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DECISION TABLE USAGE IN THE SYSTEMS & PROCEDURES FUNCTION

S P A

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INTRODUCTION

This publication is intended to make members of the Systems and Procedures Association more conscious of the employment of Decision Tables as a systems technique in analyzing, documenting, programming, in training of personnel, as an operations reference, and as direct input to a computer program (or compiler). The objective is to stimulate members to fully investigate the possible usage of Decision Tables in their systems and procedures work.

This survey was planned, organized and implemented by the Southeastern Michigan SPA Research Committee (Jim Thomson, Ann Arbor; Lynn Wilson, North Detroit; and Chairman Jerry Heyer, Detroit), with the support of SPA's International Research Committee.

Frank Goelz, Chairman

1966-67 International Research Committee

SURVEY OBJECTIVES

1. To determine the extent of Decision Table usage:
   a. Are they used in all areas of Canada, the United States and the Free World?
   b. Is usage limited to particular types of business?
   c. Does usage directly correlate to the size of the Systems and Procedures staff?

2. To discover the degree of knowledge of systems people regarding Decision Tables in general.

3. To determine the interest of SPA members in learning more about Decision Tables and their utilization.

4. To learn the reasons why Decision Tables are not fully employed at present.

5. To identify the sources of information on Decision Tables.

6. To discover in what phases of systems and procedures work Decision Tables are being used.

7. To document applications currently employing Decision Tables.

SURVEY SAMPLING

A questionnaire, "Survey on Use of Decision Tables in the Systems & Procedures Function", was mailed with a covering letter to over 5,800 SPA members throughout Canada and the U. S., and to other SPA members throughout the world. The questionnaire covered three basic categories related to Decision Tables:

—Familiarity with Decision Tables

—Acceptance of Decision Tables

—Application of Decision Tables

Replies to the questionnaire numbered over 2,000 or one-third of the SPA membership. These responses reflected the experience of the members of all SPA Chapters as well as a broad distribution of non-chapter members.

Replies were received from Australia, Canada, Columbia, England, Hawaii, the Netherlands, Mexico, the Philippines and the U. S.

Observation 1: Use of Decision Tables is well dispersed in Canada, U. S. and throughout the world.

WHAT IS A DECISION TABLE?

Decision Table usage is becoming more widespread yearly. But approximately 50% of the systems men surveyed in this publication have never used them—for varying reasons, including the lack of an instruction manual. To answer the question, "What is a Decision Table?", we present the following excerpt from "The Development and Analysis of Decision Tables," by Solomon L. Pollack. Mr. Pollack's article appeared in the 1964 **"Ideas for Management"**, published by the Systems and Procedures Association.

"Throughout business systems, and for many scientific problems, a series of actions is taken only when a set of conditions is satisfied. The expression that describes the conditions and actions is called a Decision Rule. Decision rules can be written in any language and in any form as long as they are intelligible. A popular method of expression is by means of flow charts. . . .

"The flow chart technique has serious defects, however. First, the charts are difficult to draw because of the symbols and spacing. Second, they are difficult to comprehend, in that it is hard to follow the exact path of a series of conditions and actions through the charts. Third, it is difficult to determine whether the charts cover all possible cases. And fourth, it is hard to insure the specification of the same series of actions for a particular set of conditions. These same drawbacks apply in a larger degree to the free-form English used to describe the decision rules.

"The need for faster and better communication and analysis had led to the development of Decision Tables, structures for describing a set of decision rules. Computer languages, adapted for decision tables, have been developed for describing and processing scientific and business problems. Examples in the scientific area are FORTAB and STRUCTURE TABLE LANGUAGE, while the business area has TABSOL and DETAB-X."

"Systems analysts and programmers can use decision tables to describe the decision rules for their business data processing systems or for their scientific problems. . . ."

