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## Contents

	Pag
Gil Aluja, J. <i>Nouvelles perspectives de la recherche scientifique en économie et gestion</i>	5
Achim, M.; Hinescu, A.; Gavrilă-Paven, I. <i>Public Management - Major Approaches</i>	15
Baron, M. <i>The Price Paid by the Romanian National Bank for the Precious Metals Purchased from the Local Producers between 1920–1948</i>	21
Bivolaru, D. <i>Accounting-Applied Expert Systems</i>	39
Briciu, S.; Teiușan, S.; Gavrilă-Paven, I. <i>The Accuracy of the Work-In-Process Cost Determining Influence on the Endproducts and the Result</i>	45
Ciungu, C. <i>Expert System for Management Diagnosis in Romanian Agriculture</i>	51
Ciungu, P. <i>Investment in Education, a Major Request for the Harmonization Between the Romanian and the European Learning</i>	57
Crăciun, L.; Criveanu, R.C. <i>The Performance Measurement System and Key Performance Indicators</i>	63
Cucu, I. <i>Methods of Evaluating Performances for Marketing Strategies</i>	73
Dima, I.C.; Mihai, C. <i>Considerations Regarding Comparative Management in the European Union</i>	81
Dobre-Baron, O. <i>Structural Funds and Cohesion Fund – Financial Instruments of Solidarity Policies within the European Union</i>	87
Drigă, I. <i>The Reason for Imposing Capital Requirements on Banks</i>	95
Dumbravă, G.; Koronka, A. <i>Elements of Cosmopolitanism and Globalization in Constantin Stere's Work</i>	101
Dura, C. <i>Taguchi Method for Improvement in the Quality of Production Processes</i>	107
Ferragina, A.; Giovannetti, G.; Pastore, F. <i>Romania-Eu Actual and Potential Trade</i>	117
Fleșer, A. <i>Economic and Social Effects of Mining Industry Restructuring in the Jiu Valley</i>	125
Flităr, M.P. <i>Cybermarketing and Business Performance in the Informational Society</i>	129
Ghicaianu, M. <i>Some Elements of the Managerial Control System in New Organisation of the National Power System</i>	135
Ghicaianu, M. <i>Considerations Regarding the Structure of the National Power System in Romanian</i>	141

Hada, T.; Teiușan, S. <i>Self-Financing Capacity – an Internal Funding Source</i>	149
Hulea, L. <i>Business Communication Strategies</i>	155
Iloiu, M. <i>Risk Analysis and Investment Decisions</i>	159
Iloiu, M. <i>Risk and Risk Management</i>	165
Ionică, A. <i>Facts about the Relationship between the Project Management (PM) and the Quality Management (QM) in Compliance with the Standards in Force</i>	169
Irimie, S.; Munteanu, R. <i>Performance Assessment in Public Administration</i>	173
Isac, A.; Isac, C. <i>The Company Financial Diagnosis Informatic System</i>	179
Isac, C. <i>Coordinates of Production Factors Combining in order to Increase the Electrical Plants Efficiency</i>	185
Ivănuș, L. <i>Capital Market in Romania – Evolution and Perspectives</i>	191
Koronka, F. <i>Some Economic Aspects Regarding the Use of Mechanized Complexes in Motru Bassin Coal Mines</i>	197
Lungu, I.; Vătuiu, T. <i>Aspects Concerning the Informatization Strategy for the Control Activity at the Romanian Court of Counts</i>	201
Magda, D. <i>Definite Coordinations of the Romanian Mining Industry Reorganization</i>	209
Man, M.; Calincovschii, S. <i>Theoretical Considerations Regarding the Methods of Accounting Production Stocks in the Companies Belonging to the Coal Mining Industry in Romania</i>	217
Manea, S. <i>Tendencies Qualitative and Changes in the Automotive Industry</i>	223
Popeangă, V.; Vătuiu, T. <i>Aspects Concerning Romanian's Economic Strategy in the Prospect of the Future UE Integration</i>	229
Preda, M. <i>Information Application for Multicriterial Optimum</i>	237
Răscolean, I.; Slusariuc, G. <i>Main Characteristics of Regional Development in Some Countries from European Union</i>	247
Răvaș, B. <i>Training - a New Method of Improving Companies Performance</i>	251
Slusariuc, G. <i>The Evolution of Unemployment in Jiu Valley after Restructuration of Mining Industry</i>	257
Stegăroiu, I. <i>The Concept of Crisis</i>	261
Surulescu, D.; Purcaru, I.S.; Chiril, G.; Irimie, S. <i>Optimization of Main Technological Parameters Afferent for the Mining Methods with Undermined Coal Bank Applied for the Conditions of Thick Coal Seams in Jiu Valley</i>	267
Szasz, M. <i>The Consequences of Tax-Evasion</i>	277
Vătuiu, T.; Popeangă, V. <i>National Electronic System and Computer Assisted Education System in Romania</i>	283
Vătuiu, T.; Popeangă, V. <i>The Object-Oriented Technology; Process Analysis and Cost Estimation o the Software Development</i>	289

## **NOUVELLES PERSPECTIVES DE LA RECHERCHE SCIENTIFIQUE EN ECONOMIE ET GESTION**

**JAIME GIL ALUJA \***

**ABSTRACT:** *The paper was presented on the occasion of conferring the title of doctor honoris causa to Mr. Jaime Gil Aluja at the University of Petroșani on 23 may 2005.*

### **1. DES LOIS DE LA NATURE AUX LOIS DE L'ÉCONOMIE**

Une année après l'autre, une génération après l'autre, les chercheurs qui travaillent dans le domaine de l'économie et de la gestion des entreprises ont essayé de diriger leurs efforts vers la recherche d'un corps scientifique capable de mieux comprendre, d'expliquer de façon plus convenable et de traiter avec rigueur les phénomènes, toujours plus complexes qui peuplent le panorama des états, des institutions et des entreprises. Ils aspirent, de cette manière, à apporter des voies nécessaires pour rendre moins hostile à la convivance entre les membres de notre société, et rendre plus supportables les luttes qui ont lieu pour arriver à occuper une place dans un monde meilleur.

Mais, pour changer notre monde, il faut avant tout, le connaître profondément, et découvrir, si elles existent, les lois de son fonctionnement. Il faut prendre conscience que notre minuscule planète n'est qu'un brin de poussière perdu dans l'immensité de l'univers. Mépriser cet aspect important conduit inévitablement à l'échec des chercheurs.

La Science économique, et par là les sciences qui étudient l'entreprise, ont scruté, depuis pratiquement leur origine, les regards avec lesquels les physiciens observaient l'univers, en espérant trouver des signaux avec lesquels ils pourraient, en quelque sorte, estimer les scénarios où l'activité economico-financière des organisations se développerait. Et comme résultat, on a pu trouver que les lois économiques suivaient les lois de la nature.

Mais aux «vides» ou «anomalies» de la nature se sont unis des comportements «anormaux» dans les systèmes économiques. Et dans l'esprit de nombreux physiciens

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\* *Prof., Ph.D. at the Real Academia de Ciencias Economicas y Financieras, Barcelona, Spain*

ont surgi et se sont entassées des questions sur la signification de la réalité et sur l'existence du temps, en même temps que les économistes s'interrogeaient sur l'essence des phénomènes économiques et sur le fonctionnement des «forces» qui les provoquent.

Et nous n'avons pas pu éviter que dans les coins les plus cachés de notre esprit s'agitent en tourbillons, des pensées qui cherchent la force suffisante pour émerger en forme de mots pour être présentées dans les vitrines que nous offrent les Foires de la Science. En attendant, les souvenirs de l'Histoire leur sont venus à l'aide. Et du fond de leur repos obscur, les enseignements reçus, presque oubliés, se sont convertis en lettre écrite, en récupérant de cette façon la mémoire des connaissances endormies.

Depuis de nombreux siècles, l'idée de «non temporalité» a attiré les réflexions des chercheurs, intéressés à vérifier la régularité du fonctionnement du Cosmos. Les philosophes grecs furent capables de trouver les lois qui décrivent les mouvements des planètes mais par contre, ils ne connaissaient pas les «lois» qui règlent les phénomènes les plus élémentaires de notre entourage. Le concept des lois de la nature, bien représenté par la métaphore «un monde qui fonctionne comme une horloge» se perd, donc, dans la nuit des temps et est très enraciné dans la pensée et les ouvrages de nos chercheurs.

Au XVI<sup>ème</sup> siècle, Giordano Bruno écrivait que «l'univers est un, infini et immobile. Il n'y a rien en dehors de lui, entendant par là qu'il est le tout. Il n'a pas de génération propre, puisqu'il n'y a rien qu'il puisse chercher. Il n'est pas corruptible, étant donné qu'il ne peut pas se transformer en autre chose. Il ne peut ni augmenter ni diminuer, puisqu'il est infini. Il n'est pas altérable, car il n'a rien à l'extérieur qui puisse l'affecter».<sup>1</sup> Cette idée, exprimée par Bruno, a déteint sur la pensée scientifique occidentale pendant plusieurs siècles. Voilà une manifestation de la conception mécaniste de l'univers.

Cette attitude face au fonctionnement de l'univers a été une conséquence de l'observation des mouvements qui s'y produisent et des essais pour résoudre les problèmes posés. Dans ce sens, et comme un bon exemple, nous pouvons citer le contenu du 3<sup>ème</sup> chapitre de la mémoire «Le problème des trois corps et les équations de la dynamique» de Jules Henri Poincaré (1854-1952) dans lequel il s'efforce de mettre en évidence l'existence de solutions périodiques pour les équations différentielles.

Pour donner un exemple, les physiciens ont recours à l'image élémentaire d'un satellite artificiel et on cherche à savoir s'il possède une orbite périodique. Ainsi, au lieu de suivre avec un télescope toute sa trajectoire autour de la terre, ils le placent de sorte qu'il «balaie» un plan qui va du nord au sud, d'un horizon à l'autre, et qu'il soit aligné avec le centre de notre planète. Ils notent l'endroit où il passe pour la première fois, ainsi que sa direction et sa vitesse. Et ils attendent, en tenant compte seulement du plan.

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<sup>1</sup> Bruno, G.: "De la causa", Opera Italiana, cinquième dialogue. I.Bari 1907. Cité par Leclerc.I: The Nature of Physical Existence. George Allen and Urwin Ltd.Londre 1972, page 88

La périodicité exige qu'il repasse par le même point, à la même vitesse et dans la même direction. En agissant ainsi, au lieu d'observer tous les états, il suffit d'en observer quelques uns. Cette surface est nommée la section de Poincaré, car c'est lui qui l'a utilisée pour essayer de trouver les mouvements périodiques d'un petit corps sujet aux forces de deux autres corps de grande masse, qui eux, ne sont pas affectés par lui, comme par exemple, une particule interstellaire et deux planètes. Les deux grands corps bougent en formant chacun une ellipse autour de leur respectif centre de gravité, mais le petit corps oscille d'un côté à l'autre, sans qu'il ne puisse rien faire pour changer sa trajectoire libre. Son comportement est compliqué et anti-intuitif. En effet, le système commence une activité dans un état et suit une courbe. Lorsqu'il revient à la section de Poincaré, il passe par un autre état, puis par un autre, et un autre, etc et ainsi de suite. Le système traverse, en définitive, la section de Poincaré, par une séquence incertaine de points. Poincaré se trouve alors face à une situation que nous appellerions aujourd'hui chaotique.

Mais pendant que notre civilisation considérait l'univers comme un mécanisme d'horlogerie, en pensant que les équations déterministes conduisaient toujours à un comportement régulier, la philosophie orientale, et l'hindouisme en est un exemple, en possédait une perception plus complexe. Selon la pensée hindoue, le « cosmos » passe par 3 étapes ; la création (dont le dieu est Brahma), la conservation (dont le dieu est Vishnu) et la destruction (dont le dieu est Shiva). La conservation représente l'ordre, la destruction le désordre. L'ordre et le désordre représentent 2 manières de manifester la divinité: la bénévolence et l'harmonie d'une part, la colère et la discorde d'autre part. Mais elle ne signifie, en aucun cas, la différence entre le bien et le mal. Les mathématiciens commencent à peine maintenant à considérer l'ordre et le désordre comme 2 manifestations différentes d'un déterminisme sous-jacent. Autrement dit, un même système peut donner lieu à un ensemble d'états, les uns « ordonnés », les autres « désordonnés »

Dans notre domaine de la pensée, on peut signaler que l'étude du comportement des systèmes économiques a été réalisée très souvent et dans une certaine perspective, à partir des processus markoviens et pseudo-markoviens.<sup>1</sup> En se basant sur ceux-ci, les chercheurs ont pu trouver quelques solutions aux problèmes séquentiels, ce qui nous a mené à considérer trois grands groupes :

- 1) Lorsque, à partir de données certaines et d'un système connu, les résultats convergent à la limite. Il s'agit de systèmes ergodiques.
- 2) Lorsque, sous ces mêmes circonstances, le système n'a pas une solution unique connue, mais il y a une oscillation régulière des solutions. Nous sommes en présence de systèmes périodiques.
- 3) Mais il existe aussi des systèmes dans lesquels, aussi longtemps que le temps passe, nous ne sommes pas capables de trouver des régularités, mais des états «désordonnés».

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<sup>1</sup> Kaufmann, A. et Gil Aluja, J.: "Nuevas técnicas para la dirección estratégica" Publications de L'Université de Barcelona. Barcelona, 1991, pages 45-66 et 129-133

Nous nous trouvons à l'aise, vu le confort que le traitement des deux premiers nous apporte. Mais par contre, nous sommes déconcertés par le manque de « règles » du comportement régularisable du troisième.

Ce panorama esquissé de manière grossière peut expliquer la recherche des réponses à la signification de deux éléments qui veillent dans tout processus de recherche: la réalité et le temps.

## 2. BRÈVES CONSIDÉRATIONS SUR LA RÉALITÉ ET LE TEMPS

Et c'est alors qu'apparaît la première question: ces concepts sont-ils indissociables entre eux? Normalement, nous associons la réalité au moment actuel. Le passé a cessé d'être, et le futur n'est pas encore. On dirait que notre pensée se déplace de façon que l'incertitude du demain ne le soit plus pour se convertir en réalité éphémère d'aujourd'hui, qui, à son tour, laisse la place à la certitude du passé.

Mais cette perception vitale choque en plein avec la rationalité avec laquelle les physiciens assument le concept du temps. Pour eux, il existe un «paysage temporel» où se trouvent tous les événements du passé, du présent et du futur. Le temps ne bouge pas, les objets bougent dans le temps. Le temps ne passe pas; il est, simplement. Le flux du temps est irréel; ce qui est réel, c'est le temps.

A cet égard, la correspondance écrite au cours des dernières années de leur vie respectives, entre Albert Einstein et Michele Besso<sup>1</sup> est très révélatrice. Devant la question répétitive du premier «Qu'est-ce le temps? Qu'est-ce l'irréversibilité?», le second répond. «L'irréversibilité est une illusion». A l'occasion du décès de Besso, Einstein écrit une lettre à son fils et à sa sœur où l'on trouve les mots suivants: «Michele est passé devant moi en laissant ce monde étrange. Cela n'a pas d'importance. Pour nous, physiciens convaincus, la distinction entre passé, présent et avenir n'est qu'une illusion, aussi persistante soit-elle».

