IMPACT

Transforming healthcare with intelligence-based innovations

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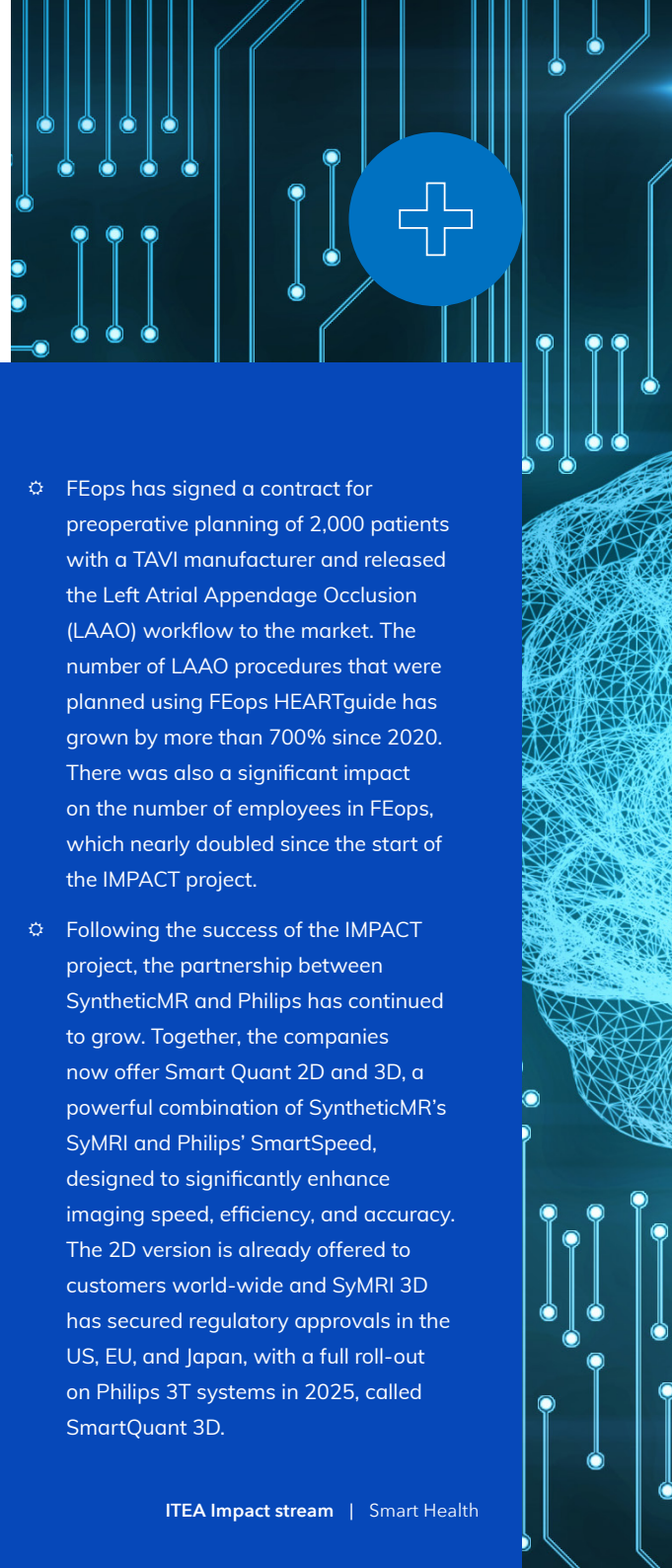
The global healthcare sector is facing immense pressure. Increasing patient demand, limited staff capacity, and the need for cost-effective solutions create a complex landscape that calls for innovation. Traditional evidence-based healthcare, while effective, often involves labour-intensive data processing steps, resulting in inefficiencies.

Therefore the 14 project partners from the ITEA project IMPACT introduced a revolutionary shift from evidence-based to intelligence-based healthcare. This transition was designed to enhance patient quality of life and improve public health but also to reduce costs and improve the working experience for care providers. By leveraging data intelligence, IMPACT has unlocked new possibilities in personalised diagnosis and treatment planning, minimally-invasive and robotic-assisted surgery, and clinical workflow optimisation.



