Printing Out the World

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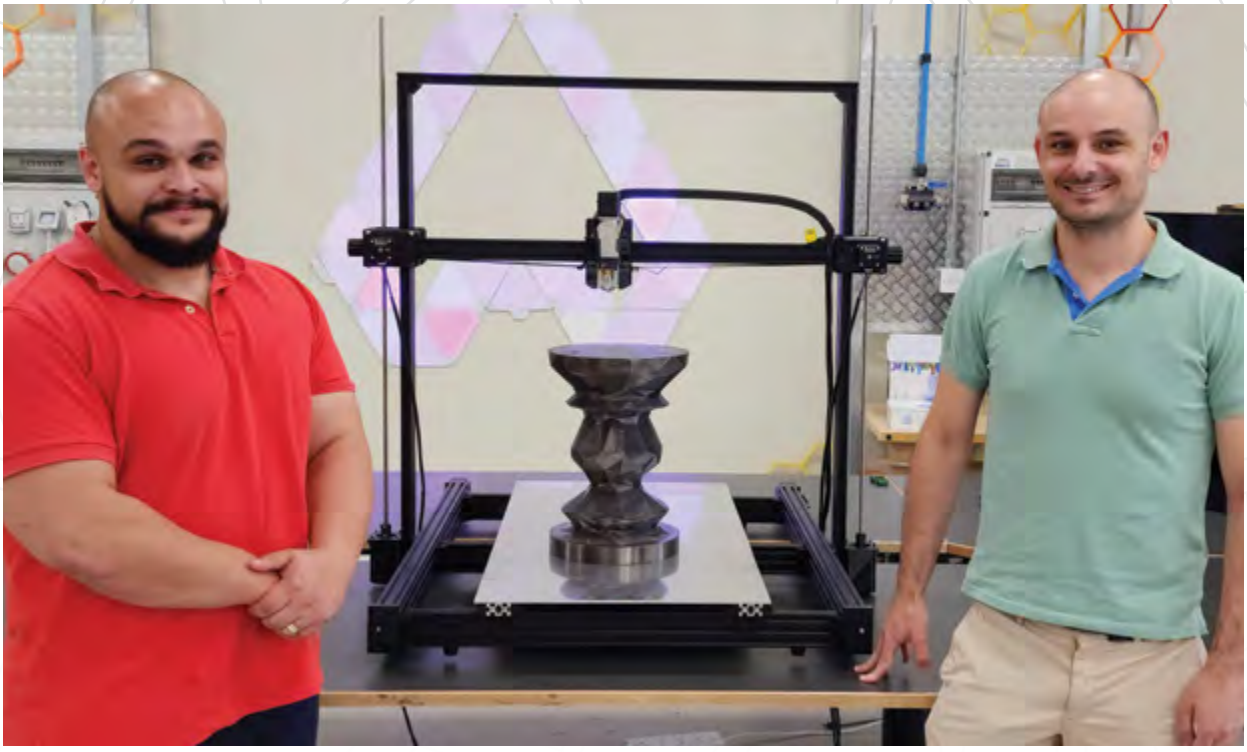
ELM Fabrication is a Maltese start-up that uses 3D-printing technology to shake up the furniture industry.

Antoni Gaudí is well-known for his architectural masterpieces, such as the Casa Batlló in Barcelona. But did you know that Gaudí also designed furniture? His Calvet Chair, for example, incorporates elements from sculpture and architecture to create a magnificent work of art.

While many would love to have such a masterpiece in their own homes, commissioning a carpenter to create such furniture would quickly end up costing a fortune! While there certainly isn't a shortage of design talent, finding a carpenter, sourcing the materials, and covering the costs of the labour involved means that unique furniture (such as Gaudí's chair) is something reserved for the affluent. But what if there were a way to reduce these costs and make distinctive furniture more accessible?

