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Management Reporting Systems and Techniques

The Design of Reporting or Information Systems: Outline

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1. Common problems with existing reporting or information systems.
2. Information systems need to be consciously designed; design of the product line.
3. The objectives of the company, or task force, in undertaking the information or reporting system development project.
4. Parallel design and development problems for management.
5. The new or modified reporting system in operation; the performance specification for the design.
6. The system which is required to design and develop the management reporting system.
7. Administration of development.
8. Dividing the information system into convenient sub-systems.
9. Program for planning the information or reporting system; total systems approach.
10. Evaluation of alternative plans for the reporting system.
11. Obtaining the decision to implement the plan.
12. Execution of the plan.
13. Searching for subsequent problems.
14. The continuous job of R & D on company reporting systems.

1. Common Problems with existing reporting or information systems

- Traditional stockholder reporting as a basis
- Legal requirements vs operating requirements
- Piecemeal growth of reporting system over years
- Information technology has not kept up with production, product, or marketing technology
- Real-time systems vs accounting systems
- Accounting of transactions vs information for decisions
- Operating decisions vs development decisions

2. Information Systems Need to be Consciously Designed

(a) An information or reporting system is just another system, which is a facility, having the elements of a generalized system including within itself

-objectives
-outputs
-facilities
-operations
-inputs

(b) This reporting system or facility must be designed to meet certain operating specifications or needs; the objectives of the system. Similar to any product design problem from identifying the users needs, to specifying the performance specifications of the product, designing the components, specifying raw material inputs.

(c) Benefits of the organized process of design as seen in the high technology industries such as aircraft, missiles, nuclear power plants, electronic systems- from the product point-of-view; application to design of information systems.

(d) The process of design is not one to be left in the hands of a single group of technical specialists; individual steps, however, may be worked on by such specialists. The importance of the participation of the report or information user, during the design process- from the Chairman of the Board to the production line foreman. The design process is a dialogue between the "designers" and management at all levels, at all stages of the project.

(e) The process of design and implementation should be an explicit and formal program; not piecemeal, casual projects; perseverance in the program until the last step of checking performance against objectives- management needs.

(f) The design of the information system is tied closely to management's view of the business and the company's business objectives.

3. The objectives of the company, or the company task force in undertaking the Information or Reporting System project:

(a) To provide information necessary for

i. Planning of operations and development

ii. Signalling for control of operations (and development)

iii. Accounting of the business transactions

iv. Mandatory reporting to stockholders, government, trade associations, and other external organizations.

(b) To develop the information system to produce these types of information effectively and efficiently (at lowest cost).

(c) To develop the company's capability to develop and maintain such an information or reporting system.

4. Parallel or Analogous Design and Development Problems for Management:

- the development of the company reporting or information system
- the development of international operations in a new region, or in a company primarily in domestic field
- the development of a new product line

4. Parallel System Design Problems

A. Management Reporting or Information System

B. Development of Company International Operations

C. Development of New Product Line

5. The new or modified Reporting or Information System in operation

(a) Assumption that the new or modified system is an improvement over the previous or existing system.

(b) Picture of the new system in operation as a means of starting the design-to-specification process in substantially improving or building a new reporting system. Focus on key problems or failures as start; deficiencies or areas not covered.

(c) The types of users, the "customers" or managers; what demands will the system be serving; what benefits will the system be providing.

(d) The reports each user will be receiving-- the "product line". What outputs of the system will be provided at what costs.

- information content and quality; accuracy.

- form of information; reports, charts; oral, visual.

- when will the information be supplied; prescribed intervals; when key element signals need; upon demand. Exception reporting; real-time control.

(e) What operations will be supplying these output reports; what kinds of data processing will be required: measurements, computations, checking, consolidations, conversions, communication, display, auditing, etc.

(f) What machines and staff will be performing these operations-- what facilities will be operating in the report system.

(g) What data will be secured for processing-- counts, instrument readings, tabulations, logging, plant operating data, field sales data, industry data, basic accounting, reporting etc. What inputs to the report system will be obtained-- by measurement, by estimate.

