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A QUANTITATIVE STUDY OF ENTREPRENEURSHIP AND
SOCIO-ECONOMIC DETERMINANTS OF DEVELOPMENT IN ASIA

by

PETER F. BELL

AID-University of Wisconsin
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7	H. Myint, "The Inward and the Outward Looking Countries of Southeast Asia and the Economic Future of the Region" (February, 1966).
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12	J.C. Leith, "The Specification of Nominal Tariff Rates in Effective Protection Estimates (October, 1966).
13	K.C. Sen, "Economic Growth and the Price Level--An Analysis of Some Asian Data, 1950-63" (January, 1967).

A Quantitative Study of Entrepreneurship and
Socio-Economic Determinants of Development in Asia

Peter F. Bell

SUMMARY

Development theory and development policy presume relationships between economic variables and between economic and social variables that have, in many cases, not been subjected to any quantitative tests. Such tests would also help to clarify some of the areas of dispute between theorists, as for example the response of the private sector to economic disequilibria.

The theory of entrepreneurship is composed of a multitude of widely differing generalizations, nearly all of which lack empirical support. This pilot study in the use of the technique of factor analysis sheds some light on the systematic relationships which have been assumed to exist between the supply of entrepreneurs and certain social and economic characteristics. Two groups of countries were used, Group I: Burma, Cambodia, India, Japan, Pakistan, the Philippines and Thailand; Group II: Greece, Turkey, Lebanon, Puerto Rico, Pakistan, and the Philippines.

The analysis suggested the following tentative results: (i) a large entrepreneurial class appears to be associated with some of the generally accepted characteristics of developing countries, namely, a decreasing agricultural sector, increasing urbanization, literacy and contact with the outside world, and a slowing down in the rate of population growth; (ii) the growth of such a group might be related to a development pattern which favors capital formation, an expanding government sector, stability of exports and of internal prices coupled with improvements in wages; (iii) a vigorous group of entrepreneurs may also be

affected by an expanding export sector, an export-orientated economy ("outward-looking"), with a degree of dependence in foreign trade. In spite of the great heterogeneity between the two groups of countries, and between the countries in each group, the results displayed a remarkable degree of consistency and "significance" when judged by the standard tests. Although the results are heuristic and tentative, the semi-quantitative insights provided suggest useful hypotheses and delineate the areas to which more detailed studies might be directed. More thorough-going studies of the inter-relations between social and economic variables would assist an understanding of the mechanisms by which growth may be promoted--both nationally and regionally--and would assist in the selection of policies which would more rapidly achieve this goal.

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INTRODUCTION

The theory of economic development remains, in many senses, a theory of capital accumulation but there is wide recognition of the importance of scarce human factors of production--in both their quantitative and qualitative aspects. Entrepreneurs have long been given an important role as innovators and coordinators of other factors of production and, more recently, as agents of socio-economic transformation.¹

In the voluminous body of literature on the role of non-economic factors in development, the concepts of the other social sciences have been widely applied to make descriptive generalizations about their role in development. But the problems of trying to establish a causal quantitative relation between the socio-economic environment and the supply of entrepreneurs are so numerous as to have, so far, escaped any serious attempt at their discovery. Much of the methodology of recent studies has provided categories for historical explanations of things that have already taken place or it has sought to explain the phenomena in terms of such immeasurable and fugitive concepts such as values and attitudes. Other writers, in the absence of any testable hypotheses, have made field studies of small samples of entrepreneurs in underdeveloped countries.² These provide, by way of data collected through questionnaires, information on the origins, education, social background, economic performance and business practices of businessmen in selected countries, but do not substantiate any single theory, permit of generalization, or serve as a guide for development policy. For a systematic analysis of the impact of non-economic variables on the process of development, and of the factors affecting the supply of entrepreneurs, one must inevitably apply quantitative techniques.

Much of the difference of opinion as to how best to achieve a rapid rate of economic growth--as for example, between the proponents of a "balanced" as opposed to an "unbalanced" view of preferable policy--hinges on an interpretation of the effectiveness of market forces and, in particular, the responsiveness of private enterprise to disequilibrium situations. Albert Hirschman has documented his faith in the effectiveness of this path to economic development.³ The development planner needs, in any case, to know the impact of market forces, the effect of varying the size of the profit-orientated sector, of incentives, and of tariff protection. Before this can be obtained one needs to know what general socio-economic factors are relevant, in other words, the underlying structure of forces influencing development in general and the relationship of market forces to the supply of entrepreneurs in particular. Hence the choice of factor analysis as a method of approaching this problem.

What follows below is a pilot study of the use of factor analysis. It seeks to show, by the use of readily available data, the relevance of quantitative techniques in relation to economic development in South-east Asia, and to shed light on the systematic relations which it has been assumed, but never been shown, to exist between selected socio-economic characteristics and the supply of entrepreneurs. Since the primary aim is to reveal the uses of this technique of analysis, it does not aim at completeness, nor does it use completely satisfactory data, it serves at this point, rather, a heuristic purpose.⁴

I

TECHNIQUE OF ANALYSIS

Factor analysis originated in psychological studies, its use in

economics and in economic development is very recent and so far quite limited.⁵ The general hypothesis appropriate to the factoring procedure is that a theoretical structure inheres in the manifest data, in other words it reduces a large number of variables into a smaller number of independent factors of "clusters". The characteristics which distinguish it from the widely used regression technique have been summarized neatly by Adelman and Morris:⁶ 1) in both regression and factor analysis the original variance of a variable is decomposed into variance components associated with the variation of a set of other quantities.

