Moving the dental world from analogue to digital:
3Shape’s success story continues

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During SCANDEFA, a major dental fair in Scandinavia, DTI recently visited the 3Shape headquarters in the heart of downtown Copenhagen to learn about the company’s new products and future strategies. The historical building alongside Kongens Nytorv square and the Royal Danish Theatre has light and airy rooms, a perfect environment for a young, passionate and ambitious organisation driven to develop the best technological solutions in 3-D scanning and CAD/CAM.

Often referred to as the “Google of the Dental Industry”, 3Shape was launched eleven years ago in a one-room apartment by two young and ambitious graduate students from the Technical University of Denmark and Copenhagen Business School—Tais Clausen and Nikolaj Deichmann. At the time, Clausen was completing his master’s thesis on a groundbreaking 3-D scanning technology and Deichmann was finalising his Master’s degree in Finance and Economics. Having met through friends, they joined forces to participate in the prestigious Venture Cup business plan competition, established by McKinsey and Co., in which they finished second. Throughout the competition, they constantly considered the manner in which the technology could be commercialised and thus the idea of launching 3Shape was born.
Initially, Clausen and Deichmann approached companies in the hearing-aid industry with the idea of developing a quality-control system for hearing-aid shells and ear moulds. Similar to a dental restoration, the devices need to be custom fitted to the patient’s hearing canal and are traditionally made by taking an ear impression that is then manually sculpted, cut and used to make a mould—a time-consuming, manual procedure.

"During these first meetings, we realised that we could actually create a mass customisation production system," Deichmann remembered. "So instead of just checking the quality we decided to go directly for changing the workflow completely, from a manual process, where you spend several hours shaping the hearing-aid shells, to a completely digital workflow."

3Shape digitised the entire manufacturing process by introducing a 3-D scanner for ear impression taking, as well as the management software and CAD software needed to simulate the position of all the electronic components that need to fit into the patient’s ear along with the shell, taking up minimal space and using CAM software for controlling the manufacturing equipment. They developed the system for a specific hearing-aid manufacturer but retained the rights to sell the technology to others. At the time, there were only six companies that controlled approximately 90% of the global hearing-aid market and within a period of three years, all of them went from a completely manual to an entirely digital production. Today, about 90% of all hearing-aid devices are produced using 3Shape’s technology.

Clausen and Deichmann were always aware of the 3-D scanning technology’s enormous potential so they soon looked to other industries where the manufacturing processes are similar to the hearing-aid industry, such as dental laboratories. In 2004, 3Shape began to receive an increasing number of requests from dental companies interested in the technology.

"We quickly decided that if we wanted to replicate our success in the hearing-aid industry, we needed to go for the full solution to have a very user-friendly system that the dental laboratories would adopt. Therefore, we went to a lot of laboratories, small ones and big ones, and tried to figure out how we could optimise the processes instead of just finding a better way to make zirconia copings. From the very beginning, our vision was to achieve a complete switch from analogue to digital," Deichmann explained.

3Shape introduced its first 3-D dental scanner and CAD/CAM software for virtual restoration design at the International Dental Show (IDS) in Cologne in 2005 and the system became a raving success. In the following years, the company extended and enhanced their dental laboratory product range by continuously responding to and involving their customers from the early stages of the product development process.

"Perhaps the most important lesson we have learned is that innovation is only successful if it moves and is guided in directions that truly benefit professionals in their daily work," Clausen, CTO and head of the 3Shape development team, pointed out.

Today, CAD/CAM has conquered dental laboratories and clinics, ensuring high profitability by maintaining top-level quality through standardised and controlled treatment and production processes that also benefit the patient. In Germany, traditionally an early adopter of new technologies, approximately 82% of all ceramic restorations are already produced using CAD/CAM technology. "The question today is no longer if CAD/CAM will endure in the industry, but rather when all dental professionals will be taking advantage of it," Clausen said.

After having conquered the dental laboratory industry, 3Shape also extended the proven technologies to dental clinics. "We analysed all existing scanning systems on the market and defined what we like and what we didn’t like about them. We wanted to create a system that incorporated all the advantages and eliminated all the drawbacks of the existing systems. Our solution really needed to be faster, easier, more accurate and more reliable," Deichmann said.

At the opening day of IDS 2011, 3Shape launched its newest achievement, the TRIOS intra-oral scanning solution, which aims to revolutionise the dental
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Tais Clausen demonstrating TRIOS during the 3Shape press conference at IDS 2011.

One of the TRIOS 3-D scanner's notable features is that it does not require dentists to apply spray or powder to coat the patient's teeth, making scanning an easy, fast and comfortable process that does not ruin scan accuracy by adding material to teeth surfaces. In addition, it can scan any material, such as metals, semi-transparent materials and skin. It only requires minimal training for use in clinical practice. The scanner captures over 3,000 2-D images per second, which is 100 times faster than a conventional video camera. Dentists who viewed the presentations at IDS stated that an “impression-free” dental practice seems to be just around the corner.

An open communication interface allows dentists to send the scanned data via the Internet directly to the laboratory of their choice, where the technician can start designing the restoration immediately using 3Shape Dental System software or the appropriate interface to third-party software. The TRIOS communication software includes a tool to visualise the technician's solutions for the patient, for example on an iPad, while the patient is still in the chair, which is especially important for anterior cases.

The system is designed to give dentists high-quality restorations and treat more patients rather than spending time and money on chairside milling. It handles a wide range of indications and produces quality 3-D data that can easily be realised by any laboratory.

Generally, digital data is controllable, predictable and available any time, requiring only minimal space. This guarantees that the dentist owns and is able to use patient data without limitation and can potentially export virtual set-ups to other systems, such as for appliance manufacturing.

Surprisingly, 3Shape is the only major dental company that offers easily integrable solutions. All products are designed as plug-and-play solutions and feature open interfaces for connection to third-party applications. 3Shape has won Ernst & Young's Entrepreneur of the Year in the Innovation category in Denmark three times. This prestigious award recognises innovation, leadership, state-of-the-art products, an international network and a clear strategy to pursue continuous growth.

Today, 3Shape's development team consists of more than 100 developers of 22 different nationalities, with at least 30 PhDs amongst them. All their products and solutions are born from the union of cutting-edge technology with the latest trends in the industry and the markets. 3Shape product managers and key developers have regular meetings with distribution partners around the world to keep each product at the top of its class. During the life cycle, the products are developed in close collaboration with partners who understand and continue to gather the needs of their customer base and the market.

But even with ten years of outstanding history, 3Shape never stops looking ahead. The company believes that the age of fully digital dentistry is only a few years down the road (of course there will always be smaller, traditional dental practices).

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3Shape is a privately held company headquartered in Copenhagen and boasts the largest team dedicated to scanner and software development for the dental industry. It is based in Denmark and Ukraine, has production facilities in Poland, and support offices in the US and China. Customer support service branches are located in Copenhagen, New Jersey (USA) and Shanghai (China), thus virtually covering every time zone. The very close collaboration between customer support and the development team allows for an unprecedented level of efficiency in responding to partners’ requests for assistance, which is typically available in 24 of the world’s major languages.