Manufacturing Strategy

Text & Cases

SECOND EDITION

TERRY HILL

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Preface

Currently in many industrial companies, strategic developments are predominantly based on corporate marketing decisions at the front end of the debate with manufacturing being forced to react to these at the back end of the process. Since manufacturing managers come late into these discussion, it is difficult for them to successfully influence corporate decisions. All too often, the result is the formulation and later development of strategies which manufacturing is unable to sucessfully support. That is not to say that this happens for lack of trying; the work ethic is strong in the manufacturing culture. However, if the basic link between the manufacturing processes and infrastructure (i.e., manufacturing strategy) and the market is not strategically sound, then—by definition—the business will suffer.

The many reasons why this happens are addressed in this book. Significant among them is that typically the attention of manufacturing managers primarily focuses upon the day-to-day part of their task. It concerns operations detail and is output-oriented, while in strategic terms their role is seen as being reactive.

The purpose of this book is to attempt to raise manufacturing managers' sights and to provide the necessary strategic perspective for the task in hand. It is intended to help them analyze and discuss issues, and to think strategically. Currently, the area of manufacturing strategy is short of concepts, ideas, and language. This further hampers manufacturing managers in sustaining strategic argument. The book goes some way toward correcting this position. It helps provide insights and evaluates manufacturing's corporate contribution through strategic perspectives, rather than just through operational performance. It not only helps manufacturing managers to develop and provide appropriate corporate level inputs, but also enables other executives to recognize and appreciate the strategic perspectives which emanate from manufacturing and which need to be given due consideration within the business debate.

The strategic perspective of manufacturing forms the basis on which the book is written, but the approach places these issues within the rightful context of the corporate

whole. Thus, it recognizes that in today's world the majority of companies will be unable to sustain success over a long period of time if their strategy is based upon a single function's view of what is important. The book, therefore, emphasizes the essential requirement to link with those of marketing manufacturing perspectives and other functions in order to determine the best strategies for the business as a whole.

In summary, the book is written as an attempt to:

1. Close the gap between manufacturing and marketing in terms of corporate strategy formulation.
2. Provide a set of principles and concepts which are pragmatic in nature and designed to be applied to each different part of a business.
3. Offer an analytical approach to the development of manufacturing strategy rather than advocate a set of prescriptive solutions. Each business and each part of each business is different. The resolution of strategy through prescription, therefore, is by definition inappropriate. Furthermore, the complexity in manufacturing is such that it encourages companies to take strategic shortcuts. As a consequence, prescriptive approaches seem attractive. The book argues strongly against such approaches. In suggesting a means of developing a manufacturing strategy and raising essential issues throughout, it provides a way of coping with this complexity. The principles and concepts outlined provide a basis for placing operational detail in an essential strategic framework.

Outlined in the book is a basic approach to developing a manufacturing strategy which has been used successfully in many companies throughout the world. It provides a logical, practical, and effective way for manufacturing to interface with marketing in formulating corporate strategy. In so doing, it ensures that the "front-end" debate concerns not just the outward-looking stance of marketing, but the outward-looking stance of the business as a whole. This thereby reduces the number of situations in which marketing-led strategies may be adopted which—in overall terms—will be harmful to the business. It does this by emphasizing the consequences for the total business of different decisions—a technique which is a prerequisite for developing sound strategic direction.

Many executives shy away from discussions of manufacturing because they see it as an area of minute detail. This is because, traditionally, manufacturing is presented in this form. The approach in this book is to group together relevant operational detail into key strategic issues, and to provide an understanding of how these can be applied in companies. The development of a strategic language also provides the opportunity of moving away from what often constitutes current practice—a discussion of operational problems. This is not only an inappropriate manufacturing contribution at the executive level, but also has the effect of dulling the interest of other functions in examining the manufacturing issues involved. Strategic language, on the other hand, helps to orient and maintain the debate at the appropriate level. It stimulates executive interest and enables others to address the complexity by creating a manageable number of manufacturing variables.

The book comprises eleven chapters. Chapter One sets the scene by drawing some important international comparisons at national, industry, and plant levels. The figures embody a growing awareness of the fact that those countries which clearly emphasize the importance of manufacturing's contribution to business success have consistently outperformed other developed countries with a sound industrial tradition.