Malgré de telles affirmations, il est difficile d'accepter une nature sans temps. Homère, dans *L'Iliade*, met Achille dans la position de la recherche de quelque chose permanent et immuable, qu'il ne découvre que tardivement, au moment où il va perdre la vie. L'œuvre s'appuie donc sur le problème du temps. Comme contrepoint, dans «*L'Odyssée*», Ulysse peut choisir entre l'éternelle jeunesse et l'immortalité (en étant pour toujours l'amant de Calypso), ou le retour à l'humanité, c'est-à-dire à la vieillesse et à la mort. Il choisit le temps et le destin humain, méprisant l'éternité et le destin des dieux. Devons-nous choisir la conception non temporelle, qui implique l'aliénation humaine, ou l'acceptation du temps qui semble s'affronter à la rationalité scientifique? Une profonde incompatibilité palpable, entre la «raison classique» avec une vision non temporelle et «notre propre existence» assaisonnée par le temps.

Pour la physique classique, une horloge mesure des durées entre les événements, mais ne mesure pas la vitesse avec laquelle on passe d'un événement à

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<sup>1</sup> Einstein-Besso: Correspondance. Ed. P. Speziali. Hermès. Paris 1972, page 88

l'autre. Ainsi donc, le passage du temps dépend de la personne qui le perçoit. Il s'agit alors d'une conception subjective.

On ne peut pas nier la validité des concepts passé et futur, même en soutenant l'inexistence du « flux du temps ». En économie, on trouve une grande quantité de phénomènes irréversibles. On dira même qu'ils sont majoritaires. Il existe donc, une asymétrie des objets dans le temps, mais non pas une asymétrie du temps. Dans ce sens, donc, l'asymétrie est une propriété des objets, et non une propriété du temps.

Nous pouvons maintenant nous demander comment l'idée du « passage du temps » a pu s'enraciner dans le subconscient des économistes et gestionnaires d'entreprises et d'institutions, Nous trouverons peut-être la réponse dans les deux aspects de l'asymétrie :

- a) L'entropie d'un système est en relation directe avec l'information qu'il reçoit. Les nouvelles sensations ajoutent de l'information et augmentent donc l'entropie. L'emmagasinage d'informations est un processus à direction unique, irréversible.
- b) Le principe d'indétermination de Heisenberg implique un futur non déterministe. En mécanique quantique, un état, aujourd'hui, peut donner lieu à plusieurs états dans le futur, sans qu'il soit possible de prédire lequel deviendra réalité. De toutes façons, il est très difficile d'arracher de la pensée économique la notion de flux temporel, même lorsque, paradoxalement, la présence de l'irréversibilité, avec toute sa charge de non temporel, a été une constante dans les apports les plus durables du corps scientifique de l'économie.

### **3. LE CARREFOUR GÉOMÉTRIQUE DARWINIEN**

Il n'y a pas de doute que quelque chose d'important était prête à émerger à la surface de l'activité scientifique, lorsque les premières essences de l'évolutionnisme, riche héritage du XIX<sup>ème</sup>, se distillaient. Quelques coups de pinceau devraient pouvoir nous placer au point de départ d'une nouvelle aventure. Et nous aurons, pour cela, recours à Darwin et Clausius.

Dans son œuvre fondamentale « L'origine des espèces », publiée en 1859, Darwin combine deux éléments: fluctuation et irréversibilité. Il soutient, en effet, que les fluctuations dans les espèces biologiques grâce à la sélection du milieu, donnent lieu à une évolution biologique irréversible. En associant les fluctuations (qu'il associe à l'idée du hasard, que nous appellerions aujourd'hui incertitude), et l'irréversibilité, on obtient une autoorganisation des systèmes avec une complexité croissante.

De son côté, Clausius formule en 1865, la « loi d'augmentation de l'entropie », avec la division correspondante entre processus réversibles et processus irréversibles. Cette distinction devient explicite dans la 2<sup>ème</sup> loi qui postule l'existence

d'une fonction, l'entropie,<sup>1</sup> qui dans un système isolé, augmente lorsqu'il existe des processus irréversibles et reste constante en présence de processus réversibles. L'entropie atteint, donc, une valeur maximum lorsque le système est sur le point d'arriver à l'équilibre et termine le processus irréversible. Le physicien Ludwig Boltzmann (1844-1906) arriva à la conclusion que l'entropie  $S$  est liée à la probabilité  $P$ . Sur sa pierre tombale, la formule:

$$S = k \cdot \ln P \quad (1)$$

a été gravée. Dans cette formule,  $k$  est une constante universelle et à laquelle Max Karl Erns Ludwig Planck (1858-1947) associa le nom de Boltzmann.

Aussi bien dans le cas de Darwin comme dans celui de Boltzmann, le hasard et l'évolution sont étroitement liés, mais le résultat de leurs recherches respectives conduisent à des conclusions contraires. Chez Boltzmann, la probabilité arrive à son maximum lorsqu'elle atteint l'uniformité. Tandis que chez Darwin, l'évolution conduit à de nouvelles structures autoorganisées.

Il est vrai que, de quelque point de vue que ce soit, l'univers possède une structure complexe. Jacques Monod soutient dans son livre « Le hasard et la nécessité » que la vie est un simple accident dans l'histoire de la nature qui, pour une raison pas très claire, est capable de se maintenir. Sans aucun doute quelques phénomènes peuvent se décrire parfaitement par des équations déterministes (mouvement des planètes), mais, par contre il y en a d'autres qui suivent des processus incertains, ou en tout cas stochastiques (développements biologiques). Il se pourrait que la vie, en ce qu'elle a d'irréversible, se trouvât aussi inscrite dans les lois générales depuis le moment primogène du Big-Bang. Mais la science, à force de chercher les généralisations, les symétries et les lois, a trouvé ce qui est changeant, temporel et complexe.

#### 4. CHERCHANT À ORDONNER LE DÉSORDRE

Les étudiants de toutes les branches du savoir observent des processus qui font la transition du chaos à l'ordre, c'est-à-dire des séquences dirigées vers une autoorganisation. La question qui se pose est celle-ci: Comment cette création de structures, c'est-à-dire cette autoorganisation a-t-elle lieu? Etant donnée l'entropie d'un système, si celui-ci est perturbé de telle façon qu'un état reste suffisamment près de l'équilibre, le système répond en rétablissant la situation initiale. Il s'agit d'un système stable. Mais si on mène un état suffisamment loin de l'équilibre, il tombe dans une situation d'instabilité par rapport à la perturbation. On a l'habitude d'appeler ce point: point de bifurcation. Et c'est là qu'apparaissent de nouvelles situations qui peuvent correspondre à des comportements éloignés de l'origine.

Dans ce contexte, les équations déterministes ne sont plus utiles pour prédire quel sera le chemin choisi parmi ceux de la bifurcation. Dans de nombreuses

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<sup>1</sup> Le mot entropie vient du grec et signifie "évolution".

bifurcations, une rupture de symétrie se produit. Dans le cas où il y a une solution «à gauche» et une autre «à droite», la nature en exige une seule. On peut dire, ainsi, qu'il existe une symétrie dans les équations mais pas dans les solutions.

Comme Paul Valéry<sup>1</sup> remarque, « le sens du mot déterminisme est vague au même degré que le mot liberté... ». « Le déterminisme rigoureux est profondément déiste. Car il faudrait un dieu pour apercevoir cet enchaînement infini complet. De sorte que le dieu retranché de la création et de l'invention de l'univers est restitué pour la compréhension de cet univers ».

Un univers dans lequel les formes que nous voyons dans la nature ne ressemblent pas, normalement, aux figures géométriques traditionnelles de la mathématique, bien que parfois elles l'aient. Rappelons qu' en 1610, Galileo Galilei dit que « la mathématique est le langage de la nature ». Mais il est vrai que la géométrie de la nature est très difficile à représenter avec les formes habituelles euclidiennes ou avec le calcul différentiel. Son ordre rare le convertit en chaotique. Nous adoptons ainsi le terme donné par Norbert Wiener, lorsqu' il voulait exprimer une forme de désordre extrême.

Benoît Mandelbrot, dans son œuvre «The fractal geometry of nature» signale que les nuages ne sont pas des sphères, ni les montagnes des cercles, ni que l'écorce des arbres est lisse. A partir de cette idée, il développe une nouvelle mathématique capable de décrire et d'étudier la structure irrégulière des objets naturels. Il établit le mot « fractal » pour désigner ces nouvelles formes géométriques.

Les fractales, tout comme le chaos, reposent sur la structure de l'irrégularité. Dans les deux, l'imagination géométrique acquiert une importance fondamentale. Mais, si dans les fractales c'est la géométrie qui domine, dans le chaos celle-ci se trouve soumise à la dynamique. Les fractales donnent un nouveau langage susceptible de décrire la forme du chaos.

Les formes géométriques traditionnelles (triangle, carré, cercle, sphère, cylindre) perdent leur structure lorsqu' elles sont agrandies (un cercle devient une ligne droite monotone, lorsqu' on l'observe à une échelle suffisamment grande, pour le tout petit être humain, la terre est lisse). Le terme fractal décrit un genre d'objet géométrique qui continue à manifester une structure détaillée à un grand nombre d'échelles.

Au début, les objets naturels, aussi bien ceux qui nous sont familiers (comme la Lune, la Terre, les Mers) que ceux qui nous le sont moins (comme une collection d'erreurs dans une liste de statistiques), sont des systèmes, puisqu' ils sont formés par des parties différenciées en connexion entre elles. La dimension fractale met en évidence un aspect de ces lois de connexion.

Les possibilités d'emploi de ces fractales sont très grandes. Les fractales mettent en évidence une nouvelle vision de la nature qui, maintenant, est susceptible d'être modélisée mathématiquement. Les possibilités de représenter de manière

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<sup>1</sup> Valéry, P.: *Cachiers I*. Bibliothèque de la Pléiade. Ed. Gallimard. Paris. 1973. Pages 651 et 531

géométrique des phénomènes économiques irréguliers ouvrent les portes pour l'emploi des fractales dans le domaine des sciences sociales. La préoccupation des fluctuations aux Bourses ne pourrait-elle pas stimuler les économistes et spécialistes en gestion pour l'étude de cette nouvelle géométrie de la Nature?

### 5. NAISSANCE ET DÉVELOPPEMENT D'UNE THÉORIE DE L'INCERTAIN

Il est impensable de ne pas accepter que les systèmes sont très sensibles aux variations des conditions initiales ou de celles qui existent à un certain moment de leur activité. Autrement dit, on conçoit que lorsqu'une perturbation dépasse un certain niveau, les déviations futures mènent à un processus non contrôlable par le système lui-même et c'est alors que se produisent de nouveaux phénomènes inattendus. Et c'est avec cette conviction que l'on peut imaginer comment, il y a quatre milliards d'années, qu'une cellule vivante a pu surgir d'une vulgaire culture d'acides aminés. La complexité de ces systèmes fait qu'on ne peut comprendre ni expliquer cela par des lois déterministes, soutenues et développées à partir d'équations linéaires. Il a fallu et il faudra une grande dose d'imagination pour rompre les liens qui nous attachent au passé, les remplaçant par des équations différentielles « non linéaires », porteuses de tout un arsenal descriptif de situations incertaines. Des points de vue d'hier et d'aujourd'hui cohabitent ou collaborent à cette tâche. On remarquera parmi ceux-ci la théorie des sous-ensembles flous qui a son épicycle dans une querelle qui date de plus de 2000 ans. En effet, Aristote (384-322 av. J. C.) faisait remarquer: «Une simple affirmation est la première espèce de ce que nous appelons les propositions simples, et une simple négation est la seconde classe de celle-ci.

En ce qui concerne les choses passées ou présentes, que les propositions soient positives ou négatives, elles sont par nécessité vraies ou fausses. Et des propositions qui s'opposent entre elles, l'une doit être vraie et l'autre fausse ». <sup>1</sup> La pensée des stoïciens allait dans ce même sens et on attribue à l'un d'eux, Crisipo di Soli (281-208 av. J.C.) l'énoncé de ce que l'on appelle «le principe du tiers exclu» (une proposition est vraie ou fausse). Les épicuriens contestèrent vigoureusement ce principe, en faisant remarquer qu'on ne peut l'accepter que s'il n'existe pas une troisième solution (*tertium non datur*) (tiers exclu). Malgré son matérialisme, Epicure croyait en la liberté de la volonté, suggérant même que les atomes sont libres et se déplacent parfois avec une totale spontanéité. Cette idée a des affinités évidentes avec le principe d'incertitude mentionnée ci-dessus.

Il faut encore 22 siècles avant que Luckasiewicz,<sup>2</sup> en reprenant l'idée des épicuriens, fasse remarquer qu'il existe aussi des propositions qui ne sont ni vraies ni fausses, mais indéterminées. Et cela lui permet d'énoncer son «principe des valences » (chaque proposition a une valeur de vérité). Il commença par affecter trois valeurs de

<sup>1</sup> Aristote: Œuvres .Logique. De la expression o Interpretación. Ed. Aguilar. Barcelona, 1977

<sup>2</sup> Luckasiewicz, J. "Ozasadzie wyłączonego srodka" Przegl' de Filozficzny,13,1910

vérité: vrai (1), faux (0), indéterminé (0,5), pour généraliser ensuite, à  $n$  valeurs,  $n$  étant égal ou plus grand que (2). Et c'est ici que commence le chemin de ce qu'on appelle les logiques multivalentes.

