

When it comes to digital disruption in healthcare, oncology, perhaps more than any other specialty, is changing the most. **Dr Michelle Tempest** and **Roma Dixit** of health and social care consultancy Candesic discuss how big pharma is following in the footsteps of tech giants to harness the revolutionary benefits of digital

Can pharma innovate like a tech giant?

Pharma might have produced some of the world's most valuable corporations but in terms of M&A activity, the sector has lacked the kind of disruption that propels innovation. Historically, the big companies have followed a conservative and undynamic path to growth, chasing after a few blockbuster agents, leading to a dry internal pipeline and reliance on biotech to bring innovation.

However, this is starting to change. And nowhere more so than in oncology, where increased prevalence is driving demand for new drugs and treatments. Developing new cancer drugs is an expensive and risky business; approval rates are low, but competition is fierce. Recent research found the length of time without competition could now be as short as one or two years before other cancer drugs come to market. Speed is of the essence. And now pharma companies are learning the lessons from that most agile of breeds – the mighty tech giants.

Lessons

One giants start out as minnows

We've all heard how Apple was conceived in Steve Jobs' Californian garage. The nascent Apple managed to order components for its computers on credit early on – so the story goes – leading to a cascade of innovation as the company released one revolutionary product after another. Four years later the company went public with what turned out to be the biggest IPO of its day. However, from that point on, growth didn't come solely from internal innovation. Since 1980, Apple has gone on to acquire over 70 companies. Siri, already synonymous with Apple, started out as a US-based voice control

software start-up and was only acquired by the tech giant in 2010.

M&A is not new to Pharma. There has been plenty of consolidation in the sector. Yet it is the volume and nature of what Pharma has traditionally acquired that differs so much from Apple's M&A strategy. To follow in the footsteps of Apple, Pharma will need to buy more often, buy smaller, and take bigger risks, relying on revenue and strategic synergies as the basis for M&A rather than focusing on cost synergies.

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Two promise the world and follow through

In tech, the M&A model is simple: develop something desirable, build hype, attract large seed investments, and focus more on growing your audience than on growing your bottom line. That achieved, turn this burgeoning customer base into ROI on investors' capital, and start buying competitors and other companies. Figure 1 shows how M&A has been integral to

the tech world, closely following the economic cycle. M&A is core to tech giants' growth strategy. They use it any chance they get. In the tech world things develop fast and you can't rest on your laurels - big pharma can't rest on its blockbusters either.

Three Buy early

That other giant of the tech world Google continues some internal product development, but it also has the financial capacity to 'test the waters' via acquisition. Instead of waiting for the market's reaction, Google acquires a variety of 'moon shot' projects: exploratory projects that have been undertaken without a proper assessment of risks and benefits. In fact, Google's holding company was developed solely to oversee acquisitions while Google focused on its core products. Its most recent acquisitions have been in robotics: Meka Robotics, Red Robotics, Boston Dynamics amongst others, with the intention of incorporating them into its Artificial Intelligence (AI) portfolio.

Oncology is following suit

Developing oncology drugs requires intensive R&D. Like the moon shots, most molecules never reach the market. As a result, big pharma companies have focused on the acquisition of smaller biotech firms, where the molecule has cleared Phase I and is already in Phase IIa clinical trials. As figure 2 demonstrates, when it comes to oncology therapeutics, pharma is part of a complex world of partnership and ownership where the focus is on growing portfolios through M&A.

Main players, unravelled

Roche has three oncology drugs patents set to expire within the next decade,

so perhaps it's not surprising that four of its most recent acquisitions are in the oncology sphere. In January, it acquired Ignyta, a company focused on personalised medicine, for \$1.7bn. Ignyta developed Entrectinib, a drug that targets tumours based on the patient's genetic profile rather than the cancerous organ within the body. The drug is currently in phase II clinical trials with an FDA approval and Orphan Drug status expected early next year.

