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Geoff Kau, Co-GM and CSO of Ping An Smart City, introduces the breathtaking breadth of the Ping An healthcare ecosystem, and the interesting projects his subsidiary, Ping An Smart City, is working on to promote efficiency and efficacy within the healthcare system for patients, payers and providers. He shares a couple of flagship projects currently underway, the importance of data privacy and security, and their plans for internationalization.

Geoff, Ping An is undoubtedly a household name in China but could you introduce the mandate of Ping An Smart Healthcare and Ping An Smart City?

To briefly introduce Ping An as a whole, Ping An started as an insurance company 31 years ago. Since then, we have grown into the largest insurance company globally by market capitalization and also become one of the top five financial institutions globally. Over the past seven or eight years, we have started to incubate and invest in more technology-driven businesses in our core and also new industries. Every year, we try to invest 1 percent of our revenue on R&D initiatives. Some notable examples include Lufax, now the largest online wealth management platform in China, serving over 43 million customers and managing over CNY 360 billion in assets; as well as most famously within the healthcare sector, Ping An Good Doctor, which listed in Hong Kong in 2018. Today, Ping An Good Doctor is the world’s largest online healthcare platform, conducting over 656,000 online consultations daily – larger than any actual hospital in China!

This brings me to the Ping An healthcare ecosystem. If you look at insurance, it really sits at the junction between financial services and healthcare, so healthcare has always been one of the main pillars of Ping An's business. When you think about the healthcare industry, there are actually three major components: patients, care providers and payers. Ping An Good Doctor works on the patient side to make healthcare easier and more convenient to access. On the payer side, besides Ping An's core insurance businesses making healthcare more affordable, we also have an entity called 'HealthKonnect', which works with over 200 cities in China to control social healthcare spend through fraud, and overtreatment detection and actuarial modeling. Finally, Ping An Smart Healthcare, which falls under the Ping An Smart City subsidiary, is our way to deliver technology solutions across the entire value chain across prevention, diagnosis, treatment and management to increase care quality and efficiency.

On the most macro level, the healthcare problem in China, as in most developing countries, is the gap between supply and demand. Our ambition is to use technology to expand the capacity of the healthcare system to serve patient needs. Our solutions have already been deployed across more than 70 cities in China.

What are some flagship projects you are particularly excited to share?

On the prevention side, we have a number of very interesting initiatives. Firstly, about three years ago, we started to work with the Chongqing and Shenzhen governments on disease prediction through the use of machine learning and AI, beginning with common communicable diseases like influenza and hand foot mouth disease and then moving on to other infectious diseases like hepatitis. Our models boast around 88 to 90 percent accuracy. Municipal and local governments use these models to predict disease outbreaks, particularly during peak seasons like the winter months, to better prepare and allocate medical resources.

In the same vein, we have also developed over 40 medical imaging models using AI to provide better disease screening and assisted diagnosis. The AI models cover all three imaging modalities which are radiology (CT scans and X-rays), pathology and, optical coherence tomography (OCT). As an example, we have developed around over 20 different OCT models to help ophthalmologists diagnose conditions like glaucoma, diabetic retinopathy and so on. This is particularly useful for rural areas where there is an ophthalmologist shortage. As people age, they often suffer from vision problems, so there are unmet medical needs here. We have also partnered with a US device maker, who is one of the top three OCT machines manufacturers globally, to incorporate our

medical imaging models into their machines. Based on these projects, we are working with the Shanghai government on a pilot program to place these ‘smart OCT scanners’ in new community care centres that the government is establishing in the city to serve elderly people. The machines are very user-friendly and do not require an ophthalmologist to operate. I am happy to say that so far the feedback has been quite positive!

We have also developed tools for diagnosis and treatment to empower physicians. For instance, using machine learning and AI, we have developed a program that essentially functions as a virtual medical expert called “AskBob”. We built the program by using various AI technologies to ‘digest’ over 28 million medical journals, over 20,000 clinical guidelines, over 270,000 clinical trial results and so on. We have also incorporated this capability into tools that integrate into the electronic medical record (EMR) system to bring together all relevant data from point-of-care to lab results to doctor prescriptions, for instance. This enables us not only to recommend tests and treatments but also to retroactively evaluate the actual diagnosis and treatment process, to see if there had been any deviation from clinical guidelines. This is particularly useful in lower-tier hospitals where the quality of care and available resources might be lower than in higher-tier hospitals. Looking at the numbers, over two million doctors work at lower-tier hospitals and less than 20 percent of these doctors even have an undergraduate degree. Currently, AskBob has been deployed in more than 10,000 primary care institutions in Gansu province, generating 400,000+ diagnoses and pieces of treatment advice each week.

In addition, we have designed an AI-based chatbot as a patient education and chronic disease management tool. We have a strategic collaboration with Chongqing since 2016 to use this program to answer citizens’ health questions via Wechat. Previously, the citizen’s hotline number and the Wechat account were manned by employees that might not necessarily be medically trained. Since the program is applied, if someone wants to know, for instance, if she can take the diabetes drug, metformin, while pregnant, she can ask our chatbot. Every week, our program handles around 1000 to 2000 such queries and so far, we have a 92 percent satisfactory answer rate. This is a great tool for chronic disease management, which is a huge problem in China because patient treatment adherence rates are very low. Top-tier hospitals tend to focus more on specialist cases and complex conditions so the responsibility for chronic disease management often falls to lower-tier hospitals, who are typically understaffed and lack the resources to handle such issues.

