

---

## Book Review

# Science lessons: What biotech taught me about management

Gordon Binder and Philip Bashe

*Harvard Business School Press, Boston, MA, 2008, hardback, 288pp., £13.99, \$29.95, ISBN: 978-1591398615*

*Journal of Commercial Biotechnology* (2009) **15**, 86–91. doi:10.1057/jcb.2008.33

Amgen is one of today's 'gold standard' biotech companies, a well-recognised and successful business with the largest revenue of any biotech company. Its 2007 revenues exceeded \$14bn, profits were approximately \$3bn, and the market cap places it into the realm of the 'big pharma' companies. The biotech industry as a whole in 2007 generated \$68.4bn in revenue; Amgen accounted for 20.5 per cent of that. In marketing terms, that is significant market share. So, perhaps we can learn a few lessons from Gordon Binder, a proven CEO/leader, about how to build a successful, sustainable, and innovative organisation.

'Science Lessons' illustrates some lessons which Binder learned regarding

- Management and leadership.
- Corporate culture.
- Management transitions.
- Building a manufacturing, marketing, and sales organisation in a science-based company.
- How scientific principles were used to build a company.

Some chapters also cover specific challenges regarding financing, partnerships, intellectual

property management, and dealing with the clinical/regulatory environment.

Binder's objectives for writing the book do not include providing a company history or his life story. He has stated that he wanted to take the reader 'behind the scenes to highlight the guiding principles that contributed greatly to Amgen's success' and made it a very unique place. That will be my goal in this review as well: identify the ingredients and leadership needed to build a great company.

Binder was recruited in 1982 to become CFO of Amgen by Dr George Rathmann (the company's founding CEO). Binder had earned a Harvard MBA and pursued a financial career in larger industrial organisations before coming to Amgen. He was in his mid-40s, but he had already demonstrated considerable success at Ford and Litton Industries. Binder was referred to Rathmann based upon his proven financial leadership skills.

The biotech industry was just starting at the time, so Binder had no knowledge of biotechnology and why he should join such a high-risk venture in a non-existent industry. Dr Rathmann, experienced in the R&D side of the pharmaceutical field, clearly understood the importance of sustained and significant

financial resources in building a biotech company. Hence, he sought an experienced financial executive to be part of his diverse, well-balanced leadership team. Given a compelling opportunity and an experienced person at the helm, team formation was critical at this juncture for the company to go forward.

Amgen was (and is) a science-driven biotech company, but I believe the reader will acquire numerous insights into what it takes to build a sustainable and innovative corporate culture in any technology or knowledge-based industry. The story covers the lifecycle of Amgen: its inception in 1980, its development stage and product launch (when Rathmann left for new challenges and the board of directors promoted Binder to CEO), the commercialisation/growth stage, and its evolution into a mature commercial organisation with revenues in excess of \$3.6bn (when Binder left and turned the reigns over to Kevin Sharer, the current CEO).

There are many lessons in management and leadership to be learned from this book. We see the challenges in defining and maintaining a culture, building a team, acquiring the resources (money and partnerships), all while developing and advancing the science necessary to achieve the opportunity and vision of the founders. These three parts of the entrepreneurial process (opportunity, resources, and team) are balanced and maintained by the leader (Rathmann first, then Binder, and then Sharer). Each had a different set of skills and talents well suited for the stage of the company lifecycle that defined their respective tenures as CEO.

For those specialising in biotech, the book also includes many insights associated with intellectual property, partnerships, regulatory, and reimbursement issues. These risk factors are particularly essential to the biomedical space. Afterwards, we will illustrate the good (mostly), the bad (a little), and the ugly; these traits are typical of most successful companies as they grow. We can learn from Amgen's

successes, challenges, and less successful 'experiments'.

In general, the challenge faced by leadership can be reduced to the following ingredients:

- Build a talented and balanced management team in a culture that incorporates a team-based approach with leadership throughout.
- Encourage and reward performance.
- Organise around autonomy and innovation.