The deal was complemented by Roche's acquisition of Foundation Medicine for \$2.4bn in June. The company analyses the genetic make-up of a patient's tumour, allowing physicians and patients to receive recommendations for potential therapies and clinical trials. This combined with AI firm 'Flatiron Healthcare' is likely to fuel Roche's oncology pipeline for the foreseeable future. However, the company is continuing to bolster its portfolio and recently entered into talks to buy Tesaro, a biotech firm focused on developing an orally administered inhibitor for breast cancer, and Eleven Biotherapeutics, which has developed a drug for bladder cancer.

Merck and Co. (MSD) has chosen to focus on non-therapeutic molecule-based oncology treatment against a range of cancer types, potentially safeguarding itself from the expiration of patents. It recently acquired Viralytics, a company that uses a modified common cold virus to attack cancer cells, for \$394m. The treatment is being trialed with MSD's Keytruda - a key drug for MSD, accounting for c.10% of revenues. If Viralytics achieves FDA approval, sales of Keytruda as a complement to this technology would drive MSD's top line.

Bristol-Myers Squibb is focused on developing differentiated oncology therapeutics by investing in treatments that augment the body's own immune system to detect and kill cancerous cells. Last year, it acquired IFM therapeutics for £2.3bn.

Effectively, big pharma has followed the model showcased by the tech giants and transferred the R&D risk to the start-ups and SMEs. They have also lessened the risk by making their play for the minnows when they know the therapy is likely to be approved or has cleared a Phase I clinical trial. As a result, we expect to

see a number of deals with private equity funds buying/investing in small biotech start-ups - potentially reaping the buyout reward from big pharma later on down the line.

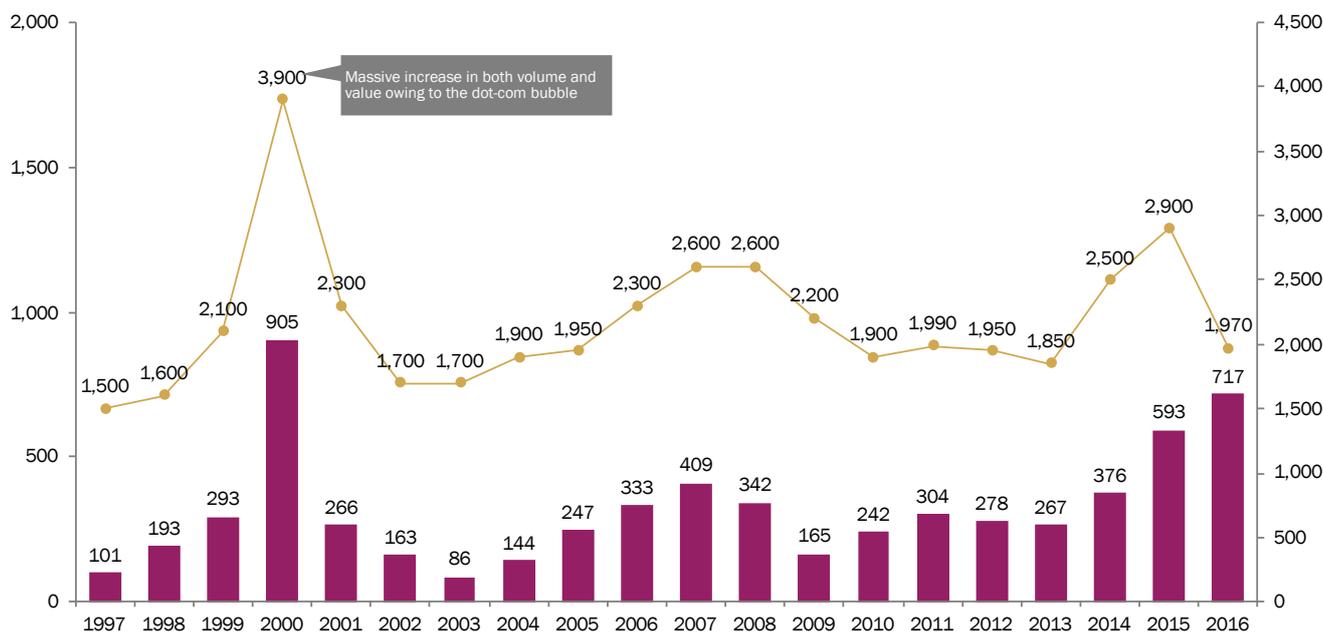
What to track

Here are five examples of companies worth watching for potential for investment/acquisition:

One Unum Therapeutics – Founded in 2014 in Cambridge Massachusetts, the company is developing cancer therapies based on an antibody-coupled T cell receptor, or ACTR (pronounced 'actor'). This antibody recognises targets on the surface of tumour cells and directs an individual's T cells to attack. It can be used to treat a variety of different cancers. Unum Therapeutics recently raised c\$70m following the IPO of 5.7 million shares at \$12 per share.

Two Imugene – Headquartered in Australia and founded in 2012, Imugene has developed an immunotherapy, HER-Vaxx, designed to treat tumours. Clinical trials are ongoing for applications in gastric,

FIGURE ONE - VALUE AND VOLUME OF TECH M&A, 1997-2016
 THE VOLUME AND VALUE OF TECH M&A WAS IMPACTED BY BOTH THE BURST OF THE DOT-COM BUBBLE AND THE 2008 FINANCIAL CRISIS. DEAL VALUE HAS SINCE RECOVERED BUT VOLUME FELL IN 2016 AFTER INCREASING IN THE PREVIOUS YEAR.



SOURCE THOMAS REUTERS; CANDESCIC ANALYSIS

FIGURE TWO - WHO OWNS WHO: MAJOR ONCOLOGY ACQUISITIONS, 2013-2018
 MAJOR M&A DEALS AND PARTNERSHIPS ARE BOLSTERING THE ONCOLOGY PIPELINE FOR BIG PHARMA



SOURCE MERGERMARKET; COMPANY WEBSITES; CANDESCIC RESEARCH AND ANALYSIS

lung, pancreatic and ovarian cancer. Imugene has also developed mimotopes that induce B-Cells to produce antibodies against cancer targets. The mimotopes are in a pre-clinical stage whereas the HER-VAXX is in stage a Phase II trial. It is a publicly listed company with stock prices relatively stable at \$0.2 per share.

Three eTheRNA – A Belgian company founded in 2013 which uses mRNA to instigate cells to initiate antigen and T-cell specific elimination of the CD4 and CD8 cancer cells. The company generated €24m in a Series A investment and is currently in clinical trials with Yervoy, which is a Bristol-Myers Squibb product.

Four Gritstone Oncology – Established in 2015 in California, the company has developed personalised immunotherapies to fight multiple cancer types, which harness the patient’s own immune system to recognise tumour antigens, neoantigens, and destroy cancer cells. Gritstone Oncology uses an AI-based

platform (called EDGE) to utilise extensive human tumour data. EDGE has been trained on large datasets and the hope is that when AI is applied in the real world clinical setting, it can predict what the immune system should target. Gritstone is likely to announce an IPO of c.6 million shares for \$13-\$15 per share in the coming months to fund both ongoing trials and further develop the technology.

Five Neon Therapeutics – Another company that focuses on neoantigens to target and kill tumours in the body. The company made its debut on NASDAQ earlier this year at \$16 per share but prices fell sharply and shares now trading at \$10.

Summing up

Oncology is set for plenty of deal action as big pharma and healthcare funds battle it out to acquire the next winner and exploit synergies with existing assets in their portfolio.

Deals are likely to increase over the coming months and valuations could be pushed up by tax reforms in the US, where most oncology biotech firms are based, and low interest rates across the world.

As ever, the question of sustainability hinges on current macroeconomic trends. Over the past two decades, economic growth has slowed down - although it has picked up more recently - demand is weak owing to a flattening of wages, and debt is cheap due to low interest rates, making interest and principal payments cheaper than in-house R&D.

However, this year alone has seen several political changes that will no doubt impact the M&A environment going forward. We believe that the bullish US equity market in particular, buoyed by tech and AI optimism will continue the M&A trend over internal R&D.

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