

Daniel J. Power



DECISION SUPPORT SYSTEMS



CONCEPTS
and
RESOURCES
for
MANAGERS

Decision Support Systems

Concepts and Resources
for Managers

Daniel J. Power

Copyright © 2002 by Daniel J. Power

All rights reserved. No portion of this book may be reproduced, by any process or technique, without the express written consent of the author.

Decision Support Systems

Concepts and Resources
for Managers

Daniel J. Power



QUORUMBOOKS

Westport, Connecticut • London

In order to keep this title in print and available to the academic community, this edition was produced using digital reprint technology in a relatively short print run. This would not have been attainable using traditional methods. Although the cover has been changed from its original appearance, the text remains the same and all materials and methods used still conform to the highest book-making standards.

Library of Congress Cataloging-in-Publication Data

Power, Daniel J.

Decision support systems : concepts and resources for managers / Daniel J. Power.
p. cm.

Includes bibliographical references and index.

ISBN 1-56720-497-X (alk. paper)

1. Decision support systems. 2. Decision making. I. Title.

HD30.213.P69 2002

658.4'03—dc21 2001048807

British Library Cataloguing in Publication Data is available.

Copyright © 2002 by Daniel J. Power

All rights reserved. No portion of this book may be reproduced, by any process or technique, without the express written consent of the publisher.

Library of Congress Catalog Card Number: 2001048807

ISBN: 1-56720-497-X

First published in 2002

Quorum Books, 88 Post Road West, Westport, CT 06881

An imprint of Greenwood Publishing Group, Inc.

www.quorumbooks.com

Printed in the United States of America



The paper used in this book complies with the Permanent Paper Standard issued by the National Information Standards Organization (Z39.48-1984).

P

Copyright Acknowledgments

The author and publisher gratefully acknowledge permission for use of the following material:

Material from DSSResources.COM used by permission of D. J. Power and C. E. Power.

Microsoft screen shots reprinted by permission from Microsoft Corporation.

Contents

TABLES AND FIGURES	ix
PREFACE	xi
ACKNOWLEDGMENTS	xv
1 SUPPORTING BUSINESS DECISION MAKING	1
Introduction	1
A Brief History of Decision Support Systems	2
A Conceptual Perspective	5
Decision Support vs. Transaction Processing Systems	8
Categorizing DSS Applications and Products	9
An Expanded Decision Support System Framework	12
Building Decision Support Systems	16
Conclusions and Commentary	19
2 GAINING COMPETITIVE ADVANTAGE WITH DECISION SUPPORT SYSTEMS	21
Introduction	21
Technology Trends	22
Gaining Competitive Advantage	23
How Can DSS Provide a Competitive Advantage?	26
What Companies Have Gained an Advantage with DSS?	27
Some Examples of Strategic DSS	27

Identifying Opportunities and Information Systems Planning	30
DSS Benefits, Limitations, and Risks	32
Resistance to Using Decision Support Systems	34
Conclusions and Commentary	35
3 ANALYZING BUSINESS DECISION PROCESSES	37
Introduction	37
Managerial Decisions	37
Decision-Making Context	41
Decision-Making Processes	43
“Good” Decision Making	48
Redesigning Decision Processes	50
Conclusions and Commentary	52
4 DESIGNING AND DEVELOPING DECISION SUPPORT SYSTEMS	55
Introduction	55
Overview of Design and Development Issues	55
Decision-Oriented Diagnosis	57
Prepare a Feasibility Study	59
Choose a Development Approach	61
DSS Project Management	65
DSS Project Participants	67
Conclusions and Commentary	69
5 DESIGNING AND EVALUATING DSS USER INTERFACES	71
Introduction	71
User Interfaces: An Overview	72
User Interface Styles	73
ROMC Design Approach	75
Building the DSS User Interface	77
Comments on Design Elements	79
Guidelines for Dialog and User Interface Design	81
Factors Influencing User Interface Design Success	82
Conclusions and Commentary	84
6 UNDERSTANDING DSS ARCHITECTURE, NETWORKING, AND SECURITY ISSUES	87
Introduction	87
DSS Architecture and IS/IT Infrastructure	88
Networking Issues	94
Improving Security for Decision Support Systems	97
Conclusions and Commentary	102