(h) Initial projection of the operating budget for the information system; (revision- see 9 (j)).

(i) Comparison of the brief view or sketch of the required information system- operating- to the existing system. Common outputs, operations and input data; points of divergence. Comparison of costs; costs vs benefits.

6. The System required to design and develop the Management Reporting System

(a) The group or department responsible for R&D on information systems; not a contradiction to the participation of management at all stages of development.

Group serves as pace-setter, catalyst, research arm for new requirements, and reservoir of specialized skills in the development of reporting systems.

(b) Manager whose responsibility is stated in terms of providing right information for management at optimum cost; focus on information.

Full-time responsibility

Staff, from within company, familiar with operating and development problems

(c) Use of outside services of- salesmen of EDP equipment, consultants, data-processing service companies.

(d) An explicit plan, having the approval of management.

(e) A development budget; developing or modifying the information system will require commitment of people, facilities, funds. Separate from the cost of implementing plan, the cost of developing the plan.

7. Administration of Development

(a) Obtaining the participation of members of the company (and outside vendors or consultants) during the design and development process. An approach to problem-stating involving objectives, counter-objectives or revisions, proposals or plans, and decisions to go ahead-- in each sub-part of the program.

Approach will be used in determining report objectives, design of information outputs, selection of processing requirements or equipment. A generally useful "planning dialogue".

(b) The use of a formal plan and time schedule; determining all of the tasks that will make up the total program.

Simultaneous and critical tasks; PERT in the design of information systems as in product design. Plan for the commitment of people and other resources during the program.

Final result of the program is somewhat more abstract than physical product development projects; insurance that we actually reach our objective vs coming to a halt with a half-finished system. A road-map.

A succession of decisions for management: from the decision to study the company's information needs through the decision to buy or lease equipment and hire operators. Management must participate in these decisions.

(c) Importance of written documents to mark the progress of the development program.

More than just the systems or controllers department is involved. Common language as a first step in integrating the final product. Participation of operating executives through foremen in stating -- for elements of the program

- the objective
- the plan or proposed way of achieving the objective
- the resulting instruction- which implements
- the progress report- which reports on the satisfaction or failure to perform

(d) Attention to the maintenance of healthy relationships with operating management and other parts of the environment--

- selling the system to top management
- participation of operating management
- outside factors: auditing firm; the union.

8. Dividing the Information System into Convenient Sub-Systems

(a) The need to break the larger problem into sub-parts so as to get started; to divide the work among responsible staff members. Initial handle on the reporting system problem.

(b) Many alternative points-of-view. Tied closely to company management's view of "what business are we in", organization, key operating, development, and competitive problems.

Business needs of the company should determine the framework in which the information system is set; vs up-dating of systems, or crash program cost savings, or desire to utilize equipment previously purchased not in framework of total plan.

(c) Characteristics of the Company which Suggest Sub-Systems

- types of business or divisions such as consumer products, industrial products, market-product group A, market-product group B, etc.

- types of operations or functions such as marketing, production, procurement, distribution, engineering, etc.

- company organization structure (not represented above) such as sales department, manufacturing group, construction department, research committee, product group, field sales region, etc. Areas of responsibility.

(d) Characteristics of the Reporting System which Suggest Appropriate Sub-Systems

- types of information users e.g. foremen, sales managers, capital budget analysts, president, stockholders, etc.

- types of uses, i.e. investment decisions, field sales decisions, plant operating decisions, distribution or transportation decisions, staffing decisions, equipment replacement or maintenance decisions, advertising decisions, etc.

- Element of the Reporting System from functional point-of-view

  - planning system (operating and development decisions)
  - signal system; calling for control
  - data processing system
  - data measuring system

(e) The advantages of a uniform and modular system which will allow management to take varying cuts or views of operations and plans, consistently, at a reasonable cost.

