

LEVEL OF LIVING AND INDUSTRIALISATION

A STUDY ON THE CUMULATION OF LEVEL
OF LIVING COMPONENTS AND
ON THE SOCIETAL FACTORS AFFECTING LEVEL
OF LIVING IN WESTERN EUROPE

BRIITTA KOSKIAHO

JYVASKYLÄ 1969
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PREFACE

At same time with this report it is outcoming a Finnish more widen version of this study by name »Elintason osatekijöiden kasautumisesta ja elintasoon vaikuttavista tekijöistä länsi-Euroopassa» in Acta Universitatis Tamperensis Series A Vol. 8.

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1. OBJECT OF STUDY

International research in social sciences is a fairly recent development, interest in this direction having been greatly furthered by the research activities of the United Nations and its special organisations. The type of analysis made is determined by the point of departure chosen for international comparison. Where the object is to compare aspects dependent upon formal, for example administrative factors the analysis may be termed *cross-national*. Where again societal factors, mainly sociological, are in the foreground we may speak of *cross-societal* analysis. And thirdly, where attention centres on aspects representative of different cultures the analysis may be described as *cross-cultural* (Scheuch 1967, 19).

In the sociological type of macroanalysis three levels of operation can be distinguished (Rokkan 1966, 21—22). The first comprises international studies based on separate investigations in the respective societies involved, these being then combined and the results compared. On the second level are studies carried out with various materials collected according to uniform principles, for example those based on international statistics. The third type of investigation involves material collected specifically for the purpose in hand, for example field studies employing the interview technique. Such undertakings require extensive resources which only the international organisations can really adequately provide.

The number of studies of the second type, working mainly with international statistical material, has shown an astonishing increase during the present decade. The sudden interest is due — apart from the trend towards international activity in general and the attention now being drawn to the underdeveloped countries in particular — to the fact that only after the population censuses of the early sixties have there been statistical data available on social variables. Extensive projects in the U.S.A. (above all those in the universities of Yale and Chicago) have begun to collect information covering wide areas of life in every country in the world. On the basis of such data there first appeared two publications by Chicago of research results (Ginsburg 1960 and 1961) and subsequently the findings of the Yale project in the form of an extensive manual with analyses (Russett et al. 1964). These two programmes contain empirical statistical data on both socio-economic and (in the case of Yale) political factors.

A number of other investigators, mainly American, have since taken advantage of these data and undertaken a considerable range of empirical studies based on them. Particularly those engaged in political research have felt the need for international comparison. Explanations for variations in political factors have been sought in factors of a socio-economic nature.¹

Very frequently the choice of socio-economic variables in these mainly cross-national studies has been somewhat random, rarely guided by reference to theory. Further, material of world-wide scope has often been treated from a markedly American standpoint. Nevertheless many of the investigators have made commendable attempts to apply statistico-mathematical multivariate techniques also to macro-level international analyses (e.g. Olsen 1968, Banks & Gregg 1965, Rummel 1969 and Russett 1968, as well as Berry, who sets out from the measurement of socio-economic factors in the work Ginsburg 1960). The starting-point for these multivariate analyses has been mainly structural-functional. The investigations have taken the form of cross-surveys seeking to discover in a wide range of variables economic, social and in most cases also political dimensions. The U.N. Research Institute for Social Development has also established a data bank for information on world variables involved in social and economic development. At present the bank has data on some hundred variables in 115 countries. It is mainly concerned to serve the needs of the Institute's own international projects in this field (Research Notes... 1968).

The point of departure for the present undertaking has taken shape gradually from two basic points of view, namely the increasingly international world scene and the analysis of the concept and content of »level of living«. Ultimately it was decided to undertake an empirical study of the level of living on an international scale, setting out from a particular theoretical standpoint.

1.1. CONCEPT AND MEASUREMENT OF LEVEL OF LIVING

The definition of level of living may be sought from many points of view and the conclusions reached may prove in very many cases to be mutually

¹ Studies of this type based on statistical material include e.g. Banks & Textor: A Cross Polity Survey 1963, Cutright: National Political Development: Measurement and Analysis 1963, Olsen: Multivariate Analysis of National Political Development 1968, Feierabend: Aggressive Behaviors within Politics 1966, Sawyer: Dimensions of Nations: Size, Wealth and Politics 1967, Banks & Gregg: Grouping Political Systems: A Q-Factor Analysis of a Cross-Polity Survey 1965, Rummel: Indicators of Cross-National and International Patterns 1969, Russett: Delineating International Regions 1968, Tanter: Toward a Theory of Political Development 1967.

exclusive. Up to now very little international research has been done on the subject. Its importance has nevertheless become clear with the increasing interest in improving living conditions in the development countries. Such research presupposes also an empirical study of the content of level of living first of all in countries where industrial and social conditions are already advanced. Such analysis would make it possible to study the content of the level of living in less advanced countries and to compare and contrast it with that of developed societies. By reason of differences in conditions it is not at all to be expected that even as regards basic aspirations the level of living of the former would prove identical to that of the latter.

Level of living is a question of the satisfaction of needs. The society seeks through its activities to satisfy the needs of its members. On the other hand it depends upon the individual himself whether he feels his needs have been satisfied, and this involves in large measure factors of culture and personality.

Definitions of the satisfaction of needs, welfare, level of living or whatever term is used are generally of such comprehensive and theoretical nature and without operational counterpart that they may mean for example »the whole of life«, a concept difficult even to begin to measure. The concept of *individual welfare* might be restricted to comprise that state of satisfaction of needs (realisation of valuations) which the individual himself regards as adequate and which lies within the criteria society imposes upon the individual in the pursuit of his ambitions. *The welfare of society* is a state in which it is possible for the individual to find adequate satisfaction for his needs in a manner approved by society. Society assumes the individual to have certain fundamental needs which must be satisfied up to a certain point (Roos 1968, 34—35). This definition diverges decisively from the concept of total welfare in economics.

In an attempt to measure factors involved in welfare this general definition must be more precisely analysed. Drewnowski, in his definition of *welfare level of the population*, has arrived at the following conclusion (Drewnowski 1966, 8). The level of welfare is the state or level of well-being of the population as it exists and can be measured at a given point of time. The level of welfare involves the physical, intellectual and moral state of the population. Thus defined level of welfare is a quantifiable concept. It involves a variety of partial factors representative of different human needs and can thus be regarded as the sum of its parts, whereas in economics welfare is frequently treated as total, as a single entity.

In such attempts at definition where no application is envisaged the term *level of living* is frequently employed as a counterpart to individual or societal welfare. Such for example is the definition whereby level of living

means the actual degree of satisfaction of the needs of life in a given population, measured by social variables agreed upon at a given point of time (Waris 1965, 145).

Level of living nevertheless usually comprises a more limited entity than level of welfare, especially where it is employed as an operational concept in the measurement of satisfaction of needs, as a partial measure of welfare. In many cases the level of living concept is further narrowed to refer only to some particular aspect, for example level of consumption (here Bennet 1951 and Family Living Studies, I.L.O., 1961 may be cited). In studies dealing with factors involved in consumption, however, investigators have confined themselves to material aspects, whereas level of living clearly involves also non-material elements (Report on International . . . 1954). The measurement of these latter, however, is subject to considerable difficulties, which explains why investigators have avoided treating them in studies of level of living.

The interest displayed in U.N. circles in the content of and the possibilities of measuring level of living assumed concrete proportions at the beginning of the 1950's, when the organisation commissioned a group of experts to examine questions relating to level of living. The main attention of the committee was directed to an analysis of the possibilities of measuring it on an international macro scale. In the early 60's the group were further commissioned to draw up a more precise account of the definition and measurement of level of living. On the basis of their reports three conceptions emerge (Report on International . . . 1954 and International Definition . . . 1961):

1. *level of living* means the actual living conditions prevailing at a given point in time,
2. *standard of living* refers to the conditions of life aimed at, and
3. *norm of living* means living conditions set up as objectives with certain criteria, usually minimum norms; for example it is sought to achieve the working hours standard recommended by I.L.O.

The effort to specify the level of living concept for operational purposes has continued in the U.N.. Professor Drewnowski of the Research Institute for Social Development has evolved a definition which is perhaps considered suitable for application in macro-level international investigations (Drewnowski 1966). By *level of living* is meant that level of satisfaction of the needs of the population achieved in a given period of time (usually one year) through the flow of goods and services provided (Drewnowski 1966, 9). Level of living is thus a flow concept measured within a given unit of time and

not a given point in time like *level of welfare*. Like the latter, level of living may be divided into components representing various needs to be fulfilled. In Drewnowski's view level of living can profitably be measured only by reference to the complete satisfaction of needs at specified standards. Also important is how the level of satisfaction of needs is distributed among the population.

Level of living, as part of the process of satisfying needs, involves first of all the consumption of social capital. After this stage it is possible to measure the degree to which the consumption has brought about a satisfaction of needs in the population (Drewnowski 1966, 44) and it is to this part of the process that level of living refers. The level of welfare, on the other hand, is a measurement of the actual physical and intellectual state of the population arising partly out of the level of living flow. Theoretically it is important to distinguish level of living from level of welfare. In practice this task is often impossible. In this study there are e.g. some indicators of level of living which better would belong to level of welfare.

In the present study the term level of living refers to the above Drewnowskian macro-level concept, embracing that part of the process of satisfaction of needs arising out of the flow of goods and services in a given unit of time. Aspects related to the measurement of level of living are treated here mainly from the macro-level and specifically from the international standpoint. According to the U.N. committee on level of living macro-level comparisons can be made only if the values or value systems are maintained identical or if differences among them are known and can be taken into account (Report on International . . . 1954, 5—6).

In the report of 1961 (International Definition . . . 1961, 4) the committee of experts arrived at the following list of spheres of life to be included in the concept of level of living:

health	education
nutrition	social security
housing	leisure and recreation
clothing	human rights.
employment conditions	

Macro-level comparisons in this field are not possible at all except by measuring clearly quantifiable units within clearly defined spheres of life (Waris 1965, 143). With this in mind the level of living is subdivided into the above 9 *components*. These components are measured in practice by *indicators* composed of indirect measures from the goods and services groups. The components are fairly wide in scope and comprise a number of elements,

while the indicators are of more simple composition. The components thus have many dimensions which the indicators can be used to map out.

The Reports of 1954 and 1961 achieved a delineation of the problem of measurement and an indication of the direction in which the solution was to be sought, but the problem of empirical measurement has hitherto found no overall solution on this basis. The report of Drewnowski and Scott makes an advance on the foundations laid and seeks to create an overall measure of level of living which could be applied in different societies with a view to a comparison of the findings (Drewnowski & Scott 1966). They divide the satisfaction of needs to comprise on the one hand *primary needs* (physical and cultural), on the other needs of a *higher degree* (designated broadly as luxury needs). In what follows the present writer uses the terms primary needs (physical), secondary needs (intellectual) and tertiary needs (luxury).

Level of living components:

those involved in satisfying primary, so-called basic physical needs

level of nutrition
level of housing
level of health

those involved in satisfying secondary, so-called intellectual needs

level of education
level of leisure and recreation
level of security

those involved in satisfying tertiary, so-called luxury needs

surplus income which can be directed to satisfying »luxury» requirements after the more basic needs are attended to.

The primary and secondary needs may roughly be said to appear in all forms of culture. The tertiary group on the other hand vary markedly from one culture to another. However the above six parts of the primary and secondary sections of the level of living each include a fundamental element and also an element which can be regarded as the satisfaction of a tertiary need; thus for example nutritional needs, where a certain basic requirement prevails as regards both quantity and quality, but where an increase in wealth brings an increased attention to the quality of nutrition. In general the components acquire different significance as one moves from one income level to the next; with increasing welfare the physical needs in particular lose their prominence and the higher requirements come to the fore. For example the general measures of quantity and quality of nutrition are much less relevant where the level of living is high.

The breaking down of the level of living into these components brings out certain problems of theory and of measurement, of which the latter are largely related to the problem of the validity of general theoretical concepts and their operational counterparts.

The measurement of level of living also involves the problem of the coverage and the mutual exclusiveness of the components, as well as that of distinguishing the tertiary needs from the rest. On the macro scale this is a matter of considerable difficulty, requiring a study of the preferences of the population. Different needs fall in a different order of importance in different cases, but how is this to be taken into account? Can a means be found of weighting the various elements of level of living appropriately? The wide range of elements involved is also a problem of internal distribution within the observation unit.

Drewnowski and Scott have established a level of living index containing indicators representative of the various components. The creation of such a system required the drafting of a set of norms in which every indicator is prescribed limits within which it varies, as well as optimal values. Weighting has been tried out, calculating figures both with the same and with different weightings. The level of living index is worked out by translating each indicator into index form according to a formula, combining the weighted indices into component indices and these finally into level of living index figures (Drewnowski & Scott 1966, 23—24, 68—69). If the level of living components are left without weightings of different value the result is perhaps an excessive simplification of the order of importance of the needs. On the other hand the weighting should have the support of other studies, e.g. population preference studies.

This attempt to find a synthetic measure of level of living embracing as many types of human need as possible is particularly notable and constitutes a great advance upon the mode of approach prevalent e.g. in economics, where level of living is treated in practice as an economic variable, usually level of income. Here level of income, though closely allied to level of living, is theoretically distinguished from it, featuring as one of the indispensable prerequisites in raising it. Other investigators have recently sought to establish level of living indices (e.g. Cseh-Szombathy 1962 and Beckerman & Bacon 1966) but the idea of Drewnowski and Scott is theoretically more advanced.

The increased use of statistico-mathematical multivariate techniques has revealed new possibilities of inquiring into connections between various factors involved in level of living and of forming measures of this on the basis of empirical material. Cumulation among level of living factors has been studied in Finland by Salavuo and Riihinen, among others, though

the object of the latter went far beyond this specific aspect (Salavuo 1968 and Riihinen 1965). Both come to the conclusion that in using factor analysis one cannot speak of complete cumulation in level of living, the cumulation involved being mainly incomplete. No clear-cut general factor is to be found in level of living such as that proposed in American studies of the subject (Salavuo 1968, 127—130, Riihinen 1965, 118—119; supporters of a general factor include Belcher-Sharp 1952 and Sharp-Ramsey 1963, 156—157).

No generally applicable means has thus been devised as yet of measuring level of living and doubtless the task will not prove easy. Level of living is so largely dependent upon the preferences of the population concerned that attention and resources ought to be devoted to these.

1.2. SOCIETY INDUSTRIALISATION FACTORS AFFECTING LEVEL OF LIVING

The theoretical starting-point for the present study lies in those societal factors which have formed our environment and contributed to the improvement of our conditions of life. The tradition of Western European industrialisation derives from the value trends prevailing in Europe throughout the modern age. Of significant influence in the birth and development of industrial society have been Protestantism and Liberalism (Riihinen 1964, 765—768). Protestantism above all has favoured the emergence of an economic system based upon rational principles and indirectly also created the conditions for the expansion of knowledge necessary to such a development in that it promoted interest in raising the level of human knowledge and pursuing research. With liberal thinking, again, came the conception that man can effect improvement in his own welfare. Welfare and its distribution is no given quantity. From Liberalism comes also the stress upon division of labour as a means of furthering efficiency of activity.

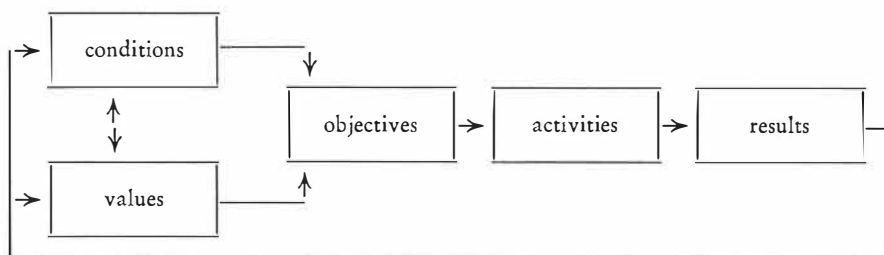
As social values changed the European peoples began in the XVIIIth century to realise the process of industrialisation and thereby the development of society. Industrialisation is by no means an end in itself. It creates the resources for the realisation of other objectives of a higher degree. In the struggle from agrarian society towards ever more industrialised modes of life a number of processes characteristic of industrialisation emerge, through which change takes place. These might be termed intermediate mechanisms and they indicate how and by what factors the change from agricultural to industrial society is to be understood (Allardt 1966, 32). They may be either processes or static phenomena (Riihinen 1965, 6).

To use Durkheim's terms, industrialisation comprises a change from

mechanical to increasingly organic solidarity in society (Durkheim 1960). The organic solidarity of modern society is based upon contracts. In such a society the factors most important in forming expectations are performance and efficiency. In a basically agrarian society again, where the solidarity is mechanical, the stress is upon personal qualities. The more advanced a society is, the less significance is attached to the characters of its members and the more emphasis is placed upon what they do, how efficiently they function in the community. It is indeed a commonplace that Western culture has its roots in the achievement-oriented movements of Protestantism and Liberalism. It might thus be held that the protestant states in Western Europe, where liberal principles have also best thrived, are as regards their value systems more uniform among themselves than with the catholic states. They are, furthermore, uniformly situated in the northern region of Western Europe.

Industrialisation may be taken to embrace more than those activities directly connected with the production of goods; it includes the relative increase in the results of production in the industrial and service fields and in the proportion of the population engaged in these fields. This of course is only the surface view, behind which lie those features of industrial evolution springing from the above-mentioned value systems (e.g. Riihinen 1964, 764—765), features such as the rational approach, the value set on performance and the decrease in pressures toward uniformity in all except efficiency, and again organisational aspects such as differentiation in division of labour, aspiration to efficiency and specialisation. The characteristic features of industrialisation are also on the whole closely allied to each other. For example the aspiration of society to efficiency is a matter of regard for performance. At the same time it presupposes a distribution of functions in the economic structure and the organisations. This distribution again requires the adaptation of training to specialised fields of work. Activities in general can in fact be said to be based on an emphasis on rationality. The rational approach and the lessening pressure to uniformity have in turn brought a new freedom from the environment (Allardt 1966, 69). The industrialised society has a wider range of values than the agrarian society and its members tend much more to accept widely different modes of thought and activity.

The process of activity in the society can be summarised in the diagram form shown below, giving in very rough terms the factors influencing the formation of the objectives the community sets itself and on the other hand the results of its activities (cf. Williams 1967, 27).



Physical conditions influence the formation of the society's objectives either directly or through the medium of values. In the background the values of the majority of its members determine the type of objective the society undertakes. The society seeks by the policies it pursues to realise its objectives. The outcome of its activities shows the extent to which it has succeeded in achieving its aims. The system does not function solely in this direction, however; rather, all elements exert an influence on all others. According to the impulses gained from results achieved the value system may be redefined. At the same time the society through its activity changes its environment. Also, apart from internal changes in the relations between factors within society, the relationship of society to the surrounding world has its effect upon the formation of its activities and upon the results of this.

The activities of a society are based upon its structure. But through its activities it at the same time changes its structure to conform more to its objectives. On the other hand disturbances may give rise to structural factors unfavourable from the community's point of view. These may, however, have the effect of giving impulse to activity and encouraging aspiration.

The effects of industrialisation are seen as changes in the functions and the structure of society, so that it is possible to inquire how far the features typical of industrial evolution — differentiation in division of labour aspiration to efficiency, specialisation etc. — are reflected in the activities and the structure of a given society.

The process of industrialisation has also its side-effects, which are reflected in structural changes. Such are the increase in population mobility, the marked trend to urbanisation, the relative increase proportion of the highest age groups and the corresponding decrease in those of working age. The industrial society also has ever-increasing contact with the outside world. At the same time mutual dependency both within society and among societies is increasing in the sense that all depend upon performance and results, this again being reflected in structural factors (Eliasson 1963).

In spite of this mutual dependency emerging in the context of performance it is evident that the differences in income level and generally in industrialisation level between the wealthy and the poor nations are becoming more

marked (Myrdal 1957, 73—75). The same would seem to apply to conditions within separate states, at least where the original regional differences are sufficiently marked (Koskiaho 1969). Thus the new type of dependency associated with the aim at efficiency does not appear to help all concerned to develop to the same degree and does not bring mutually dependent but unequally developed societies any closer together.

Structural factors on the one hand reflect the results of functions, but on the other they are resources which can be drawn upon for future activity. Such factors can be influenced directly and they can thus be controlled. But there also exist basic structural factors which under normal conditions cannot be influenced except in the very long run so as to bring notable changes. Thus for example the size of the population, the distribution of the population in religious groupings etc.

The present study also involves a concept of cumulation, emerging largely from the thought of Durkheim and Myrdal (Durkheim 1960 and Myrdal 1957). Cumulation comprises a dependency relationship among various factors in such a way that a change in one will effect a change in the other. It is thus not a question of causal relationship, of cause and effect, but of a continual changing of roles among the factors so that now one, now the other is the source of influence (Riihinen 1965, 3).

As pointed out the features of industrialisation are to a large degree associated with each other, and it may be assumed that cumulative concentration is involved, so that a fluctuation in one factor will bring a similar change in another. The present study seeks to establish the degree to which the functional and structural factors associated with industrialisation are mutually cumulative and whether a mainstream of cumulation can be found possibly with dimensions lying beyond its own bounds. The writer is thus not concerned with a causal interpretation of industrialisation subfactors but with a delineation of the main dimensions of the industrialisation process.

Industrialisation can be regarded as a means by which society realises its own ends, the most immediately associated being welfare objectives. In the present work these latter are operationally represented by the level of living. Also in the case of level of living we may speak of cumulation. Overall satisfaction of needs involves provision for more than one need group. We might in fact expect to find a mainstream in the level of living, linked with the level of industrialisation and involving mutual promotive influence among its various components. The main dimension of industrialisation might be presumed to be linked with the main dimension of level of living. On the other hand it is not so certain whether dimensions in industrialisation diverging from the mainstream would similarly be connected with divergent

dimensions in the level of living. The sources of these might lie in factors not associated with industrialisation at all.