"In regression analysis, the variable whose variation is decomposed in this manner is known as the dependent variable, and the variables which account for various portions of its variation are the independent variables. In factor analysis, each of the variables included in the study is treated as dependent and independent in turn. Thus, by contrast, with regression analysis, which is a study of dependence, factor analysis is a study of mutual interdependence."⁶

2) In factor analysis the final explanatory variables, or "factors", are not observable magnitudes but groupings of the original variables into clusters. These are formed according to the following mathematical principles: (i) The variables which are most closely intercorrelated are combined within a single factor; (ii) the variables allocated to a given factor are those which are most nearly independent of those allocated to the other factors; (iii) the factors are derived in such a manner as to maximize the percentage of the total variance attributed to each successive factor (given the inclusion of the previous factors); and (iv) the factors are normally independent (uncorrelated with each other).

In operational terms it enables one to feed into a computer a series of data describing selected indicators for a given number of selected countries (or other subjects). The technique presents first

a cross-correlation matrix of all the indicators together and of all the subjects together and it then groups the variables into clusters which explain the variance of each indicator for all of the countries taken together, revealing how much of inter-country variations in each indicator are explained by each factor. By a process of rotation it sends out vectors through the correlations and reveals interrelationships between the variables in a number of different ways. The analysis is presented in the form of factor matrices which may contain two, three, four or five factors.

The advantage of factor analysis is that it does not require any rigorous a priori hypotheses. If "the paucity of testable hypotheses has become an even more serious bottleneck in studying economic development than the shortage of data", as Hirschman asserts⁷, then this technique provides results which can serve as hypotheses. In some cases it also refutes commonly held assumptions which have never been put to empirical test. In any case it suggests plausible directions for research and for further empirical testing. It is a technique which both focuses and clarifies.

II

CHOICE OF SUBJECTS AND VARIABLES

The studies by Adelman and Morris, which served as a useful guide for this pilot study, embody methodological aspects which are preferably to be avoided. In particular they employed three different types of data in defining their indicators: (i) purely quantitative, based on published statistics, (ii) combinations of quantitative and qualitative elements, and (iii) purely qualitative estimates. This was made necessary

perhaps by their choice of such indicators as "effectiveness of democratic institutions", "extent of leadership commitment to development". The (several) purely judgemental indicators were arrived at by cross-checks with A.I.D. and country experts.

My interest, which is in any case with social and economic characteristics, allowed political variables to be excluded and pains were made to eliminate all but quantitative data obtainable from published sources.

The indicators chosen⁸ do naturally reflect hypotheses of a general nature, in particular the economic indicators were chosen with a bias to indicators reflecting a possible relationship between the numbers of entrepreneurs and the size and growth of the export sector. In this connection it would have been also highly desirable to have tested the importance of market manipulation by central authorities (tax incentives, import controls) but quantitative data which expressed this succinctly were not readily available.

The indicators chosen were as follows:

- Size of the Entrepreneurial Class.⁹
- GNP per capita.
- Extent of Government Participation in Economic Activity.
- Size of the Agricultural Sector.
- Growth of Exports.
- Instability of Prices.
- Rate of Population Growth.
- Dependence on Foreign Trade.
- Instability of Exports.
- Rate of Capital Formation.
- Wage Improvement.
- Extent of Urbanization.
- Degree of Literacy.
- Extent of Contact with outside World.
- Need Achievement.
- Religious Homogeneity.

Some comment is perhaps here in order as to the concept of "entrepreneurship" implied in this study. First, it refers to a human resource

in the non-agricultural sector of the economy since it is desired here to see what factors affect the supply in this sector. There are also reasonable grounds for thinking that the agricultural entrepreneur has not made a large contribution to the evolution of enterprise in developing countries due to the fact that (i) the technology is less exacting and (ii) due to the conservatism of agriculturalists and their resistance to change.¹⁰ Second, the concept accepted by recent theorizing is no longer that of creative innovation but rather that of "organization". Harbison regards entrepreneurship as a totality of services and organs in a firm that provide members of an entrepreneurial group the means to make decisions. The functions of entrepreneurship thus become coterminous with those of the modern business organization and they include: (i) risk and uncertainty bearing; (ii) planning and innovation; (iii) coordination, administration and control; and (iv) routine supervision.¹¹ Support for this view comes from many sources, both theoretical¹² and from case studies,¹³ which may be examined separately. Further examination of the concept here would not be warranted.

The method of scoring of the Adelman-Morris studies was to classify each indicator for each country in one of four categories (A through D), sometimes with gradations (A+, A, A-, etc.). In doing this they relied on an M.I.T. computer study by Banks and Textor¹⁴ which ranks every country in the world into simple categories according to a range of politico-economic characteristics. Adelman and Morris then simply assigned a score to each indicator on a simple, linear (1 to 100 scale). This enabled them to employ an element of subjective judgement as regards the qualitative indicators.

