THE MARKETING SYSTEM AND INDUSTRIAL GROWTH IN A DEVELOPING COUNTRY: THE CASE OF THAILAND

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1. Introduction

The marketing problems which have often served to delay, distort, and sometimes even destroy development projects and programs are discussed in a variety of authoritative sources.[2] Unfortunately, the implications of such discussions and case studies seem to have escaped the attention of the vast majority of development theorists and practitioners.

In this paper the hypothesis that the marketing system plays an important role in the process of economic development is subjected to an empirical test with data collected in Thailand.[3] Because Thailand serves as an excellent example of a developing dual economy, the results of the following analysis should be of immediate interest to Thailand's development planners and policy-makers as well as serving as something of a representative test of the previously mentioned hypothesis.

2. The Data

The data utilized in the following analysis were taken from the *Report of the* 1964 *Industrial Census of Thailand* and the *National Income Accounts of Thailand for* 1966.[4] The 1964 industrial census represented an attempt on the part of the Thai Government to collect as much data relevant to their industrial sector as possible. This information was sought to assist government planners determine priorities for the Second Five-Year Plan which was to be launched in 1967. The questionnaire used in the data collection process by the census bureau included one section in which firms were asked to report any difficulties that they were facing. A space was provided for the respondents to check any of the categories given in Table 1.

TABLE I

THE QUESTIONNAIRE'S CATEGORIES OF DIFFICULTIES FACED BY INDUSTRIAL FIRMS

Category Number	Category
1.	Lack of Skilled Workers
2.	Not Enough Machinery and Water Supplies
3.	Out-of-Date Machinery
4.	Unsuitable Factory Space
5.	Shortage of Raw Materials
6.	Problems in Transportation
7.	Marketing Difficulties
8.	Competition With Imported Goods
9.	Lack of Good Management
10.	Others

Source: *Report of the* 1964 *Industrial Census of Thailand*

Three of the ten response catagories reflect difficulties largely related to inadequacies of the national marketing system; these include categories 5,6, and 7. Category 5 is considered a marketing system variable because the marketing system of a national entity not only distributes the goods that a firm manufactures, but it also delivers the goods that the firm must acquire from other firms or suppliers. It should also be remembered that when these data were collected the international markets were not plagued by shortages of critical goods as is presently the case--thus supply problems were more a result of domestic shortages and inadequacies than international shortages.

The remaining seven categories can be separated into two additional groups. The first of these groups is made up of the categories of difficultics most likely to result form what can be termed the "economic environment" of the subject country; these include categories 2,3,8, and 10. The decision to include category 10 in this group was made on the basis that most of the difficulties which firms typically would classify as "others"--given the first 9 categories--typically should fall into the "environmental classification", either directly or indirectly.

The second of these remaining groups contains the categories which are atributable to managerial problems not directly related to the economic environment or the marketing system. The three remaining categories (i.e., 1,4, and 9) are included in this classification.

A total of 3,584 firms from throughout the country responded to the questionnaire (virtually all of the applicable industrial firms in Thailand since response was compulsory by law). All of the respondents were organized into eighteen groups according to their industrial classifications (see Table 4).

The proportion of firms in each of the eighteen industrial classifications reporting problems in each of the ten categories were used as the independent variables in the following statistical analysis. The dependent variable was the rate of growth experienced within each industrial classification (as measured by real value-added) between 1962 and 1966.

3. Statistical Analysis and Results

The first step in analyzing the data consisted of a multiple regression analysis performed with the BMD-02R Stepwise Multiple Regression Program.[5] The stepwise process requires that each independent variable be entered into the regression equation in a series of individual steps--the order in which a given variable is entered is dependent upon the order of the amount of variation that it can explain in the dependent variable. It is interesting to note in Table 2, that category 7 was the first independent variable entered into the regression equation. Thus, in this case the most explanatory independent variable was the proportion of firms reporting marketing difficulties; as expected, its coefficient was negative. The other two categories which we have considered to be related to the marketing system (variables 6, and 5) were entered into the regression equation in the third and sixth steps respectively.

TABLE 2

SUMMARY TABLE OF THE STEPWISE PROCESS AND THE REGRESSION COEFFICIENTS OF THE FINAL EQUATION CONTAINING ALL TEN OF THE ORIGINAL INDEPENDENT VARIABLES

A. Summary Table of the Step-Wise Process			B. Regression Coefficients of the Final Equation			
Step Number	Variable Entered	Multiple R^2 At This Step	Variable	Step Entered	Regression Coefficient	F to Remove
1	7	.26	1	2	13.47	1.62
2	1	.39	2	10	4.93	.48
3	6	.46	3	4	-14.84	2.47
4	3	.47	4	9	22.01	1.63
5	10	.49	5	6	7.08	1.74
6	5	.51	6	3	-9.93	2.50
7	8	.52	7	1	-2.66	.25
8	9	.53	8	7	.67	.02
9	4	.59	9	8	-26.41	1.68
10	2	.62	10	5	16.88	2.03

