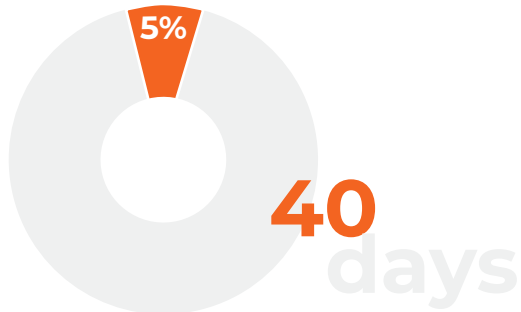


White paper

The 3D printing journey toward global business impact



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On average **5%** of parts is printable resulting in average lead time improvement of **40 days** and an investment vs return ratio of **1:3?**

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Our customers:





Embrace for business impact!

At Additive Center, we firmly believe that the path to business success should be an inspiring adventure, not merely a routine task. Within this whitepaper, we aim to share our profound passion for 3D printing and warmly extend an invitation to you to embark on this exciting journey with us. Together, we create 3D printed components but also radiate the genuine joy and creativity we infuse into our work. In the midst of all the advanced technology and machinery, it's so important to recognize that our success is fundamentally driven by the dedicated contributions of our talented teams!

Achievements:



€2.700.000
cost saved



350+ engineers
trained



200+ applications
developed

Business impact of 3D printing



The advantages of 3D printing



1. Cost Savings
Reduces material waste and lowers production costs, particularly for complex or low-volume parts.



2. Faster Prototyping
Speeds up product development by allowing rapid iteration and testing of designs.



3. Supply Chain Efficiency
Minimizes dependence on distant suppliers by enabling on-site or local manufacturing.



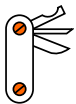
4. Customization
Facilitates tailored components and products to meet specific industrial needs.



5. Reduced Lead Times
Shortens production cycles, ensuring quicker delivery of parts and products.



6. Inventory Reduction
Eliminates the need for extensive inventory, as parts can be printed on demand.



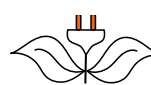
7. Tooling Flexibility
Avoids the cost and time associated with traditional tooling and molds.



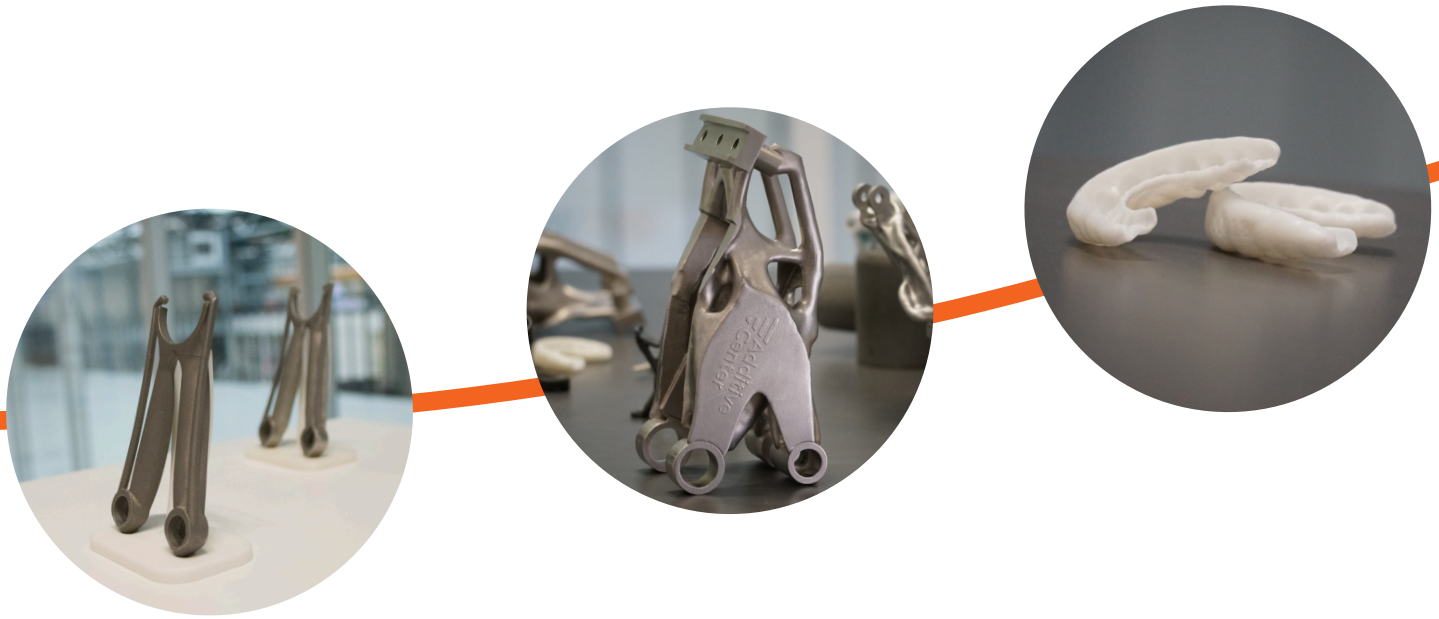
8. Complex Geometry
Simplifies the creation of intricate, high-performance components.