A l'occasion du Congrès International S.I.G.E.F. de Buenos Aires,<sup>1</sup> nous avons essayé d'installer la position épicurienne aux nouvelles coordonnées surgies du travail de Zadeh,<sup>2</sup> en énonçant « le principe de la simultanéité graduelle » (toute proposition peut-être à la fois vraie et fausse, à condition de donner un degré à sa vérité et un degré à sa fausseté). Avant et après, de nombreux scientifiques ont construit, pierre par pierre, les fondations de ce qui pourrait être un nouveau bâtiment du Savoir. Dans cette perspective de la Connaissance, plusieurs noms jalonnent déjà ce chemin fructueux : Rosenfeld, qui étudie en 1971 les relations floues,<sup>3</sup> de Luca et Termini, qui travaillent avec le concept d'entropie non probabilistique,<sup>4</sup> Kaufmann, en 1973, en incorporant l'opérateur de convolution maxmin aux équations de relations floues;<sup>5</sup> Sugeno, en 1977 pénètre dans le domaine des mesures floues;<sup>6</sup> Zimmermann, en 1978 développe en profondeur les opérations des sous-ensembles flous.<sup>7</sup> De nombreux groupes de recherche appartenant à des Universités des cinq continents travaillent aujourd'hui dans les différentes branches de l'arbre de la Science. Nous leur rendons hommage, ainsi qu'à tous ceux et celles qui ont entrouvert des portes pour que d'autres puissent les franchir. A tous ceux dont nous ne connaissons jamais le nom, à ceux qui n'ont même pas droit à un misérable petit coin dans les pages presque infinies de l'Histoire.<sup>8</sup>

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<sup>1</sup> Gil Aluja, J.: Lances y desventuras del nuevo paradigma de la teoría de la decisión. Proceeding du 3<sup>ème</sup> Congrès de la Sociedad Internacional de Gestión y Economía Fuzzy. Buenos Aires. 10-13 novembre 1996. (non numérotés)

<sup>2</sup> Zadeh, L.: Fuzzy Sets. Information et contrôle. 8 juin 1965, pages 338-353

<sup>3</sup> Rosenfeld, A.: "Fuzzy groups". Journal of Mathematical Analysis and Applications, 35.1971, pages 512-517

<sup>4</sup> De Luca, A. et Termini, S.: "A definition of non probabilistic entropy in the setting of fuzzy set theory". Information and Control 1972, 20, pages 301-312

<sup>5</sup> Kaufmann, A. "Introduction à la théorie des sous-ensembles flous à l'usage des ingénieurs". Masson et Cie. Editeurs. Paris 1973, pages 60-65

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<sup>8</sup> Gil Aluja, J. "Genesis de una teoría de la incertidumbre". Discours prononcé à l'occasion de la remise de la Grande Croix de l'Ordre Civil de'Alphonse X Le Sage. Ed. Real Academia de Ciencias Económicas y Financieras et Reial Academia de Doctors. Barcelona, 20 janvier 2000, page 27

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## **PUBLIC MANAGEMENT – MAJOR APPROACHES**

**MOISE-IOAN ACHIM, ARCADIE HINESCU,  
IONELA GAVRILĂ-PAVEN \***

**ABSTRACT:** *The public management issues are approached through three points of view: political, legally, managerial.*

**KEY WORDS:** *political approach, legally approach, managerial approach*

There are three approaches regarding the public management, known in the American literature (Rosenbloom D. - Public Administration, Understanding Management, Politics and Law in the Public Sector, Random House, New York, 1986, pag. 181). The public management issues are approached through three points of view: political, legally, managerial. So, there are resulting three major approaches of the public management: Political approach; Legally approach; Managerial approach.

**1. Political approach of the public management.** It was explained and sustained by Wallace Sayre, who considered that the public management is firstly an issue of political theory. The core issue in a democracy, as he said, is the responsibility for a total control.

This approach has attracted the observations of Paul Appleby, which considered that management is a politic process. Regarding this affirmation, many others specialists focused on the manner in which the public staff with leading functions participates in the public politic.

The public management is considered as the result of a politic will, and the accent goes, inevitably, on the specific different value ensembles. Efficiency, for example, becomes hardly difficult to obtain. The politic approach of the public management considers values like representatively, sensibility, receptivity. It is considered that theses values are essential for maintaining the constitutional democracy and can be integrated in the public management.

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\* *Prof., Ph.D. at the University „1 Decembrie 1918” Alba Iulia, Romania*  
*Prof., Ph.D. at the University „1 Decembrie 1918” Alba Iulia, Romania*  
*Assist. Prof. at the University „1 Decembrie 1918” Alba Iulia, Romania*

It is important to mention that the promoted values of the political approach are contradictory with the ones promoted by the managerial approach. The managerial efficiency is difficult to measure, but the federal managers sustained for a long time that their efficiency in the public management is influenced by the roll of the American Congress and the need of continuously consulting a diversity of political groups.

According to this approach, in some organizations or companies, the public management is oriented upon values like representatively, sensibility and evidence. In this context, the political approach points out, as it is obviously, the advantages of the political pluralism, represented in the public management. So, Seidman agrees that the executive branch's structure is the representation of the society in one country. Inevitably it reflects the values, conflicts and the existing competitive forces in a plural society. Norton Long has a similar opinion and considers that the agencies and bureaus more or less performance are interested in developing, maintaining and/or raising the political support. They are the leaders and in a major part are being led by the different groups that are influenced and which are influencing the support. So, the public management's structure becomes one politic focused on different group, which are continuously searching the representatively. It is common that some companies or organizations increase in time, mainly as an answer to the political request of satisfying the representatively interests. So, as Sideman said, these disputes will continue because the administrative institutions are frequently approached as being the dominant political issues, focusing the roll of the politic values in the public management area.

**2. Legally approach of the public management.** This approach has been minimized especially by the managerial approach's representations. In USA it is defined as one of the bigger importance for understanding and defining the public management. Even since 1905, one of the specialists that contributed significantly at the general administrative theory's development, Frank Goodnow has published the work „The Principles of the Administrative Law of the United States”. He defined the administrative law as the side of the law which significantly influences the institution and determines the executive authorities' competences, marking the specific ways for solving the breaking law situations.

Marshall Dinock wrote that for the public manager the law is a positive and coherent thing which points out his authority. This concept has been used for describing a mandatory, regarded from three points of view:

- ◆ Which are the expectations on the legally plan during the mandatory;
- ◆ Which are the authority's limits;
- ◆ Which are the individual rights of the owners?

So, each clerk is both an “interpreter” and a “constructor”. Interpreter, because in each moment he has to apply the old laws to new situations, and constructor, because he is initiating and approving new laws, concurring to the legally system's evolution.

Kenneth Davis agrees that the public institutions are the best defined in settlements' stipulations. So, an administrative institution is a governmental authority,

different from the bench or a legislative organism, which influences the private persons' rights through self adjudication and investigations.

Another aspect is the juridical one, which involves also the legal procedures that the public managers can use for substantiating the decisions. Some organizations start to function more as some courts (for example the Accounts Court, especially in USA) and after that the settlements value become greater and greater for their activity. So, in USA in 2001, in 29 agencies have been employed 1219 judges, management specialists.

The legally approach of the public management reunites three values. The first one is referring to the procedure used for developing the administrative processes. It has to be precise defined because it has been recognized as a value that can not be limited to one single demands or standards' set.

The second value is referring to the real individual rights of each public clerk. Theses are mentioned in a Rights Cart and in other settlements. The third value is referring to the juridical aspects which are influencing the conflicts results appeared between the private persons and stat. theses are defining the displaying power that the courts have to fight back the injustice, the diversions from the law and to assure equal protection for all citizens that have been affected by the managerial decisions' applying. The understanding for the third approach, the managerial approach, is conditioned by the well knowing of the scientific management and bureaucracy approach which will be presented as it follows (see Figure 1.).

<b>WEBER</b> <b>BUREAUCRACY APPROACH</b>	<b>LEWIS</b> <b>SCIENTIFIC MANAGEMENT APPROACH</b>	<b>GULICK / URWICK</b> <b>RATIONALLY APPROACH</b>
<ul style="list-style-type: none"> <li>• Specialized departments;</li> <li>• Work specializations;</li> <li>• Settled hierarchy;</li> <li>• Single person management;</li> <li>• Promoting based on the individual results;</li> <li>• Big companies' dimension;</li> <li>• Formal character of the structure, communication and management;</li> <li>• Settlements' austerity.</li> </ul>	<ul style="list-style-type: none"> <li>• Leadership roll;</li> <li>• Public manager's qualities, abilities and knowledge;</li> <li>• Public institution is the frame in which are realized the group objectives;</li> <li>• Public institution assures the structure for political power exercise;</li> <li>• Leadership's situational approach.</li> </ul>	<ul style="list-style-type: none"> <li>• Important issues: efficiency and efficacy;</li> <li>• Special attention shown to the coordinating and communication process;</li> <li>• Preoccupation for valuing the creative potential of the staff;</li> <li>• The management is realized by a "maestro";</li> <li>• The existence of many kinds of public institutions depending on the emplacement and the set objectives;</li> <li>• Evaluating the public staff depending on their working results.</li> </ul>

**Figure 1.** Major management approaches practiced in the public management

**Bureaucracy approach.** This approach is based on the general theory regarding the bureaucracy formulated by Max Weber. As it is known, Weber has been a social sciences specialist of Dutch origins (1864 – 1920) which has elaborated a typical model for characterizing the structure, processes and institutions or bureaucracy organisms' behavior.

Some of the characteristic structural and functioning elements for these institutions are presented as it follows:

- Specialized departments and tasks well delimited in their structure;
- Coherence work specialization and responsibility in the complex process of realizing the institution's objectives;
- Settled hierarchy in the institution, which assures the coordination of the activities from the specialized departments. In the bureaucracy organisms the power is in the hand of one single person, which has individual responsibility;
- The staff is promoted based on the effective obtained results and/or the age;
- The institution with bureaucracy structure and permanent activity are keeping theirs staff;
- The bureaucracy institutions are very big regarded as dimensions and implications.

The bureaucracy organizations, as the American specialist are agreeing, are characterized through the following:

- Excessive formality, in elaborating the structure and the communication processes;
- Insufficient attention of the personnel, reason for which there is a dehumanizing tendency of the personnel;
- Strictly respecting the contract's stipulations, according to the written formal rules;
- High formalization in developing the management processes and execution processes as well.

**Scientific management approach.** This theory belongs to Frederick Winslow Taylor (1856 – 1915), which in his work "Scientific management principles" (1911), has formulated 14 principles referring to the scientific management.

Interesting is the point of view of the American specialist, which mentioned the leadership's roll for the organization. The leadership is a concept that can be defined, according to the specialists' approaches, in different ways. In fact, the leadership is the ability of the manager of influencing other persons, of motivating and serving to the realization of a common goal and exercising the necessary functions for the group actions' success.

The main qualities and abilities of the manager are: faith in the success possibility, communication ability, inspiration, energy, logical rationalizing capacity and others.

Eugene Lewis in his book "Public Entrepreneurship: Toward a Theory of Bureaucratic Political Power", in 1984, said that some of the essential characteristics of the leadership in the public sector are:

- Each person sees the organization as an instrument for realizing the group objectives, through which it is marking out;

- The public institutions are the strongest instruments for making the changes in the political life;
- The organizations or institutions from the public sector are the support for exercising the political power. This idea was formulated according to the fact that the leadership is adapting its management style to the situations that it is facing, and this is, according to Chester Bernard, the situational approach of the leadership.

**3. Managerial approach of the public management.** Some specialists have the tendency of minimizing the differences between the public management and the private companies' management. In their vision, the administrative system is similar to a business, which can be led according to the same principles and values. This approach was partly rejected by the political leaders, which were unsatisfied by its influence upon the public clerks. They consider that, for example, in an election campaign it is normal that all candidates should demonstrate the capacity of leading the bureaucracy system.

The managerial approach's premises have roots back in the XIX century, when it has been applied for the public services administration. The reality from that time demonstrated that the political dominance led to corruption and inefficiency evolution, at all levels, and allowed the appearance of a political class, known as "spoils-men", which were in fact unable to lead the people.

After that, appeared the necessity of separating the two segments and demonstrating that the public management is not politically oriented. There were debates in which have been invited persons with recognized virtues more than a political position. Sometimes, the politicians reacted to this orientation, but the ones that intended the reform's implementation have been more and more convinced that the public clerks' selection could be based on efficiency and performance. So, the administration has to come out from the political area. In this sector there are questions of which answers have to be searched out for the political area. In fact, the public administration generally, and the public management especially, could be approached as business areas.

According to this approach it is very important to stipulate, even from the beginning, what Government can very well do and how it can work in efficiency conditions. The conclusion is that the political role has to get smaller and smaller because it produces inefficiency.

Wanting to maximize the results, the managerial approaches of the public management's representatives are promoting a bureaucratic institution. This can take by surprise the daily reader, when the bureaucratic concept is similar to inefficient. Although it is considered that many of the companies' principles or organizations are oriented towards profit's maximization. The reality has allowed a work specialization and a staff specialization in realizing the tasks given. So, through one specialization, each employee becomes expert in its interest area. The specialization asks a good coordination, and the bureaucracy is based on a well determined hierarchy, which allows work specialization split based on the specialization principles.

In fact, the hierarchy needs well substantiated programs and clear responsibilities, correlated with the institution's peculiarity.

This approach involves a high level of formalizing the structure and, in this sense, for each employee are specified the tasks, the competences and the responsibilities for that level. The employees' selection is depending upon their abilities, while the other aspects, such as political orientation, kind, sex and others, can be neglected.

The managerial approach of the public institutions surpasses the Weber and Taylor's theories. For a long time, these were considered as an extension of the precedent approaches.

The American specialists demonstrated that the managerial approach points out values like efficiency, economy, and efficacy, meaning those values which are influencing the structure, management and execution processes developed in public administration institutions. The ones that proposed this approach, Luther Gulick and Lindale Urwick, considers that the work specialization, and specialization generally, is the fundamental element for obtaining productivity and efficiency.

In this context, Gulick agrees that the coordinating process becomes essential, and it can be finalized either in an institution either in an organization, meaning through the interdependence between the organizational components between which are exercised the authority structures, either through ideas appeared as a consequence of the valorization of the intelligence potential of the staff that is working in an institution or organism. So, each employee will be consulted related to the self tasks and will determine to involve more in their realization.

Gulick considers two aspects: organization's structure and creative potential of the staff as being especially useful for realizing the public management efficiency and companies or organizations' efficiency.

The three major approaches reunite theoretical and practical fundamentals of the public management, contributing to the continuous development in this specific area of the science.

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## **THE PRICE PAID BY THE ROMANIAN NATIONAL BANK FOR THE PRECIOUS METALS PURCHASED FROM THE LOCAL PRODUCERS BETWEEN 1920–1948**

**MIRCEA BARON \***

**ABSTRACT:** *The author proposes a succinct presentation of the relation between the State, the Romanian National Bank respectively, and the producers of precious metals, that evolves within the framework of an essential economic component, namely the selling/purchase price of precious metals over an important period, 1920 – 1948.*

**KEY WORDS:** *mining, precious metals, price, period 1920-1948, producers, The Romanian National Bank.*

As it is well known, the basic objective of any economic activity is to result in a product that is to be offered to the market under the form of merchandise.

The mining activity ultimately means the extraction of an ore through means and technologies specific to the field, which is then subject to preliminary processing in order to be refined and sold on the market. As a result of processing, the mining product acquires value and thus becomes merchandise, obeying the laws of the market and being turned to account according to the supply and demand ratio, which, ultimately, establishes its price.

Price is an essential component of the economic mechanism because it reflects the way in which the product is turned to account on the market and decisively determines the efficiency, the prosperity or the bankruptcy of an economic unit.

This holds good for the Romanian mining in the inter - war period and, from its very complex process, we have selected the setting and the evolution of market price in the mining of precious metals.<sup>1</sup>

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\* *Assoc.Prof., Ph.D. at the University of Petroșani, Romania*

\*\* *Translated by Lecturer Ph.D. Gabriela Dumbravă, The University of Petroșani.*

Ion P. Gigurtu, the founder and leader of the “Mica” Company, considered that “to turn to account our auriferous ores, to extract the gold from them and to attribute to the latter the role of a generator of goods by virtue of its significance in the monetary problem, we must prove the same perseverance effort and energy that are necessary in all industrial branches if we want to attain a leading position among the peoples in south – western Europe, because:

1. Gold has played an important role not only in the history of mankind, but also in people’s private lives.

2. It underlies numerous wars and migrations; it is an incentive for bold businessmen; it is the goal of most adventurers and the motive of many murders.

