTAL INVOICE	3.630 €

Currently this cost will suppose a big effort to Bihurcrystal, which is why the company is not going to change the website right at this moment. Nevertheless, once the profits increases and the company expands, Bihurcrystal will definitely introduce some improvements in their website.

7.3.1 Social networks

Social networks are also very important nowadays. Bihurcrystal should analyse the role that these networks can have when commercializing their product, as they enable to create new channels to attract new clients.

Three types of social networks groups can be differentiated (Celaya Javier, 2011):

1. Professional networks (LinkedIn etc.)
2. General networks (MySpace, Facebook etc.)
3. Specialized networks (CinemaVIP, Ediciona etc.)

After analysing who the most important competitors of Bihurcrystal are and their online strategies, these are the social networks that they mostly use:

7.3.1.1 LinkedIn

LinkedIn is a social network that is used as a professional network. Funded by Reid Hoffman, Allen Blue, Konstantin Guericke, Erick Ly and Jean-Luc Vailant was launched in

2003. In 2008, the web page LinkedIn indicated to have more than 25 millions of professional profiles from all around the world.

This social network earns a lot of money through the insertion of job advertisements posted by companies that are interested in catching talent throughout the social web.

So, it could be beneficial to Bihurcrystal to create an account and publish the different accomplishment and latest development of the company, as well as search the necessary members in order to ensure to have a competent team.

7.3.1.2 Facebook

Facebook is a social network created by Mark Zuckerberg and founded beside Eduardo Saverin, Chris Hughes and Dustin Moskovitz. The growth that this company has experienced since its creation in February of 2004 has been astonishingly high.

With more than 500 millions of users, companies have realized that Facebook is one of the main means of communication that exist nowadays. This has generated a quick reaction in the companies that have started to use this network as a tool to promote their products or services. Facebook allows spreading the information to the people that is interested in the company's products or services.

The first step is to create a profile of Bihurcrystal, in which information about the company will be handed, as well as the link to its webpage.

Once the profile is done, the decision of the content of the profile needs to be taken. The following ones will be included at least at the beginning: the logo of Bihurcrystal, corporative information, images, information about the products, quality guarantees, post-sale services and prices.

In order to maximize the investment made in Facebook, Bihurcrystal needs to ensure to obtain as many users as possible. So as to measure the scope, Facebook has a statistics platform, throughout the companies can access to detailed information about their followers and measure the number of visits and users of their profile (Zarrela y Zarrela, 2011).

7.4 E-mailing

As the company members are all experienced scientists, they all have contacts within the scientific world. This is a huge advantage that has helped Bihurcrystal into having a glimpse into the reaction of the people to the product.

A member of the company has created a database with all the contacts that they have, considering them possible future clients, as explained before. After e-mailing them explaining the characteristics and the benefits of curved crystals, %75 of them responded positively, showing a high interest in the product. Of course this does not mean that all of them will be buying the product, but gives Bihurcrystal an idea of what the receiving of curved crystal is going to be in the market.

Furthermore, e-mailing is a very good way of reaching different companies that are located all around the world in a cheap way.

7.5 Viral marketing

Viral Marketing takes advantage of the benefits of the Internet to ease the communication with just a click. The aim is to reach the perception of one client in favour of the brand. Then, this client turns into the carrier of the previous message and spreads it amongst other people.

So, viral marketing is a proposal to develop a message that spreads rapidly and exponentially among consumers. Nowadays, it usually develops though email or via web, sometimes even through mobile phones.

The development of viral marketing happens by means of all communication tools, such as email, face to face, printed means etc. In most of the cases, it is a face-to-face interaction amongst people and casual dialogue between co-workers, friends or family.

There are different concepts within viral marketing that need to be distinguished (Alet Josep, 2007):

- Word of mouth: It is the most common and strong mean that exists. It consists of sharing opinions, experiences over products and services between one to another.
- Buzz marketing: It consists of events or activities that generate new, comments and information to consumers. That way, the activities turn into public relation events.