FAMILIARITY

TABLE I: OVERALL FAMILIARITY WITH DECISION TABLES

Type of Economic Activity	Have Used Them	%	Know How to Use Them	%	Know What They Are	%	Have Heard of Them	%	Have Not Heard of Them	%	Total Response
Manufacturing	381	38	165	17	266	27	143	14	35	4	990
Finance	112	36	39	13	102	33	44	14	14	4	311
Trading	37	35	20	19	32	30	7	7	10	9	106
Utilities	58	39	26	17	41	27	25	17	—	—	150
Consultants	82	47	45	26	34	20	5	3	7	4	173
Government	46	35	27	20	28	21	26	20	5	4	132
Education	19	29	15	22	19	29	12	18	2	2	67
(Other)	26	32	5	6	23	29	19	24	7	9	80
Total	761	38	342	17	545	27	281	14	80	4	2009

Observation 2: Decision Table familiarity/use is not limited to particular types of economic activity. Decision Tables have made significant inroads in all types of business.

FAMILIARITY

TABLE II: USE/KNOWLEDGE OF DECISION TABLES

Type of Economic Activity (Ranged)	(1) % That Have Used Decision Tables	(2) % That Know How To Use Them (Without Using Them)	(1 & 2) % That Either Use or Know How To Use
Consultants	47	26	73
Manufacturing	39	17	56
Utilities	39	17	56
Finance	36	13	49
Trading	35	19	54
Government	35	21	56
Education	28	22	50
(Other)	33	6	39

Observation 3: Consultants lead in usage with 47%. Most of these classifications reflect 50% usage or knowledge of how to use Decision Tables. Actual usage is concentrated between 30 and 40%.

SOURCES OF KNOWLEDGE ON DECISION TABLES

Observation 4: Many sources for information on Decision Tables do exist. Principal sources are:

a. Magazines (see Bibliography)

b. Books (see Bibliography)

c. Seminars–Associations, Equipment Manufacturers, and Outside Consultants.

d. Other–Fellow analysts and school courses.

FAMILIARITY

TABLE III: INSTRUCTION MANUAL

Need For Instruction Manual On Decision Tables:

Yes	No	No Response
1749 (87%)	144 (7%)	116

Observation 5: An overwhelming 87% in all types of business collectively feel the need for a Decision Tables Instruction Manual.

Conclusion: This high percentage may result from unfamiliarity with available reference literature.

ACCEPTANCE

TABLE IV: DECISION TABLE UTILIZATION BY TYPE OF ECONOMIC ACTIVITY

Type of Economic Activity	Use Is Standard Practice	%	Use Is At Discretion of Individual Analyst	%	Have Not Used	%	Have Discontinued Use	%	Total Response
Manufacturing	49	5	498	50	436	44	7	1	990
Finance	16	5	103	33	189	61	3	1	311
Trading	—	—	39	37	67	63	—	—	106
Utilities	19	13	64	42	65	43	2	1	150
Consultants	13	8	97	56	63	36	—	—	173
Government	4	3	61	46	65	49	2	2	132
Education	8	12	14	21	45	67	—	—	67
(Other)	7	9	17	21	56	70	—	—	80
Total	116	6	893	44	986	49	14	1	2009

Observation 6: Use of Decision Tables is not mandatory. The leaders in "standard practice" are Utilities and Education. The greatest penetration is where usage is at the individual analyst's discretion, with Manufacturing and Consultants reporting 50% or higher. The minimum in this category shows 20% usage.

Conclusion: An acceptance of Decision Tables as a usable technique by over 50% of those responding indicates that Decision Tables are gaining popularity.

TABLE V: DECISION TABLE UTILIZATION IN PROPORTION TO SIZE OF SYSTEMS STAFF

No. of Analysts in Group	Use Is Standard Practice	%	Use Is At Discretion of Individual Analyst	%	Have Not Used	%	Have Discontinued Use	%	Total Response
1-5	44	4	400	37	615	58	8	1	1067
6-10	25	7	190	53	139	39	3	1	357
11-over	38	10	234	60	114	29	2	1	388
Not Classified	9	—	69	—	118	—	1	—	197
Total	116	6	893	44	986	49	14	1	2009

Observation 7: Systems group with 1-5 analysts—40% use; 60% do not use.
Systems group with 6-10 analysts—60% use; 40% do not use.
Systems group with more than 10 analysts—70% use; 30% do not.

Conclusion: The larger the systems group, the more likely analysts are to make use of Decision Tables.