3. Gold is one of those desirable assets whose mining requires a huge effort, as well as capital and skill.”<sup>1</sup>

The mining of precious metals on the present territory of our country has an old and rich history, which creates the necessary conditions for its continuation on a superior level after the Union in 1918. From this moment on, gold mining will take place almost exclusively in the two traditional areas where the presence of complex ores facilitated mining since Antiquity, namely the Apuseni Mountains and the Baia Mare area, to which we may add the small gold mining site in Valea lui Stan (Vâlcea county).

The mining of precious ores is important for the general evolution of the Romanian society because:<sup>2</sup>

- almost the whole capital invested in this field comes from local sources, whereas the state is much more present than in other fields; the same situation holds good for the work force and most of the necessary materials and machinery, except the complex mining and processing installations;

- it brings major benefits to the state budget, paying at the same time transport and customs taxes, as well as social contributions, all of which amounting to over 1 billion lei annually at the end of the inter – war period;

- it ensures the precious metal necessary for different industrial branches, for medical and pharmaceutical use, or in the art of jewelry, photography and currency issuing; the most important role is attributed to the ensuring of the gold stock necessary for the validation of the currency used on the market;<sup>3</sup>

- it contributes to the economic development of the country and the wealth of the population in the areas of the mining sites.

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<sup>1</sup> The evolution of the market price of another important product of the mining industry was dealt with in Mircea Baron, Oana Dobre – Baron, *The Evolution of the Price of the Coal Sold to the Romanian Railways in the Inter – war Period*, Sargetia, XXXII, 2004, p. 609-622.

<sup>1</sup> I. Gigurtu, *Aurul*, *Analele Minelor din România* (A.M.R.), XXIV, 1941, nr. 8, p. 199-200.

<sup>2</sup> For details, see, Ilie Haiduc, *Industria aurului din România*, Imprimeriile „Adeverul”, București, 1940, p. 6-17.

<sup>3</sup> For the use of gold and silver, see, Ion Lăzărescu, Viorel Brana, *Aurul și argintul*, Editura Tehnică, București, 1972, p. 43-95; I. Lăzărescu, C. Beiniceanu, *Rolul aurului și evoluția lui în domeniul economic*, *Revista Minelor*, XIX, 1968, nr. 6, p. 239-245; nr. 7, p. 290-297.

The statistics of the mining of precious metals shows, after World War II, an almost constant annual increase of production, with a more accelerated ascending trend in the fourth decade of the XX<sup>th</sup> century.<sup>1</sup> Beginning with 1938, production decreases as the gold and silver deposits shrink as a result of the tendency to exploit the deposits rich in precious metals, favored by the Romanian legislation regarding the taxes pertaining to such activities. The year 1940 brings about a dramatic decrease, as Romania loses, after the Vienna Dictate, the north – western part of Transylvania, where the rich complex ores deposits of Baia Mare are located. This production level will not change in 1945 – 1947, as the mining of precious metals, like the entire Romanian industry, is tributary to the general situation and the incapacity of the authorities to control such as economic problems as the relations between the employers and employees and the maintenance of the workforce and a proper working climate, all this affecting the production level.

An important step is represented by the measures taken by the State to establish the price of precious metals, by virtue of its privileged rights as a buyer of the extracted production established by law.<sup>2</sup> This will lead to a continuous competition between the state, as a buyer and an adjusting factor, and the producers, who are

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<sup>1</sup> Ion Rusu Abrudeanu, *Aurul românesc. Istoria lui din vechime până astăzi*, „Cartea Românească”, București, 1933, p. 292–299, points out “the past and present difficulties in our gold industry’ that were to be overcome in order to ensure an expansion of the mining of precious metals, namely: gold smuggling, supported by the irrational policy of the Romanian National Bank regarding precious metals, the greediness of jewelers and smugglers who sold 8,000 kg of gold across the border in 1919 – 1934; the role of dealers who used to exploit rich mining sites to sell them later for huge prices or simply to abandon them and look for other resources; the stealing of gold from mines; the high costs of the materials necessary for mining, of which some, such as the explosives, belonged exclusively to the state; the scattering of the mining activities due to the existence of small producers, and the lack of means for a modern mining.

<sup>2</sup> Art. 87 of The Law of Mines of July 4, 1924 stipulates that “the platinum and gold extractors have the obligation to hand over to the state the whole quantity of metal. No one, except the state, has the right to buy or to appropriate under any circumstances the metals obtained through mini. The purchase price is internationally established, according to the gold quality...” Art. 86 of the law imposes that “both mining sites, and the organizations that sell raw or processed mining products, should ensure, within the limits of their production, the regular and constant supply of the country, not being allowed to decrease or suspend it without legitimate reasons or the special approval of the Ministry of Industry and Commerce...” (C. Hamangiu, *Codul General al României. Legi noi de unificare. 1922-1926*, vol. XI-XII, p. 638-639).

The law regarding the Exploitation of mines in March 28, 1929, art. 81, stipulates that: “The State has privileged rights over the international purchase price of precious metals: gold, platinum and silver. The producers of such metals are free to turn to account their production if the State or The Romanian National Bank refuse to buy it” (*Ibidem*, vol.XVIII, 1929, Editura “Universala” Alcalay & Co., București, 1930, p. 304), this principle being supported by art. 71 of the Law of Mines in March 24, 1937 (*Ibidem*, vol. XXV, 1937, Imprimeria Centrală, București, 1938, p. 639).

always dissatisfied with the imposed price. There are two studies conducted in 1940<sup>1</sup> and 1944<sup>2</sup> that outline the evolution of the authorities' attitude regarding the mining of precious metals and the turning to account of production. From this perspective, we can discuss the evolution of the purchase price of gold over the whole period in which the "Mica" Company functioned.

As before the Union of 1918 the only place in Romania that produced gold was Valea lui Stan<sup>3</sup>, and the gold extracted from here was not turned to account, the obtained concentrate being sent to the Metallurgic Plant in Zlatna, which paid cash for the metals found during the processing operations, the authorities were not aware of the importance of this industrial branch and the necessity to stimulate its development.

After the Union, Romania becomes the owner of the gold and silver deposits in the Apuseni Mountains, Baia Mare and Maramureş, becoming one of the best European producers, after the Soviet Union and Sweden. The country needed gold especially to cover the currency issues of The Romanian National Bank, and from here two major problems arose: the insurance of the gold stock to cover the currency issue and the stimulation of the mining activity through the purchase price of gold.

From the beginning, the state imposed its own privileged right over the production by means of the laws of mining. As a result, almost the whole gold production of the mines in Romania will enter the thesaurus of The Romanian National Bank, beginning with 1919. Between 1919-1947, Romania will obtain a production of 77, 801 kg, which, added to the other resources of the bank, will ensure the covering of the currency issue.<sup>4</sup>

Due to the privileged rights of the state<sup>5</sup>, the private gold producers, with very few exceptions, were not able to turn to account their production where and how they considered fit.<sup>6</sup> Later on, through Decree no. 1907/August 19, 1936<sup>1</sup> regarding the

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<sup>1</sup> I.I. Lăzărescu, *Consideraţiuni asupra dispoziţiilor luate de stat pentru mărirea producţiei de aur în România*, A.M.R., XXIII, 1940, nr. 5, p. 175-184.

<sup>2</sup> Ioan Marin, *Aurul şi preţul lui*, *Miniera*, XIX, 1944, nr. 1, p. 20-24.

<sup>3</sup> I. Marin, *Minele de aur „Valea lui Stan”*, *Revista Minelor*, VII, 1956, nr. 3, p. 141.

<sup>4</sup> Ion P. Gigurtu, *op. cit.*, p. 202, stated in 1941 that "since 1920, Romania has produced 64,000 kg of gold, and 45% of the stock of The Romanian National Bank consists of the gold produced in the country."

<sup>5</sup> C. Hamangiu, *op. cit.*, vol. XXIII, 1935, Imprimeria Centrală, Bucureşti, 1936, p. 399. In the Law regarding the change of art. 81 of the Law of Mines it is pointed out that "The precious metals extractors (individuals or firms) must hand over to the state all the metal obtained by mining. Consequently, they will be allowed to operate sales or deposits of the metal or ore only in the event of refusal from the state."

<sup>6</sup> At the beginning of the inter – war period the producers and the press initiate a campaign for the right to export the precious metal, the more so Romania was, at that moment, the only European country in which commerce with gold was not free, and the gold was bought by the state at a price that was lower than the international market price and the production price. The main producers was that, in order to save the mining industry from bankruptcy: a) the state should protect both its own mines, and the private ones by buying the gold at an international price and use the gold as it sees fit; b) the government should export monthly all the gold

control and circulation of precious metals, “The state yields to The Romanian National Bank the whole quantity of gold resulted from the exertion of its privileged purchase rights..., whereas silver and platinum will be yielded only insofar as they are not needed for internal use. The Romanian National Bank is authorized to operate purchases and to monitor the circulation and control of the precious metals over which the state had privileged rights...”(art. 14) On grounds of this Decree, the Journal of the Council of Ministers (J.C.M.) no. 1069/ June 7, 1938 will be adopted relatively to the Convention with The Romanian National Bank regarding the purchase of precious metals, which authorized the head of the National Economy Ministry to sign, on behalf of the State, a convention with The Romanian National Bank by virtue of which the latter was to get the privileged right over the purchase of precious metals.<sup>2</sup> Up to this moment, the purchases had been operated by the Ministry of Industry and Commerce through the Measurements, Weights and Precious Metals Service, which was then to yield the gold to The Romanian National Bank.

As to the norms according to which the price of gold and the payments to the State were established, there have been three periods: a) 1919 – 1929; b) February 1929 – June 1935; c) 1935 – 1947.

In the first period, known as “*the period of international price*”, which was to be over with the issue of Law of monetary stabilization on February 1929, the predominant measure in the establishing of the price of Romanian gold was its alignment with the price on the international market. Until April 1920, The Managing Board of Transylvania will establish the price of gold and, after its dissolution, this prerogative will be taken over by The Ministry of Industry and Commerce.

At the beginning, The Romanian National Bank was reluctant to the purchasing of the gold production<sup>3</sup> and when it finally accepted the idea, it imposed a

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extracted from the mines in Transylvania, thus ameliorating the foreign currency shortage (Arh. Naț. Deva, *Fond Societatea „Mica”*, dos. 11/1919, f. 85).

<sup>1</sup> C. Hamangiu, *op. cit.*, vol. XXIV/II, 1936, Imprimeria Centrală, București, 1937, p. 357-359. This Decree will be modified and improved by Decretul-Lege 3203/14 septembrie 1938 (*Ibidem*, vol. XXVI/II, 1938, Imprimeria Centrală, București, 1939, p. 1775-1778) și Legea nr. 638/12 august 1946 pentru controlul producției, prelucrarea și circulația metalelor prețioase (Monitorul Oficial, I, nr. 209/10 septembrie 1946, p. 9910-9915).

<sup>2</sup> C. Hamangiu, *op. cit.*, vol. XXVI/I, 1938, Imprimeria Centrală, București, 1938, p. 883.

<sup>3</sup> Ion Rusu Abrudeanu, *op. cit.*, p. 259 – 261 shows that after the “Mica” Company became the owner of the mines belonging to the association “Ruda 12 Apostoli” in Brad, the former intended to offer its whole gold production to The Romanian National Bank. The company obtained the right to bring the gold to Bucharest but, as the Bank refused to buy, the company had to pledge it to obtain the cash necessary for the maintenance of the mining activity. At the same time, there was hope that the mentality of the Bank board would change in a favorable manner. That is why this company, and many others, were forced to store large amounts of gold, as the government will approve a 1 – month gold export only in 1922. The “Mica” company will export 1,000 kg of fine gold processed in the mines at Brad, plus a quantity bought from the Ministry of Finances. The obtained sum enabled it to pay integrally the price of the mines of “Ruda 12 Apostoli” and to compensate the whole capital invested in concessions.

price much lower than the international quotation. Thus, at the beginning of 1920, the mining association “Ruda 12 Apostoli” will propose The Romanian National Bank a direct sale of its gold. The Bank accepted on the condition that the producer should accept an imposed price, in accordance with the gold covering of certain coins, that is approx. 15,750 crowns/kg.<sup>1</sup> In 1922, the “Mica” Company offered The Romanian National Bank 2/3 of its monthly production, at a price 15% lower than the international price. The Bank refused, to buy in 1923 the whole production of the Company at a price 22% lower than the international price. That is why the price will be below the international market quota, gold being purchased in 1919 at a price of 17,000 lei/kg. When the price of a kg of gold reaches the London quota, the State will impose a tax of 20% representing the currency difference and the manipulation expenses. Thus, by the Decision of the Ministry of Industry and Commerce no. 1468/March 17, 1921, the price of gold is established at 24,000 lei/ kg<sup>2</sup> beginning with March 1, 1921 and by the Decision no. 2008/April 19, 1921 the price of gold will become lower than 27,000 lei/kg, whereas on the London market the price is 34,500 lei/kg.<sup>3</sup> Specialists were, however, of the opinion that this price was still not corresponding to the market situation, as the producers had no certainty about the value of their products, which prevented an efficient activity in mines. The immediate result will be a big difference between the official and the market price, which leads to tensions<sup>4</sup>, the development of clandestine sells, and smuggling. At the same time, the numbers of thefts from the mines increase, which are very difficult to detect, as 19.31 kg of gold fits into a space of 1 dm<sup>3</sup>. The acceptance of this reality imposed a balanced point of view in this mining and financial matter, as well as measure to ensure the exchange, refining, turning to account and processing of raw gold.<sup>5</sup>

The Law of Mines of July 6, 1924 initiated a different attitude towards the stimulation of the mining activity by price, art. 87 pointing out that “the purchase price is the international price corresponding the quality of gold...”<sup>6</sup> However, the concept will be imposed with great difficulty and, after 1925, it was decided that the State, The Ministry of Industry and Commerce respectively, through its Exchange Office, should pay for the local gold the international price, reduced with 13.5%, that is the 10% will be subtracted from the value calculated according the international price, and 3.5% of the gold quantity will be handed over to the State to cover the manipulation and

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<sup>1</sup> Arh. Naț. Deva, *Fond Societatea „Mica”*, dos. 11/1919, f. 57-58.

<sup>2</sup> Ioan Marin, *op. cit.*, p. 21.

<sup>3</sup> A.M.R., IV, 1021, nr. 10 – 11, p. 1212.

<sup>4</sup> A memo sent on January 15 1921 by the “Ruda 12 Apostoli” association stated that, if the problem of gold price is not solved favorably, the “Mica” Company, who had already lost 25 million crowns over the last two years due to the imposed price of gold, will have to cease its activity for financial reasons, which will affect not only gold, production, but the lives of the 1, 000 employees and their families; the export of 310 kg of gold was offered as an alternative (Arh. Naț. Deva, *Fond Societatea „Mica”*, dos. 11/1919, f. 84, 99).

<sup>5</sup> xxx, *Prețul aurului la Londra*, A.M.R., V, 1922, nr. 3, p. 197-198.

