ISSN 2712-0562
Sustainable Engineering and Innovation
Original Research
Vol. 5, No. 2, December 2023, pp.303-314
https://doi.org/10.37868/sei.vi.id235

Informational aspect of the process of functioning of unitary integrated informatics systems

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Received Oct. 23, 2023
Revised Dec. 26, 2023
Accepted Dec. 30, 2023

Abstract

The relevance of the subject under study is determined by the considerable spread of information technology in all spheres of modern life and the impact of informatics systems on society. The purpose of this study was to investigate the essence and resource of the integrated unitary management process, which formulates and reveals the concept of integrated unitary management process, its specified content, categories of resources, their interrelation, differentiation from the informative side of the functioning of this process, the sequence of integration of its elements. The conceptual essence and resources of the unitary management process are revealed. The hierarchy, ranks and conceptual value of the material-information processes of the management system objects are highlighted and characterized. In this study, results were obtained indicating that conceptually, an integrated unitary management system, compared to the existing discrete management system, is characterized by a range of key indicators. Specifically, all categories of human activity (material, informational: informative (situational, cognitive) and decisional) through their direct interrelations and interactions are realized as a unified whole. At the level of organization, the system is completed in the form of a material and informational core. Regardless of the dimensionality of the spatiotemporal rays of the system, the superiority of the managerial rank, the influence potential over any managed element has the same intensity as at the primary level. The functioning management system is an analog action that works in real-time in accordance with the decisional values of which the evolution of the managed subject automatically changes.

Keywords: Information aspect, Process, Unitary integrated management system, Hierarchy, Material-information activities

1. Introduction

In the recent decades, the decisive influence of the information actions on the results of the material activities is manifested even more pronounced and visible. Such progressive influence shall be stated at any level of management for any time mode and regime for the operation of the managed object or process. Thus, the situations are now increasingly highlighted, when predominantly, if not totally, the obtaining of material

performances is motivated by the managerial capabilities of the subject, predetermined by the processed information qualities. Therefore, the success of the prosperity of society should be found in the information domain. Same time, for most material processes (fabrication, distribution (commercialization), consumption) it is the spatial and temporal isolation between the subject and the subject matter of management, and their operation is discrete and not continuous.

Based on those considerations, the content of the article is structured in the following three compartments:

Compartment I – Essence and resources of the integrated unitary management process, in which the concept of integrated unitary management process (system) is formulated and disclosed, its predetermined content, the categories of resources, their interconnection, delineation with the informative aspect of this process operation, the sequence of the integration of its elements.

Compartment II – Hierarchy, ranks, and the conceptual value of the information processes in the integrated unitary management system – contains the composition and hierarchical structure of the integrated unitary management system. As this system comprises both areas (material, information) of activities of the general management process, it was inevitably sought to determine not only the levels of management, objects managed within each level, but also the management systems on each level.

Next, the conceptual approach demonstrates and characterizes the indicative proportion between the information and material processes of each level, object, and category of managerial objects. Such structuring and delimitations demonstrate the need to increase the value of material technological information and social predestination and establish the sequence and arrangement of the components of the elucidated process.

Compartment III – Information content of the implementation of the integrated unitary management process – discloses compartments (material, information, informational sides (informative, decision-making), stages and actions of that process operation, the succession and interaction of their achievement.

Because the economic management process meets all the characteristics of many managerial systems, spatial distanced and discrete functional character, it was considered justified to elucidate the content of this article based on this domain.

2. Essence and conceptual composition of the integrated management process

Aiming the adequate clarity of the present work content, it is necessary to concretize the integrated unit management process (system) definition. Such a system (process) includes and provides the unit integration of all its components into space and time – material (informative and decisional).

This system operates in real-time mode, if, with the start of the evolution of the material object (process), the values of the situational (informative) information units are automatically obtained, and in the same regime these values are analyzed, and based on the analysis – formulated and physical (material) fulfilled the decisional units [1], [2], [3]. In such systems, the evolution of technical, technological, and social parameters at any time is directly influenced by the values of information entities, regardless of the spatial and temporal rays' dimensions of the managed object (process). To achieve this objective, it is first required to ensure that the automatic transition from the subject's management system (manual) to technical (automatic) information processing effectuation is first required.

Moreover, the progress of other informatics resources, especially technical and programmed resources, increasingly forces their application domain towards a study and realization of it as decisively as possible. At the same time, the role of informational resources in ensuring the functioning of material activities is becoming more noticeable. It is not excluded that at some stage they will become decisive in the process of the immediate evolution of each material component of the unitary management process.