TABLE VI: NON-USAGE OF DECISION TABLES WITHIN ECONOMIC ACTIVITIES

Type of Economic Activity	% That "Have Not Used" Decision Tables
Education	67
Trading	63
Finance	60
Government	49
Manufacturing	44
Utilities	43
Consultants	36
(Other)	70

TABLE VII: NON-USAGE OF DECISION TABLES WITHIN SYSTEMS GROUPS

Size of S & P Groups	Have Not Used Decision Tables Analysts	%
1-5	615	58
6-10	139	39
11-over	114	29
No Entry	118	60
Total	986	49

Observation 8: Approximately 50% of systems men have not used Decision Tables.

ACCEPTANCE

Reasons Cited For Non-Usage of Decision Tables:

1. No need and/or value demonstrated.
   "Do not have the necessary equipment."
   "More trouble to establish than they are worth."
   "Simply not needed."
   "Not sufficient complexity to require their use."
   "Never thought about it."
   "Other techniques do the same job."
2. Lack of exposure to and/or experience with DT's.
   "Insufficient training material available."
   "Staff not familiar with them."
   "Workload prevents experimentation."
   "Never have tried them."
   "Standard method not defined."
3. Too complicated, detailed, and/or time-consuming.
   "Degree of detail prohibitive."
   "Cumbersome."
4. Prefer other techniques.
   "Analysts revert to flow charts."
5. Not conducive for applications.
   "Difficult when problems contain many constraints."
   "Operating people do not understand."
   "Style format for procedures precludes use."
   "Each analyst allowed to use own means."

Observation 9: Generally, the failure to use Decision Tables resulted from lack of familiarity or actual experience.

Conclusion: An instruction manual, or a greater exposure to, or experience with, application details of Decision Tables technique would ameliorate this.

APPLICATION

TABLE VIII: GENERAL APPLICATION BY ECONOMIC ACTIVITY

Type of Economic Activity	In Documenting An Existing System	%	As Substitute for Flow Charts	%	As Substitute for, or Clarification of, Flow Charts	%	Written Procedure for Computer Programmers	%	Written Procedure for Daily Reference by Operating Personnel	%	Written Procedure for Training Employees	%	As a Direct Input to a Computer or Compiler	%	Total Response
Manufacturing	213	22	167	17	339	34	311	31	112	11	69	7	71	7	990
Finance	48	15	38	12	79	25	73	24	33	11	22	7	11	4	311
Trading	20	19	12	11	34	32	27	26	10	9	11	10	6	6	106
Utilities	34	23	25	17	49	33	40	27	22	15	14	9	15	10	150
Consultants	47	27	24	14	81	47	65	38	27	16	22	13	15	9	173
Government	18	14	12	9	42	32	30	23	16	12	11	8	5	4	132
Education	10	15	5	8	13	19	11	16	5	8	9	13	3	5	67
(Other)	12	15	11	14	19	24	16	20	6	8	1	1	1	1	80
Total	402	20	294	15	656	33	573	29	231	12	159	8	127	6	2009

APPLICATION

Observation 10: Overall, 20% currently use Decision Tables to document a system. Almost a third (32.7%) use Decision Tables in conjunction with flow charts.

28.5% use Decision Tables for instruction to computer programmers.

7.9% use Decision Tables in the training of employees.

11.5% use Decision Tables for day-to-day reference by operation personnel.

Only 6.3% use Decision Tables as a direct input to computer program or compiler.

The Manufacturing, Utilities and Consultant fields generally lead in Decision Table applications.

Conclusion: All economic activities employ Decision Tables in these general uses, but in varying degree.

Observation 11: Applications fall into three types—analysis, actual procedures and program documentation. An almost unlimited variety of applications using Decision Tables have already been put into operation.

The years 1964-67 have been the most fruitful years for Decision Table use. The applications each successive year nearly doubled that of the prior year.