The core of the book is in the nine central chapters. The headings highlight some key developments within manufacturing strategy. Together they form the substance of the language development as well as the methodologies to be used in its formulation. Chapters Two, Three and Four provide the context and content on the approach to be adopted when developing a manufacturing strategy and details what needs to be undertaken at each step. It includes some illustrations to help with this explanation. Chapter Five deals exclusively with the choice of manufacturing process, the basis for that choice, and the business implications which follow. Chapter Six introduces the concept of product profiling which provides companies with a methodology for testing the current or anticipated future level of fit between the characteristics of their markets and those of their manufacturing processes and infrastructure. Chapters Seven and Eight deal with the concept of focus and the need to assign plants or parts of a plant to a defined set of tasks. The latter provides a detailed methodology statement on how to undertake this development. Chapter Nine is concerned with examining the implications behind make or buy decisions. Companies need to address this strategic one as to where they should position themselves on the process spectrum. Although at first sight these last three chapters appear to concern solely manufacturing process decisions, it is important to recognize that they are also a critical part of infrastructure formulation, since the size and shape of plants are significant factors in what constitutes an appropriate infrastructure, the subject of Chapter Ten. This chapter introduces some important concepts as a way of providing a business with the insights necessary to formulate developments in the wide range of functions within manufacturing. This approach therefore will enable these important, expensive, and time-consuming tasks to be designed in order to support the requirements of a business. It will enable them to be given strategic shape and direction rather than emanating from specialized perspectives.

The final chapter concerns the area of accounting and finance, which is important because it provides some of the essential basic data used in the formulation of strategic decisions. As with Chapter Ten, it is not intended to be a comprehensive statement of the area, but only to represent some production management views of serious shortcomings in this essential information provision. The professional accountant may find the approach provocation; it is intended, however, to be more constructive than that. The issues raised aim to challenge current practice and ideas as a way to stimulate improvement.

Finally, I trust that all who use the book will find it helpful. It is vital that manufacturing take its full part in strategic formulation if industrial companies are to prosper in the face of world competition.

Terry Hill

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Contents

CHAPTER 1 International Comparisons

A new stark reality emerged in the 1980s—the impact of industrial competition. In most industrial nations, the struggle to survive had become, by then, an integral part of each giant company's way of life. To downsize, once anathema to business, had become an acceptable course of action, demanded by necessity or some comprehensive corporate strategic decision. The economic world of the 1980s was very different from that of the 1960s and 1970s. The 1990s are continuing the trend but increasing the pace.

For the most part, however, production decision making in manufacturing industries has not changed to meet these new challenges. In most Western companies, manufacturing management is still subordinate in strategy making to the marketing and finance functions. It continues to concern itself primarily with short-term issues. The argument of this book is that a strategic approach to manufacturing management is essential if companies are going to be able to survive, let alone hold their own or grow by competing effectively in domestic and world markets.

This chapter provides some national and corporate comparisons. It shows how some nations with strong industrial traditions have been outperformed, illustrates the extent of the changes that have taken place, and compares different approaches to the management of manufacturing. The final section focuses on manufacturing strategy, not only to link this chapter to the remainder of the book but also to highlight the increasing awareness of manufacturing as a strategic force at both national and corporate levels.

Manufacturing Output

Trends in a nation's performance within its wealth-creating sectors reflect on its overall prosperity. Since manufacturing is for most countries the most significant activity in this regard, reviewing it provides an insight into a country's general well-being.

TABLE 1–1 Comparative Manufacturing Output, 1975–1991 (1975 = 100)

Country	*1978*	*1980*	*1985*	*1990*	*1991*
Australia	103	111	110	125	119
Canada	113	114	129	135	128
France	114	118	115	130	128
Germany	113	119	123	142	146
Italy	116	129	126	143	140
Japan	123	143	165	191	193
United Kingdom	103	95	99	112	111
United States	126	126	143	163	160

SOURCE: OECD, *Indicators of Industrial Activity*, 1979, 1985, 1988, and 1992 (3).

Comparative figures on manufacturing output in the 1970s and 1980s reveal the mixed fortunes of major industrial nations. Some countries of manufacturing repute have lost ground particularly in the 1970s, while others (for example, Japan, the United States, and Germany) have maintained sound growth throughout (see Table 1–1).