At present, however, a premeditated attitude towards the functional value of information resources is observed, motivated by subjective and objective intentions. The first motivation is caused by knowingly falsifying the values of information units by increasing or diminishing them, in order to obtain certain material or social advantages. Introducing the managerial informatics integrated system into the daily information activity, conditions are created for the permanent and full elimination of such passion, as the subject will be excluded from the information process, only the tracking function of the possible undesirable extreme trends of the evolution of the managed object (process). Mystification, in the sense of increasing or diminishing managerial information values, is also justified by objective factors, including the unstoppable rapid information volume increase and the exerted works, the composition complexity, and the structural variety, which leads to increasing difficulties in both investigations and practical processing.

Those motivations, technical, and social problems explain the discord between the levels of perfection of the various informatics resources. Thus, comparing the procedural performance of technical and programmed resources with the degree of investigation and practical preparation of information to exist and evolve in their environment, it can be found that the last substantial ones are lagging. Under such remains, insufficient research and the partial practical implementation of the information compartment of the integrated management process are envisaged [2], [4].

Thus, it is necessary to point out that the realization of the high-performance informatics of any kind of application (information or material) contributes not only to the operational progress of technics and technological processes but also deep knowledge and the exact application of information processing properties and methods. Only through the contest of these conditions, it is possible to properly and fully select its informatics resources, as well as to fully cover the material-information unit space.

Generalization of the above presented allows us to conclude that the achievement in space and time of the unitary management process is an objective, that will be achieved based on the integration of its evolutionary (functional and informatics) aspects through the automated technics and methods. After all, this process will solve most of the fabrication and provisioning problems with the material and spiritual goods of human society. For this primordial reason, it is necessary to study the information content of this process [1], [3], [5], [6], [7].

In this aspect it can be noted that management cannot operate without the following two resource categories:

1) Information resources, through its content the management actions are carried out. The preservation and observance of their functional meaning are imposed not only by the management process but also by the data transformation (processing);
2) The material resources are needed both for the processing of information (information processes physical side) and for the integrated management process implementation. Therefore, the physical representation has had, not only the material processes but also the information processes (carrier, technical information tools, technological documentation, etc.).

Graphical interpretation of the conceptual interconnections between both categories of resources in the integrated unit management process is schematically presented in Fig. 1. The analytical interpretation of the interconnections in Fig.1 is presented by the following formula:

$$(U.I.M.P.(M.O.(M.A.\ V\ I_{v}.^{pr.})(m_{e1}\ V\ I_{v1}{}^{+pr}, m_{e2}\ V\ I_{v2}{}^{+pr.}, \ldots, m_{en-1}\ V\ I_{vn-1}{}^{+pr.}, m_{en}\ V\ I_{vn}{}^{+pr.}))) \ V\ O.M.S.$$
$$(M.C., I_{l.}\ C.\ (I_{l.}\ A.(\ I_{v1}{}^{+pr.}\ V\ m_{e1}\ V\ \ I^{-}{}_{d1} \longrightarrow m_{e1}, I_{v2}{}^{+pr.}\ V\ m_{e2} V\ \ I^{-}{}_{d2} \longrightarrow$$
$$m_{e2}, \ldots, I_{vq-1}{}^{+pr.}\ V\ m_{en-1} V\ \ I^{-}{}_{dk-1} \longrightarrow m_{en-1}, \ I_{l.}\ A.(I_{vq}{}^{+pr.}\ V\ m_{en}\ V\ \ I^{-}{}_{dk} \longrightarrow m_{en})))) \quad (1)$$

In Fig. 1 and in analytical Formula 1 are admitted the next significances: O.M.S. – object management system, M.O. – managed object, $I_{l.}$ A. – informational activities, M.A. – material activities, $I_{l.}$ C. – information compartment of O.M.S., M.C. – material compartment of O.M.S., me1, …, men– material elements of M.O., $I_{v1}{}^{+pr.}$ ($i_{v1}{}^{+pr.}$), …, $I_{vn}{}^{+pr.}$ ($i_{vr}{}^{+pr.}$) – obtained within the framework of M.O. primary informative elements (“raw

material" processed by O.M.S.), but belonged to O.M.); "+" means the "entry in O.M.S."; m_{e1}, …, m_{eq} – material elements of O.M.S.; I_{d1}^{-}. (i_{d1}^{-}.), …, I_{dk}^{-}. (i_{dk}^{-}) – obtained result of the processing and analysis of the primary or derivate values of $I_{v1}^{+pr.}$ ($i_{v1}^{+pr.}$), …, $I_{vn}^{+pr.}$ ($i_{vr}^{+pr.}$) decisions (managerial) information elements, " – " means "the exited from O.M.S."; ⟶ the influence of the O.M.S. decisional elements (I_{d1}^{-}. (i_{d1}^{-}.), …, I_{dk}^{-}. (i_{dk}^{-})) concerning the material elements of M.O. (m_{e1}, …, m_{en}); ∈ – including operator; ↜⇝, ↜⇝ – interconnections and interactions between the material elements of O.M.S. and M.O. at the same management level, V – conjunctional operation (procedure).