Everything in Amgen is built with the premise of recruiting and retaining world-class people. The culture is externally oriented and customer focussed (creating and delivering value). It is responsive, quick to make decisions and change directions, and it is tolerant of risk. Finally, the company is open, transparent, and ethical.

Leaders focus on external opportunities and challenges and establish vision and direction while aligning, motivating, and inspiring the team. Management executes the plan. Leadership and management need to be balanced. If I did a 'balanced scorecard' ranking of Amgen, I would rate the company and its leadership, including Binder, very highly in each of these dimensions.

The introduction to the book starts with Amgen's values. These include: Be Science Based; Compete Intensely and Win; Create Value for Patients, Staff and Stockholders; Work in Teams; Collaborate, Communicate and Build Consensus; Trust and Respect One Another; Ensure Quality; and Be Ethical. Here we are told that Amgen's secret weapon is its people, a very important resource in any entrepreneurial and innovative organisation. 'Science Lessons' explicitly states that 'from the beginning Amgen was a magnet for gifted, innovative men and women'. The organisation attracted and retained them by making Amgen a place where such people wanted to work. The salaries, benefits, and stock options were very competitive with

other biotech companies, but Amgen also fostered a well-articulated and value-based culture that gave its employees every opportunity to contribute to the solution of significant problems in healthcare.

Employees were hired with the recognition that they needed to fit the corporate culture. That started with Rathmann and was continued by Binder and then reinforced by Sharer. The book, however, also states that while it is important to hire employees with similar traits, one can take chances now and then on gifted people who may not be completely compatible with the corporation's 'values'. The authors state that playing as a team is essential; however, the CEO (as a coach does with a sports team) must rally unique individuals towards one common goal.

One thing that really stands out is that Amgen and its leadership are focussed on solving compelling medical problems based on good science. This vision existed from day one, insisted upon by the six venture capitalists (each of whom put up \$81,000) who founded the company. The board hired George Rathmann to found and build a company with a shared vision to use the new science of genetic engineering to benefit human health. Rathmann, who was a scientist by training, had the necessary experience in building science-based businesses in the pharmaceutical field.

He was uniquely qualified to assemble the team and lead it through its startup, development, and commercialisation stages. Binder was recruited to lead the financial part of the organisation. As with all startup companies, financial resources need to be acquired and reacquired constantly. This was the principal challenge of Binder in his role as CFO. Rathmann had raised money from the VCs and then got a commitment from Abbott (as a corporate investment that also validated the scientific goals), but Amgen was 'burning money' faster than planned.

The authors skillfully describe the challenges of acquiring and balancing the interests of multiple funding sources for

'high burn-rate' companies. With \$19.4m of A-round investment in place, they were off to the races. Further VC investment to fuel the required staff buildup, however, was difficult to achieve. This was due to the long, high-risk time line commonly seen when bringing a product to market in the biotech industry.

The company was running out of money as Binder accepted the challenge to become CFO in 1982. When confronted by the lack of further VC funding at the levels needed to achieve success, an IPO (initial public offering) strategy was developed by Binder (there was no plan B) which resulted in a successful IPO in 1983. You will have to read the book to hear about the challenges of achieving a successful IPO in a very adverse environment.

With \$57.5m in hand, Rathmann and his team then led the successful development, clinical testing, and FDA (Food and Drug Administration) approval of its first product Epogen (EPO). With its first product (plus a small portfolio of additional commercial candidates in development), Rathmann announced to Binder in 1988 that the board had elected him CEO. The rationale was that the company had just gotten FDA approval to launch Epogen and a new CEO at this significant milestone would need the momentum to go forward into the market-launch stage.

A small but important detail, however, was that a new organisational arrangement was required. A top-level structure was formed with Rathmann as chairman, Binder as CEO, and Harry Hixon as COO. The book details the interpersonal and organisational issues with making this arrangement work until the time that Rathmann left Amgen altogether in December 1990. This section is a good case study on management transitions and their difficulties. One quote worth noting here is that Binder described the arrangement of him as CEO and Hixon as COO akin to 'two porcupines mating'. Another important set of challenges was building the organisational

structure to deliver the approved product to market.

