

Models for Library Management, Decision-Making, and Planning

Robert M. Hayes



Contents

Preface	xvii	e de la companya del companya de la companya del companya de la co
	1.	
1	7 °	
-		
Scientific	Manag	ement 1
Intro	oduction	i 1
1.1	Models 1	to Support Management 2
		Time and Motion Studies 2
	1.1.2	Project Management 3
	1.1.3	Cost Accounting 3
	1.1.4	Systems and Procedures 4
	1.1.5	Operations Research 5
1.2	Model	s for Decision-Making 6
4		Understanding a Decision Problem 6
	1.2.2	Utility Functions 7
	1.2.3	Representation of the Decision Problem 8
	1.2.4	
	1.2.5	
	1.2.6	
	1.2.7	Cooperative Decision-Making 13
		Utility Functions in Cooperative Games 14
		The Mechanism of a Cooperative Game 14
		Risk Factors 15
		Implementation in LPM 16
	1.2.8	Transferable Utilities 16
	1.2.9	
	1.2.10	Econometric Models 18
1.3		s for Planning and Design 18
	1.3.1	Overview 19

	1.3.2	Steps of Systems Analysis 20	
	1.3.3		
	1.3.4	Defining the Scope of the System 22	
	1.3.5		
		The Dimensions of an Information System	23
		Interrelationships Among Dimensions 24	
	1.3.6	Designing Alternate Solutions 24	
		Change in Scope of System of Focus 24	
		Changes in Dimensions of Description 25	
	1.3.7	Evaluation 26	
Bibli	ography	. 27	
	Refere	ences of Historic Interest 27	
	Refere	ences for General Scientific Management 28	
		ences for Systems Analysis , 29.	
	Refere	ences for Management Information Systems 29	
	Refere	ences for General Management 29	
	Refere	ences Reflecting Perversions of Mathematical	
	Mod	deling 30	
_			
2 .		J.	
Library D	ecision-	-Making Contexts 31	
•			
Intro	duction	4 21	•
	duction		•
Intro 2.1	Library	y Operational Management 32	
	Library 2.1.1	y Operational Management 32 Operational Issues 32	22
	Library 2.1.1 2.1.2	y Operational Management 32 Operational Issues 32 Planning and Documenting Operating Budgets	32
	Library 2.1.1 2.1.2 2.1.3	Operational Management 32 Operational Issues 32 Planning and Documenting Operating Budgets Assessing "What-If" Alternatives 33	32
	Library 2.1.1 2.1.2 2.1.3 2.1.4	Operational Management 32 Operational Issues 32 Planning and Documenting Operating Budgets Assessing "What-If" Alternatives 33 Setting Fee Structures 33	32
2.1	Library 2.1.1 2.1.2 2.1.3 2.1.4 2.1.5	Operational Management 32 Operational Issues 32 Planning and Documenting Operating Budgets Assessing "What-If" Alternatives 33 Setting Fee Structures 33 Making Outsourcing Decisions 34	32
	2.1.1 2.1.2 2.1.3 2.1.4 2.1.5 Library	Operational Management 32 Operational Issues 32 Planning and Documenting Operating Budgets Assessing "What-If" Alternatives 33 Setting Fee Structures 33 Making Outsourcing Decisions 34 y Tactical Management 35	32
2.1	Library 2.1.1 2.1.2 2.1.3 2.1.4 2.1.5 Library 2.2.1	Operational Management 32 Operational Issues 32 Planning and Documenting Operating Budgets Assessing "What-If" Alternatives 33 Setting Fee Structures 33 Making Outsourcing Decisions 34 y Tactical Management 35 Tactical Issues 35	32
2.1	2.1.1 2.1.2 2.1.3 2.1.4 2.1.5 Library 2.2.1 2.2.2	Operational Management 32 Operational Issues 32 Planning and Documenting Operating Budgets Assessing "What-If" Alternatives 33 Setting Fee Structures 33 Making Outsourcing Decisions 34 y Tactical Management 35 Tactical Issues 35 Staff Assignment 35	32
2.1	Library 2.1.1 2.1.2 2.1.3 2.1.4 2.1.5 Library 2.2.1 2.2.2 2.2.3	Operational Management 32 Operational Issues 32 Planning and Documenting Operating Budgets Assessing "What-If" Alternatives 33 Setting Fee Structures 33 Making Outsourcing Decisions 34 y Tactical Management 35 Tactical Issues 35 Staff Assignment 35 Collection Growth Management 37	32
2.1	Library 2.1.1 2.1.2 2.1.3 2.1.4 2.1.5 Library 2.2.1 2.2.2 2.2.3 2.2.4	Operational Management 32 Operational Issues 32 Planning and Documenting Operating Budgets Assessing "What-If" Alternatives 33 Setting Fee Structures 33 Making Outsourcing Decisions 34 y Tactical Management 35 Tactical Issues 35 Staff Assignment 35 Collection Growth Management 37 Collection Storage Decisions 37	32
2.1	Library 2.1.1 2.1.2 2.1.3 2.1.4 2.1.5 Library 2.2.1 2.2.2 2.2.3 2.2.4 2.2.5	Operational Management 32 Operational Issues 32 Planning and Documenting Operating Budgets Assessing "What-If" Alternatives 33 Setting Fee Structures 33 Making Outsourcing Decisions 34 Tactical Management 35 Tactical Issues 35 Staff Assignment 35 Collection Growth Management 37 Collection Storage Decisions 37 Space and Facility Planning 38	32
2.1	Library 2.1.1 2.1.2 2.1.3 2.1.4 2.1.5 Library 2.2.1 2.2.2 2.2.3 2.2.4 2.2.5 2.2.6	Operational Management 32 Operational Issues 32 Planning and Documenting Operating Budgets Assessing "What-If" Alternatives 33 Setting Fee Structures 33 Making Outsourcing Decisions 34 Tactical Management 35 Tactical Issues 35 Staff Assignment 35 Collection Growth Management 37 Collection Storage Decisions 37 Space and Facility Planning 38 Information Acquisition Decisions 38	
2.1	Library 2.1.1 2.1.2 2.1.3 2.1.4 2.1.5 Library 2.2.1 2.2.2 2.2.3 2.2.4 2.2.5	Operational Management 32 Operational Issues 32 Planning and Documenting Operating Budgets Assessing "What-If" Alternatives 33 Setting Fee Structures 33 Making Outsourcing Decisions 34 Tactical Management 35 Tactical Issues 35 Staff Assignment 35 Collection Growth Management 37 Collection Storage Decisions 37 Space and Facility Planning 38	
2.1	Library 2.1.1 2.1.2 2.1.3 2.1.4 2.1.5 Library 2.2.1 2.2.2 2.2.3 2.2.4 2.2.5 2.2.6 2.2.7	Operational Management 32 Operational Issues 32 Planning and Documenting Operating Budgets Assessing "What-If" Alternatives 33 Setting Fee Structures 33 Making Outsourcing Decisions 34 y Tactical Management 35 Tactical Issues 35 Staff Assignment 35 Collection Growth Management 37 Collection Storage Decisions 37 Space and Facility Planning 38 Information Acquisition Decisions 38 Balancing Capital Investment and Operating Expense	

