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Reliable Networks for Sustainable Technological and Sanitary States in Oil Stations

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Abstract
The article shows that a reliable network for a system of oil distribution stations in which to act with reasonable certainty regarding the techno-medical-sanitary sustainability is characterized by the ex-existence and continuous action of corrective reverse loops (feedbacks). The authors describe the formalization of a reliable graph network for sustainable techno-medical-sanitary conditions in oil stations, as a concept of the application of artificial intelligence in the field. Research suggests that activity in the network of oil distribution stations may be characterized as non-polynomial nondeterministic. At the same time, recommendations are advanced regarding the use of supply sub-structures for oil products / micro-stations / micro-gas stations, complementary to the basic system / network of stations existing in any urban agglomeration.

Keywords: *reliable networks, hydrocarbons, oil distribution stations, compensatory multidirectionality*

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I. Introduction

In order to obtain a state of security regarding the medical / socio-sanitary effects from the activities of distribution of petroleum products, we appreciate and propose the formalization of a "network of trust / trust in networks" of distribution stations.
Such a conception is an early part of the application of artificial intelligence in the field.

We need certainties that can be at least "reasonable" in terms of affecting the health of human resources in the infrastructure network researched for an urban agglomeration (the case of urban agglomerations in Romania).

Adequacy of resources, more accurate knowledge of the aggregate performance to be achieved, balance and quasi-perceptual compatibility between "hardware" and "software", - these are elements of primary foundation, incipient of formalizing the trust network, a network equipped with "confidence" in the existence and sustainable operation of oil distribution stations.

In mathematical science, such a network, applicatively found for techno-medical-sanitary sustainability trust in oil distribution stations is of *the Bayesian type.*

This categorization, cataloging is mainly due to the influences given by diagrams (programs), or by the causes, causalities arising from operational diagrams proposed and recognized in advance, *de facto.*

II. Research Methodology

When distribution programs provide reasons, reasonable evidence, accepted, assumed, regarding a level of performance that can be achieved in combating techno-medical and socio-sanitary disturbances in the field, it is probably reasonable that, based on direct decisions, firmly taken, to arrive at *forecasts, quasi-measured, relative forecasts, adequately known for safety*.

Along with this new concept, it is probably appropriate to work with *expert systems.*

However, they do not prove potentially as acceptable regarding the notification of the actual uncertainties regarding the techno-medical, socio-sanitary effects in the field.

At the same time, being increasingly accepted the network formalizations in the engineering and socio-sanitary systems, related to mineral and energy fuel resources (such as hydrocarbons), once we introduce the

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thesis "network trust" / "network of / trust" , there is a need to build algorithms for research, evaluation (measurement) of the volume of intangibility (knowledge) circulating through the designed area.
On this basis, the support elements are formalized, to support the probabilistic modeling of the sustainable techno-medical-sanitary states, of sustainability in the respective networks.
Furthermore, data are provided to substantiate decisions for changes, adjustments, additions, eco-innovative transformations of technologies in oil distribution networks.

III. Formalization of a graphical trust network for sustainable techno-medical-sanitary conditions in oil stations

The difficulty of maintaining such a system stems from the lack of experience and casuistry for a given area.

In an urban agglomeration, according to our field study, we are dealing, in fact, with a techno-engineering and economic experiment of fuel distribution operated on real specific structures / infrastructures.

Diagnosis, in a general approach, prognosis, forecasting are strictly validated elements, especially in medicine, in medical science.

In such an approach, we appreciate that the conceptual-applicative and generalization boundaries of interdisciplinary can be identified with the help of trust networks, which can be found regarding the existence and sustainable operation of oil distribution stations.