9. Reduced Downtime
Enables faster replacement of critical parts, minimizing equipment downtime.



10. Improved Resource Management
Reduces material waste and energy use, promoting eco-friendly manufacturing.



Advantages in the product life cycle

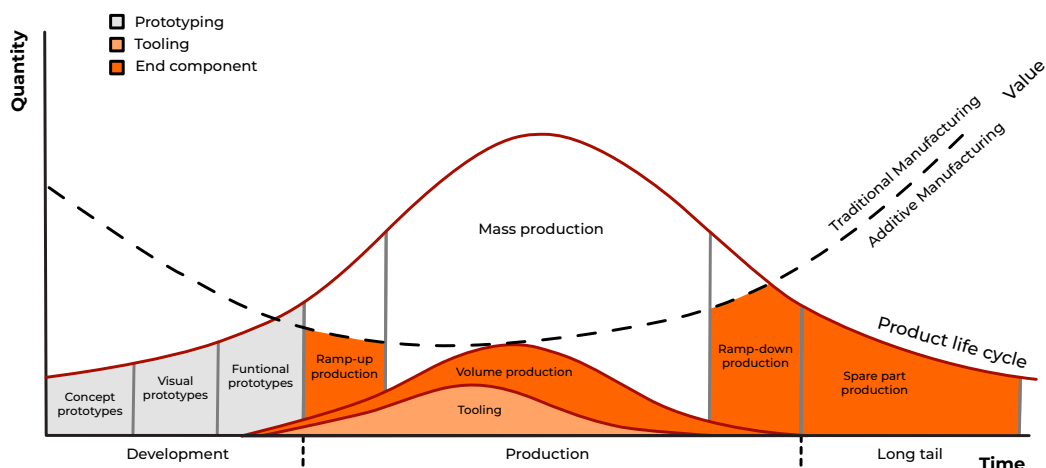
To introduce additive manufacturing (also known as 3D printing) into industrial companies, a strategic focus on investments, training, and expertise is indispensable. Hardware investments, coupled with comprehensive employee training, lay the foundation for a successful adoption of additive manufacturing (AM). Concurrently, the development of 3D modeling expertise is crucial for harnessing the full potential of this transformative technology.

Robust quality control measures, meticulous material acquisition strategies, and seamless supply chain integration are equally vital components of this journey. By ensuring quality and efficiency throughout the entire process, companies can reap the rewards of additive manufacturing.

Development: In addition, conducting comprehensive cost-benefit analyses helps organizations make informed decisions and maximize the advantages of additive manufacturing. This structured approach not only speeds up development, enabling faster iterations and quicker product introductions, but it also significantly reduces time to market.

Production: Furthermore, additive manufacturing opens up new horizons in the production of parts. It offers a more cost-effective method, particularly when considering volume and lead times. This method allows companies to balance mass production and customization, adapting to unique market demands.

Long tail: The concept of the long tail presents a challenge. It demands a reduction in costs, less inventory, and the application of localized production to meet the diverse and evolving needs of the market. In sum, by meticulously addressing these components, companies can harness the full potential of additive manufacturing, ultimately enhancing their efficiency and competitiveness within their respective industries.

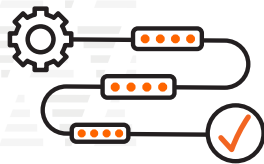
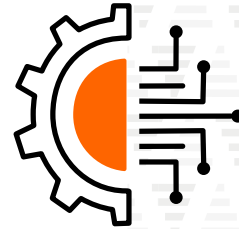


Our proven approach

How to maximise the Business Value of 3D printing

Cultivating Competence: The Catalyst for Additive Manufacturing Success

At the heart of Additive Center is a commitment to nurturing competence. We provide a structured approach to skill development across your organization. Our services include competency assessments, customized training programs, and ongoing knowledge transfer initiatives. We firmly believe that a well-trained and knowledgeable team forms the bedrock of additive manufacturing success. By fostering expertise and understanding, businesses can harness the full potential of additive manufacturing, positioning themselves as industry leaders. Our services extend beyond technical teams to encompass marketing, procurement, and supply chain teams.