	2.2.10	Automated Library Systems Development 42
	2.2.11	Capital Equipment Expenditures 42
2.3	Librar	y Strategic Management 43
	2.3.1	Strategic Issues 43
	2.3.2	Institutional Policy Effects 43
	2.3.3	Interlibrary Cooperation Effects 43
	2.3.4	National Information Policy Effects 43
2.4	Data A	Acquisition for Use in Models 44
	2.4.1	Sources of Data 44
		Published Literature 44
		Published Statistics 44
		Documents for Specific Institutions 45
		Personal Observation and Experiment 45
		Generic Problems with Data 45
	2.4.3	Specific Problems with Data 46
	id age	Problems with Data About Staffing 47
	4.8.7	Problems with Data About Collections 47
		Problems with Data About Budgets and Expenditures
		48
		Problems with Data About Workloads 48
		Problems with Data About Universities 49
	2.4.4	Means for Solving Problems with Data 49
		Use of LPM 49
		Use of Standard Conversion Factors 50
		Use of Imputed Values 51
		Calibration of Data 51
	2.4.5	Summary 51
Bibli	ography	
ņ	Refere	nces for Library Location Analysis 51
	Refere	nces for Outsourcing 52
٠		nces for Data Sources 52
	Refere	nces for Library Applications of Scientific Management
	53	
	Refere	nces for General Library Management 54