Society also has other objectives not directly associated with this process of raising welfare through industrial advance. Such for example are the establishment of internal and external security and the problems of distribution of power within society. The presence of other aims for its part restricts the optimal use of resources in pursuit of level of living objectives (Gross 1966 and Riihinen 1965, 9), but of course they too may make an indirect contribution to the level of living.

Cumulation was mentioned above as a phenomenon in variable space. Nevertheless cumulation in industrialisation and in the level of living may also be studied observationally.

This study is basically a *functional cross-societal survey* which in some degree seeks to take account also of the evolutionary standpoint. The observation units comprise 16 Western European states¹ at the beginning of the 60's.

The object of the study is:

1. to form an operational means of studying and measuring level of living and to study cumulations among the components of level of living and after that level of living cumulations in units observed,
2. to form a measure of the society-level structural and functional factors associated with industrialisation and study the cumulations among its various subfactors, and after these two points,
3. to ascertain what associations level of living has with industrialisation.

The composition of the study may be expressed in terms of the following variables:

ENVIRONMENTAL FACTORS: climate, geographical location, area

SOCIETY STRUCTURE FACTORS AND FUNCTIONS: *Basic structural factors*: natural economic resources, basic population factors, value systems, and *structural factors*: industrialisation, division of labour, efficiency objectives as well as influences exerted upon population

¹ The term Western Europe in this investigation refers to the states in Europe other than the socialist.

factors and communications by the concomitant phenomena of industrialisation, *functional factors*: functions associated with industrialisation, division of labour and efficiency

ACTUAL OBJECTIVES: the level of living with its contributory factors, components.

Level of living can be regarded as a function of other factors, thus:
Level of living = f (Environmental, Structural and Functional factors).

The object of this study is thus theoretical, to study the content of level of living and its associations with industrialisation. The task is experimental, the conditions of experiment being Western European countries. The basis is in seeking basic dimensions.

2. CHOICE OF UNITS OF OBSERVATION, VARIABLES AND METHODS OF ANALYSIS

International comparisons can be carried out at both micro and macro level. In most cases, however, they are macro-level studies employing global variables. In micro studies the reliability of results is undermined by the presence of community factors influencing the population involved and thus also any findings reached. Macro-level inquiries frequently concentrate upon the relationships between factors associated with entire systems and on the testing of hypotheses concerning the effect of the presence of various components (Rokkan 1966, 19—20).

In the selection of observation units for the present study the primary concern was with their homogeneity (Smelser 1967, 17—18). The states chosen were roughly uniform as to differences arising from geographical location, climatic conditions, historical development, social system and value patterns. Clearly the finer the analysis, the more differences will also emerge in these to some extent homogeneous aspects. *The observation units were 16 Western European states*, namely Austria, Belgium, Denmark, Finland, France, Western Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom. Lesser principalities, by reason of their small populations, and Iceland both for this reason and on account of its remote location, were not included in the inquiry.

Since one of the purposes of the investigation was to ascertain cumulations among the components involved in the level of living it was natural to select the variables so as to represent the same point in time. On the other hand in the effort to establish the relationship between the structural and functional factors of the community and its level of living it is natural to assume that the level of living at a given point in time is a function of the activities of the period preceding it. The time aspect should thus also be taken into account. The present writer resorted here to the inclusion of the growth aspect of some variables associated with industrialisation. Again it is possible to consider structural and functional factors alongside level of living factors at the same point in time and ascertain to what extent they are associated with each other thus measured.

Apart from theoretical considerations there are also practical reasons for the choice of a cross-sectional type of study here. There is namely no information on level of living in the time sense on which to base a comprehensive

common measure of all the observation units involved. The level of living variables are derived largely from census data, and the only reliable information in this context is that from the early 60's and to some extent also from ten years earlier. *The present cross-survey concerns the situation in the early 60's.*

An effort was made to include in each level of living variable indicators of both *quantity* and *quality* in the components. The level of living indicators are also indirect measures, since for this type of study no other kind of measure is available (Drewnowski & Scott 1966). They are formed mainly according to internationally agreed universal criteria such as those proposed in the level of living committee reports mentioned earlier and the level of living studies carried out by the Research Institute for Social Development (Report on... 1954, International Definition... 1961, Drewnowski 1966 and Drewnowski & Scott 1966). The measures are *ratio variables*, as are ecological measures in general. Such variables measure either average or distribution figures. The statistical material is drawn in the main from figures published by the United Nations and its special organisations.

To make it possible to deal with the large number of variables involved in the study resort was taken to *statistical multivariate techniques*, modes of analysis which allow of the simultaneous use of a number of variables. This has been the procedure also in earlier studies involving economic, social and political variables (e.g. Berry 1960, Russett et al. 1964, Russett 1968, Riihinen 1965 etc.). The theoretical and in fact primary argument for the use of multivariate analysis here is that the study is concerned to discover the basic dimensions of industrialisation and level of living and to study their mutual relationship. Study must confine itself for the most part to structure factors and functions reflective of the level of industrialisation, though in theory it is a question of industrialisation as a process. In only a few cases were the variables designed to give a picture of the process itself.

It is sought to ascertain whether there is a latent system among the variables associated with industrialisation on the one hand and level of living on the other and to discover the nature of this system (Riihinen 1965, 82 and Thurstone 1953, 59—60) and again whether the variables cumulate completely in either case or whether there is incomplete cumulation, as has been observed in other studies (Riihinen 1965 and Salavuo 1968). The answers to these questions are sought by means of factor analysis, and the most typical variables in the cumulations (factors) are sought for application both in regression-type multiple correlation analysis and in unbounded selective regression analysis of the mutual influence of industrialisation and level of living (Cooley & Lohnes 1962, 31, Harman 1960 and Mustonen 1964 b, 80—81).

3. CUMULATION OF LEVEL OF LIVING COMPONENTS

Two modes of approach are taken here in the study of the cumulation of level of living components. It is sought to clarify on the one hand the internal cumulation among the indicators in the components and on the other the cumulation among the components. In either case cumulation may be complete or incomplete. In the case of incomplete cumulation among the components it is further possible to distinguish in advance different types: certain groups of components as a whole cumulate in the same factor, or certain indicators in the various components cumulate in some factor and others in other factors in groups created by some latent common element in the indicators. This aspect distinguishes the factorisation of level of living from a mere grouping of level of living variables for theoretical analysis. However, latent functions associated with the level of living variables cannot be discovered through these variables alone, for which reason an effort as made later by reference to industrialisation to shed light on the mechanisms the level of living components are connected with.

3.1. INTERNAL ANALYSIS OF LEVEL OF LIVING COMPONENTS

Five level of living components are studied by means of factor analyses of each component calculated on the basis of a correlation matrix, and two components, on account of their scant content, on the basis of the correlation matrix itself. From level of living components there were also worked out the principal components besides principal axis factors in order to give assurance of the reliability on the factorisation (methods in Harman 1960).

LEVEL OF NUTRITION. This component contains only three indicators. The level of nutrition as a component of level of living assumes greatest significance in the undeveloped countries. In all countries in Western Europe the stage has already been reached where the estimated calory and protein requirement per head is on the average ensured, and in Central and Northern Europe the minimum has been considerably exceeded. We are thus at the stage where qualitative considerations are assuming greater significance than quantitative in this context. Thus a quality factor, the relative proportion of animal protein content, is in fact the only one of the three level of

nutrition variables which shows any notable degree of significant correlation with other level of living variables. Factorisation has not been seen to be necessary in this case.

LEVEL OF HOUSING. The basic quantitative housing level variables comprise indicators measuring the ratio of available accommodation to the numbers needing it. Qualitative factors are the indicators of sparsity of occupancy and level of equipment. Also included are factors measuring change in the number of dwellings and the ratio of privately owned accommodation to other, which are not actual level of living factors but dependent upon local conditions and particular value patterns prevailing.

Characteristic of principal axis factor analysis is that it brings out cumulation to a maximum. And indeed the first factor in the level of housing explains about 51 % of the variables, the three factors together explaining about 72 %.

Factors of level of housing in principal axis solution and varimax-rotation:

	Principal axis				Varimax		
	I	II	III	h ²	I	II	III
6. spars. of. occ.	941	-095	144	916	876	-103	-372
9. equipm.: water pipe	916	240	178	929	860	234	-366
10. equipm.: wc	858	-003	065	741	760	-019	-403
12. equipm.: electr.	829	197	-439	918	459	124	-832
7. family dwell.	817	-373	324	911	877	-356	-124
5. dwell./popul.	780	-120	-484	857	406	-194	-809
11. equipm.: bath	761	243	138	657	708	237	-317
4. dwell./househ.	228	-622	023	439	228	-621	-035
8. new dwellings	050	771	047	599	038	770	-071
13. ownership	-058	-443	-147	221	-111	-455	-044
Eigenvalue	5.061	1.495	0.632				
Eigenvalue as % of number of variables	50.6	15.0	6.3				

Cumulation appears in the high loadings on the first principal axis factor and the high figures shown by the communalities. An exception here are the quantitative criteria for housing as compared with the number of households, as well as the indicators for new dwellings and ownership. The picture thus obtained can be further elucidated by varimax rotation and the nature of

¹In the matrix the decimal point is left out before each figure (e.g. 0.941 appears as 941). h² = communality.

the factors examined. Consideration in the light of rotation is not in itself an analysis of cumulation, it consists rather in a study of mutually independent invariant dimensions (Thurstone 1953, 319—346 and Markkanen 1964).

Rotation does indeed shed further light on the picture already gained. There appears to be a division of labour between the first and the third factor, because the density of electrical facilities and the number of dwellings compared with the population, which got their highest loadings on the first principal axis factor, now transfer a considerable portion of their variance to the third factor. The *first factor* has become a typical *density of occupancy and sanitation level factor*. The *third factor* for its part has become a factor expressing *the relative number of dwellings*, typified also by a general stress on the level of electrification and household fittings. The characteristic features of the general cumulation in the level of housing are thus factors relating to density of occupancy and the level of household equipment.

The *second factor* is largely that of variables which proved in the principal axis factorisation to be exceptional. The principal axis and varimax factors are here identical as to interpretation. The most characteristic variables are the relative proportion of new dwellings and the negative value proportions of dwellings and privately owned accommodation to the number of households. The variance in the proportion of privately owned dwellings seems to a great extent to find its explanation outside the common factors, as its communality is extremely low. This factor can be interpreted in such a way that in communities where housing construction has been active, for example after widespread destruction in war, the general number of family dwellings, as also the proportion of privately owned dwellings, is low. This may also be interpreted on the contrary as a factor expressing the *traditionality of housing*, so that where the number of dwellings is high and private ownership widespread, the proportion of new dwellings is low.

LEVEL OF HEALTH. The quantitative elements in the health level are indicators associated with length of life and total mortality. Qualitative indicators, again, are measures of the equality of health level in the respective sexes and of the health level in different age groups as well as the converse figures for mortality from various causes. Since measurement of the level of health is largely associated with the course of events at birth a control variable was introduced here expressing the degree to which it is felt necessary in the various countries to transfer the event of childbirth to the controllable conditions of a hospital.

The results of principal axis analysis are satisfactory. In only one variable, the frequency of survival at birth, does the communality fall below

the 0.50 limit. The three factors included explain more than 76 % of the variables.

Factors of level of health in principal axis solution and varimax-rotation:

	Principal axis				Varimax		
	I	II	III	h ²	I	II	III
14. length of life by men	-886	094	-005	794	-675	-578	-066
21. mort. from inf. dis. conv.	-845	067	475	943	-590	-658	402
17. middle ag. men health	-810	-470	-309	972	-237	-839	-461
22. surviv. in childbirth	-795	367	178	799	-797	-366	172
20. infant health	-790	500	-081	882	-910	-225	-056
16. length of life, sexes	-756	-541	032	866	-122	-913	-136
18. health by sexes	-556	-617	194	728	082	-849	026
19. survival by children	-414	346	-400	451	-565	007	-364
23. childb. in hospital	-323	633	-143	526	-691	213	-051
15. total mortal., conv.	-191	-218	-755	655	-029	-138	-797
Eigenvalue	4.605	1.861	1.148				
Eigenvalue as % of number of variables	46.1	18.6	11.5				

The level of health seems likewise to cumulate markedly on the first principal axis factor, as the percentage of explanation is 46 %. Of the ten variables all except the last four get their highest loadings on the first factor. The exceptions are the converse figure for total mortality, the generality of hospital births, the frequency of survival at birth and the equality of health level in the middle age groups in the respective sexes. Seeking to elucidate the characteristic features of the factors further by means of rotation we find that the variables with the highest loadings on the first factor, level of health of infants, survival of mothers in childbirth, the generality of hospital births and the frequency of survival at birth, are associated with the initial situation in life. The highest, though not entirely differentiated value falls also to the life expectation of males at birth and the converse figure of mortality from infectious diseases. The *first factor* is thus largely expressive of the *level of health in the initial life situation*.

In both the principal axis and rotation factorisations the second factor gets cumulations of factors associated with the health level of the adult population, equality of life expectation in the respective sexes and equality of health level in the middle-aged population of both sexes. These variables are not at all connected with the first varimax factor. Indicators also typical of the second factor are the health level of middle-aged males, the converse figure for mortality from infectious diseases and the life expectation of males.

The *second factor* might be described as expressing the *level of health in the adult population*.

Total mortality is often regarded as an important indicator of level of living (e.g. Waris 1965, 146). In the present survey, however, it seems to have no connection with the health level either at moment of birth and in infant years or among the adult population, because the loadings it gets in both principal axis and rotation analysis are close to zero on factors I and II. Community, on the other hand, is almost 0.70, so that the third factor, in which this indicator gets a high loading, covers to a great extent the variance of this variable. Three other variables are mainly linked with this: the level of health of middle-aged males, the frequency of survival at birth as well as the mortality rate from infectious diseases as the converse of these two. The *third factor* can be regarded as the *total mortality factor*.

LEVEL OF EDUCATION. The quantitative measures of this aspect are taken to comprise the general distribution of literacy and the average duration of primary schooling. Literacy is not 100 % in all Western European states, there being deficiencies in four of the southernmost, notably in Portugal, where the percentage of 15-year-olds able to read is only 62. The general distribution of school facilities of various levels is measured here on the basis of available information of the relative numbers of those engaged in studies and the general distribution of graduated members of society. The level of instruction is measured by the ratio of teachers to students, which, however, is a very rough criterion here.

Factors of level of education in principal axis solution and varimax-rotation:

	Principal axis				Varimax		
	I	II	III	h ²	I	II	III
24. literacy	-938	323	-067	988	874	-327	344
27. enrollm. univers.	-756	007	120	586	482	-405	435
31. instr., prim.+sec.	-731	-607	-280	982	193	-970	066
30. instr., sec. school	-703	-480	014	726	162	-774	318
26. sec. school enr.	-689	157	014	500	569	-283	310
25. prim. school length	-651	562	-258	805	896	-032	046
28. graduates	-550	-001	591	651	183	-155	770
Eigenvalue	3.681	1.045	0.513				
Eigenvalue as % of number of variables	52.6	14.9	7.3				

This component proved to be the most homogeneous of those considered hitherto. In the principal axis solution all variables except the distribution

of graduates get their highest loadings on the first factor. The communalities proved high and the percentage of explanation from the first factor is 53, that of all three being 75. In rotation the variables group themselves with regard to the first factor in such a way that the *first* becomes a *factor of the amount of schooling* and the *second* one of the *level of instruction*. The former of these is typified by both of the measures of the quantity of education and that of the availability of different levels of schooling, the latter by the indicators of the level of instruction. The *third factor* can be described as the *dimension of the general availability of the higher levels of schooling*, because only one variable, that expressing the generality of graduate level achievement, gets the highest loading on it.

LEVEL OF LEISURE AND RECREATION. In the construction of the indicators for this component it was necessary to resort to two sets of factors, on the one hand those measuring the amount of leisure time and on the other those indicating the general distribution of commodities associated with leisure activity.

The analysis can be said to have succeeded well in the factorisation of the latter variables. In contrast the communalities of the variable expressing the amount of leisure remain rather low in the case of the annual amount of free time. The first factor is here again marked by cumulation, the proportion of the eigenvalue being about 49 %. The three factors together explain 67 % of the variables. The first two factors were included in the rotation analysis, the third getting too low loadings and the total number of variables being small. The results of rotation are from the point of view of interpretation exactly the same as those from the principal axis solution.

Factors of leisure and recreation in principal axis solution and varimax-rotation:

	Principal axis				Varimax	
	I	II	III	h ²	I	II
35. newspaper circulation	—883	—088	324	892	—875	—151
36. radio set density	—881	227	277	905	—895	162
37. television set density	—787	115	—342	749	—793	058
34. car density	—756	—081	—358	706	—748	—135
33. leisure time/week	383	556	—029	456	342	582
32. leisure time/year	—118	517	—015	281	—155	507
Eigenvalue	2.907	0.654	0.428			
Eigenvalue as % of number of variables	48.5	10.9	7.1			

The content of the level of leisure and recreation as measured by the variables in question falls into two parts. Material commodities cumulate on one factor, the actual amount of leisure time on another. These would thus seem to involve two different dimensions. There is a certain amount of influence here from the point of time involved, as the early sixties were a breakthrough in Western Europe. During this decade we have seen the shift to a diminishing of the working week, and at the time the measurements were made the various states in Europe were at different stages of realising the reform. The *first factor* here can be described as expressing the *possibilities of using free time* and the *second* as expressing the *amount of leisure time*.

LEVEL OF SECURITY. The indicators of this component comprise on the one hand factors expressing the extent to which it has proved possible to avoid certain situations of insecurity and on the other factors linked with the development of modes of security against certain risks. A considerable number of classes of security were left out of the analysis, e.g. questions of legal security or risks of environment pollution which can also belong to other level of living components. The composition of the second indicator, that comprising steps undertaken to alleviate the consequences of risk situations, involves measures associated with social security, above all social insurance and again within this field the proportion of the population thus safeguarded against unemployment, sickness, old age and invalidity.

Principal axis factorisation reveals the communalities of the variables to be quite high, with the exception of the employment indicator. The first factor in this case explains a smaller proportion of the variables than in the earlier analyses, but the total percentage of explanation is still 68 % when all three factors are included.

Factor of security level in principal axis solution and varimax-rotation:

	Principal axis				Varimax		
	I	II	III	h ²	I	II	III
44. old age and inv. ins.	810	132	194	711	722	140	-413
43. sickness ins. gener.	734	-085	-341	663	269	043	-767
39. traff. acc./veh., conv.	561	667	-156	785	361	721	-366
42. unempl. insur. gener.	512	-169	-518	560	-021	-014	-748
40. traff. acc./pop., conv.	-495	834	-023	941	-272	783	504
38. non-violent deaths	-492	127	-662	697	-796	239	-075
41. employment rate	487	292	224	373	533	267	-133
Eigenvalue	2.497	1.295	0.936				
Eigenvalue as % of number of variables	35.7	18.5	13.4				

The characteristic features of all three factors are preserved and emphasised in rotation. The first factor, in which all variables get fairly high loadings, though only three get higher here than on any other factor, is of bipolar character in both principal axis and rotation analysis. Its typical features are associated mainly with the distribution of insurance against old age and invalidity and sickness insurance, the degree of employment, the proportion of avoidance of traffic accidents to the number of vehicles on the roads, and the converse figures for the generality of violent deaths and the frequency of traffic accidents in the population. This factor may be regarded as expressive of the typical security factors in a welfare state.

As the level of living rises to the stage where it is possible to provide against what are traditionally regarded as situations threatening human life and causing insecurity, new risks and new threats are continually emerging which also contribute to the security component in the level of living of society. The *first factor* may be described as that of *traditional social security*.

Typical of the third dimension are measures of the distribution of various forms of social security. Also the variable comprising the frequency of traffic accidents in relation to the population gets quite a high loading here. The most characteristic variable on this factor is nevertheless the indicator of unemployment security provisions. The communalities of this variable are more or less completely located on this factor. This shows that the Western European states have not provided against the risk of unemployment in the same way as against other sources of insecurity. Provision against unemployment is seen as mainly a question of the provision of employment, where chief emphasis is placed upon advance preventative action in the economy and not upon care for the unemployed within the framework of social policy (Waris 1968, 137—149). Security against old age and invalidity has usually preceded other forms of insurance in Western Europe. For example sickness insurance as a general system has come into use much later than these. On this dimension the characteristic — or we might say the most far-reaching — forms of security are those against unemployment and sickness and on the other hand their counterpart with opposite signs, the incidence of traffic accidents in proportion to the population. This *third factor* is that of *modern social security*.

On the *second factor* are concentrated both variables associated with the frequency of traffic accidents, so that it may be described as the *traffic security factor*.

THE SATISFACTION OF TERTIARY NEEDS. The actual measures of this component comprise the proportion of available resources remaining after basic consumption, i.e. consumption on food, drink, water and accommodation.

As control variables representing objectives outside the actual level of living aims of the community were the proportion of consumption to ensure external security, which, however, does not correlate with expenditure on tertiary needs, and secondly the relative proportion of private consumption compared with the national product, which does correlate with it (-0.57). Satisfaction of the higher types of need seems to be connected with a certain degree of regulation of private consumption.

In conclusion it may be said that examination of the internal cumulation of the level of living components reveals no complete cumulation in any case. Level of living is a multidimensional phenomenon. Difficulties are in fact encountered in seeking to with the same measures the level of living in observation units of differing stages of development. Even within Western Europe it is difficult to find societal criteria applicable to all the countries concerned, so that the problems of comparing more widely diverging societies may be imagined. The content of level of living is changing continuously, and for example in the case of security, leisure and recreation levels new threats and new unsatisfied needs are ever emerging.

3.2. COMPARATIVE ANALYSIS OF LEVEL OF LIVING COMPONENTS

For the purpose of this analysis 11 of the 47 level of living indicators were removed as standing in close relation to some other variables.

