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A paper titled "Simulation in Marketing Management - An Audit" 1/ provides evidence to indicate that the number of publications in the field of computer simulation and marketing management had reached a peak in 1968-9 and had since declined. The intent of this paper is to: 1) review the data furnished in the above paper, 2) identify possible causes of the findings, and 3) provide evidence to show that a major shift in the publication record can be expected. A major portion of the paper will be devoted to the shift that has taken place in projects currently being completed versus those that were completed and published in the 1965-71 period. A questionnaire was used to obtain data to identify the changes currently underway.

Background 2/

A literature survey which covered twenty-four different journals and/or publications for the 1965-71 period located sixty-nine publications dealing with marketing and computer simulation. Of these fifty-five deal with specific functions of marketing management. Figures 1a and 1b provide insight into the existing trends in the publications record. There has been a marked change in the growth rate of the published articles with a substantial decline in recent years. The next section will provide insight into the possible causes of this change.

The matrix presented in Figure 2 was used to classify the fifty-five articles dealing with marketing management functions. The content of each article was used to classify it with respect to one or more of the cells dealing with the various management functions as cross-referenced with the major marketing variables. The bibliography contains the complete list of the publications considered for classification and manuscript referenced initially contains the data for identifying the articles that were placed in each cell. Densities of the cell give indication to the areas of work concentration in the field of marketing management and computer simulation. It is obvious that there has not been a uniform dispersion of efforts in applying simulation. Concentrated efforts have fallen in the management functions of planning and analysis especially with respect to the marketing variables of physical distribution

and promotion. Little output has appeared in the management function of organizing and control. There has been a recognizable, but small, simulation output with respect to management's decision making responsibility. Current work that has not yet been published should provide some change in the great disparity between the cell densities appearing in Figure 2. The expected change will be discussed in the last two sections of this paper.

Drop in Number of Simulation and Marketing Management Publications - Possible Causes

The change in growth of the number of computer simulation and marketing management publications probably resulted from a number of conditions. Below is a list of possible contributing factors to the drastic change in the growth pattern.

- 1) Simulation has been accepted by industry leaders and most of the work done today is not disclosed for proprietary reasons.
- 2) The stylishness of the simulation techniques eroded before they gained wide acceptance.
- 3) It is difficult for marketing departments to provide support for individuals interested in marketing simulation in terms of computer time and personnel.
- 4) Management has not accepted simulation as a helpful device in assisting them perform their duties because: i) individuals completing marketing simulation projects have not sold their clients on the benefits obtained or trained their clients to use the results obtained from the model, ii) of the difficulty management has in interpreting the programs, input assumptions or the verification procedures, iii) a clear set of problems has not been identified for simulation's profitable application, and iv) the marketing profession is not yet prepared to attack the class of problems that are most suited to a simulation approach.

TRENDS OF SIMULATION PUBLICATIONS ON MARKETING SUBJECTS

Year	Number of Publications	
	All Marketing Subjects	Marketing Management Subjects
1965	6	6
1966	12	8
1967	12	9
1968	14	10
1969	11	11
1970	9	7
1971	5	4
Total	69	55

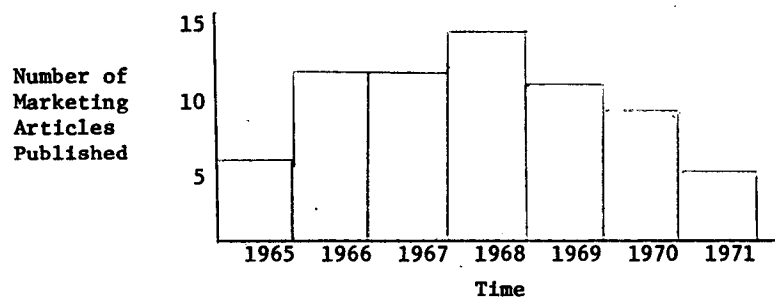


Figure 1a

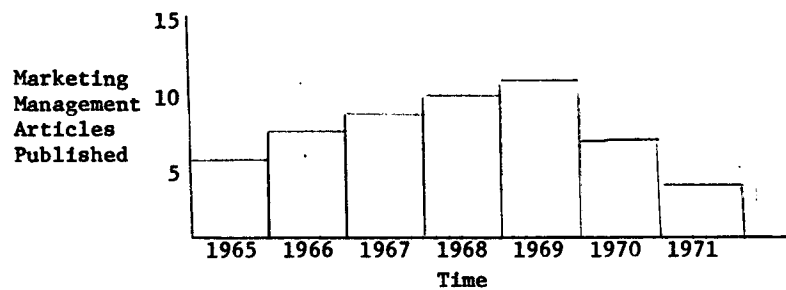


Figure 1b

- 5) There is not a clear cut body of knowledge and/or individuals committed to the field of simulation in marketing.
- 6) Publication successes are fewer because the simulation techniques are now being applied to problem types that are redundant to areas of previous publication success.
- 7) There may have been a shift in the journals publishing market simulation papers and a subsequent delay during the 1969-71 period until the new journals prepared for the marketing influx.

NUMBER OF PUBLISHED ARTICLES IN SIMULATION - MARKETING BY SUBJECT*

	Planning	Management Functions		Organizing	Control
		Analysis	Decision Making		
	6	8	4	-0-	1
Product	6	9	5	-0-	-0-
Channels	1	2	-0-	-0-	-0-
<u>Marketing Variables</u> Physical Distribution	12	11	3	-0-	-0-
Promotion	8	12	3	-0-	-0-
Price	2	1	1	-0-	-0-

Total - 55

Consumer Behavior -- 9

Others -- 5

Figure 2

*The cell total of the matrix exceeds 55 because a few of the articles were classified into more than one cell. The top row indicates the number of articles that apply to one management function and all of the marketing variables.

