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INDICATORS AND NORMATIVES IN
PLANNING INDUSTRY

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INTERREGIONAL TRAINING COURSE
ON INDUSTRIAL PLANNING

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INDICATORS AND NORMATIVES IN PLANNING INDUSTRY

Major indices or indicators and normatives
for industrial planning and their problems

Prof. Dr. sc. Edwin Polaschewski

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Major indices or indicators and normatives for industrial planning and their problems

1. Functions of plan indices

Plan indices or indicators occupy an important place in the planning systems of all socialist countries. They reflect quantitative and qualitative economic, technico-economic and social phenomena and processes.

This diversity makes it difficult to develop a useful system of indices. Neither is it possible to propose a definite index system which is valid once and for all. Plan indices are determined by

- (a) long-term economic tasks;
- (b) the system of management, the evaluation of performance and the methods of economic stimulation; and
- (c) the stage of development of the planning system.

Plan indices have repeatedly been the subject of theoretical and economic discussions. Proposals were made on how to improve the informational content of indices, and there were debates on a limitation of the number of indices. However, the decision as to what indices should be used will, in any case, depend on their functions.

1. State plan indices express social requirements. At the same time, they reflect the economic policy pursued. The kind of indices selected and their composition have to show what economic targets are to be reached.
2. Indices serve to ensure proper proportions in the development of the national economy. Simultaneously, they determine the overall conditions for the economic activities of enterprises.
3. They provide the basis for performance evaluation in the drafting and implementation of plans.

2. Principles applied in developing index systems

The indices which are to be included in planning have to be in line with the following principles:

2.1. Principle of uniformity

What are its implications?

- All indices have to refer to the same economic phenomena and have to be based on a uniform regulation about their calculation and a uniform criterion of assessment.

The following example is typical of industry:

$$\text{Labour productivity in industry} = \frac{\text{Industrial commodity production at planned and fixed prices (PPF)}}{\text{Workers and office workers, calculated in terms of full-time employees (FTE)*}}$$

Industrial commodity production is to include all finished products and material performances. The term Industrial commodity production (PPF) represents the uniform Workers and office workers (FTE) regulation on calculation and the criterion of assessment* $\left(\frac{\text{PPF}}{\text{FTE}}\right)$.

- Uniformity leads to comparability, aggregation and disaggregation of, and the harmony between, plan and accounting indices.

2.2. Principle of stability and flexibility

The index system has to be kept constant for a fairly long period - at least for one Five-year Plan. This is necessary in order to

- ensure a rational acquisition, processing and transmission of planning information;

* This means, e.g., that two part-time employees sharing a job are considered as one employee.

- facilitate the application of electronic data processing;
- make comparisons possible.

In the GDR, for instance, the basic nomenclature of the indices drawn up for the period from 1976 to 1980 is binding.

Flexibility means adaptability. However, it also means being able to combine indices so that certain comprehensive statements can be arrived at.

Example:

The resource index of Wage Fund of Workers and Office Workers combines with the performance index of Industrial Commodity Production at Enterprise Prices to indicate wage intensity.

$$= \frac{\text{Wage fund of workers and office workers}}{\text{Industrial commodity production at enterprise prices}}$$

2.3. Principle of differentiation

Plan indices are to be differentiated according to

- plan periods;
- stages of planning;
- position in the processes of management and production; and
- the flow of information.

(a) Differentiation according to plan periods

Plan indices and normatives are differentiated according to their application in annual and five-year planning. The general rule is that the longer the period of planning, the smaller the number and type of indices. This is shown by the fact that certain indices get no mention or are less detailed when the planning period gets longer.

Example:

Selected indices	To be applied to the	
	five-year plan	annual plan
- Labour productivity based on enterprise net performance	-	+
- Saving of working hours through measures of rationalization, totalling	-	+
- Reduction of the number of employees working under unfavourable conditions	-	+
- Labour productivity based on the ratio between industrial commodity production and PPP	+	+

(b) Differentiation according to stages of planning

Depending on the particular stage of plan elaboration a distinction is made between state plan tasks and state plan targets. State plan tasks are set for the stage at which the draft plan is drafted. In the process of planning and balancing they are to be increased through the use of reserves or to be made more specific on the basis of more precise calculations of demand. When it is defended before the senior planning authority the draft plan is examined as to whether the plan tasks have been observed and reasons for departures from them, if any, have to be explained.

State plan targets are binding targets for the elaboration of final enterprise plans and are derived from the state plan adopted. They are the basis for economic activities.

(c) Differentiation according to position in the processes of management and production

This means that consideration has to be given to:

- the fulfilment of special tasks, such as in foreign trade and balancing and of those resulting from the rôle of a chief acceptor of order for the construction of complete

- plants; and
- peculiarities of the particular branch of the economy.

Examples:

- (1) The performance index "Delivery of Selected Products for the population, which are arranged in groups of prices" is given only to the balancing authorities.
- (2) In addition, the plan index "Material Level of Production at Plants" is valid for enterprises erecting industrial plants.
- (3) The plan index "Repair Services (Enterprise Net Performances) of the Industrial Marketing Organizations for Radio and Television Sets, Record Players, Tape and Cassette Recorders for the Population" are given only to enterprises of the industrial branch of electrical engineering and electronics.