Principal axis factorisation shows that 21 of the 36 variables get their highest loadings on the first factor.¹ The eigenvalue of this factor involves 42 % of the number of variables. The level of living indicators thus show a considerable degree of cumulation. The proportion of variables taken by the second factor is 13 % and on this factor 7 of them get their highest loadings; the third covers 10 % and four variables get their highest loadings, the fourth 7 %, with three getting highest loadings and the fifth 5 % with one highest loading. The five factors together explain 78 % of the variables. The communalities also appear fairly high, the lowest being that of the traffic accident indicator to the number of vehicles on the roads. This latter communality leaves 56 % of the variance to be explained outside the factor and by error.

A general feature to be observed is that the essential variables on the first factor of the principal axis solution, the principal cumulation factor, are to a great extent those indicators which proved in the preceding internal analysis of the components to be typical variables on the principal cumulation factors. It will also be noted that this first factor includes variables from every level of living component. Of the housing and leisure and recreation level variables the majority are in keeping with the first factor, while level of security and level of health remain to a great extent outside this factor.

Rotation brings out two types of principal cumulation in the level of living, factors I and II, 16 variables getting their highest loadings on the former and 12 on the latter. The rest are for the most part special factors.

3.2.1. *Income-level oriented level of living factor*

Typical variables on the first factor:

<i>Level of housing</i>	
10. wc-density	858
6. sparsity of occupancy	829
12. electricity	753
7. family dwellings rate	742
11. bath room density	643
<i>Level of health</i>	
21. mortality from inf. diseases, conv.	756
15. total mortality, conv.	-739
<i>Level of education</i>	
24. literacy	725
25. length of primary school	640
26. secondary school enrollment generality	628
30. instruction level in secondary school	594
<i>Leisure and recreation level</i>	
34. private vehicles density	803
37. television set density	779
<i>Level of security</i>	
40. traffic accidents density/pop., conv.	-770
43. generality of sickness insurance	683
42. generality of unemployment insurance	595

A high level of living in terms of this dimension includes the general sparsity of occupancy, the relative abundance of family dwellings in proportion to the numbers requiring them, and a good level of household

¹ The principal axes factors are presented in Appendix III.

fittings. Infectious diseases do not constitute a threat to the health of society. Basic level schooling is now securely established, so that literacy no longer constitutes a problem. Secondary level schooling is also characteristic and efforts are being made to preserve a good instruction level by keeping the teacher-pupil ratio as low as possible. The incidence of private car ownership is high, which suggests that the possibilities of the population to move about in leisure time are considerable even if the actual amount of leisure time is not great compared to that in certain other regions. Another element among the leisure-time possibilities is the density of the television network. The abundance of private vehicles, on the other hand, brings with it a relatively large number of traffic dangers involving insecurity. Further features of a society enjoying a high level of living are far-reaching sickness and unemployment insurance measures. The factor also involves the relative rate of total mortality. Thus a low rate of mortality is not connected with a high level of living as has been assumed in a number of connections. Are we to assume that as material welfare increases, new fatal risks arise — accidents, heart and blood diseases, cancer and the general high pace of living — and prevent the total mortality rate from falling as much as might be hoped?

It is helpful in elucidating the nature of this dimension to look at the distribution of the various countries. To this end factor scores were calculated from the varimax analysis for each of the rotated factors (Harman 1960, 349). The object is also to compare the level of national income per capita (variable 71) and the level of living enjoyed by countries endowed with different economic possibilities. Map 1 shows in index form the dollar values of national income per capita and the factor scores of the first level of living factor.

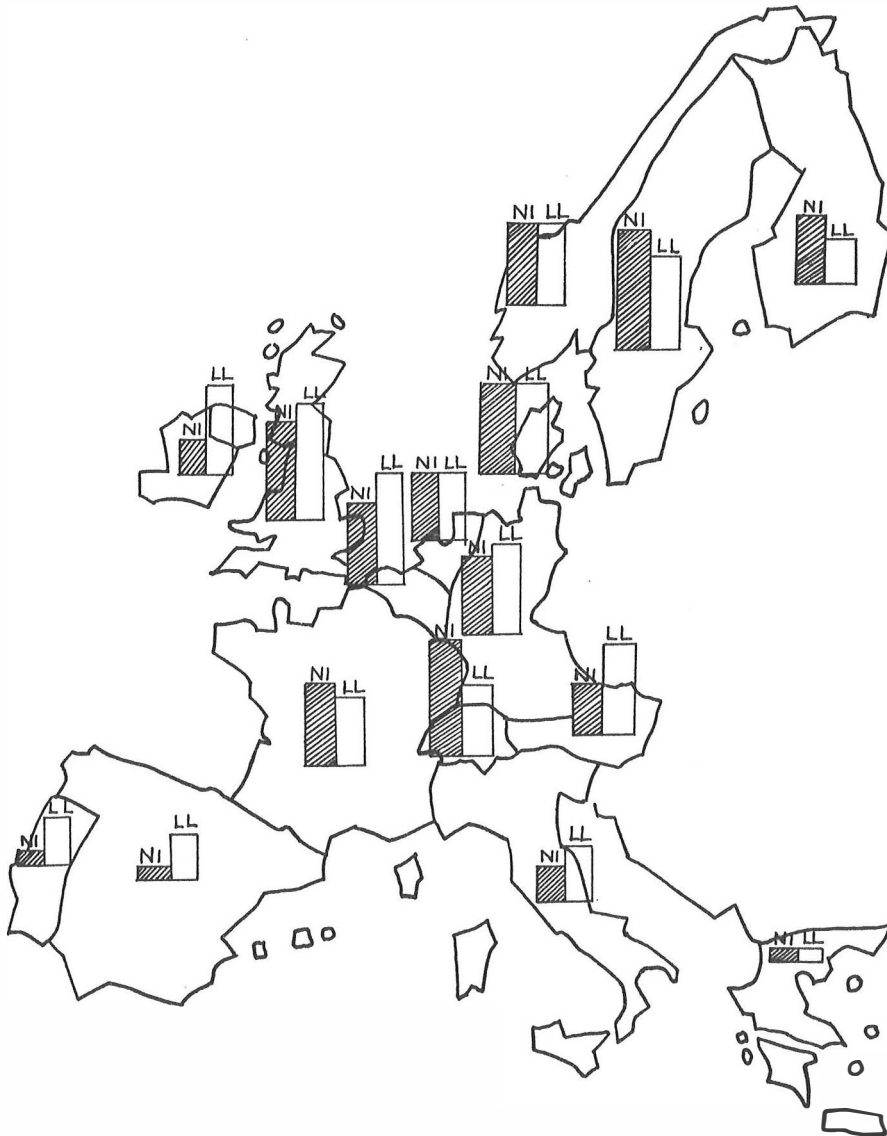
The level of living seems to be well in keeping with the income level. Worthy of note is that particularly in the cases of Switzerland, France and Finland the factor scores prove considerably lower and in Belgium, Ireland and Austria considerably higher than the level of income would lead to expect. The variables getting their highest scores on this factor are level of housing, sparsity of occupancy and sanitation, as well as the density of private car ownership. On this factor the geographical and income-level division of the European countries into less favoured peripheral and thriving central areas is well brought out (*Problems of Regional... 1955*, 138). E.g. Greece, Spain, Portugal, Finland and Italy are on this factor in a poorer position than the other countries. Correspondingly those countries which have strong industrial traditions, Britain, Belgium, Germany and also Sweden, represent a high level of living in terms of this principal cumulation dimension. The significance of the human input as an essential contribution

MAP. 1.

Factor Scores of Income-Level Oriented Level of Living Factor and Indexed Dollar Values of National Income per capita in Western European Countries

NI = Index form of national income per capita dollar value from 1 to 100
(2 mm = 1, 20 mm = 100)

LL = Value of factor score obtained by state on factor I classified in ten-division distribution, the mean standardised at 500 (2 mm = factor score under 300, 20 mm = score at least 620)



to economic growth has long been recognised in economic research (e.g. Haavelmo 1956, 36—44, Aukrust 1964, 24). The more extensive connection of this factor with the level of industrialisation will be discussed later. This *first factor* might be called the *income-level oriented level of living factor*.

3.2.2. *Level of living factor associated with modernity*

Typical variables on the second main cumulation factor are:

<i>Level of nutrition</i>	
3. proportion of animal protein	—648
<i>Level of housing</i>	
8. proportion of new dwellings	—708
11. bathroom density	—571
<i>Level of health</i>	
20. infant health level	—826
19. frequency of survival of child at birth	—640
23. generality of childbirth in hospitals	—630
14. expected length of life by men	—571
<i>Level of education</i>	
24. literacy	—452
<i>Level of leisure and recreation</i>	
35. generality of newspaper circulation	—736
36. radio set density	—628
<i>Level of security</i>	
44. generality of old age and invalidity ins.	—754
41. employment rate	—658
39. traffic accident density/vehicles, conv.	—567
38. non-violent deaths proportion	555
<i>Satisfaction of tertiary needs</i>	
45. proportion of non-primary consumption	—649

The loadings on this factor are minus values, which directly interpreted suggest a poor level of living. In the interpretation, however, the signs were converted to positive, as also the factor scores in Map 2.

The factor is characterised by the emphasis on health and security level as well as the fact that nutrition and, at the other extreme, satisfaction of luxury needs, now also emerge. The highest loadings on this factor fall to infant health level, the coverage of old age and invalid insurance, newspaper circulation and the proportion of new dwellings.

A high level of living according to this factor comprises the following

features: high quality nutrition, abundance of new housing, which also involves a high density of bathroom facilities. The health level is marked by special attention to the health of infants and children, and in this case this is high. In the context of leisure and recreation it would seem significant that special attention is paid to the provision of possibilities of increasing knowledge of the surrounding world. The form of insurance usually among the first to be put into practice, that against old age and invalidity, is in widespread use and the degree of employment also looks fairly high, so that security in this respect is good. On the other hand the incidence of violent death is quite considerable.

Thus also on the second factor a characteristic feature is one of the factors bringing insecurity, the relatively high incidence of violent death. When the level of living in general rises certain factors causing insecurity do not decrease but seem on the contrary to increase. The proportion of schooling other than the basic level is also quite high, which indicates the degree to which resources can be devoted to purposes beyond the satisfaction of fundamental needs.

According to Map 2, and better than the income level would suggest, the first in order on this factor is Norway, followed by Finland, Holland, Greece and Spain, the last two falling halfway in the distribution while the others come high on the scale. Poorer than their levels of income would suggest are Britain, Germany, Belgium and France. The four Scandinavian countries represent, together with Switzerland and Holland, the peak on this factor. The typical traits of Scandinavia are in fact markedly to the fore here. Maternity and infant care are highly regarded and since the war there has been lively activity in the house construction sector (see Major Long Term . . . 1966). The general circulation of newspapers and the density of radio receivers are also greater than elsewhere. These peak nations, the Scandinavian states, Holland and Switzerland, were also the only countries in Western Europe at the beginning of the 1960's where there was 100 % insurance of the aged and invalids. On this basis it is possible to regard this *second factor* as the *level of living factor associated with modernity*. A more precise elucidation of this aspect of modernity will come in connection with the comparison of level of living with the level of industrialisation and its special features.

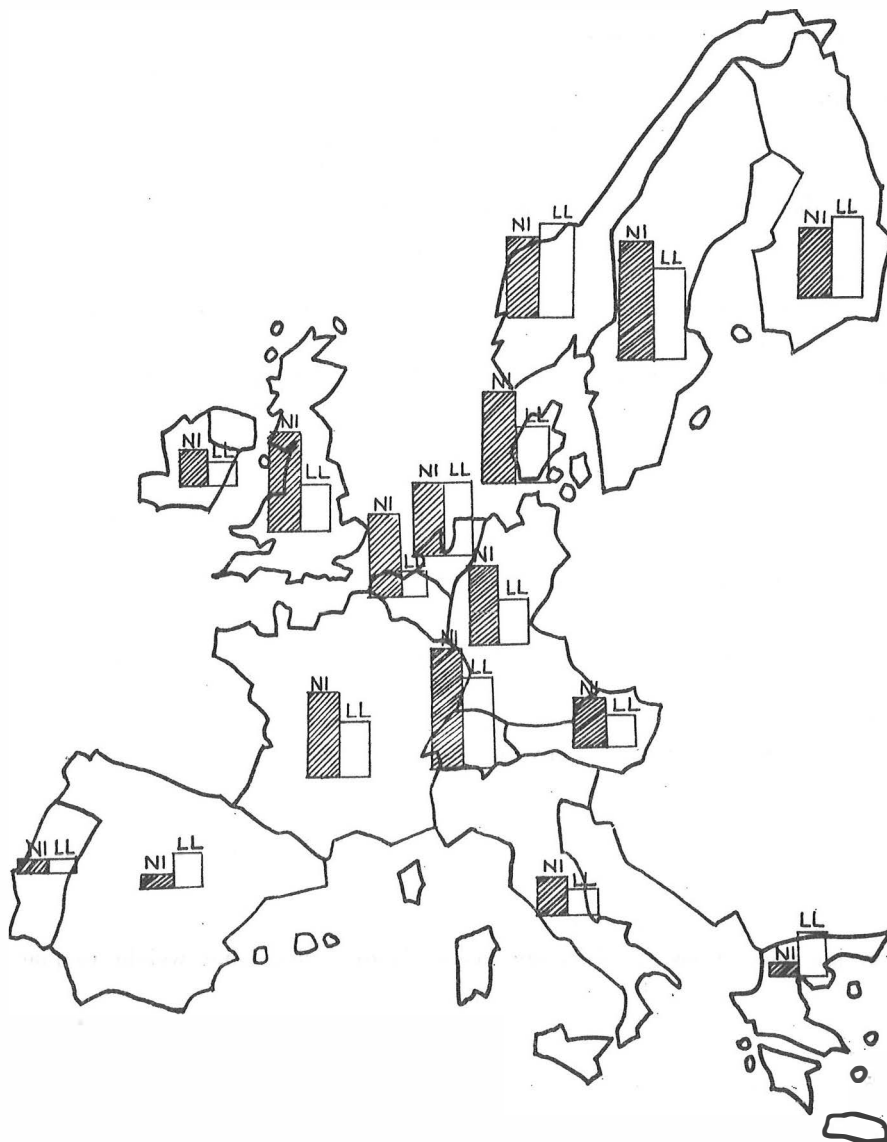
There follows now a consideration of factors already pointed out as special cumulations. A different matter is to decide what weight to place on the main cumulations on the one hand and these special cumulations on the other. It can at least be presumed that the latter will assume the greater significance, the better the satisfaction of needs expressed in the principal cumulation indicators is realised.

MAP. 2.

Factor Scores of Modernity Oriented Level of Living Factor and Indexed Dollar Values of National Income per capita in Western European Countries

NI = Index form of national income per capita dollar value from 1 to 100
(2 mm = 1, 20 mm = 100)

LL = Value of factor score obtained by state on factor II classified in ten-division distribution, the mean standardised at 500 (2 mm = factor score under 300, 20 mm = score at least 620)



3.2.3. *Adult population health level factor*

Typical indicators on the first special cumulation factor, factor III, are:

Level of health

16. similarity of expected length of life by both sexes	906
17. health level by middle age men	808
18. similarity of health level by both middle age sexes	741
21. mortality from infectious diseases, conv.	454

Level of education

27. generality of university enrollment	—594
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Level of security

38. non-violent deaths proportion	611
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Of dominant significance on this factor is the level of health in the adult population. Here as in the internal analysis of the health level component it is seen that the level of health of the adult population is not connected with the principal cumulations of level of living, but forms a problem group of its own. In all Western European countries the life expectation of females is higher than that of males, so that the latter comprise an interesting risk group. It would appear that the lower the level of living indicated by the principal cumulations in the respective countries, the lower is the life expectation of both males and females and the smaller the differences between the respective health levels of the sexes.

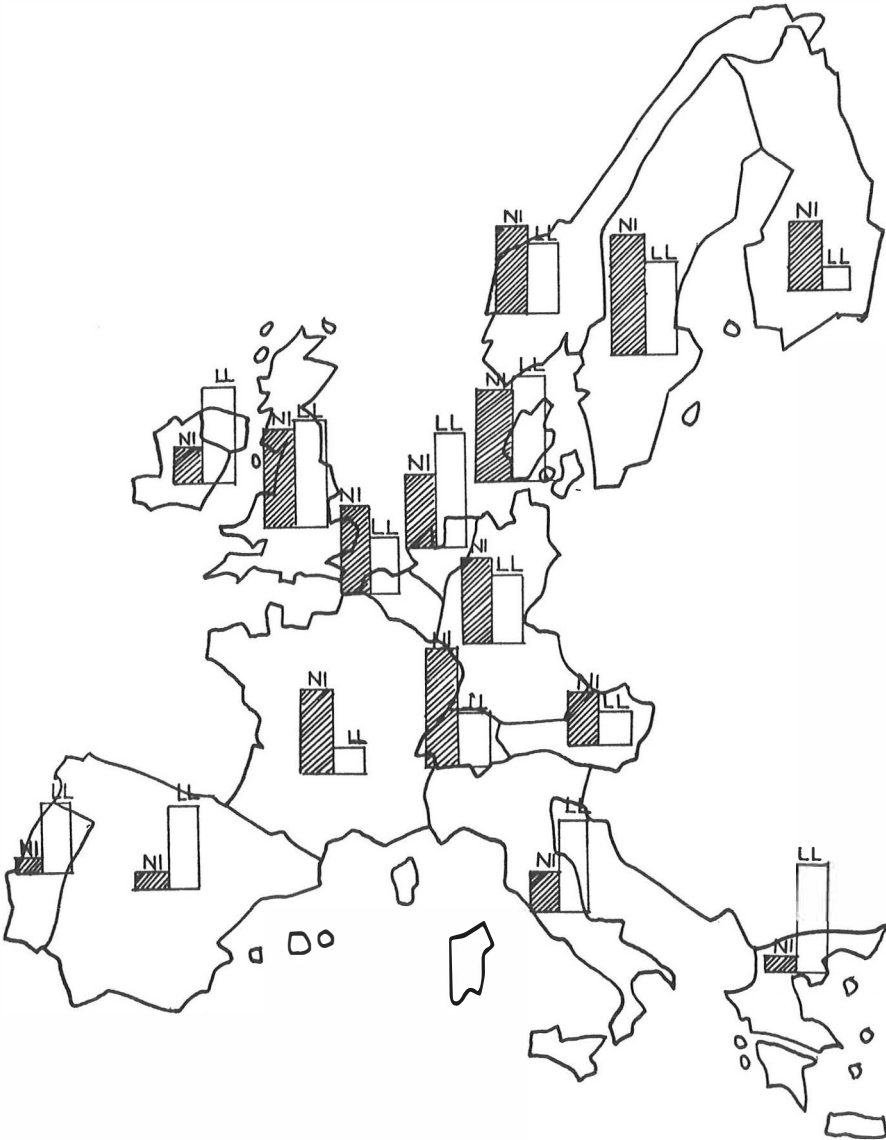
On this factor, too, there is one indicator with a sign diverging from the rest, namely the general distribution of higher education. This may be understood to mean — in as far as the situation with regard to the other indicators is in keeping with a high level of living — that where the level of living is high in terms of this factor the number of those participating in higher education is low. Greece, Ireland, Italy, Spain and Portugal are much better placed on this factor than their levels of income would lead us to expect (Map 3). However, the countries named on the basis of the income-level oriented level of living factor as enjoying high living levels — Britain, Denmark and Sweden — also get fairly high figures in this context. Particular risk groups seem to be France, Finland, Austria, Belgium, Switzerland and Germany, which are all low on the list. They are characterised by a poor level of health among the adult population, a relatively high proportion of violent deaths in the overall mortality, but on the other hand a high incidence of advanced schooling.

MAP 3.

Factor Scores of Adult Health Level Factor and Indexed Dollar Values of National Income per capita in Western European Countries

NI = Index form of national income per capita dollar value from 1 to 100
(2 mm = 1, 20 mm = 100)

LL = Value of factor score obtained by state on factor III classified in ten-division distribution, the mean standardised at 500 (2 mm = factor score under 300, 20 mm = score at least 620)



Of particular note is the feature that Finland and France are at the bottom of the list in each of the three indicators of level of health. The differences in life expectation are highest in Finland and second highest in France. Relatively more males die in the 30—49 years age group here than elsewhere in Western Europe. Finland diverged from the rest at the beginning of the 60's also in that sickness insurance covered only some 4% of the population. When later obligatory sickness insurance was generally imposed, a survey was made of the health situation in Finland prior to its enforcement (Purola et al. 1968, Finnish version 1967). This study clearly revealed how poor was the health level of the Finnish male population.

Regionally the relative mortality of middle-aged males is highest in the poorest areas of Finland, but also in the advanced areas, the capital and its surroundings, so that this factor does not follow the distribution of industrialisation (Koskiahio 1969, 28—31). It has also been observed that hospital facilities are not distributed according to the needs of the various regions and that males of working age do not avail themselves of hospital services in keeping with their needs (Bäckman 1969, 69).

In the survey by Purola et al. it was observed that more males in the 35—54 age group suffer from permanent complaints than females in the same age group (Purola et al. 1967, 147). Females also resort more readily to hospital services in the event of illness (Bäckman 1969, 6). The reason why the level of health of the adult population is low in countries where the level of living has in many cases shown itself otherwise high, may be sought perhaps in preferences with regard to health. For example in Finland the relative resources devoted to health care were considerably lower than in the other Scandinavian countries (*Social trygghet i de nordiska... 1967*).

The health level of the adult population has been studied on the international scale in a survey of causes of death in 30 countries recently made in Japan (Segi et al. 1966). The conclusions with variables similar to those used as measures here resembled those reached in this study.

Of the male adult population in this study (age group 30—49) those over 33 were involved in the war in the early 40's. The mortality rate may thus be influenced by injuries, either evident or latent, sustained in the war. The proportion of the population receiving war invalid pensions in the countries studied was at the beginning of the 50's highest in Finland, France, Germany, Belgium and Austria (Ranta-Knuuttila 1962, 3). The overall total of those receiving war pensions or otherwise victim to war was highest in just those countries where according to this factor the level of living is low, namely Austria, Germany and Finland. This factor would thus seem to be explained to a great extent from the effects of war. The *third factor* may be named the *adult population health level factor*.