The above factors do not apply equally across the marketing field. Probably any number of them provided the influences necessary to diminish the publication efforts in any single matrix cell. Some of the factors may have caused a delay in preparing manuscripts focusing on areas where the simulation effort has been light. The next section presents the results of a questionnaire survey which indicates that there is a substantial number of simulation projects currently being developed in the marketing management field and that there has been a recognizable shift in the areas of focus.

Questionnaire Results

If one were to accept current trends in the publication record it could be concluded that the published work in computer simulation and marketing management is diminishing and may soon disappear. Also one could expect this to happen with a minimum, if any, output focusing on many of the aspects of marketing management. A questionnaire survey was used to obtain another view of what could be expected in the marketing simulation field. The survey results will either confirm or disprove ideas obtained from the publication audit.

Most of the simulation and marketing publications were authored by people associated with universities and schools of business administration. The questionnaire survey was, therefore, limited to academic personnel. Since academicians were the main source of previous publication efforts it was expected that forthcoming publication changes in volume and topics would come from the same group. Thus, letters containing questionnaires were sent to 119 marketing departments of business schools throughout the United States and parts of Canada. More than one letter and questionnaire was sent to schools with unusually large marketing departments providing a total questionnaire mailing of 161. The respondents were asked to complete the questionnaire for the entire department as well as themselves. In all 103 completed questionnaires were returned from 92 of the schools with eleven of the larger marketing departments supplying more than one response.

Fifty-three (58%) of the responding schools reported that there were no current simulation activity in their marketing departments and the remaining thirty-nine (42%) of the schools reported on marketing simulation projects that were currently underway or were recently completed. The remainder of this paper is devoted to the explanation and classification of the projects that were described in the questionnaire responses.

The thirty-nine responses indicating current undertakings in marketing simulation field described seventy-one projects that were currently underway and not yet published. These seventy-one projects were broken into two groups, completed but not yet published or being constructed. The respondents for both groups were asked to classify

the projects by subject area under the following topics: Product, Channels, Physical Distribution, Price, Advertising, Sales Force, Planning, Analysis, Program Control, Organization of Management, Decision Making, Analysis of Decision Rules, Consumer Behavior, and/or Demand Projections. This information was used to develop Figures 3a, 3b, 3c which indicate the densities of completed unpublished projects, uncompleted projects and the totals by subject matter.

The margins with no identified cross reference in the matrix contain the numbers of projects whose subject matter covered one management function or marketing variable and all of the corresponding marketing variables or management functions respectively. The cell totals do not sum to, but exceed, the grand total because many of the projects were identified with more than one of the variables or functions.

Conclusions

Computer simulation is now being used to explore the marketing management responsibilities where previous publication successes were very low. The densities in the three right-hand columns indicate that a sizeable number of the unpublished projects are concerned with topics not previously viewed with computer simulation. Thus, a change in the marketing management topics covered in forthcoming articles dealing with simulation should be expected. Also, with the large number of projects underway there should be an increase in the volume of publications.

The questionnaire also provided information concerning the resources required to complete the simulation projects. On the average 1.7 man years was being allocated to a simulation and marketing management project with the range extending from .25 to 9.0 man years. FORTRAN was the language being used for 83% of the models, while only 8% of the models were being developed in simulation languages (GPSS, SIMSCRIPT, and DYNAMO). The other 9% of the models were being developed in other problem solving languages (BASIC and PL/I).

- 1/ William G. Browne, "Simulation in Marketing Management - An Audit," American Marketing Association Proceedings - 1973, to be published early 1974.
- 2/ Much of this section was derived from: William G. Browne, "Simulation in Marketing Management - An Audit," American Marketing Association Proceedings - 1973, to be published early 1974.

MARKETING SIMULATION PROJECTS - COMPLETED BUT NOT PUBLISHED

		Management Functions					
		Planning	Analysis	Decision Making	Organizing	Control	
<u>Marketing Variables</u>					1	1	
	Products	3	12	29	17	5	-
	Channels	2	5	15	8	3	-
	Physical Distribution	3	7	13	8	2	5
	Promotion	5	8	30	16	5	8
	Price	3	13	30	20	5	7

Total - 36

Consumer Behavior -- 15

Figure 3-a

MARKETING SIMULATION PROJECTS - UNDERWAY BUT NOT COMPLETED

		Management Functions				Control	
		Planning	Analysis	Decision Making	Organizing		
<u>Marketing Variables</u>				1			
	Products	4	9	4	3	2	
	Channels	1	2	4	3	1	
	Physical Distribution		3	1	2		
	Promotion	2	6	12	6	2	3
	Price	1	4	7	4	1	11

Total - 17

Consumer Behavior -- 3

Figure 3-b

TOTAL MARKETING SIMULATION PROJECTS - NOT YET PUBLISHED

		Management Functions					
		Planning	Analysis	Decision Making	Organizing	Control	
<u>Marketing Variables</u>				1	1	1	
	Products	3	16	38	21	8	6
	Channels	3	7	19	11	4	4
	Physical Distribution	3	10	14	10	2	5
	Promotion	7	14	42	22	7	11
	Price	4	17	37	24	6	8

Total - 53

Consumer Behavior -- 18

Figure 3-c

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