As can be seen from the data included in Table 2, when all ten variables were included in the regression equation, not one of them was statistically significant.[6] Also, the signs of the regression coefficients showed no reconcilable pattern. These conditions are usually strong evidence of multicollinearity, and in order to overcome the limitations imposed by its existence, factor analysis was used in an effort to derive some more meaningful and reliable results.[7]

Factor analysis can serve as a powerful tool to reduce a set of linearly related variables to a smaller number of orthogonal variables. In order to make the analysis meaningful in a theoretical sense, it is necessary to first consider the variables to be summarized in the factor analysis, and on the basis of a prior reasoning, determine, on the basis of theory, the number of factors to be rotated and upon which of these factors each of the individual original variables should load most heavily.[8] For the purposes of this analysis, it was proposed that there should be three factors, and that these factors should parallel the three groups of problem categories (i.e., marketing system deficiencies, economic environmental characteristics, and managerial problems) as previously discussed.

The factor analysis was performed on the BMD-03M Factor Analysis Program, which uses a form of orthogonal rotation to derive the factors. The three factors which resulted summarized 69.35 percent of the variance of the original ten independent variables--the minimum eigenvalue was 1.39419. The rotated factor matrix is shown in Table 3 below.

TABLE 3

ROTATED FACTOR MATRIX

Variable	Factor I	Loadings Factor II	Factor III
1	.04597	.69648	-.24201
2	.90041	.02976	.15836
3	.85077	-.00031	.19329
4	-.06127	.84871	-.03790
5	.06549	.00801	.88215
6	-.21304	.66676	.52174
7	.53009	-.08780	.58022
8	.76267	-.16832	.04105
9	.12422	.81453	.19419
10	.65647	.36642	-.14433

When each variable is placed in the factor in which it has the heaviest loading, in only one case does the results of the factor analysis differ from th e

earlier predictions. Variable 6 loads more heavily into Factor 2 than into Factor 3, but it also leads into Factor 3 quite heavily, It is also interesting to note that variable 7 leads into Factor 1 almost as heavily as it does into Factor3. In spite of this minor deviation from the predictions, it is still logical to consider Factor 1 as the environmental factor, Factor 2 as the managerial factor, and Factor 3 as the marketing system factor.

Thus, the factor analysis, conducted after the prediction of both the number and the composition of the factors, placed the variables into three factors more or less consistent with our prior expectations. Therefore, we can rely on the newly derived "artificial" variables (the three factors) as three representative and orthogonal independent variables.

In order to determine the affect that each factor had on the rate of industrial growth, the estimated factor scores (see Table 4) for each of the industrial classifications were used as the independent variables in a second set of regression analysis. The rate of industrial growth between 1962 and 1966 continued to serve as the dependent variable.

TABLE 4

FACTOR SCORES FOR EACH INDUSTRIAL CLASSIFICATION

Industry	Factor I	Factor II	Factor III
Food Processing	-.71088	-.63737	1.63881
Beaverages	1.11456	2.12255	.94845
Tobacco	.31352	1.26369	.23656
Textiles	.17988	-1.01777	.64119
Apparel	-1.04553	-1.77323	-.25850
Wood Products	-.78815	-.03893	2.28183
Furniture Fixtures Manufacturers	-1.03596	-.89373	-.11079
Paper and Paper Products	-.71109	1.22941	-.38135
Printing and Publishing	-.20046	.66285	-.88948
Leather Products	3.27860	-1.58151	-.09650
Rubber and Rubber Products	.25610	.25565	-.24682
Chemicals and Chemical Products	.39797	.05131	.70591
Mineral Products (non-metal)	.00893	.35550	.39798
Metal Products (non-machinery)	.37714	.48570	-.70158
Non-Electrical Machinery Manufacturing	-.04162	-.15896	-1.67556
Electrical Machinery and Supplies	-.34804	-.67450	-.49220
Transport Equipment	-.47773	.38403	-1.47876
Miscellaneous	-.56726	-.03469	-.51919

Factor 3 (the marketing system factor) was included in the first step of the step-wise regression process (See Table 5). Not only was it the first to be included, but its regression coefficient was also the only one which proved to be statistically significant when all three independent variables were included in the regression equation.

TABLE 5

SUMMARY TABLE OF THE STEPWISE PROCESS AND THE REGRESSION COEFFICIENTS OF THE FINAL EQUATION CONTAINING ALL THREE OF THE ARTIFICIAL INDEPENDENT VARIABLES

A. Summary Table of the Step-Wise Process			B. Regression Coefficients of the Final Equation			
Step Number	**Factor Entered**	**Multiple R^2 At This Step**	**Factor**	**Step Entered**	**Regression Coefficient**	**F to Remove**
1	3	.25	1	2	−.26	.42
2	1	.27	2	3	.25	.46
3	2	.30	3	1	−.81	4.61*

*Significant at the .05 level

The regression equation relying on factor scores as its independent variables is not likely to be useful for forecasting the rate of industrial growth in a given industry over a given period of time.[9] Its structure and the statistical significance of each of its regression coefficients do serve, however, to illustrate the comparative importance of a properly functioning marketing system for high rates of continued growth in a given industry. In fact, the only statistically significant relationship to be produced in this case is that the rate of industrial growth varied inversely with the proportion of firms in a given industry which reported that they were facing difficulties related to the marketing system (factor 3). Or, to put it another way, marketing problems slowed the rate of growth in the industrial sector more than any of the other difficulties reported.

