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Biotechnological Innovations: a Young Entrepreneur in Science and Technology*

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ABSTRACT This case presents the situation of an entrepreneur who, recently graduated from university, decides to form her own company along with two colleagues, with the help of a business incubation center and after winning an entrepreneurship competition. The company competes in a non-traditional market where there is intense use of knowledge: eco-efficiency consultancy. By the end of the first year of operations, her two partners decide to leave the company and she is confronted with a series of personal and professional decisions. The case has two central approaches: the creation of companies by young people in a setting such as Costa Rica, similar to many other Latin American countries; and the evaluation of business ideas and possible strategies for market entry.

KEYWORDS business creation, technological entrepreneurship, business strategies, business women, SMEs.

Innovaciones biotecnológicas: Una joven emprendedora en ciencia y tecnología

RESUMEN Este caso presenta la situación de una emprendedora que, recién graduada de la universidad, decide formar su propia empresa junto con dos compañeros más, con el apoyo de un centro de incubación de empresas y después de ganar un concurso de emprendedores. La empresa compite en un mercado no tradicional, donde hay uso intensivo de conocimiento: la asesoría en ecoeficiencia. Al cumplir el primer año de operaciones, los dos socios de la protagonista decidieron dejar la empresa y ella se enfrenta a una serie de decisiones tanto de índole personal como empresarial. El caso tiene dos abordajes centrales: la creación de empresas entre personas jóvenes en un entorno como el costarricense, similar al de muchos países latinoamericanos; y la evaluación de ideas de negocios y posibles estrategias de ingreso al mercado.

PALABRAS CLAVE creación de empresas, emprendimiento tecnológico, estrategia empresarial, mujeres empresarias, pymes.

Inovações biotecnológicas: uma jovem empreendedora em ciência e tecnologia

RESUMO Este caso apresenta a situação de uma empreendedora que, recém-formada da universidade, decide formar a sua própria empresa junto com dois colegas mais, com o apoio de um centro de incubação de empresas e depois de ganhar um concurso de empreendedores. A empresa compete num mercado não tradicional, onde há uso intensivo de conhecimento: a assessoria em eco-eficiência. Ao cumprir o primeiro ano de operações, os dois sócios da protagonista decidiram deixar a empresa e ela se enfrenta a uma série de decisões tanto de índole pessoal quanto empresarial. O caso tem duas abordagens centrais: a criação de empresas entre personas jovens num entorno como o costarriquenho, similar ao de muitos países latino-americanos; e a avaliação de ideias de negócios e possíveis estratégias de ingresso ao mercado.

PALAVRAS CHAVE empreendimento tecnológico, criação de empresas, mulheres empresárias, estratégia empresarial, pymes.

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* *Case analyzed for teaching and class discussion purposes. It is not intended to judge any managerial decisions made by the people involved.*

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TEACHING NOTE: If you want to use this case in an undergraduate or graduate course, send an e-mail to perspectivaempresarial@ceipa.edu.co to get a "Teaching note".

Introduction

That Sunday in early December, Lizzy was having a piña colada while she watched the sunset on Conchal Beach, in the Costa Rican North Pacific, but it tasted differently. She was concerned about the decision she had to make, which would determine her future professional life.

That same month, Lizzy's two partners, Roberto and Silvia, had announced leaving the company Innovaciones Biotecnológicas S.A. (IB), to take advantage of interesting academic and job opportunities that came up. Specifically, Roberto took a position in a transnational company, while Silvia travelled abroad to pursue a master's degree.

"Things have happened very quickly", Lizzy told herself as she took another sip of piña colada. Nearly a year ago, Roberto, Silvia and Lizzy had won the National Contest of Entrepreneurs that Instituto Tecnológico de Costa Rica (TEC) organizes annually. They participated in the contest with the idea that originated IB. This introduced them to the business world, as they received a free year of business incubation at Centro de Incubación de Empresas (CIE) of the same university.

The first year of operations ended soon, after many sacrifices and some rewards. For example, IB had managed to sell its first services. However, there was still much work to be done. Until then, IB did not have a defined strategy, it was difficult for them to differentiate the company from the competition and it had not been easy for the three partners to adapt themselves to their new role as entrepreneurs, because almost a year ago they were still full-time students[1].