The above procedure was not followed in this study, even though it

meant risking some loss of smoothness in the results. The data was collected directly from sources and fed to the computer in this state. Since only six or seven subjects were included in the study--compared to the fifty-five and seventy-four of the two Adelman-Morris studies--the ratio of variables to subjects is an unusually high one and makes more exacting use of the data. Two groups of countries were chosen; the first group on the basis of reliability and availability of data, these were countries in Southeast and South Asia: Pakistan, India, Burma, Thailand, Japan and the Philippines. The second group comprised countries for which sample studies of entrepreneurs have already been completed (two countries which fall into this category are duplicated from group I); these are: Pakistan, the Philippines, Turkey, Lebanon, Greece and Puerto Rico. The decade of the 1950's was the period chosen for study, although some figures used refer to slightly later dates.

III

RESULTS, INTERPRETATIONS AND HYPOTHESES

The data were assigned to a previously prepared factor analysis program and fed in several combinations into the computer. The tables below are a representative sample of results. A subjective element enters here, just as in the selection of indicators, but the results have been chosen because they suggest interesting hypotheses and not because they are the most mathematically perfect.

Each table is a matrix of common factor coefficients, or "factor loadings" which summarizes the results of the factor analysis. Each loading (a_{ij}) gives the weight of factor j in explaining the indicator i , thus indicating the strength of the linear relationship between each

factor and the observed variables. The "communality" of each variable (R^2 = the sum of the squared factor loadings of the variable; this is comparable to a regression coefficient in regression analysis) can be expressed either across the rows or down the columns. The row communality is the proportion of total unit variance of the variable explained by all the common factors taken together; column communality is the proportion of total unit variance explained by that factor. Comments on these as measures of significance will be given below.

Trial One

For the first factor analysis all seven Asian countries for which data was available were included. Since it was desired to first obtain an overall picture of the pattern of indicators, the size of the entrepreneurial class was not included. The first factor in Table I groups together variables which are normally associated with a higher level of development (or larger GNP per capita): a smaller agricultural sector, higher rates of urbanization, literacy and voter participation in government. The first factor accounts for 36% of the overall inter-country variations in GNP; it is consistent with the characteristics of development as given, for example by Leibenstein.¹⁶ The loadings in the second factor are high on the size of government sector, the rate of capital formation, wage improvement and a greater degree of religious homogeneity (or a less important religious minority). Since these variables are grouped together one might tentatively interpret this factor as a particular development mode in which government activity assists high rates of saving, and thus capital formation, but not at the expense of wage increases. Since these wage increases are in the manufacturing

sector it might be assumed that they are transformed into consumer demand and--stretching our hypothesis further--act as a development stimulus in urban areas. Such a "demand theory" of development cannot be deduced from this analysis alone, it requires much closer examination, but we are in this technique looking for directions and avenues to explore, not in asserting proven statements.

Table 1

Factor Analysis of 14 Social and Economic Characteristics:
India, Pakistan, Cambodia, Burma, Thailand, Japan, Philippines

GNP, Per capita	-0.93	0.13	0.05	0.11
Size of Agricultural Sector	0.97	-0.17	0.13	-0.22
Population Density	-0.74	0.36	0.04	0.54
Extent of Urbanization	-0.73	0.59	0.06	0.27
Degree of Literacy	-0.80	0.22	0.20	-0.34
Voter Participation	-0.78	0.47	0.70	0.13
Government Sector	-0.39	0.85	-0.06	-0.24
Rate of Capital Formation	-0.36	0.93	0.05	-0.00
Rate of Wage Improvement	-0.64	0.76	0.32	-0.04
Lack of Religious Homogeneity	-0.22	-0.76	-0.53	-0.34
Price Instability	-0.01	0.28	1.00	-0.04
Export Instability	-0.14	-0.09	0.96	0.13
Dependence on Foreign Trade	-0.21	0.38	-0.50	-0.74
Extent of Foreign Contact	-0.40	0.10	-0.01	0.94
[% Communality	36.00	26.60	22.07	15.40

The third and fourth factors have smaller communalities. The third suggests that price and export instability are related as positive and important sources of inter-country variation (the loadings here are extremely high); the fourth factor relates foreign contact, but not foreign trade, dependence to rising levels of GNP.

Trial Two

For this trial Cambodia was excluded (through lack of data) and the variables which are starred in Table II were added or changed. Voter participation was dropped. The first factor relates a large entrepreneurial

class to the "model" discerned in factor two of Table 1, namely wage increases, capital formation and government participation, and also includes some of the developmental characteristics previously noted. In addition a growth in exports, a variable not included in Trial One, is seen to have a high loading in this factor, which alone accounts for nearly 48% of the inter-country variations in the number of entrepreneurs.

Factor two relates literacy and per capita GNP to a large entrepreneurial class but lack of religious homogeneity again has a negative loading. The suggestion that religious minorities play no role is somewhat contrary to expectations. Sayigh in a study of the Lebanon found that more Christians were imitators,¹⁷ however, in Pakistan it appears to have been Moslems themselves who formed the rising entrepreneurial group in the 1950's.¹⁸ As this variable is inconsistent in later trials it does not merit further attention here.