The Library Planning Model 58

Introduction 58

3.1 Menu Structure 58 3.1.1 Main Menu

3.2

3.1.2 File Menu 60
3.1.3 Edit Menu 60
3.1.4 View Menu 60
3.1.5 Data Entry Menu 61
Populations Served 61
Materials 61
Services 61
Processes 62
Library Publishing 62
Library Structure 62
3.1.6 Results Menu 64
Staffing 64
Comparison with Actual Staff Distributions 6
Staffing for Publishing 65
Budget 65
Workload Estimates 65
Facilities 65
Allocation Results 65
3.1.7 Modify Menu 66
Modify Definitions 66
Modify Workload Factors 67
Modify Costs 67
Modify Parameters 68
3.1.8 Strategic Menu 68
Institutional 68
Information Publishing and Distribution 68
Information Technology 68
National Information Economy 68
3.1.9 Batch Menu 69
Source File 69 ·
Load Batch 69
Assign LPM Variables to Source Variables 70
Opportunity to Make Changes 70
Select from Batch 71
Process Batch 71
Results from Batch 71
Append to Batch 72
Save Batch File 72
3.1.10 Help Menu 72
Conceptual Structure for Operational Contexts 73
3.2.1 Matrices for Clients and Materials 73
3.2.2 Matrices for Workloads in Library Publishing 73

