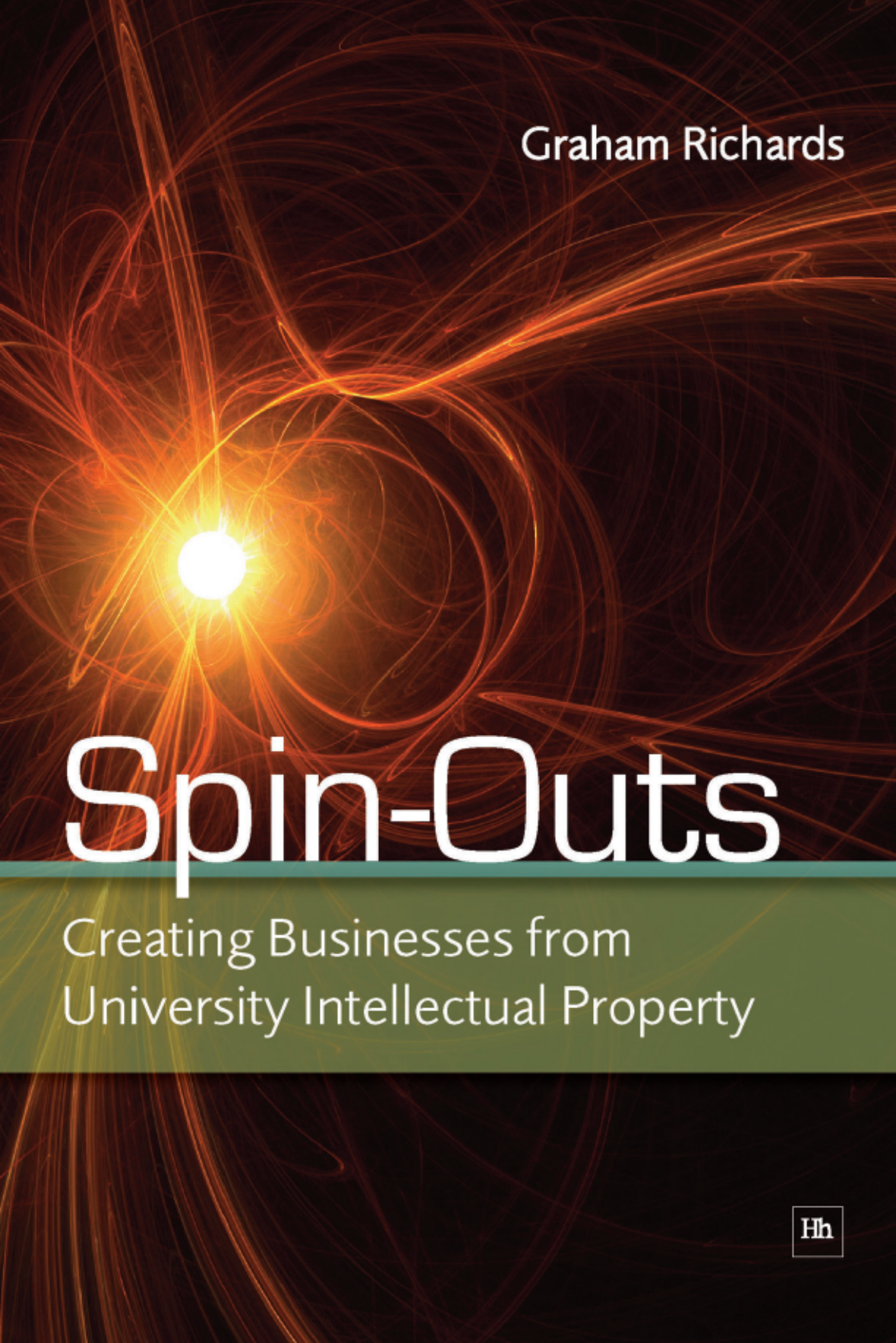

Graham Richards
Spin-Outs
Creating Businesses from
University Intellectual Property
Hh

. . . . Sample . . . .

www.harriman-house.com/spinouts

SPIN-OUTS

Creating businesses from university intellectual property

By Graham Richards

HARRIMAN HOUSE LTD

3A Penns Road
Petersfield
Hampshire
GU32 2EW
GREAT BRITAIN

Tel: +44 (0)1730 233870
Email: enquiries@harriman-house.com
Website: www.harriman-house.com

First published in Great Britain in 2008

ISBN 1-905641-98-2
ISBN13 978-1-905641-98-7

British Library Cataloguing in Publication Data
A CIP catalogue record for this book can be obtained from the British Library.

Contents

To Margaret Thatcher,

who made much of this possible.