However, of equal concern to these nations is how well they fared within the increasingly competitive markets they serve. Table 1–2 shows the percentage share gained by selected countries of the export sales of manufactured goods from 1969 to 1980 and from 1980 to 1992, as well as over the whole period. The yearly performances of the different countries vary noticeably, particularly at the extremes. On the whole, though, it reinforces the main message of Table 1–1. Japan again demonstrated its improvement in the manufacturing sector, showing by far the largest improvement in the period reviewed. Germany's strong export position remained fairly constant throughout. The declines in the United Kingdom and United States (the countries that respectively preceded Japan as the world's number-one manufacturing nation) are very marked. And, in between, the steady improvement by a number of West European countries sets an important benchmark.

To complete this initial review, export-import trade ratios are given in Table 1–3 to provide an insight into relative trading performances of main manufacturing nations. Table 1–4 shows the trade balance in 1990 for electronic products for the United States, Canada, and selected Asian countries, some of which are emerging as part of the new wave of competition.

For the United States in particular the overall manufacturing position is worrying. The country has been a net importer of manufactured goods since the late 1960s, although it has shown improvement between the mid-1980s and early 1990s. Most West European countries (with the exception of the United Kingdom) have maintained favorable ratios throughout the 1970s and 1980s, but in all instances the trend has shown a worsening position. Throughout, Japan has maintained a sizable lead, even though it was significantly lower in 1990 than in previous years.

TABLE 1–2 Selected Countries' Exports of Manufactured Goods (percentage share)*

Year	*Canada*†	*France*	*Germany*	*Italy*	*Japan*	*United Kingdom*	*United States*
1969	—	8.2	19.1	7.3	11.2	11.2	19.2
1975	4.3	10.2	20.3	7.4	13.6	9.1	17.7
1980	4.0	10.0	19.9	7.9	14.9	9.7	17.0
1985	6.2	8.5	18.6	7.8	19.7	7.8	16.8
1988	5.1	9.0	19.5	8.2	18.3	8.4	15.3
1989	4.9	8.8	20.4	8.4	17.5	8.2	16.1
1990	4.5	9.7	20.5	8.6	15.8	8.6	15.8
1991	4.4	9.6	19.6	8.4	16.9	8.5	17.0
1992‡	4.4	9.7	19.4	8.6	17.4	8.2	17.0
+ (−) % Change,							
1969–80	(7)	22	4	8	33	(13)	(11)
1980–92	10	(3)	(3)	9	17	(15)	—
1969–92	2	18	2	18	55	(27)	(14)

*— = not available.

†The 1969 comparisons for Canada are based on 1975 figures.

‡1992 figures are based on the fourth quarter of the year.

SOURCE: Central Statistical Office, *Monthly Review of External Trade Statistics* 14 (November 1976); 96 (December 1983); and 201 (October 1992).

TABLE 1–3 Export/Import Ratio for Selected Sectors (1984 and 1990) and Total Manufacturing (1972, 1984, and 1990)*

	Aerospace		**Electrical/ Electronic Industry**		**Office Machinery and Computers**		**Drugs**		**Total Manufacturing**		
Country	*1984*	*1990*	*1984*	*1990*	*1984*	*1990*	*1984*	*1990*	*1972*	*1984*	*1990*
Australia	0.11	0.07	0.07	0.12	0.04	0.09	0.34	0.25	—	0.54	0.46
Canada	0.65	1.25	0.47	0.46	0.40	0.46	0.34	0.25	—	1.01	0.94
France	2.21	1.43	1.12	0.91	0.69	0.59	1.93	1.39	1.10	1.11	0.94
Germany	1.05	0.87	1.45	1.25	0.87	0.66	1.74	1.61	1.53	1.42	1.30
Italy	1.09	1.15	1.19	0.86	0.74	0.82	0.97	0.55	1.31	1.24	1.10
Japan	0.10	0.15	10.55	5.62	5.61	3.96	0.27	0.32	2.82	2.78	1.88
United Kingdom	1.43	1.14	0.73	0.83	0.73	0.84	2.14	1.94	1.09	0.81	0.83
United States	2.98	3.26	0.52	0.69	1.83	0.95	1.70	1.56	0.84	0.63	0.75

*— = not available.

SOURCE: OECD, *Main Science and Technology Indicators*, 1974, 1984, and 1992 (3).