3.2.3 Roles of Parameters 77 Parameters Related to Materials 77 Parameters Related to Cataloging 77 Parameters Related to User Interaction 78 Parameters Related to Time 78 3.3 Conceptual Structure for Tactical Contexts 78 3.3.1 Matrices for Allocation of Materials 78 Parameters Related to Acquisition vs. Access Elsewhere 79 Parameters Related to Decisions Concepting Allocation to Alternative Means of Storage 80 3.3.2 Allocation of Budgets 81 3.4 Conceptual Structure for Strategic Contexts 81 3.4.1 Matrices for Institutional Context 81 Acquisitions Decisions 81 3.4.2 Matrices for Institutional Context 81 3.4.3 Matrices for Information Production and Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.1 Alternative Bases for Indirect Staff 89 Supervision and Clerical Support to Supervision 97 Training 90		
Distribution of the Use of Publishing Processes 3.2.3 Roles of Parameters 77 Parameters Related to Materials 77 Parameters Related to Cataloging 77 Parameters Related to User Interaction 78 Parameters Related to User Interaction 78 Parameters Related to Time 78 3.3 Conceptual Structure for Tactical Contexts 78 3.3.1 Matrices for Allocation of Materials 78 Parameters Related to Acquisition vs. Access Elsewhere 79 Parameters Related to Decisions Conferening Allocation to Alternative Means of Storage 80 3.3.2 Allocation of Budgets 81 3.4 Conceptual Structure for Strategic Contexts 81 3.4.1 Matrices for Institutional Context 81 Acquisitions Decisions 81 3.4.2 Matrices for Interlibrary Cooperation 83 3.4.3 Matrices for Information Production and Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2.1 Workload Factors 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3 Indirect Labor and Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision 97 Training 90		Types of Populations Served 74
3.2.3 Roles of Parameters 77 Parameters Related to Materials 77 Parameters Related to Cataloging 77 Parameters Related to User Interaction 78 Parameters Related to User Interaction 78 Parameters Related to Time 78 3.3 Conceptual Structure for Tactical Contexts 78 3.3.1 Matrices for Allocation of Materials 78 Parameters Related to Acquisition vs. Access Elsewhere 79 Parameters Related to Decisions Conterning Allocation to Alternative Means of Storage 80 3.3.2 Allocation of Budgets 81 3.4 Conceptual Structure for Strategic Contexts 81 3.4.1 Matrices for Institutional Context 81 Acquisitions Decisions 81 3.4.2 Matrices for Institutional Context 81 3.4.3 Matrices for Information Production and Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3 Indirect Labor and Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision 9		Distribution of the Use of Publishing Processes 75
Parameters Related to Cataloging 77 Parameters Related to User Interaction 78 Parameters Related to Time 78 3.3 Conceptual Structure for Tactical Contexts 78 3.3.1 Matrices for Allocation of Materials 78 Parameters Related to Acquisition vs. Access Elsewhere 79 Parameters Related to Decisions Contexting Allocation to Alternative Means of Storage 80 Allocation of Budgets 81 Acquisitions Decisions 83 A.4.2 Matrices for Institutional Context 81 Acquisitions Decisions 83 A.4.4 Matrices for Information Production and Distribution 83 A.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90		3.2.3 Roles of Parameters 77
Parameters Related to Cataloging 77 Parameters Related to User Interaction 78 Parameters Related to Time 78 3.3 Conceptual Structure for Tactical Contexts 78 3.3.1 Matrices for Allocation of Materials 78 Parameters Related to Acquisition vs. Access Elsewhere 79 Parameters Related to Decisions Contexting Allocation to Alternative Means of Storage 80 Allocation of Budgets 81 Acquisitions Decisions 83 A.4.2 Matrices for Institutional Context 81 Acquisitions Decisions 83 A.4.4 Matrices for Information Production and Distribution 83 A.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90		Parameters Related to Materials 77
Parameters Related to User Interaction 78 Parameters Related to Time 78 3.3 Conceptual Structure for Tactical Contexts 78 3.3.1 Matrices for Allocation of Materials 78 Parameters Related to Acquisition vs. Access Elsewhere 79 Parameters Related to Decisions Conterning Allocation to Alternative Means of Storage 80 Allocation of Budgets 81 Acquisitions Decisions 83 A.4.2 Matrices for Institutional Context 81 Acquisitions Decisions 83 A.4.4 Matrices for Information Production and Distribution 83 A.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90		
Parameters Related to Time 78 3.3 Conceptual Structure for Tactical Contexts 78 3.3.1 Matrices for Allocation of Materials 78 Parameters Related to Acquisition vs. Access Elsewhere 79 Parameters Related to Decisions Concerning Allocation to Alternative Means of Storage 80 3.3.2 Allocation of Budgets 81 3.4 Conceptual Structure for Strategic Contexts 81 3.4.1 Matrices for Institutional Context 81 Acquisitions Decisions 81 3.4.2 Matrices for Interlibrary Cooperation 83 3.4.3 Matrices for Information Production and Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision 9		Parameters Related to User Interaction 78
3.3.1 Matrices for Allocation of Materials 78 Parameters Related to Acquisition vs. Access Elsewhere 79 Parameters Related to Decisions Concerning Allocation to Alternative Means of Storage 80 3.3.2 Allocation of Budgets 81 3.4 Conceptual Structure for Strategic Contexts 81 3.4.1 Matrices for Institutional Context 81 Acquisitions Decisions 81 3.4.2 Matrices for Interlibrary Cooperation 83 3.4.3 Matrices for Information Production and Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision 9		
3.3.1 Matrices for Allocation of Materials 78 Parameters Related to Acquisition vs. Access Elsewhere 79 Parameters Related to Decisions Concerning Allocation to Alternative Means of Storage 80 3.3.2 Allocation of Budgets 81 3.4 Conceptual Structure for Strategic Contexts 81 3.4.1 Matrices for Institutional Context 81 Acquisitions Decisions 81 3.4.2 Matrices for Interlibrary Cooperation 83 3.4.3 Matrices for Information Production and Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision 9	3.3	
Parameters Related to Acquisition vs. Access Elsewhere 79 Parameters Related to Decisions Concerning Allocation to Alternative Means of Storage 80 Allocation of Budgets 81 3.4 Conceptual Structure for Strategic Contexts 81 3.4.1 Matrices for Institutional Context 81 Acquisitions Decisions 81 3.4.2 Matrices for Interlibrary Cooperation 83 3.4.3 Matrices for Information Production and Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision 9		3.3.1 Matrices for Allocation of Materials 78
Parameters Related to Decisions Concerning Allocation to Alternative Means of Storage 80 3.3.2 Allocation of Budgets 81 3.4 Conceptual Structure for Strategic Contexts 81 3.4.1 Matrices for Institutional Context 81		
Parameters Related to Decisions Concerning Allocation to Alternative Means of Storage 80 3.3.2 Allocation of Budgets 81 3.4 Conceptual Structure for Strategic Contexts 81 3.4.1 Matrices for Institutional Context 81 Acquisitions Decisions 81 3.4.2 Matrices for Interlibrary Cooperation 83 3.4.3 Matrices for Information Production and Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision 9		Elsewhere 79
Allocation to Alternative Means of Storage 80 3.3.2 Allocation of Budgets 81 3.4 Conceptual Structure for Strategic Contexts 81 3.4.1 Matrices for Institutional Context 81 Acquisitions Decisions 81 3.4.2 Matrices for Interlibrary Cooperation 83 3.4.3 Matrices for Information Production and Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision 90		. #
3.3.2 Allocation of Budgets 81 3.4 Conceptual Structure for Strategic Contexts 81 3.4.1 Matrices for Institutional Context 81 Acquisitions Decisions 81 3.4.2 Matrices for Interlibrary Cooperation 83 3.4.3 Matrices for Information Production and Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision 9		
3.4 Conceptual Structure for Strategic Contexts 81 3.4.1 Matrices for Institutional Context 81		3.3.2 Allocation of Budgets 81
3.4.1 Matrices for Institutional Context 81 Acquisitions Decisions 81 3.4.2 Matrices for Interlibrary Cooperation 83 3.4.3 Matrices for Information Production and Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision 9	3.4	
Acquisitions Decisions 81 3.4.2 Matrices for Interlibrary Cooperation 83 3.4.3 Matrices for Information Production and Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90		3.4.1 Matrices for Institutional Context 81
3.4.2 Matrices for Interlibrary Cooperation 83 3.4.3 Matrices for Information Production and Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90	•	
3.4.3 Matrices for Information Production and Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90		
Distribution 83 3.4.4 Matrices for National Policy 83 4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90		3.4.3 Matrices for Information Production and
4 Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90		
Library Operational Requirements 84 Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90		
Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90		1. Take to 101 Tracional Folicy (1)
Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90		
Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90		
Introduction 84 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90	T .	
 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90 	Library O	perational Requirements 84
 4.1 Approaches to Staff Estimation 84 4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90 	Intro	oduction 84
4.1.1 Time and Motion Studies 85 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90		
 4.1.2 Direct FTE Staff Accounting 85 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90 	•	
 4.1.3 Total Staff Budget 86 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90 		
 4.2 Direct Labor and Costs 86 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90 		41.3 Total Staff Budget 96
 4.2.1 Workload Factors 86 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90 	4.2	
 4.2.2 Determining Values for Workload Factors 87 4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision 7 Training 90 		
4.2.3 Direct Costs 88 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision 90		
 4.3 Indirect Labor and Costs 88 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision Training 90 		4 2 3 Direct Costs 88
 4.3.1 Alternative Bases for Allocation of Indirect Costs 88 4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision 7 Training 90 	4 3	
4.3.2 Workload Factors for Indirect Staff 89 Supervision and Clerical Support to Supervision 9 Training 90		
Supervision and Clerical Support to Supervision 9 Training 90		4.3.2 Workland Factors for Indicate Suff. 20
Training 90		
<u> </u>		Supervision and Clerical Support to Supervision 90
		** 44 ******
Unallocated Time 91		

