Structural Bamboo Composite Products: Bamboo Composites for Structural Applications & Sustainable Business Ideas

Vancouver, Colombia

Vancouver, Canada

Felix Böck

Year Founded: 2014
Organization type: hybrid
Project Stage: Start-Up
Budget: $100,000 - $250,000
Website: http://structuralbamboo.wordpress.com

- Eco Products
- Construction
- Sustainable development
- Technology
Project Summary

Concise Summary: Help us pitch this solution! Provide an explanation within 3-4 short sentences.

Structural Bamboo Composites are an innovative solution serving as construction material for the 21st century. By optimizing production processes and economics this project shows the benefit of bamboo as a composite material and establishes sustainable business opportunities for local manufacturers.

WHAT IF - Inspiration: Write one sentence that describes a way that your project dares to ask, "WHAT IF?"

Bamboo will no longer be seen as 'The Poor Man's Timber' but rather as "The Green Gold of the 21st Century".

About Project

Problem: What problem is this project trying to address?

Did you know that over 90% of the world's bamboo resources are growing in developing countries? The construction sector in rapidly growing cities around the world is seeking for long lasting engineering materials; the production of concrete and steel is energy intensive and unsustainable. Bamboo on the other hand is still in its early stages as structural composite material and is seeking for more efficient process technologies.

Solution: What is the proposed solution? Please be specific!

Processing bamboo culms into any kind of furnish allows us to use this natural, fastest growing plant on earth in the most efficient way without producing waste. By evaluating rudimentary processing technology to split, crush and press the raw material into any kind of oriented composite product, maximal value to the raw material is added. By comparing different resin types suitable for developing countries, considering safety and material handling, all kinds of applications can be targeted. We support bamboo product manufacturers to develop sustainable business models which allow the use of a material that can reduce CO2 emissions and offer innovative solutions not limited but focused on the rapidly growing housing industry.

Impact: How does it Work

Example: Walk us through a specific example(s) of how this solution makes a difference; include its primary activities.

Bamboo composites have been manufactured for years. The lack of know how coupled with no collaboration with resin manufacturers a/o consumers has led to no improvement in terms of energy efficiency and optimization in manufacturing processes. The production of a bamboo composite panel requires heat and pressure, as well as equipment to transport and apply resin without safety concerns. The amount of energy being used to press bamboo panels does not justify the potential of bamboo as an environmentally friendly "green composite product". This project incorporates efficient raw material processing, collaborates with machine manufacturers, resin suppliers and local bamboo manufacturers as a means of revolutionizing the bamboo industry.

Impact: What is the impact of the work to date? Also describe the projected future impact for the coming years.

Currently, the pressing time of a bamboo based composite panel (PF resin) is 110min. By optimizing the production step by step in a very logical manner, the cycle time for a 20mm bamboo panel has been decreased from 110 to 6 min. This lab trial applied to a business case in Asia would result in 85% energy savings per year without any additional investment/new equipment. However, it’s important not to stop and be satisfied after such a great achievement. The above mentioned optimization only considered one single step of the whole production process, which strange enough, is a common approach all over Asia and some facilities observed in South America. By looking closer into optimizing different processing technologies, resin type and content, consumer trends and understanding product quality the expectation is the development of a green product manufactured in an energy efficient way.

Spread Strategies: Moving forward, what are the main strategies for scaling impact?

The bamboo industry has so much potential but is still seeking a professional channel to distribute its composites which offer great advantages in material performance. Optimized bamboo products can attract big sectors (automotive industry, air-crafts, furniture) to use sustainable, green materials in their portfolio to replace more energy intensive materials (plastics, fiberglass, steel). Such companies can give local bamboo manufacturers the opportunity to grow, include communities and local suppliers to a sustainable bamboo revolution and offer chances to export value added bamboo products.

Sustainability

Financial Sustainability Plan: What is this solution’s plan to ensure financial sustainability?

This project is in its product development/optimization stage. Lab results have shown the feasibility and a sustainable financial plan can be achieved after the start of production of structural bamboo products for the housing market. Starting locally (Colombia), this project can further investigate all necessary challenges in terms of standards and building codes for a successful export business as well, which will ensure financial stability.

Marketplace: Who else is addressing the problem outlined here? How does the proposed project differ from these approaches?

This project is addressing a problem that has not yet been fully understood from other manufacturers. Due to rapidly increasing energy prices but also costs of raw materials such as resins and other additives, this research project responds with a systematic production process optimization to save energy but also to reduce expensive (and environmentally concerning) additives. By the time the project is implemented it can compete with already existing similar products with steady prices due to optimal production parameters and consistent product quality.
Founding Story

The Structural Bamboo Products Research Team was established in 2012. After gaining experience in the wood-based panel industry from setting up a pilot plant in Ethiopia, Felix Böck got recruited to join the team for his PhD. From day 1 he was inspired by the international research collaboration - his contribution was clearly to include the experiences and challenges he gained on his trips around the world. By attending the Global Bamboo Summit in Vietnam he got in contact with companies from South America and got inspired, motivated to do it ‘different’. He is now focusing on sustainable technology transfer that starts locally in countries where bamboo grows...

Team

Greg Smith, UBC Vancouver, Composite Expert; Michael H. Ramage, UC Cambridge, Architect & Material Scientist; Lorna J. Gibson, MIT Boston, Material Scientist; Helen Mulligan, CAR Cambridge Architecture, Designer; Bhavna Sharma, UC Cambridge, Civil Engineering with Bamboo; Kate Semple, UBC Vancouver, Bamboo Scientist; Joerg Stamm, Bamboo Expert & Industry Contact; Oliver Firth, INBAR, Bamboo Construction & Rural Development.

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About Your Project

Organization Name

How long has your organization been operating?

Country where this project is creating social impact

What awards or honors has the project received?

Funding: How is your project financially supported?

Individuals, National government.

Supplemental

Sector
Sustainable Sourcing.

Audience: Who have you identified as your customer/recipient groups and do these groups value your solution for different reasons? How do you engage different customer/recipient groups to deliver your solution?

A rapidly growing construction industry in developing countries around the world is having huge demands of renewable and fast growing natural materials. The main recipient group are therefore all tropical and subtropical countries with bamboo as raw material to replace much more energy intensive resources (concrete, steel). By showing its outstanding material characteristics, the fastest growing wooden grass on earth, bamboo, has the potential to be used as sustainable construction material of the future.

Scaling the solution: How would the prize money and publicity help you to achieve your objectives over the next two years?

With the support of an already existing research collaboration of three well known Universities (UBC, Vancouver; MIT Boston; UC; Cambridge) research results can be transferred on a prototype trial for structural composite products on a new and innovative pilot factory set up in Colombia (2013). The prize money would finance materials and the training of local workers for a sustainable technology transfer. The publicity can attract foreign investors but also benefits to win new partners for future R&D collaborations (resin suppliers, machine manufacturers) as well as attract customers to get curious about the benefits of this highly renewable composite product for the construction, but also automotive sector.

Experience: Please provide examples of any previous entrepreneurial initiatives you have pioneered

As Head of Product Development (African Bamboo Plc) I experienced how a conceptional idea can grow into a real project. My initiative was the development of a highly innovative, formaldehyde free bamboo composite product for indoor use. Underway that process, I redefined parts of the production process to make it safer, easy to understand and operate which lead me to the passion of creating new ways of developing products with natural materials

Are you eligible to attend the Accelerator event in Cambridge and subsequent events in London, UK in January, 2015?

yes
Will you require a visa to enter the UK?
Are you a current Unilever employee?

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