Small enterprises get a reduced number of indices - a shortened nomenclature of indices, which includes the indices of

- industrial commodity production at industry delivery prices;
- export (in terms of value);
- labour productivity;
- material investment volume;
- expenditure for science and technology;
- profit, etc.

(d) Differentiation according to the flow of information

While plan indices indicate plan targets, information indices serve in particular, to

- harmonize plans at the regional level;
- maintain harmony between material, financial and personnel conditions, on the one hand, and the plan targets on the other; and
- derive initial planning targets for the following planning state.

Feedback information is termed economic plan information in the GDR. Of special significance is the complex economic plan information. It is a summary of important indices of all plan components and of the conditions of reproduction, mainly in terms of value. The index nomenclature of the economic plan information varies with the specific conditions which prevail in every sector of the economy.

3. Content of indices

The perfection of an index system is not primarily determined by its scope, but rather by whether the indices applied reflect the development of performance and its conditions to a satisfactory degree. Evidence is furnished by four groups of indices, i.e. those of

- performance and results of economic activities;
- resources available;
- efficiency;
- working and living conditions of working people.

These groups encompass the indices on growth and level, the absolute and the relative, and efficiency and intensity. It is only for methodological reasons that in this lecture the efficiency index and related indices are put into the third group.

3.1. Performance indices

The determination of the gross national product and the development of proportions make it necessary to plan performances in and results of, economic activities with regard to their scope and structure, including features of quality.

The following performance indices are to be considered:

- industrial commodity production at industry delivery prices and at enterprise prices;
- enterprise net performances at enterprise prices;
- commodity production realized (sold) at industry delivery prices and at enterprise prices;
- profit.

Before these indices are explained in some detail it will be useful to mention six basic relationships between indices.

- (1) Industrial commodity production (ICP)

$$\frac{+ \text{Non-industrial commodity production (NICP)}}{= \text{Commodity production (CP)}}$$
- (2) Commodity production at enterprise prices (CP_{EP})

$$\frac{+ \text{Production levy}}{= \text{Commodity production at industry delivery prices (CP}_{IDP})}$$
- (3) Commodity production at enterprise prices (CP_{EP})

$$\frac{- \text{Primary and semi-finished products consumed and productive performances of other enterprises (PSP)}}{= \text{Enterprise net performance (ENP)}}$$
- (4) Gross output (GO)

$$\frac{+ \text{Changes in the stocks of semi-finished products (\Delta SFP)}}{= \text{Commodity production}}$$

$$\frac{+ \text{Changes in the stocks of finished products (\Delta FP)}}{= \text{Commodity production realized (CP}_{real.})}$$
- (5) Commodity production (CP)

$$\frac{+ \text{Intra-works consumption (IWC)}}{= \text{Overall output (OO)}}$$
- (6) Commodity production realized at enterprise prices ($CP_{real.EP}$)

$$\frac{- \text{Total prime costs of the commodity production realized (TPC}_{CP_{real.}})}{= \text{Gross profits (P}_G)^1}$$

$$\frac{- \text{Production funds levy (Pfl)}}{= \text{Net profit (P}_N)}$$

¹ The possibility of a loss, $TPC_{real.CP}$ $CP_{real.EP}$ is not considered here.

3.1.1. Material performance indices

The determination of the volume of both the industrial finished products made at enterprises in all sectors of the economy and intended for sale and all industrial material performances for third consignees is based on the index of Industrial Commodity Production at Industry Delivery Prices in marks 1000.

This comprises:

- all finished industrial products intended for sale, irrespective of whether they were made entirely for the manufacturing enterprise or some other enterprises by way of jobbing orders;
- all industrial material performances made for jobbing orders such as repairs, assembly and other industrial work, e.g. execution of jobbing orders; and
- the finished industrial products and industrial material performances, for investments at the manufacturing enterprise.

The index "Industrial Commodity Production" is used to evaluate performance development and to assess efficiency. It is the most important performance index in the GDR at present. It may be evaluated at factory prices and industry delivery prices, and since it serves as a criterion of performance for enterprises it is an indicator of the volume of material goods production and performances. Thus it orientates on the production of finished products for sale.

In almost all socialist countries gross output was considered the main index of the volume of production for many years. It reflected the total performance in industrial output, whatever its degree of completion. The over-estimation of this index fostered trends towards greater extensiveness of production and hampered efforts made to achieve an allround increase in the economic efficiency of production.

But the index "Industrial Commodity Production" also has its defects. Only when being sold do goods show whether they meet

the wishes of the buyers. Therefore, the Soviet Union has for several years been attaching great importance to the index "Commodity Production Realized". Yet neither of the two indices gives a clear picture of the actual net performance of enterprises.

The industrial commodity production of an enterprise is largely influenced by performances of other enterprises which precede their own. The need for a correct evaluation of enterprise performance has led to increasing emphasis on the index "Enterprise Net Performance", since the indices of Gross Output and Commodity Production had the advantages mentioned above.

This index is determined as follows:

Industrial commodity production at Enterprise Prices
+ Non-industrial commodity production, including other productive performances at enterprise prices
± Changes in the stocks of semi-finished products and performances at prime costs of production.
- Consumption of basic material
- Consumption of productive performances of other enterprises

= Enterprise net performance

The index "Enterprise Net Performance" reflects the new value created at the enterprise by productive living labour, and includes the consumption of auxiliary material and means of work. Enterprise net performance is well suited to measure labour productivity at enterprises.