Impact highlights

- Overall, IMPACT has demonstrated remarkable success in improving time efficiency, accuracy, and overall healthcare workflows:
  - FEops HEARTguide significantly reduced procedure times by 30%, cutting the use of x-ray contrast agents by 25% and lowering radiation exposure by 14%.
  - In brain oncology, the segmentation planning time for brain metastases has been halved, reducing from 60 minutes to 30 minutes.
  - MRI acquisition times have decreased significantly to just 6-8 minutes.
  - Tumour visibility during surgery has been improved, allowing for a 20% reduction in the required excision margin, thus preserving more healthy tissue.
- Across the consortium, eight people were hired, a joint venture of Quantib and UMCU was established and real-world exploitation has begun with 25 new products, services and systems:
  - FEops has signed a contract for preoperative planning of 2,000 patients with a TAVI manufacturer and released the Left Atrial Appendage Occlusion (LAAO) workflow to the market. The number of LAAO procedures that were planned using FEops HEARTguide has grown by more than 700% since 2020. There was also a significant impact on the number of employees in FEops, which nearly doubled since the start of the IMPACT project.
  - Following the success of the IMPACT project, the partnership between SyntheticMR and Philips has continued to grow. Together, the companies now offer Smart Quant 2D and 3D, a powerful combination of SyntheticMR's SyMRI and Philips' SmartSpeed, designed to significantly enhance imaging speed, efficiency, and accuracy. The 2D version is already offered to customers world-wide and SyMRI 3D has secured regulatory approvals in the US, EU, and Japan, with a full roll-out on Philips 3T systems in 2025, called SmartQuant 3D.

Project results

Building on a series of successful ITEA projects going back to 2010, IMPACT takes the healthcare domain to the next level of data intelligence, by incorporating medical imaging data into data lakes and by automating labour-intensive processing steps like image segmentation. By doing so, patient and imaging data could be efficiently used for diagnosis and personal treatment planning, which traditionally involve large amounts of manual work.

IMPACT addressed these real-world clinical challenges in three uses-cases:

- **Cardiac treatment**: The development of FEops' HEARTguide, a simulation tool for virtual device deployment, revolutionised preoperative planning.
- **Brain oncology**: The project accelerated image acquisition, segmentation, and treatment planning.
- **Liver oncology**: Robotic-assisted control shows promising results for the future with e.g. real-time motion compensation for breathing.

By introducing Philips' efficiency dashboards integrating multiple data sources, NewCompliance's automatic performance improvement analysis, and Barco's application-agnostic multi-modality display system which calibrates multiple image modalities according to the clinical case, the project successfully streamlined operations at various levels, from the operating table to entire hospital departments.

Exploitation

Overall, IMPACT has demonstrated remarkable success in improving time efficiency, accuracy, and overall healthcare workflows, cutting procedure times by 30%, segmentation planning by 50% and reducing MRI acquisition times to 6-8 minutes. Breathing motion compensation has also contributed to better needle placement precision, reducing the need for additional iterations. Moreover, workflow optimisation has been enhanced through innovations such as video-based tracking technology that maintains patient privacy through automatic face-blurring, as well as advanced 3D models that facilitate real-time segmentation, ultimately improving robotic-assisted surgery effectiveness.

IMPACT has already begun real-world exploitation, securing a foothold in the rapidly expanding healthcare IT market, valued at approximately USD 280.25 billion.

The 25 new products, services and systems include Quantib's CE-certified micro-bleeding detection and SyntheticMR's improved MR quantification method, both of which have demonstrated compatibility with the major MRI imaging equipment vendors.
FEops experienced major growth through a 2,000-patient contract, a 700% increase in LAAO procedure use, and nearly doubling its workforce since the start of the IMPACT project.
Swedish SME Inovia has extended their data lake towards medical imaging data, thereby integrating information which was siloed or stored in different formats into one data source.
For Philips, the results of the IMPACT project have found a continuation in new collaborative projects such as ASSIST and IWISH, with the aim to with the aim to integrate the results in the Philips Azurion imaging platform.
At Barco, the outcomes of the ITEA IMPACT project have been successfully translated into advanced functionalities that enhance both the Barco Nexxis platform and the Intuitive Workflow Tools (IWT).

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PROJECT LEADER

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PROJECT START

October 2018

PROJECT END

September 2021

PROJECT WEBSITE

https://itea4.org/project/impact.html

PARTNERS

Belgium		The Netherlands		Sweden	
Barco	●	Demcon Advanced Mechatronics Delft	⊙	Elekta Instrument	●
FEops	⊙	Leiden University Medical Center	◉	Inovia AI	⊙
		NewCompliance IT	⊙	Linköping University	◉
		Philips Electronics Nederland	●	SyntheticMR	⊙
		Philips Medical Systems Nederland	●		
		Quantib	⊙		
		University of Twente	◉		
		Utrecht University Medical Center	◉		

● (Large) Industry ○ Research institute ⊙ SME ◉ University ● Government