

Contents

1. The crucial question: to invest or not to invest in research?	1
2. Characteristics of research.....	13
2.1 Problems of measurement and definition	13
2.2 Appropriability and transferability of research results	19
2.3 Specific risks of research.....	26
2.4 Specific benefits from research.....	28
3. Reasons for research.....	31
4. Research as a source of potentials.....	41
5. Research potentials and project funding decisions	51
6. On property rights and project potentials.....	61
7. Research potentials and relative share of research	63
7.1 Mandatory research	64
7.2 Mandatory research and transfer cost.....	66
7.3 Supportive research	68
7.4 Tests of the basic relationships.....	68
7.5 Estimates of research elasticities	71
7.6 Limits to research expenditure	76
8. On sufficient conditions for research success	79
9. Primary research potentials as a necessary condition for research success.....	85
9.1 A taxonomic approach.....	85
9.2 Diagnosis of trouble.....	94
9.3 Suggestions for building potentials.....	99

9.4	How much attention for each function?	110
10.	On locating research.....	113
10.1	Qualitative analysis	113
10.2	Modeling the location decision.....	119
11.	Conclusions.....	123

Appendix

Basic research expenditures as a percentage of total research and development expenditures in major industrialized countries, 1971-1993	131
Nominal and real industrial research expenditure in three countries (Germany, Japan, U.S.).....	132
The relationship between the share of industrial research expenditures and the interest rate in Germany for three industries, 1965-1991	136
Example of a Mission Statement.....	137
Literature.....	139

List of Figures

1.	Basic industrial research as a share of the total industrial R&D expenditure in three industrialized countries.....	14
2.	Basic and applied industrial research as a share of industrial R&D expenditures in Japan and the U.S., 1981-1993	18
3.	Share of direct industrial research funding and level of industry's influence on the choice of topics in publicly funded research institutions, such as universities	22
4.	Functions of corporate research	33
5.	A comparative overview of studies on functions of industrial research.....	40
6.	A sketch of our concept.....	42
7.	Distribution of sources of R&D funds	49
8.	The system of company research potentials.....	50
9.	Example of funding by projects and potentials.....	54
10.	Project funding form.....	57
11.	Interdependencies between Nokia Central Research (NCR), top management and the business units (BU's).....	58
12.	Finmeccanica's process of technology planning	60
13.	Relative impacts of relative budget changes (Elasticities)	75
14.	A sketch of the process for securing sufficient conditions for research success	84
15.	Relevance and accessibility of external sources of research in Germany	103

16.	A process view for improving the necessary conditions for research performance.....	109
17.	Views of the budgeting process	127

List of Tables

1.	Major basic research laboratories in the Japanese electronics industry	11
2.	Functions of research in 26 German companies	35
3.	Comparison of German and U.S. perceptions of research functions	36
4.	Actual and ideal performance of research functions as seen by 17 research managers in Europe and 20 in Japan.....	37
5.	The relevance of scientific fields to technology in the U.S.	39
6.	Funding procedures in central R&D laboratories of 53 large German companies	53
7.	The relationship between the share of industrial research expenditure and the interest rate in Germany, 1965-1991	70
8.	A characterization of necessary conditions for research success with low relative technological position	88
9.	A characterization of necessary conditions for research success with high relative technological position (1).....	89
10.	A characterization of necessary conditions for research success with high relative technological position (2).....	90
11.	A characterization of necessary conditions for research success with high relative technological position (3).....	92
12.	A characterization of necessary conditions for research success with high relative technological position (4).....	93