3.2.4. *Level of living factor of proportion of leisure time*

Typical features of the fourth factor are:

<i>Level of education</i>	
31. instruction level in prim.+sec. school	585
25. length of primary school	-476
<i>Level of leisure and recreation</i>	
33. leisure time/week	732
<i>Level of security</i>	
42. generality of unemployment insurance	-524
41. employment rate	-483

The factor is to some extent bipolar, having both quite marked positive and also negative loadings. The dominating indicator on the fourth factor is the amount of leisure time, in keeping with which is also the general level of instruction. Of opposite sign to these are the duration of primary level school enrollment and the coverage of employment insurance as well as the degree of employment.

High level of living in terms of this factor comprises the following features: the weekly amount of free time enjoyed by the working population is fairly high. Abundant teaching staff is available for the number of pupils at both primary and secondary school level. The brevity of primary level schooling nevertheless leads one to suspect that in many places the level of teaching is only ostensibly high. It may be, for example, that the number of pupils is low, so that the teacher-pupil ratio looks high. On the other hand the number of unemployed is high and unemployment benefits poorly provided. The characteristics of the factor are thus rather conflicting. According to the factor scores Italy, Portugal, Greece and Spain are much better situated than their income levels would give to expect (Map 4). It is indeed possible to distinguish three separate groups: South Europe, North Europe (including Belgium and Austria by reason of their similar features) and Central Europe. In the case of the first two groups the factor scores are high. On the other hand Britain, France, Germany and Switzerland, countries with high income levels, had not at the beginning of the present decade transferred to the shorter working week. The states in North Europe have been pioneers in this respect, Finland being the first country in the world to legislate for an 8-hour working day in 1917. One reason for the interest in working hours in Scandinavia is the long, fatiguing winter in this part of the world; another the fact that there are not so many Church

MAP. 4.

Factor Scores of Proportion of Leisure Time Factor and Indexed Dollar Values of National Income per capita in Western European Countries

NI = Index form of national income per capita dollar value from 1 to 100
(2 mm = 1, 20 mm = 100)

LL = Value of factor score obtained by state on factor IV classified in ten-division distribution, the mean standardised at 500 (2 mm = factor score under 300, 20 mm = score at least 620)



festivals here as in the southern regions of Europe. Possibly the abundance of Church holidays in the highly industrialised countries of Central Europe as well as traditions in general explain why the working week has not been cut more radically as the level of living has risen. Social legislation and power of labour movements in these countries have also their influence on leisure time differences.

Also in South Europe the festivals of the Catholic Church bring an increase in leisure time. Here, however, the shift has not been made to a restriction of working hours as a means of promoting efficiency, so that whole problem must be approached from a different angle from that applied elsewhere in Western Europe.

By reason of the dominating position occupied by leisure the *fourth factor* may be described as that of *the proportion of leisure time*.

3.2.5. *Higher education preference factor*

Typical features on the fifth factor are:

<i>Level of education</i>	
28. proportion of graduates	—748
26. generality of second. school enrollment	—444
27. generality of university enrollment	—412
<i>Level of security</i>	
40. traffic accidents density/pop., conv.	418

The dominating loading on this factor, as well as two other fairly high loadings, are negative. However, for purposes of interpretation the signs are converted to positive. The factor is characterised by the emphasis on the type of living level where higher education and also secondary education are well established. Also associated now is that aspect of security whereby the traffic accident rate is not high. Since this element is also involved as a source of insecurity in the income-level oriented level of living factor, it is a question here of a dimension diverging from the general stream of level of living. The highest loading on this factor goes to the general distribution of graduate level education.

The factor scores indicate that higher education is most highly regarded in Holland, Finland and Belgium, all of which countries are located higher on the scale than their income level would suggest. Denmark, on the other hand, one of the high income level states, comes after these on the list (Map 5). Low down come countries with a high level of income, Britain,

Norway, Sweden and Switzerland, together with southern states, Portugal and Spain. Also in Austria, Greece and Italy the higher education factor gets higher scores than the level of income would seem to allow. In this as in other special cumulation factors it is clearly seen how certain factors linked with the qualitative indicators of level of living are highly regarded in countries where the income level may be lower than for example in the established industrial states of Central Europe. The high regard for education in Finland, Holland and Belgium is also reflected in the high proportion of the national income devoted to education expenditure, above all in Finland.

Education is a component whose character reflects the presence of preferences perhaps more sensitively than many others. On account for example of climatic conditions some states may have to sacrifice considerable revenue to housing. In the case of education the primary needs are not perhaps so significant, it is more a question of a desire to raise the standard of education in society. The *fifth factor* is thus the *higher education preference factor*.

Conclusions

Cumulation was observed among the components of level of living, both the principal and the special cumulations containing features from the various components. The type of cumulation was thus not to be found where each component forms its own factor. It may be regarded as characteristic that those indicators which emerged as principal cumulation variables in each component in the internal analyses also proved to be components in the principal cumulations in the intercomponental analysis. None of the components, then, was of a character diverging markedly from the rest.

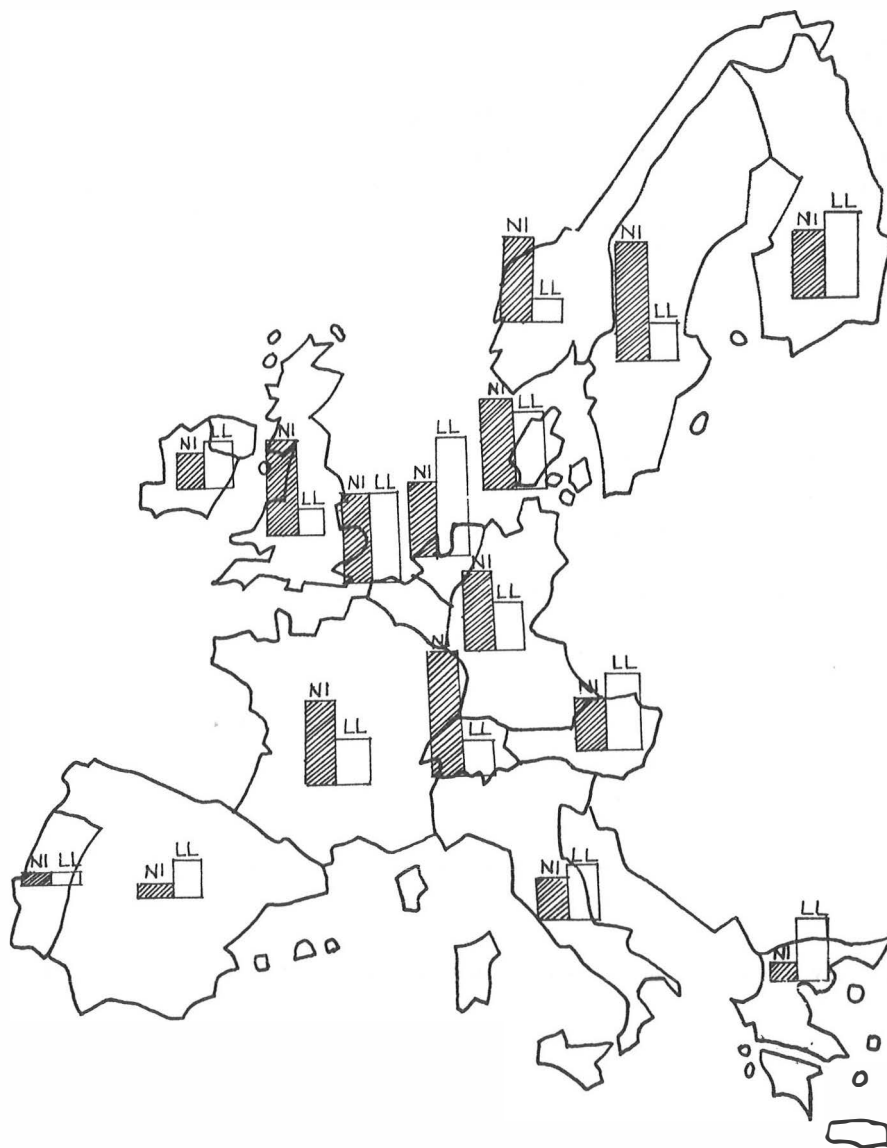
Level of living can thus not be said to cumulate completely. There formed two main cumulations and three smaller ones reflecting better structural characteristics than level of living itself. It is correspondingly established that different communities have similar features with regard to their levels of living. On the basis of the analysis made it is also possible to weight the various level of living components according to the loadings observed, taking into account either only the principal cumulation or also the theoretically interesting special cumulations. The basis for choice lies in whether according to preferences various aspects are accorded the same or different significance. Thus e.g. such a weighting does not serve social planning purposes. It was also possible on the basis of the analyses to form new cumulation type variables for application in a later analysis.

MAP. 5.

Factor Scores of Higher Education Preference Factor and Indexed Dollar Values of National Income per capita Western European Countries

NI = Index form of national income per capita dollar value from 1 to 100
(2 mm = 1, 20 mm = 100)

LL = Value of factor score obtained by state on factor V classified in ten-division distribution, the mean standardised at 500 (2 mm = factor score under 300, 20 mm = score at least 620)



There follows now a consideration of the level of living in the different countries in the light of those variables which in the earlier level of living principal axis solution got *the highest loading* (at least 0.65) *on the first factor, the principal cumulation*. These variables, of course, formed the basis for the first two factors in the rotation, those comprising income-level oriented level of living and aspiration to modernity. The *means* and *standard deviations* calculated from the ordinals of the countries (1—16) were as follows:

	Mean	St.dev.		Mean	St.dev.
Sweden (16)	13.67	2.38	Ireland (8)	7.78	3.10
Denmark (15)	13.11	1.84	France (7)	7.67	2.68
Britain (14)	13.06	2.73	Finland (6)	7.17	4.37
Holland (13)	11.56	3.31	Austria (5)	6.94	1.92
Switzerland (12)	11.44	3.33	Italy (4)	4.94	2.65
Norway (11)	11.17	3.07	Spain (3)	3.56	1.85
Germany (10)	10.22	2.07	Greece (2)	2.56	2.28
Belgium (9)	10.00	3.85	Portugal (1)	2.22	1.66

In the light of the means of the principal cumulations calculated from the ordinals the level of living proves highest in Sweden, Denmark and Britain. The next fairly uniform group comprises four central and one northern country, Holland, Switzerland, Norway, Germany and Belgium. Considerably behind these come Ireland, France, Finland and Austria, with the southern states last in a more or less uniform group.

Examination of the standard deviations reveals the extent to which the level of living variables vary in each of the observation units. Diverging from all the rest that in Finland is the highest. And indeed Finland gets a position much lower than the average on the income-level oriented level of living factor, I, (fourteenth), whereas on the modernity-oriented factor, II, it comes high (fourth). The deviations are great and also the scores on the two principal cumulation factors vary markedly in Belgium, Switzerland, Holland, Ireland and Norway. In contrast the deviations for Portugal, Denmark, Spain and Austria are low. As a general feature it may be said that the deviation is lowest in the countries last on the list, the five with poor level of living, and again in the three with the highest living levels. Denmark in particular diverges from the rest in that its position with regard to level of living remains more or less the same on all factors, both main and special cumulations. This point with low deviations of the loading and last countries on the list may be in connection with a statistical reality: these two types of countries have generally lesser possibilities to change very much on the ordinal list than the middle class countries.

We may further inquire how great is the standard deviation within the observation units. This aspect has been studied in a separate survey of the regional variations in level of living in four countries (Koskiahio 1969). The objects of the investigation were Switzerland, Finland, Austria and Italy, countries representing different levels in their means and standard deviations. The means of each unit were calculated and it was noted that the variations in the housing level within each were in general great. The deviation figure for Switzerland (18.9) was considerably higher than the others (12.1—13.4). In respect of the health level both principal cumulations were present, with their representatives mortality from infectious diseases and infant mortality, the former representing a living level factor in accord with the income level and the latter a modernity-oriented factor. As this country got a low factor score also in the case of mortality from infectious diseases the internal deviation was great. The same picture was gained from the infant mortality figures. In the case of education the differences in deviation were small, so that no clear line can be drawn on the basis of the standard deviations. They also do not seem to vary within the countries so much and so divergently from each other that the picture gained in this study would be distorted.

4. CONNECTIONS OF LEVEL OF LIVING AND SOCIETY STRUCTURE AND FUNCTIONS

The level of income is frequently taken as a general indication of the level of living (e.g. Waris 1965). In the present work likewise in the study of the level of living cumulation types the principal type was named the hypothetical income-level oriented level of living dimension. In this connection it is indeed the object to shed more light on the relationship between the national income per capita and the level of living indicators. Inquiry is made both into the special orthogonal rotation of level of living and national income per capita and into the correlations the living level indicators show with national income per capita, and thirdly into the kind of loadings these get in the analysis of the level of living components on the first principal axis factor.

The income level is one functional factor in the life of the community. The purpose here is in fact to study the mutual cumulation of the various community factors and then to form cumulation variables of the different types of industrialisation, whose connections with the level of living can then be examined by means of regression-type analyses.

4.1. NATIONAL INCOME PER CAPITA AND LEVEL OF LIVING

One means of inquiring into the relationship between level of living and level of income is a special orthogonal rotation in which all 36 level of living variables and the income level are factorised and rotated in such a way that the whole communality of the latter comes to the first rotated factor, leaving no effect from it on other factors (Rao 1965, 498—499). It is thus possible to find the dimensions where the effect of the income level is eliminated. As another indication of this relationship, the correlation coefficients of level of living and income level per capita and of the first level of living factor in the principal axis solution gave the following distribution for the various level of living variables (Fig. 1). They form three different groups. A total of four get a negative loading on the factor and also a negative correlation coefficient with regard to national income: traffic security to population (40), proportion of causes of death other than violent (38), proportion of leisure time a week (33) and general health level,

the converse of total mortality (15). The majority of the variables get a higher value on the main axis than the income level correlation coefficient would suggest. In group 1 they get a loading of over 0.600 on the first factor in the matrix and over 0.500 on the correlation coefficient axis. The variables in this group are all representatives of the two principal level of living cumulations in the varimax rotation. Likewise typical principal cumulation variables are some which appear here in groups 2 or 3: they comprise just under 30 % of the principal cumulation variables, with about 20 % of the income-level oriented factor variables and about 40 % of the variables from the modernity-oriented factor. The variables with the highest loading on the rotated subsidiary cumulations fall to groups 2 and 3. Of the five variables on the adult health level factor three are located in group 3 and the other two in group 2. Of the two on the leisure time factor one is in group 2 and one in group 3, which also contains the only variable on the higher education preference factor to get its highest loading on this factor.

The special orthogonal rotation¹, eliminating the effect of income level from all except the first factor, reveals the tendency to follow the level of income to be the dominant feature in the level of living. Twenty out of the 36 level of living variables get loadings between 0.874 and 0.605 on this income-level oriented factor (income level loading 0.937). These variables also form group 1 in Fig. 1. In groups 2 and 3 in this figure there are also such variables as stand out from the income level in the results given by the special rotation. Likewise differentiated are five groups of important level of living variables which are located on factors other than the first in the rotation. Some of these variables are such which proved typical elements on the principal cumulations above but chiefly there are special cumulation variables.

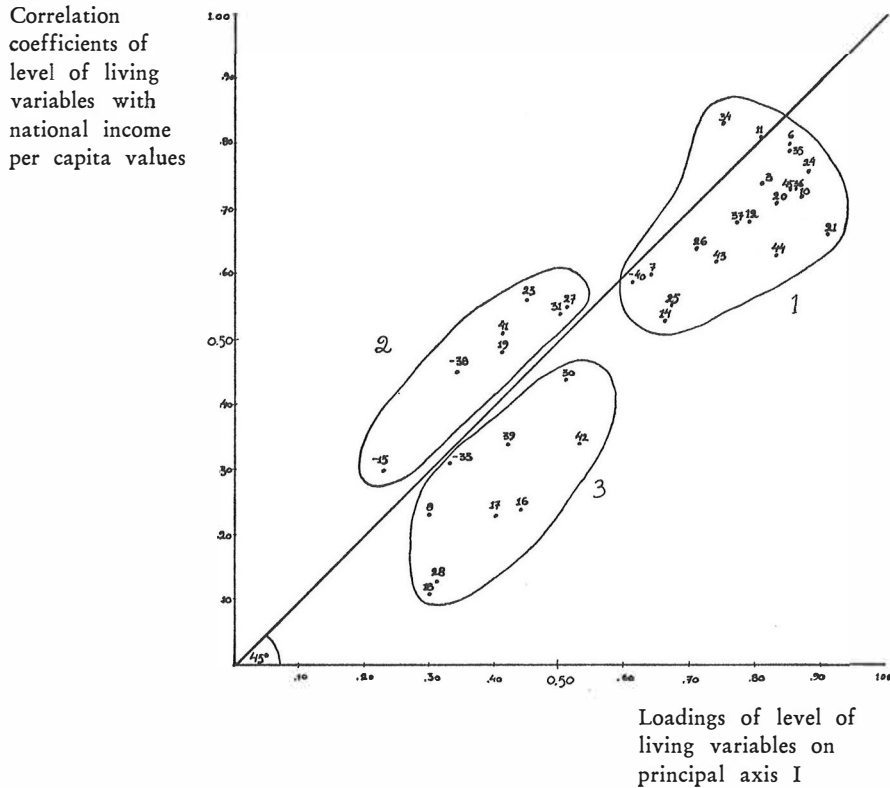
Variables associated with traffic accidents showed a tendency above to follow either the income-level oriented or the modernity factor of level of living. On the basis of the special rotation, however, the connection with the level of income may be said to be weak, so also in the case of the converse of total mortality, which earlier showed association with the income-level oriented level of living dimension. Parts of the modernity dimension of level of living, again, were the proportion of new dwellings, the frequency of survival at birth and the incidence of violent death. The special orthogonal rotation shows these aspects to have little connection with its first factor.

Already above the health level of the adult population, the leisure time and the higher education dimensions turned out to be separate factors

¹ Matrix in Appendix III.

FIG. 1.

Distribution of Level of Living Variables According to Loadings on Factor I in Principal Axis Solution and Correlations between Level of Living Variables and National Income per capita Values



diverging from the principal level of living cumulations. This picture is confirmed by the results of the special rotation. These three dimensions show no connection with income level.

Among the chief results of the special rotation is in fact the discovery that there are such features on two principal level of living cumulations, the income-level oriented and the modernity level of living dimensions, which do not stand in direct relation to the rise in economic level in Western Europe and which thus are not explicable on that basis. Such are for example the relatively high incidence of traffic accidents in countries with a high level of living, the high total mortality, the frequency of violent deaths, the abundance of new dwellings, the relatively high proportion of family dwellings and also in part the indicators of the level of instruction. Factors

linked with unemployment, the coverage of insurance arrangements and high unemployment seem to be poor variables in that although they get their highest loadings on the first factor, the loadings themselves are relatively low, under 0.500.

On the whole it may be asserted that the majority of the level of living variables are in accord with the level of income. On the special rotation 56 % of them got loadings of at least 0.600 on the first factor, and likewise, as seen in Fig. 1, the comparison of correlations and the principal axis solution shows 61 % of the variables to have loadings of 0.500 or more on both axes. It is largely a matter of preferences how important the remaining 40 % or so variables are regarded in each case in assessing the level of living. The following section will deal more fully with the question of the extent to which the level of living is associated with structural factors and functions connected with industrialisation, one of which, the level of income, has already been brought out.

4.2. CUMULATION OF SOCIETY STRUCTURE FACTORS AND FUNCTIONS

The connections between level of living and society structural factors and functions were discussed in the theoretical section above with the assumption that society seeks by means of industrialisation to raise the welfare of its members, measured here by the level of living. The activities of society and the reflections of these in structural change are thus assumed to be the basis on which the level of living is founded. Above the concept of level of living fell into a number of types of cumulation. At the same time it must be inquired what cumulation types exist among the structural and functional factors in society, as well as which of these on *the one hand level of living and on the other structural and functional factor cumulations are connected with each other, and which structural and functional types contribute to the formation of the level of living cumulation types.* In the present case the object is simply to find the points of contact, the simultaneous incidence, of the types.

The idea of cumulation is based here on the concept of industrialisation. Industrialisation factors, as intermediate mechanisms, measure the transition from agrarian to increasingly industrial society. What is inquired here is whether these factors are parts of a complete cumulation or whether the incomplete cumulations are to be observed which were already discovered in other connections (cf. Riihinen 1965).

The modes of analysis are the same as those applied to the level of

living. On the basis of the correlation matrix 11 of the 34 variables are picked out for multivariate analysis, leaving 23.

Principal axis factorisation¹ shows 12 of these 23 to have their highest loadings on the first factor. The eigenvalue percentage of the number of variables in the case of the first factor is about 34 %. This is 6 percentage units lower than that found for example in Riihinen's study of the regional differences in Finnish society, which bears close relation to the process of industrialisation (Riihinen 1965, 131). On the second factor 6 of the variables get their highest loadings and the proportion covered by the factor is 21 % of the variables: on the third factor 3 variables stand out (15 %), on the fourth 1 variable (6 %) and on the fifth none, (with however 5 %). The communalities are fairly high, only one, birth control, falling below the 0.500 limit with 0.435.

The variables getting their highest loadings on the first factor comprise structural factors and functions associated with industrialisation. Only one basic structural factor, the proportion of religions other than catholic and of no denomination, gets its highest loading here.

There follows a consideration of the results given by the rotated factors. Since a third of these factors correspond mainly to the principal cumulation factor in the principal axis solution, this group is treated first.

4.2.1. *Main industrialisation dimension associated with efficiency*

The most characteristic loadings on the third factor are in the following variables:

<i>Environment</i>	
48. average temperature	657
<i>Basic structural factors</i>	
53. proportion of non-catholis	—866
<i>Controllable structural variables</i>	
58. density of telephone network	—892
66. proportion of immigrants to emigrants	—623
65. control of birth	—562
60. participation rate of women in work life	—508
62. proportion of services	—502
<i>Functions</i>	
71. income level	—832
73. rate of total savings	—675

¹ Matrix is presented in Appendix III.