But enterprise net performance, too, is not free from distortions. Changes in assortment, for instance, result in changes in it, if rates of profit differ. Another disadvantage is that it does not facilitate a predictive statement about the volume of products. It cannot replace product indices at the central management levels of the state.

It has not yet been possible to offer a perfect solution to the problem of defining performance indices which encourage enter-

prises to manufacture products which meet demand and require minimum expenditure.

One solution is indices related to the structure of performances. Such structural indices may be developed with regard to the criteria of product, sphere of use (e.g. at home or for export), price, features of quality, etc.

Special plan tasks are set for the overall output of selected products which are of special importance for the national economy, for example, for important raw materials, energy resources and certain metallurgical products. This method has proved successful for several decades.

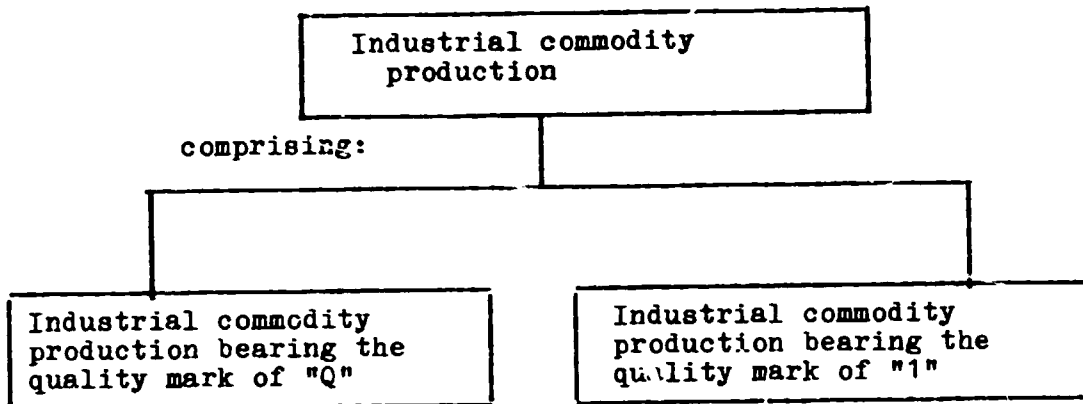
As far as the criterion of sector of use is concerned, export has to be mentioned first. The harmonization of performance with the state export planning requires a clear division of products which are to be exported to the socialist economic area and those for export to the non-socialist economic area. Within these two groups exports are broken down among countries.

The industrial commodity production earmarked for sale at home and sold there is differentiated as well. The production of finished products for the population is recorded separately. This includes all finished industrial products, which are manufactured by enterprises in all sectors of economy themselves meant for individual consumption and sold by the manufacturers either

- directly to the population or
- to the domestic consumer goods trade.

The "Output of Important Finished Products sold to the Population, in Groups of Prices" is also recorded. This ensures that enough products will be offered in the lower price groups. Increasing efforts have been made for several years to use indices of product quality in planning. This has led to a structure of industrial commodity production at industry de-

livery prices, in terms of quality marks conferred by the state.



The planning of "industrial commodity production" at industry delivery prices bearing the quality mark "Q" (quality) aims at the manufacture of high-quality products. Industrial commodity production at industrial delivery prices bearing the quality mark "1" is planned, too. This is to encourage enterprises to make products of high quality in addition to those bearing the quality mark "Q". Though an additional demand for "Q" products only would further increase in this type of output, Mark "1" output would decrease in favour of output without any quality mark. For this reason, the index "Industrial Commodity Production Mark 1" at Industrial Delivery Prices has been included in the system of plan indices.

3.1.2. Financial performance indices²

Two basic problems must be settled in the context of financial performance indices:

- (a) What importance do financial indices have?
- (b) What are the distribution indices?

These two issues are closely connected.

² This section deals only with some special problems of plan indices. Further details are given in the lecture on forms, methods and functions of material incentives in elaborating and executing industrial plans at different levels.

Concerning (a): Socialist economists have for many years been discussing the question of whether profit can be a major index or even the major index in the planning system of enterprises. For several years special emphasis was laid in the GDR on profit as an index of performance and stimulation. Yet the results were not satisfactory. The VIIIth Congress of the Socialist Unity Party of Germany in 1971 rectified this situation. Profit had been underestimated for some time.

The view now prevails that profit can only be an effective index of plan if it is combined with other indices.

Concerning (b): It is well-known that net profit (P_N) has to be divided into two parts. One part is to be transferred to the state (P_{Na}) and the other remains in the particular enterprise to be fed into its funds (P_{Nb}).

$$P_N = P_{Na} + P_{Nb}$$

The question arises whether it is possible to make one part, preferably P_{Na} , a normative. This normative, the percentage of P_N to P , has the formula

$$P_{Nb} = P_N \left(1 - \frac{P}{100}\right).$$

As a consequence, the financing of the extended reproduction is functionally dependent on P_N . This will, however, make sense only, if P is valid for a fairly long period of time.

In the GDR there was no lack of attempts to solve the problem. They all failed, mainly because the differences necessary in economic growth called for the stipulation of several different P_{Na} . At present the following plan indices for the profit and its distribution are applied:

Result in domestic trade, net profit, net profit payments to the state, transfers to the bonus fund.