The third factor suggests that price and export instability are negatively related to the size of the entrepreneurial class but that a large degree of trading activity, or a large export sector is favorable. The latter could also provide interesting hypotheses for further study.

Table II

Factor Analysis of 14 Social and Economic Characteristics:
India, Pakistan, Burma, Thailand, Philippines, Japan

*Size of Entrepreneurial Class	0.58	-0.54	-0.53
Size of Government Sector	0.96	-0.04	-0.17
Size of Agricultural Sector	-0.63	0.55	0.15
*Rate of Population Increase	-0.91	-0.05	-0.07
Rate of Wage Improvement	0.94	-0.41	0.23
Rate of Capital Formation	0.85	-0.26	-0.01
*Growth of Exports	0.79	-0.56	0.18
Extent of Urbanization	0.76	-0.60	0.05
GNP per capita	0.38	-0.88	-0.04
Degree of Literacy	0.40	-0.79	-0.02
Lack of Religious Homogeneity	0.14	0.91	-0.25
Dependence on Foreign Trade	0.45	0.08	-0.75
Price Instability	0.24	-0.09	0.91
Export Instability	0.15	0.02	0.91
% Communality	47.70	30.30	22.0]

*Refers to variables changed or added from Table 1.

Trial Three

In order to see the pattern of relationships in the countries of Southeast Asia alone India and Pakistan were excluded from this run and the same data used for just four countries. Table III shows that the communality of each factor is very evenly spread, they explain respectively 37.5%, 31.5% and 31% of the inter-country variations. In the first factor the same development "model" reoccurs as before. The size of the entrepreneurial class falls in the second factor with a positive relation to dependence on foreign trade and negative one to export and price instability. As mentioned above the lack of religious homogeneity here plays a positive role. Taken literally this means that in Burma, Thailand, the Philippines and Japan alien religious groups may play a more prominent role. There may be some reasons already to accept this in the case of the Philippines and Thailand,¹⁹ but the evidence is insufficient to lay great stress on this point. The third factor groups together, again, the characteristics of development previously noted. Higher loadings appear on GNP and the size of the agricultural sector than in Trial Two. The results are very consistent with the previous two trials.

Table III

Factor Analysis of 14 Social and Economic Characteristics:
Burma, Philippines, Thailand, Japan

Size of Government Sector	0.96	-0.27	0.12
Rate of Capital Formation	0.95	0.05	0.22
Rate of Wage Improvement	0.96	0.49	0.33
Rate of Population Increase	-0.92	0.13	-0.37
Size of Entrepreneurial Class	0.52	-0.80	-0.32
Dependence on Foreign Trade	0.30	-0.92	-0.26
Export Instability	0.30	0.97	0.03
Price Instability	0.39	0.95	-0.21
Lack of Religious Homogeneity	0.32	-0.76	-0.57
GNP per capita	0.13	0.16	0.98
Size of Agricultural Sector	-0.41	0.18	-0.90
Growth of Exports	0.68	0.21	0.70
Extent of Urbanization	0.64	0.09	0.78
Degree of Literacy	0.21	0.44	0.87
% Communality	37.50	31.50	31.00

Trial Four

This trial was run in order to include the variable "need achievement" which McClelland and his associates found was "a variable significantly related to entrepreneurial activity in a culture despite wide variations in social structure, in climate, in means of subsistence and level of technological development."²⁰ The data used were McClelland's but were available for only Japan, India and Pakistan out of the countries under consideration here. McClelland's thesis is that a high rate of need achievement precedes economic development by at least one generation (in fact Japan has already a negative value for this variable of $-.95$, suggesting that she has reached her peak in terms of development) and in Table IV this variable falls in the first factor with a familiar collection of other indicators and is negatively related to the size of the entrepreneurial class. In terms of McClelland's hypothesis this does not augur great future development, but since the variable used here is statistically very weak once again too much importance cannot be placed upon it. The factors, in general, fall into the familiar pattern of groupings. It might be mentioned that in Table III and IV the rate of population increase is negatively related to the size of the entrepreneurial class. About this the only observation which can be made is that entrepreneurs clearly do not increase merely as a proportion of population growth.

Table IV

Factor Analysis of 14 Social and Economic Characteristics:
India, Pakistan, Thailand, Burma, Philippines, Japan

Size of Entrepreneurial Class	-0.68	0.55	-0.46
Size of Government Sector	-0.96	-0.06	-0.15
Need Achievement	1.03	0.40	0.21
Rate of Wage Improvement	-0.89	-0.42	0.25
Rate of Capital Formation	-0.81	-0.31	-0.02
Growth of Exports	-0.74	-0.56	0.20
Extent of Urbanization	-0.72	-0.59	0.07
Rate of Population Increase	0.89	0.05	-0.13
GNP per capita	-0.41	-0.86	-0.02
Degree of Literacy	-0.44	-0.82	-0.03
Lack of Religious Homogeneity	-0.12	0.94	-0.20
Dependence on Foreign Trade	-0.59	0.06	-0.71
Price Instability	-0.28	-0.16	0.91
Export Instability	-0.13	-0.01	0.95
[% Communality	50.67	28.70	20.63]