	4.3.3 Indirect Expenses 91
	Benefit Expenses 91
	Indirect Operating Expenses 92
4.4	General Management and Central Administration 92
	4.4.1 Central Library Management 92
	4.4.2 Administrative Functions 93
	4.4.3 Training 93
	4.4.4 Development 93
	4.4.5 Systems Management 94
4.5	Library Administrative and Operational Structure 95
	4.5.1 Administrative Structure: Organization Charts 95
	4.5.2 Operational Structure: The Matrix of Interunit
	Relationships 95
	4.5.3 Centralization and Decentralization 96
	Effects on Users 97
	Effectiveness and Efficiency in Operations 97
Bil	pliography 98
	References Providing Introduction to General Accounting 98
	References for Managerial Accounting 98
	References Specific to Library Cost Accounting 98
=	
5	
Services	to Library, Users 99
Int	roduction 999
5.1	•
0.1	E 4.4 (D) 177 (0)
	E 10 D: 11
	The state of the s
	T . Car a
	5.1.3 Growth in Populations of Users 103
5.2	Distribute City O No. 11 April 1
0.2	5.2.1 Relationship Between Use of Materials and Use of
	Services 104
5.3	• • • • • • • • • • • • • • • • • • • •
5.4	
2.1	5.4.1 User Facilities Models 106
	Queuing 109 Standard Values for Number of Facilities 110