3.2. Indices of resources

Resources are to be:

manpower, investments, material funds, financial funds, regional resources.

Indices of resources are necessary to

- bring about a harmony between the planning of targets and the planning of resources and thus guarantee plans full of ambitious, but realistic targets;
- establish the proportions required in the national economy and at enterprises and thus guarantee a stable-long-term development;
- ensure the proper employment of resources and thus, guarantee highly effective economic activities.

Therefore, these indices should always be combined with indices related to their employment.

Only selected important indices will be explained below.

3.2.1. Manpower

Important plan indices are:

- Annual average number of workers and office workers, (in terms of full-time employees = FTE);
- manpower structure;
- wage fund of workers and office workers; and
- average use of the shift-work system.

(a) The entire labour force of an enterprise is planned in terms of numbers and of a breakdown into production workers and other employees by means of plan indices

- annual average number of workers and office workers; and
- commodity production and increase in labour productivity combined.

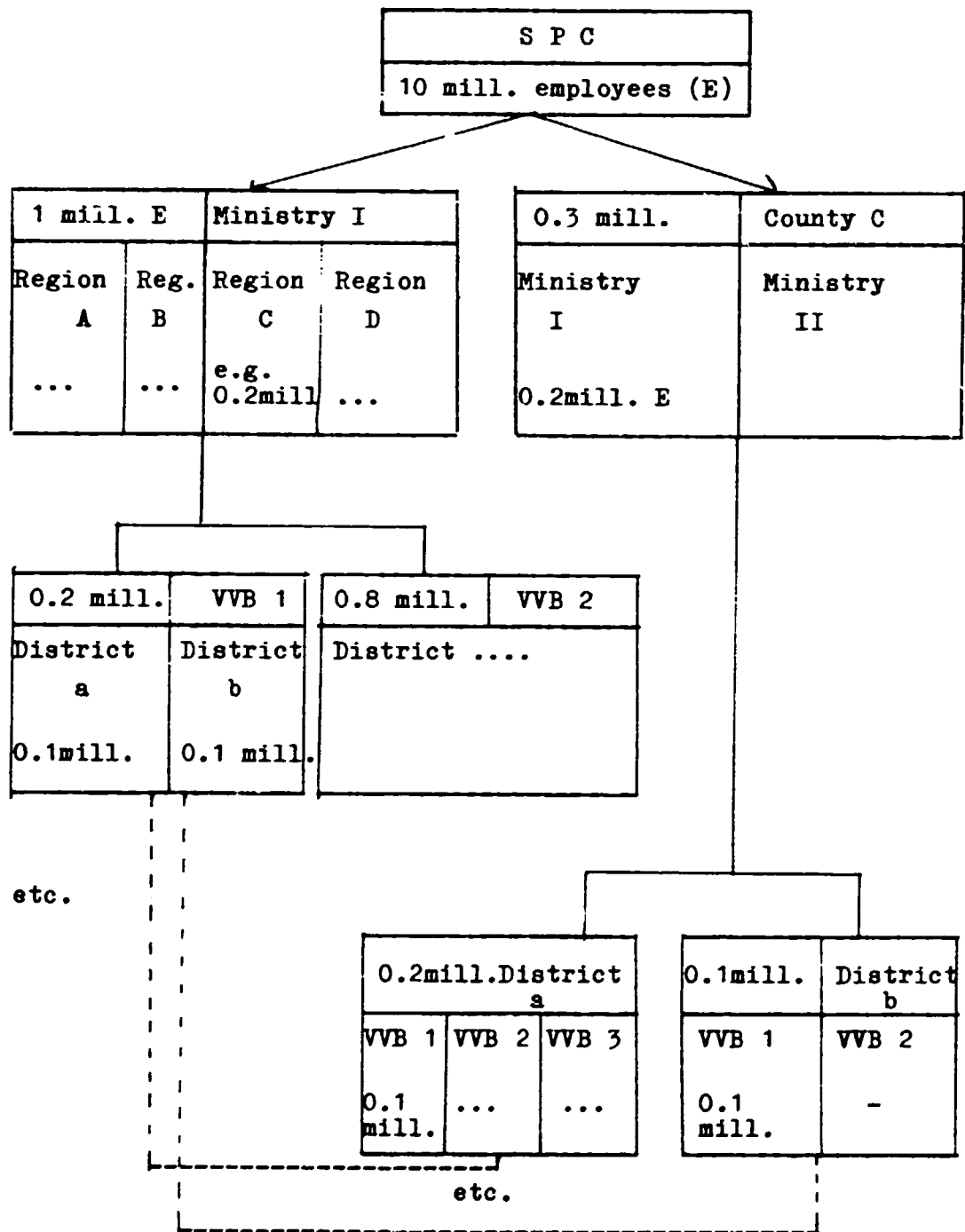
Example:

Number of employees in the plan year (E_1)	1 000
Commodity production in the plan year (CP_1)	M 500 million
Increase in labour productivity (LP')	5 %
Labour productivity in the base year (LP_0)	M 47,619 per employee

Calculation rule:

$$\begin{aligned} (1) \quad LP_1 &= LP_0 \cdot LP' \\ &= M 47\ 619 \times 1.05 \\ &\approx M 50\ 000 \text{ per employee} \\ (2) \quad E_1 &= \frac{CP_1}{LP_1} \\ &= \frac{M\ 500\ 000\ 000}{M\ 50\ 000 \text{ per employee}} \\ &= 1\ 000 \text{ employees} \\ &===== \end{aligned}$$