Within the scientific world, the opinions of prestigious people are taken very seriously and could have a huge impact on the image of every company, making the sales increase or decrease very quickly. That is why viral marketing could be a very important marketing tool that Bihurcrystal could benefit from.

7.6 Exhibitions and trade fairs

Trade fairs represent the best way of approaching clients, making contacts, evaluate the potential distributors or retailers and promote the company. Many trade fairs are held regarding scientific products, with an attendance from people all over the world. These trade fairs have a huge prestige and are very important in the scientific world. As a consequence, Bihurcrystal should consider to participate on them.

Every two years the Spanish community working on scanning probe techniques is gathered in a conference called Fuerzas y Túnel (FyT). Next conference will be held in San Sebastian from 27 to 29 August 2014. It aims to bring together scientists who share an interest in the applications, the use, the development and the theoretical description of technology based in scanning probes.

In order to make an estimation of the cost of putting a stand, Bihurcrystal should have as a reference the example of the International-machine tool exhibition made in BEC (Bilbao Exhibition Centre) in June 2014 (http://www.biemh.com/). It resembles the kind of exhibitions that Bihurcrystal is attending to go, which is why it has took is as a reference to know the costs of putting a stand.

Table Nº7: Example of the costs of putting a stand in a trade fair

Concept	Costs
Base price of the rent of space	135,00€/ 2
Inscription right	207,41 €
Participation guarantee (deposit)	25,00€/m2

These prices include the floor rent, daily clean up of the stand and expositors and mounting passes.

25m2	Cost
1 Facade	3.375 €
2 Facades	4.387,50 €
3 Facades	4.556,25 €
4 Facades	5.062,50 €

So, although the costs of putting a stand are high, it will be very beneficial for Bihurcrystal because of the huge relevance that these trade fairs have within the scientific world.

8. PRICE

Fixing the price of the product is not an easy thing to do for a company, as it depends on several variables. Furthermore, when the expected market is international, which is the case of Bihurcrystal, the price of the product is also conditioned by external factors such as fluctuation in the exchange rate and the inflation.

In order to settle an international price for curved crystals, Bihurcrystal has to take into account internal and external factors.

Amongst the internal ones there are two relevant factors. First of all, there are factors related to the company. Fixing prices is influenced by the company's philosophy as well as company's politics. The CEO of Bihurcrystal, Ruben Gonzalez Moreno, has decided to apply a discount of 25% to the first sales, as he understands that the product is still a prototype and has not been established in the market yet.

Secondly, there are factors related to the product. These factors include the innovative and singular characteristics of the product and the availability of substitutive products.

Curved crystals are a completely new product in the market, which is why they suppose an innovation in the field of surface science. Regarding the substitutive products, "plane crystals", which can be used instead of the curved ones, cannot offer the several benefits that curved crystals can offer.

So, it is justified that the price of curved crystal will be higher than the plane crystals because it is an innovative and unique product that offers many benefits to the consumer.

The internal factors are the most important ones because the company can control or change them depending the specific needs that it has over time. However, the external ones, are variables that cannot be controlled.

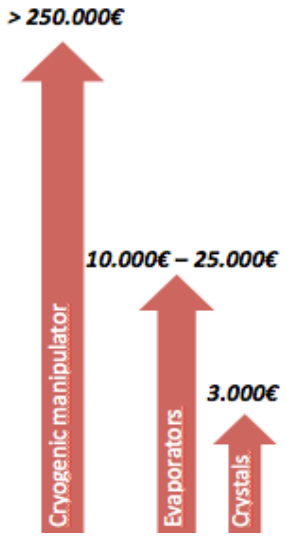
Amongst the external ones, environmental and market factors can be distinguished. Environmental factors cover the power that has the national government over the exports and imports. The import controls (duties, fees etc.) are established with the purpose of protecting the national manufacturers or reducing the flow of foreign exchange.