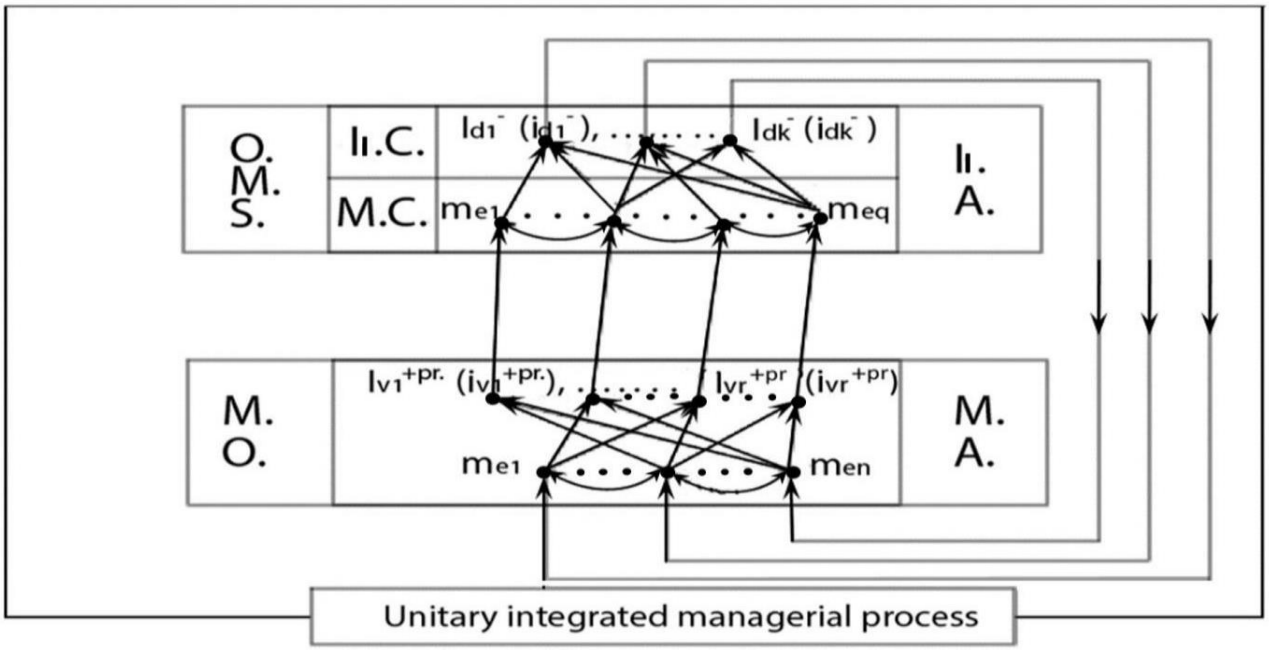

Figure 1. Conceptual interconnections and interactions between the material and information resources of the integrated unitary management process

From Figure 1 and Formula 1, it is obvious that the interconnection and the organic unit of the O.M.S. and the managed object (M.O.) within the managerial process takes place thanks to certain information flows, which infiltrate all the material elements. For this reason, it is often difficult to accurately distinguish the material from the informational processes, as they occur in O.M.S. and M.O. However, the study and informational analysis of the managerial process provokes such a necessity and that is why it requires that such processes be identified, starting from their specificity.

3. The hierarchy, ranks, and conceptual value of the material and information processes in the unitary integrated management system

In order to ensure genuine information communication between different levels of management of the above-nominated system, and the objects (processes) of each, it is appropriate to highlight and clarify their composition and ranks. Next, based on the connections between the given units, their information models are developed, and the connections between them shall be determined, finally establishing the full information model (aspect) of the management system [1], [3], [6], [7], [8]. Figure 2 schematically presents the maximum possible sequence of the string management systems with the varieties of their objects.

The analytical interpretation in Fig. 2 is presented by Formula 2:

$$(X(M.S.Ne.VNe.)\epsilon\ IX(M.S.Ne.BcVBc.Ne.)\epsilon\ VIII(M.S.Id.Bc.VId.Bc.)\ \epsilon VII(\ M.S.SBc.VSBc.)$$

$$\epsilon\ VI(M.S.As.VAs.)\ \epsilon\ V(M.S.Er.VEr.)\ \epsilon\ (IVSc.\ \epsilon\ III\ St.\ \epsilon\ IIBr.\ \epsilon\ IJb.)))) \quad (2)$$