Trial Five

In order to compare, and cross-check, the above results the same program was used for six countries for which field studies on entrepreneurs have been completed;²¹ these include two countries included above (the Philippines and Pakistan). They in general display wide variations in development patterns and characteristics, yet as Table V shows, the results are broadly consistent with those for the group of Asian countries (Trials One to Four). The inter-country variations in the number of entrepreneurs is explained by three factors, the first accounting for about 47% of the variation, rather as in Table II above. The only surprising feature being that the size of the government sector is, for these countries, quite strongly negatively related to the size of the entrepreneurial class, whilst the other features of the previous "model"--dependence on foreign trade, growth of exports, rate of capital formation--are related as before in a positive way. In the third factor need achievement and rate of population growth remain also negatively related. (Both

wage improvement and religious homogeneity were omitted for lack of suitable data.)

Table V

Factor Analysis of 13 Social and Economic Characteristics:
The Philippines, Puerto Rico, Lebanon, Pakistan, Greece, Turkey

Size of Entrepreneurial Class	0.621	-0.654	-0.567
GNP per Capita	0.959	0.045	0.012
Export Instability	-0.933	-0.172	-0.177
Dependence on Foreign Trade	0.816	-0.423	-0.219
Growth of Exports	0.816	0.524	-0.134
Rate of Capital Formation	0.804	0.504	-0.406
Degree of Urbanization	0.729	0.448	-0.446
Degree of Literacy	0.808	0.019	-0.142
Size of Agricultural Sector	-0.754	0.331	0.582
Size of Government Sector	0.127	0.921	0.021
Price Instability	0.061	1.082	0.074
Need Achievement	0.117	0.465	0.988
Rate of Population Increase	-0.227	-0.466	0.858
% Communality	46.9	30.7	22.4

Tests of Significance

The test of significance of the analysis is the communality or the amount of inter-country variation which is explained by the factors, or the proportion of total unit variance explained each factor taken by itself. These tests are obtained by adding the squares of the individual factor loadings either across the columns or down the rows. In Table 1, 90% of inter-country variations in GNP per capita are explained by the fourteen variables considered ($R^2 = (0.93)^2 + (0.13)^2 + (0.05)^2 = 0.8965$). In Tables II, IV and V, the amount of inter-country variation in the size of the entrepreneurial class which the factors explain are 35%, 37% and 32% respectively. Considering the wide variation in the two groups of countries considered and crudeness of the data this is a very consistent result. Within the individual trials there is also a remarkable consistency as to the pattern in which the variables group themselves

(re-calling the mathematical principles underlying this grouping from page 4 above). In every case a primitive "model" is in evidence and also the concurrence of characteristics which theorists have associated with developing countries. The grouping of indicators such as the growth of exports and dependence on foreign trade suggest interesting hypotheses for closer research.

It must be re-emphasized that factor analysis is a preliminary technique which affords the widest possible scope for interpretation. It is this which allows the highly tentative hypotheses above to be drawn. The only assertion implied by the data itself is that a theoretical structure inheres within it; alternative interpretations than those given here may be equally valid.

Lastly, the technique does not permit one to isolate a single variable from the factor in which it is grouped since the individual loadings are not observable magnitudes but expressions of the net correlation between each factor and the observed variables. Although I have gone to some lengths, at times, to explain why an individual loading has a certain relationship to the dependent variable--the size of the entrepreneurial class--this is going beyond the scope of this technique. It will be noticed that occasionally a variable changes its sign between trials. In each case the sign is only relevant insofar as its relation to the size of the entrepreneurial class. In very few cases does this relation change. In the case of the lack of religious homogeneity it does change between Tables II and III. Several points may be made about such instances: (i) no attempt was made to refine the data and produce 100% consistent results by re-runs; (ii) the data itself is crude and is used primarily to illustrate the technique of factor analysis; (iii) when any variable is being

considered attention must be paid both to its value, or loading, and to the communality of the factor in which it falls--lack of consistency would be much more serious in the first factor, if it has high communality, than in the third or fourth; and (iv) the results must be judged overall, according to the tests mentioned above.

IV

RELATIONSHIP OF RESULTS TO THEORIES OF DEVELOPMENT AND
THEORIES OF ENTREPRENEURSHIP

The interpretations of the factor analysis must be, of necessity, highly tentative. But it is interesting to relate these findings to the "inward-looking" and "outward-looking" countries notion suggested by Myint²² and the testing of this hypothesis by Sen.²³ A large entrepreneurial class is associated with Sen's aggregative indicators (per capita real income, saving and investment and consumer price index) and with some of his structural indicators, especially the tendency to export promotion and a shift of employment towards the non-agricultural sector. He finds that on the aggregative front the evidence is inconclusive but on the structural front, the "outward-looking" countries (Thailand, the Philippines, Malaya and Singapore) have fared better than the "inward-looking" ones (Burma, Ceylon, India, Indonesia). A rising entrepreneurial class in an economy would seem to be associated with an outward-looking development policy since the growth of the export sector (for roughly the same period as tested by Sen), and the indicator of dependence on foreign trade, are both positively related to the size of this class in the countries considered.

