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# Investments in Human Resources. Cost of Man Formation

*The concept of investments in human resources and the cost of man formation are examined in this paper, starting from the idea that man is the purpose and reason of all developments. The three demo-social subsystems (first age — young population, second age — population fitted to work, and third age) are analysed, and the equations between those subsystems are presented, so as to maintain the economic-social balance.*

*A classification of the expenses for human investments is presented, and calculations are carried out about the cost of formation of a young man up to 18 years, the same cost, but up to 20 years, and the cost of formation of a highly skilled member of managerial staff (24 years).*

*The calculation method of the indicators expressing the recovery duration of the demoeconomic investments is subsequently presented, as well as the marginal coefficient of investments in labour resources, the relation between the total consumption of a generation and the labour productivity during the whole active life.*

In the socio-economic literature, which characterizes the contemporary science, the study of human resources from various points of view, begins to occupy an increasingly privileged place, justified mainly by the seasonableness of the strategies and tactics concerning the economic development and the population. The latter is identified, and not without reason, as the main factor and beneficiary of development.

Referring himself to the role and importance of man as creator and beneficiary of all material and spiritual necessities, the President of Romania, Nicolae Ceaușescu, made the following remark: ..."Starting from the

idea that man is the purpose and reason of all social activity, that the population represents the supreme wealth of each country, we consider that we must analyse and debate upon the fundamental problems of the human condition, as a major essential requirement of the contemporaneousness"... [1].

The same idea, generous for the man, is fromulated in the World's Action Plan, adopted by the World's Population Conference (Bucharest, 1974), according to which ... "the population is the most precious asset existing in the world"...

The human resources, examined in a systematic vision, are integrated, through their specific character and their structure, through their degree of mobility, character of reproduction etc., into the general socio-economic system, through a series of direct connections and feedbacks, some of them perceptible only after a long time period. The multiple relations and interdependences formed between the human-resource variables and the economic development, bring forward a series of most important laws, which compel to make searching efforts which make out, at present characteristic moments of the contemporary research in the study of this exceedingly complex problem.

The recent experience, of many countries, among them also Romania, points out that the investments devoted to the development of human resources, demoeconomic in the first place, are by no means less important than the economic investments and that there are tight and quantifiable correlations, between the educational stock, on the one hand, and the growth of labour productivity and of the gross national product or of the national income on the other hand.

The present-day technical-economic revolution has overthrown the classical ratio between simple and complex skilled labour, pushing in the forefront the role of the factor "man". The multilateral training of man, the multiplication of the knowledge through the education of all degrees, as well as the permanent education, are the essential factors of the economic growth. All those lift at a higher level the role and importance of human-resources investments.

The human or demographic resources form the object of interesting debates at international level. The French demographer and scientist of world renown, Al. Sauvy, who has special concerns on this matter, defined the demographic investments, as the expenses made by the society, so that the material standard and cultural level of the people, do not diminish as a consequence of the population increase. According to other authors, the demographic investments are classified into several categories: a) services, promoting the health, including, in a wider sense, the expenses which affect the expectation of life, the strength and vitality of a people; b) the expenses for the training in view of a profession, including all sorts of aprenticeships, organized by the enterprises; c) organization forms of education at all levels: elementary, secondary, higher institutes; d) programmes of studies for adults, which are organized outside the enterprise (firm); expenses for individual and collecitve migration, when changing the profession [5].

An interesting grouping is used by the French scholar, F. Perroux, according to whom the demographic investments may be distributed opera-

tionally into three groups: a) costs which impede human beings to die (struggle against mortality) within and without the professional activity; b) expenses which allow to all human beings the ensurance of a minimum of conditions for the physical and spiritual life (higiene, medical care, invalidity, old-age, unemployment grants etc.); c) expenses which grant to all human beings a life, ensuring a minimum of knowledge and a minimum of leisure (the cost of the elementary education, the minimal cost of the leisure time) [6].

Taking into account the implications of the contemporary technico-scientific revolution upon the ratio between population — economy — human ecology, the investment sphere could be widened and included within two subsystems: a) a *wider subsystem*, getting nearer the so-called conditions of human life or, when using a more comprehensive term, the quality of life, and b) *another more restricted subsystem*, but tightly connected to the first one, and which would refer to the demoeconomic investments, i.e. the labour resources.

In the first case, we could understand, by investments in human resources, the total of material, financial expenses and those for services, expressed in money units or in their working-time equivalent, advanced by society and family, in view of ensuring the conditions of food, clothing, medical care, education, trining, maintining the quality of life and improving the human personality, for a population, during all life.

