



BIOTECH GREEN ENTREPRENEURSHIP

"Risks and benefits in Green Biotech Business"

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General considerations

The move towards raising business awareness of environmental protection has been gradual over the decades since the first conference on the subject in 1972 - the Stockholm Conference, followed by the 1992 Rio De Janeiro Earth Summit, the Kyoto Protocol and Framework Convention on Climate Change and others.

In a broader sense, green technologies are those that help the environment in comparison to the conventional technologies they are meant to replace. (Hall and Helmers, 2013). It is argued that green entrepreneurs work to develop businesses in a sustainable, more environmentally friendly, greener way.

Concept of risks in Green Biotech Business

- Any circumstance or incident that has the potential to result in losses is referred to be a risk. In the context of economics, risk refers to potential future occurrences that could result in damages.
- Green Biotech Business is called to help maintain and even improve environmental protection.
- However, risk factors can occur at any time, which is why it is very important to be able to prevent any risk situation. To do this, we should know what risk factors can occur

Factors of risks

Risk factors can be separated into a number of significant groups, including:

- based on the potential for prediction
- based on their location
- based on the extent and content of the risks

Types of business in Green Biotech

Green Biotech in bioremediation of soils and waters

- The concept of biodegradation is accepted as the sum of the processes of decomposition of natural or synthetic constituents through the activation of specialized strains of microorganisms, resulting in end products that are useful or acceptable in terms of their impact on (Pamfil, 2011; El Amrani et al, 2015).
- Bioremediation, an environmental-friendly and low-cost strategy (Megharaj and Naidu, 2017), relies on the ability of microorganisms (including prokaryotes, fungi and microalgae) to reduce contaminant concentrations and/or their toxicity (Figure 1).

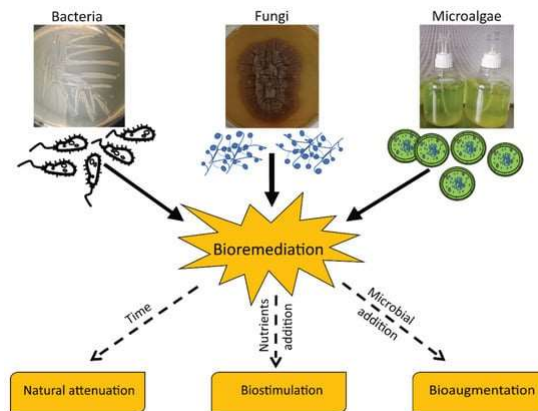


Figure 1. General scheme of bioremediation strategies involving different microbial taxa
(Source: Brar et al., 2017)

Green Biotech in bioremediation of soils and waters

- In recent decades, the term bioremediation has been used in a more specific way, which is reflected by the two specific definitions:
- The use of living organisms to degrade environmental pollutants, to prevent pollution or in the waste treatment process (Atlas,1995);
- Application of biological treatments for cleaning, decontamination and degradation of hazardous substances (Cookson, 1995).
- Bioremediation can be applied "in situ" (on the polluted area, substrate, site of contamination has occurred) or "ex situ" (in specially designed systems/facilities, where the the polluted substrate to be treated by biological methods) (EPA, 2006).

Advantages of bioremediation

- **Treating contamination *in situ*.** The majority of the expense is attributable to conventional cleanup techniques that include physically removing and storing contaminated soils. Bioremediation doesn't require removal or storage costs because it can be done in place by supplying nutrients to contaminated soils.
- **Taking advantage of natural processes.** Natural microbial mechanisms can eliminate pollutants even at some sites without the help of humans. Significant cost savings are possible in these situations where bioremediation (natural pollution abatement) is appropriate.
- **Reducing environmental disturbance.** In comparison to conventional approaches, bioremediation decreases disturbance, and post-treatment expenses can be significantly decreased.

