Alan Goh – CEO & Co-Founder, NDR Medical Technology

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Alan Goh of NDR Medical Technology, a pioneer in intelligent navigation and image processing for minimally invasive surgery, introduces the progress of the company to date, how its technology has been received by surgeons, and the growth strategy he has put in place.

Could you introduce yourself to our international readers?

I am the CEO and co-founder of NDR Medical Technology, a company established in 2015 to develop image-guided robotic intervention device which helps clinicians perform faster and safer medical procedures.

Following the creation of our product prototype, the device was integrated with imaging modality to overcome the cognitive literary struggle of accessing specific anatomy in an interventional procedure. The true value proposition of the tool stems from its ability to improve visualization of medical imaging for guidance and provide a level of diagnosis beyond simply the increased precision and stability of the robot.

Currently, the aim is to increase the adoption level of robotics to ensure good clinical outcomes through AI in respect to its assistance for clinicians. The implementation of AI in the surgical field is predominantly focused on lowering the complexity of the procedures.

Can you tell us more about the company's device?

The differentiating factor of our device is the ability to achieve navigation and alignment with any existing medical imaging equipment like Computer Tomography (CT) and Fluoroscopy to automate the process of needle intervention. For example, while the devices of our competitors require pre-surgical calibration, taking more than 10 minutes to prepare the device, a clinician with minimal device training can have the calibration of our tool automated and guided without constant re-calibration or special tools

Integrating with fluoroscopic c-arm, the guidance is achieved using real-time images for navigation purposes across a 2D image before using the third plane for depth measurement. With respect to CT images, navigation is accomplished by reconstructing the sliced images into volumetric data, identifying the coordinates of the lesion as well as any obstacles or blockages, and plotting the trajectory path for the insertion of any medical needle into the anatomy with precision.

However, due to the automation, the flexibility for manual adjustments and alignments are not necessarily within the scope of the specific algorithm we have put in place. However, there are buttons to bypass this for advanced users that allow for precise control. As a platform device that integrates to fluoroscopic or CT modalities, the tool can be used for orthopaedics, neurology, vascular necrosis or other fields that require this type of imaging guidance.

In addition, the key to our technology is that it does not require optical, electromagnetic or external sensors to capture the 3D space, but instead uses only images from existing medical equipment to close the loop to determine the position of the needle. This reduces both the complexity of the calibrations as well as the financial outlay needed.

What feedback about the device have you received so far?

The machine requires clinicians to be less hands-on – although currently in the early adoption phase, it must still be handled by trained professionals – and reception so far has been mixed. While senior clinicians are highly skilled in the procedure and thus might only use the device as an assistive tool, less experience and younger clinicians adore the idea of having a device that improves their capabilities and practices.

The tool aims to empower clinicians of all levels of experience and consequently establish a stronger level of consistency for patients regardless of where they are receiving their medical care. For the basic device, this can ensure the level of clinical outcome to a certain extent and make the

procedures more risk-averse.

Additionally, the device, from an external point of view, can potentially help mitigate legal issues such as patients suing for malpractice or not delivering care at the expected level.

What markets are key for your growth strategy moving forward?

For ANT-X, we have CE approval for kidney stone PCNL procedures in Europe, Singapore and Malaysia, and the product is ready to be deployed in these countries. We are in the midst of the application process for FDA approval in the United States and looking forward to physically travel and demonstrate the product. Furthermore, we are seeking approvals for lung procedures in parallel with trials currently being conducted in the Netherlands before eventually expanding the same real-time imaging navigation into liver, pancreas, renal, kidney, and beyond.

What are your partnership strategies?

Due to the current size of our business and the product being capital-intensive to produce, we will need to use third-party distributors and partners to penetrate the market. This process will be relatively slow and differentiated from purely digital healthcare devices where the speed to market is significantly quicker, surgical robotics are known to be capital intensive, have fewer competitors and generates better returns for hospitals and investors.

What has been your experience of raising funds in the digital medical space following the acceleration of digitalization throughout the pandemic?

While there is a lot of investment directed at the digital space in general, the specific form that takes, whether medical or other industries, depends on market trends.

COVID has spurred a lot of telemedicine in the region, moving away from physical contact with a medical practitioner for a diagnosis. Projects in the deeptech space and with hardware require more capital to scale compared to asset-light digital companies in which the ASEAN funds usually invest. Therefore, device-based projects tend to fair better in fundraising in markets like China or the US.

In my opinion, there remains a need for companies to develop physical devices that go beyond the capabilities possible for digital businesses. However, generating the capital required for our physical device business will depend on how we position the company to gain the necessary funding to move our R&D and commercialization efforts to the next stage.

Do you believe Singapore's leadership in AI and its innovation in digital infrastructure is translating well enough into digital healthcare?

Singapore's investment in digital infrastructure and the promotion of digitalization over many years has established the country as a base for R&D. This focuses on the translation and commercialization of ideas and intellectual property into digital healthcare or hardware equipment.

The implementation and setup of digital healthcare regarding government policies and telemedicine standards in Singapore set the pace in comparison to other Southeast Asian countries, with neighbouring countries following suit.

In addition, Singapore will remain a good testing ground for companies' new solutions prior to venturing to larger markets such as China or the US, and is well-positioned in regard to ease of business, production of intellectual property protection and government support.

What is the general public opinion of robotics in Singapore and Asia?

While there is generally support for digitalization and how it leads to better analysis and productivity, many clinicians in the past are hesitant to adopt innovation and disruptive technology.

For the moment, we are trying to make a semi-automated product that increases consistency and reduces complexity by automating parts of the procedures through infusing AI to robotics, and not just creating a remote-control device. We are trying to overcome the idea that robotic systems are difficult to adopt with a steep learning curve; they can improve the clinical outcomes of medical procedures as well as reduce costs for patients, the number of hospital stays, exposure to radiation, and time taken.

Based on health economics survey, it will take approximately 70 procedures to recoup the cost of the device. While this is not a lot, it depends on which procedures are used and their popularity in the hospital.

What are your priorities for the next few years?

The priority for us would be to deploy sufficient units and partner with Key-opinion-Leaders across different geographical regions to gain credibility and validation. We aim to be one of the pioneers in the surgical robotics space in the region, and the measure of this success will be in deploying commercially viable products into the market and receiving positive feedback and having a high utilization rate. Primarily, we are aiming to achieve this in PCNL for urology or other specialties.

For the next three years, we need to raise substantial funding to push the boundaries of our potential achievements. This will require our flagship product ANT-C with the integrated AI-driven robotics moving into the mainstream market and receiving approvals in markets across the globe.

In addition, more clinical validation needs to be completed to prove the integration of AI with robotics. The key reason our company remains in pre-commercialisation and focus more on deployment to acquire more regulatory approvals and endorsements from clinicians to validate the product on a global scale.

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