9. Program for Planning the Information or Reporting System

9.1 Define the demand for information; the information output objective. (The analysis of your "market" and its uses of the "product")

(a) The information output objective as a document to be used by specialists in designing output of reporting system, data processing, input measurements, etc. The output objective described by managers and task force.

Define by focusing on end-uses of report or information

- Has the need for planning and control been recognized in each company area; what are the existing expressions of performance: return on investment, gross margin, monthly sales vs quota, standard variable cost, variances, cost as % sales, net profits as % sales, equipment utilization hours, days receivables, inventory level vs standard, etc.

- The planning and control decisions that are made to achieve the above expressions of performance: field sales decisions, plant operating decisions, staffing decisions, advertising decisions, investment decisions, equipment replacement decisions, product design decisions, production control decisions, warehouse decisions, etc.

- Other uses of information by company- paying taxes, information returns to Internal Revenue, reporting to industry and government agencies, etc.

Define by focusing on the users of information: the type of responsibility and the number of each type, e.g., president, vice presidents, functional department managers, field sales supervisors, plant managers, product engineers, capital budget analysts, foremen, SEC, Bureau of Internal Revenue, stockholders, etc.

Resulting information output objective: the information's objective to be accomplished by the manager and the reporting system.

(b) Techniques of defining the Report System Objectives

- Interviews with managers

- Formal agreement as to the uses of the information he requires

- Focusing on basic ideas in drawing up objectives such as return on investment, other performance measures, the objects or physical things in his decisions

- Analysis of information he is currently using-- formal reports received; informal sources of information; relative importance of his personal contacts to system.

- The comparison of information objectives within functional areas and up and down organizational elements; consistency; do the objectives of sub-managers compose into the objectives of other managers etc..

- Opportunity to integrate and evaluate standards of performance; expressions of performance; amount of planning and control that is actually taking place.

- Participation of managers in interview and joint development projects communicate reporting system objectives to the specialists and begins to assist managers in learning to use information system fully, properly, with respect to company performance objectives.

9.2 Design the output of reports, data, etc. to satisfy the "demand" as expressed in the information output objectives. Design of the "product line" of the information system.

- The information content required: subject, units, accuracy.

- The form of the information or report defined: charts, tables, reports, written information vs orally presented information (meetings); use of newer display devices; management information centers; production control boards; automated production management- refinery display systems; computer register runs.

- The timing of information and reports; frequency; exception reporting; need for real-time reporting (process control); information upon demand; specific needs of operations with respect to control-- product development progress reports vs manufacturing control or daily auditing of bank balances.

- Testing the design of the reporting system element or group of reports, or part of control system; example reports; refining of these with managers. Effect on performance.

9.3 Define the data input required to the reporting system; the "raw materials" required to produce the "product line".

- The physical and non-physical items which must be measured or estimated: product, customer, workforce, cost elements, etc.

- The units in which this must be measured: number of products sold; the dollar-value of products sold; location from which products are sold; number of units of cost elements expended; cost in dollars; number of staff; hours worked by staff; dollar cost of staff...etc.

- Types of data currently gathered; major changes requires.

9.4 Design the operations to produce the output reports or information from the input data; design the data processing required to obtain the reports required.

This will require the writing of data logging, computation, tabulation, and consolidation systems and procedures; development of computer programs to obtain desired output from accounting, field sales, and production systems;

Development of instruction manuals for the preparation of analytical reports; procedure descriptions covering information content, computation techniques, tabulation and presentation (form of communication) methods, and timing of information flow or intervals.

Use of EDP and systems specialists; How to obtain output with lowest cost data processing operations. The designed operations should not preclude other reports and information outputs; over-automated systems; over-sophisticated or single-purpose accounting and data processing procedures which may be inflexible with regard to future analytical problems.

Will the data processing for signalling the need for control, provide for the information required for planning.

9.5 Design the facilities to perform these operations at optimum cost.

- Selection of the hardware: computers
  punch card equipment
  printers
  leased wires
  auxiliary equipment
  office facilities etc.

Selection by means of evaluation of alternatives; specification as a means of inviting bids from equipment vendors. Importance of the performance specification developed by systems specialists.