One of the main factors of the market is the purchasing power that the clients have, although the pressure of the competitors can also affect the price of the product. In the case of Bihurcrystal, clients are other research centres that are used to buy and sell expensive equipment in order to carry out their researches. That is why their purchase power is very high.

Regarding the competitors, it exists, in fact, the pressure of MaTecK and SPL figuring out the production process and starting to commercialize curved crystals on their own.

So, taking all this into consideration, Bihurcrystal has decided which prices their products (all except AFM tips) are going to have, which are shown in the following graphic.

Graphic Nº7: Prices of Bihurcrystal's products



Regarding AFM tips, they are more often sell in packs of different amounts and, depending on that, their prices vary. Bihurcrystal has not decided yet what their selling strategy will be in this case.

9. ORGANIZATION

Once the products have been established, being curved crystals the most important ones, the type of organization needs to be discussed. There are several types of organization that Bihurcrystal could use as it shows the table below.

Table Nº 8: Analysis of different kinds of organization

	Organization by zones	**Organization by products**	**Organization by markets**	**Organization by clients**
Concept	Divide the market in different zones and territories following the geographic criteria.	Divide the commercial activity in product lines that are attended independently, meaning that each product line is part of an auto-sufficient group.	Independent sales teams that perform in a specific market with people that are specialized in that field.	The specialized group performs over objective public that has been divided.

	Organization by zones	**Organization by products**	**Organization by markets**	**Organization by clients**
Advantages	- It is simple to organize and control - It avoids overlaps between the sellers. - The shorter the travelling is, the lower are the costs. - It improves the information about the markets because each seller dominates its market. - Fewer managers are needed.	Its adequate: - When the products are technically complicated. - When the number of references is very high. - When does not exist homogeneity between the different lines of products.	- Higher breakthrough into the market due to specialization - There is no possibility that different sellers of the same organization visit the same buyer.	- The seller knows very well the decision process of the client.
Disadvantages	- There is less specialization. The seller can't be an expert in each product. - The territories have to ensure a minimum level of income.	- Higher structure costs. - Possibility that the same client will be visited more than once for sellers of the same organization.	- The product range can't be very numerous or heterogeneous. - Biggest structure - Lack of geographic homogeneity	- Lack of geographic homogeneity - Issues due to the cleavage of sales strength.

(Source: Own elaboration based on Artal Castells, M. 2009)

Mixed organization: *Different combination of the procedures mentioned before. Companies must choose that combination that allows them to maximize the chances that the market has to offer.*

After seen the characteristics and the advantages and disadvantages of each of the different organization types, it can be concluded that the best that suits Bihurcrystal is the organization by markets. Due to the Independence of the markets of the different products that Bihurcrystal is offering and the specialization of people that conform these markets, this will be the best option.

10. CONTROL MECHANISMS

As many decisions of different relevance are being taken, the company needs to control its results. In order to do this, the company has to compare periodically the work done with the fixed objectives; study which have been the most important virtues and continue empowering them and analyse the deviations in order to correct them. The deviations can happen because of different reasons, such as change of market tendency, non-foreseen competence actions or mistakes committed in the elaboration of the plan (Sainz de Vicuña Ancín, 2004).

Thus, for the purpose of checking if the plan is effective and know in what way the objectives previously fixed are being fulfilled, Bihurcrystal will trace and analyse the results in those areas:

- The annual plan: Check if the company accomplishes the fixed objectives.

- Profitability: Determine the profitability of the product.

- Efficiency: Evaluate and improve the effect of commercial expenses.

- Strategy: It consists of determining if the company is taking advantage of the opportunities that the market offers.

11. MEETINGS

The members of Bihurcrystal are also involved in other projects and researches, which means that cannot dedicate all of their time to their work as part of Bihurcrystal.