A reliable network for a system of distribution stations for petroleum products in which it is possible to act with reasonable certainties regarding the techno-medical-sanitary sustainability, is characterized by the existence and continuous action of corrective reverse loops (*feedbacks*). (*fig.1.)*

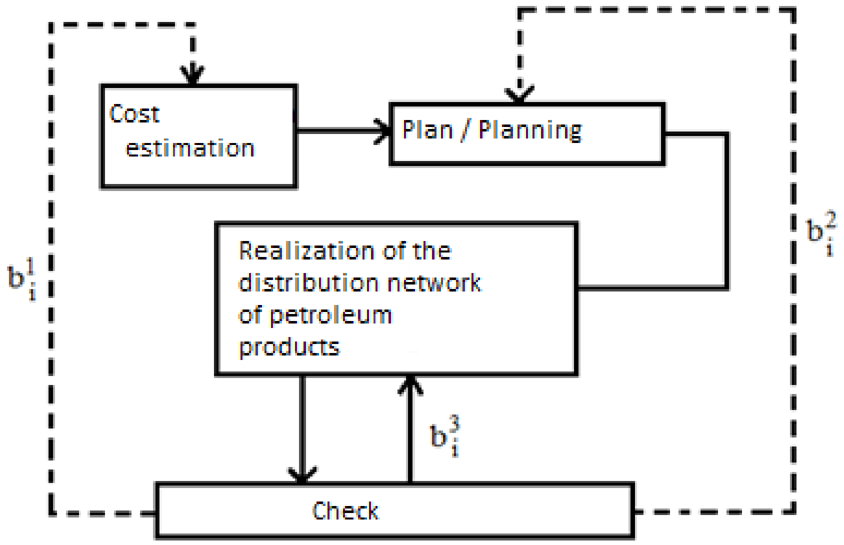

Fig. 1 The algorithm for setting up reliable networks for stations distribution of petroleum products
$b_i^1; b_i^2; b_i^3$ = inverse correction loops (*feed-backs*)
(Source: Author J.K, 2018)

The network, in the present research, means a graphical representation of an infrastructure in the environment through which are highlighted:
1) conditional / conditioned dependencies between oil distribution stations;
2) uncertainties of all types in the researched area;
3) the relationships between the variables in a set of factors in the field in question.
In fact, each node (petroleum products distribution station) is a “strong” variable of the model of the techno-medical-sanitary problem of sustainability in the field.
An oriented graph is an ordered pair of oil stations, which are finite and empty sets.
The elements of the graph are the oil stations, assimilated with nodes or peaks.
The elements of the ordered pairs of stations (nodes) are arcs.
A graph of oil stations is complete if any two peaks inside it are adjacent.
In the network of oil stations in any large urban agglomeration, we can talk about connectivity between stations.
The oriented graph in the researched area can be represented by means of an adjacency matrix.
To this is added a list of arches, lists of successors. [7]

A road matrix can be associated with a graph in the area if a square matrix of size n is formalized, with the elements 0 (zero) or 1 (start-finish).
In the representation graph, any arc between two nodes shows the relationship between the two stations, respectively the conditional / conditioned dependence between / between them.
We find that in an urban agglomeration, the network representation of oil distribution stations records flows: a) direct and b) acyclic, the latter, (b), being generated by the unpredictability of supply capacity / availability (endowment) real fuel.
In essence, *direct graph* highlighting refers to a *source node (station)* that induces influence in the next *sub-source node (station).*
The acyclicality of the graph shows that certain constraints, restrictions (for example, the shortage of octane fuels) do not allow the closure of a feasible cycle of "supply-distribution-consumption-a new supply".
Analytical immediately, we believe that the network trust / trust network is established and manifests itself when the graph has direct formalizing characteristics, not acyclic ones.
Usually, we notice that for such a network / networking, described above, a node (a station) can be *input* or *output*. [8]
The essential *input* is materialized by the supply of petroleum fuels, the *output* is defined by the "effective, applied distribution" of these fuels.
However, in the network, in some situations, a supply of compensation / compensation can be spent, taking over from the quantities of apparent “excess” from one station (output), relocating the respective quantities to another station (node), through input.
Therefore, it is useful to assume the concept of *input-output-input flexibility,* which has effects in flattening the sustainable techno-medical-sanitary impacts in the field (in the researched area).
We launch the thesis that we are dealing with a *compensatory multidirectionality*, which highlights successively or simultaneously: 1) the network diagnosis and 2) the specific decision / decisions.
Extending the assertions of this nature, we argue that if a network model is thus designed for the multitude of oil distribution stations in an urban agglomeration, the most difficult problem is that of *maintaining operationally*, to which is added the need to maintain the structure so designed. [3]
Of course, *maintenance* does not mean *non-intervention*, but the intrusion could be: a) pseudo-isolated, b) insular, c) quasi-adjusted.

