

The Japanese Iron and Steel Industry, 1850-1990

Continuity and Discontinuity

Seiichiro Yonekura

Associate Professor of Business History

Institute of Business Research

Hitotsubashi University

Tokyo

M

St. Martin's Press

Contents

<i>List of Tables</i>	xii
<i>List of Figures</i>	xiv
<i>Acknowledgements</i>	xv
<i>Photographs of Oshima Takato, Noro Kageyoshi, Imaizumi Kaichiro and Nishiyama Yataro</i>	xix
1 Introduction	1
1.1 A Quantitative Survey	1
1.1.1 Productivity	2
1.1.2 Economies of Scale	4
1.1.3 Technological Innovations	7
1.2 The Question of MITI-Led Growth	11
1.3 Prewar and Postwar Periods: Continuity and Discontinuity	15
2 Oshima Takato and the Beginning of Modern Ironmaking	18
2.1 Oshima Takato: Father of the Japanese Iron and Steel Industry	19
2.2 The Kamaishi as a State-owned Works	22
2.3 Failure of the Kamaishi Works and Technological Accumulation	25
3 Establishment of the State-owned Yawata Works	32
3.1 Military Tension with China and the Need for a National Steel Works	32
3.2 The State-owned Yawata Works	35
3.3 Technological Development of the Yawata Works	38
3.3.1 Early Problems	39
3.3.2 Independence from German Technology and Japanese Adaptation	42

3.4	Organisational Development of the Yawata ¹ Works	46
3.5	Military Expansion and Resources Procurement in Asia	51
3.6	Significance and Limitation of the Yawata Works	54
4	Establishment of the Industry: Yawata as a Business Incubator	57
4.1	Economic Growth and Yawata's Expansion	57
4.2	Steel Producers for the Navy and the National Railway Bureau	59
4.2.1	Sumitomo Copper and Sumitomo Steel Casting	60
4.2.2	Kobe Steel (Kobe Seiko-sho)	62
4.2.3	Kawasaki Shipbuilding's Hyogo Steel Works	63
4.2.4	Nihon Seiko-sho	64
4.3	Firms Specialising in Blast Furnace Operation	66
4.3.1	Tanaka's Kamaishi Works	66
4.3.2	Hokkaido Coal and Shipping Company's Wanishi Iron Works	67
4.4	Firms Catering to Domestic Needs Yawata Could Not Meet	68
4.4.1	Nihon Kokan Kabushiki-kaisha	68
4.5	Firms Established in China, Manchuria, and Korea	70
4.5.1	Han Yeh Ping Coal and Iron Company in China	70
4.5.2	SMRC's Anshan Works in Manchuria	72
4.5.3	Ben Xi Hua Coal and Iron Company	72
4.5.4	Mitsubishi Steel's Kenjiho Iron Works in Korea	73
4.6	Characteristics of the Emerging Industry: Yawata Works as an Incubator	73
4.7	The Industry's Distribution System	75

5	Impact of the First World War: Government, Zaibatsu, and Technology	78
5.1	Governmental Promotion of the Industry	78
5.2	The Unbalanced Development between Iron and Steel Production	88
5.3	Merger and Affiliation under the <i>Zaibatsu</i> Umbrella	93
5.4	Development of Original Technologies	98
5.4.1	The Iron and Steel Institute of Japan: A Technological Network	98
5.5	Education and Training	100
5.6	The Beginnings of Technological Continuity	104
5.6.1	Iron Ore Preparation Technology	104
5.6.2	The Energy-efficient Coke Oven	106
5.6.3	The Large Blast Furnace	107
6	Establishment of Japan Steel: Privatisation of Yawata	109
6.1	Government Protection and Tariffs	109
6.2	Iron Subsidisation and Cartelisation	117
6.2.1	Subsidisation	120
6.2.2	The Iron Cartel	124
6.2.3	Steel Cartels	129
6.3	The Showa Depression and the Industry-wide Merger	132
6.3.1	Industrial Rationalisation and the Show a Depression	132
6.3.2	The Economic Policy of Takahashi Korekiyo and Tariff Increases	136
6.3.3	The Controversy over the Consolidation	141
6.4	Japan Steel Corporation: A Half Solution to the Problem	149
6.4.1	Significant Contributions of the Japan Steel Corporation	151
7	The Second World War and the Controlled Economy	156
7.1	War Preparations and Capacity Expansion	156
7.2	The Cabinet Planning Board and the Early Hierarchy of Control	165

7.3	The Southward Invasion and the American Embargo on Scrap	170
7.4	The New Economic Structure and the Iron and Steel Control Association	172
7.5	The Controlled Economy and Private Firms	180
7.5.1	Japan Steel Corporation	180
7.5.2	NKK (Nippon Kokan Kabushiki-kaisha)	182
7.5.3	Kawasaki Heavy Industries	184
7.5.4	Kobe Steel and Sumitomo Metal Industries	185
7.6	What the Government and the Industry Learned	186
8	The Postwar Struggle of the Industry	189
8.1	'Japan Does Not Need Its Costly Iron and Steel Industry'	189
8.2	The Dodge Line as a Paradigm for Change	194
8.3	Break-up of Japan Steel and the Establishment of Kawasaki Steel	197
8.4	The Economic Purge and the Rise of New Management	200
8.5	Nishiyama's Three Innovations	207
8.6	Dynamic Interaction between Continuity and Discontinuity	209
9	A New Competitive Model and Innovations: The Development of the Industry	212
9.1	Expansion Plans of the Industry	212
9.2	Innovation Begets Innovation	219
9.3	In the Footsteps of Nishiyama's Model	222
9.4	Coordination and Competition	226
9.5	The 1970 Structural Change: 'The Sumitomo Rebellion' and Establishment of Nippon Steel	232
10	Diversification and Globalisation: – Struggle for Survival	239
10.1	The 'Nixon Shocks' and the Oil Crisis	239
10.2	The Quality Control Circle Movement: Innovation through Group Dynamics	243
10.2.1	Case 1: Technological Extension of the	

	Basic Oxygen Furnace's Durability	248
10.2.2	Case 2: Re-use of Oil in the Rolling Process	250
10.3	The 1980s: The 'Age of Winter' for the Large Integrated Firms	253
10.3.1	The Invasion of Steel from Developing Countries and the Minimills	254
10.4	Rationalisation and Diversification Measures	256
10.4.1	Technological Inductive Leap	258
10.5	Globalisation of the Industry	262
11	Conclusion: Continuity and Discontinuity	273
11.1	A Summary of the Industry's Initial Development	273
11.2	A New Business-Government Relationship	277
11.3	Postwar Development: A Historical Solution and a New Competitive Model	278
11.4	The Dynamics of Continuity and Discontinuity	280
11.5	Beyond the Product Cycle	282
	<i>Notes and References</i>	284
	<i>Bibliography</i>	308
	<i>Index</i>	317