Up until now, they used to meet weekly, catching up with the work that each of them had been doing during the week and deciding which the next step would be.

However, considering the new phase that the company is getting into, the meeting assiduity needs to be changed. As mentioned before, the personal of Bihurcrystal is going to grow because of the needs that have risen during this year.

When the commercials of the marketing, finance and technical area are hired, several meetings have to take place in order to establish their tasks. Once the role of everyone is clear, the meetings with each of the area manger will be fortnightly.

12. MEASURES

The objectives that Bihurcrystal has fixed have already been explained. If Bihurcrystal does not achieve to fulfil these objectives, corrective measures will be taken after analysing the possible causes.

Nevertheless, because of the newness and few knowledge of the market, actions will be taken only when the oscillation is very high:

- If the sales are less than 50% of the expected ones.
- If the market share achieved is not enough to make the company profitable.
- If the competitors entry the market faster than expected.
- If the efficiency of the workers is deficient.

If any of those cases happens, Bihurcrystal will have to take action into the issue and change the strategy that has chosen. The measures can be taken in different areas such us price, advertisement, market entrance, cooperation partners etc.

13. FINANCING OPTIONS

The need of financing of Bihurcrystal is undeniable. Being a high-technology manufacturing company gives Bihurcrystal the option to access some subsidies and loans that other companies cannot.

There is no need to say that the conditions and requirements of these possible financial aids vary sustainably from one to another, which is why each one of them has to be studied and analysed thoroughly.

13.1 Horizon 2020 – Access to risk finance

Under 'Access to Risk Finance', Horizon 2020 is a programme that helps companies and other types of organisation engaged in research and innovation (R&I) to gain easier access, via financial instruments, to loans, guarantees, counter-guarantees and hybrid, mezzanine and equity finance.

13.1.1 Financing instruments

13.1.1.1 Loans Service for R&I

It aims to improve Access to risk finance for R&I projects emanating from large firms and medium and large midcaps; universities and research institutes; R&I infrastructures; public-private partnerships and special-purpose projects.

For medium and large midcaps, the loans will be between 7.5 - 25 million euros. For the other entities mentioned above, in which Bihurcrystal is located, loans from 7.5 million euros to 300 million euros will be available. The European Investment Bank (EIB) and the European Investment Fund (EIF) will implement this service.

This instrument is likely to be available from the first quarter of 2014 with the budget of 107.70 million euros in 2014 and 92.50 million euros in 2015.

13.1.1.2 SMEs & Small Midcaps R&I Loans Service

Is part of a single debt financial instrument supporting the growth of enterprises and their R&I activities. It targets R&I-driven SMEs and small midcaps requiring loans of between 25.000 - 7.5 million euros.

The European Investment Fund (EIF) will implement this facility by providing direct guarantees to financial intermediaries (such as banks), who will extend the actual loans to final beneficiaries. The guarantee will cover up to 50% of intermediaries' potential losses.

This facility is likely to be available from the fist quarter of 2014, with the budget of 87.75 million euros in 2014 and 72.70 million euros in 2015.

13.1.1.3 Equity Facility for R&I

Is part of a single equity financial instrument supporting the growth of enterprises and their R&I activities, designed to improve Access to risk finance by early-stage R&I-driven SMEs and small midcaps through supporting early-stage risk capital funds that invest in individual enterprises.

The European Investment Fund (EIF) will make and manage equity investments into risk-capital funds and will be able to invest in a wide range of financial intermediaries.

It has a budget of 40.00 million euros in 2014 and 36.00 million euros in 2015.

13.1.1.4 Technology Transfer Financing Facility Pilot

This pilot facility will co-finance investments made by existing technology transfer (TT) funds and vehicles. It will focus on TT undertaken via the creation of new companies and

the licensing of intellectual property, and concentrate on the proof-of-concept, development and early commercialisation stages of the TT process.

This facility is likely to be available from 2015, with a budget of 60.00 million euros.