A particularity of the index "Number of workers and office workers" is its regional distribution. It is due to the function of the regional authorities (regional and district councils), which balance available and employed manpower. Consequently, this index is planned in a twofold manner as the following chart will show:



SPC = State Planning Commission
 E = Employees
 VVB = Association of Nationally-Owned Enterprises

(b) The index of "Structure of Manpower" is based on binding classification patterns. They classify according to

- their spheres of work
 - e.g. spheres of production,
 - spheres preparing production and
 - spheres of management;
- the type of work done,
 - e.g. persons engaged in production and
 - persons engaged in management and administration
- levels of qualification and vocations
 - e.g. university graduates and
 - engineering college graduates;
- age structure;
- sex.

The ratio between production workers and other employees and the demands on their qualifications are controlled by state plan indices.

Examples are the indices:

- Number of workers and employees;
- additional university and engineering college graduates;
- number of school-leavers taking up vocational training.

(c) The wage fund is the limit of the remuneration (the total of gross wages planned) for all workers and office workers employed at an enterprise: it is fully available if all plan targets are fulfilled. The development of the wage fund is planned in connection with the development of manpower and labour productivity.

(d) The index "Average use of the shift-work system" is applied to measure the degree of utilization of the production funds available. It says what shift-work system corresponds to the allocation of manpower to the various shifts and is calculated by means of the following formula:

$$s = \frac{P_s}{P_{st}}$$

s = shift coefficient

P_s = persons employed in the shift system

P_{st} = persons employed in the shift which is most heavily
staffed.

3.2.2. Investments

Investment indices are given in two senses, namely, as

- the material investment volume and
- financial requirements.

In addition, there is the planning target of centrally planned individual investment projects.

(a) The material investment volume represents the material performances envisaged for the planning period. The planning target is set with regard to the structural items of

- . building industry; and
- . equipment.

(b) The financial requirements of investments are derived from the plan index of material investment volume. It stems from the financial responsibilities of those commissioning an investment regarding the efficient performance to be completed as planned within the plan year.

The material and financial investment targets pursue the aims of

- providing the framework for material balancing (e.g. the balancing of the share of building to be done regionally);
and
- promoting punctual financing.

The problem which is connected with the latter is that there is a time lag between the material work done in making an investment and its financing from investments. This lag is due to the fact that the efficient performances or contractually agreed partial payments may be financed from investments.

Example:

(a) Work done in making an investment (= material investment volume) in the year x	M 2,480,000.-
(b) Payments for investments in the year x	M 2,360,000.-
(c) comprising payments related to the year x-1	M 310,000.-
(d) financial surplus for the year x+1	M 430,000.-
d = a - (b - c)	

3.2.3. Material funds

The indices of the material funds are different from those of the other resources. The difference is in the functions of the indices. The indices for manpower and investment embody the absolute distribution of resources. The indices of the material funds limit supply and consumption. That is why, mainly normatives of the material consumption and of stock reserves are applied.

Important indices are:

- normatives of material consumption;
- share in balancing; and
- normatives of stock reserves.

(a) Consumption normatives are fixed on the basis of a nomenclature of products or groups of products for raw and other materials which are important for the national economy. They are physical indicators, i.e. a combination of physical and value indices or/and value indices.

E.g. the index of Material Intensity

$$= \frac{\text{Material consumption in units of quantity}}{\text{Commodity production at EP}}$$

or the index of Material Cost Intensity

$$= \frac{\text{Material costs}}{\text{Commodity production at EP}}$$

(b) The index of Share in Balancing sets supply limits for special materials which are important to the national economy (e.g. oil). These must not be overstepped.

(c) For other such materials even the volume of stocks to be kept within the plan is fixed by normatives related to stock reserves with regard to supply and consumption. They are the binding basis for the planning of material requirements and the setting of standards for stock reserves and for the checking of the execution of plans in the field of stock reserves.

3.2.4. Financial funds

At this point only two financial indices will be mentioned

- total expenditure for science and technology; and
- the fund of science and technology.

These indices are set to create a secure material basis for the preparation and implementation of scientific and technical progress in industry. Therefore, the indices of the financial funds are supplemented by material plan indices, such as

- persons engaged in research and development in the annual average number of full-time employees, and
- task-related economic targets (targets for research and development projects).

The total expenditure for science and technology restricts the expenditure ceiling for purpose-oriented spheres of employment during a planning period whatever the sources of financing.

It includes expenditures for:

- research and development;
- launching costs for tasks arising from the introduction of the Plan on Science and Technology;
- taking licences; etc.

It does not include:

- investments,
- activities of the research and development office which are not directly connected with research and development.

The source of financing is largely determined by the index "Fund of Science and Technology". It is set as a normative cost figure which increases the costs of the whole current production. This approach is controversial, since it does

not give a correct economic account of the profitability of current production. Therefore, it might also be possible to debit the new production directly with it. The present procedure commends itself by its simplicity, the safe reflux of resources and the principle of old technology financing new technology.

3.2.5. Regional resources

Regional resources include:

- manpower;
- building performance;
- land.

Their balancing authorities are the regional authorities. For this reason the same double planning is applied that was explained in the context of the index "Number of Workers and Office Workers".

