Commercialising health innovation

TU Delft's Professor Ronald Dekker discusses the potential benefits of open technology platforms as presented by the Health.E Lighthouse, as well as other areas such as the regulation of medical devices and the future of the electronic medical device industry in Europe

The Health.E lighthouse is an initiative of the ECSEL Joint Undertaking. It aims to accelerate innovation by providing solutions for a wide range of health-related societal challenges. It encompasses several co-ordinated projects to increase collaboration and the production of integrated solutions in the electronic medical device industry.

The initiative promotes open technology platforms designed to bring health innovation to the market by focusing on the commercial applications of the technology.

Ronald Dekker, of Philips Research, is currently part of the Health.E Lighthouse Initiative Advisory Service and is working to enable innovation in smart catheters and implants using open technology platforms in the associated POSITION project. He spoke to *SciTech Europa Quarterly* to discuss the potential benefits of open technology platforms, the regulation of medical devices in Europe, how industry and academia can collaborate to ensure health innovation, and the future of the electronic medical device industry in Europe.

What are the potential benefits of open technology platforms, specifically for health innovation?

The biggest benefits of open technology platforms will be an acceleration of health innovation. Currently, healthcare products largely rely on proprietary technologies. These are very diverse, fragmented, and small in volume, which hampers innovation in medical systems. This means that healthcare does not fully benefit from new developments in research, and it is difficult to effectively exploit the developments in mainstream electronics.

There is a comparison to be drawn with the CMOS industry. When I joined Philips in 1988 we were running about 25 CMOS processes, and we needed those because our applications were so delicate and diverse. The problem, however, was that it is expensive to keep the processes running at the expense of the real aim, which is to design innovative circuits.

Now, many semiconductor companies order their chips from a large foundry, meaning that they are able to concentrate on their designs and solutions, while the foundry has the volume for innovation in developing the next CMOS generation.

In the past, we needed a very special transistor, for instance, to reduce offset in our operation amplifiers. Now, we use an additional thousand transistors because they've become so small and so cheap and so to compensate for this offset.

The strategic idea behind this is that the industry can consolidate by buying the basic technologies form one manufacturer that is solely responsible for the innovation and ensures a new generation every few years. This means that industry can concentrate on applying that technology.

It is a good idea to move away from proprietary 'point solutions' and towards open technology platforms that are used for multiple applications and that serve multiple customers. The aim of the ECSEL Health E. Lighthouse is to investigate, demonstrate and promote the concept of open technology platforms for healthcare products. It will encourage the electronic components and systems industry to consolidate their technology innovations, meaning that open technology platforms can serve multiple applications for multiple users, ensuring sustainable health innovation.

What are the current challenges facing the medical industry in terms of bringing new technology innovations to market?

In the medical industry, specifically in the area of smart catheters and cardiac interventions, there is not enough of a revenue cycle to justify a new technology innovation cycle every five years. An example of this is that, in the past, catheter manufacturers wanted to integrate an ultrasound sensor at the tip of the catheter, for which they needed to go to an academic institute to ask for
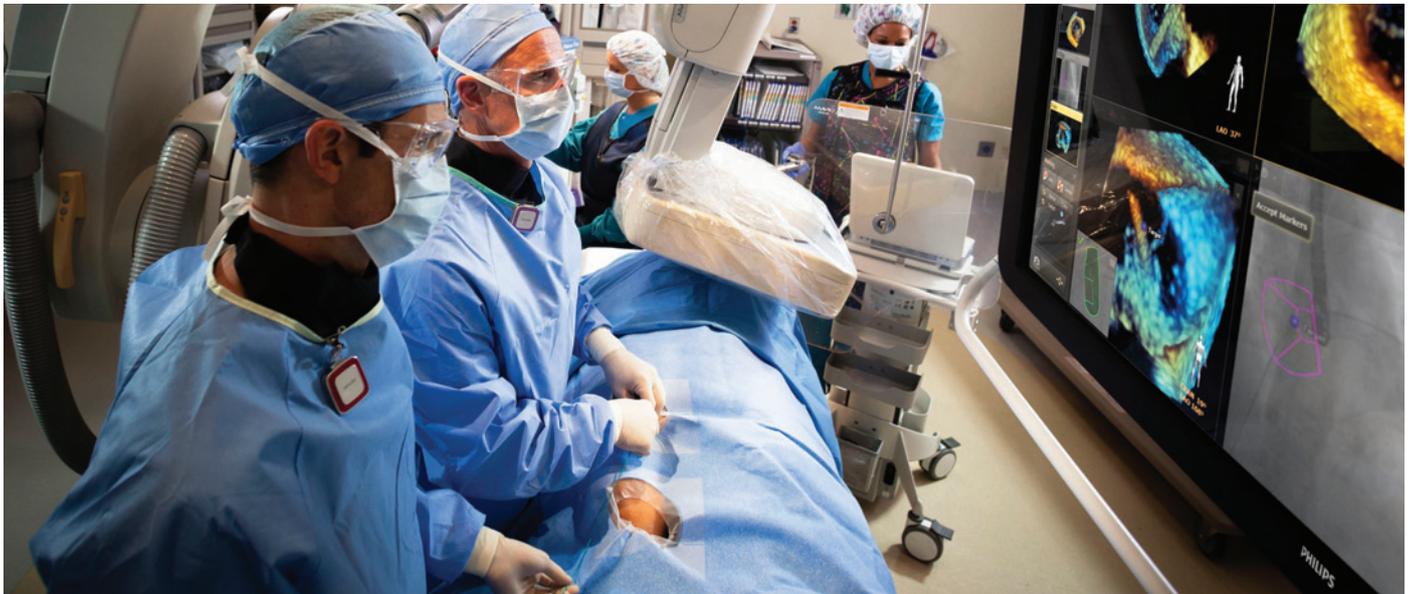
the technology and to validate the concept they had created. A problem with this style of innovation is the technology for smart catheters is lagging compared to state-of-the-art consumer products.