13.1.2 External expertise

- ***Assessing the Investment Potential of SMEs Emerging from Phase I of the SME instrument:*** Establishing a group of investment specialists, operating in a personal capacity, to assess the investment potential of SMEs. The group will include bankers, business angels, venture capital (VC) and other risk-capital fund managers etc.
- ***Technical and Financial Advisory Service for Risk Finance in R&I:*** This service aims to improve the "bankability" and investment-readiness of large, complex projects that need substantial, long-term investments in order to come to fruition. It also provides assistance in improving framework conditions that facilitate Access to risk finance for R&I.
- ***Evaluation of proposals:*** This action will support the use of appointed independent experts for the evaluation of proposals stemming from calls for proposals and, where appropriate, for the monitoring of running projects.

13.1.3 Studies

- ***Understanding the Intellectual Property Aggregation Marketplace:*** This study should produce a comprehensive picture of what is happening in these rapidly developing areas and pave the way for possible EU-level action in 2015/2016.
- ***Assessing the Potential for EU investment in Venture Capital Funds-of-Funds:*** The Commission aims to make the European venture capital industry more self-sustainable and globally competitive by reducing its dependence on the public sector and encouraging more investments from institutional and private sources, especially into early and growth-stage funds.
- ***Feasibility Study for Prizes Scheme in the R&I 'Access to Risk Finance' Domain:*** The aim of this study is to help inform a decision on whether, and if so on what basis, to set up and launch a prices scheme to encourage good practices, innovations and professionalism in the 'Access to Risk Finance' domain.
- ***Interim Evaluations of Horizon 2020 Financial Instruments and Facilities:*** These evaluations will give feedback on the implementation of the financial instrument facilities implemented in 2014-2015, and provide recommendations for their improvement.

13.1.4 Conferences

- ***Presidency Conference on Access to Finance for Research, Innovation and Growth:*** This conference will raise awareness of the potential for the financial instruments, facilities and accompanying measures launched under Horizon 2020 to enhance Access to finance for research, innovation and growth.

13.2 Horizon 2020 – Innovation in small and medium-sized enterprises

13.2.1 Innosup-7-2-2015: Professionalization of open innovation management in SMEs

While open innovation in large firms does not affect its strategic objectives, in the case of SMEs, it alters the strategic orientation of the company and requires a comprehensive overhaul of the firm's strategy. If implemented correctly, the benefits for an SME can be very important, for instance in the fields of technology transfer, capital raising, resource optimisation or networking (Vanhaverbeke et al., 2012). An urgent need exists, therefore, to study how collaboration and/or open innovation is managed and organised in SMEs.

For an entrepreneur comprehensive data and performance indicators would allow drawing conclusions whether open innovation is productive and should be continued or suspended.

This activity will consist of the following elements:

- Collection and analysis of information and data on the application of open innovation in SMEs

- EU-wide diffusion of success stories of SMEs using open innovation: This action will promote Europe-wide case-study examples that illustrate how entrepreneurs successfully transformed their business through a network of partners. It will also illustrate how managing such a network will allow SMEs to gain competitive advantage, overcome their size and resource limitations and how open innovation can become key both for creation and appropriating value.

- Development of practical management tools to support and explain the identified case studies: The management modules should focus on (1) Strategy dimension, (2) Entrepreneurship skills, (3) Resource needs, (4) Tools to build trust and control and manage risk in a collaborative partnership.

- **Development and testing of open innovation indicators to support management support tools within an SME:** The developed quantitative tools should help management to make decision about the timing when to establish or end partnerships. Companies should be supported not only in partnering, but also in determining when, for how long and in which sequence partners should be drawn into the projects.

13.3 Neotec

The aim of the financial aid of NEOTEC is to support the creation and consolidation of new enterprises with technological basis in Spain. Is about supporting novel entrepreneurs in the business world.