How processes maximise the Business Value of Additive Manufacturing

Our approach involves in-depth analysis to pinpoint components perfect for 3D printing. Our real case studies showcase impressive reductions in lead times and the enhanced cost-effectiveness that comes with this strategy. We also conduct comprehensive assessments of your existing processes, adapting them as needed for AM. This includes aspects like validation and qualification processes and the implementation of a manufacturing process.

Elevating Efficiency with Advanced Techniques

In the next phase, we take a deep dive into advanced additive manufacturing techniques and the services we offer to improve your efficiency and value proposition. We meticulously review your current technology and materials, identifying opportunities for additive manufacturing improvement. Our activities encompass technology audits, material assessments, and technology integration plans. Leveraging our expertise in advanced additive manufacturing techniques, your business can make significant strides in efficiency and product quality.



We understand that passionate individuals are the linchpin of success amid ever-evolving technology and innovation. Our focus is on inspiring your team's enthusiasm, guiding them through the world of additive manufacturing, all while recognising that your people can enjoy themselves with this exciting journey. We consider our mission a success when we make ourselves redundant.

How we make AM a strategic advantage for your business

Enhancing Efficiency and Cost

Consider the immense potential of additive manufacturing in revolutionizing your business's supply chain and operational efficiency. We view additive manufacturing as a powerful strategy, one that can expedite product development by creating prototypes, thereby reducing time-to-market and slashing development costs. Moreover, additive manufacturing enables the fabrication of tools for "conformal cooling" in injection molds, leading to reduced cycle times and optimized manufacturing processes. The beauty of this approach is its non-invasive nature; no need to alter the final product, just refine operational practices. Notably, 21% of companies with prior additive manufacturing experience highlight the optimization of supply chain and operational components as a substantial benefit.