It would seem that the main trend in industrialisation is associated with a cool climate, and economic underdevelopment in Europe with warmer climate. And indeed the southern countries are behind the rest in this respect. The factor is interpreted here with changed signs. According to this dimension industrialised society also shows a relatively low proportion of catholic adherents. The high proportion of non-catholics is associated with low pressure to uniformity in this frame of reference. This variable thus strongly supports the original assumption that Protestantism and industrialisation are connected phenomena.

The highest loading on this factor goes to an aspect associated with the efficiency component so important in industrialisation, namely the density of the telephone network, as well as to the indicator of the level of industrialisation, the level of income. The level of industrialisation and the application of division of labour are also reflected in the proportion of the services occupations. Also connected with the increase in efficiency and the division of labour is the intensity of participation of women in work life, which in turn reflects the modern unprejudiced view of the position of woman in society.

Birth control, which gets its highest loading on this factor, is also regarded as an indication of the aspiration to efficiency. Population expansion is at present seen as a world-wide problem and one of the severest obstacles to economic and social development. In Western Europe its regulation also appears to be a reflection of economic advance. In Riihinen's study of the regional differences in the Finnish community this aspect also proved to be a variable with its highest loading on the most marked and general factor (Riihinen 1965, 175).

The factor involves two fairly marked aspects connected with the consequences of industrialisation and with a corresponding attention to industrialisation. Industrialised societies attract new residents from elsewhere, the number of immigrants exceeding the number of emigrants. Since the control of births is fairly strong in advanced societies, immigration also represents a labour resource. One of the marks of an industrial society is the attention it pays to the continuity of development, which is reflected in the proportion of saving on this factor.

In other studies involving international material the main features arrived at have been similar, even though the more important investigations have been on a world-wide scale. In the Yale study of the economic, social and political development of 82 countries seven dimensions were brought out by factor analysis. The most important of these was termed the dimension of economic development, and here the density of the telephone network and the measure of the occupational structure got the most outstanding

loadings (Rummel 1969, 134). In Russett's study of the same 82 states five marked dimensions emerged, the most outstanding of which, that of economic development, contained high loading measures of income level and occupational structure (Russett 1968). Similar conclusions were reached by Olsen in his study of 115 states, where the most important indicators of economic development are seen as the level of income, the density of the telephone network, the occupational structure of the population and the consumption of energy (Olsen 1968, 705). The basic elements on the main dimension of industrialisation would thus appear to be the same whether over 100 or under 20 states are involved. This *third* varimax factor might indeed be termed the *main industrialisation dimension associated with efficiency*.

4.2.2. *Factor of industrialisation resources*

Features typical of the second factor are:

<i>Basic structural variables</i>	
52. population density	—884
54. production of total energy	—780
51. total population	—771
55. international financial state (U.N.)	—738
<i>Controllable structural variables</i>	
59. coverage of road network	—817
63. proportion of inhabitants in urban. area	—666
62. proportion of services	—541
<i>Functions</i>	
76. proportion of manuf. goods in exports	—658

The second factor comprises the second main cumulation in industrialisation. It is typified by various basic structural elements, as opposed to the controllable structural elements outstanding on the first factor. On the functional aspects only one belongs to the most characteristic elements here. The most marked features of the factor are associated with population resources, represented by total population and population density. On the other hand the production of energy expresses the potential economic resources of society. The classification according to financial position drawn up by the United Nations seems to be connected rather with this than the former dimension of industrialisation. The actual level of industrialisation is reflected by the proportion of service occupations. Urbanisation is associated with industrialisation both as a consequence and as a prerequisite

(Eliasson 1963, 18—19). The shift to industrial activity demands an accumulation of population. On the other hand the increase in service occupations and other phenomena accompanying industrial development cause the population to gather in urban communities. Expressive of efficiency in this context are the coverage of the road network and the proportion of manufactured goods in the total exports. The former reflects the extent to which the community has provided itself for the traffic involved in industrial activity, while a high proportion of raw materials in the exports of a country is a sign of its underdevelopment. And in fact the proportion of manufactured goods gets a considerable loading on this factor.

In other studies, involving most of the countries in the world, the same types of cumulation have emerged. The variables on this factor have cumulated into an entity of their own, but usually as two factors. Typical of the one are total population, national income (Russett 1968, Rummel 1969) and regional extent (Russett). The other is typified by density of population (Russett), and extent of arable land and coverage of road network (Rummel). Similar cumulation emerges in the study by Berry. On the fourth factor there density of population, energy reserves and the extent of arable land are prominent (Berry 1960, 85). In the present study the extent of arable land as a variable is omitted because of the low correlation coefficients. The *second factor* may be named the *factor of industrialisation resources*.

4.2.3. *Economic growth factor*

The following three factors are by nature mainly special cumulation factors. The first of them involves the following typical features:

<i>Controllable structural variables</i>	
62. proportion of services	527
<i>Functions</i>	
80. growth of domestic capital formation	—875
72. growth of national product	—746
70. generality of international air traffic	669
69. width of foreign telegram and letter connect.	575
73. total savings rate	—471

In its bipolarity the factor reflects a community where in the intensity of economic development the stage has not yet been reached, as in advanced countries, where contacts outwards are strong and the occupational structure dominated by tertiary production. An essential feature of successful economic

growth is also the extent of investment, which indeed emerges in the presence of the savings component on this factor. The *first factor* might be termed the *economic growth factor*.

The effect of a rising level of living on economic growth is brought out here. Denison for his part refers to expansion in America and asserts that over the past 30 years it has derived most from the improvement of training and research (Denison 1962, 266). Galenson and Pyatt arrive at similar conclusions in an attempt to elucidate factors affecting economic development. They conclude that health, training, housing and social security are important prerequisites to expansion (Galenson & Pyatt 1964, 88). Niitamo also, in his study of 1958, found that a considerable part of the rise in productivity probably derived from the increase in technical and organisational knowledge and skill (Niitamo 1958, 127). The significance of the level of training, one of the important components in level of living, is thus made evident.

In the long run, however, growth levels out. Countries whose expansion has been rapid have previously been marking time, and correspondingly those in a state of stagnation now have earlier been centres of powerful expansion (Aukrust 1964, 30).

4.2.4. *Factor of international contacts*

The variables getting their highest loadings on the fourth factor are the following:

Basic structural variables

51. total population	444
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Functions

69. width of foreign telegram and letter c.	-662
78. width of foreign trade	-919

This factor seems to be essentially that of external contacts. Two variables expressing international orientation get their highest loadings here. If further to this the loading for international air traffic is regarded as symptomatic (-0.324), this factor reflects a community which attaches great significance to international relations. Associated with this are small population if the factor is interpreted conversely in the positive direction, and symptomatically low temperatures, low financial position and poor rate of economic expansion (loadings under 0.400). The factor is indeed understandable when it is noted that the Benelux and Scandinavian countries are

outstandingly represented by the variables on this factor. To some extent the international relations here are within the group, for neighbourly contact among the Scandinavian countries on the one hand and the Benelux on the other are indeed marked. In times of mass production and mass marketing small states may also by reason of the narrow range of their resources need this outward-looking approach.

The picture gained from this factor is also well in keeping with the features pointed out by Allardt in his treatment of the conditions for international cooperation (Allardt 1966, 224—232). Referring to the theory of Guetzkow he proposes that the structural and functional components present on this factor are important as contributing to the creation of possibilities of cooperation (Guetzkow 1957). According to Guetzkow's so-called cultural background hypothesis the similarity of language, customs and ideology of peoples facilitates the establishment and maintenance of cooperation between them. And here in particular there emerge two groups of states, Scandinavia and the Benelux, each with strong points of contact on the one hand in respect of cultural background and on the other in cooperation. This factor is thus to be termed the *factor of international contacts*.

4.2.5. *Factor of change in population structure*

The characteristics of the fifth factor are:

Basic structural variables

54. production of total energy —478

Controllable structural variables

57. proportion of old age groups —777

67. proportion of persons working in primary occupations —640

In addition to these variables on this factor diverging from the main direction in industrialisation a symptomatic positive loading goes to temperature and a negative loading to the participation of women in work life.

The picture given by the fifth factor is associated with one of the spheres of development. Here the proportion of the highest age groups, an aspect of change in population structure, is the dominant element on the entire factor. This is linked with the speed with which the occupational structure changed in the 1950's from primary to industrial and service production. The extent of potential economic resources is also involved here. The use of female labour reserves is likewise apparently associated to some extent with the picture gained, as also a relatively cool average temperature.

This factor involves above all the Central European states, Belgium, France, Germany, Britain and Austria. Sweden also features, the proportion of the higher age groups there being very considerable and the change in occupational structure extremely rapid. The prolongation of life expectation and improved economic possibilities have effected a relative increase in the numbers of old-age members of the community. The *fifth factor* is termed the *factor of change in population structure*.

Conclusions

The societal structural factors and functions are found to be mutually cumulative. *This cumulation is not, however, anything like complete.* That on the first factor of the principal axis factorisation proved to be industrialisation-oriented. The variables which on *the basis of the principal axis factorisation proved the most outstanding, with the highest loadings*, were the following seven: the proportion of the aged, the density of the telephone network, the proportion of service occupations, the control of population growth, the ratio of immigrants to emigrants, income level, and the counterpart to these, growth in the national product as an indication of economic growth. *Means and standard deviations* may be calculated for these variables. If the indicator of economic growth is included, the countries with a high level of industrialisation get somewhat lower, and conversely countries less advanced somewhat higher values than if this variable is omitted. The deviations are also greater.

The means and standard deviations for the various states are:

	Mean	St.dev.
Sweden	12.7	3.6
Switzerland	11.7	3.8
Britain	11.6	4.8
France	11.3	3.8
Denmark	10.9	3.8
Germany	10.2	2.5
Belgium	9.3	4.2
Holland	8.5	4.1
Norway	8.3	2.9
Austria	7.1	3.6
Italy	6.4	4.2
Finland	6.4	2.9
Greece	5.6	6.0
Spain	4.8	4.1
Ireland	4.4	3.9
Portugal	3.7	4.2

The Southern European states, together with Ireland and Finland, appear on the basis of their mean figures to be in the rear as to their level of industrialisation. Sweden's lead is marked, and high on the list are Switzerland, Britain, France, Denmark and Germany, with Belgium, Holland, Norway and Austria in the middle.

To what extent, then, are the societal structural and functional factors connected with the level of income? The level of development of a country is frequently measured by its level of income. This forms in fact an essential part of the principal cumulation. Most markedly independent of the income level are the participation of women in work life, the proportion of total savings, the proportion of those living in conurbations, the density of population and the growth of domestic capital formation, with the total population entirely independent. Of the variables 57 % are associated with the national income with correlations of under 0.45.

Rotation brought out five factors, two of which reflected more directly than the rest the main lines of industrialisation and one of them the process of industrialisation itself, which is not in direct relation to the dimensions of the level of industrialisation. It emerged already in the principal axis stage that the cumulation on the first factor is by no means complete. The proportion of variance on the second factor is markedly high. After rotation the third factor, that of the efficiency aspect of industrialisation, actually represents the principal cumulation type, while the second factor, that of industrialisation resources, represents the second cumulation type in the principal axis factorisation. The rest reflect various special features of industrialisation, which in turn are partly linked with the principal cumulations.

The rank correlation coefficient between the essential features on the one hand of the main industrialisation dimension found by Russett in his study of 82 countries and on the other of the main dimension linked with efficiency in the present study, was 0.90. The characteristic features of the main dimension in industrialisation would thus appear to be the same whether the units observed are situated in Western Europe or throughout the world.

4.3. LEVEL OF LIVING CONTRA SOCIETAL FACTORS

The writer has sought here by means of factor analysis both level of living and society factors for use in regression-type analysis. A varimax-rotated factor matrix was taken as the basis of selection because the representatives of variables, both explaining and to be explained, must be causally as

far independent of each other as possible. The getting high loadings on different factors are presumably most independent of each other and least correlating (Tantner 1967, 169).

In the explanation of level of living multiple correlation analysis was first employed, the results being largely identifiable with those of bound selective regression analysis, as no selection was applied in the case of the explaining variables. The model also does not progress step by step as is possible in regression analysis, the results here coming in one batch (Cooley & Lohnes 1962, 31—34). Secondly completely unbound selective regression analysis was applied as a parallel approach (Mustonen 1964 b 80—81). In this model the computer selects as explainers each variable in turn which best improves the multiple correlation coefficient. Before selection, however, the computer ensures whether the programme contains an explainer so poor that it ought to be removed (Väliaho 1964, 86). Both approaches yielded chiefly the same results. In this connection the results of the multiple correlation analysis are taken for study, the picture being supplemented with the results of the regression analysis where these add anything essential to the explanation.

As variables to be explained, as dominators, in this analysis one was selected to represent each varimax-rotated level of living cumulation type. On the *first* level of living factor, that linked with income level, two variables got highest, almost equal loadings: WC density and general density of occupancy, of which the latter, variable 6, was taken for the multiple correlation analysis. From the modernity-oriented factor, the *second* of the principal cumulations, infant health (20) was taken as having the highest loading, from the *third* the adult health factor, equality of life expectation in the respective sexes (16), from the *fourth*, the leisure time factor, the indicator of weekly leisure (33), and from the *fifth*, the higher education preference factor, the general distribution of graduate level achievement (28).

As explaining variables, those were chosen, on the basis of the varimax-rotated society structure and function factor matrix, which got the highest loading on each cumulation. Thus from factor *three*, the efficiency-oriented aspect of industrialisation, variable 58 was taken, the density of telephone network in regression analysis income level variable (71) has also been used as alternative to telephone network density, from the *second*, industrialisation resources, which already in the principal axis stage diverged from the first, variable 52, density of population, from the *first*, economic growth, growth of domestic capital (80), from the *fourth*, the international contact dimension, the magnitude of foreign trade (78), and from the *fifth* factor, change in population structure, the proportion of the

highest age groups (57). The correlation matrix shows no multicollinearity among the explainers.

The *first* level of living cumulation type to be explained in the analysis is the income-level oriented dimension, represented by density of occupancy, variable 6. The *second* is that dimension of level of living associated with modernity, represented by infant health level, variable 20. These analyses in themselves shed light on the picture already gained from the special orthogonal rotation of the income-level oriented aspect: income-level oriented factor really does show dependency on the level of income (in regression analysis), while the modernity dimension shows strong association with the efficiency aspect of industrialisation, even more markedly than the income level oriented one, and is not so strongly linked with level of income.

The income-level oriented dimension of level of living (represented by sparsity of occupancy). In the explanation of this dimension both explanation models are found to apply. Where both income level and the representatives of the special cumulations were considered as possible explaining variables the programme selected only the level of income. The value for the regression coefficient of this variable, 0.79, is highly significant, as is the value 0.78 found for the multiple correlation coefficient. By means of the level of income 61 % of the original variance can be explained. In economic studies the proportions of explicability are generally fairly high, ranging between 50 and 90 per cent. The reason for this is that usually the quantities involved in problems of economics attain a high degree of precision in measurement, so that chance variations can be eliminated. In other studies, however, those measuring social phenomena, where the use of regression analysis has been less widespread, the proportions of explanation frequently remain extremely low — about 20—30 % (cf. Bäckman 1969, 52). The present study is mainly concerned with social phenomena, but it avails itself of both social and economic statistical material. The precision of measurement is greater than that of material obtained in studies based on interview material. The proportion of explanation attained is in fact in keeping with the assumption that precision would from this standpoint excel that of field studies but fall below that of economic research.

When density of telephone network, as a variable associated with efficiency, is included in the model instead of level of income, the model assumes three stages. The significance of the efficiency dimension is predominant, its regression coefficient being highly significant at each stage: by itself it explains 53 % of the model ($R = 0.73$ at the first stage).

¹ The results of the regression and multiple correlation analyses are given in Appendix IV.

At the second stage the dimension of industrialisation resources, represented by density of population, joins telephone network density as an explaining variable. This addition improves the proportion of explanation by 11% and its regression and multiple correlation coefficients are still significant at the 95% confidence level.

At the third stage the dimension of change in population structure enters the picture, represented by the proportion of the high age groups. At this stage the significance of the multiple correlation coefficient falls somewhat below the 95% level ($R = 0.84$, proportion of explanation 71%). The regression coefficient of the efficiency dimension is still highly significant and that of the industrialisation resources dimension also exceeds the 95% level. The dimension of change in population structure, on the other hand, does not quite attain the 95% mark. Here, then, the model no longer meets strict requirements. It can in fact be said that the income-level oriented dimension of level of living is explained in this model by the dimensions of efficiency and resources, as well as hypothetically by that of structural change in population (coefficients at the third stage: efficiency 0.64, resources 0.33 and population structure 0.29).

The efficiency-oriented dimension is in this explanation model the most significant. The dimensions of industrialisation and change in population structure were earlier found to contain similar features and it would seem particularly logical that these two, the stability of economic and population resources, with the indicator of their effects, change in population structure, would together with efficiency appear as explaining variables. Nevertheless these two models show that income level alone is a better explaining variable than efficiency, even if the combined proportions of explanation afforded by efficiency and resources respectively gives a greater percentage than that of income level alone (the former 64%, the latter 61%).

In the case of the second main cumulation type, *the dimension associated with modernity*, (represented by infant health level), each of the two representatives of the main cumulations of industrialisation feature alone as explaining variables in their own models. Here, however, efficiency appears to be the dominant factor as opposed to income level, because in the income level model the proportion of explanation is smaller.

In the income level model the regression coefficient, 0.71, almost attains the highly significant level and the multiple correlation coefficient 0.69 is highly significant. Level of income explains 48% of the variance on the modernity dimension of level of living. When it is replaced by density of telephone network as a possible explainer this also is the sole one on the dimension, and the regression coefficient 0.89 and the multiple correlation coefficient 0.89 are highly significant. The modernity dimension may be

said to be itself more efficiency- than income-level oriented, because here the proportion of explanation rises considerably higher (79 %) than in the former case.

The income-level oriented dimension of level of living is thus associated more with level of income than with the efficiency aim. In the case of the modernity dimension the opposite holds. This finding bears out indications noted previously. The results of the multiple correlation analyses are in keeping with those of the regression analysis.

In the *explanation of the special cumulations* of level of living assumptions earlier proposed were found to be confirmed. Of the three dimensions only one was explained by the industrialisation aspect. This was the *dimension of higher education preferences*.

The factor of higher education preferences, represented by the generality of academic qualifications, is not associated with the efficiency aspect of industrialisation, not with density of telephone network, nor with income level nor again with the special cumulations of industrialisation with the exception of the dimension of international outlook. The latter, with its indicator, the extent of foreign trade, by itself explains the dimension of higher education. The regression coefficient 0.69 is significant at the 99.0 % confidence level and the multiple correlation coefficient 0.62 is likewise significant at the 99.9 % level. The result of the multiple correlation analysis is the same, but here the model does not attain the significant level. In the analysis of the higher education aspect note was in fact made of the possible connection of this dimension with internationality, international exchange, so that the finding supports the interpretation even though a large proportion of the dimension remains unexplained by the model.

In connection with the analysis of the *dimensions of leisure time and adult health level* note was already made of the poor connection of these aspects with the principal cumulations of level of living and thereby also possibly with industrialisation. The assumption would appear to be correct, because in neither the regression nor the multiple correlation analyses did any industrialisation dimension prove able to explain them. These dimensions are thus not connected with the kind of society structure and functions dimensions involved in this study. In the analysis of the content of these dimensions reference can be made to the possible connections of the adult health level with the late wars and their aftermath, and also to the connections of the proportion of leisure time with the intensity of trade union and social legislation.

Conclusions

The principal cumulations of level of living, or the majority of level of living indicators, are to be explained through the efficiency dimension of industrialisation. The modernity-oriented aspect of level of living above all finds its basis here. The income-level oriented aspect, on the other hand, derives mainly from the level of income, which also plays a role in the efficiency dimension. It also has to some extent points of contact with industrialisation resources and with change in population structure and economic expansion, the latter as a negative factor. The special cumulations, again, the adult health level, the amount of leisure time and the general distribution of higher education, are to be explained through factors other than industrialisation. Only the higher education element has any points of contact with international outlook, with a special cumulation type of industrialisation.

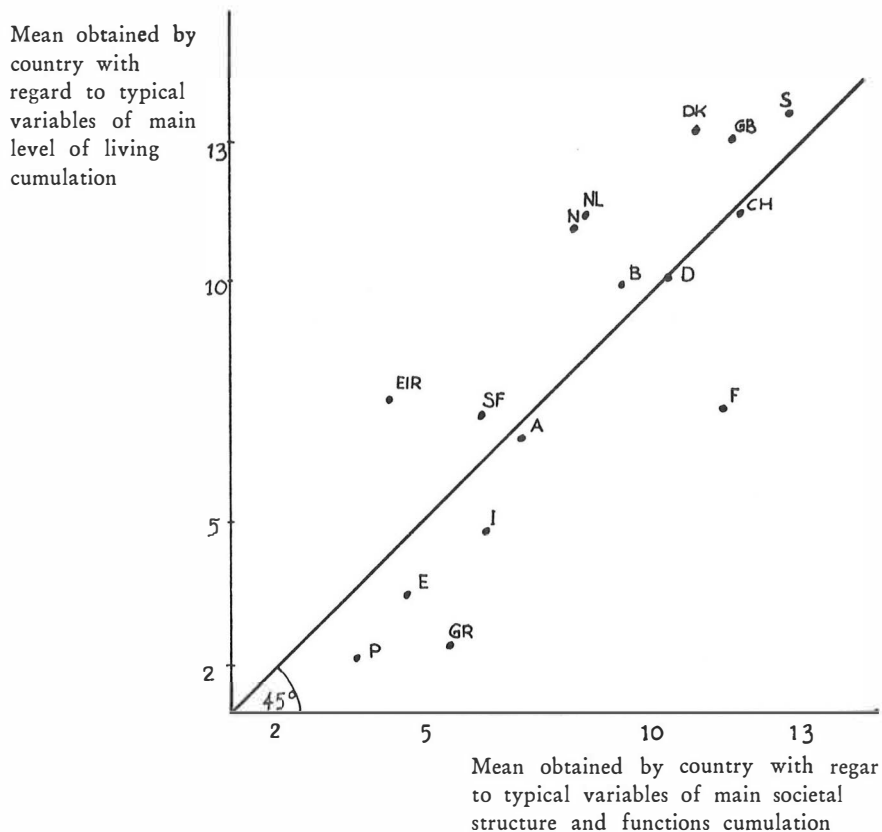
It was not possible except to a very limited extent to take into account here on the one hand obstacles to the course of development and on the other the detrimental effects emerging in the community. The social system contains simultaneously both functional and dysfunctional elements. Presumably level of living investigations should take more account of these hindrances, whose influence has not at time of writing been overcome. By reason of differences in conditions the components involved in the satisfaction of needs require in different societies different degrees of sacrifice, economic and other.