APPLICATION

Attached is a listing of specific applications which employ Decision Tables:

ACCOUNTING

Decision Table applications in this area of activity include:	Analysis	Procedure	Program Documentation
Accounts Payable	x	x	
Accounts Receivable	x	x	x
Accounts Receivables Statements		x	
Analysis of Loan Status Cards	x	x	
Analysis of Vendors	x		
Annuity Classification	x		
Applying Construction Charges		x	
Appropriation Procedures	x	x	
Assignment of Commission Credit	x		
Automatic Premium Loan Repayment	x		
Billing and Billing Adjustments	x	x	x
Billing Brackets			x
Brokerage Calculations	x		
Budget Program			x
Building Standard Costs	x		x
Capital Equipment Projects	x		
Capital Stock		x	
Cash Application	x	x	
Cash Disbursements	x	x	
Chart of Accounts Validity Check		x	
Check Writing	x	x	
Collection Follow-Up	x		
Compute Service Charges	x		
Commercial Loan Accounting	x		
Commission Accounting	x		
Computer Audit of Invoices (Frt Application)		x	
Cost Accounting		x	x
Cost Analysis	x	x	
Cost Estimating		x	
Cost File Maintenance	x		
Credit Analysis & Rating	x		
Credit Letter Writing		x	
Dealer Financing	x	x	
Demand Deposits		x	x
Depreciation–Book and Tax		x	
Determination of Freight Allowances		x	
Discount Determination	x		
Effective Rate Table Maintenance		x	
Escrow Account Analysis	x		
Expense Allocations	x	x	x
Expense Distribution Edit		x	
Expense Ledger	x		
Financial Analysis	x		
Financial Operating Plan	x		x
Freight Demurrage Calculations	x	x	
Freight Rates Calculations		x	
General Accounting			x
General Ledger	x		
Government Bond Purchase		x	
Handling Fee Reports			x
Hospital Accounting	x		x
Interest on Loans		x	
Installment Loans	x	x	x
Insurance Claims (input)	x	x	
Insurance Rates	x	x	
Insurance Rate Formula		x	
Investments	x	x	
Job Cost	x		
Job Cost Distribution	x	x	
Journal Converted to General Accounts	x	x	
Labor Reporting	x		
Labor Standards	x		
Liabilities at Term		x	
Master Vendor No. Assignment	x		
Material Accounting	x	x	
Merged Accountability & Fund Reporting	x	x	
MICR Check Reconciliation		x	
Natural Gas Accounting	x	x	
Overhead Analysis	x		
Pension Fund			x
Preparation of Quarterly Tape for Social Security	x		
Pre-Underwriting			x
Product Costs		x	
Production Accounting	x		
Product Tax Rebating		x	
Property Cost Control	x		
Real Estate Billing		x	
Retired Pay System		x	

ACCOUNTING (Continued)

	Analysis	Procedure	Program Documentation
Revenue Accounting	x	x	
Revenue Edit–Price Checking	x	x	
Route Accounting			x
Royalty Payments		x	
Sales Accounting	x		
Salesmen's Commission	x	x	
Savings	x		
Servicemen's Savings Deposit System		x	
Setting Up Customer Accounts		x	
Stock Dividend Calculation	x		
Stock Purchase Plan	x		
Stores Accounting	x		
Tenant Billing	x		
Territorial Distribution of Monies			x
Test Level of Authorization for Credit Memos		x	
Timekeeping/Payroll/Taxes	x	x	x
Trust Accounting	x	x	
Use of Transaction Codes in a Billing Operation		x	
W-2 Requirements	x		
Work-in-Process Accounting	x		
Work Standards		x	

SHIPPING

Decision Table applications in this area of activity include:			
Freight Decisions		x	
Freight Rates		x	
Shipping Dept. Instructions for Filling Out Shipment Cards		x	
Shipping of Goods		x	
Shipment Matrix	x	x	x
Tonnage Report		x	
Truck Routings		x	