These results are consistent with the accepted doctrine of economic

development in which an increase in the entrepreneurial class is regarded as a positive tendency. The question that is not fully answered is by what mechanism can such a class be induced? These factors analysis results suggest that certain key economic variables are associated with variations in the numbers of entrepreneurs. They are suggestive of directions for exploration and in no way conclusive. One feature which is frequently overlooked, and which could be measured quantitatively to some extent, is the social cost of growth through the rapid enlargement of the entrepreneurial class. It would be instructive to see how profit rates moved in Pakistan in the 1950's, to what extent great inequalities of income played a necessary role. The side-effects of such development promotion should be kept in mind throughout.

How do the above results relate to current hypotheses about the supply of entrepreneurs? It does affirm that entrepreneurial talent is a dependent variable that is closely related to other characteristics of a social and economic environment. It thus complements the notion of economists such as Henry Bruton.²⁴ The variables included are of a general nature and do not reveal any greater detail as to the impact of uncertainty and profit expectations which may have an important bearing on this supply. Carroll's study of the Philippines lead him to conclude that entrepreneurship was more directly conditioned by economic than by social factors,²⁵ that characteristics such as the possession of capital, technical know-how, business experience and economic incentive are the intervening variables linking up with sociological characteristics.

In particular, says Carroll:

"In the cases of India, Pakistan and Turkey as well as that of the Philippines, a sudden post-war increase in industrial entrepreneurship is seen as the economically rational response of

certain elements of a profit-orientated trading class to the pressure of import controls and the expansion of opportunities for substantial profits in manufacturing."²⁶

It would have been valuable to include in the factor analysis the extent of import controls and the expectations of profits (or actual realized profits) in order that this statement might have been given empirical support.

A model provided by Leibenstein is a useful comparison for its emphasis on economic factors. His definition of entrepreneurship as a "quality" which can be measured by "the amount of money (or value or resources) that can be marshalled for entrepreneurial activities...on the assumption of a given set of available investment opportunities"²⁷ is rather different from the concept embodied in this study which is concerned solely with the number of people in entrepreneurial or managerial type activities. He analyzes the growth of an entrepreneurial group in terms of forces affecting demand and supply. On the demand side growth is a function of ability, training, motivation, and access to opportunities. The latter is a function of growth itself. On the supply side growth depends on the supply of entrepreneurial opportunities which in turn are a function of changes in the relative availability of factors, shifts in the demand for final goods, changes in the supply of factors and in factor prices (which affect prospective profits); and the latter may change as a result of (i) new savings, (ii) population growth and the supply of labor, (iii) the accretion of knowledge plus discoveries. The overall growth of entrepreneurship, which can be interpreted as synonymous with the number of people engaged in "non-zero sum" activities (having a positive affect on national income)--a distinction made by Leibenstein which we cannot make empirical since we know only the quantity

of entrepreneurs--thus depends on the initial size of the entrepreneurial group, the level of per capita income and the economic environment (including prestige accorded to these activities, inventions, new combinations, etc.).²⁸

Leibenstein's model, whilst not in the category of Hagen-type social psychology and Parsonian sociology which defies all measurement, cannot be empirically tested either. It is notable for its emphasis on economic factors as determinants of entrepreneurial growth.

CONCLUSION

The elusive relation between social and economic characteristics, upon which it was hoped to shed some semi-quantitative insights, needs much greater exploration. As stressed above, this study was intended to be a pilot one in which the uses of the technique of factor analysis would be explored by the use of readily available data and fairly randomly chosen indicators. Factor analysis does not, of course, prove anything, but it does suggest reasonable lines of enquiry which might be pursued, by closer statistical examination of certain relationships or groups of relationships, and by field surveys in the countries themselves. In this instance the factor analysis throws a general light on social and economic relationships in the countries which were included. It also supports a view that entrepreneurship is related in a systematic way with economic characteristics. In particular the model of development suggested by factor one (Table II and III) and factor two (Table 1) of government participation combined with a high rate of capital formation and wage improvement is an interesting one. Larger numbers of entrepreneurs seem associated also with factors expressing a large dependence

on foreign trade and the growth of exports and those expressing greater degrees of price and export stability during the 1950's. The level of GNP per capita, by contrast, is not highly correlated with entrepreneurship.

Underlying the search for proven relationships between these variables is the question of development policy and what it should emphasize, in particular (as mentioned above) the reliance that is placed upon market forces and the positive response of a profit-orientated sector to carefully chosen incentives. This study does not contradict the notion that the manipulation of market forces is a determining influence, yet neither is it detailed enough to support this supposition. This study is a beginning attempt to fulfill the need, mentioned by Carroll,

"...for empirical and statistically sound studies, particularly of a broad, descriptive type, on the rise of entrepreneurship under varying circumstances...there has been little effort to relate these variables (social and economic) to each other, to study their interaction and relative importance, or to investigate the whole range of variables which are likely to be relevant."²⁹

APPENDIX

Definition of Variables and List of Countries

The following countries were included in the various trials of the factor analysis:

GROUP I	GROUP II
1. Burma *	1. Turkey
2. Cambodia *	2. Greece
3. India	3. Puerto Rico
4. Japan	4. Lebanon
5. Pakistan	5. Pakistan
6. Philippines	6. Philippines
7. Thailand	

* Because of missing data Cambodia was not included in all the computer runs.