<sup>6</sup> C. Hamangiu, *op. cit.*, vol. XI-XII, 1922-1926, p. 638.

processing expenses. The State will have the obligation to hand over to the Romanian industry 10% of the whole gold quantity produced in Romania at an international price.<sup>1</sup> J.C.M. no. 4338/December 30, 1925 decided that, starting with January 1926:

a. The State should pay for the extracted gold the international price established by the London market, and 4% of the gold will be retained as such to cover the manipulation and processing expenses;

b. It should hand over to the manufacturers of precious objects 10% of the gold production of the country at an international price;

c. Of the silver contained in the metallic gold presented at the Exchange Office, a quota of 4% should be retained to cover manipulation and processing expenses.<sup>2</sup>

The retention of 4% of the gold handed over was justified as, until 1925, Romania did not have a processing installation for precious metals, and gold had to be sent to London for processing. In 1925, such an installation starts operating at Baia Mare, followed by another one at the “Mica” Company. Nevertheless, the State and the Bank will continue to receive much of the gold unrefined, and retention will go on.

The second period of gold price is the one of “*stabilization*”, between February 7, 1929–June 18, 1935. If up to that moment gold was purchased at a price established annually, the Law regarding the stabilization of the Romanian currency of February 7, 1929 establishes the gold price at 111,111.11 lei/kg of fine gold, of which 2% was represented by the commission of the National Bank for processing operations.<sup>3</sup> This price was closer to reality, but still lower than the international one, which continued to favor smuggling and led to protests from producers.

With J.C.M. no. 1060/June 18, 1935 starts the third period in the establishing of the purchase price of gold, known as the period of “*gold bonuses*”. These were determined by the awareness that the gold price established by the Law of stabilization was below the international price and. Therefore, these bonuses for the gold handed over to B.N.R., which were at the beginning higher than the stabilization price, and then higher than the basic price<sup>4</sup>, were meant to raise the gold price without changing the law.

There were three stages of the “gold bonuses” period:

The first stage runs between June 18, 1935 – June 26, 1936. Now, J.C.M. no. 1060/June 18, 1935 establishes that “The Romanian National Bank will pay, beginning with June 11, 1935, a bonus of 30,000 lei/kg of gold handed over at the State Exchange Office, and a bonus of 27% of the value of silver, in accordance with the international quota, transformed into stabilized lei...”, which brought the kg of gold to the price of

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<sup>1</sup> A.M.R., VIII, 1925, nr. 6, p. 225.

<sup>2</sup> A.M.R., IX, 1926, nr. 2, p. 136; by J.C.M. no. 2501//November 3, 1927 the quota of gold retained as such to cover expenses was to be reduced to 2% beginning with October 1, 1927 (A.M.R., XI, 1927, nr. 11-12, p. 593).

<sup>3</sup> I.I. Lăzărescu, *op. cit.*, p. 176.

<sup>4</sup> Ioan Marin, *op. cit.*, p. 22.

141,111 lei.<sup>1</sup> This regulation will be followed by J.C.M. no 1228/June 26, 1936, which decided that, beginning with June 1, 1936, the bonus for each kg of gold will be of 38%, calculated at the price established by the Law of stabilization, and for silver it will be 38% of the value corresponding to the international quotation, transformed into stabilized lei.<sup>2</sup>

The second stage of the period begins with J.C.M no. 1229/June 26, 1936<sup>3</sup>, which introduces bonuses for the production surplus, alongside with other bonuses, according to the specific of each mining procedure:

a. The Romanian State will pay all the gold producers the following bonuses: 13,500 lei/kg of amalgamated gold; 17, 500 lei/kg of gold produced by concentration or other methods.

b. Producers who will increase their production in comparison with 1935<sup>4</sup> will receive a supplementary bonus, between 2,500 – 15,000 lei for a production increase from 10 to 50%, provided that at least 50% of the production surplus is obtained from ores with a content of maximum 5 gr./t of ore.

c. For the gold extracted from concentrates the State will pay 35% of the processing taxes directly to the metallurgical plants when the melting taxes would be higher than 15,000 lei/kg of fine gold, and the producer will have to pay the corresponding exchange taxes, reduced with 35%. Concentrates with a content of less than 40gr/t will not benefit of this reduction. Finally, the contribution of the state to the melting taxes will be on no account higher than 7,500 lei/kg of gold.

d. Producers that will not increase their production with at least 10% over the quantity in 1935 will not benefit of the bonuses specified at a and b.

By Decree no. 2504/November 6, 1936, for the reevaluation of the gold stock of The Romanian National Bank, the 38% bonus was included in the gold price, the latter reaching 153,333.33 lei/kg of fine gold<sup>5</sup>, and by J.C.M. no. 3164/December 10, 1938, the bonuses meant to encourage the increase of gold production stipulated in J.C.M. no. 1229/June 26, 1936, no. 2375/November 6, 1936 and no. 3469/November 11, 1937 will unite. Thus, beginning with July 1, 1938, there will be a fixed bonus of 66,666 lei/kg of gold extracted by small producers, and 46,666 lei for the gold extracted by large producers. At the same time, a new category of bonuses is introduced:

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<sup>1</sup> Monitorul Oficial, I, nr. 139/21 iunie 1935, p. 4470.

<sup>2</sup> C. Hamangiu, *op. cit.*, XXIV/II, 1936, p. 46-47.

<sup>3</sup> *Ibidem*, p. 47-48.

<sup>4</sup> J.C.M. no. 2375/November 6, 1936 changes art. 2 and 4 from J.C.M. no 1229/June 26 1936, establishing as a purchase condition the increase of the 1936 production in comparison to the average production of 1933 – 1935 (*Ibidem*, p. 592 – 593). Another J.C.M. will be adopted, no. 3469/November 11, 1937, which grants a supplementary bonus of 5,000 lei/kg of fine gold, this category being mentioned in art 1 of J.C.M. no. 1228/June 26, 1936 (*Ibidem*, vol. XXV/II, 1937, Imprimeria Centrală, București, 1938, p. 2257-2258).

<sup>5</sup> Monitorul Oficial, I, nr. 260/7 noiembrie 1936, p. 9200.

- a. for the encouragement of the processing of ores with a low content of precious metals;
- b. for the encouragement of production increase, varying according to the increase;
- c. for the producers who started their activity after January 1, 1938, who receive an investment bonus of 15,000 lei/kg of fine gold;
- d. a special bonus of 20,000 lei/kg of fine gold produced by cyanide processing or from the concentrates processed in the metallurgical plants;
- e. for silver the supplementary bonus is of 500 lei/kg, which is added to the basic price and the 38% bonus. There is also a subvention that represents 5% of the total value of the gold and silver handed over to The Romanian National Bank, which is meant to create a Survey Fund<sup>1</sup> and is not given to small producers.

I.I. Lazarescu considered that this Journal is the most complete of all the Journal issued up to that point and, if it had appeared earlier, the Romanian gold production would have evolved differently. Besides the increase of the basic price of fine gold there were the bonuses mentioned above, which indicate a preoccupation for the financing of mining, as well as of survey activities, absolutely necessary for the discovery of new deposits. At this moment there appears another preoccupation, which will remain constant up to the end of the period, namely the attention paid to the content of ores. This is a change of vision that has in view the integral turning to account of resources; the bonuses previously granted were meant exclusively to increase production, determining the producers to force the mining of the richest deposits, which led to a certain production increase, followed in 2 – 3 years by an obvious decrease determined by the exhaustion of resources.<sup>2</sup>

**Table 1. The average purchase price of precious metals (lei) 1921 – 1939<sup>3</sup>**

Year	Average price/kg		Year	Average price/kg		Year	Average price/kg	
	Gold	Silver		Gold	Silver		Gold	Silver
1921	64.078	2.920	1928	108.741	2.856	1935	141.111	2.303
1922	111.304	3.775	1929	111.111	2.688	1936	153.333	2.032
1923	141.951	4.499	1930	111.111	1.966	1937	153.333	2.032
1924	143.075	4.499	1931	111.111	1.577	1938	204.154	1.889
1925	138.748	4.394	1932	111.111	1.406	1939	222.169	1.856
1926	146.327	4.204	1933	111.111	1.466	-	-	-
1927	112.008	2.850	1934	111.111	1.416	-	-	-

Continuing the new orientation in order to stimulate production, the Decree no. 1645/May 19, 1940 regarding the evaluation of gold by The Romanian National Bank

<sup>1</sup> C. Hamangiu, *op. cit.*, vol. XXVI/III, 1938, Imprimeria Centrală, București, 1939, p. 2624-2627.

<sup>2</sup> I.I. Lăzărescu, *op. cit.*, p. 180.

<sup>3</sup> xxx, *Statistica industriei extractive*, XLI, 1939, Editura Institutului Central de Statistică, București, 1942, p. 12.

establishes that the latter will pay for each kg of fine gold 153,333.33 lei plus a bonus of 50%, therefore a total price of 229,999.99 lei/kg of fine gold.<sup>1</sup>

J.C.M. no 1725/July 12, 1940 reinforces this new orientation. It establishes that The Romanian National Bank will pay additionally to the basic price of 229,999.99 lei/kg of fine gold:

a. a fix bonus of 20,000 lei/kg of fine gold, irrespective of the extraction method;

b. a bonus for the encouragement of ores with a lower content of precious metals, which was to vary according to the extracted content, and which was to be paid to all the producers with an output higher than 12 kg of fine gold. This bonus varied from 279 lei/ kg of gold for a content of 14.9 gr/to of extracted ore to 186,664 lei/kg of gold for a content of 3 gr/to of extracted ore. The calculation of the gold quantity will not include the native gold, which will be processed separately and paid with only 230,000 lei, like the gold extracted from ore with a content of 15 gr/to, plus a bonus of 20,000 lei. For small producers, mining associations and individuals producing up to 12 kg of fine gold per year, there is the fix bonus of 20,000 lei plus a single bonus of 93,332 lei/kg of fine gold. All the other bonuses granted previously were suspended, the State offering for the survey fund a subvention of 5% of the total value of the gold handed over to The Romanian National Bank, the small producers excluded.<sup>2</sup>

The third stage of the purchase price of gold starts in 1941. Now, the price of gold (the basic price plus the bonus) was established annually or whenever necessary, on grounds of the study production costs conducted by the two big companies “Mica” and “Minaur”. This study was considered to enable the establishment of a fair price for the kg of fine gold. Thus the gold industry was placed on the same level with other industrial branches, which established the prices of their products starting from production costs. At the same time, the variation of the price of a kg of gold in inverted proportion to the richness of the extracted ore seemed to be a good idea, as it stimulated the integral exploitation of resources.<sup>3</sup>

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<sup>1</sup> C. Hamangiu, *op. cit.*, vol. XXVIII/I, 1940, Imprimeria Centrală, București, 1941, p. 758. The Decree no 896/March 31, 1941, regarding the bonuses for gold and silver establishes that, beginning with April 1, 1941, both the 50% bonus stipulated by J.C.M. no. 919/1940, and the 38% bonus stipulated by J.C.M. no 1228/1936 were to be suspended. From now on, the price of gold was to be calculated by adding to the price of 111,111.10 lei/kg of fine gold established by the Monetary Law on February 7, 1929, the bonus of 90% which, by virtue of Decree no. 895/March 31, 1941, was paid in freely convertible dividends. The bonus of 50% established for silver sells by J.C.M. no. 919/1940 was to be suspended as well and, beginning with April 1, 1941, the bonus added to the silver price established by J.C.M. no. 1228/1936 was to be 90%, in similar payment conditions as in the case of gold, established by decree no. 895/March 31, 1941 (*Ibidem*, vol. XXIX/I, 1941, Imprimeria Centrală, București, 1942, p. 732). Thus, the basic price of a kg of fine gold becomes 211,111.10 lei, and of a kg of fine silver 2,560 lei.

<sup>2</sup> *Ibidem*, vol. XXVIII/I, 1940, p. 1083-1085.

<sup>3</sup> Ioan Marin, *op. cit.*, p. 23. Ion P. Gigurtu wondered whether the gold hidden in the thin, and often barren seams should be extracted or not, whether it represent an asset for Romania or not, having in view that gold is an asset only as long as it can be mined. In the first inter-war years,

The first step in this direction is taken by J.C.M. no. 1332/November 6, 1941 relatively to the bonuses meant to encourage the production of gold.<sup>1</sup> According this normative act:

a. The bonuses stipulated by J.C.M. no. 1725/July 12, 1940 change and unite, so that beginning with July 1, 1941 each kg of fine gold handed over by companies with an annual production of over 12 kg will be purchased at the basic price of 211,111.10 lei, plus a single bonus meant to encourage the processing of barren ores, variable according to the average content of extracted gold in the raw ores. The bonus varies from 78,889 lei/kg of fine gold for an average content of 15 gr/to of ore to 318,889 lei/kg of fine gold for an average content of 3 gr/to of ore.<sup>2</sup>

b. Small producers (mining associations or individuals producing up to 12 kg of fine gold per year) will be paid, beginning with April 1, 1941, the basic price of 211,111.10 lei plus a bonus of 243,889 lei corresponding to a content of 4 gr/to;

c. Any other bonuses or gold prices established by J.C.Ms are suspended and replaced with the ones stipulated by this journal;

d. The mining and survey fund will continue to receive from the State the subvention of 5% of the total value of gold handed over to The Romanian National Bank, with the exception of small producers.

The normative act stipulated for the first time that the average gold content will be calculated by the ratio between the whole quantity of extracted gold and the whole quantity of ore processed by a company in a year. In order to establish the value of encouragement bonuses, a Commission of Gold will be set up by the Decision of the Ministry of National Economy, including representatives of the Ministry of National Economy, the Ministry of Finances, the Romanian National Bank, the General

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gold producers were not supported but, by the end of the period, it became absolutely necessary that the State should support by means of stimulating prices all the productive sources, including the ones with a low content of 1.5 – 3 gr/to. Ion P. Gigurtu also pointed out that the maintenance of mining was also a social problem, the welfare of the people in the respective areas depending on this activity (I. Gigurtu, *op. cit.*, p. 200 – 202).

<sup>1</sup> C. Hamangiu, *op. cit.*, vol. XXIX/III, 1941, Imprimeria Centrală, București, 1942, p. 2341-2346.

<sup>2</sup> Ioan Marin, *op. cit.*, p. 22, showed that, as a result of the “Report” of the Board in charge with the establishment of encouragement bonuses for 1942 based on the study production costs, variable bonuses were established as it follows: 189,189 lei /kg of fine gold for an average content of 15 gr/to, and 656,389 lei/kg of fine gold for an average content of 3 gr/to for the companies with an annual production of over 12 kg of fine gold, whereas the bonus for the small producers with a production of over 12 kg of fine gold per year was of 510,389 lei. J.C.M. no. 1236/December 10, 1942 that establishes these bonuses also points out that silver will be purchased at a price of 2,560 lei, plus a fix bonus of 1,500 lei /kg of fine silver handed over. It also stipulates that, to encourage the processing of auriferous concentrates provided by small producers in metallurgical plants, the “Minaur” company will receive a subvention of 10,000 lei for each ton of auriferous concentrate exchanged at the metallurgical plant at Zlatna and processed at “Mica” Company in Târnăveni (Monitorul Oficial, I, nr. 293/14 decembrie 1942, p. 10832-10833).

