
Contents

Acknowledgments	xi
Introduction	xiii
Part 1. Industrialization and its Conceptualizations	1
Introduction to Part 1	3
Chapter 1. The Notion of Industrialization and Other Related Notions	5
1.1. The notion of industrialization.	5
1.1.1. The birth of the notion of industrialization	5
1.1.2. Industrialization according to economists	8
1.1.3. Industrialization according to management sciences	18
1.1.4. Sociologies of technology and knowledge	20
1.1.5. Industrialization according to technological historians.	21
1.1.6. The objectives of histories of technology.	23
1.1.7. The different histories of technology	28
1.1.8. The synthesis of these contributions: continuity or discontinuity?	35
1.2. The links between industrialization, technological revolutions and machinism	37
1.2.1. Industrialization and industrial revolutions.	37
1.2.2. Industrialization and the various revolutions.	38
1.2.3. Industrialization and machinism	38

Chapter 2. Social Dynamics, Shared Inventions and Competitive Innovations	41
2.1. Social dynamics	42
2.1.1. The glorification of arts and crafts: from guilds to arts and crafts communities.	43
2.1.2. The defense and glory of nations.	47
2.1.3. The links between technology, social relations and people at work	48
2.2. Evolution of the notions of technological change, invention and innovation.	50
2.2.1. Technological changes and the temptation of symbols and representations.	50
2.2.2. The ambiguities of the notion of invention.	51
2.2.3. The enigmas of innovation	52
2.2.4. The end of the technological change/invention/innovation triangle?	53
2.3. Shared inventions	55
2.3.1. From the sharing of inventions to shared inventions	55
2.3.2. The first definitions of shared inventions.	56
2.3.3. A definition of shared inventions	57
2.3.4. The trajectories of shared inventions	59
2.4. Competitive innovations	60
2.4.1. The first definitions of competitive innovations	60
2.4.2. The competition principles adopted	61
2.4.3. The trajectories of competitive innovations	62
Part 2. Historical Periods, Social Dynamics, Shared Inventions and Competitive Innovations	65
Introduction to Part 2.	67
Chapter 3. 1698–1760 or the Emergence of Machinism	69
3.1. The situation in 1698	69
3.1.1. Major changes in social relations, religions and manufactories	69
3.1.2. Manufactories and the organization of work in France and England.	71
3.1.3. New models of manufactory organization	72
3.1.4. Performance of manufactories versus development of nations	73
3.1.5. Statement of account	74

3.2. 1698–1760: industrialization and major changes	75
3.2.1. Conflicts between religions and the economy	75
3.2.2. Conflicts between nations	76
3.2.3. The willingness of governments to enact change in public affairs	76
3.3. The precursors and inventions of steam engines	77
3.3.1. The era of the Enlightenment and other imaginative inventors	77
3.3.2. The appearance of the true inventors	78
3.4. Steam engines and shared inventions.	79
3.4.1. The first steam engine and its first patent.	79
3.4.2. The first sharing of steam engines	81
3.5. Coke metallurgy	83
3.5.1. Reinventions.	83
3.5.2. The search for substitutes	83
3.5.3. The invention of puddling.	85
3.6. Sharing around the inventions of the textile industry	87
3.6.1. Weaving and the fly-shuttle.	87
3.6.2. Perforated ribbons and weaving machines	87
3.7. “Printed cotton <i>indiennes</i> ” or copies of inventions and the organization of factories	88
3.7.1. Sectoral characteristics of the shared inventions of this period	91
3.7.2. Strong tensions	93
Chapter 4. 1760–1850 or the Industrial Revolution and its Competitive Innovations	95
4.1. The transition from the emergence of machinism and its shared inventions to the Industrial Revolution and its competitive innovations	95
4.2. The Industrial Revolution and competitive innovations (1760–1850)	96
4.2.1. Competitive innovations.	97
4.2.2. The contradictions of the steam engine industry.	98
4.2.3. The contradictions of the textile sector	100
4.2.4. The inescapable contradictions of machine tool production	103
4.3. 1851: an inventory?	104
Chapter 5. 1850–1914 or the New Shared Inventions and the Birth of the Modern Large Company	107
5.1. The invention of the modern large company	107

5.2. Precursors	109
5.2.1. The “ <i>ébauches</i> ” of Frédéric Japy (1771)	109
5.2.2. Oliver Evans’ “endless mill” (1784)	110
5.2.3. Honoré Blanc’s rifles and the Springfield Armory (1790, 1819)	110
5.2.4. Thomas Tassel-Grant’s “sea biscuits” (1830)	111
5.2.5. The inventions of Mr. Johann Georg Bodmer (1833 onwards)	111
5.3. The Singer Manufacturing Company and the Civil War uniforms	111
5.3.1. The sewing machine, its invention and innovations.	111
5.3.2. The true birth of the sewing machine can be traced from 1849 to 1850	113
5.3.3. The sewing machine and the organization of the company	114
5.4. The Chicago Yards and their integrated slaughterhouses	115
5.4.1. The actors involved in the creation of Union Stock Yards	116
5.4.2. The operating modes of the Union Stock Yards	119
5.5. The Swiss example	121
5.6. An almost totally invented inauguration and improbable analyses	122
5.7. The management of these shared inventions	125
5.7.1. The invention of the commercialization of products	125
5.7.2. The invention of marketing	126
5.7.3. Labor and employee management	127
5.7.4. The importance of the links between management tools and shared inventions	129
Chapter 6. 1914 or the Birth of Extended Machinism.	131
6.1. Major changes in social dynamics	131
6.1.1. World wars.	131
6.1.2. The increasing number of crises	131
6.1.3. Profound changes in terms of social dynamics.	132
6.2. Large shared inventions combined with competitive innovations	134
6.2.1. The irresistible growth of electricity.	134
6.2.2. The extraordinary growth of gas and oil	136
6.2.3. Maritime and air transport.	137
6.2.4. Metallurgy	137
6.2.5. Machine tools	139
6.2.6. Chemistry	140

6.2.7. Agriculture	140
6.2.8. Lifestyles	141
6.2.9. Computing and the reinvention of calculating machines	143
6.2.10. Automation	146
Conclusion	149
References	157
Index	171