

Nawal Roy - Founder & CEO, Holmusk



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12.03.2021

Tags:

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Nawal Roy of global digital health platform Holmusk which aims to establish data as a core utility to the treatment of behavioural health disorders explains the challenges of working in behavioural health, why continuing inflows of talent and capital to the space are so important, and the benefits of basing his company in Singapore.

Nawal, you have started a number of new ventures in your career. What is the story behind the establishment of Holmusk in 2015?

It is probably worth me first saying that I do not come from the healthcare industry. I am trained as an economist and spent the first 20 years of my career in finance, initially as a banker and then as a management consultant.

Around 2014, I read that for the first time in human history more people die each year from chronic disease than from infectious diseases. As I parsed through the data, it became clear that 70 percent of the global burden of disease is due to five non-communicable disease types (NCDs), which lead the causes of global mortality and morbidity. Neuropsychiatric disorders are the single largest cause of disability while cardiovascular disease claims the most lives each year.

This deeply perplexed me. Modern medicine has increased life expectancy to near miraculous levels however humanity has yet to solve how we can ensure people age healthily. Chronic disease and

mental illness carry with them a disease burden and increased the risk of comorbidities that reduce in quality of life steadily in our final decades of life. For example, poorly controlled diabetes contributes to risk of blindness, loss of liver function, kidney failure and more.

After nine months and a serious commitment of my own financial resources, I pinpointed three main challenges in healthcare:

1. **The entire healthcare system is designed for acute care.** Health systems have no incentive to keep you healthy, just to treat you when you are already sick. This means systems aren't equipped to prevent disease or help people maintain their health.
2. **The relationship between consumption and payment is broken in the healthcare sector.** We all like to say that health is important, but people don't seem to like to pay for it. In modern healthcare systems, whether public or private, individuals behave as irrational consumers who don't value health maintenance correctly.
3. **The inability to move patient health information across health systems.** Today, you can move currency to dozens of countries globally almost instantaneously, but you cannot bring your own health data with you to another clinic or hospital! There remains a lot of ignorance and fearmongering on this topic. In this sense, the healthcare sector is 30 years behind finance, and perhaps 60 years behind the defence industry.

Getting into health was exciting because of the immense challenge and potential impact. I know the vocabulary of data from my finance days, and I understand the underlying value that data analytics can bring to other industries. I had seen first-hand the transformation the finance sector underwent when data and technology were unleashed and wanted to understand what it would take to help healthcare transform in the same way. It was in this way I saw an opportunity to build a science-driven platform to tackle healthcare problems.

Digital healthcare, the use of AI, the development of Big Data and so on are hot topics in the sector today, especially because they are seen as ways to deliver better healthcare more cheaply. Even tech companies like Google and Amazon are entering the playing field. How do you see the global ecosystem evolving in the future? How will the use of technology affect countries' adoption of public or private healthcare systems?

We will never see a trillion-dollar Amazon-type company in healthcare. Even if there is to be significant consolidation and the growth of larger players in this space, the market dynamics do not allow a single player to dominate the sector. What is true is that the business model will evolve and converge, with a number of players globally that dominate local or regional markets.

When it comes to healthcare systems, we do not see it as a private versus public debate. It is a question of efficient systems versus non-efficient systems. Each country has regulations and conventions that support different systems, but the question is, no matter who pays for it, how efficient is your system? In Singapore, the public health system is extremely efficient, not just in terms of costs but also in access to care and patient experience. A lot of healthcare delivery today is centred on the concept of "trust the doctor" because of complexities of the system and information asymmetry that make it hard for individuals to be empowered to truly own their healthcare decisions. But there is so much variation in the quality and value of care people receive. This is where digital tools and new data-driven approaches can enter and advance care further.

All that being said, what is the value proposition of Holmusk's platform and how are you delivering that value to patients and other sector stakeholders?

Holmusk aims to establish data as a core utility to the treatment of behavioural health disorders. Our mission is to build the world's largest Real-World Evidence (RWE) platform starting with mental health. We leverage our technology to address the huge unmet need in mental health. With data at its core, Holmusk's data science and digital therapeutics provide the capacity to drive a leapfrog-change in the provision of care and pioneer research into new treatments in neuroscience and chronic disease.

We have a suite of digital health apps, a specialty electronic health record (EHR) system and a deep AI platform that can generate vast sums of real-world data and enrich it into a real-world evidence base. Our primary focus is behavioural health however our proprietary modelling capabilities have utility across chronic disease.

A large part of our business today involves working with pharma companies in Phase III and IV of their clinical development, with an exclusive focus on neuroscience or neuropsychiatry. We can generate evidence that supports companies with patient selection, trial design, label expansion, and so on, in addition to market access studies, RWE, and others.

We chose to work with pharma companies instead of payers in the first instance because of the revenue model and sales cycle of the sector. It was a necessary decision for survival. Holmusk is a highly knowledge-intensive and capital-intensive enterprise. No matter how great the ambition and vision are, without sustainable funding, the company will not survive to realize its dreams. As we scale however, our deep-tech solutions can serve the wider healthcare ecosystem to include payer and providers to meaningfully improve care delivery.