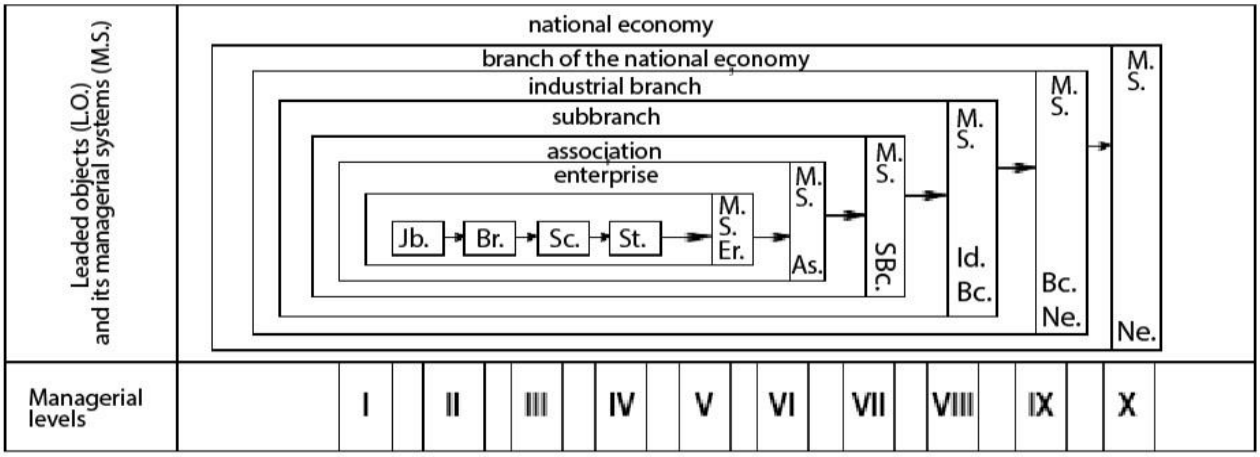

Figure 2. Conceptual subordinate succession of managed objects and their management systems (referred to industrial domain of the national economy)

In Fig. 2 and Formula 2 are elaborated and applied the following significations: I – X meaning the managerial levels, ∈ – including operator, V – conjunctional operation (procedure), Ne. – national economy, Bc.Ne. – branch of national economy, Ib.Bc. – industrial branch, SBc – subbranch, As. – association, Er. – enterprise, Sc. – section, St. – sector, Br. – brigade, Jb. – job; M.S.Ne. – managerial system of national economy, M.S.Bc.Ne. – managerial system of branch of national economy, M.S.Id.Bc. – managerial system of industrial branch, M.S.SBc. – managerial system of subbranch, M.S.As. – managerial system of association, M.S.Er. – managerial system of enterprise.

Figure 2 and Formula 2 show that some of the material objects (Jb., Br., Sc., St.) do not have their management systems, physically organized and highlighted. Such a situation is conditioned by the dimensions, variety of composition, and complexity of the structure, their predominantly material (technological) interdependence, and only then – organizational – informational, derived from the properties of the processes and materials of objects. The objects in question are predominantly material content, whereas the undertaking is more socially involved. Therefore, material processes are limited by certain regulations and regulations of internal order, not having management bodies.

Therefore, the social management system is formed by the enterprise (M.S.Er.), considered as an organizational-physical border of material activities. In some cases, such a category can be production associations (As.), but mostly they are organized in the form of an ensemble of enterprises, spatially scraped, specialized by material functions, and with various activity regimes, but oriented, coordinated, and united by achieving a common purpose. Other objects (managerial levels VII-X) are purely organizational, as they only contribute to the realization of connections and actions between the objects of levels I-VI, as well as to the handling of their bulky and varied resources, but all they take place on the account of information activities.

Decisional information is formed and used at all management levels. Depending on the presentation form, the operativity of obtaining and responding to the managed object (M.O.), information is considered to be the regulation. They are inherent for objects of lower management levels (Jb, Br, Sc, St) which are predominantly presented orally and are documented only in small volume. Compared to management, the adjustment consists in the fact that regardless of its informational basis of achievement, no immediate documentation is required at these levels. The scheme of the information process in Fig. 2. is elaborated for such a unit, as the enterprise, which handles not only material processes but also the informational. It is characterized by the massive operation of material processes, where most resources are practically consumed. At the same time, resource consumption for carrying out information activities remains insignificant [1], [3], [6], [8].

Compared to the aforementioned, higher levels of management, as a rule, are concerned with informational product fabrication. They correlate with purely organizational objects (imaginable), which as monolithic

material (physical) integrity do not exist, such as, for example, various associations, companies, subbranches, and branches of the national economy. Any organizational object is presented in the form of totally interconnected and interacted material objects for certain finished products or to perform certain material or spiritual activities. Therefore, also the enterprise is a set of production subdivisions, which can be interpreted as objects managed by their bodies of the managed levels. In connection with this, the following regularity could be formulated: as higher the managerial level (the object is placed above in the subordination hierarchy) is, the more considerable the volume of the information activities, and for some levels constituting the integral content of their operation. And vice versa, the lower this level is, the more considerable are the material processes, and the information ones – much lower [9], [10].