Commission of Prices, as well as of the gold and silver producers. The “Report” of the Commission for 1943<sup>1</sup> is illustrative for the way in which it operated.

According to the “Report” of March 17, 1944, “the Commission adopted procedures similar to the previous years, establishing the probable production expenses for the whole year at the two main companies, “Mica” and “Minaur”, which represented approximately 85% of the national gold production. To the probable price of a kg of gold (i.e. production costs) a benefit quota was added, and then the price per kg of gold and the bonus pertaining to it for the year 1943 were calculated.

Starting from the price thus calculated, and from the corresponding content of gold in the processed ore, we have established a scale of bonuses which will be applied to all the gold producers.<sup>2</sup>

The Commission agreed that the basic principle on grounds of which bonuses were to be calculated should be the same as the one for years 1941 and 1942, namely: the lower the average content of gold in the extracted ore, the higher the bonus. At the same time, the variation of the bonus according to the average content  $n$  of extracted gold in grams per ton should be expressed by the formula:

$$P = A + \frac{B}{n} \quad (1)$$

which represents a hyperbole branch.

This formula was adopted in 1940, being based on the bonuses established by J.C.M. no. 1725/July 12, 1940. Since then, it was kept for the calculation of bonuses in the following years, the value of its coefficients being determined each time on grounds of the cost established by the different Commissions and the benefit quotas that were granted.

The Commission appreciated that the main objectives of the bonus calculation by the formula was to encourage the mining of barren deposits and to increase amount of exploitable ores. It was considered that this principle, meant to stimulate the extraction of ores with an average gold content between 3 and 15 gr/to, led to good results, even in the hard conditions brought about by the war. Thus, several low content auriferous ores, as well as abandoned mines and waste deposits were turned to account, which eliminated to a great extent the wasteful mining that extracted only the rich parts, degrading the deposit. This also enabled the almost complete exploitation of the mineral content of auriferous ores and the turning to account of major amounts of sulphurs. This last aspect is particularly significant as long as 50% of the raw materials necessary for the sulphuric acid plants that served the war came from auriferous pyrites. That is why:

a. it was agreed that the bonus should be granted for ores with an average gold content between 3 and 15 gr/to;

<sup>1</sup> Arh. Naț. Deva, *Fond Societatea „Mica”*, Dos. 56/1943, f. 1-30.

<sup>2</sup> *Ibidem*, f. 4-5.

b. starting from the formula  $P = A + \frac{B}{n}$  and considering the condition that the corresponding prices established by the Commission should be for the “Mica” Company of 692,500 lei (602,000 lei the costs of the extraction of 1.962 kg of fine gold x 15% the benefit quota) for a content of 8.7 gr/to, and for “Minaur” of 1,081,500 lei (940,500 lei the costs of the extraction of 410 gr. of fine gold x 15%) for a content of 3.4 gr/to, the following formula was established:

$$P = 231.889 + \frac{2.171.000}{n},$$

where  $n$  = the average extracted content, gr/to,  
and the formula for the gold price is:

$$P = p + 211.111, \text{ adică } P = \left( 443.000 + \frac{2.171.000}{n} \right) \text{ lei/kg}$$

On grounds of these formulas, a table was drawn containing the bonuses and the total prices for average extracted contents from 3 to 15 gr/to.<sup>1</sup>

The calculations and the bonuses table referred to the companies with an annual production of over 12 kg of fine gold. The small producers were granted by the Commission a bonus corresponding to an average gold content of 3 gr/to, not of 4 gr., like before. The increase of the production bonus was thought to eliminate clandestine sells, where small producers were the best clients and the financial efforts of the State were not higher than 9 – 10 million lei.<sup>2</sup> The same Commission established that the special bonus granted for the State to cover the expenses of “Minaur” in the exchange of the auriferous concentrates coming from the small producers, and which were to be processed at the Metallurgical plant of the “Mica” Company in Târnăveni should be of 12,000 lei per ton of auriferous concentrate.<sup>3</sup> An encouragement bonus was also established for silver production. The starting point was the awareness that the regular ratio between the price of gold and that of silver on the international market varied from 1:80 to 1:100 and, since for the year 1943 the Commission had established that the international price of gold would be of approximately 588,000 lei, it was concluded that the fix bonus granted to producers should be 3,440 lei/kg of fine silver handed over to The Romanian National Bank. Thus, the total price was to be 6,000 lei/kg of fine silver = 2,560 lei the bank price + 3,440 lei the encouragement bonus.<sup>4</sup>

All this will underlie the elaboration of J.C.M no. 326/March 27, 1944<sup>5</sup>, which basically established the price and the payment procedures for the precious metals produced and handed over to The Romanian National Bank between January 1 – December 31, 1943. It was established that the price paid by the Bank for the gold

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<sup>1</sup> *Ibidem*, f. 17-20.

<sup>2</sup> *Ibidem*, f. 25.

<sup>3</sup> *Ibidem*, f. 25-28.

<sup>4</sup> *Ibidem*, f. 29.

<sup>5</sup> Monitorul Oficial, I, nr. 74/28 martie 1944, p. 2942-2944.

extracted by big producers would vary between 587,733 lei (376,622 lei bonus + 2,111,111 lei the basic price) for a kg of fine gold extracted from an ore with an average content of at least 15 gr/to, and 1,166,667 lei (955,556 lei bonus + 211,111 lei for a kg of fine gold extracted from an ore with an average content of 3 gr/to or less. Article 10 of the Journal stipulated the obligation of the producers to invest 4.35% of the received price of gold in mine workings in order to open new deposits. These expenses were not to be included in the production costs in the future. This obligation was established separately from the 5% subvention, which will continue to be used for the Survey Fund.

The next Journals will be based on the same principles. Thus, J.C.M. no. 1218/August 24, 1945<sup>1</sup> established the payment conditions for the precious metals produced and handed over to The Romanian National Bank in the period January 1 – December 31, 1944:

a. big producers will receive for a kg of gold a price varying from 956,376 (745,265 lei bonus + 211,111 lei the basic price) for a kg of fine gold extracted from an ore with an average content of at least 15 gr/to, and 2,462,280 lei (2,251,169 lei bonus + 211,111 lei) for a kg of fine gold extracted from an ore with an average content of 3 gr/to or less.

b. small producers will receive the basic price of 211,111.10 lei the basic price plus the bonus of 2,251,169 lei for a kg of fine gold extracted from an ore with an average content of 3 gr/to and a supplementary bonus of 200,000 lei/kg of gold.

c. to encourage the processing of auriferous concentrates coming from small producers in metallurgical plants, the “Minaur” Company will be granted a subvention of 40,000 lei per ton of auriferous concentrate exchanged at Zlatna Metallurgical plant in 1944, taken from the bonus fund and meant to cover the transport of these concentrates and their processing at the Metallurgical plant of the “Mica” Company in Târnăveni.

d. it was established that silver producers will be paid the basic price plus a fix bonus taken from the gold fund of 12,440 lei per kg of fine silver handed over to the Bank in 1944.

e. the 5% subvention is maintained, as well as the obligation of companies to invest in 1945 4.35% of the total price of gold in survey operations and mine workings.

Payment conditions for precious metals in 1945 will be established by the Commission appointed for this purpose only in 1947, which will prevent big producers from outlining their balance in time.<sup>2</sup> The decisions of the Commission will materialize in J.C.M. no. 381/March 29, 1947,<sup>3</sup> which contained the following stipulations:

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<sup>1</sup> *Ibidem*, nr. 193/27 august 1945, p. 7534-7536.

<sup>2</sup> *Societatea Mica, Darea de seamă a Consiliului de Administrație și Raportul cenzorilor către Adunarea Generală ordinară a acționarilor din 24 mai 1947. Exercițiul 1945*, Institutul de Arte Grafice „Curierul Judiciar”, București, 1947, p. 8.

<sup>3</sup> *Monitorul Oficial*, IA, nr. 76/1 aprilie 1947, p. 2614-2616.

a. the basic price for a kg of fine gold of 211,111.10 lei will be maintained between January 1 – December 1945, and the encouragement bonus granted to big producers for the processing of low content ores will vary from 4,464,443 lei/kg of fine gold for an average content of at least 15 gr/to to 27,722,358 lei/kg of fine gold for an average content of 3 gr/to or less. The average content for each company will be determined by the ratio between the whole amount of extracted gold and the whole amount of processed ore during a year.

b. small producers will be paid the basic price plus a bonus of 27,722,358 lei /kg of fine gold;

c. the melting tax for the concentrates that small producers exchanged at the Zlatna Metallurgical Plant was 693,000 lei/to;

d. silver producers will be paid the basic price of 2,560 lei plus a fix bonus of 199,000 lei/kg of fine gold handed over to The Romanian National Bank in 1945;

e. the 5% subvention will be maintained, as well as the obligation of producers to invest in 1946 4.35% of the total price of the gold produced in 1945 in survey operations and mine workings.

A new element is the setting up, for each gold producer except small ones, of an Investment fund that represents 20% of the value of the gold and silver produced in 1945. Each company will receive this sum under the form of investment bonus, provided it has an investment project approved by the Superior Council of National Economy. The Gold Commission functioning at the Ministry of Mines and Oil was in charge with the examination of these projects, as well as with the control and financing of their achievement. If a company didn't use the money for two years, starting with January 1 1947, the sum was included in the State budget.

This delay was basically determined by the unstable economic and political situation after August 23, 1944, which will lead to explosive inflation. Under the circumstances, the authorities will be forced to establish temporary prices and to spend certain sums<sup>1</sup> in order to maintain the extraction of precious metals in operation, the final price being established by subsequent calculation. Starting with the period 1946 – 1947, Mines Department in the Ministry of Mines and Oil will adopt decisions regarding the encouragement bonuses for gold production meant to face inflation. Thus, the Mines Department establishes on February 28, 1946, a bonus between 11,265,401 lei/kg of fine gold for an average content of at least 15 gr/to and 29,336,249 lei/kg of fine gold for an average content of 3 gr/to or less.<sup>2</sup> The same Department establishes on June 13, 1946 a variation of bonuses from 25,611,042 lei to 66,270,449 lei/kg of fine gold, the bonus for fine silver being 632,217 lei/kg.<sup>3</sup> On

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<sup>1</sup> In *Miniera*, XX, no. 2, p.28, where the Report of the Managing Board of the Romanian National Bank to the General Assembly in 1944, it was shown that, as a result of the increasing production expenses, the Inter – ministry Council granted, starting with January 1, 1944, temporary bonuses of 550,000 lei/kg of fine gold. These were to be paid to the producers in advance, until the final calculation of the bonuses for 1944.

<sup>2</sup> Arh. Naț. Deva, *Fond Societatea „Mica”*, dos. 67/1946, f. 2-3.

<sup>3</sup> *Ibidem*, dos. 11/1947, f. 4-5.

December 2, 1946, the variation was set between 44,027,789 lei and 99,579,389 lei/kg of fine gold, the bonus for fine silver being 932,000 lei/kg added to the official price of 2,560 lei/kg of fine silver.<sup>1</sup>

The chaotic variation of prices will become more obvious at the beginning of 1947, under circumstances of economic instability. Thus, the Department of Mines sent on February 10, 1947 a notification to The Romanian National Bank regarding the temporary price of gold in 1947, by which:

a. the Bank was requested to pay a temporary price for the gold and the silver handed over beginning with January 1, 1947 until further notice: big gold producers will be paid from 63,159,433 lei/kg of fine gold for an average content of at least 15 gr/to to 135,441,166 lei for an average content of 3 gr/to or less. Small producers will be paid, beginning with February 15, 1947, the total temporary price, the bonus of 150,211,000 lei/kg included. The total temporary price of fine silver will be 1,292,560 lei/kg, the bonus included;

b. the discount for exchange taxes paid by small producers at the metallurgical plants was temporarily set, beginning with January 1, 1947, at 725,000 lei/to of concentrates, the difference between the exchange cost and the discount being covered by a subvention granted to the plants;

c. processing taxes for gold and silver were temporarily set at 943,720 lei/kg of fine gold and 51,700 lei/kg of fine silver,<sup>2</sup> beginning with January 1, 1947.

The same Department sent on April 5, 1947, another notification to The Romanian National Bank, by which the latter was requested:

a. to pay for the gold extracted by big producers a price varying from 258,221,520 lei/kg of fine gold for an average content of at least 15 gr/to to 664,815,600 lei for an average content of 3 gr/to or less. Small producers will be paid a total temporary price of 664,815,600 lei/kg, the bonus included, but only beginning with April 1, 1947; fine silver is valued at a total temporary price of 5,974,060 lei/kg, the bonus included;

b. the discount applied to the exchange taxes paid by the small producers to metallurgical plants was temporarily set at 3.2 million lei/kg of concentrates beginning with January 1, 1947, the difference between the exchange costs and the discount being covered from subventions granted to the plants;

c. the processing taxes for gold and silver were also temporary, beginning with January 1, 1947: 4,361,070 lei/kg of fine gold, and 238,962 lei/kg of fine silver, representing 1% of the value of gold (average price) and 4% of the value of silver. For the processing of precious alloys with impurities higher than the one stipulated by the official Exchange Regulation, the temporary taxes are raised to 20%.<sup>3</sup>

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<sup>1</sup> *Ibidem*, f. 6-7.

<sup>2</sup> *Ibidem*, f. 1-2.

<sup>3</sup> *Ibidem*, dos. 179/1947, f. 3-4.

This notification will be followed by another, sent on June 6, 1947, requesting The Romanian National Bank to revise the prices established by the letter of April 5, 1947 for the gold and silver handed over beginning with January 1, 1947:

a. the price of fine gold – 211,111.10 + temporary bonus – for big producers should vary from 660,000,000 lei/kg, for an average content of at least 15 gr/to to 1,100,000,000 lei/kg for an average content of 3 gr/to or less, whereas for the small producers it was 1.1 billion lei/kg, beginning with June 15, 1947. The temporary price + the bonus per kg of fine gold, payable from January 1, 1947, should be 11,642,560 lei, small producers receiving the same price starting with June 15, 1947;

b. the discount to the exchange taxes paid by small producers to metallurgical plants was set temporarily at 6 million lei/to of concentrates, beginning with June 15, 1947;

c. the processing taxes for gold and silver were also temporary, beginning with January 1, 1947: 8.5 million lei/kg of fine gold, and 466,000 lei/kg of fine silver, representing 1% of the value of gold (average price) and 4% of the value of silver. For the processing of precious alloys with impurities higher than the one stipulated by the official Exchange Regulation, the temporary taxes are raised to 20%; the processing taxes for small producers were to be applied starting with June 15, 1947.<sup>1</sup>

This decision will be the last attempt to regulate the purchase price of precious metals before the passing of the Law of monetary reform On August 15, 1947, meant to end inflation and economic chaos. The negative impact of inflation was evident and, from here, the necessity to support the economic balance by the dissolution of an overabundant purchase power, which will be achieved by a series of normative acts meant to restore national economy.<sup>2</sup>

Law no. 287/August 15, 1947 for monetary reform stipulated that “the price of a kg of fine gold was set at 168,350.17 lei, corresponding to 1 leu, monetary unit with a content of 0.60 mgr gold, with the title 9/10” (art. 3).<sup>3</sup> Since Decision no. 4561/August 14, 1947 of the State Subsecretariate at the Department of Industry and Commerce had set the principles of prices and taxes in industry agriculture, commerce and services, the prices for gold and silver were to be established according to art.2, alin. D., “by applying the stipulations of art 5 in Law no. 351/1945, with the approval of the Ministry of Industry and Commerce.”<sup>4</sup>

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<sup>1</sup> *Ibidem*, p. 1.

