The Effectiveness of Management Information Systems

by

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ABSTRACT

There are a large number of references in the literature to the problem of evaluating Information Systems in terms of both efficiency (the technical aspects) and effectiveness (the users' view, and the effect the system has on the organisation). Whereas efficiency can be defined clearly in mathematical terms, measurement of effectiveness tends to be subjective and is usually measured retrospectively (i.e. some time after installation) using a questionnaire approach, or by expensive simulators, prior to installation.

This presentation deals with the initial thinking behind the development of a quick and less costly system dynamics approach to measuring effectiveness, by using a simple model to examine the effect the proposed system will have on the organisation into which it is to be installed.
PROBLEM

Present requirement analysis techniques do not take into account the influence a new information system will, or can, have on organisational structure and policies, therefore, new information systems often fail to meet expectations.

REQUIREMENT

A technique which can be incorporated into requirements analysis to allow the analyst to model the organisation, quickly and simply, in terms of the interaction between the flow of information and the associated flow of goods/services which the organisation produces.

ANSWER

A system dynamics model of a single representative function using DYSPAM2 software on an IBM PC/AT or compatible.
METHODOLOGY

STAGE 1 - The MANUAL system

Model a representative function of the organisation in terms of its physical and information flows, and the policies which represent the impact of one on the other.

STAGE 2 - The COMPUTERISED system

Modify the attributes of the information flow (e.g. source, accuracy, content, amount, timeliness) to represent the effect of the proposed information system.

STAGE 3 - The ENHANCED system

Use the model to investigate modifications to policies and structure which the proposed system would facilitate, such that the full potential of the system to improve organisational performance is realised.
APPLICATION OF METHODOLOGY TO DEMONSTRATION MODEL

ORGANISATION

Logistics operation with one main depot supplying three distributors (see figure). The demands of Distributor 1 are seen to have priority over those of Distributor 2 who, in turn, has priority over Distributor 3.

The aim of the organisation is to operate in such a way that each distributor can satisfy as near to 100% of customer demand as possible.

STAGE 1

Models the distribution of one item, in terms of the flow of that item from depot store to the distributors, the associated flow of information and the policies (stock allocation, transport allocation and resupply policies) which affect these flows.
APPLICATION OF METHODOLOGY TO DEMONSTRATION MODEL

STAGE 2

Models the effect of the proposed installation of a computerised system to give the inventory controller on-line access to both transport availability and the current stock situation, such that stock will only be released if sufficient transport is available to deliver it.

STAGE 3A

Investigates the effect of a change in transport management from a priority to a proportional allocation policy.

STAGE 3B

Investigates the additional effect of a reduction in safety stock-holding by the Distributors.
TOTAL NUMBER OF ITEMS ORDERED

BY MAIN DEPOT

STAGE 1  STAGE 2  STAGE 3A  STAGE 3B

TRANSPORT CAPACITY

ITEMS

0  20000  40000  60000  80000  100000

VERY RESTRICTED  MODERATELY RESTRICTED  SUFFICIENT
MAXIMUM LEVEL OF STOCK
HELD AT MAIN DEPOT

STAGE 1  STAGE 2  STAGE 3A  STAGE 3B

TRANSPORT CAPACITY

* = CAPACITY OF STORE
PERCENTAGE CUSTOMER DEMAND ACHIEVED

TRANSPORT CAPACITY
VERY RESTRICTED

STAGE 1  STAGE 2  STAGE 3A  STAGE 3B

PERCENTAGE DEMAND

DISTRIBUTOR 1  DISTRIBUTOR 2  DISTRIBUTOR 3
PERCENTAGE CUSTOMER DEMAND ACHIEVED

TRANSPORT CAPACITY
MODERATELY RESTRICTED

<table>
<thead>
<tr>
<th>STAGE 1</th>
<th>STAGE 2</th>
<th>STAGE 3A</th>
<th>STAGE 3B</th>
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![Bar chart showing percentage demand for different stages and distributors]
PERCENTAGE CUSTOMER DEMAND ACHIEVED

TRANSPORT CAPACITY
SUFFICIENT

STAGE 1

STAGE 2

STAGE 3A

STAGE 3B

PERCENTAGE DEMAND

DISTRIBUTOR 1

DISTRIBUTOR 2

DISTRIBUTOR 3
MAXIMUM STOCK HELD BY DISTRIBUTORS

COMPARISON OF
STAGE 3 POLICIES ONLY

STAGE 3A

STAGE 3B

TRANSPORT CAPACITY