Such regularity requires the classification of the economically managed objects in organizational-material and organizational-informational. Such distinction contributes to the correct determination of the primordial importance of the managed objects operating, in order to continue to be deeply studied and perfected. Conventionally, the class of organizational-material objects includes the enterprise (organization) with all its subdivisions (sectors, sections, brigades, jobs). This does not, however, mean that there are no organizational works in the listed objects, without them the object cannot operate.

Their specificity is that they massively manipulate material objects and processes and insignificant – informational ones. Their existence and evolution are conditional on the realization of the organizational activities. The maximum possible composition of the managerial levels and their belongings to industry, as well as the conceptual ratio (proportion) between the material and information processes that take place within them conventionally are shown in Fig. 3.

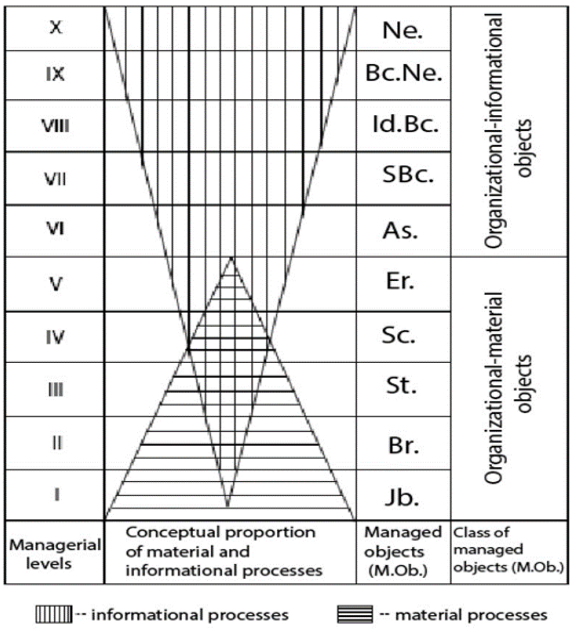

Figure 3. Conceptual proportion of material and information processes at the managerial economic levels

The scheme in Fig. 3 is also presented by the following similar analytical formula:

$$(\boldsymbol{O}.\boldsymbol{Rs}. \in O.Il.\boldsymbol{O}.\boldsymbol{C}.(Il.\ A.(X\ Ne.,\ IX\ Bc.Ne.,\ VIII\ Id.Bc..,\ VII\ SBc.),\ O.Rm. \in O.M.O.\ C.\ (VIAs.))),$$
$$(M.A. \cup Il.A.^{min}(VEr.,IVSc.,IIISt.,IIBr.))),Rinf.O.(Am(IJb.)))) \quad (3)$$

In the scheme and formula are applied the following significations: O.Rs. – superior managerial rank objects, O.Rm. – middle managerial rank objects, O.Rinf – inferior managerial rank objects; M.A. – material activities, Il.A. – informational activities, I-X – managerial levels, M.O. – managed objects: Jb. – job, Br. – brigade, St. – sector, Sc. – section, Er. – enterprise, As. – association, SBc. – subbranch of the national economy, Id.Bc. – industrial branch, Bc.Ne. – branch of the national economy, Ne. – national economy, ∪ – conjunction, ∈ – including operation (procedure).

The superior rank consists of the VII-X managerial levels objects (SBc.,Id.Bc., Bc.Ne., Ne.). The average rank includes objects of the II-VI managerial levels. Finally, the inferior rank is considered the biophysical systems which include the primary managerial level objects – jobs => [worker + equipment]. As observed from the scheme (Fig. 3) and its analogous analytical Formula 3, starting with the level of the production association (As.) and finalizing with the national economy (Ne.) level, exclusively take place only the informational processes. Certainly, here there are effectuated and material processes, but they are motivated not by the material goods production, but the information products fabrication – informative and decisional.

Depending on size, potential, compositional variety, and structural complexity, objects presented in this scheme can also be classified by ranks [11], [12]. Three ranks are frequently distinguished. The higher order is considered the rank of social-political and macro-economic objects. This rank includes level VI-X objects. Conventional the managing bodies of the objects of levels I-V are considered located in the same space as material processes and physically form a unitary complex of material-informational order. For other levels, it is characteristic of the essential territorial and temporal gap between material and informational activities. For this reason, only purely organizational object management systems (bodies) are found physical at levels VI-X and indirect administration of the previous (I-V) levels of material objects.

4. Realization of the integrated management process information content

From the positions of information realization, the following three steps (Fig. 4) are highlighted in the composition of the integrated unitary management process [7], [13].