This question is also linked closely with the problem of preferences in level of living. Different significance is attached to different needs according to conditions prevailing. The matter of preferences involves on the one hand taking account of the order of preference among the various level of living factors and on the other a clarification of the connections between level of living preferences and those regarding other society objectives.

A more thorough elucidation of the special cumulations would possibly bring out differences in value systems. Statutory regulations reflecting values prevailing at the time the present survey was made have exerted considerable influence on the picture gained. It was not, however, possible to take into account the extent to which statutory reforms have taken place in the various countries with respect to the aspects studied immediately prior to the survey, during it and since. Such developments might modify the picture gained of differences between these countries. Political influences have likewise not been analysed. On the other hand the effect of war has been roughly analysed as a factor group exerting significant influence on the adult health level.

FIG. 2.

Mean of Each Country with regard to Typical Variables of Principal Level of Living Cumulation and Societal Structure and Functions



A = Austria	GB = United Kingdom
B = Belgium	GR = Greece
CH = Switzerland	I = Italy
D = Western Germany	N = Norway
DK = Denmark	NL = Netherlands
E = Spain	P = Portugal
EIR = Ireland	S = Sweden
F = France	SF = Finland

In the explanation of level of living linear regression-type models were employed such as are most frequently resorted to in the social sciences. This for its part is a result of the failure of theoretical frames of reference to give certainty regarding dependencies prevailing among the variables

involved. Non-linear models can be applied where the non-linear dependency of the variables is known in advance; this dependency cannot even by transformation be put in linear form (Mustonen 1964 a, 88). In most cases no certain explanation candidates can be proposed, and study is by nature somewhat preliminary.

In order to give a picture of the placing of the observation units with regard to the principal level of living cumulation and the principal industrialisation cumulation explaining this, Figure 2 shows the means of variables typical of level of living (18 variables) and of structure and functions of society (7 variables) in principal axis factorisations for each country. The closer the observation unit is situated to the 45° line the better industrialisation predicts the extent to which the principal cumulation type of level of living dominates there.

The best predictions of level of living from industrialisation are obtained in the case of Sweden, Switzerland, Germany, Belgium, Finland and Austria. In France and also to some extent in Greece the level of living is markedly behind the level of industrial development. In Denmark, Holland, Norway and Ireland, again, the level of living is considerably higher than the level of industrialisation would give to expect. Nevertheless no very remarkable divergencies are to be observed, this being confirmed by the fact that the explanation percentages in the regression analysis were high.

Russett has carried out a study of the grouping of the various nations on the basis of the similarity of voting of the members of the United Nations (Russett 1967, 67—68). The groups he found in the votings in the 1950's and the 1960's are a concrete manifestation of the extent to which the common culture of the Western world makes for similar voting behaviour in United Nations sessions. The countries involved in the present study emerge as a clear block in Russett's survey, the only slight divergency appearing in the case of three southern states, Greece, Portugal and Spain. It may indeed be said that the Western European states have a similar basic attitude and similar objectives, the different members having progressed towards these at different rates in the manner the diagram here reveals.

5. CONCLUSIONS — NEW DIMENSIONS

»Consumption is on the increase. Strange, incredibly effective modes of consumption are created; new needs, each more complicated than the last, are turned out of the machinery of production; this is called progress. They say: the level of living is rising! We ask: Where is the level? Will it last? Can you see it? Is it horizontal or vertical? Is it crooked, or isn't it a level at all — a sheet of corrugated iron perhaps? And we ask: Does hunger care whether the stomach is on the second floor or the sixth?» Thus the Finnish writer Lauri Viita speaks of the rising level of living and industrialisation in his work »Moreeni» (Viita 1956, 8—9). In the present study the desire has been to elucidate this welfare-oriented concept of level of living and inquire how far it can be explained through the structure and functions of society associated with industrialisation.

The object of the undertaking was in the first place *to seek the basic dimensions of 1) the level of living and 2) the structural factors and functions of society associated with industrialisation*. The functions of society are determined by the value systems prevailing in it, these being the basis on which objectives are conceived. Through its functions society realises its aims. The intermediary entity on which the functions are founded is industrialisation. By this means society seeks to raise its members' level of living. But society has other objectives besides this, and the pursuit of these may restrict the possibilities of realising the welfare objective or raising it indirectly.

The writer has thus sought to bring out the theoretical fundamental dimensions of the various level of living components on the one hand and the structural factors and functions associated with industrialisation on the other. An effort was made *to compare these dimensions one with the other*. Deriving from the chain of society activities the structural and functional elements were seen as the basis on which the level of living associated with the actual level of aspiration of society is founded. And it was sought to determine the extent to which the societal basic dimensions associated with industrialisation contribute to the explanation of level of living dimensions. The mode of approach in the inquiry was an observation survey of the Western European states, but the main emphasis was nevertheless on the search for the dimensions of the variable space.

The methods applied were *factor analysis* in the case of the basic dimensions and in connection with the seeking of connections *multiple correlation analysis* together with a *linear unbound selective regression analysis* model. To ascertain invariance parallel analyses were also carried out in connection with factorisation, for example comparing the principal axis factors with the principal components and applying two modes of rotation, oblique cosine and orthogonal varimax, and further, in connection with the selected varimax rotation rotations with different factor numbers. The results are in keeping with one another in interpretation, which is significant from the point of view of the search for basic dimensions. The varimax technique was decided on because it offered the possibility of bringing out dimensions as far as possible distinct and independent of one another for use in the subsequent sections dealing with the explanation of level of living. In addition a special orthogonal rotation was used where as well as the level of living factors the income level featured, its entire communality being directed according to one factor, the first, with the rest left free of influence from the income level.

The point of departure in the study was the assumption that the various components in level of living on the one hand and industrialisation on the other, are mutually cumulative. The method chosen for the study, factor analysis, maximises the principle of cumulation. However, in neither case was complete cumulation observed. The *principal level of living dimensions* proved in the varimax rotation to be the income-level oriented and the modernity-oriented aspects, both of which represented principal cumulation types in level of living, and several others which may be regarded mainly as special cumulations, namely the adult health level, the proportion of leisure time and the higher education factor.

In the analysis of *society structural factors and functions* the principal axis solution brought out five dimensions. In rotation the factor associated with the drive to efficiency in industrialisation proved the most prominent, with the factor of industrialisation resources second to it. Special cumulations were represented by economic growth, international outlook and change in population structure.

The level of living is divided into *components* according to the kinds and degrees of satisfaction of needs and each of these components measured by means of a number of *indicators*. Internal analysis of the components showed them to be to a great extent cumulative with regard to their indicators. *In comparison of the components it appeared that the five factors mentioned by no means followed the lines of demarcation of the components* and did not divide the variables according to the degree of satisfaction of needs. Typical of the level of living cumulation was indeed cumulation across the need

group limits. *The society structural factors and functions* were divided on the one hand into functions expressing the process of industrialisation or the level of it, and on the other structural factors associated with industrialisation. In addition environmental and basic structural factors were to be distinguished, which could be influenced only in the long run. *Cumulation here too was problematic, passing over the lines of demarcation imposed.*

The study brings out clearly that other factors than those originally proposed, the primary, secondary and tertiary need groups, determine the grouping of the level of living indicators. It is possible to speak on the one hand of *level of living which is industrialisation-oriented* and on the other of *level of living which is not associated with the dimensions of industrialisation*. Both of the principal level of living cumulations, the income-level oriented and the modernity-oriented, are to be explained through industrialisation; the former is more closely linked to the income level itself and the latter to the efficiency aspect of industrialised society. It is further to be observed that the level of income, which is frequently taken as the equivalent of level of living, but which in this study is regarded as one of the indicators of the level of industrialisation and thus one of the explainers of level of living, does not explain all even of the dimensions following the lines of industrialisation. The special level of living cumulations are not to be explained through the various dimensions of industrialisation, being influenced by other factors here hypothetically indicated.

This study follows the lines of the ideology of highly industrialised welfare states (Eliasson 1963, Inghe & Inghe 1967, 13—14). *Characteristic of the advanced industrial societies of Western Europe is the aspiration to increase the welfare of the members of the community.* This view, however, has only assumed prominence in the various countries when the process of industrial development has gone so far that the state in question can be regarded as among the world's leading ones in this context, as for example Sweden, where this attitude is firmly established. It would seem in fact that this mode of thought becomes dominant only after the actual process of growth has reached its climax and levelled out.

In countries still in a process of rapid expansion the welfare ideology is not yet to the fore. Here the improvement of the living level is regarded mainly as a *means* in economic development and *not as an end in itself*. An example here is Finland, which according to the picture given in figure 2 is among the middle group of European countries as regards levels of living and industrialisation. In the view expressed in a report this year by the state committee for the underdeveloped regions (Kehitysalueiden... 1969, 7) the main objective in state level social policy is the improvement of economic growth. Other objectives must wait until this is

realised. It would thus appear that the actual ordering of objectives into final (welfare) and instrumental (industrialisation) is not yet clearly established in this specimen country.

Interesting and also problematic is the question of the hierarchy of objectives in the *underdeveloped countries*. These are going through their initial phase of industrialisation at a time when the emphasis on welfare objectives is becoming more and more marked. Although the advanced state of technical knowledge and skill assists them to develop extremely rapidly as compared with the states in Europe so far, the pressures of the welfare ideology will be severely felt so long as their level of industrialisation affords no possibilities of realising welfare objectives.

Western welfare ideology has placed its main emphasis on the increase specifically of *material welfare*. What will happen once this objective is extensively achieved? It would appear that new objectives will emerge, with a stress on the *non-material aspects of welfare*. Of this there have been marked signs in Sweden throughout the 1960's in the abundance of anti-welfare literature there (e.g. Eliasson 1963, Inghe & Inghe 1967 and Myrdal, Jan 1966). A further symptom is the recent unrest among students in various parts of Europe. The welfare ideology has been attacked partly also from the standpoint that in their pursuit of material objectives the Western states are tending to forget on the one hand the underdeveloped countries and on the other the problems emerging at home in the unequal distribution of level of living and in minority groups.

If *needs* are divided in the manner proposed by Townsend into *objective, normative, or social needs*, and *subjective needs the present study may be said to concern itself rather with the normative needs* (Townsend 1969, 51), that is, needs whose presence can be observed. The analysis was carried out on a group basis with global variables. Most social-scientific *investigations* are in fact either *group-level* or *individual level* studies. However, the type of study where both approaches could be applied would be of great advantage in the study of level of living. Further to these modes of approach we may distinguish the so-called *structural analysis* type, working mainly on the group level but also employing data on individual units, and *contextual analysis* operating largely on the individual level but also involving material at the community level (Allardt 1969, 46). In the case of these intermediate types of study we might compare for example the societal content of level of living found in this study with population *preferences*, it might be possible to combine the level of living picture given by normative and subjective, perhaps even objective needs. International level studies of preferences, however, are so far-reaching in scope that they would require the support of organs cooperating at the international level.

The level of living indicators used in the reports of the United Nations committees and in the study by Drewnowski & Scott are based mainly on the measurement of normative needs (Drewnowski & Scott 1966, International Definition... 1961 and Report on International... 1954). The normativity on which these needs are founded are largely those of the advanced societies of the world. It has been recommended that the measures used in countries of different levels of development be at the same time objective. However, the indicators employed have been favourable to the developed communities (Townsend 1969, 51). Also no account has been taken of the detrimental effects of industrialisation. The present study has sought, if on a somewhat restricted scale, to accommodate also these aspects, unfavourable phenomena such as the common incidence of traffic accidents and violent death. The suicide rate would also have been included if data on this had been forthcoming from the Catholic countries. Future studies of level of living should indeed take account of these and other disadvantages of advanced society, aspects like environmental hygiene, pollution, noise, the incidence of physical illnesses associated with welfare, and the whole problem of mental health. If comparisons of levels of living were made on the basis of these factors between developed and underdeveloped countries, the latter would prove to have the higher level.

It may indeed be that level of living should be measured with different criteria in advanced and underdeveloped countries respectively, and dimensions should be sought in whose measurement the variables would be valid in transfer from one level of development to another and in comparison of nations of differing social systems, for example socialist and non-socialist. The task is difficult because many criteria lose their relevance as attention shifts from one level to another. In the present study, for example, the literacy indicator is not relevant in comparisons within Central and Northern Europe, but highly significant where the levels of living of e.g. African countries are being compared. The incidence of traffic accidents, again, is a reasonable measure in European conditions, but hardly applicable in a study of differences between African countries.

Just as comparison between countries either geographically or developmentally remote from each other is problematic, chronological comparison of levels of living is a difficult task. The relevance of various criteria tends to diminish as new needs and new problems emerge. Of particular significance in level of living comparisons based on statistics are population censuses. Such studies are in fact a challenge to the planners of these surveys. The census designer should take into account on the one hand what level of living elements in the survey can be chronologically compared with one another and what again can form the basis for comparisons between different communities.

Chronologically the level of living in Western Europe, following the process of industrialisation, has risen markedly the whole time. »We are nevertheless living through a period of unrest, a time of violent demonstrations, anarchistic thought, tear-gas and power politics. Wars rage in Asia and in Africa, contrasts become ever sharper, lulled by a false sense of security we are awakened harshly to the actual precariousness of that security, to the insoluble nature of the problems of violence. Anxiety grows, the problems have become world problems». Thus the Finnish writer Mika Waltari analyses the problems of our time in 1969. At time of writing man has just set foot on the face on the moon, and the papers write that the conquest of the universe will open man's eyes to a new view of his own problems and to effective solutions to them. This only time will tell.

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APPENDIX I/1

LIST OF VARIABLES

LEVEL OF LIVING

Nutrition

1. Satisfied calorie need $\frac{\text{Daily consumed calorie amount per head minus estimated daily calorie need per head (FAO)}}{\text{estimated daily calorie need per head}} \times 100$
2. Satisfied protein need $\frac{\text{Daily consumed total protein amount per head minus estimated daily total protein need per head (FAO)}}{\text{estimated daily total protein need per head (FAO)}}$
3. Satisfied animal protein need $\frac{\text{Daily consumed animal protein amount per head}}{\text{daily consumed total protein amount per head}} \times 100$

Housing

4. Ratio of housing units to number of households $\frac{\text{Occupied housing units per number of households}}{\text{number of households}} \times 100$
5. Ratio of housing units to total population $\frac{\text{Occupied housing units per total population}}{\text{total population}} \times 100$
6. Sparsity of occupation $\frac{\text{Dwellings with 0—1 person per room}}{\text{occupied housing units}} \times 100$
7. Proportion of family dwellings $\frac{\text{Number of dwellings with at least three rooms per number of households with two or more persons}}{\text{number of households with two or more persons}} \times 100$
8. Proportion of new dwellings $\frac{\text{Dwellings completed during ten years before the last census per occupied dwellings}}{\text{occupied dwellings}} \times 100$
9. Dwellings equipment level: piped water $\frac{\text{Dwellings with piped water inside building per occupied dwellings}}{\text{occupied dwellings}} \times 100$
10. Dwellings equipment level: wc $\frac{\text{Dwellings with flush toilet inside building per occupied dwellings}}{\text{occupied dwellings}} \times 100$

- | | |
|--|--|
| 11. Dwellings equipment level: bathroom | Dwellings with bath or shower per occupied dwellings $\times 100$ |
| 12. Dwellings equipment level: electricity | Dwellings with electricity per occupied dwellings $\times 100$ |
| 13. Home ownership ratio | Owner-occupied dwellings in urban areas per occupied dwellings in urban areas $\times 100$ |

Health

- | | |
|--|--|
| 14. Length of life in males | Life expectancy of males at birth |
| 15. General health level: total mortality, conv. | Total number of deaths per total population $\times 1000$ as subtracted of 1000 |
| 16. Similarity of length of life in both sexes | Life expectancy of females at birth minus life expectancy of males at birth \div life expectancy of males at birth $\times 100$ as subtracted from 100 |
| 17. Level of health of middle aged males | Deaths in males in 30—49 per number of males in 30—49 $\times 1000$ as subtracted from 1000 |
| 18. Similarity of health level in both sexes in middle age | Deaths of males in 30—49 per number of males in 30—49 minus deaths of females in 30—49 per number of females in 30—49 \div deaths by males in 30—49 per number of males in 30—49 $\times 100$ and this all subtracted from 100 |
| 19. Survival frequency in children at birth | Deaths at birth or at late foetal phase dead per live births $\times 1000$ as subtracted from 1000 |
| 20. Health level of infants | Infant deaths (0—1 year old) per live births $\times 1000$ as subtracted from 1000 |
| 21. Mortality from infectious and parasitic diseases, conv. | Deaths from infectious and parasitic diseases per total number of deaths $\times 1000$ as subtracted from 1000 |
| 22. Survival frequency in delivering mothers | Deaths of delivering mothers per live births $\times 10\ 000$ as subtracted from 10 000 |
| 23. Generality of delivery in hospitals or in clinics | Mothers delivered in hospitals or clinics per number of delivered mothers $\times 100$ |

Education

- | | |
|---|--|
| 24. Literacy | Number of illiterates per population in 15 — $\times 100$ as subtracted from 100 |
| 25. Normal length of primary school attendance without completing | |

26. Generality of secondary school level enrolment	Enrolled at secondary level in that year per population in age 15—19 \times 100
27. Generality of university level enrolment	Enrolled at tertiary level in that year per population age 20—24 \times 1000
28. Proportion of graduates at university level	Graduates at tertiary level in that year per total population \times 10 000
29. Primary level school instruction level	Number of primary level teachers \div number of primary level pupils \times 1000
30. Secondary level school instruction level	Number of secondary level teachers \div number of secondary level pupils \times 1000
31. Primary and secondary school instruction level	Number of primary level teachers plus number of secondary level teachers \div number of primary level pupils plus number of secondary level pupils \times 1000

Leisure and recreation

32. Leisure time during one year in workers after 15 years service	
33. Leisure time per week by workers in manufacturing industries	Average working hours per week in manufacturing industries \div total hours number in week \times 100 as subtracted from 100
34. Private car density	Number of private cars in operation \div private households \times 100
35. Newspaper circulation ratio	Circulation amount of general daily newspapers \div private households \times 100
36. Radio set density	Number of radio sets in operation \div private households \times 100
37. TV set density	Number of TV sets in operation \div private households \times 100

Security

38. Incidence of non-violent deaths	Violent, non-suicide, deaths per number of total deaths \times 1000 as subtracted from 1000
39. Traffic security in regard to number of motor vehicles	Number of persons hurt or dead in traffic accidents \div number of motor vehicles \times 1000 as subtracted from 1000
40. Traffic security in regard to population	Number of persons hurt or dead in traffic accidents \div total population \times 1000 as subtracted from 1000

41. Employment rate Number of unemployed (definition by ILO), mean of years 1958, 1959, 1960, 1961 and 1962 ÷ economically active population (definition by ILO) × 1000 as subtracted from 1000
42. Coverage of unemployment Number of registered in unemployment insurance per economically active population (definition by ILO) × 100
43. Coverage of sickness insurance Number of registered in general sickness insurance per total population × 100
44. Coverage of old age and invalidity insurance Number of registered in old age and invalidity insurance per population 15 years and older × 100

Tertiary needs

45. Proportion of non-primary consumption in disposable incomes Basic consumption expenditures (food, beverage, water, rent) in private consumption ÷ disposable incomes in households and private non-profit institutions × 100 as subtracted from 100
46. Proportion of private consumption in national product Private consumption expenditures at current market prices ÷ expenditure on gross national product at current market prices × 100
47. Proportion of non-defence expenditures in government consumption expenditures Defence expenditures ÷ general government consumption expenditure at current market prices × 100 as subtracted from 100

ENVIRONMENT

48. Year mean temperature, C°
49. Geographical situation, latitude as mean of the most southern and northern places as subtracted of 100
50. Total area, km²

STRUCTURE AND FUNCTIONS OF SOCIETY

Basic structural factors

51. Total population
52. Population density, people/km²
53. Proportion of non-catholics Roman catholics and orthodox per total population × 100 as subtracted from 100
54. Production of total energy Mean of years 1959, 1960, 1961 and 1962, quantities in million metric tons of coal equivalent, and in kilograms per capita

55. Financial situation of country in regard to United Nations financial classification

56. Cultivated area $\text{Cultivated area per total area} \times 100$

Controllable structural factors

57. Proportion of old aged (industrialisation, in connection with number of working age) $\text{Population 65 years or older per total population} \times 100$

58. Telephone density (efficiency) $\text{Number of telephones} \div \text{population 15 years or older} \times 100$

59. Road density (efficiency) $\text{Road kilometres} \div \text{total area km}^2 \times 100$

60. Women in labour force (division of labour, efficiency) $\text{Economically active females aged 20—64 per number of females aged 20—64} \times 100$

61. Generality of employment in manufacturing industries and services (industrialisation as a whole, efficiency, division of labour) $\text{Workers in primary industries (agriculture, forestry, hunting and fishing) per economically active population} \times 100 \text{ as subtracted from } 100$

62. Generality of employment in services (industrialisation, division of labour) $\text{Workers in services per economically active population} \times 100$

63. Proportion of inhabitants in urbanized areas (a consequence of industrialisation and on the other hand a prerequisite for it, division of labour, efficiency) $\text{Inhabitants in population centres (at least 20 000 inhabitant) per total population} \times 100$

64. Population growth on an average 1958—1962 (population resources, conv. efficiency aspiration, birth control)

65. Birth control (efficiency aspiration) $\text{Number of children aged 0—4} \div \text{number of women married aged 15—49} \times 100 \text{ as subtracted from } 100$

66. Immigration rate (a consequence of industrialisation, population resources needed) $\text{Immigrant number minus emigrant number per total population} \times 100$

67. Relative change in number of workers in primary occupations in 1950's (Industrialisation as a whole, development of division of labour, efficiency aspiration)

68. Change in ratio of immigrants to emigrants, net immigration (-emigration) yearly average %-rate of population growth 1952-61 (industrialisation, formation of population resources)

Functions

69. Extent of foreign telegram and letter contacts (internationality, a consequence of industrialisation) Foreign letters sent and received, thousands, plus foreign telegrams sent and received \div total population 15 years or older \times 100
70. Extent of international air traffic (internationality, a consequence of industrialisation) Passenger kilometres flown (thousands) \div total population \times 100
71. Income level, national income per capita, indexed dollar value (industrialisation)
72. Growth of national product as deflated with national product 1960 (industrialisation) Gross national product 1964 at fixed prices minus gross national product 1953 at fixed prices \div 11 \div gross national product 1960 at fixed prices \times 100
73. Proportion of total saving (taking into consideration future industrialisation) Total saving \div national income \times 100
74. Product of secondary industries (industrialisation, division of labour, efficiency) Product of mining, quarrying, manufacturing and construction \div gross domestic product at current factor cost \times 100
75. Proportion of non-primary product (industrialisation, division of labour, efficiency) Agricultural product (plus product of forestry, hunting and fishing \div gross domestic product at current factor cost \times 100 as subtracted from 100
76. Proportion of manufactured goods in export (efficiency) Raw materials in export per total export \times 100 as subtracted from 100
77. Proportion of domestic capital formation (taking into consideration future industrialisation) Domestic capital formation \div domestic gross product at current market prices \times 100
78. Extent of foreign trade (internationality) Export plus import \div gross national product at current market prices \times 100
79. Average annual rates of growth of real gross domestic product per capita at market prices 1950-60 (industrialisation)

80. Average annual rate of growth of total gross domestic capital formation 1950—60 at 1954 prices (industrialisation, taking into consideration future industrialisation)
81. Proportion of average annual rate of growth of secondary industries in gross national product 1950—60 (industrialisation development of division of labour)
82. Proportion of average annual rate of decrease of non-primary industries in gross national product 1950—60 (industrialisation, development of division of labour)

APPENDIX I/2

DETAILS OF THE RESPECTIVE VARIABLES

Variables 6 and 7: kitchen counted as room

13: dwelling owned by occupant

9, 10 and 11: housing census information from many countries mentions only that there are such facilities in the building

11: In Finland saunas included

19: pregnancy progressed at least 28 weeks

21: Manual of the International Statistics Classification... 1948, cause groups 1—138

22: deaths from abortion not included

24: delineation of age groups varies from one country to another

25: normal = general, it does not necessarily mean the same as compulsory basic schooling. In England, for example, the normal school attendance is longer than the statutory requirement.