These are the conditions that are established in order to be able to be a candidate of NEOTEC:

- The company must have less than 6 years of life in the moment of the grant of the financial aid and less than 4 years of life in the moment of the solicitude.
- The costs in Research and Development must represent at minimum 15% of the total functioning costs during at least one of the three previous years before the grant of the aid. The company needs to submit a certificate of an external auditor that verifies this.

The companies that request the programme NEOTEC have to present a 5-year business plan, from which the CDTI could finance at maximum the first two years from the date of the solicitude.

The financial aid will be a loan at a fixed rate, which will be the one year Euribor + 0.1%. This type of rate will be established in the moment of the approval of the aid. The minimum financeable budget should be around 175,000€, including eligible costs such as personal expenses, investments in fixed assets, materials, external collaborations, expenses to entry the stock-exchange etc.

The quantity of the financing could rise up until 70% of the expenses accepted in the presented business plan, with a maximum amount of 250,000€.

The CDTI (Centro para el Desarrollo Tecnológico Industrial) funds a business plan, not only the project of R&D. Hence, all the activity lines that the company has provided to do in the following 5 years must be submit. Nevertheless, the expenses associated to the activities of R&D should be the biggest part of the budget of the presented project.

Companies will assume with equity at least 30% of the budget of the business plan that they submit.

The company will return the financial aid to CDTI in accordance with its generating a positive cash-flow. For that, the company is committed to facilitate annually the definitive annual accounts to the CDTI. The refund of the loan will be in annual quotes of 10%, 15% or 20% of the generated cash flow in that period.

13.4 Nets

The NETS program is a program to support the realization of projects to launch new enterprises of technological and scientific basis into the market. The aim is to promote projects of R&D&i oriented to the use or the creation of knowledge that can be commercialized in order to create new companies with technological basis in 2014.

These are the requirements that enterprises must have:

- The entities that are interested have to present a unique solicitude by project.
- One of the participants needs to assume the condition of leadership of the project.
- The company must have everything in order with the Treasury.
- In case of the Pymes, the characteristics of the Pyme need to correspond with the ones that the communitarian rules have.
- They can't have any link-up or dependence of the Public Administration, or belong to the Institutional Administration.
- In case of the medium and big companies, they can't be in the restructuring period. If that's the case, the European Commission has to be informed of the correspondent aid of the restructuring.
- The entities cannot be sanctioned neither penal nor administrative with the loss of the chance of obtaining any subsidies.

The payment of the subsidy will be done in two parts: 70% in a immediate way once the resolution of the NETS is known; and the 30% rest will be paid once the annual programme has concluded. The total budget of NETS is 3,785,714.00€.

13.5 Enisa

ENIS is a public company dependent of the Ministry of Industry, Energy and Tourism that, since 1982, is involve actively in the financing of business projects that are innovative and viable.

The loan that Bihurcrystal has the chance to apply is the one categorized as "Enisa Entrepreneurships". The objective of this loan is to support financially the first stages of live of the PYME's promoted by entrepreneurs, without age limits, so that they can undertake the necessary investments and carry out their project.

These are the characteristics of the loan:

- Shareholder loan (the moneylender entity takes part in the profits of the financed company).
- Minimum amount: 25.000€
- Maximum amount: 300.000€
- In order to determine the amount of money, the level of equity and the

financial structure of the company are going to be valued, amongst other factors.

- The rate of interest will be applied in two stages:
  - 1st stage: Euribor + 3,75% of differential.
  - 2st stage: Up to 8% additional based on the financial profitability of the company.
- Arrangement fee: 0,5%.
- Maturity: maximum 6 years.
- Trimestral amortization of interests and principal.
- No guarantees.

These are the financing options that Bihurcrystal is considering. The company has already applied for the NETS program, which they have been accepted for. Furthermore, Bihurcrystal is preparing all the documents necessary to apply for the NEOTEC program.