With a view to understanding the investments in human resources, as well as for the operational limiting of their calculation elements, we can start from a classification of the population in demosocial subsystem and subdivisions, in three great categories (Fig. 1):

**I-st Age, young human resources** (0—15 years), characterized by the fact that children and young people, through their condition, don't produce, but consume, in advance, part of their future production, obtained after entering the active age groups;

**II-nd Age, demoeconomic resources** (16—60(62) years) characterized by the participation to the production process; these people produce more than they consume;

**III-rd Age, older population** (over 60(62) years), having the particularity of not taking part to the production process (they don't produce), but they consume the excess produced during their active life.

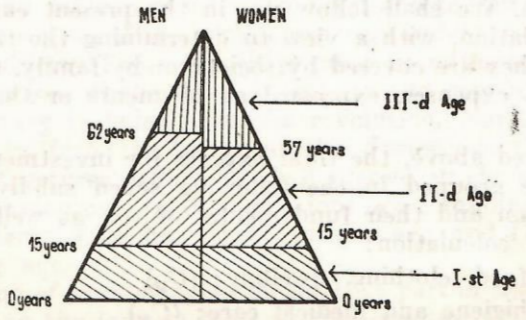



Fig. 1. Pyramid of the demosocial subsystems

A series of relations and fundamental connections are stated between these demosocial subsystems, so as to maintain the socio-economic balance of any society; those relations and connections characterize the produced amount and the consumed amount, during the whole life, by each generation or even by each single individual.

This socio-economic balance, e.g. for a contingent, could be presented by the following relations:

$$V_I^? = C_I^? + C_{II}^? + C_{III}^? + \Delta_I^?;$$

$$V_{II}^? = C_{II}^? + C_I^? + C_{III}^? + \Delta_{II}^?;$$

$$V_{III}^? = C_{III}^? + C_I^? + C_{II}^? + \Delta_{III}^?$$

in which

$V_I^?$, $V_{II}^?$ $V_{III}^?$ represent the production which must be or was produced during the whole active life by a contingent from the demosocial group $V_I$, $V_{II}$, $V_{III}$;

$C_I^?$, $C_{II}^?$, $C_{III}^?$ — the total consumption during the whole life of a contingent from the demosocial groups, $V_I$, $V_{II}$, $V_{III}$;

$\Delta_I^?$, $\Delta_{II}^?$, $\Delta_{III}^?$ — the surplus to be achieved by a contingent from the groups $V_I$, $V_{II}$, $V_{III}$.

Referring, by instance, to group II, the most important one, viz. the population able to work, this must have, during the active-life time period, such a productivity, that it could contribute to ensure an essential balance, i.e.: a) compensation of the consumption during the youth period (*I*-st Age); b) covering the consumption from the active-life period (*II*-nd Age); c) storing the necessary consumption for the old-age period (*III*-rd Age); and d) accumulation of an excess, at society's disposal for distribution according to the general-interest requirements. Fundamentally examined, these relations express the concept of a new social typology, in the sense that a society can be the more developed, as this ratio, both for the entire population, and for each generation, is positive, i.e. each generation or social contingent produces, during its active-life period, more than it consumes during the whole life.

There arises the problem of defining and classifying the expenses belonging to the human-resources costs. These may be classified, as a matter of fact, according to several criteria, according to the task proposed by the scientific research. We shall follow up, in the present case, the operation side of the calculation, with a view to determining the total expenses, no matter whether they are covered by society or by family, as they represent direct or indirect expenses, expressed as payments or through their equivalent.

As we showed above, the total expeses for investments in human resources, could be grouped in the following seven subdivisions, according to their destination and their fundamental object, as well as according to the necessities of calculation:

1. Expenses for food, clothing, dwelling; ($C_{1t}$)
2. Expenses for higiene and medical care; ($C_{2t}$)
3. Expenses for providing general education; ($C_{3t}$)

4. Expenses for training in view of a trade or profession; ($C_{4t}$)
5. Expenses for leisure in view of perfecting the human personality; ($C_{5t}$)
6. Expenses for socio-professional adaptation (changing the working place, territorial mobility); ($C_{6t}$)
7. Expenses for permanent education (recycling, postgraduation education, specialization, etc.); ($C_{7t}$)

Plotted in a diagram, for the whole man's life period, the expenses in human resources would present themselves as in Fig. 2.