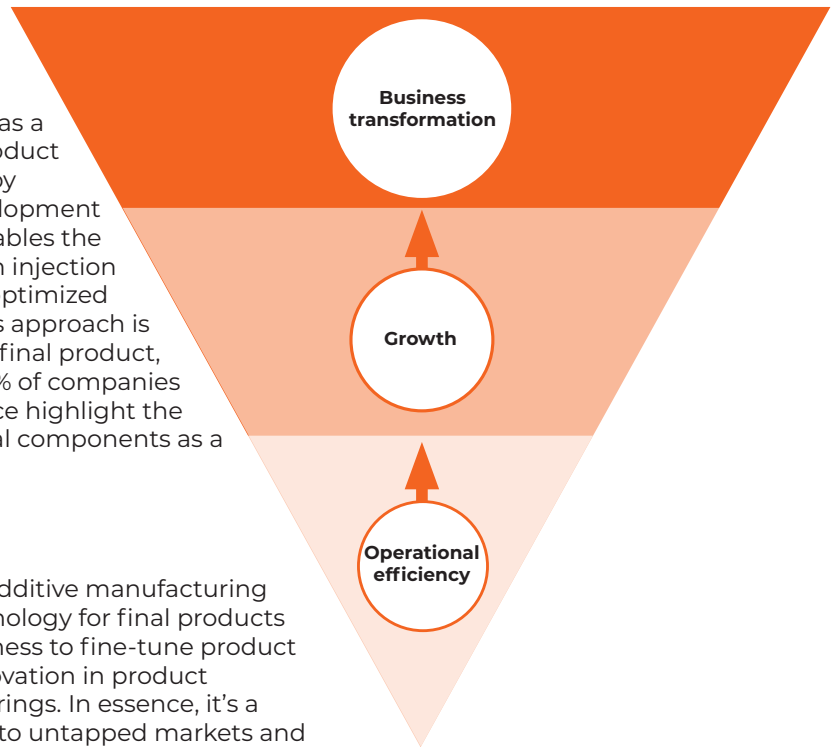
Realizing Growth Benefits

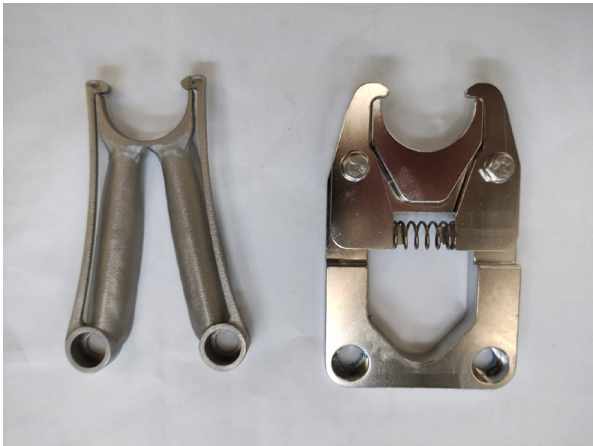
The true transformation takes place when additive manufacturing becomes the principal manufacturing technology for final products and components. This empowers your business to fine-tune product design, enhance customer value, foster innovation in product development, and elevate your existing offerings. In essence, it's a revenue-generating engine, opening doors to untapped markets and growth opportunities. The full potential of this approach is realized when you embark on designing customized or highly complex products, impossible to achieve through conventional means. This approach has been overwhelmingly successful, with nearly 83% of additive manufacturing embracing companies citing the creation of superior-quality products, intricate structures, and tailored solutions as the most significant benefit. This path also leads to enhanced supply chain and operational efficiency.

Transformational Benefits

Now, imagine additive manufacturing not just as a tool but as a catalyst for a profound transformation. It opens the door to new business models, unique product portfolios, and innovative operational structures. It's a paradigm shift that ushers in an era of global, digitally-driven business models. Additive manufacturing transcends its role as a mere production tool to become a cornerstone upon which businesses can build a formidable competitive advantage. The essence lies in the shift of value from the physical product to digital product design. Additive manufacturing isn't just reshaping business and innovation; it's redefining the entire competitive landscape.

We invite you to explore these opportunities. We've witnessed countless businesses experience these very benefits, and we're eager to guide you through your own journey of efficiency enhancement, growth realization, and transformative potential. Embrace the future with us, where additive manufacturing isn't just a technology; it's a strategic advantage.





Description of customer

Sidel is a leading manufacturer of packaging equipment and services for various liquids. Part of the Tetra Laval Group, they specialize in handling beverages, food, and home and personal care products.

The Challenge

The bottle gripper, a critical component in Sidel's high-speed process equipment, handles over 50,000 bottles per hour and requires customization according to bottle sizes. Sidel aimed to redesign the existing multi-part assembly into a single component while ensuring it met all technical standards including stress, fatigue, and emergency stops.

The Solution

Additive Center developed an innovative concept that merged the gripper fingers, springs, and all associated parts into a single component. Utilizing generative design for the preliminary shape, the team then perfected the design and its gripper functionality through extensive simulation software applications. Recognizing the component's importance, special attention was given to the Additive Manufacturing process to ensure and guarantee critical-to-quality.

The Business Value

- **Increase Productivity:** Extended service lifetime of the gripper enhances productivity.
- **Enhanced Cleanability:** The unique rounded top surface ensures better part cleanability.
- **Supply Chain Simplification:** Consolidated the design and supply chain from 10 parts down to 1.

How the design and validation process looked like:



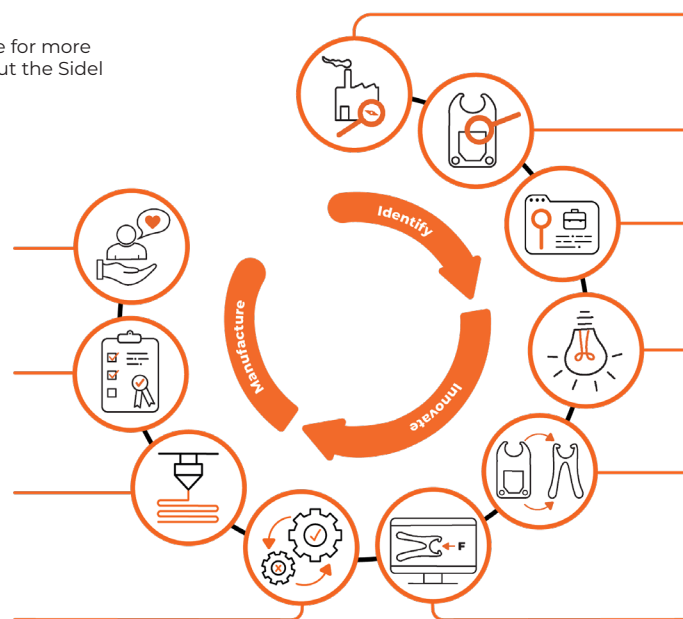
Scan the qr-code for more information about the Sidel Gripper

Customer use
We will ensure Sidel's satisfaction by closely observing the use of the gripper and implementing any necessary improvements.