3.3. Efficiency indices

The development of efficiency has been examined rather intensively in the last few years. The results of these examinations have led to changes also in the system of indices. Now planning requires what is called a statement of efficiency. Moreover, new indices have been included in several parts of plans. First a few definitions.

Efficiency in the narrower sense = $\frac{\text{Result}}{\text{Expenditure}}$ Intensity = $\frac{\text{Expenditure}}{\text{Result}}$

Certain conclusions about efficiency can be drawn from:

- Cost-cost ratios, e.g. share of investments for the purpose of rationalization in total investments;
- Result-result ratios, e.g. share of commodity production of new and improved products in total commodity production.

In GDR terminology all four groups of indices are referred to as efficiency (in the wider sense of the word).

When efficiency indices are used in planning plan tasks are objectified. Revealing relationships between partial processes, they offer opportunities for the evaluation of the overall process.

The problem as before is what processes should be described in terms of their efficiency. Since both the result of economic activities and the expenditure required for it have a wide variety of aspects, certain definite criteria must be applied so that the result and cost figures can be arrived at whose mutual relations must be established. But it has been proved that the efficiency of economic units cannot be expressed by only one index. Rather, the best procedure is to use several indices to measure the efficiency. The general conditions for the stipulation of such indices are determined by different types of expenditure (investment costs and operating costs).

3.3.1. Efficiency indices of operating costs

The essential efficiency index of operating costs is the index "Labour Productivity". Its yardstick is the ratio between the result of work and the expenditure of living labour. The work result may be expressed by:

- commodity production at enterprise prices;
- enterprise net performance;
- production volume expressed in physical terms; etc.

The expenditure of living labour is expressed by the number of working hours spent or the number of employees.

Which result index is selected to become the basis for the calculation of labour productivity depends on the informational potential of indices and on the purpose for deriving productivity.

The calculation of labour productivity on the basis "commodity production" provides relatively limited information on the net performance of an enterprise. Yet on account of its national economic aggregation it continues to be used in plan-

ning and accounting on the basis "commodity production".

But the evaluation of labour productivity on the basis "net performance" is much more suitable for the evaluation of the performance of enterprises than the evaluation on the basis "commodity production". But this index, too, does not remain free from influences. In the discussion on the improvement of the informational potential of the index "labour productivity", there has been particular emphasis on the defects in the data used so far in the calculation of the productivity of living labour. There has been a suggestion to measure labour productivity in time units according to the time-summing method or to use index combinations. Such combinations will have to include indices, such as the

Ratio between the increase in labour productivity (LP') and the development of the average wage (W'),
ratio between the increase in labour productivity and the development of fixed assets (EFA'); etc.

The following conditions of efficiency will then be the criteria for the evaluation of the development of productivity:

$$LP' \geq W'$$

$$LP' \geq EFA'$$

$$\text{Fund of fixed assets (EFA)} = \frac{\text{average stock of fixed assets}}{\text{number of employees}}$$

The efficiency of the operating expenditure of work which is materialized in material is expressed by the commodity production at enterprise prices per mark of material costs. The reciprocal value of this figure is the material intensity (I_M) of production.

$$I_M = \frac{C_M}{CP_{(EP)}}$$

CM = material costs

CP_(EP) = commodity production at enterprise prices

Other data for calculation which are applicable at enterprise level may be:

- gross output;
- prime costs of commodity production;
- enterprise net performance.

The index of Material Cost Intensity expresses the ratio in per cent between material consumption and commodity production sold at enterprise prices.

Example:

Material consumption amount to M 80,000 and the commodity production sold to M 100,000.

$$\text{Material cost intensity} = \frac{M 80,000}{M 100,000} \times 100 = 80 \text{ per cent}$$

That means that if commodity production is M 100.- material costs are M 80.- .

The advantage offered by this index is the relatively easy identification of calculation values. Yet, the information conveyed by this index is distorted by a number of external factors, which include in particular:

- (1) changes in prices for raw and other materials and energy;
- (2) consumption of raw and other materials which are better and therefore more expensive and
- (3) structural effects increasing the share of material in the total field.

The decrease in the material intensity is an essential source of greater efficiency of production. This requires

- a decrease in the specific input and consumption of material;
- the use of material-saving designs, building methods, processes and production techniques.

Other intensity indices of the economical use of material are the aggregated coefficient of the input of material and the rates of material consumption.

The aggregated coefficient of the input of material (ACIM) is an index for the quantitative employment of a certain type of material, or a group of them, per quantity or value unit of a given production.

Example: Steel consumption in kg for 1 000 kg of roll bearings of various sizes

Here material input is seen in relation to a product's production volume in terms of quantity and value or to the volume of the production of an enterprise, combine plant or branch of the economy. Its high degree of aggregation limits the employment of the ACIM in the planning of material requirements. At enterprise level, the ACIM is suitable for special purposes only, e.g. the long-term planning of material requirements or in the case of a wide and relatively stable range of production. In taking into consideration the informational limits of the ACIM, this index is an important basis for the determination of the material requirements at the level of economic management organs, and of central state and economic authorities.

At enterprise level, mainly rates of material consumption are used when the material requirements are determined.

These rates represent the maximum material requirements necessary to manufacture a product or make a performance.

Example: 12.75 kg of steel consumed for every bevel gear.