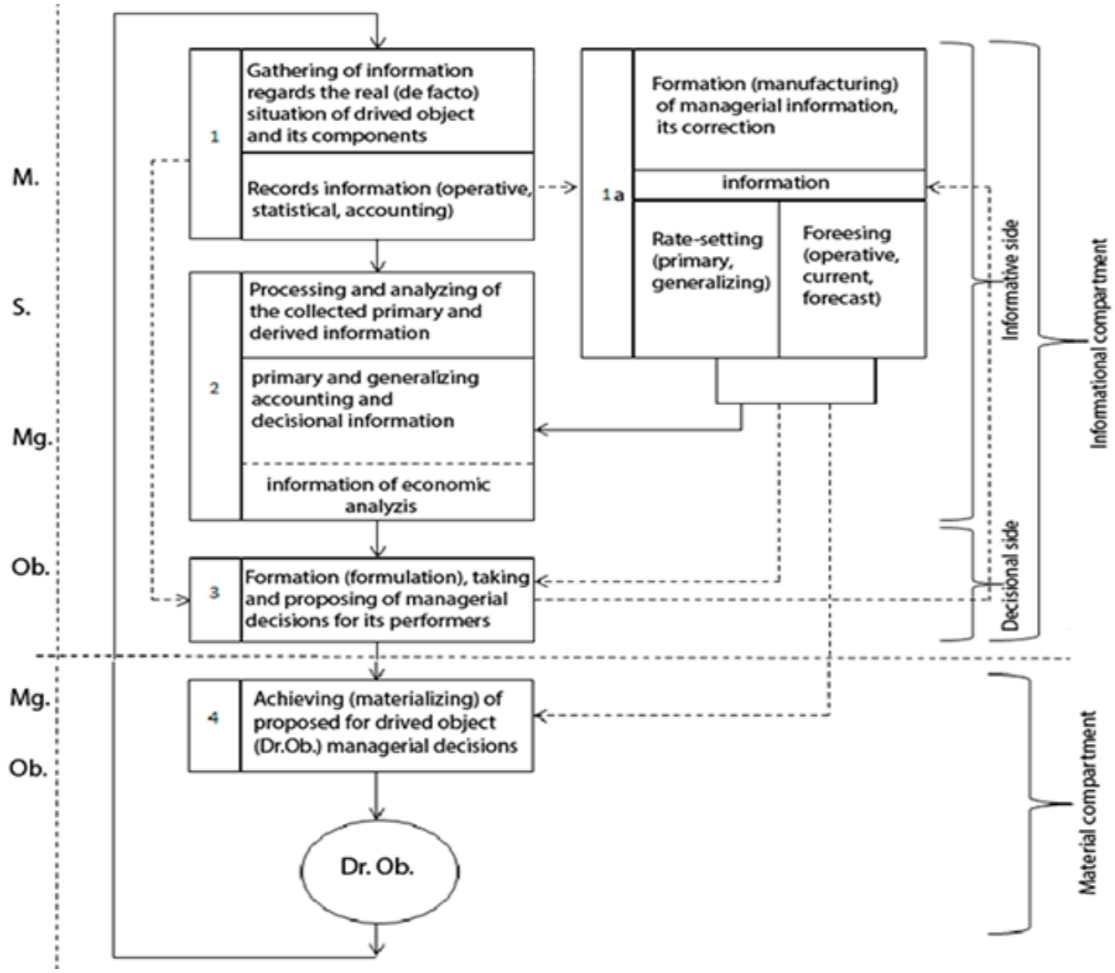

Figure 4. Conceptual realization of the informational side of the unitary integrated managerial process: → – permanent connections; -------► – periodic, occasional, unregulated connections; --------- – separation lines; M.S.Mg.Ob. – managerial system of managed object; Mg.Ob. – managed object, Iv.Sd. – informative side; Dl. Sd. – decisional side; Il. Ct. – informational compartment; Ml. Ct. – material compartment

According to the scheme in Fig. 4, the information content of the integrated unitary management process shall take place in the following order. First, the procedures and operations of Stages 1 or 1a shall be fulfilled. Their splitting into two stages is motivated by the need to make (specify) information on the basis of time training and correlation periods with the management process.

Thus, depending on when the managed objects (Mg.Ob.) operation started, various information could be formed. If the object for the first time starts the activity or after the operation period expiry, primary managerial information is formed (Stage 1a.). If the object is already operating, initially is obtained the primary information which reflects the de facto situation, part of it is involved in the decisional information formation processes [7], [9].

Since in terms of performance accuracy, essentially dispersed spatial and temporal managerial activities have probabilistic character, at each period of their realization, it is necessary objective to obtain information on the real situation of the managed object and its components. For this reason, after the completion within the prescribed period of the works contained in the decision, at the exit of the managed object, it is mandatory to request the extraction of information reflecting the actual situation, which constitutes Stage 1 content.

Further on, the values of this information are processed jointly with the information in block 1a (Stage 2) and so on, thus the information-material process is repeated. The values of this information are processed in common with the information in block 1a (Stage II) and so on, so the informational-material process is repeated. The number of iterations depends on the composition and periods of the managerial actions [1], [3], [4], [6], [7].