7	IMPLEMENTING COMMUNICATIONS-DRIVEN AND GROUP DECISION SUPPORT SYSTEMS	103
	Introduction	103
	Key Terms	104
	Group Decision Support Situations	105
	Communication and Group Support Tools	107
	A Managerial Perspective on Communications-Driven DSS	111
	A Contingency Theory	112
	Group Decision Support Systems Benefits	115
	Virtual Organizations	116
	Evaluating Communications and Group Support Tools	120
	Conclusions and Commentary	120
8	BUILDING DATA AND DOCUMENT-DRIVEN DECISION SUPPORT SYSTEMS	123
	Introduction	123
	Comparing Data and Document-Driven DSS	124
	Data-Driven DSS Subcategories	125
	Comparing DSS Data and Operating Data	130
	An Interconnected Data-Driven DSS Architecture	133
	Implementing a Data-Driven DSS	134
	Finding Success	137
	Conclusions and Commentary	138
9	BUILDING KNOWLEDGE-DRIVEN DSS AND MINING DATA	141
	Introduction	141
	Key Terms and Concepts	142
	Characteristics of Knowledge-Driven DSS	144
	Managing Knowledge-Driven DSS Projects	145
	Knowledge-Driven DSS Examples	147
	Data Mining and Creating Knowledge	149
	Data Mining Examples	153
	Evaluating Development Packages	154
	Conclusions and Commentary	154
10	BUILDING MODEL-DRIVEN DECISION SUPPORT SYSTEMS	157
	Introduction	157
	Modeling Decision Situations	158
	Accounting and Financial Models	161
	Decision Analysis Models	165
	Forecasting Models	167
	Network and Optimization Models	169
	Simulation Models	171
	Modeling Languages and Spreadsheets	173

Model-Driven DSS Airline Industry Examples	176
Conclusions and Commentary	176
11 BUILDING WEB-BASED AND INTERORGANIZATIONAL DECISION SUPPORT SYSTEMS	179
Introduction	179
Key Terms	180
Designing and Developing Web-Based DSS	181
Managing Web-Based and Interorganizational DSS	184
Examples of Web-Based DSS Development Software	186
Examples of Web-Based DSS	188
Companies with Web-Based DSS	189
Advantages and Disadvantages of Web-Based DSS	191
Conclusions and Commentary	192
12 EVALUATING DECISION SUPPORT SYSTEM PROJECTS	195
Introduction	195
DSS Project Evaluation Process	196
Evaluation Tools and Techniques	198
DSS Project Evaluation Criteria and Risk Factors	204
International and Cultural Issues	205
Ethics and Privacy Issues	207
Conclusions and Commentary	208
APPENDIX I: DECISION SUPPORT READINESS AUDIT	211
APPENDIX II: DSS USER-CENTERED DESIGN CHECKLIST	217
APPENDIX III: KEY DECISION SUPPORT SYSTEM TERMS	221
REFERENCES	237
INDEX	247

Tables and Figures

TABLES

1.1 Evolution of DSS Concepts	5
1.2 An Expanded DSS Framework	16
2.1 Categories of Strategic Relevance	25
4.1 A Decision Process Audit Plan	58
4.2 DSS Feasibility Study Outline	60
6.1 DSS Framework and Architecture Issues	90
7.1 Four Combinations of Group Decision Support	106
7.2 A Matrix of Task Types and Media Types	114
8.1 Comparing Operating and DSS Data	130
12.1 Summary of Evaluation Tools and Techniques	199

FIGURES

1.1 Traditional DSS Components	17
3.1 Categories of Organizational Decisions	38
3.2 Matching Decision Support to Decision Situations	39
3.3 A General Decision Process Model	46
4.1 A DSS Design and Development Hierarchy	61
4.2 Participants on a DSS Development Team	68
5.1 Examples of Icons	74
5.2 An Example of a Simple, Balanced Screen Design	78
5.3 Some Excel Chart Types	80
6.1 DSS Components	88
6.2 High-Level DSS Architecture	92
7.1 Communications-Driven DSS Architecture	109
8.1 An Example of a Multidimensional Data Cube	126
8.2 Star Schema Diagram	127

8.3 Decision-Oriented Process for a Data-Driven DSS	135
9.1 Components of a Knowledge-Driven DSS	145
9.2 Neural Network Example	152
10.1 Break-Even DSS Developed in Microsoft Excel	162
10.2 A Hierarchical Representation	166
10.3 An Example Optimization Spreadsheet DSS	171
11.1 Web-Based DSS Architecture	182
11.2 JavaScript Decision Aid at DSSResources.COM	190
12.1 Ongoing DSS Project Evaluation Process	197
12.2 DSS Project Evaluator Decision Aid	201