

Michael Holmes, Opsys Ltd

"A very Oxford Company"

"Born in New Zealand Michael Holmes has British/NZ citizenship. After graduating in classics from Balliol College, Oxford, he worked for two years with Boston Consulting in London. It was "a very interesting period", but he left to set up Opsys with Balliol chemist and junior research fellow, Victor Christou. "We rowed together." The first finance came from another Balliol contemporary who made money in the city, while the founding engineer was an Oxford contact of Victor. "It was a very Oxford company where I needed a scientific mind, and I had a strong amateur interest as an avid reader of popular science."

Early plans

"Opsys was established to develop materials technology for a new kind of display, the organic light emitting diode (OLED), which promised to be cheaper, brighter and thinner than existing flat panel display technologies. "The class of materials we planned to develop was called organolanthanides."

The first Opsys business plan emphasised the strength of its assets - scientists, technology and ambition – its good business models, good branded technology and clear licensing strategy. Annual sales growth for such products was forecast at around 30% during the 2000s.

The plan argued that Opsys had, in Oxford, 'one of the world's most broadly-based research teams in the OLED area', designing products and developing manufacturing processes – a team built through sponsored research in Oxford University. Opsys's board and management group were also strong, including Sir John Fairclough of Rothschilds (Chairman) and Michael Holmes (Managing Director).

It soon emerged that developing a single technology strand (the light emitting material), in isolation from all other OLED technologies, was neither technologically nor commercially feasible. There were two possible alternatives – either to try to develop materials alone, and accept lower royalty rates from a wider range of markets, or to concentrate on relevant OLEDs, but also develop some adjacent technologies. Initially, Opsys chose the first strategy; and the 1998 business plan emphasised contract licensing, the development of phosphors for all display technologies and the fact that offering a 'service' element made entry easier.

In 1999 - 2000, however, expectations for OLED technologies soared and Opsys switched to the second strategy, concentrating both on OLEDs and on developing capabilities in both engineering and physics.

Manufacturing and California

Michael Holmes insists that the life cycle of the typical university spin-out is complex, events rarely moving as quickly or successfully as predicted. So, during 2000, he concluded that the general OLED market was developing too quickly, while the displays market was rather too sophisticated, to permit a pure arms-length licensing strategy. "To be an effective licensor in the displays area, a company should ideally be an effective manufacturer too." Michael and the Opsys Board therefore decided that, "while remaining an independent company with a strategy for licensing more-advanced rather than basic technology, Opsys must build and own a pilot manufacturing operation. This would demonstrate the manufacturability and compatibility of Opsys technology, as a necessary pre-requisite for successful licensing."

So the board decided that the Oxford unit would design new classes of materials and new structures for devices, while a new plant they would establish in Fremont, California would develop these and move into manufacture. Michael explains. "Committing ourselves to pilot manufacturing 8000 miles

from our Oxford base was another controversial decision, but I still stand behind it because in California we could recruit valuable skills not available in the UK"

"We thought it was the right strategy both internally and in the existing capital-funding environment. To begin pilot manufacturing we would use an amalgam of technology, some licensed from Kodak because that was the most stable and mature technology to use as a base. Having brought the manufacturing operation to break-even with this stable technology we could, once the Kodak technology matured, start bringing our technologies over from Oxford and into our pilot manufacturing line. We could then offer our putative licensees a full, qualified, manufacturable package for licensing. That strategy's total cost would have been some \$80 to \$100 million dollars, which in the financial climate of 2000 was acceptable."

A worsening financial climate

"Unfortunately, during 2001 the outlook for borrowing from the financial sector changed completely. In particular, the position of 3i, our lead investor at the time, changed substantially, both because of the worsening general climate and because of internal turmoil in 3i. Moreover, for large investments in early stage technology projects, financial investors were increasingly seeking endorsement from corporate businesses better qualified to assess the technological risks and potential rewards. We therefore had to seek a different set of investors and pursue a different funding strategy."

"The 11 September attack on the USA was cathartic. We had already recognised that our plans would be much harder to finance than expected, even though our strategy and technology were still valid. But after 11 September the climate worsened even more and 3i dropped out, having no stomach for the changed risks."

"So, late in 2001, we had to raise more capital, but in extremely straitened circumstances. We employed 70 people, 35 in each of the UK and USA. Now display technology programmes are very expensive. To develop, say, a new projector a Taiwanese team will contain 50 to 100 people, and teams in big Japanese companies up to 200. Moreover, when we were working on inter-disciplinary technologies to invent compounds, in order to understand what is happening, for every chemist we needed an engineer, and access to physicists. That was expensive. Opsys was 'burning' £1 million a month and our biggest investor had dropped out."

"We had to do two things: first, to raise more capital in extremely tight circumstances from our new lead investor, Quester, who proved and prove to this day extremely supportive, second, to secure funds from corporate investors who would now be a better source of funding for Opsys."

"However general corporate investors in the display sector either funded fundamental technology (Japanese and Koreans) or manufacturing projects (Taiwanese). So although our management and financial investors very much wanted to fund the whole company, both technology development and manufacturing, the corporate investors, to whom financial investors were looking, wanted each side to be funded independently. This brought enormous stress, as well as financial and operational complications, to the process of marketing and negotiating deals."