Quality assurance
We personally checked and approved the quality of each printed gripper before sending them to Sidel.

Release for production
We collaborated with our supplier to ensure the desired quantity and quality of 3D-printed grippers.

Testing and validation
After simulating and iterating through prototypes, we validated the part for release.



Exploration workshop
We explored the factory to understand the machines and identified potential areas for improvement.

Part selection
We selected the gripper as the key component with the most potential for improvement and cost reduction.

Business case
We created a business case to explain the benefits, cost and alternative options to Sidel.

New mindset design
We came up with a new one-piece gripper design, replacing the previous five-part design.

Design for additive manufacturing
We optimized the gripper's 3D model using Hexagon's fatigue analysis software and generative design for 3D printing.

FEA simulation
FEA simulation helped us understand the model's behavior and make improvements before the initial test 3D print.

Description of customer:

JHT is a global, customer-centric company specializing in coating and engineering. They offer comprehensive solutions for coating, laminating, and impregnating systems. Their portfolio ranges from individual components to intricate coating systems. Additionally, they undertake retrofitting of old systems and the production of unique components.

The Challenge

JHT, in partnership with a university, innovatively crafted a prototype for a new kind of roller: a stainless steel, segmented 3D-printed roller with internal vacuum channels. The pressing issue was the industrialization of this prototype. The aim was to figure out a manufacturing process that was cost-effective, maintained quality standards, and optimized the initial design.

The Solution

Close collaboration was at the heart of the industrialization process. We worked hand in hand with JHT and leveraged our extensive supplier network to devise a scalable industrial solution, allowing JHT to commercialize their pioneering product. By fine-tuning the design for manufacturability in conjunction with the customer and ensuring rigorous quality checks with suppliers, the project successfully transitioned from concept to market-ready product.

The Business Value

- **Assured Quality:** By leveraging our qualified manufacturing network, we guaranteed the highest quality for JHT.
- **Smooth Market Entry:** JHT was able to introduce their innovative product to the market without manufacturing concerns.
- **Enhanced Competitiveness:** With the new product, JHT improved its market position and competitiveness.



Description of customer:

photolithography machines utilized in chip production. As of 2023, they dominate as the largest supplier in the semiconductor sector and are the sole global provider of extreme ultraviolet lithography (EUV) photolithography machines essential for producing state-of-the-art chips. By June 2023, ASML's market capitalization reached approximately US\$280 billion, making them the most highly valued European tech company.

The Challenge

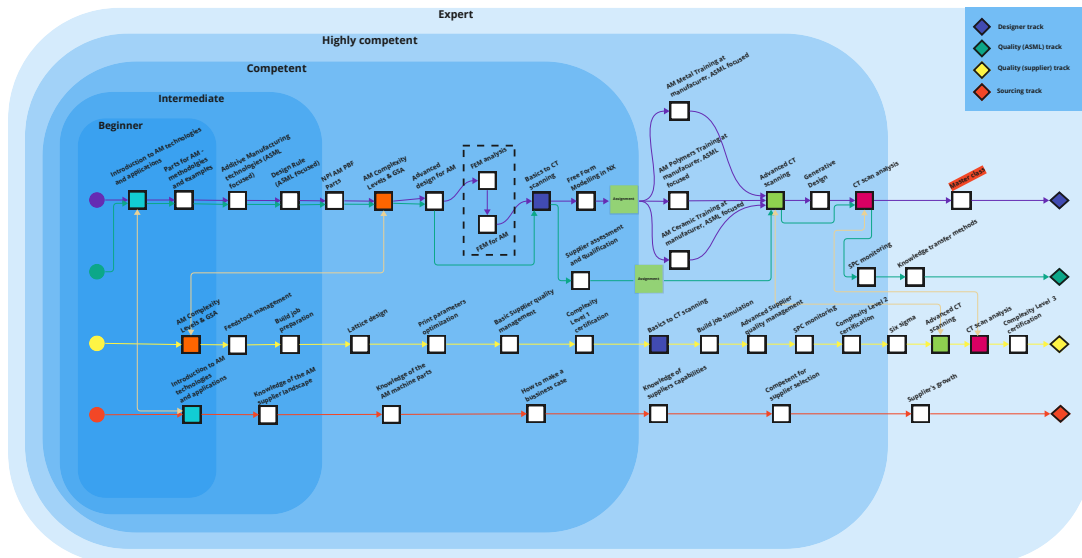
With the need for unmatched wafer stage accelerations, positioning accuracy, and temperature variation precision, additive manufacturing emerged as the only viable solution for ASML. It offered benefits like reduced mass, increased stiffness, enhanced dynamic properties, and optimal thermal behavior. However, the inherent challenge was the inconsistent quality of additive manufacturing parts. Rapid melting followed by solidification could lead to varying material properties, and internal stresses might develop during cooling. The additive manufacturing process itself could introduce defects due to the evolving material microstructure. Additionally, inadequate heat dissipation might lead to part warping. ASML also found that in some multi-laser machines, smoke from one laser could interfere with the beams of other lasers, causing disruptions depending on the gas flow.

