

One click away from a global market

Technology is a useful tool in mental as well as physical health and providers can pursue a global strategy, argues Candesic's **Dr Michelle Tempest**

Let me start by declaring a bias on this topic. I used to work in a hospital as a psychiatrist and as a result am all too aware of the intricate link between physical and mental health. What is clear is the global tsunami of increasing mental health issues both clinical and subclinical. This article tackles how suited psychiatry is to globalisation and if technology has the ability to quell this growing demand.

Can the mental health market be global?

Mental health/ psychiatry is all about the brain. Every person reading this article has more synapses in their brain than the number of galaxies in the observable universe. In fact, a typical brain has well over 100 trillion synapses; more connections than the number of stars in the Milky Way.

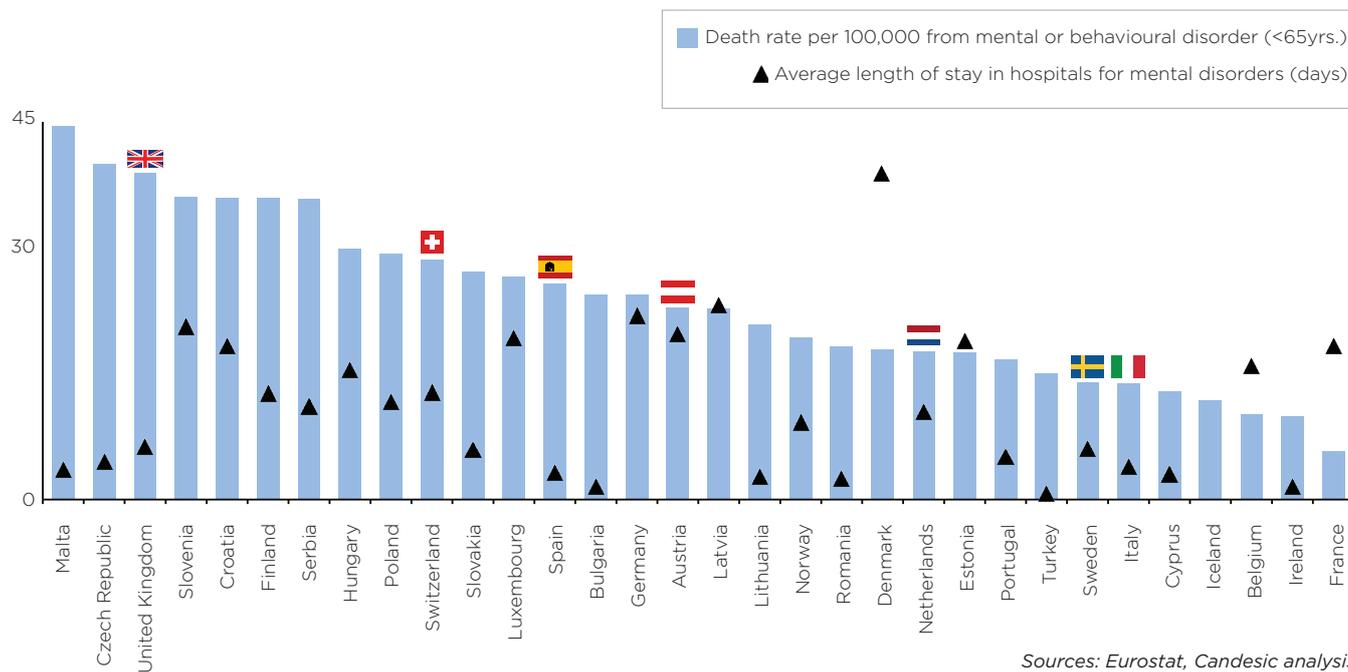
On top of this brain beauty, our understanding of mental health or perhaps more correctly mental illness, has developed in varying ways. We live in a diverse world of cultures evolved from different philosophical, psychological, sociological and anthropological perspectives. So, it should come as no surprise that there is global variation in the mental health diagnosis and treatment. The brain is such a magnificent organ no matter how you spin the numbers. In 400BC, Hippocrates said: "From the brain, and from the brain only, arise our pleasures, joy, laughter and jests, as well as our sorrows, pains, griefs, and tears."