MATERIAL CONTROL

Decision Table applications in this area of activity include:			
Classification of Inventory	x		
Critical Stock Ratios		x	
Ingot Selection	x		
Inventory Allocation	x		x
Inventory Analysis			x
Inventory Control		x	x
Inventory Control–Explanation of Printed Reports	x		x
Inventory Control–Ordering		x	
Inventory Forecasting	x		
Inventory Levels of Material & Supplies	x	x	x
Inventory Movement	x	x	
Inventory Masterfile Maintenance			x
Inventory Order vs. Record Update	x	x	
Inventory Simulator			x
Inventory Transaction Codes	x		x
Make or Buy	x		
Order Quantity Calculation			x
Parts List Format Selection		x	
Parts Processing	x		
Processing Inventory Transactions			x
Production Inventory Planning	x		
Retail Stores Validation	x		
Sales Classification of Inventory	x		
Sales Replenishment		x	
Service Parts Control	x	x	
Stock or Not Stock		x	
Stock Catalog	x		
Stock Status		x	
Storeroom	x		
Tool Stores Inventory		x	

PRODUCTION PLANNING

Decision Table applications in this area of activity include:			
Alternate Evaluation	x		
Bills of Material Generation		x	
Bills of Material Maintenance	x		x
Continuous Process or Select Periods		x	
Critical Unit Scheduling	x		
Determination of Machine Centers		x	

PRODUCTION PLANNING (Continued)

	Analysis	Procedure	Program Documentation
Determination of Machine Operations		x	
Equipment Requirements	x		
Equipment Selection	x		
Job Scheduling		x	x
Labor Routings		x	
Level Reporting		x	
Load Data Experience		x	
Load Forecasting	x		
Machine Loading		x	
Machine Utilization		x	
Min/Max Order System Machine Loading		x	x
Performance Reporting		x	x
Product Process Routing Determination		x	
Production Control Specifications	x	x	
Production Order Writing System	x	x	x
Production Planning Subroutines to Various Types of Material and Stock Situations	x		x
Production Planning Reports		x	
Production Priorities Calculation		x	x
Production Scheduling (Training Aid)		x	
Routing Input Logic	x		
Schedule Lists			x
Scheduled Operation Simulation	x	x	x
Selection of Manufacturing Processes	x	x	
Shop Load		x	
Toll Message Rating			x
Trunk Line Assignment		x	
Valid Machine Numbers	x		
Work-In-Process Production Control	x		

MARKETING

Decision Table applications in this area of activity include:			
Backlog, EDP			x
Circulation	x		
Coding of Orders		x	
Competitive Bidding	x		
Computer Preparation of Quotations	x		
Contract Terms		x	
Customer Information Recording and Retrieval	x		x
Customer Support—Spares	x		
Data Input Criteria	x		
Describe Warehouse Operation to Management		x	
Distribution Simulation	x	x	
Editing Orders	x		
Estimates (Screen Those To Bid On)		x	
Experience Comparison	x		
Follow-up Mailing to Prospects		x	
Instructions for Field Personnel	x		
Issuing Insurance Policies/Changes	x		
Mail List Application			x
Maintenance of Customer Records		x	
Marketing Information System		x	
Marketing Simulation		x	
Marketing Strategy	x		
Operations Research	x		
Order Cancellation Procedure		x	
Order Entry	x	x	x
Order Processing Manual		x	
Order Status System	x		
Order Volume Analysis			x
Pricing/Price Changes	x	x	
Processing of Customer Applications		x	
Processing of Service Requests		x	
Product Distribution			x
Product Identification		x	
Product Line Matrix	x	x	x
Product Sales Analysis (Statistics)	x	x	x
Publication Distribution by Computer		x	
Sales Data Base	x	x	
Sales Forecasting		x	

MARKETING (Continued)

	Analysis	Procedure	Program Documentation
Sales L.P. Program	x	x	
Sales Order File Update		x	x
Sales Reporting		x	
Sales Training Manual		x	
Selecting the Proper Shipping Point		x	
Special Pricing Agreements	x	x	
Standard Product Coding		x	
Standard Warehouse Practices	x		
Subscription Information System	x		
Travel Forecast	x		

PURCHASING

Decision Table applications in this area of activity include:			
Analysis of Purchasing Procedure	x		
Choice of Purchasing Document		x	
Equipment Ordering	x	x	x
Ordering Material Practices	x		
Ordering Supplies			x
Procurement			x
Purchase Order Follow-up	x		
Purchase Order Revisions	x		
Receiving & Inspection System	x		
Selective Inspection of Receipts			x
Steel Tolerance Requirements	x		