The Solution

Together, we've developed a GSA (Generic Standard of ASML), drawing from various ASTM standards, namely 52920, 52930, and 52940. Beyond establishing this foundational standard, our partnership expanded into creating comprehensive learning paths tailored for various roles within ASML — spanning the entire organization like Engineering, Architecture, Procurement, and Quality. These learning paths not only cater to internal stakeholders but also extend to ASML's suppliers, ensuring the consistent maturation of the entire supply chain. Each learning path is meticulously structured to account for different competence levels, ranging from starters to experts. This ensures that every individual has a clear roadmap of the skills and competencies required for success in their specific role.

The Business Value

- **Quality Assurance:** Ensures top-tier quality in expanding additive manufacturing.
- **Holistic Development:** Tailored learning paths for organization and supply chain.
- **Supply Chain Maturation:** Consistent quality and stronger supplier partnerships.

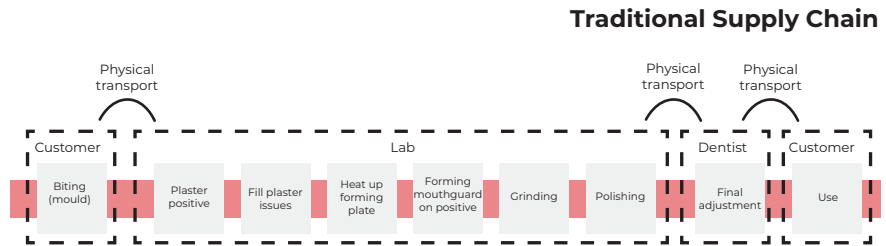


Description of customer:

Founded in the Netherlands, Clik.Fit originated from observing challenges faced by athletes with traditional mouthguards during the 2018 Hockey Women’s World Cup. With expertise in Additive Manufacturing and sports, they envisioned creating custom-made mouthguards that eliminate common discomforts. Now with the capacity to produce over 300,000 mouthguards annually, Clik.Fit aims to dominate 10% of the global market by 2030, translating to more than 5 million mouthguards.

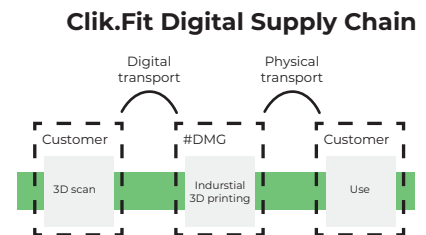
The Challenge

Clik.fit’s prototype of a 3D printed mouthguard was promising. However, the critical challenge lay in establishing a validated production process capable of manufacturing these mouthguards at a massive scale without compromising on cost.



The Solution

In collaboration with AMcubator, a hub for developing scalable 3D printed applications, and through partnerships with industry leaders like Stratasys and Rösler, we architected an end-to-end production process that emphasizes quality assurance. This novel approach enabled the creation of mouthguards that not only meet the demands of high-volume production but are also safe for intraoral use. Notably, the innovative design ensures a shock absorption capacity surpassing the existing gold standard set by dental labs.



The Business Value

- **Ambitious Scaling:** Enabled Clik.fit’s vision of manufacturing 5,000,000 mouthguards annually.
- **Superior Protection:** Delivered a mouthguard with enhanced shock absorption than the current benchmark.
- **Digital Supply Chain:** Offer a fully digital supply chain to customers, replacing the expensive and unsustainable traditional methods.



For more information about Clik.Fit scan the qr-code and check out the website

Unlock the potential of industrial 3D printing.

We would love to get in touch

You can easily reach out to our company through email or phone, or for direct contact get in touch with Maarten and Alexander.



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Many thanks to our partners, together we team up to offer you unparalleled services:



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