This can be improved by looking at smart catheter products and asking what the models have in common so that one technology platform can be used for various applications.

There is a shift from large medical equipment (such as CT scanners) to wearable, implantable technology and point-of-care diagnostics. IP is shifting from the technology level to the application level. For example, semiconductor companies don't want the intellectual property rights to a specific transistor any more. Rather, they want the IP on the algorithms and circuit solutions. This way of thinking is relatively new to the medical industry which is largely focused on proprietary solutions. The Lighthouse initiative is advocating increasing the awareness of these opportunities across the ECS industry.

Does the current regulatory environment impact innovation in the European Union?

The regulation of innovative medical devices is necessary and, in many respects, much more lenient than the regulations in the USA.

However, the ECSEL Health.E Lighthouse is addressing the need to achieve a consolidation of the regulated technology by the way it is funded. Instead of having to ask the European Commission for funding for each individual project and technology, the ECSEL Health.E Lighthouse agree on a number of projects on the key topics of industry, mobility, and health so that the underlying technologies can be regulated collectively, which reduces the work involved with overcoming regulatory hurdles.

Would you like to see increased co-operation between industry and academia?

My career has always been in industry, including at Philips, but I am also a professor at Delft TU. Although there are a lot of positive collaborations occurring between industry and academia, there are issues which mean that some research is never actually commercialised and applied as a product.

Universities are often focused on the publication of academic research rather than bringing a product to industry. Some academics believe that innovation ends after the patent, but on the contrary, the patent is the beginning of the real innovation. Creating the concept of a product only equates to around 10% of the whole innovation process, while the rest is developing the process and solving practical details. Involving academia in this process is a good first step to increasing co-operation between industry and academia.

In the pan-European POSITION project, we have substantial academic content. By combining the best of what Europe has to offer in research, technologies and market position, the Lighthouse will make it possible for Europe to become a leader in healthcare with a sustainable technology base.

What are your hopes for the future of the industry, and where do the Health.E Lighthouse priorities lie with regard to smart technologies and devices?

In the medical domain, many game changing innovations are anticipated from open technology platforms. Some examples are smart-body patches that combine cost effective ultra sound with on-body sensors which will allow for patient monitoring without the need for hospitalisation, as well as point-of-care diagnostics that allow for faster decision cycles, and bioelectronic medicines that are anticipated to offer permanent alternatives to traditional medicines with less side-effects. Organ-on-Chip devices that allow for the development of personalised medicines are also interesting here.

The corner stone project of the Health.E lighthouse is the ECSEL Joint Undertaking project POSITION. Here, open technology platforms for the next generation of smart catheters and implants are being developed. Rather than developing a separate technology for each type of smart catheter, an open technology platform technology that can be used for multiple catheter applications from multiple catheter manufacturers is being sought. Only in this way can the production volume be obtained which will fuel continuous innovation.

Via open technology platforms, supported by roadmaps, this project aims to bring the technologies for these products into the digital 21st century. The platforms will make possible the development of new products that support an entire value chain of medical equipment and products.

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