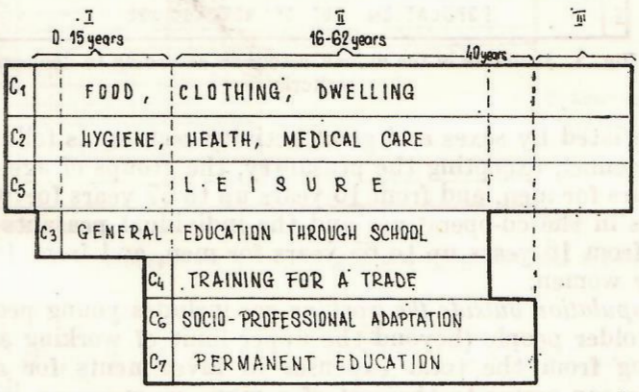



**Fig. 2. Distribution of the expenses for human resources by demosocial groups**

As concerns the concept of investments in human resources or demographic resources, we shall refer further down to the second subsystem, namely investments in *demoeconomic resources*, and further on, to the necessity and possibility of calculating the cost of a man. There cannot be, of course, question of subordinating this new demoeconomic category to the general category of costs on the bookkeeping. If it would be so, the man would have to be included in the bookkeeping, introduced as an item in the computer and recorded in a special account of "Profit and Loss".

In this context, something else is involved, something which means much more and has no similitude whatever with anything existing. We have to proceed to an exceedingly complex qualitative estimation of the demographic potential, in order to measure, to direct and to stimulate the physical and intellectual capacities of the human resources under the conditions created by our socialist society. These capacities must be adjusted more efficiently to the complex factors of the development, in the new conditions imposed by the contemporary technical-scientific revolution. Nevertheless, we have to delimit correctly, from the beginning the demoeconomic resources, their dimensions and structures, which we shall present in the diagram in Fig. 3.

The human resources (total population) are composed, in this case, of two great subsystems: I, population of working age, and II, population outside the working age.

By *population of working age* is meant that part of the human resources which, according to the laws in force in this country, include the limits of

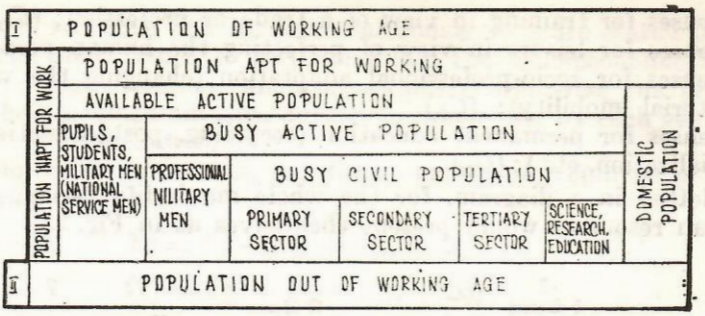



**Fig. 3. Structure of the human resources according to demoeconomic criteria**

age, differentiated by sexes and great activity sectors, as follows: a) for the working personnel, excepting the peasantry, the groups of age from 16 years up to 62 years for men, and from 16 years up to 57 years for women; b) for the peasants in the co-operatives and the individual peasants are valid the age groups from 16 years up to 65 years for men, and from 16 years up to 60 years for women.

*The population outside the working age* includes young people (under 16 years), and older people (beyond the upper limit of working age).

Starting from the total expenses in investments for demoeconomic resources, we can arrive to the cost of a man, or, more precisely expressed, to the cost of formation of a young man, for production, for life [4].

The cost of launching a man in life, or the cost of formation of a young man for the life, would include all material, financial expenses, as well as services, expressed in money units or in an equivalent (labour time), advanced by society and family, for upkeeping, higiene, medical care, education, qualification and shaping of the human personality, from birth untill entering the production, as well as the expenses for permanent education during the whole active life.

We must emphasise that these demoeconomic investments must include all direct and indirect expenses, including the expenses expressed in equivalent for the non-paid labour of mothers or other persons meant for the children care.

The size of the cost for man formation will be, obviously, the greater as the degree of professional training will be a higher one, and will correspond to a certain socioprofessional typology: a labourer with a certain qualification (18 years), a labourer with a mean qualification (20 years), or a higher-qualified specialist (24 years). Figure 4 presents the demoeconomic expenses, corresponding to the cost of formation of a man.

