

MINDMAZE, NEUROSCIENCES' FIRST UNICORN IS SWISS

BY FABRICE DELAYE **A PRODUCT OF WESTERN SWITZERLAND'S STARTUP ECOSYSTEM, THE COMPANY FOUNDED IN LAUSANNE BY INDIAN ENTREPRENEUR TEJ TADI IS USING VIRTUAL REALITY FOR NEUROREHABILITATION AND OTHER BRAIN ENHANCEMENT APPLICATIONS.**

It's surprising who you might chance to encounter at MindMaze. On the day of my visit, I met Guerrino De Luca, President of IT company Logitech, leading a delegation to the Lausanne-based startup and meeting its 35 year-old boss Tej Tadi.

Since the company's announcement earlier this year that it had raised \$100 million, Tadi has brought Switzerland into the small club of countries able to produce a "unicorn" - a startup valued at more than the symbolic US \$1 billion mark. TechCrunch lists 168 of these worldwide, mainly in the United States and China but including 12 in Europe.

In his new 7th-floor offices with breathtaking views over Lake Geneva and the Alps beyond, Tadi intends to leverage these new funds in an ambitious growth strategy. A clear sign of buoyant growth is that his 55 employees are already rather cramped, barely three months after they moved in.

The company's spectacular fundraising has aroused great interest, but Tadi will not be diverted from the path he started on twelve years ago, rooted in the mission driving the Swiss Federal Institute of Technology in Lausanne (EPFL) to turn science into business. Tadi is the product of the transdisciplinary scientific ethos encouraged at the institute by its President Patrick Aebischer. He is also the beneficia-

ry of the EPFL's various support mechanisms for the creation of startups at its Innovation Park.

"Video ergo sum"

How Tadi came to Switzerland says something of his character. While at high school in Hyderabad, India, he published an article explaining how fuel cells could perpetually power a spacecraft to explore the universe. Its originality and ambition caught the eye of an electronics professor at EPFL, Alfred Rufer, who invited him to Lausanne. It was a trip that decided Tadi's future. "I come from a family of doctors and all I knew then was that I did not want to do medical studies," he says.

"Electronics and graphic interfaces were much more fun." So much so that he got work developing special effects in Bollywood movies and continues to this day to make short films in 3D, just for fun.

Having started his engineering studies jointly at EPFL and the University of Nagpur in Mumbai, he settled in Switzerland in 2004 to start a masters degree with Prof. Daniel Thalmann, one of the pioneers of virtual reality. At that time, however, major changes were also taking place on the Lausanne campus.

Professor Aebischer's initiatives in neurosciences led to the creation of the Brain Mind Institute and the recruitment of visionary researchers including Olaf Blanke who was investigating how the brain builds representations of the body through illusions like phantom limbs and extracorporeal experiences. Fascinated, Tadi started his PhD with Blanke exploring how to digitise human walking for avatars and robots. To do so, he proposed using virtual reality.

Tadi built the basic components of the system that now drives MindMaze: 1,100

cameras recorded the movements of healthy people as well as patients affected by neural problems. At the same time, an electroencephalogram (EEG) and other sensors measured brain activity. Tadi discovered the power of brain plasticity and the ability of neurons to reorganise.

"I realised the exercises patients were doing for rehabilitation such as using a mouse to move a hand on a screen were not satisfactory," he says. "They were not consistent with the representations our brain has of our body." Hence the idea of using the immersive world of virtual reality. This was the "eureka" moment which led to the 2007 publication in Science journal of an article titled "Video ergo sum" - I see therefore I am - and laid the foundations of MindMaze's technology culminating two years later with the Pfizer neurosciences prize.

A product of Western Switzerland's ecosystem

Unlike his colleagues, Tadi is not a pure scientist. The more he experienced virtual reality with patients, the more he became convinced of its potential for rehabilitation, and the idea of a startup matured. He had no business experience. But he had the advantage of being immersed in the entrepreneurial ecosystem the EPFL was growing.

The first to see his potential was Hervé

"Tadi had the advantage of being immersed in the Swiss entrepreneurial ecosystem."

MindMaze's CEO Tej Tadi has developed its own VR Helmet associated with EEG.

started a special project for developing countries where treatment of brain diseases remains primary," he says. "I was looking for a hospital in India with which to collaborate. I finally came to the Hinduja clinic in Mumbai that has an interesting model because doctors do not know the financial means of patients and treat them all the same way." This led him to meet with the Hinduja group and specifically Ajay Hinduja who is based in Geneva.

Enhanced training

After due diligence, the Hinduja Group invested 100 million francs of which half is in cash and the rest takes the form of convertible loans. Few other private investors joined the round. With this deal, Tadi found funding but also a strategic partner with which he has the equivalent of a credit line. The Hinduja conglomerate, with 70,000 employees and revenues of \$30 billion, runs factories, distribution networks, leasing and call centres in 50 countries.

It was not only the potential of virtual reality for motor rehabilitation of patients that interested the Indian group. They also saw opportunities for a medical grade device which also had applications in other markets such as security, sports and learning.

Tadi uses applications such as remote control for drones and robots as well as performance training. MindMaze can be used, for example, on a simulator project for the improvement of brain-motion interfaces for driving. The way of learning is the same for anything from golf to trading.

But there is yet more to Tadi's vision. He is currently working on a multisensory processing chip to create deeper identification between avatars or robots and people through the use of human senses. As he looks out at the magnificent view from his Lausanne office, he is counting on Western Switzerland's renowned expertise in microelectronics and neurosciences to achieve his further ambitions.



Lebret who managed the Innogrants programme which supports new ventures. In the last eight years it has backed 90 projects selected from 650 applications, and of these, 60 resulted in the creation of startups. "My number one criterion is the personality of entrepreneurs," Lebret says, recalling his meeting with Tadi. "I went to see an esoteric virtual reality technology and I found someone who was charismatic and funny and who could explain an ambitious project with great simplicity. It didn't take us long to select him."

Innogrants provided 100,000 francs to allow Tadi to concentrate for a year on transforming his project into a startup.

Tadi thus entered a community, passing through VentureKick, an acceleration programme that awarded him 30,000 francs, then the business training programmes VentureLab and VentureLeaders that brought him to Boston to meet potential partners and investors. His selection in the startup competition of the IMD business school led him to Silicon Valley, but seed financing came from Swiss institutions such as the Gebert R uf Foundation, the Commission for Technology and Innovation (CTI), the canton of Vaud and

two business angels.

Incorporated in May 2012, MindMaze runs parallel strategies. "The idea was always to have a medical grade product," Tadi says, "plus a technology for other markets." This led to the development of MindPlayPro, a suite of interactive games for the rehabilitation of upper limbs, then to MindLeap, a virtual reality helmet associated with EEG.

The company opened an office in San Francisco where, in nearby Silicon Valley, Tadi saw virtual reality gathering momentum with the acquisition of Oculus by Facebook and the phenomenon of unicorns. This made him think about how to finance MindMaze. "We were not building an app but hardware," he says. "It needed scale and long-term investors. Raising a spectacular amount became justifiable because we had not only a commercial product validated by clinical data but also a technology for the future."

Recruited by the Davos Forum of Young Global Leaders programme in 2015, Tadi found his way to the giants of tech. But it was ultimately chance, philanthropy and the proximity of Geneva that led to the 100 million francs financing round. "We had