Figure 1 shows a scatter of black triangles, which are death rates per 100,000 from mental illness of people under 65 years old. Globally mental illness is oft stigmatised and sometimes the diagnosis is deliberately omitted from the death certificate. The near zero death rates form

mental health in Turkey, Bulgaria and Ireland are questionable and some studies have shown that Catholic and Muslim countries in particular under report cause of death due to mental illness. The blue bars on the same chart are the average length of stay of hospital psychiatry inpatients, although again interpretation must be in market context. For example, the UK is in the upper quartile for length of inpatient stay, but it also has the highest rate of home care. Hence, the long bar may reflect that the UK only admit people if they are very unwell, often sectioned under the Mental Health Act and as a result take longer to recover. Figure 2 highlights the variation in number of psychiatrists per 100,000 population and is more of the classic north/south divide across Europe. Having highlighted these differences, I return to my own personal experience as a psychiatrist in A&E. I am proud to say that hospitals treat ►



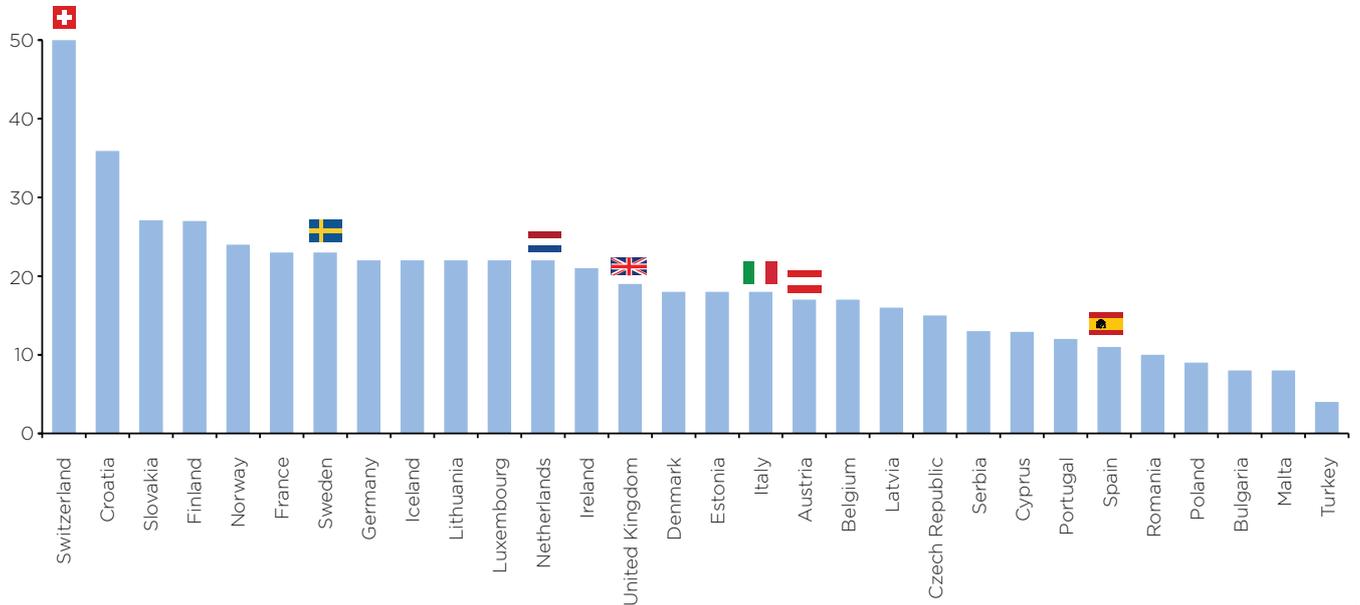
FIGURE 1: VARIATION IN DEATH RATES CAUSED BY MENTAL HEALTH ACROSS EUROPE



Sources: Eurostat, Candescic analysis



FIGURE 2: PSYCHIATRIC DOCTORS PER 100,000 OF THE GENERAL POPULATION



Sources: Eurostat, Candesic analysis

► and admit patients from all over the world, so a global mental health market is already possible.

With technology on the healthcare international horizon, will this help the globalisation of mental health?

For the nay sayers out there who say that mental health is too complex to ever be solved by robots or technology, let's remember world famous chess player Garry Kasparov who said that IBM's chess computer would and could never beat him. Well that was until 1997, when IBM's deep blue did just that. Modern medicine now has IBM's Dr Watson which has a much harder task to predict and diagnose the human body than the 32 chess pieces. But it has started to out-smart some doctors.