Regarding the Horizon 2020 and Enisa financing options, Bihurcrystal has to analyse deeper to see if the company does effectively fulfil all the necessary characteristics and requirements that those programs require. This is a very important task that needs to be done in a short-term.

14. CONCLUSION

New technological improvements have a direct consequence into the scientific world, making it constantly evolving and innovating. Bihurcrystal is a company that has benefited from this technological advance creating a new product in the area of surface physics: Curved crystals.

From one hand, the macro-economic analysis of Bihucrystal has shown that the most relevant market is the German one, due to the fact that has the highest amount of high-technology manufacturing companies, as well as being the one that most profits generates. Nevertheless, the market of France, Great Britain, Ireland and Italy are also markets to keep in mind.

The Spanish market has lost a lot of relevance because of the economic crisis. However, the strategic plan of the Spanish Government can improve considerably the situation of the high-technology market.

From the other hand, through the different contacts of the members from Bihurcrystal and after analysing the scientific publications made regarding crystalline surfaces, a market estimation has been done. Curved crystals could have a market of 27,000,000€ (3,000€), which is quite a small market. That is why Bihucrystal has decided to amplify its product range.

After analysing the company's situation and emphasize its strengths, weaknesses, opportunities and threats (SWOT analysis), the marketing techniques that Bihurcrystal should carry out will focus on specialized magazines, trade fairs and price discounts. Internet and social networks have a very important role in the marketing strategy of Biihurcrystal, using viral marketing and social media such as Facebook or Linkedin as possible means of promotion.

Finally, regarding the financing aspect, Bihucrystal is already part of the NETS programme, and is going to enrol in the NEOTEC programme. There are other financing options that are also interesting for Bihurcrystal, for instance, HORIZON 2020 and Enisa, which Bihurcrystal needs to analyse deeper.

The conclusion reach through this marketing plan is that, even though the market of surface physics is a small one, curved crystals are an innovative product that, carrying out the mentioned marketing strategies and obtaining the necessary funding, could establish in the market successfully.

14. CONCLUSIÓN

Por otro lado, el "meso-análisis" ha revelado que el poder de negociación de los proveedores, así como el riesgo de plagio de los competidores es muy alto. Surface Preparation Laboratory (SPL) y Material-Technologies & Kristalle (MaTeck) son los competidores directos de Bihurcrystal, siendo el primero un posible candidato para una asociación.

Mediante los contactos que los miembros de Bihurcrystal tienen y estudiando las publicaciones científicas que han sido publicadas relacionadas con superficies cristalinas, se ha podido realizar una estimación de mercado. Los cristales curvados podrían tener un mercado de 27.000.000€ (3.000€ por cada cristal curvado) en todo el mundo, lo cual constata un mercado pequeño, por ello, Bihurcrystal ha decidido ampliar su gama de producto.

Después de analizar la situación de la compañía y resaltar sus debilidades, amenazas, fortalezas y oportunidades (DAFO análisis), las técnicas de marketing que Bihurcrystal debería llevar a cabo se centrarían en revistas especializadas, ferias y exhibiciones relacionados con la física de superficies y descuentos. Internet y las redes sociales también jugaran un papel importante como estrategia de marketing de Bihurcrystal, utilizando el marketing viral y medios sociales como Facebook o Linkedin como vías de promoción.

Por ultimo está la financiación. Bihurcrystal ya es parte del programa NETS y está ultimando los preparativos para inscribirse al programa NEOTEC. Hay otros programas de financiación que también resaltan interés en la compañía, como son HORIZON 2020 y Enisa, los cuales Bihurcrystal analizará más profundamente.

La conclusión alcanzada mediante este marketing plan es que, aunque el mercado de física de superficies sea un mercado pequeño, los cristales curvados son un producto innovador que, llevando a cabo las estrategias de marketing sugeridas y obteniendo la financiación necesaria, logrará afianzarse en el mercado exitosamente.

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