The authors state that Amgen struggled with how to maintain a nimble posture when you are no longer a startup (a classic problem). This was accomplished by decentralising the organisation and establishing an entrepreneurial culture that embraces change, encourages innovation, and empowers its people. Here is a quote from 'Science Lessons' worth repeating: 'In an industry such as biotechnology, failures abound. If Amgen had not lived by its principle (employees must have the freedom to make mistakes) we would not have survived'.

As Binder took over he faced the challenges of launching a new product, and there was also disagreement on how to build the salesforce. Building a salesforce is expensive and difficult (particularly in a science-based organisation), and here is one example of using the scientific process to determine how best to sell a new biotech drug. Following the pharmaceutical industry's playbook, Amgen knew it had to bring to market two products (Epogen and Neupogen) based at the time on a common platform. Each was targeted at a different medical need, however. Epogen targeted anaemia in the kidney dialysis market, and Neupogen was used to prevent infections associated with chemotherapy. Should one team sell both products to two different markets (the conventional wisdom) or should two teams exist, with each focussed on a specialised market?

Dennis Fenton, promoted by Binder from a scientific management role to the sales and marketing chief, was charged with solving this problem. He led a sales experiment using a prospective, randomised, controlled, and double-blinded-based testing model standard in clinical testing. He took two sales districts at random and had people sell only one product for a short period to see what worked best. It was very quickly proved that a dedicated team approach worked best. In effect, selling new, specialised biotech

products posed a sales challenge that was best met by specialists. This was the difference between selling a high-value, highly differentiated product and selling a commodity. The authors refer to the latter as 'hawking vacuum cleaners door to door'. Amgen recruited nurses, pharmacists, and highly educated professionals to 'sell' their products, but they were basically educating the customer, and these professionals were best able to articulate the value proposition in scientific terms expected by those who purchased and used these products.

While expanding the organisation, Binder also faced the classic challenge of balancing R&D expenditures vs those associated with building the marketing, sales, and manufacturing operations. Maintaining a pipeline of product opportunities is important, and Binder certainly was mindful of that need. He notes that the period from 1993 to 1996 was Amgen's 'nuclear winter', where not a single drug was brought to market.

This is the classic challenge, especially for a public company where the analysts penalise it for a perceived lack of a robust pipeline. As market caps decline and revenues are compromised, there is the inevitable challenge of being taken over by a larger competitor – in this case 'big pharma'. The authors report on the investment bankers making periodic pitches 'showcasing Amgen to the pharmaceutical behemoths'. Binder came to the very quick conclusion that if the P/E ratio remained high Amgen would be too expensive to purchase: 'That's the best defense against a takeover'. So, he delivered revenues and profits.

How do you fill the gap when the science does not work? The authors report on issues of 'science failures' associated with portfolio development through the clinic and also the approaches taken to acquire pipeline from other companies. A notable success was Amgen's acquisition of Immunex during Binder's tenure as CEO in 2001. This move added the arthritis drug Enbrel to the Amgen pipeline. I would add parenthetically that

Amgen has been very aggressive in developing a pipeline via in-licensing and acquisition. This is an important part of the growth strategy of any biotech company, and it follows an open innovation business model which is essential for global competitiveness.

Even for science-driven companies, there is an abundance of good science and technology beyond the ‘walls’ of the company laboratory, and there are numerous good contributors and partners around the world. Several reflections by Kevin Sharer deal with Amgen’s product-pipeline failures during this period (mid to late 1990s). ‘Sometimes the science just doesn’t work’. He indicated that the acquisition of Synergen for \$254m in 1994 was a bold move. As with many other products promising treatment for sepsis, Synergen’s drug failed in the clinic. On the bright side of this failure, Synergen had a promising treatment for rheumatoid arthritis. This drug became Amgen’s fourth approved human therapeutic in 2001.