In terms of the digitisation of mental health, it has started to skyrocket and is shaking up the system. Figure 3 looks at the businesses in this space. The horizontal axis divides the players into self help, assessment and talking therapy – making the distinction between algorithm computerised cognitive behavioural therapy (CBT) to interacting with a qualified therapist. On the far right are companies like Ginger who offer an on line consultation with a psychiatrist.

The flag shows country of origin. The size of the bubble shows the size of company. The vertical axis illustrates how long the business

has been around – so the top of chart are the more mature companies.

Some of these technology businesses have struggled cross borders due to language barriers, but others have started to show some pretty good outcomes. One example being 'Ieso', who are active in both UK and USA: they are a therapy platform. The client and the therapist interact over the telephone not by speaking but by messaging on a mobile, just like texting or Whatsapp. They are developing risk based algorithms and have published outcomes in The Lancet. Outcomes based on the depression index Becks Depression Inventory, recorded recovery to be at 42% for Ieso clients after eight months, compared to 26% in the control group.

Another e-mental health platform and cloud based solution is Karify. Based in the Netherlands it is already delivering new models of care in over 450 clinics combining face to face meetings with online exercises, tailored medical information and ways to communicate safely. It is enabling the caregiver to create behavioural change through feedback, monitoring, and big data. Joris Moolenaar, chief executive of Karify said: "I believe that digital health is like the new super power of mental health care, Karify gives a psychologist a better view of the patients challenges, engages with and helps you to change behaviour more actively, while the patient is more engaged in treatment."

Patient monitoring platforms such as

Medopad have also entered the mental health space with some doctors perscribing apps as well as medications. Dan Vahdat, co-founder of Medopad said: "Medopad patient monitoring solutions are evaluating how someone's mental health is affected by different treatment choices. This applies to any patient in the world using our technology. This collective understanding will continue to grow as our AI and machine learning technologies analyse more and more data, and as our solution portfolio scales and expands to include dedicated applications for mental health conditions."

Then there are online primary care platforms such as Doctor Care Anywhere who are expanding into online talking therapies and psychiatrists online for both the private and NHS cohort.

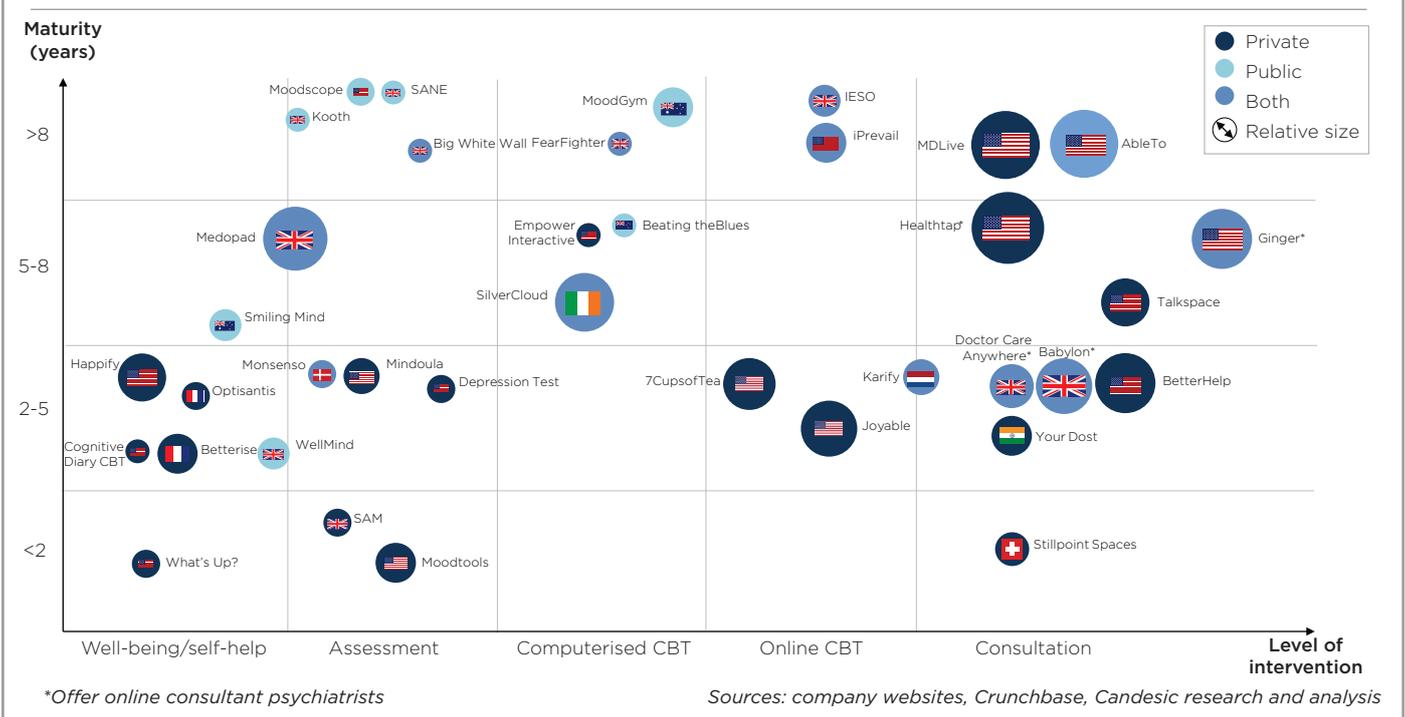
Through the looking glass into the future

