

Papermaking Science and Technology

a book series
covering the latest
technology and
future trends

Book 1

Economics of the Pulp and Paper Industry

Second Edition

Totally updated version

Book editor

Magnus Diesen, M.Sc.(Tech.), Retired Executive Vice-President, Stora Enso Oyj, Finland

Publisher

Finnish Paper Engineers' Association/Paperi ja Puu Oy



Paperi ja Puu Oy

Table of Contents

1.	Main characteristics of the global pulp and paper industry.....	9
2.	Impact of the forest industry on the economies of Finland and Sweden.....	18
3.	World paper markets	32
4.	Fibre demand and outlook	54
5.	Raw material resources – forests and wood supply	65
6.	Raw material resources – recovered paper	80
7.	Energy resources and consumption	90
8.	Structure of the global pulp and paper industry and main suppliers 2005-2006.....	99
9.	Financial valuation and analysis.....	130
10.	Investment decisions.....	158
11.	Economy of scale.....	175
12.	Economy of integration	184
13.	Currency exchange rates and risk management	192
14.	Future strategies for the Nordic pulp and paper industry	207
	Clossary	216
	Converson factors.....	220
	Index	221

CHAPTER 1

Main characteristics of the global pulp and paper industry

1	General	10
2	Typical features of the pulp and paper industry	11
2.1	Growth	11
2.2	Technical development	11
2.3	Globalisation	12
2.4	Cyclical nature of the pulp and paper industry	12
2.5	High investment rates	13
3	Opportunities for the pulp and paper industry	14
4	Challenges to the pulp and paper industry	15
	Sources	17

CHAPTER 2

Impact of the forest industry on the economies of Finland and Sweden

1	Finland	19
1.1	General.....	19
1.2	Past and present production.....	19
1.3	Exports.....	20
1.4	Forest increment and drain.....	22
1.5	Labour force and productivity.....	24
1.6	Investments.....	25
1.7	Environment.....	25
1.8	Profitability.....	26
1.9	Comparison to other countries.....	26
2	Sweden	27
2.1	General.....	27
2.2	Past and present production.....	27
2.3	Exports.....	28
2.4	Forest increment and drain.....	28
2.5	Labour force and productivity.....	29
2.6	Investments.....	30
2.7	Environment.....	30
2.8	Comparison to other countries.....	30
	Sources.....	31

CHAPTER 3

World paper markets

1	Introduction.....	33
2	Definitions	33
2.1	Bulk products	33
2.2	Speciality products.....	34
2.3	Specification of main paper grades	35
3	Driving forces of demand	35
4	Global paper demand	38
5	Demand outlook for main paper grades	40
6	International trade flows	44
7	Price trends 1990-2006	45
7.1	General.....	45
7.2	Newsprint and mechanical printing paper	45
7.3	Woodfree printing and writing papers	46
7.4	Containerboard and cartonboard.....	47
7.5	Price stability 1995-2002	48
8	Sales and marketing of paper.	48
9	Criteria for establishing new capacity	49
	Sources/References.....	53

CHAPTER 4

Fibre demand and outlook

1	Introduction.....	55
2	Consumption trends	56
3	Production trends	58
4	Pulp industry structure.....	59
5	Pricing	62
	Sources/References.....	64

CHAPTER 5

Raw material resources – forests and wood supply

1	Introduction.....	66
2	Forest area	66
3	Forest harvest and use of wood.....	68
4	Certification	68
5	Wood supply.....	69
5.1	Terminology	69
5.2	Europe	69
5.3	Canada	71
5.4	United States	72
5.5	Other areas	73
6	Plantations	73
6.1	South America	74
6.2	Asia and Oceania	75
7	Wood costs	76
7.1	Definitions	76
7.2	Regional average costs	76
	Sources/References.....	79

CHAPTER 6

Raw material resources – recovered paper

1	Introduction.....	81
2	Definitions.....	81
3	Global recovery and supply.....	83
4.	Trade flows.....	86
5	Recovered paper prices.....	87
6	Recovered paper users and suppliers.....	88
	Sources.....	89

CHAPTER 7

Energy resources and consumption

1	Introduction.....	91
2	Global energy outlook.....	91
3	Carbon dioxide emissions	93
4	Kyoto protocol.....	95
5	Electricity consumption of the pulp and paper industry.....	96
5.1	Paper	96
5.2	Pulp	96
	Sources	98