TABLE 1–4 Trade Balance in 1985 and 1992 for Electronic Equipment and Components for Selected Countries ($ millions)*

Country	*1985*	*1992*
Australia	(2.6)	(4.3)
Canada	(6.7)	(6.4)
Hong Kong	1.3	2.9
Japan	37.1	60.6
Malaysia	0.7	4.0
Singapore	1.1	7.1
South Korea	2.0	9.0
United States	(14.5)	(19.5)

*Electronic equipment includes electronic data processing, office equipment, controls and instruments, medical, industrial, military, communications, consumer, and telecommunications. Components comprise active, passive, and other.

†The trade balance is calculated by subtracting the value of imports from the value of exports. Figures in brackets indicate an unfavorable balance.

SOURCE: 1988 and 1992 *Yearbook of World Electronic Data* (Elseveir, England).

Table 1–4 highlights one of the more recent and important sectors of manufacturing, that of electronics. It shows that some of the emerging industrial nations are effectively competing in export markets with small but improving trade balances in this important sector. The United States, meanwhile, again shows a worsening picture in terms of its competitive position in world markets.

The United States' decline in world industrial markets is there for all to see—loss of market share abroad, increased imports at home. U.S. industry has performed badly for a long time, whatever measure is used.

Against this background of decline, it is interesting to note that successive U.S. administrations have tended to act on the sometimes painful premise that exposure to overseas competition is a necessary ingredient for the development of a strong, domestic manufacturing base. Of deep concern, however, is that manufacturing industry's response to that exposure has been woefully slow. Many firms have complained about "unfair" external competition and focused on domestic rather than overseas competitors. They have adopted inadequate, reactive strategies because they have not appreciated the consequences for manufacturing. Typically, they have filled capacity by chasing orders, increasing variety, and reducing batch sizes, leaving overseas competitors with substantial advantages in the higher-volume segments of their markets. One outcome has been the loss of high-volume markets such as motorcycles, automobiles, trucks, and shipbuilding: the nations that are prospering have often built their wealth base in these sectors.

Many business have failed to recognize, until too late, that the sellers' markets of the 1950s and 1960s have long since passed. They typically became entangled in the period of transition during the 1970s and 1980s. Businesses must now require new strategies that aim to gain and maintain some specific and significant advantages against the most, not the least, powerful competitors.

While the United States in particular was being buffeted by this new competitive surge, some countries seemed to have moved from strength to strength. Of deeper concern still for the United States, the United Kingdom, and other nations with long manufacturing traditions are the facts underlying these trends, especially that of comparative productivity.

Productivity: National Comparisons

A nation's prosperity depends on its comparative productivity. The past two decades of increasing competition have brought this sharply into focus. Although not a precise measure, it affords a way of assessing trends both for the performance of individual countries and their relative positions in appropriate world rankings.

Thus, there are two important dimensions of a productivity slowdown for any nation. The first is the rate of the slowdown itself; the second is the cumulative effect of the slowdown on the comparative level of productivity between a country and its competitors.

When a nation's growth rate lags substantially behind that of other industrialized countries for a protracted period, its standard of living will decline and companies will find themselves at a serious competitive disadvantage. If this condition goes unchecked, recovery will be increasingly difficult to achieve and breaking free from the downward spiral will be a major task. For the first time in its history, the United States is facing the real prospect that its next generation will fail to enjoy a marked improvement in living standards compared with today and may even experience a decline.

Productivity measures the relationship between outputs (in the form of goods and services produced) and inputs (in the form of labor, capital, material, and other resources). Although in practice productivity is not so simple to measure because of the global nature of the figures involved, it does provide an overall review of improvement that lends itself to trend analysis. Two types of productivity measurement are commonly used: labor productivity and total-factor or multifactor productivity. Labor productivity measures output in terms of hours worked or paid for. Total-factor or multifactor productivity not only includes the labor input but also all or some of the plant, equipment, energy, and materials. However, when there is a change in a single-factor productivity ratio, it is important not to attribute the change solely to that one input. Owing to the interrelated nature of the total inputs involved, the change may well be influenced by any or all of the many variables that could contribute to the change. For example, production methods, capital investment, process technology, labor force, managerial performance, capacity utilization, material input/usage rates, capacity scale, and product mix are all potential contributors to productivity