<sup>2</sup> See the content of these laws in, Monitorul Oficial, I, nr. 187/16 august 1947, p. 7303-7343. A pertinent analysis of the process is made by, Costin C. Kirişescu, *Sistemul bănesc al leului și precursorii lui*, vol. III, Editura Academiei, Bucureşti, 1971, p. 116-138; see, Costin Kirişescu, *Stabilizarea monetară din 1947*; Magazin istoric, XXX, 1996, nr. 10, p. 33-35.

<sup>3</sup> Monitorul Oficial, I, nr. 187/16 august 1947, p. 7343.

<sup>4</sup> *Ibidem*, p. 7353. Art. 5 of Law no. 351/May 3, 1945, for the application of Decree no. 1460/May 2, 1945 for the repression of illicit commerce and economic sabotage stipulated that “the General Commission of Prices is the only authority with the right to establish the prices of products and merchandise ... By derogation from the stipulations of alin. 2, the prices of products and merchandise established by law, until the validation of Law no. 282/May 1, 1943,

On the occasion of monetary stabilization the price of gold was established taking into account only currency - related elements. Subsequently, the Commission of Economic Restoration and Monetary Stabilization started looking into this problem, charging the Commission responsible with the gold price to establish the price mainly according to the restoration price; actually, the analysis of the situation shows that the price of a kg of gold seems to have been approximately 750,000 lei after August 15, 1947 at the "Mica" Company.<sup>1</sup>

By observing the previous procedures of the Commission of Gold, the purchase price of gold and silver will result from the price established by art 3 of the Law for monetary reform + production bonus. Thus, for 1948, the price of fine gold will vary from 494,100 lei/kg, for an average content of at least 15 gr/to to 972,500 lei/kg for an average content of 3 gr and less. After mines become State property by the Law of nationalization on June 11, 1948, there will be no difference between big and small producers; the price of a kg of fine silver will be 9,200 lei.<sup>2</sup>

As a conclusion, we can state that, by a balanced policy that had in view both the State as a buyer, and the producers the purchase price was one of the factors that maintained the mining of precious metals in operation.

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with its ulterior modifications, will be established or changed by the same departments or authorities, but only with the approval of the General Commission of Prices" (*Ibidem*, nr. 101/3 mai 1943, p. 3636).

<sup>1</sup> Arh. Naț. Deva, *Fond Societatea „Mica”*, dos. 27/1941, f. 101/103.

<sup>2</sup> *Ibidem*, dos. 179/1947, f. 8.

## ACCOUNTING-APPLIED EXPERT SYSTEMS

DOINA BIVOLARU \*

**ABSTRACT:** *This paper presents expert systems and the options of applying expert systems to the financial-accounting field.*

**KEY WORDS:** *accounting, expert systems, Exsys, intelligent applications*

### 1. EXPERT SYTSEMS STRUCTURE

#### *Exsys Developer - General Overview*

Exsys is a product of the American Company with the same name, and has been marketed as far as 1989. The latest version is named Exsys Developer and operates in Windows- controlled graphical environments.

a) *FEATURES:*

Exsys Developer has proved to be one of the best and most flexible worldwide development environments based on production rules, due to the following features:

- allows developing intelligent applications right from decision trees or from production rules;
- allows the easy understanding and interpretation of the operating language and of the algebraic syntax;
- its powerful interface engine analyzes the logics and the answer's relevance;
- its is equipped with both control strategies (forward and back chaining);
- 6 operation modes YES / NO (0 or 1); 0-10; from -100 to 100; Increment / Decrement; Custom Formula (customized formula); Fuzzy Logics;
- user-friendly dialogue interface;
- communication possibilities with numerous external programs;
- its configuration options allow applications extended customizing;
- uploads the certainty factors values attached to the results, after they have been introduced in a calculus table;

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\* *Lecturer, Ph.D. Student at "Ioan Slavici" University of Timișoara, Romania*

- the reports generator allows expert systems to generate Web access via Exsys Web Runtime;
- runs from the server and interacts with the end user through a browser;
- b) *SYSTEM ASSEMBLY:*

It is designed especially to those who wish to create own applications rapidly.

It is made up of 5 main parts and three advanced parts:

b1. THE MAIN PART

1. The set-up system;
2. the generator or the rules editor, provided with a visual interface for decision trees, for creating and modifying a knowledge base;
3. RUNTIME part allows the user to use the previously created knowledge base;
4. the validation part;
5. the inference engine;

b2. ADVANCED PARTS:

1. the commands for rules chaining control; data obtaining from external sources; external tasks
2. configuration options for system customizing;
3. reports generator, which creates printed or listed output for the end user.

Before developing an expert system using the EXSYS DEVELOPER generator, a short check up of the most important notions is necessary.

- the expert system generated by EXSYS DEVELOPER contains individual actions, incorporated in the decision-making important items. These items are used in representing knowledge by means of production rules and decision trees methods;
- the production rules are IF-THEN-ELSE methods, but the most popular method is IF-THEN;
- expert systems are used for reaching a conclusion, a solution or a recommendation. EXSYS DEVELOPER uses for these conclusions the notion of GOALS (alternatives-purposes);
- in case the IF premises is true, then the THEN-related knowledge items shall be activated; on contrary, the ELSE-related knowledge items shall be activated. If the ELSE part is missing, then the next rule in the decision tree will be used.
- EXSYS DEVELOPER uses three items: questions and variables.

c) *EXSYS SETUP AND RUNNING*

The EXSYS DEVELOPER systems generator setup is a normal procedure, by running the setup.exe file from the setting-up kit and by presenting adequate answers to the questions. Usually the setting-up is performed by creating a set of pictograms to the available modules in the EXSYS packages. This procedure is to be performed by the network manager.

EXSYS DEVELOPER run can be performed only after the programs-related packages setup.

## **2. CASE STUDY. LIABILITIES AND DEBTS ACCOUNTING USING EXPERT SYSTEMS**

### *a) ELABORATING A KNOWLEDGE BASE*

I have decided to elaborate an expert system prototype to decide the best way to approach a client who has a falling due invoice; the prototype shall be named ANALYSIS, taking into account the knowledge base. From this moment we can begin creating the knowledge base or visiting the current ones. If we decide to create the knowledge base for evaluating the funds necessary for marketing, we shall choose File from the horizontal menu, followed by New from the vertical one.

In the Expert System Name window, we shall introduce the name of the knowledge base, i.e. ANALYSIS. If ANALYSIS had already existed, from Open, we could've accessed it.

The minimum information that we must take into account when creating a knowledge base can be found in the next steps to make. In the control board we can specify: the working procedure and the certainty factor for the purpose, the knowledge base search procedure, rules display option Activation / Deactivation, new rules testing Activation / Deactivation, the text to be displayed when beginning to search the knowledge base and in the end, as well as the minimum limit at which the purpose-related certainty factors are displayed.

After specifying the knowledge base parts and author, and perhaps the other above mentioned elements, the systems generator shall process the purposes by displaying a window to work with the main menu and a 6 pages window, named: Goals (Purposes), Questions, Variables.

According to the stage we are in, we may choose to use one of the buttons: new, edit, Again, Where, Move, Import and Help.

We can introduce a new purpose in the knowledge base by activating the Goals submenu and New; a new window for undertaking the purposes shall be opened.

In this case we shall have two purposes:

1. Immediate cashing
2. Suspending Deliveries until Cashing

After introducing these purposes, we can build the first rule. From our experience and obeying the general principles of IT products design, on the grounds of the problem to be solved, we suggest that the following knowledge items are introduced: purposes, questions and EXSYS Developer generator specific variables.

From the domain and problem brief analysis, we identify the following knowledge items:

Purposes:

1. Immediate cashing
2. Suspending Deliveries until cashing

Questions:

1. invoice falling due 30 days
2. invoice falling due 60 days

Variables:

1. Client with credit limit
2. Problem client

*Elaborating rules* means activating the Rules page, which allows adding, editing, deleting and moving rules. After activating New, we get a processing scheme within the IF-THEN-ELSE parts. As we can notice the IF and THEN parts are compulsory. This window allows validating, exiting, adding, editing new items to the scheme. On request we can use the HELP button as well.

As premises we can have knowledge information under the form of questions, variables, purposes (in case we wish to reach the certainty factors-reached level). We find the same parts in the conclusions category as well; however, purposes are followed by ascertaining a value to the certainty factor, according to one of the values in the parameters control board.

The control board allows printing all the knowledge items continuously or on different pages, using one of one of the three fonts: 10, 12 or 14. The ANALYSIS prototype-related knowledge base has been redirected to the "CLIENT" file from the EXSYS work directory:

Subject:

DEALING WITH CLIENTS WHO HAVE FALLING DUE INVOICES

Author:

OFELIA ŞULEA

Starting text:

EXSYS DEVELOPER EXPERT SYSTEMS FOR CASHINGS DECISION-MAKING

Ending text:

EXSYS EXPERT SYSTEM HAS REACHED THE FOLLOWING CONCLUSIONS:

Uses all applicable rules in data derivations.

Probability System: 0-10

DISPLAY THRESHHOLD: 2

*QUALIFIERS:*

1 INVOICE FALLING DUE IN 30 DAYS

CLIENT WITH CREDIT LIMIT

PROBLME CLIENT

2 INVOICE FALLING DUE IN 60 DAYS

CLIENT WITH CREDIT LIMIT

PROBLEM CLIENT

GOALS

1 IMMEDIATE CASHING

2 SUSPENDING DELIVERIS UNTIL FALING DUE INVOICE CASHING

**RULES:**

RULE NO 1:

IF:

INVOICE FALLING DUE IN 30 DAYS

CLIENT WITH CREDIT LIMIT

THEN:

IMMEDIATE CASHING – CONFIDENCE = 10 / 10

RULE NO 2:

IF:

INVOICE FALLING DUE IN 30 DAYS

PROBLEM CLIENT

THEN:

SUSPENDING DELIVERIES UNTIL FALLING DUE INVOICES CASHING –  
CONFIDENCE = 9 / 10

RULE NO 3:

IF

INVOICE FALLING DUE IN 60 DAYS

CLIENT WITH CREDIT LIMIT

THEN:

IMMEDIATE CASHING – CONFIDENCE = 8/0

RULE NO 4:

IF

INVOICE FALLING IN 60 DAYS

PROBLEM CLIENT

THEN

SUSPENDING DELIVERIES UNTIL FALLING DUE INVOICES CASHING –  
CONFIDENCE = 7 / 10**b) PROGRAM RUNNING**

The system runs with using the option *Options* form the main menu, by activating the option *RULE*.

Press OK to display the results.

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## **THE ACCURACY OF THE WORK-IN-PROCESS COST DETERMINING INFLUENCE ON THE ENDPRODUCTS AND THE RESULT**

**SORIN BRICIU, SORIN-CIPRIAN TEIUȘAN,  
IONELA GAVRILĂ-PAVEN\***

**ABSTRACT:** *The accuracy of the work-in-process cost influences the end products' cost and the profit. Between the work-in-process dimension and the finished goods and profit's dimensions there is a reversed report. The over evaluation, of the work-in-process, leads to an unjustified diminishing of the finished goods' cost, and increases also, in an artificial way, the profit. The under evaluation of the work-in-process has an opposite effect, determining the increasing of the finished goods and the decreasing of the profit. Both situations are unfavorable for the enterprise. For reflecting the existing correlations we are presenting below a hypothetical example.*

**KEY WORDS:** *accuracy, work-in-process, under evaluation, over evaluation, hypothetical example*

Developing a production process can cause the appearance on the technological flux of a certain quantity of work-in-process. The work-in-process is "the production that has not pass yet through all processing stages, stages included in the technological process, as well as the products untested, without the technical acceptance or incomplete"<sup>1</sup>. This is containing the works and services, as well as the studies in progress or unfinished.

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\* *Prof., Ph.D. at the "1 Decembrie 1918" University of Alba Iulia, Romania*  
*Assist.Prof, Ph.D. Student at the "1 Decembrie 1918" University of Alba Iulia,*  
*Romania*

*Assist.Prof, Ph.D. Student at the "1 Decembrie 1918" University of Alba Iulia,*  
*Romania*

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*From the physical viewpoint*, the work-in-process includes the pieces, marks, products, which have an intermediary situation between the raw material and half-finished products or between the half-finished products and the finished goods, or they are finished but haven't been yet accepted.

It is very important not to mistake the finished goods with the half-finished products. The half-finished products are those that have passed through a certain stage of the production process, and the work-in-process hasn't finished a certain stage, adequate to a production cost; more, the work-in-process can be in different production stages (begun or almost finished), and the half-finished products are identical<sup>1</sup>.

*From the value viewpoint*, the work-in-process includes the raw material consumption, processing materials, the needed manual labor for the processing operations until one stage of production, as well as the indirect expenses (of the production ward) and the general administrating expenses (for the entire enterprise).

Determining the cost for the work-in-process imposes the calculus and the splitting from the general amount of the production expenses of the ones, which are regarding the work-in-process. But, there are still some exceptions. So, if the work-in-process is staying constant from the physical and value viewpoint, from a period to another, it is not considered when is establishing the effective cost for the finished products (is the case of the enterprises with large production, constant nomenclature and with insignificant differences from a calculating period to another). The cost's calculus is imposed especially for the small enterprises because the work-in-process' variances are bigger from a calculus period to another<sup>2</sup>.

Underlining the difference between the expenses regarding the work-in-process and the expenses regarding the finished goods let us formulate one of the principles regarding the cost calculation, which can be found in the specialty literature of the administrating accounting and costs' calculation, and in the legislative area in the final settlement regarding the costs appeared in Romania, meaning the OMFP nr. 1826/2003. This principle is available for those units where the production is presenting in an intermediary shape at the end of the administrating period, the quantity and value being different from one administrating period to another<sup>3</sup>.

The administrating accounting will have to assure, among others, the work-in-process cost's calculation<sup>4</sup>.

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<sup>1</sup> Dubrulle L. - Administrating Accounting, (translate by Mihaela Dumitrana), Economic Publishing House, Bucharest, 2002, p. 49.

<sup>2</sup> Dumbrava P, Pop A. - Industry Administrating Accounting, Intelcredo Publishing House, Deva, 1997, p. 186.