I believe we will all be future consumers of mental health apps and mental health technologies as part of everyday life – on our phones or on our watches, iPads and computers. Consolidation of the mental health technology market may come from investors consolidating and rolling up digital companies, with some 'hyperscale' platforms like Google buying unicorn businesses from the cohort in figure 3.

I believe that technology will also stretch into being part of psychiatrists' everyday diagnostic



FIGURE 3: COMPETITIVE LANDSCAPE IN DIGITAL MENTAL HEALTH



and clinical treatment tools. Here are four brief examples:

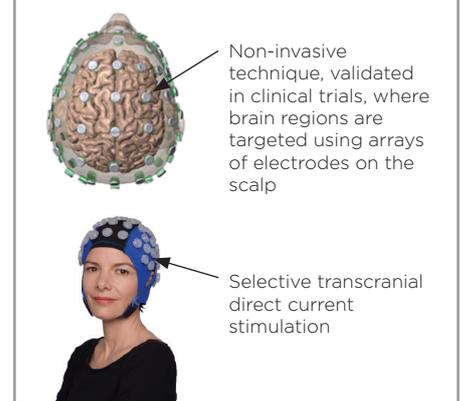
1. Clinical teams in the future may well be using more informed personality psychological profiling, for example, artificial intelligence which uses things such as Facebook likes to help understand, what people care about and what drives their decision making. After all, this kind of technology is already used by the military and in America is termed 'psychological operations'. It was also allegedly used by politicians during the Trump campaign as a method of behavioural micro-targeting – so why should it not also be used for its rightful purpose to help clinicians understand what's important to patients to help them improve care?
2. Clinicians of the future may also be using analysis of videos in real time. Streaming live feeds to interpret facial micro expressions to help understand when a person is getting agitated or to monitor medication responses. This was first made famous by psychiatrist Paul Ekman.
3. Standard telephone triage may well be enhanced by voice recognition software.

This is already being used to help diagnose depression. It works by analysing the voice using loudness, rhythm, melody and tone and is of growing interest in the Artificial Intelligence world.

4. Finally, there is the future of neuromodulation. Neuromodulation can take many forms and *figure 4* illustrates the kit. It's headgear where you can position electrodes and choose (neurotarget) where to pass current. This has come a long way from deep brain stimulation where doctors used to have to drill through your skull. It is already in promising clinical trials for brain injury after a stroke. By positioning the electrodes in different places on the head, you can target and then electrically pulse or zap localised brain neurons. The effect maybe to reconnect or short circuit some of the millions of brain connections. In a similar way to relieving road congestion by building new roads or a making a bypass.

What's interesting about this nascent mental health technology market is that it could augment the current creaking state systems and bring lots of different parties together. Providers

FIGURE 4: NEUROMODULATION FOR TARGETING CORTICAL AND DEEP BRAIN STRUCTURES



have the opportunity to work in collaboration with these businesses, and investors have the opportunity to invest in unicorns or to roll up current fragmented services into community mental health provision. It's also a pending issue global governments are seeking solutions for. So, these technologies could lead to the creation of the first pan European or even global psychiatry business. ■

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