Lizzy thought "We were working on that", but then Roberto and Silvia announced that they were leaving the company.

The entrepreneur's background

Lizzy is the eldest daughter of a couple of business managers with an emphasis on finance. Her father was a finance specialist and held a managerial position in an agro industrial company, while her mother worked on the banking field. Her parents had met while working at a banana company in San Jose, Costa Rica. Although both of them had "desk jobs", they loved the countryside and the beach and they visited these places frequently, whether for work or fun. Lizzy still remembers nostalgically those weekend family lunches on the beach or the mountain.

Until the age of two, Lizzy was the only daughter, but when her brother arrived her parents decided to enroll her in a kindergarten so she could share with other children and reduce the jealousy she felt towards the newcomer. This is how Lizzy entered the formal educational system from a very young age, where she always obtained excellent results. Over the years, when it was time to think about her undergraduate studies, her dream was to become an astronaut. Her excellent academic performance would make it possible, but the lack of options in the country and the high costs of studying abroad discouraged her. In this scenario, her best option was to study some kind of engineering in order to later obtain a scholarship or a study option abroad that allowed her to fulfill her dream of being an astronaut.

With this idea in mind, she decided to look for options in the country and finally enrolled in the Biotechnology Engineering program at TEC without really knowing what it was about, but rather influenced by a high school teacher who advised her and persuaded her to pursue those studies.

As a college student, Lizzy had trouble adjusting. The Biotechnology program required the highest admission score at that time, so she had very smart and competitive classmates and she did not feel at ease in this environment. Her results were still among the best and she could even afford going often to the beach and the mountain, but there was no "chemistry" with her classmates and she was different from them even in her personal appearance. However, in the second semester she met and got along with three classmates, so they quickly became good friends and study partners. They were Roberto, Silvia and Gabriela. From that moment on, Lizzy felt relieved.

Pleasant moments from her university life come to her mind. For example, at some point in the past Lizzy was a bit disappointed. Since TEC's laboratories were not well supplied for student practice, she had to imagine a great deal of what she learned in class. There was a specific laboratory technique that she wanted to learn and after reviewing the literature on the subject, she found a Mexican professor who applied it frequently. She

1 More information about IB can be found on its website: www.ibcr.net

wrote to him and asked him if she could use his article for free (buying it online was very expensive). The professor asked her to have a meeting with him, because he would be visiting Costa Rica in a few days. She went to the appointment with some expectation and fear, but she and the professor got along very well and he even invited her to work as an intern in his laboratory at Universidad de Merida, Mexico. This is how Lizzy spent a month in that country, learning about the technique.

Another aspect that Lizzy also remembers fondly about her days at TEC was the constant encouragement to think as an entrepreneur and not as an employee, both through courses and daily contact with teachers that instilled in her that idea, which at the end she was convinced about.

Proof of this was that almost towards the end of their studies, Lizzy, Roberto and Silvia decided to register in the National Contest for Entrepreneurs. This decision forced them to study business plan preparation for almost four months. They decided to do this simultaneously with their professional practice project, which is a kind of internship that advanced students at TEC must do as a final graduation requirement. This is the contest that they won, which consequently gave birth to IB.

Business Opportunity and its Context

Definition of Eco-efficiency

Eco-efficiency can be framed within a school of thought that seeks, in general terms, to improve the efficiency and effectiveness of resource use from a broad perspective. At the corporate level, this has resulted in multiple actions, such as ecological economics (Georgescu, 1971; Hall, Lindenberg, Kümmel, Kroeger & Eichhorn, 2001), economy for the common good (Felber, 2012), the Global Footprint Network (2014), cleaner production of the Costa Rican Chamber of Industries (2014) and some areas in charge of corporate social responsibility (Stahrl, 1977).

These movements are intended to foster a paradigm shift in the functioning of the economy. The current paradigm is quantitative, it focuses on profitability measurements (profits, return on equity and related aspects) and it has to do with constant growth of the economic activity (measured in terms of GDP) (Urra, 2013). The new paradigm sought is based on the natural sciences and their principles, as it considers the environment and all its dimensions, so for example, constant growth is not feasible (Urra, 2013; Hall et al., 2001; Meadows D.H., Meadows D., Randers & Behrens, 1972). In short, it consists of aligning the strategic economic paradigm (company behavior) with the real environment (nature behavior) (Hall et al., 2001).