Preface

Spin-out companies from university science departments are very fashionable, important and much encouraged by governments. The new high-tech companies offer the hope of keeping Western economies viable at a time when much manufacturing is being outsourced to developing countries. At the same time they are the best possible means by which those same developing countries can move away from a mere reliance on cheap labour and develop their own sophisticated industrial enterprises. They can also be a means of sustaining university finances, an idea reinforced recently in the UK by the Lambert Report.

The aim of this book is to provide help to those tempted to follow the route of building a company based on the research conducted in university laboratories. The role of technology transfer offices and the technicalities of creating a spin-out company are covered, but the bulk of the text is devoted to the case study of Oxford Molecular, the company spun-out from the University of Oxford in 1989. The author was the scientific founder of Oxford Molecular, and this led to his involvement in a wide range of spin-out companies. This experience enables him to tell exactly how things are in practice, and to recount the high spots and the failures he encountered.

Recently retired from Oxford, where he was head of the University Chemistry Department, the biggest chemistry department in the Western world, the author was involved in 1988 in the founding of the University of Oxford's technology transfer company, Isis Innovation Ltd, of which he was a director for some 20 years. He was also a director of Catalyst Biomedica Ltd, which for a time was the technology transfer organisation charged with exploiting the intellectual property generated through research funded by The Wellcome Trust, the world's second biggest charity (after the Gates Foundation). He was chairman

of IP2IPO Group Plc, the company resulting from a deal he did with Beeson Gregory Ltd in 2001 in order to fund a new chemistry research laboratory, and now itself the publicly quoted IP Group Plc of which he is senior non-executive director.

Graham Richards' range of experience, which he has gained as a long-term senior academic scientist and through involvement with a number of spin-out companies, makes him the ideal guide on how to spin out a company from a university. He knows what it is really like in practice, including the inevitable difficulties, and he can offer useful guidance on where this increasingly important sector will head in the future. This book will be of interest to universities, academia and business readers alike.

1

Introduction

The role of University science departments is to teach and to do research. This has always been the case and remains their most important function. Only relatively recently has the additional expectation emerged whereby the intellectual property they generate should be exploited for the public benefit. This is possible without compromising the traditional values, which nonetheless must remain at the forefront. Exploitation can be achieved by one of two mechanisms. Either the research can be licensed to outside companies who will pay royalties, or alternatively new companies, spin-outs, can be created.

Spin-Out Companies

Although licence income can be very significant, it tends to come in slowly and only the very rare example generates huge sums of money. This has in the past been more true of novel drugs than any other area. The returns are more likely to come quickly from the founding of a spin-out company, although this is more complex and time-consuming.

The University of Oxford has an outstanding record in the area of spin-out companies and I have been fortunate to be closely involved in many aspects of this activity. After the university set up its technology transfer company Isis Innovation, the first spin-out company came from my research group, Oxford Molecular Ltd. This paved the way in particular for companies derived from the Chemistry Department, which has played a unique role. This single department has contributed more than £80 million to the central university – £40 million in un-earmarked cash from sales of shares in quoted companies, £20 million represented in unrealised holdings in quoted spin-outs from the department and a further £20 million represented by the fair value of its equity in companies which are still private.

Oxford Molecular

Oxford Molecular is the company which we will take as a model, not necessarily of how it should be done, but as a case study of a very typical story. It was founded by me and my former researcher Tony Marchington in 1989. We took the company from a £350,000 start-up to a public company with an initial public offering (IPO) in 1994. It grew to have a capitalised value of £450 million following several takeovers, notably in the USA. At its height the company employed nearly 500 people, half of them in America where we operated five sites. We made mistakes and in the year 2000 the company was sold for some £70 million. Oxford Molecular yielded almost £10 million for the university.

Following how the story of this particular company panned out should be helpful to any academic embarking on this route and also give any incoming management some idea of what they are likely to face.

IP Group Plc

Oxford Molecular was a pioneering UK example of a university spin-out company in which the university itself held shares. The model was repeated numerous times in Oxford and elsewhere so that there has grown up a commercial sector of companies whose role is to create, foster and develop university spin-outs. Pre-eminent in this field is IP Group Plc. This grew out of an original arrangement which I made on behalf of the Chemistry Department of Oxford with a London-based company then known as Beeson Gregory Ltd. The agreement was that for an upfront sum they would receive half of the university's equity in any spin-outs from the Chemistry Department for a fixed period of time. That deal proved to be outstandingly successful for all the parties

involved. It was developed into a separate company which now has similar arrangements with 10 UK universities and also operates in continental Europe. The way in which this company has grown, and its role in generating new companies, is also a tale which has lessons for academic entrepreneurs and for university technology transfer organisations which have been set up to accelerate company formation.

Before going into these case studies it will be helpful to give a brief account of how the story of university spin-outs has developed and to discuss the nature of technology transfer including the technicalities of setting up a spin-out company.

