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Commentary

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Book review – Chemistry Entrepreneurship

When we held this book in our hands for the first time, we were surprised as to the reason someone had made the effort to compile another such book with already so many similar titles available – especially in such a small niche as chemistry. Right in the first sentences of the preface, the focus of chemistry entrepreneurship is widened to "adjacent disciplines" without going into details about who might be meant by this. As one of their motivations, the editors describe in the introduction that such a book would have been of great assistance when García-Martínez started his first chemistry start-up in 2006. With the experience of having founded a chemistry company themselves, the editors emphasize the relevance of chemistry start-ups to solve problems of our time such as material innovations and climate change and want their book to inspire chemists to start a company. The editors emphasize the fact that many chemists receive little or no training in how to start a company based on their scientific endeavors, even though this would be of importance to society. Finally, the editors note that the present book is intended to be much more of a practical guide for chemists and chemical engineers than an academic study on how to start a business.

The table of contents makes it clear, quickly, that the contents of the book were indeed broader in terms of topics and target groups than the book title and introductory words suggest. Under the headline "We Need An Entrepreneurial Culture in Chemistry: Do You Have What It Takes to be a Chemistry Entrepreneur?", chapter 1 deals with the topics of start-up ecosystem and culture, the particular difficulties and challenges of starting a company from the academic chemistry environment and tells in a very stimulating and exciting way how chemistry start-ups have changed our society in the past.

The title of Chapter 2 – "Taking Ideas Out of the Lab: Why and When to Start a Company in the Biomedical Field?" – already makes you wonder: are bio-medical and chemistry start-ups the same? Does not the title of the book itself suggest that chemistry start-ups are so special that an entrepreneurship book, just for them, is necessary?

Chapter 3 – "In Pursuit of New Product Opportunities: Transferring Technology from Lab to Market" – adds to the confusion at first glance. However, both chapters are extremely exciting by themselves. As all chapters, they are written by experienced practitioners and entrepreneurs describing numerous case studies, revealing many practical tips, and providing inspiration to upcoming entrepreneurs. However, the reader has to accept that they are not explicitly and exclusively about chemistry start-ups.

Chapter 4 with the title "Financing and Business Development for Hard Tech Startups" provides an overview of investors, their expectations, and how they feel about hard-tech start-up companies. Apart from the fact that "hard-tech" remains undefined and that it is up to the reader to see the parallels, this is a very important and well-done chapter. Here, company founders get to know investors as "customers" with a slightly different understanding of the product, who want to deal with market opportunities rather than with technical details. Capital raising is a relevant topic right from the beginning since chemistry start-ups usually are intense regarding the investment necessary.

Chapter 5, titled "Battery Entrepreneurship: Gameboard from Lab to Market", again deals with a specialty that is of great added value for everyone who plans to start a company in this field of technology. For those who expect further insights into the challenges of a chemistry start-up, it must be said that much transfer of knowledge is necessary to recognize the parallels and references. The case studies are about applications such as medical devices, drones, aircraft, shipbuilding, the automotive, and the energy industry and

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thus offer a broad view of the value-creation chain of chemical products. Here, at the latest, it becomes clear that the term "chemistry entrepreneurship" is used broadly, implying, that almost every tech start-up deals in principle with chemicals or products derived from the chemical industry. However, we consider this to be of little assistance in understanding how start-up companies emerge from chemical research.

Chapter 6 – "Growing a Business in the Chemical Industry" – deals with the market environment and characteristics of the chemical industry. Above all, the author discusses the fundamentally important topic of the relationship between invention (solution) and the corresponding problem of potential clients. The author points out that without a corresponding problem, there is little chance of the idea successfully entering the market. Although the chapter also provides some explanations and tips for the later phases of a start-up, it is primarily interesting to anyone intending to start a company and early-stage company founders.

Chapter 7, titled "New Models to Foster Big Pharma and Chemistry Entrepreneurship", begins with the challenges for start-ups when it comes to cooperating with large companies in the pharmaceutical industry. However, there is no clear distinction from companies whose target group is the chemical industry. As before, the reader has to ask himself whether pharmaceutical companies operate in the same way as technology companies outside the healthcare sector. Thus, the chapter is just right for those who envisage their market entry into the pharmaceutical industry, but not helpful for the many other chemistry start-up founders who want to develop their products in cooperation with established companies from the chemical industry.

The last chapter – "The Economic Need for Chemically Based Start-Up Companies" – is more a chapter for political decision-makers in the US than for company founders from around the world. Even if it does not hurt for US-based company founders to understand their financial environment and the funding landscape, we believe this chapter is of little help to international readers and for the task of building a start-up company in general. However, the politically motivated reader will find examples and may be inspired by their projects.

In summary, "Chemistry Entrepreneurship" is a strong and necessary book with a multitude of case studies that honor the fact that, in addition to some generally valid findings, it is the diversity of cases that can encourage and inspire the reader. We are convinced that "Chemistry Entrepreneurship" is an exciting book for all natural scientists and engineers and early technology entrepreneurs in general. However, we hope that non-chemists will not be put off by the somehow too specific title.

Chemistry Entrepreneurship
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