ELM Fabrication is a Malta-based start-up that intends to revolutionise the furniture industry, using 3D-printing technology to circumvent the technical and resource limitations of handcraft. The start-up, founded during the pandemic by engineers Nicholas Borg Calleja, David Sciberras, and award-winning designer Paavo Pietola, is developing the technology necessary for 3D printing furniture using recycled materials (such as recycled biocomposite wood and plastic), as well as a commercial platform that links digital artists, customers, and manufacturers.

The traditional furniture industry puts a lot of stress on Earth's finite resources, being highly driven by the timber industry and requiring a high influx of raw material. If a piece of furniture breaks, it tends to end up in a landfill or burnt. A linear economy like this, always reliant on the extraction of raw materials from nature, is neither sustainable nor compatible with our environment. There's an urge to find a way around the waste of resources and adjust the economy to our planet's needs. Hence, ELM Fabrication works around this problem by using recycled biocomposite wood and plastic, leading to a sustainable, circular-economy industry. With the use of these materials,



David Sciberras and Nicholas Borg Calleja together with a prototype of their medium-size 3D printer
Photo courtesy of ELM Fabrication

when an object reaches the end of its utility, it can be ground back into pellets to produce a new product without the need for cutting down new trees or accessing raw materials. This is a perfect example of a circular economy.

The ease of reusing these materials allows for flexibility that hasn't been available until now, the possibility of having furniture that can be redesigned and reassembled with no waste. This game changer has value from both a sustainable and artistic point of view.