Top 5 Bioremediation Companies

- **Hexas Biomass, Private Company, USA, Founded: 2018** - Hexas is a biomaterials company focused on the production of regenerative, plant-based raw materials that replace wood and fossil fuel-based materials in multiple applications.
- **Evonetix, Private Company, United Kingdom, Founded: 2015** - Evonetix has developed a unique silicon chip that allows parallel synthesis to be carried out on a large scale.
- **BluumBio, Private Company, USA, Founded: 2021** - Has developed bio-based technologies that rapidly clean soil, air and water.

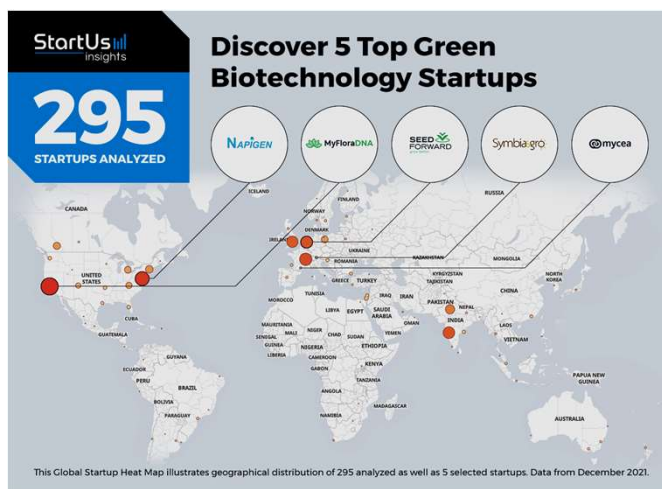
Top 5 Bioremediation Companies

- **Commonwealth Scientific, Private Company, Australia, Founded: 1926**
 - Bio-synthetic silk is produced through a process that allows industrial volume silk production at room temperature without negative environmental effects.
- **Pluton Biosciences, Private Company, USA, Founded: 2017** - Pluton Biosciences is an exploration company. Like drilling for oil or mining for gold, Pluton's team of scientists and engineers extracts valuable, natural resources from the soil in the form of bacteria, fungi, and viruses

Romanian bioremediation companies

- **ALTERNATIVE FUELS ROMANIA** - provide the complete solution for the whole range of hazardous and non-hazardous industrial wastes
- **ECOQUALITY SERVICES SRL** - provide high-quality, high-performance services, without impact on the environment and occupational health and safety
- **ECO FIRE SISTEMES** - collection, transport and neutralisation by incineration of waste
- **ERIC BIOREMEDIERE OIL SRL** - treatment and disposal of hazardous waste

Green Biotechnology Startups



The global startup map below (Figure 2) shows the distribution of 295 startups and scaleups analyzed by the StartUs Insights Discovery Platform. Furthermore, this map highlights 5 BioTech startups selected based on criteria such as year founded, location, funding raised and more.

Figure 2. The global startup maps and the 5 BioTech startups selected
(Source: <https://www.startus-insights.com/innovators-guide/green-biotechnology-startups>)

Global risks of no sustainability in Biotech Business

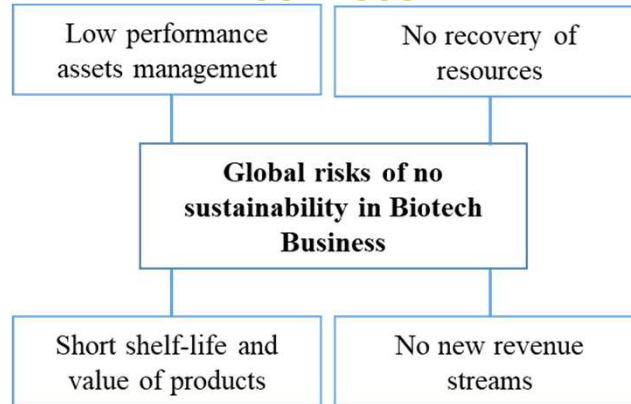


Figure 3. Risks of no sustainability and green practices in Biotech Businesses

(Source: <https://biotechfarms.com/a-sustainable-business-model-how-to-build-a-business-with-the-circular-economy-framework/>)