QUALITY

Decision Table applications in this area of activity include:			
Failure Analysis			x
Inspection of New Products	x		

PRODUCTION

Decision Table applications in this area of activity include:			
Data Collection	x		
Dept. Location of Production Equipment	x		
Die Standardization		x	
Equipment Time & Reliability			x
Exception Reporting	x		
Generation of Manufacturing Specifications		x	
Instructions for Salvage of Loose Ends			x
Manpower Forecasting	x		
Manufacturing Practices			x
Material Rejection	x		
Milling Order Entry	x		
Numerical Control Programming			x x
Process Sheet Maintenance	x		
Tool & Dimension Use			x

ENGINEERING

Decision Table applications in this area of activity include:			
Automated Product Design		x	
Engineering Analysis		x	
Engineering Changes	x		
Engineering Data File Maintenance	x		
Engineering Progress & Projection System	x		x
Engineering Specifications	x	x	
Fan Design Programs	x		
Part No. Assignment		x	
Project Approval & Assignment	x		
Selection of Research Projects			x
Technical Specification Writing	x		

PERSONNEL

Decision Table applications in this area of activity include:			
Attendance	x		
Benefit Plans		x	
Computer Audits of Personnel			
Transactions			x
Data Systems Directives & Personnel Operating Instructions			x x
Employee Benefit Claims			x

PERSONNEL (Continued)

	Analysis	Procedure	Program Documentation
Employee Classification		x	
Employment Processing		x	
Employee Skills Inventory	x		
Group Insurance on Line	x		x
Leave of Absence Authorization		x	
Nurse Utilization		x	
Personnel Information System	x		
Personnel Operating Manuals		x	
Schedule Counciling of Students		x	
Security	x		
Sick & Annual Leave Mechanics		x	
Student Admission Application		x	

MISCELLANEOUS

Decision Table applications in this unclassified area of activity include:			
Acquisition Studies		x	
Appendice to Procedure Manuals		x	
Approval Authority	x	x	x
Approval Procedures		x	
Card Punch Instruction Sheets		x	
Categorizing of Records	x	x	
Central Mail File	x		
Choosing the Best Procedure Layout	x		
Claims Payment Program		x	
Claims Verification		x	
Completing Forms		x	
Computer Feasibility Analysis	x		
Computer Index Run		x	x
Converting Codes to Description & Vice Versa		x	
Credit Card Operation		x	
Curriculum Planning	x	x	x
Daily Transactions Edit			x
Data Communication Study	x		
Data Display	x		
DP Program Analysis			x
Data Transmission	x		
Data Validation			x
Determine Option Installation		x	
Development of Clerical Systems	x		
Development of Office and DP Systems	x		
Distribution of Memos		x	
Document Flow of Reports	x		
EDP Systems Definition	x		
EDP Systems Definition	x		
File Up-Date Rules	x	x	x
Form Selection Guide		x	
Forms Control	x	x	
General Claims Reporting		x	
Hardware Selection	x		
Information Selection for Reports	x		
Instructions for Clerical Personnel	x	x	
Investment Analysis		x	
Length of Stay Reporting		x	
Library Circulation System	x	x	
Masterfile Update	x		
Medicare	x	x	
Operation Memos		x	
Operations Research	x	x	
Passenger Reservations	x		
Payroll Disk Pack and Reconstruction		x	
Policy Manual	x		
Problem Definition	x		
Property Maintenance Program			x
Proposed Capitalization Approval Routing		x	
Reports Control		x	
Scheduling Computer Activity	x		
Selection of Plant Locations	x		
Shareholder Proxy			x
Signature Authorization		x	
Sources & Distribution of Data	x		
Specific Form Needed & Data Required	x	x	
Sub-Station Load Analysis		x	
Systems Training	x		
Teller Training Manual		x	
Traffic Data Recorder		x	
Transportation–Car Record Type Report to Issue	x	x	
Validating Sequence Reporting	x	x	x
Vehicle Registration System	x	x	
Writing Program Logic	x		
Zip Code Conversion	x		

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