Conceptual Algorithmic of the Managerial Information Subsystems Precedent Economic Material Processes

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The informative role sub-systems of the integrated unitary economic management process are highlighted. Depending on the precedence and subsequence to material activities, their systematization is carried out. At the conceptual level, according to the logic of the solution succession, imposed by the managerial functions realization, within each sub-system are profiled the complexes of issues, and in each complex – the issues totalities. According to such an approach, the place, role and functional value are elucidated, determined the composition and content of the algorithmic interface of these managerial units (sub-system – issues complex – issue). Material incorporates the composition of groups of general character algorithms of the information sub-systems, precedent the economic activities of human materials (manufacturing, distribution (commercialization), consumption) – those of rate-setting, settlement, current foreseeing, as well as operative foreseeing and conducting of these activities. Starting from the predestination of economic management functions, the overall functional content of the fundamental algorithms of the nominated subsystems is revealed.
Keywords: *Conceptual Algorithmic, Economic Integrated Managerial System, Information Sub-Systems, Material Activities, Composition*
DOI: 10.24818/issn14531305/25.1.2021.02

1 Introduction

Like any other human activity, the design and functioning of any primary informational or informatics system requires the knowledge, development and application of certain algorithms, based on them certain works are carried out or the day-to-day functioning of a particular object, process is organized.
One of the contributing components to the realization of economic informational processes of decisive functional importance is considered mathematical resources. Although it initially seems to constitute a specific descriptive instrument and only that, after all, and, more importantly, after a trough reflection, it is aware that their absence practically does not allow the initiation and execution of any works.
No event or object can be perceived without prior knowledge of the logic of their organization, structuring, processing and consumption. So, revealing the essence of content and succession of any activity and its resource requires the disposing of a certain number of rules and their application sequence, which in the information domain is considered right the algorithmizing, and the last one is related to such a variety of resources, such as, mathematical ones.
For any domain these resources are inevitable, regardless of how to carry out the information process, either manual or automatic. Thus, their role and importance in the performance of integrated economic management functions, as well as their influence on the composition and dimensions of other informatics resources, are decisive [1,407-408; 2.85-86; 3,303; 8,52-54].
It should be noted that in modern interpretation and laconic expression increasingly insistent and justified, in authors opinion, it is proposed to replace the elucidated name of the domain with the term of algorithmic [9], explaining its use in this article.

2 Compositional Content

2.1 Structuring the Application Informational Domain of Algorithmic

Prior to the pre-destination place of the resources concerned establishment, it is necessary to elucidate the unitary management system, which at the most general level includes and ensures the operation in interconnection and interaction of two departments - material and informational, and the last - of the informative and decisional services (Fig. 1).

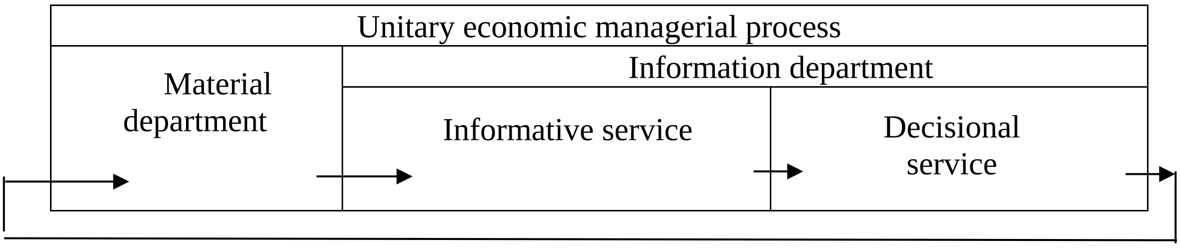

Fig. 1. The composition, interconnection and interaction of the departments and services of the unitary economic management process.

Within the first sub- department some of the information products have a descriptive role, reflecting the situation and dynamics of the functioning of the object (process). Another part of information entity performs both reflective and decision-making roles, since material activities evolve according to their values.

The first refers to the evidence information of any variety (primary, operative, accounting, statistical), and to the second–the normative, settlement and forecast (forecast, current and operative). As a rule, the latter are obtained precedent, and the evidence information-after the processes of the material department.

However, for all sub-systems it is characteristic to break down each of them into complex issues, and for each complex–in separate issues. According to the meaning and predestination of the service of certain managerial functions, within the unitary management system, the sub-systems, of each sub-system-the complex, and within each complex- the issues are found in a certain interconnection and interaction.

Therefore, at the level of material organizational unit (enterprise, organization), in this paper, first the conceptual aspect of the algorithmic of the sub-system of rate-setting and settlement, then - of current foreseeing, the operative foreseeing and financial administration will be revealed and analyzed.