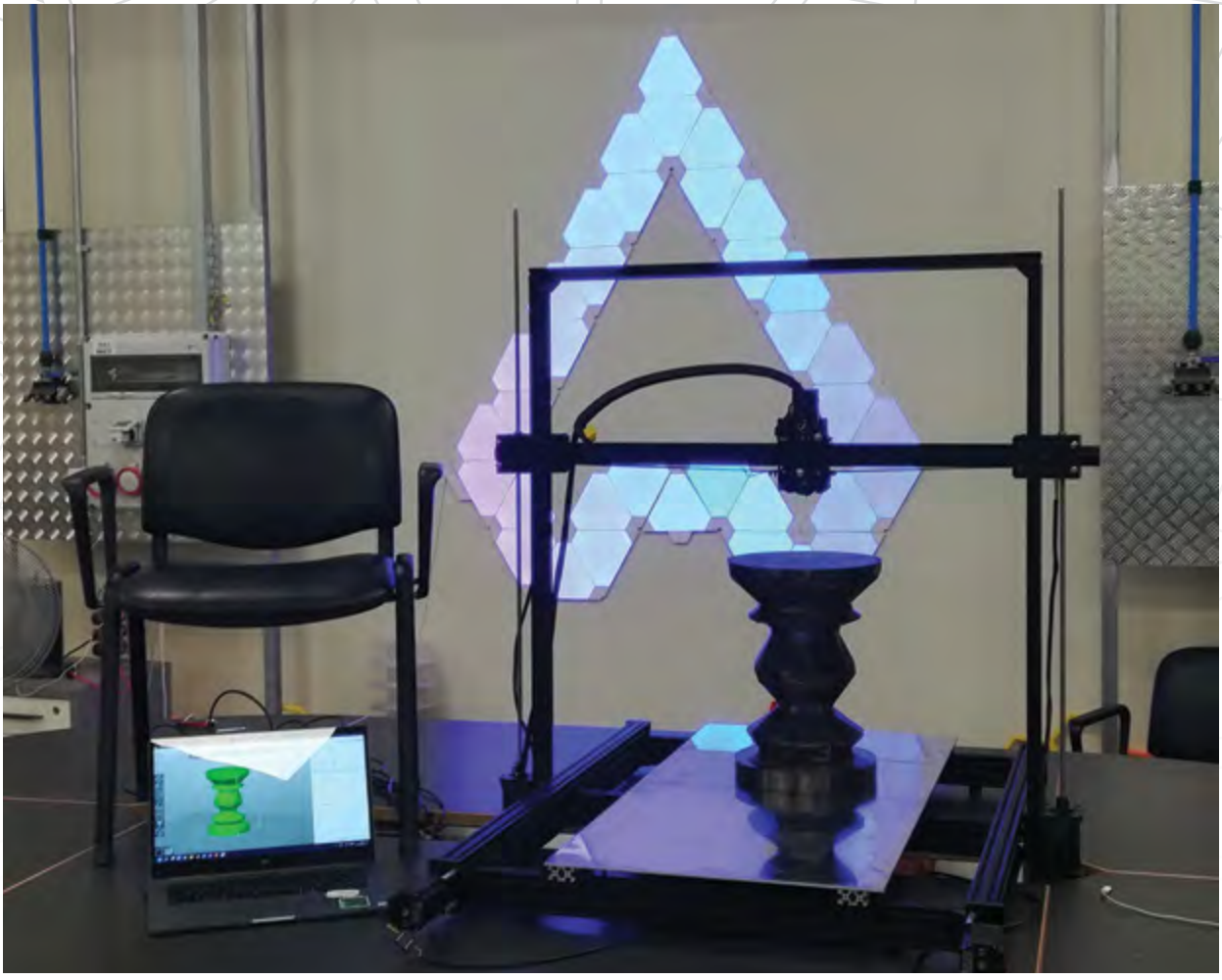
SHARPENING THE TOOLS

While 3D printers have existed for over two decades now, they still present considerable challenges.

Borg Calleja explains how 'the price of an industrial 3D printer is a setback to adapt this technology to the furniture industry. So, we decided to create our own 3D printer.'

The high price of large-sized 3D printers is a barrier for businesses in the sector to take the technological leap. Robotic setups, comprising a robotic arm moving on tracks, are the most common type of large-scale industrial 3D printer. They have extremely high precision; however, they are notoriously expensive, ranging between €160,000 to over €300,000 in price. One of the main reasons for the price is that there are many different individual components that constitute the printer. Taking this into account, ELM Fabrication tackled this problem by applying vertical integration and building a simple and affordable 3D printer from scratch.

A 2m x 2m x 6m printer was designed at a fraction of the cost of the printers on the market and is currently waiting for more funding to be produced. In the meantime, a smaller model with dimensions 1m x 1m x 1m has been produced as a proof of concept and used for the production of several items such as vases and tables. Resulting from this, ELM Fabrication has received an award from Tech.mt for the best startup performance during EIT MED ClimAccelerator (a programme designed to support and fund local start-ups focused on cleantech and sustainability).



The chair next to the 3D printer illustrates the scale of the prototype
Photo courtesy of ELM Fabrication

The versatility of 3D printing allows for the production of more complex designs. It saves an immense amount of time, produces much less material waste, and even allows certain designs that wouldn't be possible to manufacture otherwise.

With a printer, it is also possible to change the thickness of the printed filament. By choosing a nozzle with a small aperture, it is possible to create almost translucent objects, whereas by choosing a thick filament, it is possible to develop a resistant material that is fit to withstand harsh conditions such as those in a maritime environment.

CONNECTING THE PARTS

Many digital artists are looking for an opportunity to bring their ideas to life. Without easy access to printing technology, many ideas could be lost. ELM is developing a digital platform to connect designers with manufacturers, boosting the creative processes of digital artists from all over the world.

The platform has already been developed, and once it's populated by artists, manufacturers, and consumers, it's ready to work. The idea is that the consumer can navigate through different artists and their designs online. Once a product is chosen, it is produced at the manufacturing site closest to the client and directly shipped, in a fast and cost-effective way.

With the printer's production in Malta and manufacturers all over the world, ELM Fabrication could have global reach and revolutionise the future of the furniture industry. Its way of production could help make this sector compatible with the world we live in without having to exploit resources at a mass scale, all while enabling a counter-force against the boring and standard designs typically commercialised. As Borg Calleja puts it, 'if Antoni Gaudí lived in our time, he would have hired ELM Fabrication to effortlessly create his furniture masterpieces.'