IV. Conceptual consolidation of the trust network

A network, in the advanced conception through the present rows, can be:
1) unconnected (completely / quasi-completely isolated, independent) or
2) connected (incomplete / quasi-incomplete connected to other networks, one / more sources and clustered structures).
The case investigated by this paper refers to variant 2), respectively to the *connection situation / state (connected).*
Therefore, the type of *connected network,* as investigated in the present research, has "arcs" (arc segments), they are not independent, but advancing oriented from nodes (stations) to other nodes (stations). [5]
Also, the variables (quantities of diesel, gasoline, liquefied gas, salable products / consumables from stations, etc.) are dependent on each other throughout the network.
In fact, the variables are related to each other by "graph arcs" (graph "arcs").
We observe that such a network can even be acyclic, insofar as t*he permissibility of variable variability* is manifested.
At the same time, the connection can be: a) multi-connection or b) simple connection. (*fig. 2*)

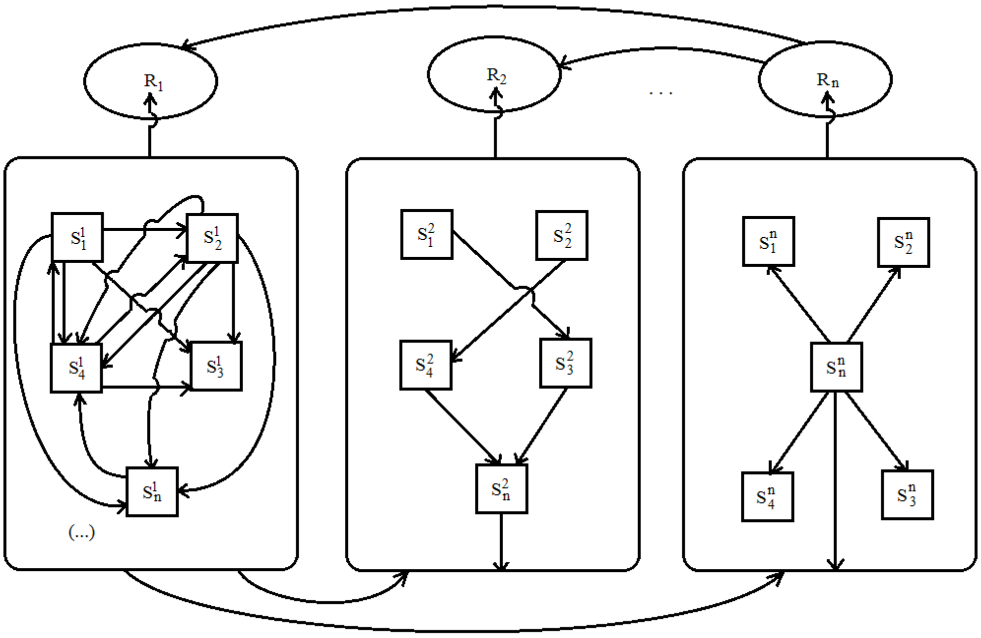

Fig. 2. Interconnections of oil distribution stations in urban areas
R_1, R_2, ...,R_n= networks of oil distribution stations,
$S_1^1, S_1^2, \dots, S_1^n, S_n^1, S_n^2, \dots, S_n^n$ = oil distribution stations.
(Source: Author J.K., 2018)

In the literature, [2], it is mentioned the development of trust in networks, respectively of trust networks.
They show that the variables in a network (nodes, quantities, qualities, etc.) can be found in "mutually exclusive" and / or, or "collectively exhaustive" situations.
Therefore, to complete our conception, in the case of examination / evaluation of the techno-medical-sanitary conditions of sustainability (sustainable) in the distribution stations of petroleum products with octane number, we launch, by extension, the idea of mutually exclusive approach composed with the collective exhaustive approach of variables / set of variables circulating in the respective network (including in the specific / related cluster). [4]
We note that conditional probabilities can be reduced numerically (quantitatively) for the variables in the network when dealing with *binary variables.*
A practical, effective conclusion is that if the network consists of as few (minimum) number of arcs / “arcs” of graph as possible, then the roads between / between nodes are maximized (distribution stations for petroleum products with octane number).
When we propose the restructuring or transformation of the network of stations, in the sense of their operationalization in order to ensure the sustainability of the techno-medical-sanitary conditions, we recommend the analysis (“look”) on the arches / arches preceding a node (a station).
In fact, transformative intervention is necessary / useful on them.
The final state of the network is met and assumed when a level of *conditional aggregate probability* of operation is identified / established in the spirit and practice of safety / sustainability.