2

A Brief History Of Spin-Outs

University spin-out companies are not new. Probably the first was the Oxford University Press, founded in 1478 and still going strong. Interestingly it has never actually been spun-out and remains technically a part of the University of Oxford, with no shareholders and no obligation to pay corporation tax.

Despite that early start, Oxford came late to the business of creating companies based upon the research being conducted as part of the normal functioning of a seat of learning. Universities are about teaching and research. Spin-out companies are a by-product, even though they may be important for a country's financial health and major contributors to university funds.

Oxford Instruments was founded in 1959 by Martin and Audrey Wood but the university played no part in the formation of the company, whose origins were in the Physics Department. In that department at the time there was a need for magnets, and with this being the staple product of the company the university became the first customer.

The modern history of high technology companies is firmly focussed on the United States, and in particular Silicon Valley in California and the Route 128 area of Massachusetts, with the influence of Stanford University and Massachusetts Institute of Technology being a vital component.

The California Story

The San Francisco Bay area was a major site for US Navy work, including the large Navy aviation research centre at Moffett Field. This led to a growth in aerospace related companies, but the civilian high technology enterprises had their origins at Stanford University. Dean of Engineering Frederick Terman encouraged students to stay in the

Palo Alto area by finding venture capital for them, with William Hewlett and David Packard setting up Hewlett-Packard in 1939.

In the 1950s Stanford Research Park was created, providing low-cost industrial buildings for technical companies. Once again the influence of one individual was crucial in turning the region into Silicon Valley. William Shockley, who had quit Bell Labs in 1953, moved to Mountain View to create the Shockley Semiconductor Laboratory as part of Beckman Instruments. Shockley's difficulties with his colleagues led to a distinguished group of them, often dubbed as "the traitorous eight", resigning. The group includes now legendary names in the world of hi-tech business: Julius Blank, Victor Grinich, Jean Hoerni, Eugene Kleiner, Jay Last, Gordon Moore, Robert Noyce and Sheldon Roberts. With funding from the eastern US company Fairchild Camera and Instrument, they started Fairchild Semiconductors to make silicon transistors.

During the 1960s several of the original founders left Fairchild to form their own companies: the "Fairchildren". Massively successful examples included Intel, founded by Robert Noyce and Gordon Moore, and over the years this pattern repeated itself several times, so that there grew to be a critical mass which attracted the all-important venture capital groups and support services, such as specialist lawyers, to the region.

The presence of Stanford University and the campuses of the University of California in the region were critical factors in providing novel science and high quality people, but these companies cannot really be called spin-outs. The universities often benefited from the generosity of alumni who had created significant wealth through their entrepreneurial activity, but the universities were not directly involved in the creation of the companies and did not take founders' equity.

The Massachusetts Story

The same is true of the similar development of high technology, especially electronics companies, on the 65 mile highway, Route 128, around Boston. The Massachusetts Institute of Technology, along with Harvard and the other fine universities of the region, provided much of the intellectual input, and the US government, through the Department of Defence and the National Science Foundation, provided the funding. This was more evident on the US east coast than in California. In addition, the big successful companies such as Digital Equipment Corporation and Raytheon provided capital and, more importantly, acted as customers for the start-up companies.

As in California the benefits to the universities were indirect, albeit substantial. The companies were start-ups with the involvement of individual entrepreneurial academics as founders or technical advisors. The universities themselves did not place as much emphasis on starting companies as on licensing the technology they owned to the companies.

The Bayh-Dole Act

In 1980 the United States became concerned about declining productivity and rising competition from Japan. As a response Congress passed the Bayh-Dole Act, which enabled universities to patent federally funded research on a large scale. Universities were offered the opportunity to licence campus-based inventions to private companies in exchange for royalties. In the years following, Congress passed a number of additional laws to encourage university-industry links, notably generous tax breaks for corporations willing to invest in academic research. The Act permits the university to pursue ownership of an invention in preference to the government who had sponsored the research.

The impact of this legislation can scarcely be overstated. There was a ten-fold increase in patents generated and cumulative increases in industry funding for universities, rising to an annual $2 billion by the turn of the millennium. There are those who are unhappy about the Bayh-Dole provisions since in a sense giving private firms the rights to inventions generated at public expense means that the public has to pay twice for the same invention – once through taxes to support the research that yielded the invention, and then again through higher monopoly prices and restricted supply when the invention reaches the market.

The legislation does contain safeguards such as a "march in" provision enabling the federal government to terminate an exclusive licence if the licensee fails to take effective steps to bring the invention into practical application within three years. A royalty-free licence is also included to enable the government to use the technology at any time.