Within this analytical framework, there is empirical evidence that the economic model behind the current economic paradigm is no longer sustainable. The studies on issues such as climate change (Intergovernmental Panel on Climate Change IPCC, 2007), resource and food availability (Meadows et al., 1972) and energy use trends (World Energy Outlook WEO, 2012), are an example of this.

Concerning climate change, IPCC (2007) clearly states that "warming of the climate system is unequivocal, as evidenced by observed increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level" (p. 2). This report states that natural systems in all continents are being affected by regional climate changes, especially temperature increase. The same report reveals how, if the current trend continues, there will be problems related to water scarcity for human consumption, endangered ecosystems, reduced productivity of agriculture (for example, cereals) and increased morbidity and mortality from heat waves, floods and droughts, among many other effects.

The previous conclusion is not completely new. Many years ago, Meadows and colleagues (1972) warned in their report sent to the Club of Rome that the Earth would reach its maximum limit in one hundred years if population, industry, natural resource exploitation and pollution continued to grow at the same pace.

On the other hand, the report by the International Energy Agency (WEO, 2012) is categorical. From the perspectives of energy security, environmental sustainability, economic development as well as elements such as oil, coal, natural gas, renewable energy and nuclear energy, the report concludes: "Taking into account all new developments and policies, the world is failing to lead the global energy system towards a more sustainable path". It also calls for immediate action by

arguing that "although there are many uncertainties, many decisions cannot wait" (p. 1).

This is how eco-efficient production, understood as the way industrial companies can obtain the most efficient use of raw materials and available resources, is a target for the various participants in the socioeconomic setting and this is IB's raison d'être.

Business environment

This awareness on the importance of eco-efficiency has been reflected in decisions made by governments all around the world. In that sense, Costa Rica is no exception and currently there are a number of regulations (laws, decrees and norms) which are the background for companies to develop themselves from the environmental point of view (Annex 1 shows the main ones).

Legislation also has incentives particularly aimed at small and medium-sized enterprises (SMEs) which, due to their resource access challenges, have more difficulties to produce in an eco-efficient way. This is how a kind of "national system of incentives" (Varela, 2009) exists, which is made up of:

- Refundable and non-refundable financial incentives.
- Support incentives and services.
- National, regional and international awards.
- Incentives from institutions with experience in Cleaner Production (CP).
- Tax and tariff incentives.

Competitive sector

This combination of interests, regulations and incentives has clearly generated a competitive and fairly dynamic sector. According to a study by IB (2005), in 2000 there were in Costa Rica about 21 companies that provided some type of service related to this market, while five years later that number rose to 35, which creates a market where various companies and institutions provide a series of products and services (shown in Annex 2). A percentage distribution of the number of companies that focus on each sector can be seen in the figure in Annex 3.

As for competitive rivalry, an analysis carried out by IB (2005) shows a series of behaviors and characteristics of the competitive sector. For example, competitors have the following characteristics:

- They have more experience.
- Their sales and advertising policies are defined.
- They have a greater supply capacity on a large scale.
- They have a better infrastructure and financial capacity.
- They have a greater implementation capacity.
- They offer high sales prices.
- They do not provide customized solutions.
- Their services are provided "reactively", instead of preventively.

New competitors are very likely to appear, and this can be analyzed from two perspectives: companies that currently offer one or a few services can easily offer the other services, since they have the knowledge and experience required, although some of those services are highly specialized. In addition, there is a wide supply of young professionals (including recent graduates) who would eventually be able to offer similar services to those of IB.

This competitive setting also has the participation of a number of non-profit entities that have specific interests in the area of eco-efficiency, both through the sale of services and the establishment of alliances. These entities are:

A) Government agencies (Ministries of Environment, Economics, Science and Technology, Ombudsman's Office).

B) State universities, such as: Instituto Tecnológico de Costa Rica (ITCR), Universidad de Costa Rica (UCR), Universidad Nacional Autónoma (UNA), Agricultural School for the Humid Tropics Region (Earth), Organization for Tropical Studies (OET), National Institute of Learning (INA) and Tropical Science Center (CCT), among others.

C) International organizations (World Bank, United Nations, Inter-American Development Bank, among others).