V. Conclusions

- The scheme of algorithm for setting up trust networks for oil distribution stations proves to be relevant, as an applicative premise for defining the techno-medical-sanitary trust of sustainability, *Bayesian type*, considering that each node (oil station) is a “strong” variable of the model of the techno-medical-sanitary problem of sustainability in the field.
- The network representation of oil stations records direct and acyclic flows, the latter being determined by the uncertainties in the availability of fuel supply.
- The thesis on *compensatory multidirectionality* is launched, which successively or simultaneously highlights the network diagnosis and specific decisions, when the most difficult problem is the *maintenance of operations* in oil stations.
- It is appreciated, conclusively, that the network of stations can even be acyclic, insofar as the *permissibility of the variability* of the variables is manifested.

The final state of the network is met and assumed when a level of *conditional aggregate probability* of operation can be established in the spirit and practice of oil station sustainability.

- In this context, the original concept regarding the temporal linearization of "what circulates quantitatively and qualitatively through the fuel distribution stations" is launched.
- Research suggests that the activity in the network of distribution stations for trolley products can be characterized as *non-polynomial nondeterministic.*
- Recommendations are made regarding the use of supply sub-structures for oil products / micro-stations / micro-gas stations, complementary to the basic system / network of stations existing in any urban agglomeration.

Bibliographical References

[1]. Brender J.D., Maantay J.A., Chakraborty J., -Residential Proximity to Environmental Hazards and Adverse Health Outcomes. American journal of public health, 101, Suppl. 1: S37–52, 2011

[2]. Gâf-Deac I.I., - Analiza multicriterială la utilizarea raţională a resurselor naturale, Revista Minelor, Bucureşti, nr.11-12(185-186)/2006

[3]. Hoffman F.O., Hammonds J.S.,- Propagation of uncertainty in risk assessments: the need to distinguish between uncertainty due to lack of knowledge and uncertainty due to variability. Risk Anal, 14(5):707-712, 1994

[4]. Khamis Jamal,- Eco-network characterization of the distribution of petroleum products in Damascus, Syria /, Session 3/ Knowledge, Innovation, Smart Development and Human Capital / The 7 International Conference the Economic Scientific Research – Theoretical, Empirical and Practical Approaches, Romanian Academy National Institute of Economic Research, National Bank of Romania, Centre for Economic Information and Documentation, 30 Years of Inspiring Academic Economic Research – From the Transition to Market Economy to the Interlinked Crises of 21 Century, Bucharest, Romania, November 26-27, 2020

[5]. Khamis Jamal, et al., - Super-compact structures of quality standards for health and security in the sustainable development of a Mining Basin in Romania, International Journal of Research in Engineering & Technology, ISSN(P): 2347–4599; © Impact Journal**,** ISSN(E): 2321–8843, Vol. 8, Issue 2, 11–22

[6]. Lundteigen M.A., - Safety instrumented systems in the oil and gas industry: Concepts and methods for safety and reliability assessments in design and operation, Norwegian University of Science and Technology, Trondheim, DOI: 10.13140/2.1.3663.7769, 2008

[7]. Morales Terrés, Isabel M., et al., - Assessing the impact of petrol stations on their immediate surroundings, Journal of Environmental Management, 91, pp. 2754-2762, 2010

[8]. Rupert Herbert-Burns, - Petroleum geopolitics: a framework of analysis, University of St. Andrew, April 2011

[9]. Sexton K., Callahan M.A., Ryan E.F., -Estimating exposure and dose to characterize health risks: the role of human tissue monitoring in exposure assessment. Environ Health Perspect., 103 (suppl 3): 13-29, 1995

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