CHAPTER 8

Structure of the global pulp and paper industry and main suppliers 2005-2006

1	General	100
2	Technical structure based on production capacity.	104
2.1	Chemical pulp.....	104
2.2	Paper and board	105
3	Production structure by grade and region	110
4	Global paper machine asset quality 2005.....	111
5	Average paper machine size vs. state-of-the-art machine size in North America and Europe 2005	112
6	Main suppliers and companies 2005	112
6.1	Total paper and board	112
6.2	Main suppliers by grade.....	113
7	Changing industrial structure	117
7.1	General.....	117
7.2	Major mergers and acquisitions	121
7.2.1	Global mergers and acquisitions activity	121
7.2.2	Driving forces for mergers and acquisitions in the pulp and paper industry	121
7.2.3	Mergers and acquisitions in the pulp and paper industry.....	122
8	Characteristics of major pulp and paper industry companies	124
8.1	General.....	124
8.2	Financial Results 1999-2005	124
8.3	Investment behaviour and structural changes 1999-2005	126
	Sources	129

CHAPTER 9

Financial valuation and analysis

1	Introduction and principles	131
2	Definitions	132
3	Business performance	137
4	Valuation	141
5	Factors affecting ROCE.....	143
6	ROCE development in selected countries 1999-2005.....	144
7	Investment behaviour in selected countries	146
8	Management accounting.....	149
8.1	Definition	149
8.2	Analysis and examples.....	149
9	Factors affecting production rate	154
10	Evaluation of development investments.....	156
11	Distribution of economic information to the operating floor	157

CHAPTER 10

Investment decisions

1	General	159
2	Capital expenditure projects	160
2.1	Definition of investment categories	160
2.2	Capex planning process	160
2.3	Profitability and competitiveness criteria	162
2.4	Project implementation	169
2.5	Criteria for selecting new equipment.....	169
3	Mergers and acquisitions (M&A)	171
3.1	Features of M&A transactions	171
3.2	M&A processes.....	172
	References	174

CHAPTER 11

Economy of scale

1	Definition and description	176
2	Economy of scale of a pulp mill	178
3	Economy of scale of a paper mill.....	179
4	Economy of scale in two-line paper mills	180
5	Minimill concept	181
6	Economy of scale of speciality paper mills	182
7	Future development of economy of scale.....	182

CHAPTER 12

Economy of integration

1	Definitions	185
2	Financial integration	185
2.1	Degree of financial integration	186
2.2	Main objectives of financial integration	186
2.2.1	Streamlining of production	186
2.2.2	More efficient use of investment funds.....	187
2.2.3	Lessening the impact of cyclical variations.....	187
3	Vertical integration	188
4	Two common development strategies of the pulp and paper industry	191

CHAPTER 13

Currency exchange rates and risk management

1	Currency exchange rates.....	193
1.1	Introduction	193
1.2	Definitions	193
1.3	Historical aspects of the Western monetary system.....	196
1.4	Factors affecting exchange rates.....	197
1.5	Purchasing power parity	198
1.6	Conclusions	201
2	Risk management.....	202
2.1	Introduction	202
2.2	Features of risk management.....	202
2.3	Hedging methods and instruments.....	204
2.4	Case examples	205

CHAPTER 14

Future strategies for the Nordic pulp and paper industry

1	Global trends 1990-2006	208
2	Trends in Europe 1990-2006.....	210
3	Future trends.....	212
4	Conclusions	215

The pulp and paper industry is the 11th largest manufacturing industry in the U.S. industrial sector, but is the third largest energy consumer. Unlike other industries, however, the pulp and paper industry can generate a large percentage of its energy needs through the use of wood residue. As a result, the industry is in a unique position to reduce its purchased energy costs, as well as its vulnerability to fuel shortages and/or disruptions. Economics of Paper Products Production. Product Demand. Because the paper industry has a wide spectrum of end products, its growth patterns closely resemble those of the general economy. The pulp and paper industry comprises companies that use wood as raw material and produce pulp, paper, paperboard and other cellulose-based products. The pulp is fed to a paper machine where it is formed as a paper web and the water is removed from it by pressing and drying. Pressing the sheet removes the water by force. Once the water is forced from the sheet, a special kind of felt, which is not to be confused with the traditional one, is used to collect the water. Whereas, when making paper by hand