Ì

		5.4.2	Staff Facilities Models 111	
		5.4.3		
	Bibli	ograph	y 112	
			ences to General Methods for Study of Library Use 112	,
		Refer	ences on General Library Use 113	_
		Refer	ences on Use of Collections 114	
			ences Related to Queuing Theory 116	
			one remine to Queuing Theory 110	
(6.			
Proce	ssing	g of Lil	brary Materials	
]	Intro	duction	n 117	
			ations of Materials 117	
		6.1.1	Distribution Among Types of Materials 118	
		6.1.2	Growth in Populations 123	
		0.1,2	Exponential Growth Models 123	
			Linear Growth Models 124	
			Steady-State Growth Models 125	
			Logistic Curve Growth 125	
			Program-Related Growth Models 127	
•	5.2	Distrik	outions of Technical Processing 128	
			Workloads 128	
			Effects of Future Developments 129	
•	5.3	Workl	oad Factors for Technical Processing 130	
	5.4	Materi	ials Storage and Access 131	
	4	6.4.1	Storage Facilities 131	
		6.4.2		
			Central libraries vs. branch libraries 132	
			Open-Stack Shelving vs. Compact Shelving 133	
			On-campus vs. Depository 133	
		6.4.3		
			Zipf's Law and Bradford's Law 135	
		-	Mixture of Poisson Distributions 135	
		6.4.4		
		6.4.5	Allocation Decisions Model 137	
			Parameters Encompassed by the Model for	
			Decision-Making 138	
			Access Allocation Model 138	
6	5.5	Choice	e Between Acquisition and Access 146	
			The Contexts for Acquisitions vs. Access Decisions 146	6

	6.5.2 Application of the Allocation Model to Acquisition	ı vs.
	Access Decisions 147	
	Parameters for Application to Acquisitions vs.	
	Access Decision 147	
	. Illustrative Applications 149	
	6.5.3 Application of the Allocation Model to Acquisition	ı vs.
	Access Decisions 150	
	Historical Data and Status-Quo Projections 1	50
	Applying the Model for Allocation Decisions	153
Bibl	iography 156	
	References on Collection Development 156	
	References on Programmatic Criseria for Collection	
	Development 157	
	References for Peer Comparison Criteria 158	
	References for Growth Rates 159	
	References on Storage Allocation 159	
_		
7	***************************************	
Institutio	nal Requirements 161	
Intr	oduction \$ 161	
7.1	The Context: Universities in the Coming Decades 161	
	7.1.1 Economics 162	
	7.1.2 Effects of Technology 163	
	7.1.3 Faculty Renewal 163	
	7.1.4 Student Diversity 164	
	7.1.5 Academic Priorities 164	
	7.1.6 Means for Scholarly Communication 164	
	7.1.7 Information Needs of Academic Programs 165	
	7.1.8 Investment in Information Activities 166	
	7.1.9 Other Effects 167	
7.2	Institutional Needs for Information Services 168	
	7.2.1 Populations Served 168	
	7.2.2 Information Services Required 169	
	7.2.3 Coordination of Libraries and Information	
	Technologies 169	•
	Access to Computing Within Libraries 169	
	Automated Systems for Libraries 169	
	t en	

Alternatives for Access 146

Implications for Acquisition Decisions 146
Implications for Deacquisition Decisions 146