- Selection of, design of the software:

	Manuals; training and reference.
System Operating Instructions	Programs
	Other operating instructions
- Storage	Price books, charts, tables and other methods of storing data
- Identification	Codes, file patterns, charts of accounts and other means of tagging data for processing, storage, retrieval, display.
- Planning & Control of System	Tables of processing time, parts of above manuals, and other means and data for planning and control of information system, itself

- Selection of the staff; design of the appropriate organization to carry out the required operations;

  Organization Plan
  Staff: from key punch operators through analysts, chartists, forms designers, managers.

  Educational program for the operating staff; change-over from old jobs; new technology; relationships with operating management.

9.6 Design of the program for the education of managers and all other users of the output reports; to have effective decision making--improved performance; to effectively use the reporting system.

9.7 Establish a healthy relationship between the information system and its environment of managers, government agencies, trade associations, stockholders, auditors, etc.

9.8 Costs; Investment-

(a) Estimate of the cost to design and install system: capital and expense.

(b) Estimate the cost of operating the reporting system; comparison to existing system.

10. Evaluation of Alternative Plans for the Reporting System

(a) Estimate the probable results of the plan

- physical, e.g. number of reports per day; availability of data on time, etc.

- financial; costs of operating; benefits in control and planning.

(b) Evaluation of the probable results vs the objectives

- will it work; is it physically feasible; dependable; accurate; timely .. in relation to operating and planning performance objectives

  Pre-supposes that company has developed performance evaluation standards, procedures for planning, control, etc.--- performance standards for system.

- will the benefits in improved profits exceed the costs.

(c) This evaluation is a continuous reconciliation during the design and development stages of the performance specifications for the reporting system (the "demands" of the "customers") vs the probable results of any specific proposal: e.g. machine vs clerical operations, centralization vs decentralization, one set of reporting intervals vs another, one piece of equipment vs another, one form design vs another, etc.

11. Obtaining the Decision to Implement the Plan

The strategy of selling top management is a balance between:

(a) Enlisting their participation in the development process; their decisions initiate action... and

(b) Giving them a finished or semi-finished product-- partial or full output of reports for planning and control... particular orientation to their decision needs.

12. Execution of the Plan

(a) Installation of the system

(b) Operation of the system until reliable and reproducable results are obtained; the breaking in period; debugging.

13. Searching for Subsequent Problems

Feedback of signals indicating that redesign or modification is required-

(a) During development and installation

(b) During operation

14. The Continuous Job Required of R & D on Company Reporting Systems

Responsible manager or department to insure that the information needs of management are being met at optimum cost.

(a) Is the system delivering the "product line" of information on time, with the proper quality, at the lowest cost.

(b) Are we getting the most out of the facilities we have.

(c) Do changes in the needs of managers and company call for changes in the system; changes in facilities; investment.

(d) Are the types of skills required being supplied to adequately maintain and develop (improve) the system. Is the organization proper to handle the operations. Is it changing with changing technology and demands on the reporting system.

Info Utility System

System

objective

↑ output (reports)

↑ calculation; memory; file; analysis

↑ input

quality; time; cost; volume

1. control of each component
2. acceptance management
3. Specialist to inform management & determine requisite info. — not a scratch —
4. management absent know; therefore must not set parameters
5. ~~expose~~ management
6. grow system people — characteristics?
   a. lazy — hours absorbed — energy involvement
   b. broad understanding of business & company discipline climate
   c. numbering systems — top level and dimension of business — know all systems in company —
7. Specialists as teams
   a. willingness to change structure dependent upon outputs — new tool cast reflection on areas.
   b. all managers must now be part systems men —
   c. access to top —

Reports
1. Mapping — (activity) skill structure
2. Few facts per area of activity
3. Exposure

No. "plan in error" not confused by mechanistic nature —
i. Design not short term job — resources must be provided — concept must be whole
h. measurements must be significant — standard
l. consultant — must know — personality — useful —
~~Lockheed~~ — better to develop inside talent. f