The cost of formation of a young man in the three qualification groups (A, B, C) could be determined on the basis of following relations:

$$\mathcal{C}\,(\mathrm{A}) = \sum_{t=1}^{16} (C_{1t} + C_{2t} + C_{3t} + C_{5t}) + \sum_{t=17}^{18} (C_{1t} + C_{2t} + C_{3t} + C_{4t} + C_{5t}) + \sum_{t=19}^{62} (C_{6t} + C_{7t})$$

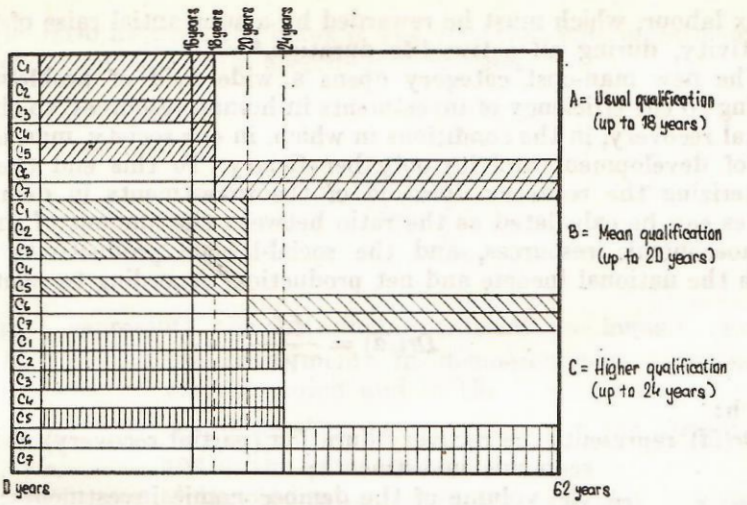



Fig. 4. Demoeconomic expenses grouped by profesional typologies

$$\mathfrak{C}\,(B)=\sum_{t=1}^{16}(C_{1t}+C_{2t}+C_{3t}+C_{5t})+\sum_{t=17}^{20}(C_{1t}+C_{2t}+C_{3t}+C_{4t}+C_{5t})+$$

$$+\sum_{t=21}^{62}(C_{6t}+C_{7t})$$

$$\mathfrak{C}\,(C)=\sum_{t=1}^{20}(C_{1t}+C_{2t}+C_{3t}+C_{5t})+\sum_{t=21}^{24}(C_{1t}+C_{2t}+C_{4t}+C_{5t})+$$

$$+\sum_{t=25}^{62}(C_{6t}+C_{7t}).$$

By using the methodology examined above, we shall present some prudent calculations, concerning the launching of a man in production, in our country, for the three typologies: usual qualification, mean qualification and higher qualification, as it results from the following items:

A. The cost of formation of a young man up to 18 years, corresponding to a usual qualification, is equal to the equivalent of 8—9 years of work of a mean labourer, in the condition of year 1980.

B. The cost of formation of a young man up to 20 years, corresponding generally to a mean qualification, is equal to the equivalent of 10—11 years of work.

C. The cost of formation of a young man up to 24 years, an age generally corresponding to a higher qualification, is equal to the equivalent of 14—15 years of work.

It is sure that the development and economic modernization, the technical-progress complexity, urge the increase of man's cost, the growth of the

complex labour, which must be rewarded by a substantial raise of the labour productivity, during all active life duration.*

The new man-cost category opens a wide field of problems, mainly belonging to the efficiency of investments in human resources, to their partial and total recovery, in the conditions in which, in our society, man is the main factor of development and its only beneficiary. To this end the indicator characterizing the recovery duration of the investments in demoeconomic resources can be calculated as the ratio between the amount of investments in demoeconomic resources, and the social-labour productivity expressed through the national income and net production, according to relation:

$$Dr(id) = \frac{Ide}{W}$$

in which:

$Dr(id)$ represents the recovery duration (partial recovery) of the demo-economic investments;

$I_{de}$ — the volume of the demoeconomic investments;

$W$ — the level of the social-labour productivity on a year.

The significance of this indicator consists in the fact that it shows in how many years and in which group of age, a generation, or a generation contingent, recovers the investment, advanced by society and family, for its formation, up to the age of entering the production.

We can present also a second, more significant and more complete, indicator, viz. the one characterizing the total recovery duration of investments in human resources, which is calculated as the ratio between the demographic investment total value (during the whole life), and the social labour productivity, according to the following relation:

$$Dr(i.u) = \frac{Iru}{W} = \frac{C_I + C_{II} + C_{III}}{\frac{Q}{T}}$$

in which:

$Dr(i.u)$ represents the recovery duration (in years) of the investments in human resources;

$Iru$ — investments in human resources ($C_I$, $C_{II}$, $C_{III}$) represent the total consumption during the whole life);

$W$ — social labour productivity, calculated as ratio between the national income (gross internal product) and the number of people having an occupation.