Summary and Conclusions

The hypothesis that the marketing system of a developing country plays a crucial role in the economic growth and development of that country has been subjected to an empirical examination. Information collected in the 1964 Industrial Census of Thailand was analyzed with both step-wise multiple regression analysis and factor analysis in an effort to investigate the nature of the re-

lationships between certain operating difficulties reported by industrial firms, and the rate of industrial growth between 1962 and 1966. The only statistically significant relationship uncovered was that the rate of growth of an industry was negatively related to the proportion of its member firms which reported difficulties related to the marketing system.

Even when dealing with the original set of ten independent variables, in spite of the problems inherent in dealing with data characterized by multicollinearity, the relative importance of the marketing system was recognizeable. This recognition was more obvious after factor analysis was used to construct three theoretically consistent "artificial" variables from the original set of ten.

Thus, considerable evidence has been produced which supports the original hypothesis. As a consequence, therefore, it appears as if additional research (both quantitative and qualitative) designed to investigate the feasibility of constructing more sophisticated and complete theories of development which treat the marketing system as an element important to both the pace and patterns of economic development are called for.

FOOTNOTES

[1]Professor Sentell was engaged in a year long field research project in Thailand conducted in cooperation with NIDA and financed by MUCIA during 1974 when this paper was written.

[2]See for example, James C. Abbott, "Marketing Issues in Agricultural Development Planning," *Markets and Marketing in Developing Economics*, edited by Reed Moyer and Standley C. Hollander (Illinois: Richard D. Irwin, Inc., 1968); William Glade and Jon G. Udell, "The Marketing Behavior of Perunian Firms : Obstacles and Contributions to Economic Development," *Markets and Marketing in Developing Economics*, edited by Reed Moyer and Standley C. Hollander (Illinois: Richard D. Irwin, Inc., 1968); and William Glade, William A. Strang, Jon G. Udell and James E. Littlefield, *Marketing in a Developing Nation* (Lexington, Massachusetts: D.C. Health and Company, 1970).

[3]For theoretical discussions related to the formulation of this particular hypothesis, see W. W. Rostow, "The Role of Marketing in Economic Development," *Marketing and Economic Development* (Chicago, Illinois: American Marketing Association, 1965); Peter F. Drucker, "Marketing and Economic Development," *Journal of Marketing*, XXII (January, 1958), 252–9. Hans B. Thorelli and Gerald D. Sentell, "The Interface Between the Marketing System and Economic Development" (*Thai Journal of Development Administration*, XIV, No. 4 (October, 1974), 498–515); and Gerald D. Sentell, "Dualism and Development: Implications for Market-

ing and Product Market Measurement in a Dual Economy," (unpublished) Doctoral Dissertation, Graduate School of Business, Indiana University, 1973).

[4]These data, as in the case of most data originating in a developing country, must be viewed by the analyst with great caution. For two reasons, despite their dubious quality, these data are useful in this analysis. First, they were simply the only data of this nature available at the time of the analysis -- if not the only data of this nature in existence. Second, in the ensuing analysis we are concerned only with the direction and strength of the relationships between the dependent and independent variables--it is relatively safe to assume that these data are sufficiently accurate to permit such basic analyses.

[5]For an enlightening example of the application of this program, see Donald L. Harne *Introduction to Statistical Methods*, (Massachusetts: Addison-Wesley Publishing Company, 1970), pp. 321–326.

[6]The statistical significance of the regression coefficients is determined on the basis of the "F to Remove" statistic. This statistic is the F ratio for the applicable partial regression coefficient and thus indicates at what level one can reject the null hypothesis that the population coefficient equals zero. See Donald L. Harnett, *Introduction to Statistical Methods*, (Massachusetts: Addison-Wesley Publishing Company, 1970), p. 326. None of the F statistics given in Table 2 are statistically significant at even the .10 level. (The degrees of freedom in this case are 1 and 18-m-1).

[7] The fact that category 7 entered the regression equation first, had the expected sign (negative) and was statistically significant at the .05 level until other variables (and hence multicollinierity) were introduced into the equation does, nevertheless, lend some vigorous support to the hypothesis that marketing difficulties severely limit the rate of growth of both firms and industries.

[8] For an enlightening discussion on the problems inherent in using factor analysis to generate theories rather than test hypotheses see J. Scott Armstrong, "Derivation of Theory by Means of Factor Analysis: Tom Swift and His Electric Factor Analysis Maching," *American Statistician*, XXI, (December, 1967). pp. 19–21.

[9] This statement is based on the relatively low values of R^2 and the instability of the regression coefficients for factors 1 and 2 which can be clearly seen in the data contained in Table 5.