Thus, the informative aspect of the management process can be achieved in various ways, depending on the managed objects (Mg.Ob.) operational stage. If this object is just put into exploitation (will be operated the first time), the realization chain of the given process may be as follows: 1a → 4, i.e. suddenly and from the outset, decisional information is formed, based on these values it is operated the Mg.Ob.

After completion of the first and other cycles of Mg.Ob. operation, such a chain is realized in variants: (1 + 1a) → 2 → 3 ≡ (1 + 1a → 3) → 4 ≡ (3 → 1a) (<< ≡≡≡ means the performance of simultaneous processing).

From the scheme, it is obvious that the management systems information compartment encompasses the activities of Stages 1(1a) ÷ 3, and the material compartment – the activities of Stage 4. The first important compartment is the distinction of two categories of basic information – reflection (descriptive, informative, or situational) and managerial (decisional). It specifies the information side and decisional side of the unitary management process.

It should be noted that the information products obtained at Stage 1a have a dual role in the integrated management process. Thus, in order to initiate the operation of the managed object Mg.Ob., it is necessary to preliminary prepare decisional information, since the respective activities are organized based on their values.

If one or more operations have elapsed during the process evolution, such information is telling. In this respect, certain decisions can be formulated by joint processing with other information and derivate information values obtained or the values of such information could be modified only based on the analysis.

In the case of such situations detection, in which Mg. Ob. evolve within the limits (rules, tasks) established (without deviations), this information has a managerial role, as it contributes to the achievement of the static (organizational) situation of the management process. The same role is performed by the given information when Mg. Ob. is only put into operation [14]. The decisional information that achieves the dynamics of the management process is formed at Stage 3. Reflective information provides knowledge of Mg.Ob. "behavior" (in the past, future, limit (norm)), which is formed separately during its periods of operation. Each of such information (de facto, forecast, normative, regulatory), taken in particular, has informative (descriptive) character, and based only on one of them in particular, the decision cannot be made, the formulation of the last one is possible by common processing the values of this information. Therefore, such information is formed at Stages 1(1a) – 2, and those managerial – at Stage 3 [10], [15].

The analytical interpretation of the given scheme is presented based on the following analogous formula:

$$(U.I.Mg.P.(Mg.S.Ob.(I_l.C.(Iv.SC.((1\text{-}K.R.S.Ob.It.(Ev.It.(Op.,Bc.,St.)) \equiv 1a - Fr.(Cr.\ M_l.It.(Rs(Pm.,Gz.),.St.(Ad.,Th.,Cs.),Fs.(Op.,Cu.,Pn.)) \longrightarrow 2 - Pc.,Az.\ .It.^{pm.,dv}\cdot(It.^{pm.,dv}\cdot(A_l.\ It.))),D_l.SC.(3 - Fr.,Tk.,Of.Dz.Ex.) \longleftarrow (1+1a))) \longrightarrow M.C.(Mg.Ob.(4 - Ac.Dz.Mg.Ob.) \longleftarrow (1a),Mg.Ob. \longrightarrow 1)))) \quad (4)$$

The following meanings and identifiers are developed and used in the formula: U.I.Mg.P. – unitary integrated management process, Mg.S.Ob. – object management system, I_l.C. – informational compartment, Iv.SC. – informative subcompartment, 1 – K.R.S.Ob.It.(Ev.It.(Op., Bc., St.)) – Stage 1 of the operation initiation (M.O.) regarding the real situation (R.S.) of the managed object (Ob.) information (It.).

As a result of this stage are obtained: a) the informational products Ev.It.(Op.,Bc., St.) operative (Op.), book-keeping (Bc.) and statistical (St.) evidence (Ev.), b) where it is only intended to organize and operate the Mg.Ob., fulfilling the Stage 1a, within this framework took place the Fr.(Cr. M_l.It.(Rs.St.(Pm.,Gz.), Fs.(Op.,Cu., Fc.) activities – formation (formulation) (Fr.) and correction (Cr.) of the managerial information (M_l.It.).

At the end of these activities are obtained the information products Rs., St.(Pm.,Gz.), Fs.(Op.,Cu., Fc.) of primary (Pm) and generalizing (Gz.) rate-setting (Rs.), administrative (Ad.), technological (Th.), constructive (Cs.) settlement (St.), as well as operative (Op.), current (Cu.) and prognostication (Pn.) foreseeing (Fs.) informational products. Since in both cases, but in each individual, i.e. in one case or another, on the basis of the respective information products, starts the activity of Mg.Ob., according to its role, Stage 1a is considered the same value as stage (≡) and is therefore numbered 1a.

At Stage 2 took place of the works: Pc.,Az. $It.^{pm.,dv.}(It.^{pm.,dv.}(A_l.\ It.)$ – processing (Pc.), analyzing (Az.) obtained within the 1 and 1a stages primary, derived informational values ($It.^{pm.,dv}$). The second processing variant (common) contributes to obtaining the informational analysis products (A_l.It.).