What is quite certain is the fact that the Bayh-Dole Act produced a massive increase in the amount of academic research being commercialised in the USA, more in terms of licensing than in the creation of spin-out companies.

The British Story

Virtually nothing happened in the UK until Mrs Thatcher shook up the system. The much repeated truism that Britain is good at invention, but poor at exploitation, is based on a long history of innovative science and woeful commercial success. In the 19th century Perkin produced the first synthetic dye, mauveine, and even started to manufacture it commercially. The country had a unique lead, but by 1914 when it was necessary to send an army to France, the only source of khaki dye for the uniforms was Deutsche Farbe and some of the British Expeditionary

Force went to war in navy blue uniforms dyed with woad, the natural dye favoured by the ancient Britons.

The BBC started television broadcasts in 1938, some ten years before a television service began in the USA, but by the end of the 1960s there were no British companies making TV sets. Computing is often traced back to Babbage, but the first modern electronic computer was built at Bletchley as part of the Enigma code cracking project by Tommy Flowers, based on the theoretical work of Alan Turing. In the early 1960s possibly the best electronic computers in the world were built by the UK Ferranti company. My first experience of computing was with the wonderful Ferranti Mercury in 1961. By the 1970s the industry had disappeared overseas.

The modern era was much influenced by the Second World War. In the dark days of 1941 when Britain stood alone after the fall of France, the USA came to the aid of the old country by providing 50 ships to help make up for convoy losses in the Atlantic. The deal was known as "lend-lease", since at its heart was the provision of permanent leases on bases in the West Indies to the Americans. Less widely known is the fact that in the small print of the agreement between Churchill and Roosevelt, the UK agreed not to patent three strategic British inventions: radar, the jet engine and penicillin. All were potentially vital to the war effort and only the USA had the industrial power to exploit these technologies. They helped the allies to win the war, but at huge financial loss to post-war Britain.

That fact was not lost on the post-war Atlee British government which in 1948 set up the National Research and Development Corporation (the NRDC). This nationalised body was created to commercialise innovations resulting from publicly funded research, at government research centres and universities, with research support from the state-

funded research councils. Amongst their successes were the cephalosporin antibiotics, developed in the same Oxford laboratories which had exploited penicillin, magnetic resonance imaging and Interferon. The NRDC became the British Technology Group (BTG) following a merger with the National Enterprise Board, and was privatised in 1992.

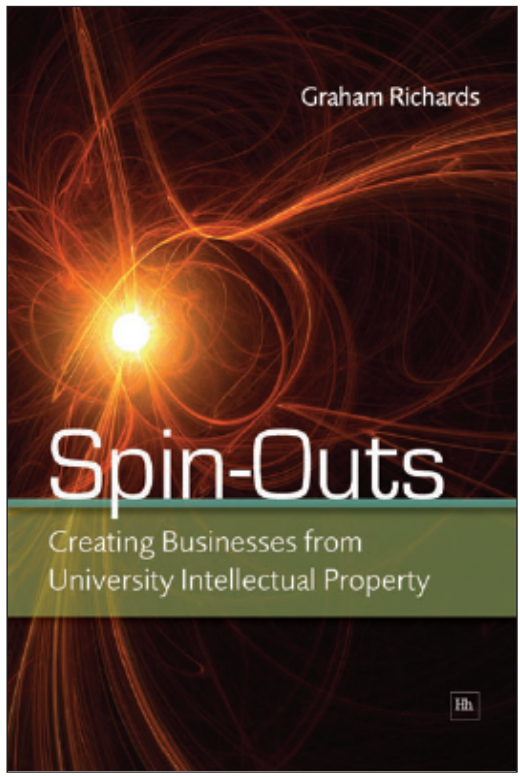
In its days as a state monopoly, the NRDC, despite some striking successes, was essentially risk averse and not subject to normal commercial pressures. They turned down the hovercraft and, most notoriously, decided that monoclonal antibodies were not worth patenting. This they did under the reign of Margaret Thatcher who had great sensitivity to commercialisation (she was an Oxford-trained chemist). Indeed she had been responsible for another crucial innovation – changing the taxation rules to permit and encourage venture capital, which did not exist in the UK before 1982.

In 1987 she again took a seminal decision to hand over the ownership of intellectual property derived from government funding to the universities in which the IP had been generated, provided they set up a mechanism to encourage exploitation, or as it has become known "technology transfer". This crucial step set the stage for the flowering of spin-outs in the UK.

Spin-Outs

Creating Businesses from University Intellectual Property

Graham Richards



Available direct from Harriman House and all good booksellers. To order a copy of the print or ebook edition go to:

www.harriman-house.com/spinouts

Hardback: 9781905641987
eBook: 9781906659424

Follow us on Twitter: **@harrimanhouse** for the latest news and special offers

Hh