D) Multiple non-governmental organizations (Neotrópica Foundation, INBio, Association for the Preservation of the Wild Flora and Fauna (Apreflofas), Conservation Federation of Costa Rica (Fecon), among others).

E) Business chambers (industry, agro business and exporters, among others).

F) Other civil society sectors.

Annex 4 presents the characteristics and services offered by the most relevant competitors.

Market

From the perspective of customers, a company usually requires consultancy in eco-efficiency for some of the following reasons:

- Comply with national legislation.
- Address complaints from neighbors on industrial malpractices.
- Reduce the cost of raw materials and other supplies.
- Differentiate itself from competition.
- Add value to products and improve the company's image.
- Internal and external market pressures to guarantee product quality.
- Grow and open the company to new markets.

On the other hand, some elements that discourage consultancy are:

- Lack of awareness of prevention alternatives.
- Poor monitoring and control from state regulatory entities.
- High costs of consultancy services.
- Lack of an environmental protection culture among entrepreneurs.
- The demand prefers cheap services.

In Costa Rica there are about 49,000 formally registered companies (MEIC, 2013). 5% of these are classified as large companies (with more than 100 employees), while the others are micro, small or medium (MSMEs).

Regardless of their size, it is possible to find examples of companies of all kinds which are immersed in eco-efficiency processes. For example, a recent newspaper report states that over 45 companies are participating in the Business Eco-Efficiency initiative, which is led by the Business Partnership for Development (AED) and endorsed by the Blue Flag Ecological Program, the Ministry of Environment and Energy, and the international company United Way (Camacho, 2012).

IB's Resources

IB's business plan that allowed it to win the entrepreneur contest stated the main resources of entrepreneurs and their company.

For example, in terms of education, as professionals in Biotechnology Engineering, the three partners can work in the following areas: solid waste management; sewage treatment; agro-ecosystem management; industrial microbiology; ISO, HACCP[2] and 5S[3] certification systems; clean production; environmental and biotechnology law; ecology; formulation and management of investment projects; greenhouse management; good manufacturing, agricultural and laboratory practices, as well as food biosecurity and handling of hazardous (radioactive) substances.

The three partners had also taken part in extracurricular activities while they were in college, such as student life participation, training in personal development issues and they had some work experiences too. Another element that stood out in their business plan was team work, because they had worked together for over three years and all of them had outstanding academic performance.

The motivation expressed by the entrepreneurs in their business plan was not only in financial or managerial terms. They were moved by the desire to generate innovations and provide solutions to mitigate environmental problems.

With those ideas in mind, IB's mission statement was: "Provide consulting services to food and agri-food industries through the use of biotechnology to promote eco-efficiency and improve productivity".

Similarly, their vision was defined as follows: "Be the leader in the implementation of new alternatives for sustainable production and be recognized throughout the country for offering eco-efficient solutions that optimize production".

IB's initial service offer was intended to cover specific frequency demands, as shown in Annex 5.

2 Hazard Analysis and Critical Control Points (HACCP) is a process intended to guarantee food safety in a preventive, logical and objective way.

3 5s is a quality assurance practice originated in Japan. It has five principles: Seiri (classification); Seiton (organization); Seiso (cleaning); Seiketsu (hygiene and visualization) and Shitsuke (discipline and commitment).

In the financial field, the business plan included cash flow projections that can be seen in annex 6.

In relation to the projected cash flow, it is important to clarify some aspects. Towards the end of IB's first year of operations, it had only reached 50% of the projected revenue and its expenses were about 10% higher than the estimated amount. Given the company's characteristics, the necessary equipment to start basic operations was acquired through a loan whose income, amortization and interest payment were considered in the projected flow. The investment plan intends to increase equipment investment gradually every year, so as not to affect cash flow from the beginning. The strategic objectives even include purchasing their own analysis laboratory in the sixth year of operations. Also, because the entrepreneurs had recently graduated, their salary was according to their profile, although in fact they were only able to pay for it entirely a few times a year.

A New IB Was Born

The sound of the glass, which had been filled with piña colada not so long ago but now was empty, brings Lizzy back to the present. She has realized that she must make decisions of various kinds.