The variables were all quantitative and were obtained as follows:

1. Size of the Entrepreneurial Class

Sources: United Nations Demographic Yearbook, 1964, Table 10: Administrative, executive and managerial workers as a % of total population. For India and Pakistan: United Nations ECAFE Bulletin IX: 3 (December, 1958), Table 15: Managerial, clerical and related workers. These have been checked by reference to other sources. For India and Pakistan the figures have been roughly checked by comparing the size of the middle class and the number of physicians as a % of total population with comparable figures for the other countries.

2. GNP per capita, 1957

Expressed in \$ U.S.

Source: Joseph D. Coppock, International Instability: The Experience After World War Two (New York: McGraw-Hill, 1962), Table A-2, variable X₂₂.

3. Size of Government Sector, 1958/59

Source: Bruce M. Russett, et.al., World Handbook of Political and Social Indicators (New Haven: Yale University Press, 1964), Table 17: Government Expenditure on social security and public enterprises as % of GNP.

For Puerto Rico, figure obtained from U.N. Statistical Yearbook, 1963, Table 171: General Government Expenditure.

4. Size of Agricultural Sector, various years 1950-61

Source: Russett, op. cit., Table 50: % of total labor force in agriculture.

5. Growth of Exports, 1946-58

Source: Coppock, op. cit., Table A-2, variable X_{21} , obtained by taking the slope of the least-squares line through the annual export proceeds.

6. Instability of Prices, 1950-58

Source: Coppock, op. cit., Table A-2, variable X_{24} , obtained by taking the 1958 cost of living index as a % of the 1950 index.

7. Rate of Population Growth, 1958-61

Source: Russett, op. cit., Table 8, percentage annual rate of increase in population. For Lebanon and Greece, U.N. Demographic Yearbook, 1958-63, Table 1.

8. Dependence on Foreign Trade, 1946-58.

Source: Coppock, op. cit., Table A-2, variable X_4 , foreign trade as % of GNP.

9. Instability of Exports, 1947-58

Source: Coppock, op.cit., Figure 4-1, p. 50, Instability index numbers for exports for 83 countries.

10. Rate of Capital Formation, 1961

Source: United Nations ECAFE, Economic Survey, 1961, Table 2-1. Level of gross domestic capital formation as % of GNP. For Puerto Rico, Lebanon, Greece, and Turkey: U.N. Statistical Yearbook, 1963, Table 172.

11. Wage Improvement, 1954-61

Source: United Nations, Statistical Yearbook, 1963, Table 166. Increase in male earnings in manufacture. (Converted in \$ U.S. at official exchange rate.)

12. Extent of Urbanization, 1947/58, various years

Source: Russett, op. cit., Table 9, Percentage of population in cities over 20,000.

13. Degree of Literacy, various years 1950-60

Source: Russett, op.cit. Percentage Literate Population age 15 and over, Table 64.

*14. Extent of Contact with outside World, 1960/61

Source: Russett, op. cit., Table 34, Foreign mail items sent per capita/items received per capita.

*15. Need Achievement, 1950

Source: Russett, op. cit., Table 56, Index of Achievement Motivation-Children's readers.

*16. Lack of Religious Homogeneity, various years 1956/61

Source: Russett, op. cit., Table 74, Christians as % total population. For the Philippines (93% Christian) the figure used was the percentage of the population speaking Chinese, obtained from United Nations, Demographic Yearbook, 1963, Table 10, Population by language.

*17. Voter Participation in National Elections, 1960/62

Source: Russett, op. cit., Table 24, Voters in National Elections as % of Voting-Age Population.

*18. Population Density

Source: Coppock, op. cit., Table A-2, Variable X₁₄, persons per square kilometer.

*Variables which are starred were not used for all runs of the factor analysis.

NOTES

¹ Particularly the work of Hagen, McClelland, Hoselitz, and Spengler. See, for example, Everett E. Hagen, On the Theory of Social Change (Homewood: Richard Irwin, 1962); David C. McClelland, The Achieving Society (Princeton: Princeton University Press, 1961); Bert F. Hoselitz, Sociological Aspects of Economic Growth (Glencoe: Free Press, 1960); Joseph J. Spengler, et.al., Economic Growth: Brazil, India, Japan (Durham: University of North Carolina Press, 1955).

² Yusif A. Sayigh, Entrepreneurs of the Lebanon (Cambridge: Cambridge University Press, 1962); Thomas C. Cochran, The Puerto Rican Businessman (Philadelphia: University of Pennsylvania Press, 1959); John J. Carroll, The Filipino Manufacturing Entrepreneur (Ithaca: Cornell University Press, 1965); Gustav F. Papanek, "The Development of Entrepreneurship", American Economic Review (May, 1962), pp. 46-59.

Other studies include: James J. Berna, Industrial Entrepreneurship in Madras State (Bombay: University of Bombay Press, 1962); J.T. McCrory, Small Industry in a North Indian Town (New Delhi: University of Delhi Press, 1961); Alec P. Alexander, "Industrial Entrepreneurship in Turkey: Origins and Growth", Economic Development and Cultural Change (July, 1960), Pt. I. and "Industrial Entrepreneurship in Contemporary Greece", Explorations in Entrepreneurial History (Winter, 1966), pp. 101-120.