They are the basis for material planning. They stipulate the most purposeful use of material and offer opportunities for a reduction of the material consumption, for its analysis and control.

The cost ratio measures the intensity of the operating costs of an enterprise which are represented by costs.

It is the quotient from the total prime costs of commodity production (TPC) and the commodity production sold at enter-

prise prices. It indicates the average costs per M 100 of commodity production. Its development shows to what extent the costs of production have been reduced. The lower the quotient, the lower the production costs.

3.3.2. Efficiency indices of investment costs (non-recurring)

There are two types of efficiency indices of investment costs: those related to the economic efficiency in the use of funds and those related to the efficiency of investments.

Indices of the economic efficiency in the use of funds express the efficiency of an enterprise per mark of productive funds employed. Commodity production and profit are used as performance indices. Such indices can be based on:

- the annual average stocks of fixed assets and working capital;
- the average stocks of fixed assets (\bar{FA});
- the average stocks of working capital (\bar{WC}).

The indices which are derived from these three items are called output-capital ratio, fixed assets ratio and working capital ratio.

When the economical use of fixed assets is accounted for, the index of fixed assets ratio (FAR) is all-important, because it directly refers to fixed funds and their employment.

Expressing the ratio between commodity production and the average stocks of fixed assets, it says what performances are made by an enterprise per one mark or one thousand marks of fixed assets employed.

Example:

An enterprise has a commodity production of 10 mill. marks and the average stocks of fixed assets amount to 13 mill. marks.

$$FAR = \frac{CP(EP)}{FA} = \frac{M 10 \text{ mill.}}{M 13 \text{ mill.}} \times 1,000 = M 769.2$$

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The manufacture of a production volume of M 769.2 requires average stocks of fixed assets of 1,000 marks. If the fixed assets quota rises, the volume of production per unit of fixed assets employed is greater. This signifies a favourable economic development. If the fixed assets quota is to show a rising trend, the factors contributing to its increase or decrease have to be analysed. The following measures increase efficiency:

1. proper proportions between the development of fixed assets and that of manpower;
2. improvement of the extensive and intensive utilisation of the fixed assets available;
3. improvement of the efficacy of investments;
4. improvements of the scientific and technological level of fixed assets;
5. planned maintenance and reduction of down time.

The rate of return on capital employed is a special manifestation of the economic efficiency in the use of funds. It is the quotient from profit and the average stocks of productive funds which indicates the profit per mark of productive funds employed. The rate of return on capital employed is so important for the identification of the efficiency of reproduction at enterprises especially because it conveys concentrated information. Its volume reflects the action of all those factors which influence the volume and development of profit, on the one hand, and which directly determine the volume of the expenditure funds on the other.

An important index of the efficiency of investments is their payback period (PP).

It gives the number of years, which the additional total annual profit (P) which is achieved through the investments (A_J) needs to reach the level of the expenditure for the investments.

If, for example, the profit achieved per year through investments remains unchanged, then

$$R = \frac{A_J}{\Delta P}$$

The shorter the payback period, the more efficient the investments.

3.3.3. The economic "normal"

Often it is not enough to examine the informational content only of individual indices. Rather, it is necessary to find out about relations between indices and examine the trends of their development. Such a chain of indices (sequential model) is referred to as the economic "normal" or the complex coefficient of economic reproduction. It allows making demands on the development of the efficiency of enterprises, combine plants and branches of the economy and control their observance.

It should not be forgotten, however, that the economic "normal" can be maintained only with regard to its trend.

Since the purpose of the evaluation by means of the economic "normal" varies, so must the combinations of indices.

At this point three of the large number of potential combinations of indices are given to illustrate the point:

(1) If draft plans of enterprises and combine plants have to be assessed as to how they bring about intensification, the ratios of the following indices have to be checked:

$$G' > CP' > F'_{\text{prod}} > WF' > MP'$$

G'	= profit increase in per cent
CP'	= increase in commodity production in per cent
F' _{prod}	= increase in productive funds in per cent
WF'	= extension of the wage fund in per cent
MP'	= increase in manpower in per cent

(2) The development of efficiency of enterprises and combines is to be checked and if it has to be found out whether economic plan indices are free from contradictions, the following combination has to be used:

$$G' \quad ENP' > CP' > MC > F'_{\text{prod}}$$

ENP' = increase in enterprise net performance in per cent

MC' = increase in material consumption in per cent

(3) If the efficiency of measures taken to make economical use of fixed assets, the following combination has to be used:

$$G' > CP' > FA' > MP'$$

FA' = increase in fixed assets in per cent.

3.4. Indices of social development

The planning of scientific-technical and economic processes has for some years now been encouraged and supplemented by the planning of social processes.

The diversity of tasks to be planned in social development requires a classification of indices according to groups of tasks.

- Indices of material working conditions

Example:

- Number of work places which are re-organized with measures related to the scientific organization of work;
- reduction of the number of employees working under unfavourable conditions
- indices of medical care

Example:

$$\text{Sickness figure (\%)} = \frac{\text{Total number of days of work lost through sickness and days off for house-keeping} \times 100}{\text{Potential total of days of work}}$$

- Indices of the employee supply system

Example:

Extent of supply

$$\text{Employees have their meals (\%) in the enterprise canteen} = \frac{\text{Number of employees taking a meal in the enterprise canteen} \times 100}{\text{Potential total of employees who may have a meal in the enterprise canteen}}$$

- Indices of the care for children

Example:

Extent of supply with places at crèches and kindergartens (%) = $\frac{\text{Total number of places at crèches} \times 100}{\text{Number of places required}}$

- Indices of holiday and recreational services

Example:

Extent of supply with holiday vouchers (%) = $\frac{\text{Vouchers} \times 100}{\text{Number of employees}}$

- Indices of cultural and sports activities

Example:

Readers registered by enterprise libraries

- Indices of housing.