On the one hand, at a personal level, she must decide what to do with her professional career. An option, of course, is to lead IB alone. However, she still remembers her mother's words: "Look for a job, do not overthink things", or her father's remarks "See, a year after graduating and you do not even have a bicycle"; "Stop playing entrepreneur, get settled". She knows that they love her unconditionally and that they tell her those things to make her reflect. She is also sure that they will support whatever decision she makes. But she cannot ignore the fact that what they say is partially true, because some of her classmates have good positions in large companies, own a car and enjoy other benefits. Even one of her friends, who manages several hotels, asked her to leave everything behind and go to work with him, with a very good salary and on her favorite place: the beach.

However, Lizzy is really motivated towards her company. It is an aspiration, a way to make a living while trying to help solve serious problems, such as proper environmental management on the part of companies. She does not picture herself doing anything else. From her first days in the TEC classrooms, she imagined herself applying everything she had learned independently, doing things her way and without depending on bosses or bureaucracies that stopped her from developing herself. Besides, she recalled having read and discussed about the perseverance of entrepreneurs, who usually swam against the tide without giving up. Was she going to quit only after her first try?

As if this were not enough, at the business level, Lizzy must also face important situations. In case she decided to continue with IB all by herself, what strategic challenges would she face? What options would she have in order to compete in the target market of her interest? What are some of the most relevant characteristics of the business model that she should apply? Finally, how could she fulfill her mission and reach her business vision, given the new challenges?

REFERENCES

Camacho, A. (2012, 7 de septiembre). La ecoeficiencia hay que compartirla. *Semanario El Financiero*. Retrieved from http://www.elfinancierocr.com/negocios/ecoeficiencia-compartirla_0_149985035.html

Cámara de Industrias de Costa Rica CICR (2014). *Centro Nacional de Producción más limpia.* Retrieved from: http://www.cicr.com/Promotor/detalle/12/Centro-Nacional-de-Producción-más-Limpia-(CNP+L)

Donato, V., Haedo, C. & Novaro, S. (2003). *Propuesta metodológica para un observatorio latinoamericano de pequeña y mediana empresa*. Serie de informes de buenas prácticas. Washington D.C.: Banco Interamericano de Desarrollo. Retrieved from http://publications.iadb.org/handle/11319/5063?locale-attribute=en

Felber, Ch. (2012). *La economía del bien común*. Bilbao: Deusto.

Georgescu, N. (1971). *The entropy law and the economic process*. Cambridge: Harvard University Press.

Global Footprint Network (2014). *Qué hacemos.* Retrieved from http://www.footprintnetwork.org/es/index.php/GFN/page/what_we_do/

Hall, C., Lindenberger, D., Kümmel, R., Kroeger, T. & Eichhorn.W. (2001). The Need to Reintegrate the Natural Sciences with Economics. BioScience, 51 (8), 663-673.

Innovaciones Biotecnológicas IB. (2005). Plan de Negocios. Presentado al Concurso Nacional de

Emprendedores 2005. Centro de Incubación de Empresas. Document not available for public use.

Grupo Intergubernamental de Expertos sobre el Cambio Climático IPCC (2007). *Cambio climático 2007: Informe de síntesis. Contribución de los Grupos de trabajo I, II y III al Cuarto Informe de evaluación del Grupo Intergubernamental de Expertos sobre el Cambio Climático (IPCC), Ginebra, Suiza.* Retrieved from http://www.ipcc.ch/pdf/

Meadows, D. H., Meadows, D., Randers, J. & Behrens III, W. (1972). *The Limits to Growth: A Report to The Club of Rome.* Nueva York: Universe Books.

Ministerio de Economía, Industria y Comercio MEIC. (2013). *Estado de situación de las pymes en Costa Rica. 2013*. Retrieved from http://www.meic.go.cr/web/388/estudios/pyme/estado-situacion-pyme-2013

Observatorio de Mipymes (Omipymes), (2009). *Primer informe: estado nacional de las mipymes*. San José: Editorial UNED.

Stahrl, E. W. (1977). Unifying Concepts in Social Responsibility. *Academy of Management Review, 2*(1), 38-45.

Urra. A. (2013). *Rentabilidad empresarial y estrategia: ¿cambio de paradigma económico?* Ponencia dictada en el II Congreso de Estrategias Empresariales. San Jose, Costa Rica.

Varela, I. (2009). Sistema nacional de incentivos a la producción más limpia en Costa Rica. *Tecnología en Marcha, 22*(2), 51-62.