In this context, the informative content of the rate-setting and settlement subsystem consists of complexes of primary and general rate-setting issues, and the settlement complexes – of the complexes of constructive and technological settlement issues. In turn, primary rate-setting includes issues of determining (calculating) of the dimensions of consumption of economic resources (human, material, financial), which revert to an elementary machine part and technological (action, operation) unit.

The general rate-setting consists of issues of calculating of the rates of nominated consumptions that respectively revert to a constructive coupling unit (node, assembler, finished product) and generalizing technological unit (sub-stage, stage, process).

Based on the pre-destination of the management functions of the material department of the integrated economic management process, as well as the periods of fulfilment, the foreseeing sub-systems can be categorized and carried out in the following sequence: forecast (5,10,15 and several years), current (year, half year, quarter, month) and operative foreseeing and financial administration (shift, day, week, five days, decade).

In the organizational units environment, mainly concerned with material processes (enterprise), the majority of current and operative foreseeing are practiced, on that account the article refers to them.

In this context, in practice and theory of current foreseeing, primordial the algorithmic complex of issues concerning the composition and dimensions of the plan tasks is developed and applied, on the basis of the tasks - of the algorithmic of structure and volumes of the

needs of resources (human, material, financial) of the organizational unit and its subdivisions.
Based on values of the current foreseeing indicators, the indicators values of the foreseeing information subsystem and operative financial administration, which comprise the complex of issues of the operation operative rate-settings of the technological lines of construction units manufacture, of the composition, volumes of the operative plan tasks, the resources need for their fulfilment, the control, analysis and adjustment (correction) of the tasks.
Heading and enumeration presented objectively are dictated by the conditioning of the pragmatic content of their issues and their complexes. For this reason, the article highlights and systematizes the sequence of algorithmic formalization of information processes precedent human material activities, which take place in the environment of material organizational units.

2.2 Functional Value and Role of Algorithmic in the Unitary Management Process and Informatics System Environment

The functional value of the algorithmic information processes of elucidated sub-systems is predetermined by the fact that, compared to other information sub-systems, in the unitary management process they have a dual role. In the case of separate use, without interconnection with the information of other sub-systems, they perform the function of unilateral (reflective, descriptive), i.e. informative report.
Combining them with other variety of sub-systems (e.g. foreseeing and evidence, rate-setting and settlement – both, etc.) creates the basis of formulation and decision-making. Also, as previously noted, even though separate application they fulfil the management role, since their values serve as a basis for the initiation and permanent monitoring of the evolution of processes and material objects. So, in the absence of these sub-systems algorithms are impossible the existence, start and evolution of any object or process.
Regarding the algorithmic value in the information (informatics, informational) systems (informational) environment, its reduced down to the following.
The totality of algorithms describing the process of solving a problem or complex, subsystem and system of issues constitutes their algorithmic entourage, lately often replaced by the term algorithmic. The adequacy and accuracy of the consistency of the algorithms of obtaining the values of the information products largely depend on the quality and volume of the results of material and financial activities. The authenticity of the algorithms of the organization, structuration, processing and use of the values of the information units depends on the composition and quality of all basic information resources, such as informational, programmed, technological and economic.
The extensive and profound influence of the examined interface is motivated by the fact that on its basis afterwards is determined the composition and structure of other resources. Thus, according to the algorithms, the content, composition and structure of the initial and derived information units (files, databases) are determined. Otherwise initially the algorithms are formulated orally or textually, in the form of rules, instructions, etc. and only after that – in mathematical form (formulas).
Knowing the content and logical sequence of information units values calculations, graphic algorithms can easily be developed in the form of block-schemas, programed line-schemas, operator schemas, etc. Next, only on the basis of the graphic algorithms, in particular, of the block-scheme, the applied programmed resources can be developed, without them certain concrete (real) informational products cannot be obtained automatically.
In turn, having the logics of solving economic information issues and the programmed resources that realize it, the possibility of elaborating technological resources, both internal (in the physical interior of computer) and external (interaction between the user and

the technical means) appears. Just as technology determines the composition, sequence and volume of works, it creates possibilities to determine the composition and volume of the necessary economic (human, material, financial) resources for the day-to-day operation of technological resources.
Therefore, the fullness and correctness of the algorithmic interface (algorithmic entourage (of algorithmic), mathematical resources) of any information sub-system depend on the same qualities of any other resources. Even the technical infrastructure is designed, produced and put into operation according to the algorithms. Any technical means is nothing more than a physical achievement of the certain algorithm of certain material, informative or decisional activity. This way, it becomes clear that the depth and length of the influenceable chain of the algorithmic interface on the other informatics departments are quite considerable.
Based on above considerations, it can be said that the value of the algorithmic economic information issues is indisputable. Therefore, it is necessary to know as fully and in detail as possible the its application in the nominated domain. Since the functional (pragmatic) aspect of the content of economic information is decisive, it is necessary first that the variety and specificity of the concerned resources be elucidated from these positions.
For this purpose, it is necessary to establish the combination of structural information units (in economy, as a rule, the informational massive within the framework of obtaining each category of products of the same (informational) nature. Economic information activities domain has two primary units with unilateral descriptive (reflective) possibilities, such as indicator and decision. The granting of the multilaterally of reflection occurs by merging them into various variants within such a constituent unit, such as the issue, with its concluding documental perfection.
For this reason, for the activities examined as an informational issue, the elaboration of the content of a derived document (intermediate, of synthesis), which mainly contains a lot of indicators with resulted values (as opposed to such domains as physics, technique, mathematics, etc.). In turn, depending on the category of material objects (activities) described from an economic point of view, these issues are systematized (organized) in complexes (sectors), and the latter – in sub-systems and in a unitary system of information. Any value obtained within these organizational units shall be considered as an informational product, which one should have a different descriptive (reflective) ray.

