

Preface

Is there a need for one more book on innovation? In the fourth edition of the important and voluminous “*Strategic Management of Technology and Innovation*” by Burgelman, Christensen and Wheelwright (2004), for example, there is hardly anything at all about the innovation of process technology. The phenomenon is not uncommon, and there are few publications dealing with process innovation at company level. One possible explanation for this state of affairs is that the subject is felt to be too complicated for researchers lacking a technological background and, particularly, knowledge of the industrial environment in the process industries.

Process industries and other manufacturing industries: Are they different?

There are a number of similarities between the process industries and other manufacturing industries with regard to development activities and how they are performed, but there are also a number of differences. The main difference is probably the strong relation between product development and the development of process technology. An understanding of production process technology is thus essential to the development of new products. The automotive industry has recognised the importance of “design for manufacturability” (Boothroyd *et al.*, 1994). The same concept is also valid in the process industries, but in this book it will be called “innovation for processability.” The concept of “dominant design”, describing a product that outperforms its

competitors, was introduced by Utterback (1994, p. 18). This concept name does not fit products commonly produced in the process industries very well, since they are not designed assembled products. The idea behind the concept is however still relevant and valid, and here “dominant performance” is introduced and will be used to describe the “best-in-class” products in the process industries. The following list also highlights some other differences between innovation in the process industries and that in other manufacturing industries:

- *Development work is done in a laboratory/pilot plant/production plant environment and not in a design office.*
- *Constructing prototypes is not an intermediate development stage in product development but is replaced by test runs in pilot plants or full production, manufacturing batches of new products for customers and verifying process conditions.*
- *Customers are often industrial business-to-business or B2B in long supply chains, before finally reaching the end user business-to-consumer or B2C.*
- *Process development often takes place in collaboration with manufacturers of process equipment and suppliers of raw material and reagents.*
- *Changes in the company’s portfolio of products and product varieties are often very complex, since the company’s production structures are long internal interconnected production chains.*
- *Final quality of products and intermediate product properties are related to available raw material properties.*

The conclusion is that the differences in the development context motivate a separate study of product and process innovation in the process industries.

Process innovation is not, however, the only area of innovation that does not receive proper attention. Considering that the process industries make up a large part of all manufacturing industries, the management of innovation and technology in the process industries is an area that deserves more recognition in academic research and in other publications. In this book it has sometimes been necessary to discuss process innovation from the perspective of all kinds of innovation

and innovation-related activities in the process industries in order to give a better understanding. Readers interested solely in process innovation are recommended to read those other parts extensively.

Process innovation (development), as defined in this book and distinct from product innovation, is in itself a strategic area of innovation for most firms in the process industries seeking to secure competitive and cost-efficient production technology. The supportive development of process technology for successful product development is by no means considered to be of less importance. This work is, however, an activity classified as part of product innovation as defined here, even if carried out by the organisation for process innovation.

Readership

Research on the management of process innovation can be included in the larger research area often referred to as “research on research” and as such must be considered an applied part of this research area. Because of that, and because the readership for this book includes both academic scholars and industry professionals, the aspects of company usability (relevance) are stressed — maybe even sometimes at the expense of some academic rigour. The need for such a focus has been well demonstrated by Ball (1998), and the aim and overall purpose of this book are thus:

To introduce existing and improved concepts, models and management tools in the area of process innovation in order to improve the performance of innovation at the company level. Furthermore, to provide theoretical insight into the subject matter and to give ideas for further research in the area of process innovation and innovation in general in the process industries.

A note to the reader

An oft-quoted statistical argumentation attributed to Samuel Johnson states: “You do not have to eat the whole ox to know that the meat

is tough.” The phrase is instructive for scholars in statistics, but unfortunately we all know that different parts of the ox really do differ in tenderness, and that people have different preferences for which parts to eat. Different parts of this book may be of different tenderness, more or less tough to digest, and furthermore different parts will probably interest different readers. For the reader to find out which parts are of special interest to him, I am sorry that I must advise him to “eat the whole ox.”

Please try to take a slice of the ox at a time and do not hesitate to start with the part that interests you most. It is thus possible to start with Part 5, Process Innovation Performance, or, if you are currently busy working out how to develop R&D work processes, please feel free to start with Part 3. However, since the book does have an intended structure for improved understanding, I sincerely recommend that you start from the beginning of the story. Please observe that further references are given at the end of each part of the book.

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