In March, I was treated to a personal tour of Materialise’s main facility in Leuven, Belgium, along with ROBO Global’s CEO of EMEA & Asia, Richard Lightbound. One of the largest additive manufacturers in the world, Materialise’s high-end software solutions form the backbone of 3D printing processes for a wide variety of industries, including healthcare, automotive, aerospace, art and design, and consumer goods. Our extensive tour included a personal interview with Chief Technology Officer Bart Van der Schueren, as well as discussions with numerous department heads, all of whom provided us with insights into the past and future of Materialise, as well as the trajectory of the 3D printing industry.

Founded in 1990, Materialise has been consistently focused on a single goal: enabling new uses for the extraordinary potential of 3D printing. Today, the company is a clear technology leader, with more than 242 granted patents and nearly 200 pending. It was recently awarded the ‘Factory of the Future Label 4.0’—recognition that followed a rigorous selection procedure by Belgium-based Agoria and Sirris, two leading trade associations for the technology industry. One of the key criteria for the award is exhibiting a collaborative approach to development that supports the fully networked factory. PwC has estimated that as many as 64% of manufacturing factories will use connected sensors by 2020, and that the number of factories using 3D printing will double. That reality has dramatically increased demand for solutions from Materialise, which have become the industry standard in 3D software solutions.

“Collaboration is a key driver of innovation. By working together with our partners and customers, we discover innovative and exciting ways to apply 3D printing in applications that have the potential to create new and significant business opportunities.”

— BART VAN DER SCHUEREN, CHIEF TECHNOLOGY OFFICER, MATERIALISE
Van der Schueren, who has been with Materialise for 29 years and has watched the 3D printing industry evolve first hand, says that the ability to enable this new level of inter-connectivity is a major strategic focus for Materialise today. By taking a more holistic view of the ecosystem, the company is finding new ways to add value for its partners and customers. As we toured the production floors together, Richard and I could clearly see the decades of software expertise at work creating the future of digital manufacturing through collaboration. Rows and rows of printers from leading industry partners such as Stratasys, 3D Systems, and more were being put to the test, combining Materialise software with advanced print hardware to rapidly build a massive variety of complex deliverables: medical cranial implants, custom ski boots, automotive components, aviation parts. The list seems endless.

Engineering clearly lies at the heart of everything Materialise does. Historically, additive manufacturing was used primarily for prototyping. Currently, Materialise is investing heavily on the post-production side to shift both the perception and the reality away from this limited view of 3D printing applications. As we met with one department head after another, their excitement about the future was palpable. Here are just a few industries where Materialise is poised to create incredible transformation in the next three to five years:

**Medical**

3D printing for medical applications is the fastest growing business at Materialise, driven largely by growing demand for 3D surgical implants. Since selling its first license in 1992, Materialise has become the industry standard for 3D printing in the healthcare industry. In recent years, the medical group has expanded the reach of its software, design, and manufacturing approach to include:

- Pre-surgery planning using polymer prototypes of human organs and porous metal plates for skulls.
- Custom medical implant design and manufacturing that combines years of experience in CAD with the latest 3D and AI innovations to offer surgeons a wide range of patient-specific implants, such as cranio-maxillofacial implants, acetabular hip implants, and shoulder implants.

The company’s range of products and reputation for solid execution have supported double-digit sales growth. Brigitte de Vet-Veithen, VP of Medical Segment, shared that their strategy for the medical sector includes partnering with orthopedics market leaders like Zimmer Biomet, Smith and Nephew, and Stryker to dramatically improve surgical outcomes. Orthopedics for the upper and lower extremities is a top target, though the cardiovascular and neural markets may offer even larger opportunities in the long term.