2.3 Conceptual Algorithmic of the Rate-Setting and Settlement Sub-System

As has been justified before, on the basis of the formulated conceptions of the predestination of service of management functions, economic in formational products belong to two classes of sub-systems, those preceding material activities and those that succeed these activities. Depending on the reflecting area of the informational products, the issues of rate-setting are of a primary algorithm (1)-(3) and generalizing algorithms (4)-(5) order.
The former is solved by multiple measurement of the dimensions of the consumption of natural economic resources (material and time) with their subsequent evaluation in cost units returning to a constructive or technological unit and their totalization (summation, generalization) [1,407; 3,303-304; 5,228-232; 6,338-343; 7,109 -117]. In this case the value of the primary rate of consumption could be calculated according to the following conceptual algorithms:
For a technological (*1t*) or constructive (*1c*) primary unit *i*, in value expression:

$$N_{ival}^{1t(c)} = n_{1i}^{1t(c)val} + n_{2i}^{1t(c)val} + \dots + n_{ji}^{1t(c)val}; \quad \textbf{(1)}$$

where: N_{ival}^{1t} - primary rate (in value expression) of the consumption of all supported resources during the effectuation (fulfilment, fabrication) of a constructive constituent unit (e.g. technological operation, piece); $n_{ji}^{1t(c)val}$- primary rate (in value

expression) of the consumption of each resource j for the fulfilment (fabrication) of a technological (constructive) unit i;
$i = \overline{1,r}$ – composition of technological units (constructive); $j = \overline{1,q}$ – composition of the consumed resources.
This algorithm can also be presented as follows:

$$N_{ival}^{1t(c)} = \sum_{j=1}^{q} n_{ji}^{1t(c)val}; \quad \textbf{(2)}$$

As noted above, obtaining in natural expression the values $n_{ji}^{1t(c)val}$ occurs through multiple measurements with the most optimal determination, and – in cost units – by multiplying the natural size of this rate to the cost rate of a resource unit:

$$n_{ji}^{1t(c)val} = n_{ji}^{1t(c)nat} \times P(T)_j^1; \quad \textbf{(3)}$$

where: $P(T)_j^1$- estimate rate in cost units (*P*–price, *T*-tariff of a unit of natural resource *j*.
Calculation of the dimensions of generalized rates in natural expression takes place based on systematization of primary rates values of each consumed resource within the constituent (included, initial) constructive units in a higher constructive unit of the same category:

$$N_{kjnat}^{1t(c)} = \sum_{i=1}^{r} n_{ji}^{1t(c)nat}; \quad \textbf{(4)}$$

where: k $=\overline{1,l}$ - composition of the constructive constituent units.
The same rate-settings dimensions in value expression and relating to all resources consumed shall be determined on the basis of the algorithm (3), only instead of operating $n_{ji}^{1t(c)nat}$ its operated by $N_{kj}^{1t(c)nat}$:

$$N_{jkval}^{1t(c)} = \sum_{i=1}^{r} \sum_{j=1}^{q} N_{ji}^{1t(c)nat} \times P(T)_j^1; \quad \textbf{(5)}$$

In addition to the issues of consumed resources rate-setting, the composition of the informational subsystem of rate-setting and settlement of economic material activities (R.S.S.E.M.A.) also includes issues of constructive rate-setting (settlement) (algorithm (6)). Their essence is reduced to determining the applicability (normalized number) of the inferior constructive units in a superior assembly unit, obtained at the next assembly stage *n+1*. The next stage (*n+1*) of assembly, as initially, starting with the first, and further on – with the previous (*n*) stage, the applicability of the assembly units is known [1,408; 3,304-306; 4,106-113; 5,232-240; 6,343-347; 7,103-109].
In order to find out this applicability at the next (*n+1*) or final stage (finished product, completed activity), the applicability of the inferior constructive units (from the initial or previous stage) to the applicability of the constructive units of the next assembly stage, which includes the units from the *n* stage, in turn, and the constituent unit being included in the next assembly stage, is sufficiently multiplied.
Then the general algorithm of such calculations is as follows:

$$A_{n+1}^{q1m} = A_n^{q1t} \times A_{n+1}^{t1m}; \quad \textbf{(6)}$$

where: A_{n+1}^{q1m}- the applicability (normalized number) of the inferior constructive unit *q* at the *n+1* assembly stage in a higher constructive unit *m*, the last, in turn, also being included in the unit of the next of assembly stage (*n+2*);
A_n^{q1t} - the applicability of the constructive unit *q* in a unit from the initial assembly stage *n* in a constructive unit from the next assembly stage *n+1*;
A_{n+1}^{t1m} - the applicability of the constructive unit from assembly stage *n+1* in a constructive unit *m* from the next assembly stage (*n+2*).
On settlement issues (algorithms ((6)-(8)), their resolution in the economic daily reality ends with the elaboration of certain documentation of administrative, constructive and technological content, according to which material activities are organized (regulated). That's why the algorithms for these issues are textual, very concrete and based on purely real objects and works.

For given reasons they are the most variable by content and composition, thereby not allowing their easily and fully standardization. This procedure may be subject to algorithms determining the time limit and level of performance and compliance with the initially placed before the executors settlement tasks:

$$\pm \Delta T = T_{s-} T_f, \quad \textbf{(7)}$$

or

$$\Delta V = (V_{pl-} V_r) \times 100; \quad \textbf{(8)}$$

where: Ts is the settlement deadline for carrying out the task, and T_f - the de facto time limit; V_{pl} - the volume of planned works, and V_r - the actual fulfilled volume.

2.4 Conceptual Algorithmic of the Current Foreseeing Sub-System

2.4.1 Algorithmic optimization of economic resources

Mathematical resources of the issues of foreseeing sub-systems (forecasting, current, operative) also have specifics for each planning category. Thus, the algorithms and economic-mathematical methods of prognostic information products can only be generalized with regard to determining the dimensions of needs in certain resources in order to achieve certain long-term objectives, which are formally identical to the algorithms of calculation of the values of the same resources within the current foreseeing (see that material below).

According to the content and the goals pursued, the current foreseeing of two varieties is highlighted: optimization and linear. The issues of the first variety (optimization) are unique, in addition to those of economic analysis, as they are formalized by means of economic-mathematical modelling. For such issues it is characteristic the disposing of one or more criteria, the values of which are optimized by maximizing (minimizing) their values under (in) the conditions of respecting with certain restrictions.

Thus, the issue of optimizing the manufacturing plan of finished products (carrying out activities) can be solved by applying three basic criteria, such as maximizing the size of the benefit, maximizing the manufacturing volume of finished products (fulfilling the volume of activities) and minimizing the cost price of this volume. At the same time, the issue has disposing such restrictions as the delimitations of the manufacturing volume expressed in natural units, the dimensions of the time fund of the operation of the performing equipment, the rare material resource fund (in natural units), the remuneration fund and the labor of the manufacturing plan load.

Based on above considerations, the economic-mathematical model of the optimization of the manufacturing plan load shall be formulated in the following way: to determine the extreme value of each of the criteria (with condition respect) the mentioned above restrictions. In this case the algorithmic of the issue is presented in the form of the following general formulas:

A. Algorithmic of extreme values determination of the planned fabrication volume optimizing criteria [1, 409-410; 3, 306; 5, 240 – 243; 6, 347 – 349, 7, 153 -156]:

1) criteria algorithm of maximizing the obtained benefit dimension as a result of finite products commercialization (accomplished activities) (F_1):

$$F_1 = \sum_{i=1}^{n}(C_i^1 - S_i^1) \times X_i \rightarrow max; \quad \textbf{(9)}$$

where: $i = \overline{1,n}$ - composition (number) of the finite products names (accomplished activities) according to the fabrication plan; C_i^1 - commercialization price of a finite products unit (accomplished activities) i; S_i^1 - the price cost (sum of incurred expenses) of a finite products unit (accomplished activities) i; X_i -fabrication volume plan (units number) of each finite product or realization of each activity *i;*

2)criteria algorithm of maximizing the finite products volume fabrication (carried out activities) expressed by the commercialization price (F_2):

$$F_2 = \sum_{i=1}^{n} C_i^1 \times X_i \rightarrow max; \quad \textbf{(10)}$$

3) criteria algorithm of minimizing the finite products volume fabrication (carried out activities) expressed in cost prices (F_3):

$$F_3 = \sum_{i=1}^{n} S_i^1 \times X_i \rightarrow .\, min; \quad \textbf{(11)}$$