These are just some examples of the many projects we are working on within the entire Ping An healthcare ecosystem. It is important to note that the aim of all these programs is never to replace

healthcare practitioners. The aim is to enable them. These programs are not autopilot systems, they are navigation systems. There still needs to be qualified medical professionals keeping their hands on the wheel, not just because the technology still has limitations but also because of related ethical concerns when it comes to the making of healthcare decisions.

How much are you working with industry, for instance, pharma companies, on new solutions and projects?

We are already working with a few pharma companies to explore how technology can make their operations more efficient. For instance, one company has built a medical research platform for doctors. Our virtual medical expert can help doctors identify the latest research trends and findings, so they can improve and adapt their own research accordingly.

We are also working with pharma companies alongside hospitals to identify the most relevant patient populations for their therapies. For instance, we are working with a leading renal disease hospital in China to see how we can use Big data to identify people at risk or suffering from chronic kidney disease early, and how to treat them with targeted and differentiated therapies.

Ethics are a hugely important priority within the healthcare industry, and new technology usually raises new ethical issues. As a healthcare technology company, how do you deal with the typical healthcare industry concerns of compliance, data management, patient privacy and so on?

We certainly take these issues very seriously. Ping An Group, as a whole, is regulated by the CBIRC, the banking and insurance regulator. Financial service is also a highly regulated industry with security and privacy being paramount concerns, so as a company, we have that in our culture. There is a division within Ping An focused on information security and we have extremely strict internal policies to adhere to.

When we started working with local governments and hospitals a couple of years ago, we were actually the ones to educate them on the importance of these issues and to offer them solutions to safeguard data privacy. A very simple policy we respect strictly is that any data we work with does not leave the host servers. We do not take the data back to our offices, we work onsite to clean, process and anonymize the data as well as build the models.

We also leverage new technologies, such as blockchain. For instance, local governments in China are starting to build EHRs for their citizens. Blockchain is a very useful platform for this because of the security features: people can only see the information relevant to them. At the moment, this is still being used for patients to access their own records but there is huge potential for EHRs to be used to simplify the patient's healthcare journey from hospital to home, such as facilitating e-prescriptions. Using the right technologies not only help people protect their data but also facilitate the use of that data in ways that make life easier for them.

Operationally, with so many different projects going on in different areas of the healthcare value chain, could you share your decision-making processes when it comes to project management and resource allocation?

The starting point is our high-level strategic roadmap, which incidentally is very in line with the Healthy China 2030 plan, to improve the accessibility and quality of healthcare as well as healthcare provision for people in China, as I described earlier. After that, we do look at specific therapeutic and disease areas to select high-impact use cases. For instance, chronic conditions like cardiovascular diseases, diabetes and renal diseases are major problems in China. Internally, we also consider the value we can bring to this area. Which part of the value chain do we come in? What is the angle or niche that we bring? We also want to see if we can develop proprietary capabilities or technologies in this area, as well as to find the right partners so that we can unroll our programs. These are all important questions for us to consider.

After that, the first step is product development, starting from the initial proof-of-concept. The first checkpoint involves asking: is there true technology differentiation? Is the model accurate? Can we be confident in using it?

Next is bringing the model or the program into the real world. Performance under lab conditions can differ significantly from real-world performance. Typically, we would find a hospital or government partner to run a pilot, so that we can receive real feedback and iron out any kinks.

The last stage is the commercialization: do we see monetization potential? Is there sufficient market demand? All these are important questions at this stage.

What is your internationalization strategy?

We have already started developing our international operations. The current strategy is to build a partnership with top medical institutions overseas to better develop our technology and eventually deploy the solutions in developing countries, which have the same kind of healthcare needs as China, such as access gaps between urban and rural areas, unequal quality of care, and so on. For instance, we are working with SingHealth, one of the largest care provider networks in Singapore, to design a tool to help better manage and treat diabetic patients. We identified six common comorbidities with diabetes (chronic kidney disease, hypertension, etc.) and are trying to build a model to see how to identify patients susceptible to these comorbidities early on and help to prevent or improve these conditions through better overall disease management. The program will be then utilized to empower primary care doctors to better serve their patients.

We have also started a pilot in India, using AI models to screen for eye diseases, four months ago. We are also looking at Southeast Asian countries like Indonesia, Vietnam and so on, as well as Central Asia.

In China as elsewhere, we always aim to work with local partners, whether governments or hospitals or other types of healthcare organizations and networks, to deliver our projects in tandem with local entities. This is important as a way for us to truly localize our technology and models. As mentioned, we never remove data from the client site so whenever we work in foreign countries, we also keep the data locally. This is also why finding local partners is so important.

A final message?

We are hoping that we can facilitate, from all angles, better management of the entire healthcare lifecycle or value chain, so patient needs can be better met. From the identification of at-risk individuals, targeted screening, to prevention and diagnosis methods, to higher-quality, more consistent, better care, and all elements in between, we are really aspiring to deliver end-to-end healthcare solutions so that people are healthier, healthcare practitioners are empowered, and healthcare institutions are more efficient.

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