Overall, the Immunex and Synergen acquisitions had positive outcomes to counterbalance the science failures. Sharer also points out that during this period Gordon scaled up the company so well that it was ready for its next growth phase. He delivered on share price, financials, and groomed Sharer as a successor.

This review would not be complete without discussing two key factors that demanded Binder’s time and attention during his tenure as CEO: partnerships and intellectual property.

Partnering in biotech is a key component of the open innovation business model for a number of reasons:

- Access to markets and use of existing sales forces.
- Acquisition of capital, perhaps at a better rate and in larger amounts than with VCs.
- Validation of the scientific base.
- Expertise in clinical testing, manufacturing, or both.
- Risk reduction.

Since Amgen was an emerging company in the early days, it chose to partner with Johnson and Johnson (J&J) on Epogen, with Amgen taking responsibility for the anaemia market and J&J taking charge of the chemotherapy market.

But several problems came to bear, first from cultural differences resulting with the partnership itself, and then with the underlying product that was originally based on the same technology patented by Amgen and licensed to J&J. Amgen had developed a new approach for producing Neupogen, and that resulted in a significant intellectual property dispute between the partners since J&J claimed that Neupogen was in effect an improvement over Epogen. Amgen claimed that it was a new invention, and eventually it entered into a protracted and expensive legal battle with its own partner.

Needless to say this is not an example of a partnership that worked. One can learn, however, from the poor experience. As these IP and partnership issues cover many pages in the book, suffice it to say that if you are going to enter into partnerships, licensing, and distribution products, be prepared to allocate the resources to be able to enforce your patents and partnership agreements. Also make sure that there is a good strategic and cultural fit.

I would strongly advise you to read the book for these details and also to explore a very effective partnership between Amgen and a Japanese partner, Kirin Brewery Co. In this case, the Amgen and Kirin executives had much in common in their strong R&D bases, culture, and fundamental values. The authors also said that ‘they were pleasantly surprised’ with the Japanese tradition of deals being conducted with a minimum of attorneys! The protocol is that the deal has to be fair to both parties, and each party will deal ethically with the other if and when difficulties arise. Amgen and Kirin entered into a joint venture where Kirin acquired rights to Epogen in Japan and Amgen retained all rights in the US.

In a concluding chapter, Binder talks of the value of ethics in business, a common theme in recent years. He talks about the importance of creating a culture of ethics and honesty, and that it is vital for people, partners, and leaders to 'do the right thing' when confronted with decisions where it may be tempting to act otherwise. The authority figure's actions set the tone that 'permeates the organization'. Binder learned this lesson early in life from his father (as did I), and this was reinforced in many business relationships over the years (including Amgen). This provides another example that mentorship is an important part of leadership development.

In the spirit of this review title and Bender's statement that this book is what he learned about managing a biotech business, here is a final note on the importance of leadership in building and running companies. In his book '*On Becoming a Leader*', Warren Bennis summarises five qualities that leaders are not born with but can learn:

- An ability to engage others by creating a shared meaning (vision, persuasiveness, and empathy).
- A distinct voice (purpose, self-confidence, and sense of self).

- Integrity (a strong moral compass).
- Adaptive capacity (ability to respond quickly and intelligently to change).
- An ability to engage a mentor and to mentor others.

The concluding chapter of 'Science Lessons' summarises some interesting observations from the people who worked under Binder, including Dennis Fenton, Kevin Sharer, and Ed Garnett. Each states that a principal challenge faced by Binder (other than those listed above) was that he had to fill the shoes of George Rathmann, a legend and the beloved company founder. Binder clearly stood up to this challenge and also demonstrated all the other qualities of leadership noted by Bennis. Garnett also pointed out that in the history of each organisation (I use the term 'company life cycle'), there is a founder (Rathmann), followed by the builder (Binder), and then the changer (Sharer). Enormous growth took place on Binder's watch, and he imprinted his leadership style on the organisation.

Arthur A. Boni  
Tepper School of Business  
Carnegie Mellon University,  
Pittsburgh, PA, USA