World Energy Outlook WEO. (2012). *Resumen ejecutivo: Perspectivas de la energía en el mundo 2012*. Publicación de la Agencia Internacional de Energía. Retrieved from http://www.iea.org/publications/freepublications/publication/Spanish.pdf

ANNEX 1. LEGAL FRAMEWORK OF ENVIRONMENTAL ECO-EFFICIENCY IN COSTA RICA

LAWS	EXECUTIVE DECREES
Water Law number 276, August, 1942.	Executive Decree number 25584-Minae-H-P.
Law on Fishing and Marine Hunting number 190, July 1948 and Regulation number 363, January 1949.	Regulation for the rational use of energy, 1990.
General Health Law number 5395, October 1963.	Executive Decree number 25083-Minae, Guayacan award, April 26, 1996.
General Drinking Water number 276, August 27, 1946; reformed by laws 2332, April 9, 1959; 5046, August 16, 1972 and 5516, May 2, 1974.	Executive Decree 26042-S-Minae. Regulation for use and discharge of wastewater
Law on the Promotion of Scientific and Technological Development number 7169, August 1, 1990.	Executive Decree number 26635, February 2, 1998.
Wildlife Conservation Act number 7317, October, 1992.	Executive Decree number 28815, August 9, 2000.
Costa Rican Ratification Act to the Regional Convention on Climate Change, number 7513, October 29, 1993.	Executive Decree number 30840, June 12, 2002.
Law of Regulation of Rational Energy Use number 7447, 1994.	Executive Decree number 31176-Minae, Environmental Canon for Wastewater Discharge, June 23, 2003.
Organic Environmental Law number 7554, 1995.	Executive Decree number 31697-MEIC, March 22, 2004.
Law on the Central American Agreement on Transboundary Movements of Hazardous Waste number 7520, July, 1995.	Executive Decree 31849-Minae. General Regulation on EIA-Related Procedures
Forest Law number 7575, February, 1996	Executive Decree number 32868, Environmentally Adjusted Canon for Water Use, January 30, 2006.
Phytosanitary Protection Act of the Ministry of Agriculture and Livestock number 7664, April, 1997.	
Law of Land Use, Management and Conservation number 7779, April, 1998.	
Water Resource Law number 14,585, 2005.	

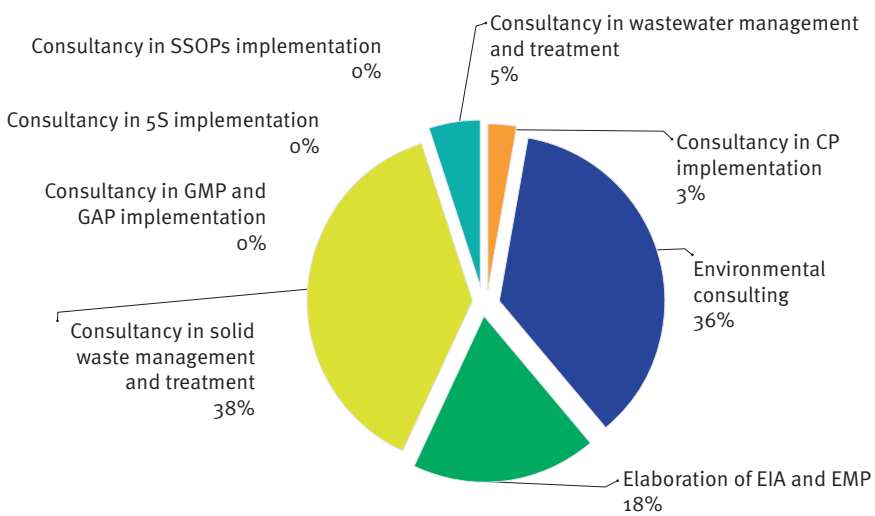
Source: Varela, 2009; IB, 2005.