³ Albert O. Hirschman, The Strategy of Economic Development (New Haven: Yale University Press, 1958).

⁴ This study is based, in form and inspiration, to the two studies of Irma Adelman and Cynthia Taft Morris, "A Quantitative Study of Social and Political Determinants of Fertility", Economic Development and Cultural Change, (January, 1966), pp. 129-158; and "Factor Analysis of the Interrelationship between Social and Political Variables and Per Capita Gross National Product", Quarterly Journal of Economics (November, 1965), pp. 555-579.

For an account of the technique itself see references in the Adelman-Morris articles and also R.B. Cattell, "Factor Analysis: An Introduction to Essentials", Papers I and II, Biometrics, (March 1965 and June 1965).

⁵ For an excellent account of the method of factor analysis and its potential uses see Mary Megee, "On Economic Growth and the Factor Analysis Method," Southern Economic Journal (January, 1965) which also gives an account (in the large bibliography) of its development in economics and the other social sciences. Apart from the articles mentioned above in note 4, see an application of the Technique in Akin L. Mabogunje, "Urbanization in Nigeria: A Constraint on Economic Development", Economic Development and Cultural Change (July, 1965), Pt. I, p.. 413-438.

⁶ Morris, op. cit., pp. 130-131.

⁷ Hirschman, op. cit., pp. v-vi.

⁸The exclusion of qualitative variables means effectively that many indicators which have a respectable place in theory and which one would like to include--such as status deprivation, the role of ideology--must be left out. Moreover I would have wished to include had data been available, the importance of foreign investment and the pattern of business profits.

⁹Some comment must be made on the fact that the only available figure which approximates this indicator is that of "Administrative, Executive and Managerial Workers" (see Appendix for sources) which includes two effective groups (i) administrative and executive officials in government, (ii) directors, managers and working proprietors in the private sector; see International Classification of Occupations (ILO: Geneva, 1958). Since it is not possible to separate these in any consistent manner it is necessary to make the additional assumption that the skills are in fact transferable between the two groups; an assumption which would not hold in all these countries.

¹⁰This is the view of Yusif A. Sayigh in his study, op. cit. See his footnote 15 to Chapter Two for supporting literature.

¹¹Frederick Harbison, "Entrepreneurial Organization as a Factor in Economic Development", Quarterly Journal of Economics (August, 1956).

¹²See, for example, Hugh G.J. Aitken, "The Future of Entrepreneurial Research", Explorations in Entrepreneurial History (Fall, 1963); J.K. Galbraith, Economic Development in Perspective (Cambridge: Harvard University Press, 1962). Pertinent to this discussion also is Heinz Hartman, "Managers and Entrepreneurs: A Useful Distinction?", Administrative Science Quarterly (March, 1959).

¹³Sayigh, op. cit.: suggests the entrepreneur is "any man who has power to make a decision in or for an enterprise" (p. 2). He also contradicts the view that managers are 'taught' but entrepreneurs 'born': "The manpower base for which entrepreneurial resources can be drawn can indeed be conditioned to produce entrepreneurial talent". (p. 124). See also, Gustav F. Papenek, "The Development of Entrepreneurship", American Economic Review, Papers and Proceedings (May, 1963). He concludes that (p. 57) "the development of industrial entrepreneurs may depend largely on economic incentives which are determinable by government policy." The United Nations publication, Management of Industrial Enterprises (Department of Economic and Social Affairs, 1958), regards management as one of the "general dynamics" of industrialization.

¹⁴Arthur Banks and Robert Textor, A Cross-Polity Survey (Cambridge: Harvard University Press, 1964).

¹⁵This follows the description given by Adelman and Morris, op. cit., pp. 135-136. See also Appendix II for mathematical description.

¹⁶Harvey Leibenstein, Economic Backwardness and Economic Growth (New York: John Wiley and Sons, 1957), pp. 40-41.

- ¹⁷ Sayigh, op. cit.
- ¹⁸ Papanek, op. cit.
- ¹⁹ Carroll, op. cit., and Robert J. Muscat, Development in Thailand (New York: Frederick Praeger, 1966).
- ²⁰ McClelland, op. cit., p. 70.
- ²¹ See footnote 2 above for details.
- ²² Hla Myint, "The Inward and Outward Looking Countries of Southeast Asia and the Economic Future of the Region", paper presented at a Conference at Kyoto, Japan, February, 1966.
- ²³ Keshav C. Sen, "The Inward-Looking and Outward-Looking Countries of Southeast Asia", AID-University of Wisconsin Project on Economic Interdependence in Southeast", manuscript, January, 1965.
- ²⁴ Henry J. Bruton, Principles of Development Economics (Englewood Cliffs: Prentice-Hall, 1965), especially pp. 254-259.
- ²⁵ Carroll, op. cit., p. 198 passim.
- ²⁶ Ibid., p. 197.
- ²⁷ Leibenstein, op. cit., p. 122.
- ²⁸ Ibid. His complete model is given on pp. 121-146.
- ²⁹ Carroll, op. cit., p. 16.