UnitedHealth Group, through their subsidiary Optum Ventures, led our Series A round last year, as their first non-US portfolio company. They are building one of the largest mental health platforms and they saw the value we could bring. We have also signed a long-term partnership with the Institute of Mental Health, the only inpatient psychiatry facility in Singapore, and we have been recognized as a 2019 World Economic Forum Technology Pioneer.

What was the rationale behind focusing on mental health and neurological conditions, which are quite challenging and ill-defined areas?

Behavioural health disorders – including mental, neuropsychiatric, neurological, psychiatric, and substance use disorders – are such an important aspect of overall health and have been an afterthought for too long. There are also a lot of inherent challenges in behavioural health that have prevented progress and made it hard for companies to be successful here. Many pharma companies have divested their CNS pipelines in the last few decades because of the challenges, at the expense of the tens of millions of people living with behavioural health disorders around the world.

Firstly, behavioural health disorders lack quantitative biomarkers and standardized terminology, so even defining diseases and understanding drivers of outcomes have been very difficult to achieve. If someone has a temperature higher than 37 degrees Celsius, we know they have a fever and likely an infection. But there are few hard metrics that characterize depression, as it physiologically looks very different from person to person, day to day.

Secondly, there is a lot of stigma attached to these conditions that inhibit discussions and research. We've seen positive trends in awareness in recent years, but this has also driven demand on

systems that are not equipped to meet the depth and breadth of the need.

Thirdly, there remains historic silos between mental health and physical health institutions, and also within the neuroscience community between those that practice psychiatry and those that practice neurology. This means research and care is fragmented, making it more opaque to patients trying to navigate care, and diluting the research funding and capacity across the field.

I won't understate how challenging working in behavioural health is. It's underfunded and underrecognized. But there is real potential here, and a real urgent need to transform how things are currently done. COVID-19 has certainly accelerated this trend due to the negative impact of the pandemic and response measures on society's mental health. At Holmusk, we want to tackle this problem head on before a mental health tsunami hits. Holmusk has developed a strong reputation in our field because we have invested significantly in scientific research and publications. One of our papers has recently been published in *Computational Psychiatry*, and another paper we wrote on dementia was published by *Nature*, for instance.

How do you see the future of a company like Holmusk?

We define our ambition as wanting to be the best plumber in town. Holmusk's work is about getting the right drug to the right patient, at the right time. Innovation and drug discovery are an important piece of keeping people healthy, but you need the right data as the backbone to know how to do this in the most effective and efficient way. If a psychiatrist is seeing a new patient, we can learn about the patient and every other patient with similar characteristics and see which medicines or therapies would be the best fit for that patient. This is plumbing 101. We collect data, we clean the data, and we generate insights from that data. At Holmusk, we've been able to do this like never before in behavioural health because of years of blood, sweat, and tears devoted to figuring it out.

Being headquartered in Singapore, how do you assess the efforts of country to position itself as a regional biopharma innovation hub?

A significant amount of progress has been made in the Singaporean biotech space and the sector has become the competitive edge for Singapore in Southeast Asia. There is impressive university infrastructure here, leading research being conducted and significant government funding. Singapore is taking all the right steps to become a forefront global biotech nation and the chance of extreme success in the next five to ten years is very high.

Biomedical R&D takes a very long time and significant amount of capital, a reality often forgotten. There is a nice parallel with the internet and its development. The Internet really took off in 1994 with the launch of Netscape but people started working on the technology in 1960, over 30 years before! Amazon is incredibly successful now, but it was struggling in the 1990s and 2000s. There are a lot of serendipitous discoveries and miracles in biopharma innovation, but they do not happen overnight.

For Holmusk, it has been great to be headquartered in Singapore. When we first started, we benefited from the business-friendly environment, which is very supportive of young companies. Now we are more mature, and the likes of Basel, Boston and Beijing tempt us, however Singapore remains a competitive location. We have wanted to build a global company from day one and our two top markets are the US and China. To expand into these markets, it is proving to be easier to operate from Singapore rather than of one of the two.

Singapore also has the reputation of being a very clean and non-corrupt country, which is important in a sector like healthcare. In addition, Singapore has a great talent immigration policy. One of the biggest roadblocks to building a healthcare company is talent, and in this sector, talent is always sourced globally. In terms of connectivity, certainly pre-COVID, Singapore offers access to all the international hubs in a single direct flight. This is how we have managed to open seven different offices across the world as a six-year-old start-up.

A final message for our international audience?

We are open to working with anyone that is serious about solving the challenges in behavioural health, no matter how small or large. Our conviction is that mental health will be the defining problem of our generation. We used to say that mental health will be the cancer of tomorrow, however it is now the cancer of today. The bottom line, we need more smart people and greater inflows of capital in this space.

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