Preface

The theme for this book was stimulated by the many encounters I have had with successful entrepreneurs during some 20 years of travel in Asia. It was easy to be awed by these entrepreneurs who had used biological knowledge to create value and wealth, some of whom confessed to having no technical training in biology but had been able to see the opportunities — reflecting truly a spirit of innovation.

What impressed me most was the entrepreneurial spirit that seemed inherent in so many different cultures in Asia — from the small peasant enterprises to the home-grown conglomerates, and, in this globalized environment, the presence of multinationals. Mushroom culture, biofermentation and biopesticides have been practised before the era of modern science. Value had been created. Of course, with the advent of computers, gene technology and the knowledge economy, it was inevitable that bioscience enterprises would increase in scope, scale and sophistication.

This book is therefore my humble effort to capture some of the excitement of applied biology, especially as we move into the "Biology Century". This book aims to share with a broader audience the tremendous possibilities of using one body of knowledge to benefit humankind. Bioscience entrepreneurship is just one example of how "innovation and enterprise" can move from being a mindset to practical outcomes. An entrepreneur sees possibilities to meet some needs of society. Often, the ideas may remain just ideas. Innovations need to become reality before there is successful entrepreneurship.

Value creation is at the heart of entrepreneurship. Creating value from knowledge is the modern, successful equivalent of the age-old, fruitless quest to turn base metals into gold. Where alchemy has not succeeded, biology has, and in the process, has brought wealth to many.

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This book is also an attempt to set right a negative. In my many years as an educator, too often have I heard statements like "There is no money in science", "You can't get rich being a scientist", "You become a scientist because you love science, not because you want to be rich", etc. Yet, as this book will show, there have been many scientists who have taken the extra step beyond their comfort zones and have become very successful in enterprises, gotten very rich, and at the same time, helped to meet some of the most important needs of human society like food and fiber.

Yes, science provides the knowledge to drive entrepreneurship. But creating value and wealth are not the end-points in themselves. Bioscience products meet basic human needs and are truly renewable and sustainable. Nobel Laureate Norman Borlaug has noted in his Foreword to this book the "food versus fuel" dilemma that faces many countries. This is a dilemma of success, because alternative uses have to be decided for the successful production of basic biocommodities like corn and rice.

In this new knowledge-empowered age, scientists are well-positioned to "have their cake and eat it" too. The lines between so-called ivory-towered laboratory research and product development, and ways to cross them, have become clearer. Scientist-entrepreneurs are now many, with good role models in many countries. My hope is that books such as this one can help further bridge the gap between R&D and product development, because knowledge does empower.

It has not been possible to give equal treatment to all the enterprises covered as some are more developed than others. When the research for this book first started, I had aimed at providing a simplified primer on the science and technology behind each of the bioscience enterprises so that more can appreciate the tremendous remaining potential. It has not been altogether possible. For that, I crave understanding from the reader and have suggested a reading sequence.

To guide the reader, a suggested reading sequence is to start with Chapter 1, followed by Chapter 10. Then, selectively, the chapters from two to nine provide details of ten bioscience enterprises. Where appropriate, sources of further information such as websites have been provided.

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Lastly, as a biologist, I continue to be impressed by how supposedly uneducated people have successfully mastered the intricacies of using biological knowledge to make products. This book has focused on the bioscience aspects of entrepreneurship. However, entrepreneurship is more than just knowledge and skills; it is also a mindset. Being an entrepreneur means having the ability to spot opportunities and use them to create value. I hope this book will both enlighten and inspire a mindset change in some readers.

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