

Composite Research

EXECUTIVE SUMMARY



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Executive Summary

Introduction

Composite Research (CoRe) is an Italian technology start-up founded in late 2015 and operating in the field of composite materials R&D. Thanks to our patented **MadFlex** technology, we have been able to achieve important successes so far (160 k€ pre-seed, winner of EIT Raw Materials Booster Program and SME Instrument Phase I, finalist at the JEC World Startup Booster 2018) and sign our first agreements. Now, we are going to reach our next level of maturity, transforming a still embryonic activity into a solid, scalable business opportunity.

Problem addressed

Composite sandwiches are a special class of composite materials, combining structural performance to lightweight, which are increasingly used in automotive, aerospace, wind energy, building, sport and leisure sectors to create lighter yet strong and performing products and components and increase energy efficiencies. One major drawback of composite sandwiches is their structural stiffness that often prevents or makes unprofitable their use in many applications. In fact, the stiffness of traditional composite panels leads to local brittleness that makes them complex and difficult to join them together or with other materials, thus requiring the creation of monolithic parts that are complex and expensive to produce, transport and assemble. This, in turn, precludes composite sandwiches from entering an even wider and more differentiated range of applications as a replacement for other heavier and/or less structurally performing light materials.

Proposed solution

CoRe has developed and patented an innovative composite sandwich panel design, that is flexible (or even rollable) if pressed on one side, while being rigid as traditional panel if loaded on the other side (Italian patent granted + EU and US extension pending). The panel can be produced with commonly available raw materials (carbon/glass fibre, steel, UHMWP fibres, foams, honeycomb, etc.) at comparable costs than traditional composite sandwiches and manufactured using the same production facilities and processes. CoRe has given the name "**MadFlex**" to this technology as a reference to its extreme resistance (MADly strong), and flexibility (super FLEX).

Key competitive advantages

In addition to the many advantages of composite materials, thanks to its flexibility, MadFlex can represent a triple business opportunity.

1. **Replacement of composites sandwiches in key applications:** Easier assembly and transport, simplification and cost-reduction of the moulds (flat panels used and applied in-situ in any shape - no bespoke moulds), vibration dampening, avoidance of large tooling and hinges.
2. **Replacement of other less performing light materials (aluminium, tech textiles, polimeric):** Superior lightness (5-6 times lighter than a sheet of ABS of the same flexural rigidity) and mechanical performances (5 times stronger than structural steel), improved acoustic and thermal insulation, reduced environmental impact (5 times lower compared to aluminium)
3. **Development of new applications** in any relevant market segment, combining lightness and structural performances with unique mechanical behaviour.

Market potential

The global lightweight materials market size was estimated at 113.78 B\$ in 2016 and is expected to register a CAGR of 8.9% from 2016 to 2024. Polymers and composites dominate overall consumption of lightweight materials and the trend is likely to continue over the forecast period. The global composites market size is expected to reach 130.8 B\$ by 2024 and expand at a compound annual growth rate of 7.8.

Business model & go-to market

Currently, CoRe operates as an R&D company, working on key proof-of-concept (PoC) “**engineered products**” in the automotive, aerospace, building and medical device markets. As we are pushing forward our technology in these demanding sectors, we aim to optimize and qualify the various possible combinations of our products according to the standards and constraints specific to each sector, while offering to composite parts manufacturer and to OEMs the possibility to create innovative PoC products with unique physical and mechanical characteristics. PoC contracts have already been signed in the automotive, medical and building sectors, and we expect these and other PoC projects to progressively lead to contracts for mass-produced parts so to generate additional revenues in the form of licenses and royalties. Our ambition is to bring by 2021 the MadFlex to the market as a **standard semi-finished product** (in the form of standard panels), taking care of its production directly or through third-party manufacturing licenses.

Management

At the moment, CoRe is managed by its 4 founders: Eugenio Fossat (CTO, chemist with long experience in composites research), Nicola Giulietti (PM, energy engineer), Marco Morrone (CBO, finance and business strategy expert) and Nadia Ceolin (CMO, graduate in business communication). To help us achieve our goals, we can count on the support of three business angels with very different backgrounds (academic, entrepreneur, equity investment), as well as a network of professionals in the production, legal and patent fields. The strengthening of the team's skills will be the cornerstone of the next business steps, with the aim of increasing human resources first through NEDs/interim, and then moving on to a real expansion of the 100% operational workforce.

Fundraising objectives

Currently, CoRe is seeking a first substantial equity investment (in the range of 500 k€) with the goal over the next 24 months to continue to invest in a high level of protection of intellectual property, as well as to internalize skills and prototyping equipment that currently are outsourced. This Our business plan involves the development of two complementary and consequential strategic lines that will make it possible to speed up operations considerably, but also to avoid sharing sensitive information about the technology with third parties.

1. **Dissemination:** Systematic presence at events/fairs/b2b/sector publications), professional consultancy (marketing, design, etc.), involvement of a NED for MadFlex application/PoC engineering, company image and further technology validation through prototype testing and production).
2. **Structuring:** Skills internalization (application and industrial engineers, designers, marketing, etc.), purchase of materials and laboratory equipment.

Financial projections

In the next 3 years, we expect that revenues from PoC contracts will be progressively be reached and overcome by earnings from the sale of standard panels as well as royalties from serial products. Our financial projections are summarised in the table. The figures are expressed in thousands of euros.

| | 2019 | 2020 | 2021 |
|---------------------------------|---------------|----------------|----------------|
| Revenues from R&D | 119 € | 1.173 € | 1.490 € |
| Revenues from sales & royalties | 10 € | 722 € | 1.403 € |
| Other revenues | 9 € | 37 € | - € |
| TOTAL REVENUES | 138 € | 1.932 € | 2.893 € |
| Direct costs | 112 € | 1.045 € | 1.343 € |
| Fixed costs | 136 € | 285 € | 385 € |
| EBITDA | -110 € | 602 € | 1.165 € |

Exit strategy

M&A's activities in the composite materials sector are rather systematic and consolidated, with large players (generally chemical companies producing raw materials) aiming to maintain control of the value chain up to the end customers also for the purpose of generating new demand. However, there are also numerous examples of IPO's being successful in secondary technology markets. Our target is to reach a level of maturity and value that reasonably considers these opportunities for exit starting from 2024.