	7.3	Institutional Needs for Information Materials 170
		7.3.1 Program-Based Acquisitions Decisions 170
		7.3.2 Budget-Based Allocation Decisions 171
		7.3.3 Comparison with Peer Institutions 174
	7.4	Institutional Governance of Information Activities 174
		7.4.1 Commentary on Terminology 175
		Titles for Academic Administrators 175
		Titles Relating to Information Resources 176
		7.4.2 Governance Patterns 176
		Summary of Titles for Library Administrators 176
		Governance Structure for Academic Libraries 178
		Summary of Titles for Computer-Related
		Administrators 179
		Governance of Telecommunications 180
	9	Governance of Instructional Media and Technology
		180
		7.4.3 Centralized Management 181
		Library Management 181
		Information Technology Management 182
		Total Information Resource Management 183
1	Biblic	ography 185
		References for Carnegie Classification 185
		References for Economics of Libraries 185
8	.	
Inform	natio	n Production and Distribution 187
Ī	ntroc	luction 187
8	3.1	The Production of Information 187
		8.1.1 Authorship 187
		8.1.2 Processing 188
		Measure for Communication of Information 188
		Measure for Selection of Information 188
		Measure for Organization of Information 191
		Measure for Reduction of Information 193
8	3.2	The Distribution of Information 194
		8.2.1 Context and Overview 194
		8.2.2 The Forms and Formats of Distribution 195
		Books 195
		Popular Journals 196
		Scholarly Journals 196

		Retrospective Books and Journals 197
		Databases 198
		Software 198
		Digital Libraries of Multimedia 199
	8.2.3	The Operating Costs in Distribution of Information 199
		Distributors and Retail Outlets 199
		Academic, Research, and Public Libraries 199
	,	The Internet and the World Wide Web 200
8.3	The E	conomics of Information 202
	8.3.1	Context 202
	8.3.2	Economic Properties 203
		Cheaply Shareable 203
		Value Increases with Accumulation 203
		Self-Generating 203
		Costs Independent of Scale of Application 203
	8.3.3	
	8.3.4	Application to Database Companies 205
	0.0.1	Institute for Scientific Information 206
		OCLC 206
		An Academic Research Library 206
		An Internet Company 207
	8.3.5	Determination of "Goodwill" 207
	8.3.6	13
		Research and Development 208
	*	Computer Software 209 Motion Picture Production 210
	8.3.7	Application of Standard No. 53 to Database
	0.5.7	Contexts 210
		Institute for Scientific Information 210 OCLC 210
		An Academic Research Library 211 Online Database Services 213
	020	
	8.3.8 8.3.9	The Combinatorial Effect of Database Size 213
D:1.1:		Conclusion 214
DIDI	ography	
		ences on Publishing Costs 214
		ences on Accounting for Information Investments 214
		ences on Measurement of Information 214
		ences Related to Publishing Patterns and Policies 216
		ences Related to CD-ROM Publishing 218
	Keter	ences Related to Online Publishing 218
		•

<i></i>	· · · · · · · · · · · · · · · · · · ·
ies Withi	n Larger Structures 219
9	*
	aries Within National Information Structures 219
	Distribution 219
9.1.2	2 Libraries Within National Social Policy 219
9.1.3	Libraries Within Information Economy Structures 220
9.2 Libra	aries Within Cooperative Structures 221
9.2.1	
	Multiversity Systems 221
	Statewide Systems 222
	National Systems 222
	Contractual Arrangements 222
3.37	International Agreements 222
9.2.2	
	Sharing of Resources 222
	Cooperative Acquisitions 223
	Automation 223
	Shared Cataloging 223
•	Shared Storage 223
•	Preservation and Access 223
9.2.3	
	Network Structure Models 224
	Communications Traffic Models 224
,	Response Time Models 225
*	User Response Models 225
	Cost Trade-off Models 226
• 9.2.4	220
	Capital Investments and Operating Costs 226
	Library Effectiveness 227
	Governance 227
	Professional Ethics 227
0.25	The Consequent Utility Function 228
9.2.5	Transfer of Goopelative Games 220
	Cooperative Acquisitions 228
3 I.h	Cooperation in Automation 228
	ries Within Information Economy Structures 233
7.3.1	Librarians as Components of the Information
	9.1.1 9.1.2 9.1.3 9.2.1 9.2.1 9.2.2 9.2.3

9.3.2	Structure of the Model 233
9.3.3	Process for Determining Row and Column Totals 234
	Column Totals (Functions) 234
9.3.4	Model of National Information Economies 234
	Parameters in the Model of National Information
	Economies 236
9.3.5	. National Policy Planning in Other Countries 238
	The Effects of Digital Libraries 240

References on Library Networks 242
References on Intellectual Property Rights and Fair Use 243
References Related to National Information Policies 243
References on Information Economy 244

Appendix 247
Column Totals (Types of Occupation) 247
Row Totals (Types of Industry) 250

Index 263

Bibliography 242