With the completion of Stage 2, the information subcompartment (SC) is completed (Iv.SC.), and on the basis of its informational products it is starting the operation of the decisional subcompartment (D_l.SC.) of the informational compartment (I_l.C.) of M.S.Ob. In the environment of this subcompartment, at Stage 3, took place the processes Fr., Tk.,Of., Dz., Ex. – formation (formulation) (Fr.), taking (Tk.) and offering (Of.) the managerial decisions (Dz.), according to which their executors will subsequently operate (Ex.). The values Dz. are obtained by common processing of the informational units of Stages 1 and 1a (1+1a).

With the completion of Step 3, conditions for the material compartment (M.C.), which physical is presented of the managed object (Mg.Ob.). Within this object, Stage 4 takes place the realization (materialization) (Ac.) of the offered by Mg.Ob. decisions (Dz.), which can occur according to the values of the information products of Stage 3 and Stage 1a.

After completion of Stage 4, in the material environment of Mg.Ob., again gathered information of its de facto situation, which is once more processed within Stage 1 (Mg.Ob. → 1), a.s.o., thus being permanently repeated the realization of U.I.Mg.S. of all material – informational processes.

Therefore, on the basis of compartment 3, it can be confirmed that in the conceptual aspect the integrated unitary management system, compared to the existing discrete management system, is characterized by the following essential performances [9], [10]:

a) all categories of human activities: (material, informational: informative (situational) and decisional), through their direct interconnections and interactions, are performed in the form of a whole;
b) on an organizational level, the completion of system operation is produced in the form of a material-information nucleus;

c) regardless of the dimensions of the spatial and temporal rays of the system, the superiority of the management rank, the potential of influence over any managed element is of the same intensity, which also at the primary level (job);
d) the managerial system is of analogous action, operates in real-time mode, thus ensuring the starting of material processes, and the initiating adequate informational processes, according to the decisional values of which automatically alter the evolution of the managed subject (process).

5. Conclusions

Examination and analysis of the predestination, place, role, and order of the process realization of the integrated unitary management system in the information aspect led to the following conclusions:

1) the process has decisive value in achieving a higher level of material prosperity;
2) the field of material activities (fabrication, distribution (commercialization), consumption) are two categories of management – technological and organizational;
3) extensive spatial dispersion of the territorial location of material objects (processes) and the operation in significantly various temporal regimes of their management systems constitute the eloquent causes of insufficient theoretical founding and practical realization of the integrated unitary management system;
4) such a process, by its operation, realized in the integrated material-informational nucleus form, removes the organizational, structural, and operational discord of the existing discreet management process;
5) the progress of material activities is and will be predetermined by the performance of information processes. Therefore, functionally, regardless of the dimensions of space and temporal rays, the globalization of material processes occurs and will be constantly produced through the globalization of information processes;
6) the unitary management process and system compositionally consists of material and informational compartments and the last one – of informative and decisional sub-compartments;
7) elaboration and operation of the given process and system calls for the primary determination of its components succession of integration within each level of management and between these levels;
8) indifferent to the spatial dispersion degree size and the discontinuity level of object's temporal operation, processes within the integrated unitary managerial system, which will ensure their evolution in continuous real-time mode.

Since situational information derives from material objects or activities and forms the basis for the formation of decisional products, it is necessary to primarily investigate the role and informative content of the integrated unitary management process. This approach justifies the present investigations with the following results:

1) the categories of resources that ensure the functionality of the management process are determined, contributing to the monolithic approach of the management process;
2) the scheme and analytical formula of the conceptual interconnections and interactions of these resources in the integrated management process are elaborated and characterized, which allows for the interpretation and achievement of this process adequately;
3) the scheme and analytical formula of the conceptual subordinate succession of the managed objects and their management systems in the unitary management system are elaborated and elucidated, which provides the possibility to highlight and achieve interconnections, and information interactions between them;
4) the classification of objects managed in organizational materials, organizational-informational, and on ranks is founded and effectuated, establishing the character, role, and peculiarities of the activities carried out in these objects;
5) the elaborated and examined scheme and analytical formula of the maximum possible composition of the managerial levels and their corresponding objects, the conceptual ratio of the material and information

processes of the levels, which allows determining the domain, intensity, and specificity of the primordial implementation of informatics tools;

6) the scheme and analytical formula of the functioning of the information compartment of the integrated unitary management process are elaborated and analyzed;
7) the proposed and disclosed block interaction paths of the informational compartment, graphically described in Fig. 4 and analytically described in Formula 4.

Declaration of competing interest

The authors declare that they have no known financial or non-financial competing interests in any material discussed in this paper.

Funding information

No funding was received from any financial organization to conduct this research.

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