Contents

Foreword		Xi
P	reface	xiii
A	cknowledgements	xv
PART I		
1	Introduction	3
2	Industrial Research and Development at Project Level in	
	the Modern Corporation	9
	Industrial Innovative Activity: Concepts and	
	Classification	10
	The Rational Model of Innovation	13
	Uncertainties in the Innovation Process	17
	Hierarchical Arrangement of Sub-Systems	23
	Linkages between R & D Sub-Systems, and Project	
	Uncertainty	24
	Summary	28
3	Models of Technological Change in the Firm	30
	The Neoclassical Theory of the Firm	31
	Research and Development as Uncertain Activity	36
	R & D Residual: Penrose and the Behavioural Theories	41
	General System Theory Classification of Models and	
	Systems	47
	Summary	56
4	Industrial Research and Development at Functional	
	Level in the Modern Corporation	58
	The Evolution of the Modern Corporation	59
	The Firm and its Environment: Evolution of Organi-	
	sational Hierarchy	65
	The R & D Function and the Institutionalisation of	
	Technological Change	68

viii Contents

	Managerial Preference for R & D Sub-Systems	7 7
	Summary	83
5	The Framework	85
	Abstraction in Interpretation of Complex Systems Nature and objectives of Corporate Resource	87
	Allocations	91
	The Derivation of the Preference System	95
	A Framework for Intra-Firm Resource Allocation	98
	Hierarchical Structure of Preference System	110
	Conclusions	112
P	ART II	115
6	Budget Decision-Making for Research and Development Requirements for Establishment of Stable Preference	117
	for R & D Resources	119
	Implications of Stable Preferences for R & D	123
	Summary	125
7	Distribution of R & D and Basic Research Activity in	
	Industry	126
	Corporate Reaction to Changes in the Determinants of R & D Steady States	128
	Determination of R & D Steady States: Hypotheses Determination of Basic Research Steady States:	132
	Hypotheses	146
	Empirical Evidence of Steady State in Industrial	150
	Activity in U.S.	130
	Measurement of the Variables Used to Test	153
	Hypotheses	15.
	Level of Data Aggregation and Functional Forms of	156
	the Regression Equations	160
	Testing the X_{ij} Hypotheses Testing the Basic Research Hypotheses	16
	Testing the Spillover Model	170
	Conclusions	18
8	Rivalry, Learning and Variation in Innovative Activity	18
J	Rivalry and the Imitative Hypothesis	18
	Resource Allocation in the Systems Approach	19.
	Adaptive Learning in Corporate Allocations	19
	Conclusions	20.
	Constantions	۷.

	Contents	1X
9	Technological Change in the Modern Corporation and Implications for Theory of the Firm	206
A	PPENDICES	215
N	Notes	
R	eferences	247
Iı	ndex	263