Example: Supply of flats

- Indices of business traffic

Example: Employees taken to and from enterprise by transport owned either by their enterprise or other organizations with which the enterprise has concluded a transportation agreement.

Annex: Simplified survey of plan indices fixed by the state

1. Performance indices
 - 1.1. Industrial commodity production (in terms of value), at industrial delivery prices
 - 1.2. Industrial commodity production (in terms of value) at enterprise prices
 - 1.3. Industrial commodity production (in terms of value) at constant plan prices
 - 1.4. Industrial commodity production at industrial delivery prices bearing the quality mark "Q"
 - 1.5. Industrial commodity production at industrial delivery prices bearing the quality mark "1"
 - 1.6. Enterprise net performance at enterprise prices
 - 1.7. Total manufacture or commodity production of important products (quantity and value per product)
 - 1.8. Commodity production realized at industrial delivery prices
 - 1.9. Commodity production realized at enterprise prices
 - 1.10. Supply of finished products to the population (total) at industrial delivery prices
 - 1.11. Production of important finished products sold for the supply of the population (quantity and value)
 - 1.12. Production of selected finished products sold for the population, in groups of prices
 - 1.13. Export (in terms of value), broken down into
 - export to the socialist economic area (in marks)
 - export to the non-socialist economic area (in foreign exchange marks)
 - 1.14. Export of important products (quantity and value) broken down into
 - export of important products (quantity and value) to the socialist economic area
 - export of important products (quantity and value) to the non-socialist economic area
 - 1.15. Scientific and technological tasks aimed at using results of scientific and technical research into production or other areas of practical activity

- 1.16. Domestic result (gross profit)
- 1.17. Net profit
- 1.18. Net profit payment to the state

- 2. Indices of resources
 - 2.1. Manpower
 - 2.1.1. Number of workers and office workers (in persons) on their annual average, excluding apprentices
 - 2.1.2. Number of workers and office workers (full-time employees) on their annual average, excluding apprentices
 - 2.1.3. Persons engaged in research and development (full-time employees) on their annual average among them:
 - university graduates
 - engineering college graduates
 - 2.1.4. Wage fund of workers and office workers
 - 2.1.5. Additions of graduates from universities and engineering colleges after they have terminated full-time studies, broken down into their scientific branches
 - 2.1.6. Admission of school-leavers for vocational training with parallel twelve-year secondary school training leading to university-entrance qualification
 - 2.1.7. Shift-work coefficient of the production process
 - 2.2. Investments
 - 2.2.1. Investments (material volume)
 - among them: building construction
 - equipment
 - 2.2.2. Centrally planned investment projects
 - planning of their preparation
 - planning of their implementation
 - 2.3. Material funds
 - 2.3.1. Import (in terms of value) by
 - import from the socialist economic area (in marks)
 - import from the non-socialist economic area (in foreign exchange marks)
 - 2.3.2. Import of important products (quantity and value) broken down into

- import of important products from the socialist economic area
- import of important products from the non-socialist economic area
- 2.3.3. Share in the balance related to the purchase of raw and other materials and products which are important for the national economy and of energy (quantity or value)
- 2.3.4. Availabilities of secondary raw materials
- 2.3.5. Specific input of raw and other materials and products which are important for the national economy and of energy (quantity and value)
- 2.3.6. Normatives of material and energy consumption
- 2.3.7. Energy intensity (energy consumption in KWh per unit of commodity production)
- 2.3.8. Ratio between the rate of increase in the material circulation capital fixed and the rate of increase in industrial commodity production at industrial delivery prices
- 2.4. Financial funds
 - 2.4.1. Total expenditure for science and technology
 - 2.4.2. Fund of science and technology
 - 2.4.3. Reduction of prime cost
 - 2.4.4. Changes in the volume of credits for fixed assets
 - 2.4.5. Minimum share of an enterprise's own resources in the financing of working capital (stocks and requirements), in per cent
 - 2.4.6. Transfers to the cultural and social fund
 - 2.4.7. Transfers to the bonus fund
 - 2.4.8. Transfers to the bonus fund per employee (full-time employees)
- 3. Efficiency indices
 - 3.1. Labour productivity of workers and employees (full-time employees), based on
 - industrial commodity production at industrial commodity prices and constant plan prices
 - enterprise net performance at enterprise prices

- 3.2. Fixed assets ratio
- 3.3. Export profitability broken down into
 - export profitability related to the socialist economic area
 - export profitability related to the non-socialist economic area
- 3.4. Reduction of costs for rejects, refinishing and after-sales services in per cent, related to one mark per 1000 marks of industrial commodity production at enterprise prices

- 4. Indices of social development
 - 4.1. Number of workplaces re-organized through measures related to the scientific organization of work
 - 4.2. Reduction of the number of employees working under unfavourable conditions (persons)