ANNEX 2. TYPES OF COMPANIES AND SERVICES OFFERED IN THE ECO-EFFICIENCY MARKET

TYPE OF SERVICE PROVIDED	EXAMPLES OF COMPANIES
Environmental consulting	Grupo Unsat, Geoambiente, Inforest, Deppatt, Insuma
Environmental Impact Assessments (EIA) and Environmental Management Plans (EMP)	Ecoplan, Business & Environmental Management, Proamsa
Consultancy in solid waste management and treatment	Sandix
Consultancy in wastewater management and treatment	Jeymar, Solamsa, Trisan, Aquapura
Consultancy in implementation of Hazard Analysis and Critical Control Points (HACCP), 5s, Standardized Sanitary Operational Procedures (SSOPs), Good Manufacturing and Agricultural Practices	Institute of Technical Standards of Costa Rica (Inteco), Food Technology Research Center at UCR
Consultancy in CP (cleaner production) implementation	National Center for Cleaner Production

Source: IB, 2005.

ANNEX 3. CURRENT DISTRIBUTION (BY ACTIVITY) OF COMPANIES THAT OFFER CONSULTANCY SERVICES IN ENVIRONMENTAL MANAGEMENT FOR THE PRODUCTIVE SECTOR



Source: IB, 2005.

ANNEX 4. RELEVANT COMPETITORS IN THE ECO-EFFICIENCY MARKET

COMPANY	FEATURES	MAIN SERVICES	WEBSITE
Grupo Unsat	The company focuses on sustainable development. We are an alternative that allows you to boost your project with the certainty that you are being advised within an environmental, social and economically viable framework.	Consulting, advising, training and technical assistance.	www.grupounsat.com
Sandix	Consulting services in the fields of chemistry and quality for the trade and industry sectors in Costa Rica, in response to the needs of small and medium-sized enterprises that use chemicals or large companies whose production activities involve chemical processes but do not require a full-time chemist.	Consultancy services in the fields of chemistry and quality.	www.sandix.net
Solamsa	Engineering company in the environmental field. Market requirements so far have made the company focus heavily on wastewater treatment, which is the area where the company has achieved high specialization, knowledge and experience.	Consultancy, construction, equipment, implementation and after sale services.	www.solamsa.com
Trisan	It represents prestigious international manufacturers of specialized supplies. It works on the introduction, development and commercialization of products and services of technological innovation, as well as on bio-solutions which are friendly to the environment for the agricultural, agro industrial, industrial and financial sectors.	Research and development of new alternatives for the animal health, agricultural and aquaculture sectors	www.trisan.com
Institute of Technical Standards of Costa Rica (Inteco)	Legally registered private, non-profit association with own equity. Created in 1987. Acknowledged by executive decree as the national standardization entity in 1995.	Consultancy in your field of action	www.inteco.or.cr
Food Technology Research Center at UCR	It was born after a cooperation agreement between Universidad de Costa Rica, the Ministry of Science and Technology and the Ministry of Agriculture and Livestock	Consulting in implementation of hazard analysis and critical control points	www.cita.ucr.ac.cr
National Center for Cleaner Production	Non-profit organization founded in 1998 by the Chamber of Industries, the Center for Technological Management and Industrial Informatics (Cegesti) and the Costa Rican Technological Institute (ITCR), with the objective of building capacity at the national level in terms of cleaner production, prevention of contamination and eco-efficiency. It is part of the CP global network UNIDO and UNEP (United Nations Environment Program)	Consultancy in CP implementation	http://www.cicr.com/index.php?option=com_content&task=view&id=27&Itemid=

ANNEX 5. SEASONALITY OF THE DEMAND (ACCORDING TO FREQUENCY) OF THE SERVICES OFFERED BY INNOVACIONES BIOTECNOLÓGICAS S.A.

VERY OFTEN (1 OR MORE TIMES / MONTH)	FREQUENTLY (1-2 TIMES / QUARTER)	MODERATELY (1-2 TIMES / SEMESTER)	RARELY (1 TIMES / MONTH)
Consultancy in wastewater management and treatment	Advisory in GMP and GAP implementation	Consultancy in solid waste management and treatment	Advisory in CP implementation
Consultancy in 5s implementation		Consultancy in SSOPs implementation	

Source: IB, 2005.

ANNEX 6. PROJECTED CASH FLOW (IN US DOLLARS)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Sales revenue	50,000	55,500	63,825	76,590	99,567
Total expenses	29,380	37,285	42,707	51,060	55,201
Net result	20,620	18,215	21,118	25,530	44,366
Accumulated flow	20,620	38,835	59,953	85,483	129,849

Source: IB, 2005.