Ensuring survival

"Over six months several things held us afloat, but everything had to fit. The continuing role of Quester, now our lead investor, was crucial; our Japanese investor convinced his colleagues they must help us survive; and that brought some money. Beyond that - an important lesson - at this critical and risky time our private investors put in over £1 million. Without that we would have failed. It was very tight."

"After four of those six months we had lined up various deals. A licensing and joint development deal with Toppan, a big Japanese company, was eventually worth \$8 million. Two deals with US companies were worth \$13 million, beyond which were more deals. Against many predictions, we had secured the survival of Opsys."

Despite this Michael faced another question: Would the deals ensure growing shareholder value? He says: "Each deal, while lucrative and helpful to developing the technology, compromised Opsys's intellectual property (IP) and made the business harder to sell."

"Towards the end of that period of corporate deal-making, Opsys's highest-profile competitor, CDT, based in Cambridge, UK, began offering to buy the company. The initial offers were derisory, CDT obviously exaggerating Opsys's financial difficulties, but once it was clear that Opsys would survive, the offers increased and finally became attractive."

"After very lengthy consideration, the Opsys Board opted for a sale which excluded all of the deals they had negotiated, except that with Toppan, but made it near-inevitable that Opsys would have to close the Fremont operation." Nevertheless, Michael and others thought that the prospects for growth in the value of Opsys were "still probably higher in the sale scenario. So, after protracted and tortuous negotiations, Opsys was sold in exchange for shares in CDT. Because of its long capital-raising history and the amounts of capital involved – Opsys raised \$45m in total - Opsys has a convoluted capital structure and Opsys shareholders' future receipts depend on the as-yet-unknown value of CDT if it is sold."

"From the sale, Arborescent emerged - a company majority-owned by Opsys shareholders, in which CDT has a stake. Based at St Andrews, Arborescent aims to develop and sell materials technologies developed by a very innovative group in Oxford, for all displays applications outside CDT's field. In these very early development stages, Arborescent is staffed by a 'volunteer army' of about 7 part-timers. The research in chemistry is led by Paul Burn in the Inorganic Chemistry Lab of Oxford University and in physics by his associate, Ifor Samuel of St Andrews University."

"Arborescent intends to market its products to various non-display sectors including passive electronics, sensors, photo-detectors, etc. It aims to do so partly through own investment, potentially through onward licensing and partly through materials development contracts from customers. About a year in gestation, Arborescent's pace of movement will essentially depend on how much time I can spend on it," says Michael, and continues.

"Arborescent is very interesting because it has better scientists, a good IP position, more experience, a stronger management team and, I believe, a stronger business plan than Opsys. It is very young but in 2004 will spend about £250,000, more than £100,000 of which will be from government sources, including a SMART award. Private money has come from CDT, private investors, etc. That will finance three science projects producing interesting IP. Doing that on £250,000 gives us much more flexibility than would greater spending."

Arborescent is just one of Michael Holmes's current commitments, partly for financial reasons. "I have large unsecured debt from various investments and from early, unpaid work in Opsys. I must earn money and am doing so, for example, as a consultant to the board of a Hong Kong company. I am also an unpaid observer on the Board of CDT, representing the interests of the Opsys shareholders, which is quite time consuming."

Entrepreneurial Learning

None of this seems to stop Michael being an entrepreneur. "We will see", he says. "I am currently pursuing some ideas, including Arborescent. The last six years were very exhausting, but I have learned enormously - doing a lot right and a lot wrong. By many measures Opsys succeeded, by some it didn't, and on some the jury is still out."

"I have certainly learned more about business over six years than I could have done on almost any other path, including an MBA, having done so from a huge number of angles. Running a small business you manage lawyers, accountants and scientists. You manage downwards; you manage boards; you manage external relationships. You do not do that on an MBA programme."

"Entrepreneurial learning is very disordered, but I believe MBAs rapidly forget their more-structured learning. What you learn less-rationally as an entrepreneur in difficult times, you remember well. The entrepreneur's difficulties, challenges and execution are all practical. You can easily over-theorise, though you do need business plans, which tell you that any actual business is sloughing around selling products. You must write as good a plan as possible, whatever time and money that takes. But you must recognise that this will only be one of the plans for the business. Things are rarely so straightforward."

I explain my concept of 'wriggling about'. You have your plan, but things do not go as you expected so you must change the plan. Michael agrees. "I think successful small companies do succeed because of 'wriggling about' – with two implications. First, you need colleagues who are both tied to the company and have the energy and will to 'wriggle'. Part-timers are not sufficiently committed. Second, as Opsys showed, to 'wriggle' successfully your financial commitments must not stretch out further than you can easily raise money."

'In Opsys we did one big 'wriggle' towards a strategy I am still convinced was correct internally, but which became incompatible with the state of the capital market. So we had to change backers, leaving us with outstanding financial commitments which made that change of direction very challenging.'

"There are lessons, and the executive management lesson is subtle - about listening. You must be able to take in many points at once; both listening to things directly related to your company, sector and business, and simultaneously listening more generally to the outside world."

Douglas Hague, July 2004.