B. Algorithmic of **r**estrictions [1, 410; 3, 307-308; 5, 243 – 245; 6, 353 – 355; 7, 156 - 157]:
1) restriction algorithm of the planned fabrication volume finite products (accomplished activities) is expressed in natural units:

$$r_i \le X_i \le R_i;\ i = \overline{1, n}; \quad \textbf{(12)}$$

where: r_i- minimum volume(number) planned of the finite products fabrication (carried out activities) of each name i; R_i - maximum planned volume (number) of fabrication (carried out activities) of each name i;
2) restriction algorithm of the operating time fund dimensions of deficient tool:

$$\sum_{i=1}^{n} t_j^{1i} \times X_i \le A_j;\ j = \overline{1, m}; \quad \textbf{(13)}$$

where: $j = \overline{1, m}$- composition (number) of the deficient (advanced) tools names involved according to the fabrication plan in each finite product fabrication (activity accomplished) i; A_j- planned (possible) annual time fund of deficient tool operation, belonging to technological group j; t_j^{1i} - labourworkmanship time (hours) of finite products unit processing (carried out activity) i with support of deficient tool j.
3) restriction algorithm of the deficient material resources fund dimensions necessary for the fabrication task achievement:

$$\sum_{i=1}^{n} m_k^{1i} \times X_i \le M_k,\ k = \overline{1, l}; \quad \textbf{(14)}$$

where: $k = \overline{1, l}$ - composition (number) of the deficient materials names necessary for each finite product fabrication (activity effectuation) i; m_k^{1i} - consumption rate of deficient material k for the finite product unit fabrication (for carrying out the activity) i; M_k - fund dimension (volume, number of units) of deficient materials of each k-name for the fabrication planned year.
4) restriction algorithm of the remuneration fund dimensions (basic salaries and bonuses), necessary for the fabrication plan fulfilment:

$$\sum_{i=1}^{n} (Z^{1i} + P^{1i}) \times X_i \le U_{zp}; \quad \textbf{(15)}$$

where: Z^{1i} - basic normed salary sum paid for the finite product unit fabrication (activity) i; P^{1i}- normed bonuses sum for overachievement the finite product unit fabrication plan (activity)i; U_{zp}- the planning fund for all production fabrication.
5) restriction algorithm of working hours (normed hours - T) dimensions of the finite product unit fabrication plan (for carrying out the activities):

$$\sum_{i=1}^{n} \sigma^{1i} \times X_i \le T; \quad \textbf{(16)}$$

where: σ^{1i} - normed working hours (hours number) total dimension required for the planned finite product unit fabrication (for one-unit activities effectuation) i:
Within the issues belonging to the elucidated category, the primordial functional value also has those of optimization of the tools and technologies operation. They are resolved together with the fabrication plan optimization and formally are reduced to determination and algorithmizing of the criteria and restrictions.

2.4.2 Algorithmic of the Current Economic Linear Prediction

Only after determining the indicators values of the optimal fabrication plan X_i (algorithms ((9) – (16)) the linear prediction activities could start (algorithms ((17)-(22)) [1, 410-411; 3, 313- 323; 4, 108-109; 5, 246 – 254; 6, 356 – 360; 7, 158 - 168]. First issue of this planning is the evaluation of the optimal fabrication plan indicators (V_i) in cost units:

$$V_i = X_i \times P_{s(c)}^{1i}; \quad \textbf{(17)}$$

where: $P^{1i}_{s(c)}$- the price (*s*-stable; *c*-commercialization) of a finite product unit (activity) i.
Next, based on solving possibility logics, we present the following types of issues:
1) Estimation of the finite products fabrication plan (of carried out works) by each group's necessary tools arrangement at the prediction period start. First, we determine the required number of tools to carry out the optimal fabrication task of each group:

$$n_d^{pl} = \frac{T_d^{pl} - F_d^{pl}}{r_d^1}; \qquad \textbf{(18)}$$

where: n_d^{pl}- tools planned number of each technological group *d*, necessary for optimal fabrication plan fulfilment; T_d^{pl}- tool working hours volume of the technological group *d*, which the economic unit will have within the predicted time limit; F_d^{pl}- the work time volume for the same time limit of fabrication plan; r_d^1- dimension of the annual time fund planned for the tool unit operation belonging to each technological group *d*.
Next, we obtain the determination degree of the optimal fabrication plan with deficient tools ($\pm\Delta n_d$):

$$\pm\Delta n_d = n_d^{pl} - n_d^{fac}; \qquad \textbf{(19)}$$

where: n_d^{fac} - de facto tools number of each group *d* at the prediction period beginning.
2) The needs volume of other resources for basic fabrication plan realization is determined according to the following generalizing algorithm:

$$R_q = \left(\sum_{i=1}^{n} X_i \times N_q^{1i}\right) - S_q; \qquad \textbf{(20)}$$

where: R_q-needs volume in the *q* resource for the nominated plan task realization; N_q^{1i}- the rate of resource q consumption of the finite product unit (activity) i; S_q - resource q balance volume at the planning deadline.
3) Based on various resources needs volume, the sum of the financial resources necessary for their procurement (*C*) are determined:

$$C = \sum_{q=1}^{h} = R_q \times \left(T_q^1\right); \qquad \textbf{(21)}$$

where: $q = \overline{1, h}$- composition (number) of resources names; $P_q^1(T_q^1)$- price (tariff) of a resourcess unit *q*; *R q*- volume, in the natural expression of each resource.
4) Knowing the total commercialization amount (income) (*V*), it is possible to determine the planned benefit dimension (*B*) for the prescribed period:

$$B = V - C. \qquad \textbf{(22)}$$

2.4.3 Operative Foreseeing and Conducting Algorithmic

2.4.3.1 Specificity of sub-system structuring, functioning and managerial value

The last informational sub-system that precedes the economic material processes is that of operative and management –the source of the daily organization and settlement of these processes. For his issues it is characteristic that their information base consists, in particular, of the values of the current foreseeing indicators. If the issues of the last sub-system (current foreseeing) refer to the economic unit as a whole on such time limits as a year, half a year, quarter and a month, then the issues of operative foreseeing and operative conducting (algorithms (23)-(36)) have an attitude towards each organizational unit, its subdivision and job, for such time limits as, such as, one working shift, one, 5 and a decade, most indicator values are expressed in natural units.
In addition to mentioned above, unlike any other information sub-system, excluding economic analysis, within the examiner done took place the full realization of the cyber cycle, which includes not only the motive, but the decisional services, with settlement of the material processes. For this reason, in his environment are carried out all the specific management functions for the economic managerial process: operative foreseeing operative evidence, operative control and analysis, operative regulation [2, 85-86].

Moreover, comprising in interconnection and interaction all material and informational processes, the elucidated sub-system carries out the whole unitary integrated management process (Fig.1). Its main drawback is that the operation takes place discreetly, but within operative time limits. The retentions of the analogous realization of the sub-system are mainly motivated by the level of automatic completion of the processes of the material department.
Based on the above, it can be establishing that the conditional this sub-system is found at the transient stage of its transformation into an automatic material-informational core, which until it works discreetly. Therefore, it can be considered the prototype of this informatics unit to carry out entirely the unitary management process.
The functioning of the sub-system is ensured by mean off our informational functions: foreseeing, accounting, control and analysis, operative regulation, carried out in three phases of the unitary process of operative foreseeing and settlement. The interconnection of these phases and the interaction of functions within each of them graphically are shown in Fig. 2.

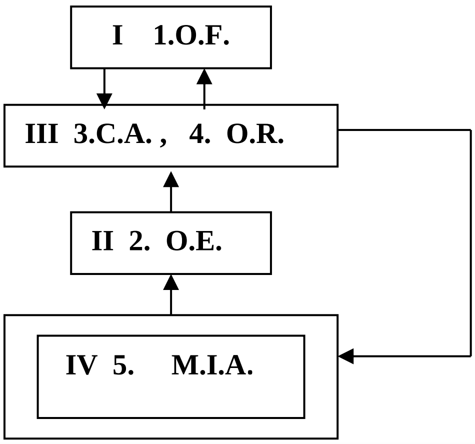

Fig.2. The composition and interconnection of phases

The interaction of the functions of the unitary integrated process of the operative foreseeing and conducting sub-system of the organizational-material unit (enterprise, organization) is: the numbers of blocks **I-IV** refer to the sequence of the achievement of the phases of operative forecasting and conducting, and the numbers within the blocks (phases) indicate the sequence of the performance of the functions: **1. O. P.** – operative foreseeing function; **2. O**.E - operative evidence function; **3. O. C.A.** – operative control and analysis function; **4. O**.R. - operative regulation (correction) function; **5. M.I.A.** – regulated (corrected) material and informational activities (processes, objects).
From Fig.2 it is obvious that phase **III** (control, analysis and regulation) has met two functions – operative control and analysis **(3)** and of the operative regulation **(4)**. This meeting is explained by the fact that the operative regulation is carried out immediately after obtaining the results of the operative control and analysis. In addition, the volume of their informational and decision-making activities is non-essential, and some of the material processes within time limits (exchange, working day) may require analogous regulation.
Composition of the sub-system phases is conditioned not only by the sequence of their realization, dictated by the functional content of the works, by the volume and the direct connection, but also by the fact that functions **3** and **4** require real-time performance. This is why of the imperious role disposing not only these lessons, but also the order of performance of the functions.
In this context, first the information processes for determining the composition and volumes of the operative tasks of manufacturing finished products (semi-manufactures, etc.) are carried out, then – the resources needs of any variety for the tasks performance. However, prior to these calculations, it is imperative to determine the calendar rates for the operative foreseeing of the functioning of the manufacturing process, as without them subsequently both information and material processes cannot be initiated and carried out.