Several risks that can appear in a business model

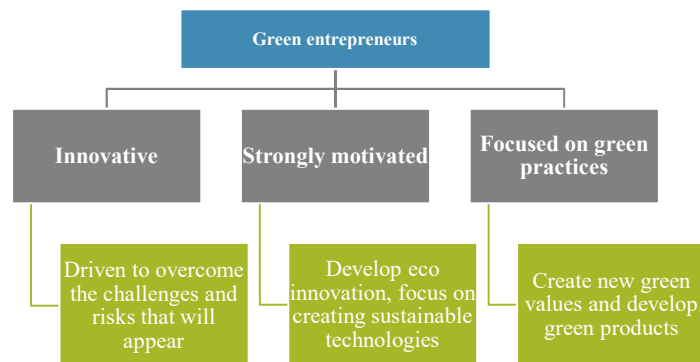


Figure 4. Green entrepreneur mindset

Concept of a sustainable product policy



Figure 5. Economic conditions for sustainability in terms of human needs

(Source: Doane & MacGillivray, 2001)

Benefits in Green Biotech Business

- Green entrepreneurship focuses on several major key elements, such as:
 - a business model oriented on nature and sustainability,
 - environmental friendly services and products,
 - efficient waste management and provision of environmental management services (Linnanen, 2002).

- The core concepts of a circular and green biotech model that is applied to a business helps it develop and gain several benefits, such as extended producer responsibility, reuse of by-products obtained when processing raw materials, eco design of the processing line and waste management system, regenerative design, zero waste policy and life cycle thinking.

Make your business greener and circular



Figure 6. Four ways to make your business greener and circular

(Source: Čekanavičius, 2014)

Benefits in Green Biotech Business

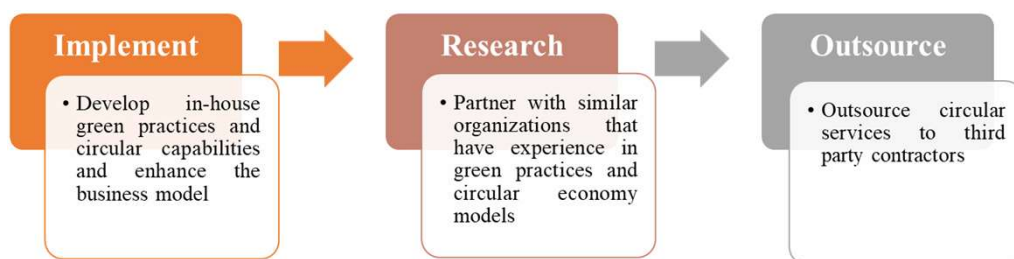


Figure 7. Green business practices

(Source: <https://biotechfarms.com/a-sustainable-business-model-how-to-build-a-business-with-the-circular-economy-framework/>)

Benefits in Green Biotech Business

- Any business model that implements green practices will gain a competitive advantage, not only because of the sustainability factor but also because modern consumers prefer to purchase goods from businesses with a green image and that apply green methods. (Hartman et al., 2005).
- Customers that are willing to pay more for green products are more appreciative and value them more. Nevertheless, a green brand needs to be properly conveyed or sold in order for people to recognize it.
- Moreover, by being green, a business can improve its networking opportunities with other green businesses that are searching for partners who are committed to the same principles.

Benefits in Green Biotech Business

- The entrepreneur could benefit from this approach in terms of environmental sustainability and customer confidence by using low carbon footprint materials, recycled materials, and high efficient energy sources aimed at reducing the impact of the construction practice on the environment. By designing a sustainable building that addresses the ecological, social, and economic concerns in the context of its neighborhood. (Glavinich, 2008).
- Construction costs for green projects are often higher than those for conventional ones.

Benefits in Green Biotech Business

- Due to the intricacy of the designs and the modeling expenses required to incorporate green practices into projects, the prices are greater (Zhang et al., 2011).
- However, employing green building materials and technology comes with higher expenses (Hwang and Tan, 2010).
- According to Zhang et al. (2011), employing green building materials will cost you between 3 and 4% more than using traditional ones

**Thank you for
your participation!**