de Vet-Veithen believes that Materialise is prepared to disrupt all four segments of the cardiovascular market by building 3D structures of the heart and the heart valve. Other exciting areas include respiratory; next-generation surgical implants and prototyping that use more AI, as well as different materials and applications; and augmented reality to support surgical procedures. We also toured a new facility where medical implants are cleaned and sterilized, adding another level of value for Materialise’s medical customers.
Consumer Goods
Materialise is able to create consumer goods that are tailored to a customer's specific needs. Integration with design software like CAD and PLM supports the 3D printing of items that, in the past, were challenging to customize at a practical cost, such as footwear and 3D-printed eyeglasses. Materialise recently partnered with HP to deliver customized, 3D-printed shoe insoles. The demand for custom 3D insoles is growing quickly, with the expectation that all shoes could be customized in the not-so-distant future. While the eyewear opportunity is still early, Materialise has partnered with Yuniku to deliver the world's first 3D-tailored eyewear and introduce vision-centric design. As they innovate to improve the efficiency and customization capabilities, Materialise expects to see a meaningful revenue stream over time. Other applications that the team leaders were proud to showcase during our visit included custom ski boots, footwear and insoles, eyewear, jewelry, and home designs.

Manufacturing
Strategic partnerships are at the core of Materialise's growth strategy. The company's strong partnership with BASF aims at promoting an open-market model in industrial 3D printing. Last summer, BASF confirmed its interest in Materialise when it invested an equity stake of $25M in the company. Working together, Materialise and BASF are developing applications that support new materials and material adaptations. Once these applications are complete, BASF will use Materialise's 3D printing facilities to launch and certify new materials for a variety of applications in industries such as aerospace, automotive, and wearables. The company is also partnering with leading 3D printing machine manufacturer Stratasys to deliver point-of-care 3D printing to hospitals worldwide.

In November 2018, Materialise announced a partnership with Essentium and BASF that relies on Materialise to develop 3D printing software to drive Essentium's advanced fused filament fabrication (FFF) solutions for industrial additive manufacturing. The partnership specifically targets new market vertical applications, such as the aviation industry, that are focused primarily on polymers.

Automotive
Materialise is expanding its offerings in industrial parts production, with new metal offerings such as titanium and inconel, a nickel-chromium-based superalloy. In the pre-production floor for high-end cars such as Aston Martin, for example, Materialise provides the manufacturer with custom components that replace traditional aluminum with stronger carbon-based materials.

The company's RapidFit Smart Cube solution is designed to help automakers deliver vehicles using a faster, leaner, and more flexible process. Smart Cube enables the manufacturer to exchange and update separate modules according to new CAD revisions and design maturation, and enables modification at a low direct and indirect cost.
Materialise believes the Smart Cube is an industry game-changer, in part because it can be introduced much earlier in the development process and then used throughout the production cycle of each vehicle. And because Smart Cube allows new parts to be introduced without losing valuable time to reconstruct the entire cube, the solution accelerates time to market—a factor that is particularly critical in the automotive industry.

For companies in every industry, Materialise’s proprietary software platform combines data analytics, manufacturing, and artificial intelligence (AI) to provide new pathways for industrial automation using 3D printing technology. Stefaan Motte, VP of Software at Materialise, told us that he believes AI will be the key differentiator moving forward. AI is making it possible—for the first time ever—to monitor and process industrial systems in real time using the power of machine learning.

For example, the Materialise Magics 3D Print Suite offers smart data preparation software for additive manufacturing that is equipped with a customizable, intuitive user interface (UI). The solution guides users through every step of the 3D printing workflow, whether creating a car component, an aviation part, or insoles for basketball shoes—all while using deep learning and neural networks to optimize the system at each moment during the printing process.

As Richard and I completed our tour of the company’s facilities, what resonated with us the most was that Materialise is enabling manufacturers of every kind to bridge the gap between 3D printing and practical application. By making cost-effective additive manufacturing a reality Materialise is transforming manufacturing as we know it, creating the factory of the future—as well as providing an important opportunity for any investor hoping to support and profit from the 3D printing revolution.