29, 30 and 31: strictly speaking these are also control variables and not actual level of living variables

32: the situation in the mid-fifties, this variable is influenced also by differences in the number of church festivals in the various countries

34, 35, 36 and 37: including for comparison private households, though it cannot be shown how far these concern private households. Daily papers = general newspapers appearing at least 4 times a week

42, 43 and 44: comprises only public systems, not private

48: average of mean temperatures prevailing at observation points throughout the country

59: including surfaced roads, the situation in 1958

70: international traffic by registered airlines in each country

76: raw materials include, according to the Standard International Trade Classification ... 1951, »crude materials, edible, except fuels, animal and vegetable oils and fats»

APPENDIX I/3

SELECTION OF VARIABLES

The composition of the variables is largely dependent on the statistical material involved. The first selection procedure took place in looking for operational counterparts, the next in choosing variables for the multivariable analyses on the one hand of the components of level of living and on the other of society structure and activity factors.

For the purposes of overall analysis of level of living a total of 11 variables were eliminated. As indicator of the nutrition level only the criterion of quality of nutrition, the amount of animal protein, was left. Of the housing level variables both variables connected with total number of dwellings, as well as owner-occupant dwellings and, among the quality criteria, water facilities total, are eliminated; total of households/population is part of the housing cumulation but not one of its highest indicators. The measure of use of dwellings independent of other households, again, is associated with the age of dwellings. Owner-occupation is markedly associated with institutional factors lying outside the scope of the present inquiry and is not in fact necessarily measure of housing level. The water facility variable correlates very strongly with bath and shower facilities and is in close dependency on this variable.

Of the measures of health level the inquiry omits the mortality of women in childbirth, which is markedly dependent upon infant mortality. In the case of schooling one of the three measures of teacher/pupil ratio was left out, namely the proportion of basic schooling, this standing in close dependency relation to the overall measure. On the other hand the number of secondary school teachers diverges here and is retained in the analysis. The number of holidays is a poor measure of leisure time. It is dependent upon institutional factors in the respective countries and is not in fact so much a measure of its counterpart, so that it was omitted here, as were both control variables of satisfaction of tertiary needs.

Of society structural and activity factors the three variables of environment factors are mutually closely correlated. The average temperature was included here. Of basic structural factors all except the indicator of cultivated area are included, this latter having proved to correlate poorly and its correlations being in keeping with the coefficients of the given factors. The controllable structural factors, primary production and the measure of the numbers engaged in service occupations, are strongly correlated mutually and with other variables, so that only one of them was selected for use here. Population growth correlates poorly with other intermediate mechanisms. The average increase in immigration in the 50's for its part strongly correlates with the immigration in 1960, so that only the latter of the two was retained in further analysis. Factors measuring the proportional role of the various occupation sectors in product are correlated with corresponding structural factors, for which reason they were eliminated. Other variables associated with economic growth correlate markedly with growth of deflated national product and domestic capital formation, and these others were omitted. The measure of the extent of domestic capital formation proved weaker than overall savings and was likewise eliminated.

APPENDIX I/4
STATISTICAL SOURCES

LEVEL OF LIVING

Nutrition:

FAO: Production Yearbook
FAO: State of Food and Agriculture, 1964. Rome 1964

Housing:

UN: Annual Bulletin of Housing and Building Statistics for Europe, 1963. New York 1964
UN: Major Long-Term Problems of Government Housing and Related Policies. ECE. New York 1966
UN: A Statistical Survey of the Housing Situation in European Countries around 1960. ECE. New York 1965
Censuses in different countries

Health:

Maternity Care in the World, An International Survey of Midwifery Practice and Training. F.I.G.O., I.C.M., Pergamon Press Great Britain 1966
UN: Demographic Yearbook
UN: Statistical Yearbook
WHO: Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, 6th Revision of the International Lists of Diseases and Causes of Death, Adopted 1948. Vol. I. Geneva 1948

Education:

UN: Demographic Yearbook
Statistical Yearbooks of different countries
UNESCO: Current School Enrolment Statistics. No 9, September 1962
UNESCO: International Yearbook of Education. International Bureau of Education. Geneva
UNESCO: Statistical Yearbook
UNESCO: World Survey of Education I, II, III. Zürich 1958 ja 1961

Leisure and recreation:

L'Evolution des Charges Sociales et des Coûts de Main d'Œuvre en Europe Occidentale et aux Etats-Unies. Etudes et Conjoncture, I.N.S.E.F. Paris Aout 8. 1957
UN: Demographic Yearbook
UN: Monthly Bulletin of Statistics
UNESCO: Statistical Yearbook

Security:

ILO: Year Book of Labour Statistics
OECD: Manpower Statistics 1954—64. Paris 1965
UN: Compendium of Social Statistics: 1963. Statistical Papers Ser. K.2. Publ. 17. New York 1963

UN: Demographic Yearbook

UN: Statistics of Road Traffic Accidents in Europe 1961. ECE. Geneva 1963

Tertiary needs:

UN: Yearbook of National Accounts Statistics

ENVIRONMENT

Calmann, John (ed.): Western Europe, A Handbook. London 1967

BASIC STRUCTURE

Dewhurst, F., Coppock, J., Yates, L. P. Europe's Needs and Resources. Twentieth Century Fund. New York 1961

CONTROLLABLE STRUCTURE

Dewhurst, F., Coppock, J., Yates, L. P. Europe's Needs and Resources. Twentieth Century Fund. New York 1961

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FUNCTIONS

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APPENDIX II/1

CORRELATION MATRIX OF LEVEL OF LIVING (N = 16)

	2	3	4	7	13	8	6	5	9	10	11	12	14	16	15	17	18	19	20	21	22	23	26
1	588	311	-073	232	-079	-032	157	-243	162	253	182	-226	156	420	-022	284	562	150	000	210	132	-099	097
2		347	041	197	168	217	199	063	226	241	365	-109	094	-044	-168	-157	003	485	359	169	300	282	297
3			-081	553	-193	466	597	395	715	597	801	556	655	699	-041	584	553	524	701	738	671	468	468
4				369	206	-453	262	300	151	105	064	004	110	-126	-549	-253	-174	-290	000	-031	189	208	-255
7					115	-239	870	504	685	732	582	477	546	354	-458	205	306	132	335	691	550	198	356
13						-322	-039	037	-235	-103	-073	-036	-164	-313	-165	-487	-244	-279	009	-072	147	113	-012
8							-003	-080	252	-025	277	177	321	348	551	532	041	624	137	162	268	362	166
6								642	855	861	620	734	710	322	-345	333	214	249	439	821	733	366	612
5									628	602	543	813	233	-116	-486	-077	-049	304	681	531	649	333	610
9										735	800	710	643	423	-188	417	162	329	403	793	750	332	585
10											603	716	590	401	-404	299	362	153	585	896	700	163	779
11												564	367	363	-324	178	224	376	626	626	541	506	456
12													519	209	-280	285	153	229	576	773	722	382	727
14														608	171	711	394	311	737	756	737	382	308
16															233	860	772	052	365	585	387	-048	148
15																489	003	254	162	-196	-022	-096	-191
17																	661	293	393	513	411	024	131
18																		106	050	480	206	-137	091
19																			479	198	362	474	235
20																				691	829	535	544
21																					802	143	717
22																						372	638
23																							113
26																							
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27	28	29	30	31	24	25	32	33	34	35	36	37	38	41	42	43	44	39	40	46	47	45		
-121	063	-450	031	-250	168	357	-413	-640	197	242	-047	132	194	171	283	-097	-074	029	-111	256	036	150	1	
388	423	050	251	106	546	525	-309	-546	365	506	279	076	-309	041	154	-254	226	176	-256	-012	295	109	2	
143	174	040	247	158	589	481	075	-343	571	838	659	544	-108	409	298	638	662	494	-223	-388	058	624	3	
206	-263	241	064	099	059	215	050	161	540	038	-058	-023	180	107	119	-020	-220	105	015	430	-099	012	4	
071	039	182	550	285	506	412	-152	-085	565	462	438	450	091	121	244	543	388	079	-461	-006	270	556	7	
-094	-015	009	054	-009	062	140	178	434	-100	-013	-082	-265	253	-359	-055	-218	-074	203	265	209	365	-356	13	
035	123	137	-057	134	189	114	019	-133	-089	514	392	006	-322	191	-026	208	540	353	110	-490	000	172	8	
332	162	439	617	520	696	519	-100	-122	680	575	623	650	-169	279	432	712	551	193	-629	-330	155	721	6	
584	058	681	490	690	594	306	286	218	654	419	602	628	-357	122	219	586	389	090	-645	-193	075	454	5	
332	-039	403	397	447	707	502	172	-320	706	749	729	685	-365	506	481	808	723	418	-565	-491	053	821	9	
379	348	315	500	426	754	666	-235	-276	668	614	732	832	-050	191	577	631	524	100	-718	-335	076	653	10	
338	-033	338	380	385	725	633	193	-358	700	887	691	585	-303	412	316	643	746	353	-473	-471	290	615	11	
433	122	597	439	611	658	427	242	187	573	512	658	727	-252	173	491	850	549	261	-579	-497	034	553	12	
194	329	079	311	135	511	355	012	-201	420	543	579	385	-106	461	366	557	572	558	-103	-408	038	728	14	
-407	-052	-385	-094	-220	074	195	-057	-295	184	473	327	387	431	286	303	529	355	418	134	-137	-211	382	16	
-391	014	-410	-361	-324	-388	-497	148	-027	-661	-078	010	-356	-092	251	-417	-159	180	261	569	-258	-167	070	15	
-290	012	-208	017	-043	020	-014	-039	-155	031	331	308	296	184	325	164	533	371	352	101	-231	-211	449	17	
-235	155	-335	201	-068	051	117	-110	-194	179	218	124	412	485	-003	196	348	097	132	-033	124	050	168	18	
368	342	244	386	341	390	090	-104	-176	109	462	432	047	-571	197	-274	080	469	044	-247	-229	295	376	19	
468	372	282	213	276	747	551	172	-296	485	854	894	459	-435	526	319	469	838	644	-207	-659	091	721	20	
268	334	239	459	359	741	567	033	-221	588	670	770	797	-054	210	616	778	670	421	-525	-447	141	688	21	
359	217	300	306	371	688	495	199	-050	571	720	791	565	-191	353	415	593	630	600	-288	-326	027	647	22	
462	088	372	219	265	483	460	066	-015	465	552	297	003	-410	445	023	195	365	279	-048	-369	152	346	23	
391	405	359	324	462	674	465	-077	-179	438	503	688	785	-268	074	496	528	486	129	-675	-512	-085	456	26	
	509	656	477	556	736	482	110	-214	615	339	471	388	-709	218	301	088	316	109	-597	-374	261	371	27	
		119	432	202	458	204	-251	-241	101	144	387	265	-259	-161	088	-158	257	074	-274	-325	281	149	28	
			655	924	495	255	178	337	453	254	400	388	-453	-165	139	389	374	-021	-617	-324	339	118	29	
				811	534	223	-050	109	380	257	397	436	-236	-254	013	337	434	-084	-652	-189	704	254	30	
					481	186	146	306	415	298	479	532	-341	-221	055	454	451	-038	-675	-303	417	162	31	
						815	006	-377	725	756	750	605	-510	270	581	453	666	339	-665	-524	382	619	24	
							-265	-419	692	711	482	432	-123	229	708	285	374	215	-462	-252	209	363	25	
								250	095	090	181	116	-241	238	-054	334	302	621	229	-306	059	134	32	
										-314	-391	-226	-238	317	-549	-353	056	-230	-147	229	287	082	-481	33
											617	488	665	-218	368	598	516	330	324	-556	-200	001	512	34
											817	515	-265	444	344	519	814	535	-294	-506	204	606	35	
												685	-374	338	256	563	887	441	-455	-626	189	700	36	
													-085	162	562	732	506	206	-701	-453	-062	529	37	
														-429	-004	-062	-437	-124	400	574	-195	-485	38	
															169	271	356	409	039	-435	-330	771	41	
																476	137	325	-418	-250	-158	304	42	
																	597	363	-433	-493	-025	596	43	
																		524	-315	-763	390	674	44	
																			308	-424	-010	350	39	
																				270	-241	-409	40	
																					-082	-571	46	
																						-010	47	
																							45	

APPENDIX II/2

CORRELATION MATRIX BETWEEN LEVEL OF LIVING AND STRUCTURE AND FUNCTIONS OF SOCIETY (N = 16)

Level of li- ving	Structure and functions of society																	
	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
3	—525	—631	—108	—237	—037	745	025	211	—115	259	689	176	373	530	574	258	231	638
7	—275	—391	—547	—212	309	412	162	126	162	374	535	559	—088	632	656	065	—003	381
8	—27C	—357	083	—261	—229	455	—290	—016	—492	—213	408	—411	500	121	—051	041	316	317
6	—343	—486	—422	—047	386	493	416	456	104	528	748	579	062	873	793	264	141	556
10	—449	—560	—459	088	500	471	515	482	224	524	665	668	—006	906	915	462	071	497
11	—622	—656	012	—153	000	800	144	364	—055	365	741	153	406	615	562	174	224	473
12	—625	—612	007	101	171	608	529	591	—101	645	701	267	381	762	625	448	—028	695
14	—28C	—482	—285	—297	029	473	091	140	—057	250	684	226	021	540	573	206	185	335
16	001	—228	—176	—002	110	308	060	104	301	—075	310	192	—236	288	368	497	166	353
15	163	080	181	—137	—245	025	—362	—265	—043	—725	013	—429	003	—327	—350	073	436	—099
17	069	—111	—184	—013	116	225	072	139	124	—089	372	087	—107	287	240	520	256	463
18	—009	—102	—226	—009	115	003	115	019	379	098	053	297	—185	103	221	553	—153	384
19	—411	—324	—218	—468	—144	447	—329	—138	—557	016	491	—135	675	185	097	—135	271	497
20	—663	—802	—035	—362	—144	835	—018	197	—272	204	894	012	371	591	632	082	277	330
21	—533	—688	—353	—081	304	626	383	382	188	474	738	547	107	790	843	529	077	485
23	—459	—448	300	—302	—433	439	—061	136	—571	291	459	—349	561	253	096	—364	112	361
26	—498	—577	—185	253	465	497	544	595	147	392	574	576	297	797	782	518	227	566
27	—512	—379	015	—121	—006	312	221	319	—358	635	474	132	465	406	403	—076	—047	130
28	—382	—402	—420	—256	173	086	—107	—122	—200	060	191	259	149	199	298	—021	—067	—017
30	—372	—380	—485	—283	257	175	069	112	—058	371	447	348	148	444	283	072	—269	342
31	—385	—376	—171	—047	218	271	221	408	—165	451	544	176	256	524	265	165	—283	524
24	—722	—765	—182	—244	076	663	277	328	—144	618	732	353	495	707	736	135	119	278
25	—481	—592	—090	—127	—002	413	321	265	—025	580	432	258	278	571	617	081	007	120
33	—045	020	147	—120	—267	—170	—153	—191	—256	001	—173	—376	—032	—261	—425	—197	—651	159
34	—333	—397	—029	038	126	447	418	551	010	796	585	435	165	653	721	144	—050	422
35	—640	—790	—019	—324	—136	840	—004	228	—147	248	820	054	394	588	606	116	221	426
36	—729	—811	—191	—238	103	841	076	283	—108	212	921	191	259	706	721	259	165	422
37	—376	—449	—165	356	526	441	626	729	352	518	606	629	—012	806	800	712	041	578
38	394	219	—124	109	029	—432	—038	—233	432	—198	—468	068	—656	—262	—162	132	—504	—058
41	—084	—087	338	112	—112	432	215	367	037	063	482	—041	118	303	356	124	683	130
42	—150	—292	—004	283	253	190	673	539	298	694	238	517	061	547	646	496	052	077
43	—377	—448	000	198	260	590	501	621	151	452	667	298	130	714	560	602	115	645
44	—693	—792	—097	—333	—016	858	—068	192	—141	022	884	001	336	567	475	195	291	313
39	—321	—560	359	—350	—465	591	—135	070	007	101	524	—115	176	071	282	085	085	034
40	322	233	424	—262	—643	—221	—577	—563	—095	—608	—426	—643	—215	—768	—623	—380	—083	—408
45	—385	—402	—150	—021	221	650	309	408	061	260	794	329	162	700	709	312	577	351

66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	
397	114	407	364	594	736	-557	342	-105	468	267	047	366	-524	-096	-384	270	3
368	176	351	715	565	600	-718	-129	071	529	674	-355	535	-686	-426	-664	483	7
083	-059	064	-051	369	229	026	496	-182	041	-334	768	047	041	118	184	-051	8
659	429	488	617	641	799	-713	159	237	763	576	-176	-488	-639	-425	-614	477	6
612	476	357	603	541	715	-771	247	341	768	485	-248	657	-618	-341	-587	256	10
547	209	507	374	418	812	-542	458	291	650	397	-049	271	-433	-132	-369	371	11
588	700	221	264	273	687	-524	435	340	730	106	106	232	-337	-095	-439	582	12
338	244	-047	499	802	532	-575	269	-326	341	156	033	492	-598	-438	-477	204	14
-055	-214	-047	198	547	236	-347	077	-511	096	242	-126	272	-447	-003	-252	-041	16
-292	-379	-226	-461	095	-296	436	229	-537	-518	-451	488	-163	278	232	491	-243	15
049	-076	-061	128	496	225	-122	242	-514	057	081	190	213	-223	134	-083	-014	17
-129	-014	-280	206	165	112	-238	027	-418	-047	291	-283	327	-265	285	-217	-215	18
365	091	263	262	238	482	-039	418	050	138	-068	586	308	021	165	042	124	19
494	260	413	350	726	712	-610	542	006	462	-085	230	473	-556	-432	-387	294	20
444	464	201	565	664	661	-774	323	092	614	400	-101	636	-641	-318	-581	289	21
442	185	586	090	241	573	-277	304	044	381	-177	185	-119	-233	-268	-254	255	23
626	518	401	171	338	644	-530	319	532	718	271	031	380	-347	-150	-274	227	26
668	665	369	332	085	553	-274	507	585	515	-029	085	311	-082	-203	-197	138	27
182	503	-030	310	286	134	-293	300	113	077	-036	184	656	-144	-155	002	-263	28
350	617	037	544	218	444	-382	268	280	348	441	053	556	-239	-004	-263	250	30
485	674	183	259	076	535	-259	386	471	488	191	215	280	-132	124	-176	468	31
637	536	369	586	524	758	-729	455	448	699	273	011	550	-498	-466	-534	172	24
403	205	236	534	455	551	-761	161	298	607	222	-223	373	-571	-580	-661	-084	25
-393	178	-238	-211	-355	-311	103	-270	-202	-282	-425	182	-244	081	182	-072	495	33
691	395	552	485	406	826	-634	169	371	762	444	-402	264	-577	-359	-604	356	34
453	087	407	389	647	785	-667	435	072	526	160	062	401	-606	-321	-462	248	35
535	407	369	394	582	732	-610	600	212	538	071	165	625	-506	-226	-336	409	36
624	593	322	256	297	682	-497	429	432	729	453	-233	420	-377	044	-289	277	37
-641	-383	-469	-059	-068	-447	-131	-635	-547	-374	050	-473	-031	-274	035	-238	-141	38
547	-128	593	-068	297	509	-021	412	-009	344	029	-126	-149	-112	-179	-021	091	41
337	328	062	334	379	343	-562	074	274	583	313	-296	176	-405	-454	-525	-120	42
460	465	328	218	366	619	-412	407	142	649	345	013	140	-328	024	-326	543	43
405	324	285	301	590	630	-452	697	094	411	114	331	471	-357	-146	-154	335	44
021	-014	062	-006	585	341	-405	204	-394	009	-112	-037	059	-518	-365	-316	188	39
-724	-647	-329	-487	-091	-588	338	-350	-808	-785	-554	023	-440	085	007	212	-187	40
712	269	566	376	547	732	-372	536	168	606	321	-028	370	-327	-253	-244	306	45