For ampler analysis necessities, we can also calculate the marginal coefficient of the investments in demographic resources, which can be deter-

*) According to the calculations carried out by A. Sauvy, the cost of formation of a young man up to 18 years was equal in 1950 to the equivalent of 5.5 years of work, but after only 13 years (1963) the same cost raised up to 10—12 years of work, a fact which made necessary the demographic investments.

mined as the ratio between the index of the demoeconomic investments, and the index of economic growth, according to relation:

$$K_m(iu) = \frac{I_{de_1}}{I_{de_0}} : \frac{\frac{V_{n_1}}{R_{u_1}}}{\frac{V_{n_0}}{R_{u_0}}}$$

in which:

$K_m\ (iu)$ represents the marginal coefficient in human resources;

$I_{de_1}, I_{de_0}$ — the investments in demoeconomic resources in the current period and in the basic period;

$\frac{V_{n_1}}{R_{n_1}}, \frac{V_{n_0}}{R_{n_0}}$ — the national income by person, in the current period and in the basic period.

The significance of this indicator lies in the fact that it gives some indications on the rhythm which must be observed by the demoeconomic investments, so as to obtain one percent of economic growth, i.e. one percent of growth of the national income by inhabitant.

The necessity of establishing the investments in human resources and their efficiency gets a most particular significance in the prospect. Our socio-economic models for the following decade aim consequently at ensuring a normal demographic growth, the improvement of people's health, maternity and child protection, the achievement of a right proportion in the structure by groups of age of the population, the vigorous physical and intellectual growth of the new generations. The country's population will be, in 1985, according to the estimate, of 23.4—23.7 million inhabitants, reaching a mean life duration of about 71 years. With the conditions of the socio-economic development, the busy population will grow from 10.4 million persons in 1980, up to 11.3 million persons in 1985, and there from more than 78% will work in industry and in the non-agricultural branches. An essential target of the future five-years plan, 1981—1985, is the further development of the education of all degrees (the school population will include about 27% from the total), the thorough organization of the qualification of the labour force, the generalization of the recycling process of the managing staff. Conditions will be created with a view to generalizing up to 1990 the 12 year-education.

All these targets rise so much more the role and importance of the investments in human resources, for the multilateral formation of the young generations.

The determining of the man cost, a new, extremely complex, socio-economic category, requires further investigations, the involvement of the interdisciplinary researches, the optimization of the structure ratio between the complex shaping of the demoeconomic resources, in the conditions of our socialist society.

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## INVESTISSEMENTS EN RESSOURCES HUMAINES. LE COUT DE LA FORMATION DE L'HOMME


Prenant comme point de départ l'idée que l'homme est le but et la raison de tout développement, les auteurs examinent le concept d'investissements en ressources humaines et le coût de la formation de l'homme. Y sont analysés les trois sous-systèmes démo-sociaux (premier âge — population jeune, deuxième âge — population apte de travail et troisième âge) et on présente les équations qui se forment dans les conditions du maintien de l'équilibre économique social.

On présente une classification des dépenses pour les investissements humains et on effectue les calculs concernant le coût des ressources démo-économiques par trois topologies: le coût de la formation d'un jeune jusqu'à 18 ans, le coût jusqu'à 20 ans et le coût nécessaire pour la formation supérieure (24 ans).

Les auteurs présentent dans la suite la méthode de calcul des indicateurs exprimant la durée de la récupération des investissements démo-économiques, le coefficient marginal des investissements en ressources de travail, la relation entre la consommation totale d'une génération et la productivité du travail pour toute la durée de la vie active.


## ВЛОЖЕНИЯ В ЛЮДСКИЕ РЕСУРСЫ. ЗАТРАТЫ НА ФОРМИРОВАНИЕ ЧЕЛОВЕКА


Исходя из предпосылки, что человек является целью любого развития, в работе рассматриваются понятие вложения в людские ресурсы и затраты формирования человека. Анализируются три социо-демографические подсистемы (I-ый возраст — молодое население, II-ой возраст — работоспособное население, и III-ий возраст) и приводятся уровнения, существующие между ними в условиях сохранения социально-экономического равновесия.

Даётся классификация затрат для вложения в людские ресурсы и расчитаны затраты на демо-экономические ресурсы в трёх случаях: затраты на формирование молодого человека до 18 лет, затраты на формирование человека в возрастве до 20 лет и затраты на формирование специалиста с высшим образованием (24 лет).

Далее приводится расчётный метод для показателей, выражающих срок окупаемости демо-экономических вложений в трудовые ресурсы, отношение между совокупным расходом одного поколения и производительностью труда при всей своей активной жизни.


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