2.4.3.2 Algorithmic of the Calendar Rates of the Operative Foreseeing

According to above considerations, the following complex of calendar rates initially

is developed at the operative foreseeing phase [3,305-306;5,250-254;6, 112-117; 7, 82-117]:
a) algorithm for calculating the size of the manufacturing tact, what showing the duration of manufacture of a unit of product.

$$r = \frac{(T_{ch} - T_{res}) \times S}{N}; \quad \textbf{(23)}$$

where: r- tact size (manufacturing duration); T_{ch} – duration of the work shift (effective time fund); T_{rep} – duration of the settlement rest during operation (activity) (shift, day); S – functioning regime (number of shifts); N – the task of plan on a working day;

b) algorithm for calculating the size of the manufacturing rate (R) (of performing the material activity):

$$R = r \times V_{tr}; \quad \textbf{(24)}$$

where: V_{tr} – the volume of the part (number of products transmitted from technological operation to another);

c) algorithm for determining the normalized dimensions of launch parties of the products in manufacturing process:

$$n = \frac{t_{ef}}{t_{un} \times K_{min}}; \quad \textbf{(25)}$$

where: n_{min} – the minimum number of products in a part; t_{ef} – the actual time required to retrain the equipment; t_{un} – the processing time of a unit product; K – the coefficient of time loss required for retrain the equipment.

2.4.3.3 Algorithmic of Operative Foreseeing Tasks

Within the completion of calculations based on algorithms 23 -25, conditions are created to determine the composition and volumes of operative manufacturing tasks [1, 411; 5, 252-254; 6, 341-347; 7, 169-196], which is achieved by distributing the values of tasks of current manufacturing plans by operative time limits:

$$X_i^{op} = X_i^c x\, Q_i^{op}; \quad \textbf{(26)}$$

where: X_i^{op}- the operative task of manufacturing the finished product (carrying out the activity) i; X_i^c- the same task, only on the current fabrication time limit; Q_i^{op} - the coefficient of distribution of the current load of the same category on the operative time limit.

If the operative task is not fulfilled for the previous period, its non-fulfilment ($-\Delta X_i^{op}$) shall be distributed over the next period. Therefore, the volume of non-fulfilment of the task (in natural units) is first determined:

$$\pm \Delta X_i^{op} = X_i^{op} - X_i^f; \quad \textbf{(27)}$$

where: X_i^f- the actual (defacto) fulfilment of the operative task. If a new non-fulfillment is again formed ($-\Delta X_i^{op}$), then it will be added to the manufacturing task for the next foreseeing time-limit ($X_i^{op(n+1)c}$), etc., until such deviation is (not it will forming):

$$X_i^{op(n+1)c} = X_i^{op(n+1)in} + (-\Delta X_i^{op(n)}), \quad \textbf{(28)}$$

where: $X_i^{op(n+1)c}$- corrected manufacturing rate (c) for the next period ($n+1$); $X_i^{op(n+1)in}$- initial manufacturing rate (in) over the next period ($n+1$).
With the values of the foreseeing tasks, appear the possibility of determining the composition and volumes of the needed resources for them to be achieved. The conceptual algorithms of these calculations are of the same form as the algorithms of the current foreseeing issues (17-21).

2.4.3.4 Algorithmic of Operative Evidence

The operative evidence function ((29) – (31)) is mainly concerned with obtaining the values of the generalizing indicators of the resources run and of the determining the balance dimensions. Therefore, it includes the following varieties of generalizing algorithms [1,411-412; 5,118-145;6,328-341;7,107-329]:
(a) the algorithm for obtaining the generalizing value of the indicator (in natural expression):

$$I_g^{nat} = \sum_{j=1}^{n} i_j^{nat}, \quad \textbf{(29)}$$

where: I_g^{nat} - indicator with generalizing value (in natural expression); i^{nat}_j – initial indicator j (in the same expression); $j = 1 \div n$ - number of operations (inputs, outputs);

b) algorithm of obtaining the generalizing indicator value (in cost units) (I_g^c).

$$I_g^c = I_g^{nat} \times N_c^{1g(nat)}, \quad \textbf{(30)}$$

where: $N_c^{1g(nat)}$ - the estimation normative (price, tariff) of a unit of the generalizing indicator value;

c) algorithm to obtain the size of the final balance of each resource (in natural-*nat* expression or in cost-*c* units):

$$B_{fk}^{nat\,(c)} = B_{ik}^{nat\,(c)} + I_k^{nat\,(c)} - E_k^{nat\,(c)}, \quad \textbf{(31)}$$

where: $B_{fk}^{nat\,(c)}$- size of the final balance (f) of each resource k in natural expression- *nat* or cost-c; $B_{ik}^{nat(c)}$ –size of the initial balance (i) of the same resource k (in natural-*nat* expression or cost-c); $I_k^{nat(c)}$- total size of hauling time entrances of resource k during a period of time in natural - *nat* or cost-c expression); $E_k^{nat(c)}$- size of the total hauling time of the k resource outputs (during the same period and its inputs in natural expression - *nat* or cost-c).