APPENDIX II/3

CORRELATION MATRIX OF STRUCTURE AND FUNCTIONS OF SOCIETY

(N = 16)

	48	49	50	51	57	52	53	54	55	56	58	59	69	70	60	61	62	63
48																		
49	891																	
50		012																
51			215															
57				101														
52					098													
53						177												
54							197											
55								088										
56									865									
58										341								
59											355							
69												159						
70													159					
60														412				
61															418			
62																585		
63																	585	
64																		418
65																		
66																		
71																		
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75																		
76																		
77																		
78																		
67																		
68																		
79																		
80																		
81																		
82																		

64	65	66	71	72	73	74	75	76	78	77	67	68	79	80	81	82	
096	-258	-261	-463	508	-551	-237	-333	208	-271	-409	-505	-221	259	142	297	-361	48
083	-265	-207	-537	740	-403	-047	-338	076	-152	-496	-368	-163	580	376	483	-310	49
062	-043	-068	-074	342	181	-056	-144	-494	-049	-787	-110	109	282	218	223	018	50
289	169	324	-029	357	056	456	376	238	-257	-442	164	251	377	353	366	-124	51
-278	357	518	532	-489	052	438	638	257	-272	143	563	246	-322	-265	-616	286	57
274	205	438	165	-021	045	518	518	650	-126	302	320	206	062	103	146	-035	52
262	381	415	694	-512	516	121	453	006	242	321	212	463	-427	-229	-307	544	53
200	321	553	318	-128	146	535	668	376	-369	-152	440	271	003	009	-149	-003	54
313	503	740	568	-080	362	577	779	361	-201	-210	464	534	-020	105	-008	209	55
124	-098	-064	-085	-067	-235	-016	007	536	-694	-022	-177	-243	-159	043	-073	-268	56
239	506	635	850	-572	548	162	597	162	162	467	362	496	-533	-282	-396	559	58
150	219	441	368	-417	-184	391	524	803	-485	439	263	156	-365	-221	-322	-012	59
-183	049	221	374	-673	-048	082	353	432	-067	800	221	018	-553	-518	-643	165	69
239	139	253	518	-703	033	-235	329	326	013	569	-026	212	-768	-674	-521	150	70
183	315	288	362	-051	400	294	221	-247	545	-090	242	251	153	056	-015	127	60
286	560	797	788	-584	369	512	921	491	-052	439	521	572	-441	-285	-387	365	61
230	399	674	756	-741	169	356	762	494	-325	569	347	463	-659	-462	-575	282	62
197	405	241	194	-051	322	150	324	306	-165	065	278	-112	018	353	021	-118	63
	046	465	277	225	345	206	295	239	191	-160	-207	484	208	-024	371	-166	64
		518	676	-226	211	145	533	178	120	051	296	463	-214	297	-204	494	65
			841	-226	478	676	879	379	-016	143	497	808	-127	-115	-107	330	66
				-557	374	376	803	397	-082	293	344	726	-518	-235	-435	494	71
					101	-006	-464	-301	320	-626	-215	-146	917	706	882	-269	72
						325	348	-158	478	159	543	251	282	311	344	047	73
							688	315	034	028	536	463	241	053	116	141	74
								479	-091	193	542	722	-294	-244	-322	377	75
									-450	274	068	218	-297	-132	-217	035	76
										019	176	-034	441	269	443	049	78
											302	-115	-510	-324	-412	041	77
												209	049	068	-048	290	67
													-148	-168	-036	502	68
														706	863	-307	79
															685	-074	80
																-311	81
																	82

APPENDIX III/1

FACTORS OF PRINCIPAL AXIS AND PRINCIPAL COMPONENTS IN
LEVEL OF LIVING

Variable	Factors					h ²	Components				
	I	II	III	IV	V		I	II	III	IV	V
3	809	-388	050	002	082	814	811	390	054	-005	076
7	641	126	396	034	241	643	646	-132	408	-042	244
8	298	-515	-468	258	-052	642	302	538	-489	-269	-045
6	847	150	220	093	174	827	849	-154	222	-095	173
10	867	190	329	-005	-185	930	866	-194	329	-001	-175
11	811	-009	-061	-141	283	762	818	010	-061	151	292
12	788	174	116	225	216	762	791	-177	116	-222	230
14	710	396	054	067	-023	669	721	416	062	-076	-029
16	437	-743	494	-003	-084	994	434	727	490	-005	-080
15	-233	-757	-380	310	-192	904	-232	753	-369	-303	-183
17	400	-739	244	274	-092	849	401	746	255	-286	-093
18	299	-380	554	139	-226	612	303	392	586	-164	-252
19	411	-134	-556	365	-067	634	416	141	-578	-388	-076
20	826	-275	-368	-033	-036	896	827	278	-363	037	-032
21	907	-080	321	091	-148	963	905	077	320	-092	-133
23	445	-009	-460	-113	402	584	453	014	-496	133	451
26	707	227	059	112	-270	640	716	-240	063	-121	-281
27	509	541	-476	-123	-144	813	513	-550	-492	134	-151
28	310	163	-218	188	-621	591	317	-173	-238	-218	-717
30	512	467	018	500	-005	731	515	-475	012	-516	000
31	496	523	-115	535	170	847	498	-530	-125	-538	190
24	881	293	-203	-166	-128	947	879	-288	-203	165	-118
25	671	203	027	-463	-061	710	676	-205	028	476	-057
33	-328	189	145	548	451	668	-332	-195	142	-577	509
34	745	291	111	-362	182	817	750	-296	114	377	182
35	846	-221	-191	-139	118	835	846	223	-187	141	116
36	855	-067	-194	147	-099	805	861	068	-195	-151	-095
37	774	180	330	066	-182	778	779	-187	340	-069	-181
38	-341	-228	795	037	041	804	-342	224	800	-047	048
41	409	-421	-317	-500	183	728	410	422	-305	500	156
42	526	122	343	-455	-190	652	531	-126	358	481	-191
43	742	-121	338	190	336	829	741	118	340	-183	334
44	779	-216	-291	214	048	787	786	224	-297	-219	056
39	418	-456	-135	-159	105	438	430	499	-144	194	129
40	-605	-637	-084	-101	184	823	-608	650	-083	106	182
45	794	-215	-139	-142	025	716	789	209	-126	135	008
Eigen- value	14.960	4.752	3.714	2.411	1.605		15.096	4.894	3.875	2.583	1.851
% of number of variables	41.6	13.2	10.3	6.7	4.5		43.0	13.6	10.8	7.2	5.1

APPENDIX III/2

FACTORS OF PRINCIPAL AXIS AND PRINCIPAL COMPONENTS IN
STRUCTURE AND FUNCTIONS OF SOCIETY

Variable	Factors					h ²	Components				
	I	II	III	IV	V		I	II	III	IV	V
48	-477	-546	488	118	265	848	-480	559	486	-107	-265
51	084	-952	-072	055	070	926	087	947	-079	-065	-064
52	430	-627	370	-377	020	859	436	640	368	372	040
53	605	511	-399	-028	259	855	610	-525	-390	-067	280
54	526	-749	-040	229	-189	928	526	738	-043	-245	155
55	620	-675	-276	195	116	967	619	662	-269	-191	-127
57	629	-097	-046	406	-518	840	636	092	-047	-495	484
58	799	370	-264	-083	289	935	798	-375	-248	118	-279
59	631	-419	555	-089	-060	893	633	424	553	068	076
60	193	339	-608	158	-159	572	202	-370	-657	-233	143
62	925	-016	222	035	083	913	923	012	227	-024	-085
63	405	-572	-096	-222	057	553	425	613	-111	286	-067
65	528	-155	-334	010	146	435	559	164	-372	-029	-245
66	774	-227	-245	090	081	725	793	227	-251	-122	-093
67	539	-140	-308	-194	-504	696	557	141	-330	160	616
69	544	437	486	-129	-272	813	547	-443	497	108	300
70	568	451	374	017	365	799	573	-462	396	044	-378
71	887	115	-225	181	260	951	876	-121	-207	-163	-268
72	-687	-439	-337	-194	095	824	-691	448	-351	191	-070
73	366	025	-665	-403	002	739	376	-032	-689	455	048
76	494	-306	484	-068	123	591	510	325	518	074	-129
78	530	433	407	-550	-192	974	526	-427	402	525	242
80	-327	-462	-508	-466	017	795	-324	470	-522	452	-002
Eigen- value	7.746	4.829	3.331	1.326	1.201		7.882	4.952	3.527	1.465	1.380
% of number of variables	33.7	21.0	14.5	5.8	5.2		34.3	21.5	15.3	6.4	6.0

APPENDIX III/3

ROTATED FACTOR MATRIXES OF LEVEL OF LIVING AND STRUCTURE AND FUNCTIONS OF SOCIETY, THE FIRST FIVE FACTORS OF PRINCIPAL AXIS MATRIX (Varimax rotation)

Level of living

Variable	I	II	III	IV	V
3	466	-648	405	-115	-013
7	742	-128	226	072	139
8	-227	-708	172	104	-223
6	829	-328	157	085	-033
10	858	-165	253	-141	-287
11	643	-571	-001	-100	108
12	753	-360	089	233	-063
14	367	-571	435	-088	-102
16	161	-301	906	-213	109
15	-739	-436	352	109	-181
17	018	-438	808	043	-054
18	224	022	741	-068	-087
19	-001	-640	-096	248	-393
20	352	-826	079	-167	-236
21	756	-340	454	-089	-248
23	221	-630	-331	017	171
26	628	-202	077	-041	-444
27	447	-276	-594	-121	-412
28	126	-092	-027	-075	-748
30	594	-075	-102	473	-372
31	580	-161	-256	585	-278
24	725	-452	-208	-237	-344
25	640	-238	-118	-476	-059
33	-068	241	-045	732	261
34	803	-248	-138	-285	102
35	492	-736	101	-199	-035
36	523	-628	111	-001	-353
37	779	-120	263	-068	-287
38	-052	555	611	031	345
41	042	-658	-014	-483	244
42	595	027	145	-524	-043
43	683	-372	391	200	176
44	373	-754	125	-101	-233
39	072	-567	227	-218	110
40	-770	-054	226	-061	418
45	462	-649	140	-233	-090

Structure and functions of society

Variable	I	II	III	IV	V
48	-013	-356	657	343	416
51	-332	-771	122	444	-101
52	-057	-884	064	-264	031
53	208	189	-866	-159	-009
54	017	-780	-094	287	-478
55	-048	-738	-430	386	-292
57	370	-245	-198	032	-777
58	285	-072	-892	-231	-005
59	370	-817	039	-272	-110
60	-083	401	-508	093	-372
62	527	-541	-502	-254	-161
63	-233	-666	-216	008	-096
65	-026	-298	-562	094	145
66	139	-483	-623	069	-283
67	-180	-254	-332	-282	-640
69	575	-058	-088	-662	-184
70	669	-079	-399	-324	285
71	396	-282	-832	022	149
72	-746	052	315	350	209
73	-471	-026	-675	-177	-172
76	345	-658	-008	-183	075
78	288	-109	-185	-919	-012
80	-875	-127	-010	098	062

APPENDIX III/4

ROTATED FACTOR MATRIXES OF LEVEL OF LIVING AND STRUCTURE AND FUNCTIONS OF SOCIETY, THE FIRST FOUR FACTORS OF PRINCIPAL AXIS MATRIX (Varimax rotation)

Level of living

Variable	I	II	III	IV
3	435	-404	533	-414
7	693	051	295	-127
8	-155	-728	271	-112
6	817	-186	245	-187
10	874	-059	258	-249
11	582	-324	151	-465
12	770	-290	185	-062
14	364	-391	530	-318
16	098	-011	950	-274
15	-658	-529	378	105
17	033	-302	862	-064
18	225	129	702	005
19	122	-784	-014	012
20	370	-680	214	-499
21	773	-197	492	-251
23	177	-484	-157	-364
26	701	-236	067	-123
27	512	-368	-570	-266
28	284	-330	-122	036
30	721	-289	-101	342
31	701	-382	-214	368
24	747	-369	-146	-465
25	568	-002	-070	-616
33	-028	059	-027	678
34	713	011	-050	-522
35	455	-495	251	-553
36	585	-583	199	-272
37	807	-053	259	-153
38	-127	662	530	260
41	-080	-306	141	-758
42	514	270	129	-512
43	643	-169	512	-106
44	425	-694	255	-239
39	015	-331	346	-444
40	-847	059	261	-015
45	434	-431	261	-523

Structure and functions of society

Variable	I	II	III	IV
48	-229	-214	824	026
51	-442	-822	208	080
52	180	-800	186	-390
53	352	110	-805	060
54	-048	-901	-056	273
55	-108	-875	-314	277
57	328	-416	-300	448
58	486	-128	-774	-000
59	533	-746	186	-120
60	-102	223	-652	248
62	696	-549	-340	062
63	-099	-698	-148	-175
65	034	-398	-496	091
66	210	-600	-533	174
67	054	-401	-516	-114
69	839	011	-094	-165
70	797	023	-176	-005
71	459	-380	-677	265
72	-849	045	243	-184
73	-213	-147	-769	-285
76	459	-570	177	-099
78	755	008	-202	-571
80	-766	-172	-118	-406

APPENDIX III/5

GRAM-SCHMITH ORTHOGONAL ROTATION OF LEVEL OF LIVING AND INCOME LEVEL, THE FIRST FIVE FACTORS OF PRINCIPAL AXIS MATRIX

Variable	I	II	III	IV	V
3	742	478	-164	064	089
7	638	-046	-512	084	-155
8	254	532	424	276	146
6	828	-050	-357	161	011
10	747	-093	-459	065	379
11	874	110	-067	-082	-103
12	764	-081	-243	284	041
14	605	484	-156	131	196
16	238	772	-520	024	152
15	-311	678	406	269	109
17	214	782	-286	308	156
18	096	418	-594	160	231
19	431	170	473	390	098
20	788	365	248	042	288
21	745	180	-448	162	374
23	598	066	377	-075	-258
26	607	-160	-166	174	478
27	586	-479	377	-068	289
28	179	-138	169	219	643
30	502	-408	-113	546	071
31	543	-464	023	570	-039
24	865	-186	058	-080	359
25	666	-122	-133	-410	266
33	-265	-212	-098	475	-437
34	807	-199	-234	-311	005
35	843	318	066	-069	110
36	791	160	072	230	340
37	653	-097	-447	127	377
38	-459	188	-699	-012	-133
41	475	457	248	-433	-066
42	427	-059	-414	-408	381
43	687	210	-446	239	-104
44	748	309	183	298	166
39	391	520	089	-135	065
40	-585	558	188	-151	-287
45	760	292	012	-055	149
Income level	937	-000	-000	-000	-000

APPENDIX IV/1
REGRESSION ANALYSES OF LEVEL OF LIVING AND STRUCTURE AND
FUNCTIONS OF SOCIETY

Criteria

1. Income-level oriented level of living factor (Analysis 1. and 2.)
2. Adult population health level factor (no predictors)
3. Level of living factor associated with modernity (Analysis 3. and 4.)
4. Higher education preference factor (Analysis 5.)
5. Level of living factor of proportion of leisure time (no predictors)

Predictors

6. Factor of change in population structure
7. Factor of industrialisation resources
8. Factor of international contacts
9. Economic growth factor
10. Main industrialisation dimension associated with efficiency, level of income
11. Main industrialisation dimension associated with efficiency, density of telephone

ANALYSIS 1.

Stage No. 1

Predictor 10 Degr. of fr. = 14 F = 24.640

Criterion 1 S = 2.939 R = 0.782

Regression coefficients with standard deviations:

Constant = 1.900

Predictor	b-coefficient	standard deviation	T-value
10	.791	.159	4.964

Residuals

1	*—	.647	5.397	1.815	—5.229	—4.394
6	*	.188	—3.274	2.144	— .065	2.562
11	*	2.979	— .691	1.518	—2.768	.441
16	*	.023				

Standard deviation of residuals = 2.939

ANALYSIS 2.

Stage No. 1

Predictor 11 Degr. of fr. = 14 F = 17.791

Criterion 1 S = 3.240 R = 0.727

Regression coefficients with standard deviations:

Constant = 2.325

Predictor	b-coefficient	standard deviation	T-value
11	.741	.176	4.218

Residuals

1	*—	—1.513	7.004	1.299	—6.737	—1.254
6	*	3.228	—2.066	2.710	—1.031	—1.219
11	*	.040	—1.807	.451	—3.184	1.557
16	*	2.522				

Standard deviation of residuals = 3.240

Stage No. 2

Predictor 7 Degr. of fr. = 13 F = 5.503

Criterion 1 S = 2.818 R = 0.802

Regression coefficients with standard deviations:

Constant = $-.626$

Predictor	b-coefficient	standard deviation	T-value
7	.359	.153	2.346
11	.730	.153	4.771

Residuals

1	* -1.351	4.678	.824	-4.387	$-.722$
6	* 1.226	-1.256	4.272	-2.327	-3.869
11	* 2.783	-2.062	1.643	-1.124	.736
16	* .937				

Standard deviation of residuals = 2.818

Stage No. 3

Predictor 6 Degr. of fr. = 12 F = 4.130

Criterion 1 S = 2.530 R = 0.844

Regression coefficients with standard deviations:

Constant = -2.157

Predictor	b-coefficient	standard deviation	T-value
6	.293	.144	2.032
7	.333	.138	2.413
11	.640	.144	4.441

Residuals

1	* -3.387	3.297	1.520	-2.204	-2.988
6	* .724	$-.359$	3.038	-1.797	-2.316
11	* 2.568	$-.704$	2.399	-1.899	1.840
16	* .269				

Standard deviation of residuals = 2.530

ANALYSIS 3.

Stage No. 1

Predictor 10 Degr. of fr. = 14 F = 14.375

Criterion 3 S = 3.462 R = 0.687

Regression coefficients with standard deviations:

Constant = 2.450

Predictor	b-coefficient	standard deviation	T-value
10	.712	.188	3.791

Residuals

1	* -1.721	-2.279	$-.703$	4.856	-1.991
6	* -3.568	$-.585$.991	-3.297	7.568
11	* 5.144	-2.162	$-.874$	2.874	-1.838
16	* -2.415				

Standard deviation of residuals = 3.462

ANALYSIS 4.

Stage No. 1

Predictor 11 Degr. of fr. = 14 F = 55.807

Criterion 3 S = 2.207 R = 0.886

Regression coefficients with standard deviations:

Constant = .900

Predictor	b-coefficient	standard deviation	T-value
11	.894	.120	7.470

Residuals

1	*-2.159	-.947	-2.418	3.159	.947
6	*-.265	2.206	2.524	-3.371	3.371
11	* 1.476	-1.688	-.582	.794	-2.312
16	*-.735				

Standard deviation of residuals = 2.207

ANALYSIS 5.

Stage No. 1

Predictor 8 Degr. of fr. = 14 F = 10.577

Criterion 4 S = 3.674 R = 0.624

Regression coefficients with standard deviations:

Constant = 3.226

Residuals

Predictor	b-coefficient	standard deviation	T-value
8	.686	.211	3.252

1	*-2.767	3.547	-.824	5.289	3.403
6	* 4.346	3.032	.861	.717	1.805
11	*-2.654	-4.340	-1.912	.604	-4.082
16	*-7.025				

Standard deviation of residuals = 3.674

APPENDIX IV/2

MULTIPLE CORRELATION ANALYSES OF LEVEL OF LIVING AND STRUCTURE AND FUNCTIONS OF SOCIETY

The first analysis: criterion is income-level oriented level of living factor (variable 6.)
 β -coefficients and regression coefficients, b:

Predictor	β	b
Main industrialisation, efficiency (58.)	0.602	0.597
Industrialisation resources (52.)	0.371	0.367
Change in population structure (57.)	0.248	0.245
Economic growth (80.)	-0.232	-0.230
International contacts (78.)	-0.016	-0.017

Constant C = 0.422 Standard error of estimate for criterion $s_m \sqrt{1-R^2} = 2.029$ R = 0.903, $F \frac{5}{8} = 7.051$.

The second analysis: criterion is level of living factor associated with modernity (variable 90.)

β -coefficients and regression coefficients, b:

Predictor	β	b
Main industrialisation, efficiency (58.)	0.837	0.837
Economic growth (80.)	-0.174	-0.174
Industrialisation resources (52.)	-0.172	-0.172
Change in population structure (57.)	-0.095	-0.095
International contacts (78.)	0.091	0.091
Constant C = 4.374		

Standard error of estimate for criterion $s_m \sqrt{1-R^2} = 1.702$

$$R = 0.934, F \frac{5}{8} = 10.919$$

The third analysis: criterion is higher education preference factor (variable 28.)

β -coefficients and regression coefficients, b:

Predictor	β	b
Main industrialisation, efficiency (58.)	-0.152	-0.150
Economic growth (80.)	0.060	0.060
Industrialisation resources (52.)	-0.061	-0.060
Change in population structure (57.)	0.020	0.020
International contacts (78.)	0.762	0.796
Constant C = 3.465		

Standard error of estimate for criterion $s_m \sqrt{1-R^2} = 3.480$.

$$R = 0.673, F \frac{5}{8} = 1.321.$$