2.4.3.5 Algorithmic of Operative Control and Analysis

In the frame of operative control function and operative analysis, mathematical resources are presented by the following two varieties of algorithms [1, 412;7, 238-329]:

1) algorithms to verify the degree of performance of the foreseeing tasks or compliance of established rates:

a) in natural units (*nat*) or cost units (c):

$$\pm \Delta I_{nat(c)} = I^{f(n)}nat(c) - I^{fc}nat(c); \quad \textbf{(32)}$$

where: $\pm \Delta I_{nat(c)}$- the size of the deviation between the foreseeing indicator values (I^f) or normalized ($I^n{}_{nat(c)}$) indicators and de facto indicator ($I^{fc}{}_{nat(c)}$);

b) in relative units (in percentages):

$$\Delta I^{rel} = (I^{f(n)}nat(c) \div I^{fc}nat(c)) \times 100; \quad \textbf{(33)}$$

2) algorithms to calculate the influence on the general deviation value:

a) of each factor:

$$\Delta D_{ji} = f^{ij} \times d_i, \quad \textbf{(34)}$$

where: ΔD_{ji}- the size of the influence of factor j on the size of the deviation i; di – the general size of the deviation i; f^{ij}– the weighting of the factor j influence on the deviation i value;

b) of all factors:

$$\Delta D_i = \sum_{j=1}^{m} \Delta D_{ij}, \quad \textbf{(35)}$$

c) verifying the correctness and completeness of the calculation of the general size of the influence of all factors on the total volume of deviation:

$$\Delta D_i - d_i = 0. \quad \textbf{(36)}$$

The completion of this function issue solving ends the informational cycle of the operative foreseeing and conducting sub-system of economic material activities. Next, within the same sub-system, passing the decision-making, which constitute the content of the operative regulation (correction) function.

The latter refers not only to material activities, but also to informational ones, the first (material) being carried out directly within the technological environment, and the second (informational) – in the environment of the operative management sub-system. Operative informational regulation its reducing to revising of the values of the indicators of tasks, resources needs and correcting the calendar rates of forecasting of material processes functioning.

Finally, it can be concluded that precedent of material activities economic informative issues, prior to material activities, disposing rather extensive and essentially varied of algorithmic entourage. The fact that it is insufficiently carried out in the daily practice the informatic activities is explained by the lack of scientific approach, as a result of the lack of knowledge of the laws nature of organization, structuring, processing and use of economic informational units and existing descriptive and transformative capacities of the algorithmic economic informational issues.

In-depth mastery of the conceptual aspect of the algorithmic sub-systems that form the informative informational and decision-making basis of material activities of any nature, inclusively and of the economic order, contributes to the most rational organization and to the most efficiency results of their initiation and functioning, which consequently leads to the material and spiritual prosperity of society.

3 Conclusions

1. The primary study of the algorithms of informational sub-systems for informative purposes is motivated by their functional value, they constitute the link between the material department and the decision-making service of the integrated management process. Therefore, without obtaining and applying them, it is not possible to carry out this process and its components.
2. Each material activity, inclusive the economic, objective requires its precedence and succession of such sub-systems.
3. According to the performance logic, imposed by the sequence of operation, the previous ones include the sub-systems of settlement, settlement and foreseeing, and the succeeding ones – the evidence sub-systems (primary, operative, accounting, statistics).
4. In turn, the sub-systems consist of issue complexes, and the latter–of separate issues.
5. The presented order justifies the sequence of highlighting, systematizing, elaboration and using previously elucidated sub-systems algorithmic.
6. Starting from the findings so far, and on the basis of the imperative conditioning of some issues with others, first the algorithms of constructive and technological applicability are elaborated and used, then – the primary and generalizing rates algorithms, and finally – the algorithms of the prognostic, current and operative planning.
7. After their construction, the algorithms of rate-setting and settlement issues are simple, it refers to a technological or constructive unit, are solved by resources (material, temporal, financial), the results being expressed in absolute units (natural and value).
8. Content and predestination of the current foreseeing are the basis for specifying its issues in those of optimization (planning tasks and resources necessary to carry out these tasks), as well as linear planning. The first ones are achieved by applying the algorithms of economic-mathematical methods, the second ones – the algorithms of direct calculation.
9. Essential difference of the sub-system of foreseeing and operative management is the full realization of the information cycle of the unitary managerial system. Therefore, first of all, the issues of calculating the calendar rate-settings for the functioning of material processes are solved, based on activities tasks issues, resources need, financial results, accounting, control and analysis.
10. This ordinance confirms the sequence of elaboration in interconnection and using in interaction of algorithmic of the operative foreseeing and management sub-system.

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