<sup>3</sup> Align. 2.1. from „Costs' calculation principles”, extract from the annex “Specifications regarding some measures referring to the administration and management of the administrating accounting” in OMFP nr. 1826/2003

<sup>4</sup> Align. 1. from „Costs' calculation principles”, extract from the annex “Specifications regarding some measures referring to the administration and management of the administrating accounting” in OMFP nr. 1826/2003

*The accuracy of the work-in-process cost influences the end products' cost and the profit<sup>1</sup>. Between the work-in-process dimension and the finished goods and profit's dimensions there is a reversed report<sup>2</sup>. The over evaluation, of the work-in-process, leads to an unjustified diminishing of the finished goods' cost, and increases also, in an artificial way, the profit. The under evaluation of the work-in-process has an opposite effect, determining the increasing of the finished goods and the decreasing of the profit. Both situations are unfavorable for the enterprise. For reflecting the existing correlations between the work-in-process dimensions, the finished goods cost dimension and the profit dimension, we are presenting below a hypothetical example.*

**EXAMPLE:** We are considering an enterprise with industrial profile, which is fabricating more products. Regarding one of its products, obtained in a certain administrating period, we know the following dates: Obtained quantity: 10,000 pieces; Production cost: 240,000,000 ROL (Romanian currency); Unit selling price: 30,000 ROL/piece; Totally assured marketing.

A) Knowing that the exact measure of the work-in-process cost, at the end of the administrating period, is 40,000,000 ROL, it is required to determine the finished good's cost and the total cost regarding the finished goods, as well as the result corresponding to that product.

B) Knowing that the undetermined production measure hasn't been exactly determined, we have the following situations:

B1) the value of the work-in-process is 60,000,000 ROL;

B2) the value of the work-in-process is 40,000,000 ROL

It is required to calculate the influences upon the finished goods cost and result's dimension.

Considering the dates and the problem's requirements, the situation can be synthesized as it follows:

**Table 1. Determining of the end-product' cost and the result**

Nr.	Explanations	U.M.	A Situation	B1 Situation	B2 Situation
1.	Quantity	Pieces	10.000	10.000	10.000
2.	Production cost	c.u.	240.000.000	240.000.000	240.000.000
3.	Work-in-process' cost	c.u.	40.000.000	60.000.000	20.000.000
4.	Finished goods' cost (r.2-r.3)	c.u.	200.000.000	180.000.000	220.000.000
5.	Unitary cost (r.4/r.1)	c.u./piece	20.000	18.000	22.000
6.	Unit selling price	c.u./piece	30.000	30.000	30.000
7.	Unit result (r.6-r.5)	c.u./piece	10.000	12.000	8.000
8.	Total result (r.7 x r.1)	c.u./piece	100.000.000	120.000.000	80.000.000

<sup>1</sup> There are others efficiency indicators, which are affected by the influence of the over appreciation and under appreciation of the work-in-process (for example the return on the capital).

<sup>2</sup> Cristea H. - Accounting and Calculation In Enterprise's Management, MIRTON Publishing, Timisoara, 1997, p. 75.

Based on the upper table data's analyses we can conclude the following:

- Considering the over evaluation of the work-in-process (situation b1, 60.000.000 c.u.) the finished goods' cost is smaller with 20.000.000 c.u., and the result is bigger with 2.000 c.u. for each product;
- Considering the under evaluation of the work-in-process (situation b,2, 20.000.000 c.u.) the finished goods' cost grows at 220.000.000 c.u., and the result is smaller with 20.000.000 c.u.

As a base for work-in-process' cost determination there are two methods: the direct one and the indirect one.

*The direct method* supposes the physical inventory of the work-in-process for every working place and the results' recording in the inventory lists. The inventory is being done through numbering, measuring, weighting of the existing quantities in the shape of the work-in-process right there on the working place (on the transport bands, pushcarts), by the inventory committee. It follows the establishment of the work-in-process' value, by transforming the quantitative data into monetary data using the evaluating process.

So, this method uses two procedures: inventory for the quantitative determination of the work-in-process, and evaluating for the value determination of that one.

Evaluating the work-in-process it is done by using different prices. Considering these conditions we can talk about a few methods of evaluating the work-in-process, such as<sup>1</sup>:

- *Evaluating at the effective cost of the current period*: supposes the determination of the effective expenses, distinct for articles for the work-in-process;
- *Evaluating at the effective cost of the precedent period*: can be applied in units with large production, where the finished goods and the work-in-process are recording a relative stability considering the dimensions from a period to another. It supposes the establishment of the production expenses considering two elements: physical production recorded at inventory and the costs' dimension determined in the precedent period.
- *Evaluating at ante calculated cost*: supposes the use of an ante calculated cost established by evaluating the unfinished production.
- *Evaluating at normative cost*: supposes the use of the formal costs<sup>2</sup> for evaluating the work-in-process.

*Evaluating considering the weight of the technical level*: supposes the establishing of a technical level weight for the work-in-process when the physical

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<sup>1</sup> Consider Pânteia I. P. - Romanian Accounting Managementul, vol. II, Publishing House Intelcredo, Deva, 1998, pp. 655-656, Epuran M., Băbăiță V., Grosu C. - Accounting and Administrating Control, Economic Publishing House, Bucharest, 1999, p. 193, Dumbravă P., Pop A. - op. cit., pp. 187-188.

<sup>2</sup> The calculation at formal cost resembles with the ante calculation, excepting the fact that the expenses norms are updated considering the ones existing at the beginning of the period.

inventory takes place, weight which is multiplied with the ante calculated cost or the effective cost for the precedent period for each piece, sign, and assemble.

*The indirect method* supposes the determination of the work-in-process based on the accounting data, being called also the accounting method. There can be more ways<sup>1</sup> of calculating the expenses belonging to the work-in-process, such as:

- From the total amount of the production expenses we are deducting the effective expenses of the finished goods and half finished goods obtained in the calculating period, the obtained result being the measure of the work-in-process expenses.

- The expenses recorded for some orders, which are not finished at the end of the administrating period are considered entirely expenses regarding the work-in-process. Considering the situation in which the orders are partly finished and given to beneficiaries or the storages, it can take place the deduction by eliminating from the total amount of the production expenses of the expenses regarding the finished goods evaluated at ante calculated cost or at effective cost from the precedent period.

The accounting method although it is operative and easy to apply cans not determine the reality, the accuracy of the data that are supplied, being approximate.

From the two methods presented up, the direct method is the most common in the daily life of the economic units, because it allows the establishing with accuracy, in a quantitative and qualitative way, of the work-in-process.

Establishing the effective cost of the finished goods after determining of the work-in-process cost, supposes the use of the following mathematical equation:

$$Cgf_n = Cwp_i + Ee_n - Cwp_f \quad (1)$$

Where:

- Cgf<sub>n</sub> – finished goods cost at the end of the n period;
- Cwp<sub>i</sub> – work-in-process' cost at the beginning of the n period;
- Ee<sub>n</sub> – effective expenses in the n period;
- Cwp<sub>f</sub> – work-in-process final cost at the end of the n period;

The work-in-process' cost established at the end of one period becomes the initial cost for the next administrating period. In the upper formula Cwpi is Cwpi from the precedent period. This one (Cwpi) has to be consider when we are calculating the effective cost of the finished goods from that administrating period, because the unfinished goods are becoming during the period, by manufacturing and processing (for which there are being spent money), finished goods. But the unfinished goods' cost is being deducted because they do not regard the finished goods but the work-in-process.

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<sup>1</sup> Consider Pântea I. P. - Romanian Accounting Managementul, vol. II, Publishing House Intelcredo, Deva, 1998, pp. 655-656, Epuran M., Băbăiță V., Grosu C. - Accounting and Administrating Control, Economic Publishing House, Bucharest, 1999, p. 193, Dumbravă P., Pop A. - op. cit., pp. 187-188.

From the administrating accounting viewpoint, it well known that at the end of the administrating period the calculation accounts 921 “Based activity costs” and 922 “Auxiliary activity expenses” are containing all the direct and indirect cost considering the production obtained no matter if the production is finished or not. Determining the effective cost of the finished goods and crediting of the accounts 921 and 922 with this measure imposes the calculation of the work-in-process cost.

In the 9<sup>th</sup> class of the “Administrating accounts” the one which is the most used in the calculus of the effective expenses of the finished goods and the work-in-process is the account 933 “The work-in-process’ cost”.

After establishing the work-in-process’ cost, it is being reflected in the administrating accounting be debiting the account 933 “The work-in-process’ cost” and crediting the account 921 “Based activity costs”, if there are resulting from the base activity, and of the account 922 “Auxiliary activity expenses”, if there are obtaining from the auxiliary activities.

By deducting the expenses regarding the work-in-process from the total amount of the production expenses from the debit of the 921 and 922 accounts we are obtaining the amount of the effective expenses regarding the finished goods, respectively the effective cost of this production.

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## **EXPERT SYSTEM FOR MANAGEMENT DIAGNOSIS IN ROMANIAN AGRICULTURE**

**CRISTINA –ANTOANETA CIUNGU \***

**ABSTRACT:** *The quality of diagnosis depends on the one hand on the transcription of human reasoning and on the other hand on information used to evaluate references. In this paper I will discuss about use and limitations of expert system in agriculture.*

*This paper describes the relevance and benefits of an expert system in management diagnosis of farm.*

**KEY WORDS:** *expert system, management diagnosis, Romanian agriculture*

### **1. INTRODUCTION**

The rhythm of economic and technological changes has been growing significantly during the past years, and this is also felt in the dynamic of labour market and in the need to permanently improve professional and cultural knowledge

The world has changed into a global village. Information has become a powerful commodity and has become invaluable resource to people in both the developed and developing countries. With the operation of information super highway, the world has witnessed a significant economic growth owing to this development.

This is the age of information technology (IT) and the IT made tremendous impact in every dimension of human beings in the world.

In this situation, agricultural production has evolved into a complex business requiring the accumulation and integration of knowledge and information from many diverse sources. In order to remain competitive, the modern farmer often relies on agricultural specialists and advisors to provide information for decision making. Unfortunately, agricultural specialist's assistance is not always availed when the farmer needs it. In order to alleviate this problem, expert systems were identified as a powerful tool with extensive potential in agriculture.

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\* *Prof. at the "Virgil Madgearu" Commercial College of Tg-Jiu, Romania*

## **2. WHAT IS AN EXPERT SYSTEM?**

Experts systems combine the experimental and experiential knowledge with the intuitive reasoning skills of a multitude of specialists to aid farmers in making the best decisions for their crops.

An Expert System (ES), are designed to represent human expertise I a domain (an area of expertise). The capture and preserve the Knowledge of experts in a specific domain and translate into computer software. It is a computer program designed to simulate the problem-solving behaviour of an expert in a narrow domain or discipline. In agriculture, expert systems unite the accumulated expertise of individual disciplines, e.g., plant pathology, entomology, horticulture and agricultural meteorology, into a framework that best addresses the specific, on site needs of farmers.

## **3. THE USE OF AN EXPERT SYSTEM IN MANAGEMENT DIAGNOSIS OF AGRICULTURE**

Faced with increasing uncertainty as to the future, many farmers now apprehend their role in the world as real businessmen. They need, in order to make optimum choices, a regular evaluation of their farm's performances. Nowadays, uncertainty prevails: in order to manage a farm successfully, the farmer must be able to adapt very quickly to changes in the economic environment. He must continually modify his choices concerning : investments, production, personal expenses ... In short, to cope with a more and more uncertain environment, the farmer needs to evaluate the economic situation of his farm regularly, i.e. set up an economic diagnosis, so that he can take the best decisions at the best moment.

This diagnosis, which is, in fact, an evaluation of the farm's situation, requires the collection and treatment of several kinds of economic data. The analysis reifies, indeed, on technical data as well as on financial data. Based on existing information, the goal of the analysis is to provide the farmer with results which can help him to take his decisions.

Even if the use of computers has become usual in agriculture! Management, classic software in agriculture is not adapted to systematizing human reasoning. It is necessary to apply new methodology: the use of artificial intelligence, and more particularly, the expert system. Though the expert system, it \*is possible to atomize the management diagnosis on a farm and, therefore, to provide the farmer with a more evolved Information System.

An expert system can provide an improved level of decision support in a timely and integrated fashion whenever and wherever a farmer requires it. It gives the farmer the Information necessary to reduce some purchased inputs by substituting high-quality, integrated, information derived from many sources (e.g. farm level data; weather records).

The user may query system about specific problems of pest management, soil fertility, and orchard planning. They may also request in-depth supplementary

information (including pictures) about an individual insect, disease, or weed. Recommendations are usually given with a range of alternatives, (where alternatives exist) thus allowing the farmer to combine his own preferences and experiences with the recommendation being offered by the system. This combined "package of information" is then used to support the decision-making process of the farmer in planning a pest management or other strategy.

Three advantages can be identified by using an Expert System: the commentary is quite short (5-6 pages). Like businessmen, farmers want and need to have condensed information: the length of the commentary seems, therefore, well adapted to their needs.

#### **4. THE GRAPHS ADD EXTRA VALUE TO THE COMMENTARY**

Even if they are merely a presentation of the results, they are easily comprehended by the farmer.

The farmer is interested in the link between technical and economic results because the farmer is above all a technician: the approach used by the expert System is, therefore, suited to his way of thinking.

A primary emphasis of the expert system must decrease the detrimental environmental impacts associated with pesticide and fertilizer use as well as input costs, thereby improving farm profitability and reducing economic risk. The expert system must view the farm from an ecological perspective, as a complex and highly interdependent system where the altering of one component results in changes in the entire system. The system mimics the way in which a farmer must approach problem-solving in his farm. The goal is to consider the farm as a whole organism, and to make management recommendations in a holistic fashion, rather than making individual recommendations based upon independent components.

Limits:

- ▶ Firstly, the expert system is an Information technology that is intrinsically different from most Information technologies previously utilized by farmer. The kinds of practical and educational experience a farmer/user has, may effect how well the system is understood and thus, adopted.
- ▶ Secondly, the expert system is a technology inherently connected to microcomputers. In order to make use of the decision support capabilities farmers must: have access to a microcomputer capable of running the system; be able to operate the computer proficiently.
- ▶ Even if the expert system is appreciated, it is still incomplete in transcribing human reasoning. It has two main limits, whose consequence is the simplification of human reasoning: the modification of the reasoning and the information used.

First of all, to atomize the diagnosis with an expert system, it is necessary to make a model of that diagnosis. That means to describe and to formalize it in order to create a model. Unfortunately, the formalization of the diagnosis unavoidably

simplifies human reasoning. The structure of the diagnosis, and its atomization method (If... then...) have, indeed, simplifying effects.

The second limit concerns information used in the expert system. As the entire information cannot be introduced, the system is necessarily somewhat imprecise. To achieve a common basis used in the diagnosis, it is impossible to consider all information existing in reality. Therefore, the more the field of information was limited, the poorer the transcription of human reasoning.

The expert system uses technical, economic and financial information. It is now interesting to describe more precisely what information is. In fact, the term, which is ambiguous, can be broken down into two aspects:

- ✓ *A material part*, the "signifier", which is the "visible" and transferable part of Information (words, codes, symbols...).
- ✓ *A conceptual part*, the "signified", which represents what is understood from the Information. (we use the terms of sense, semantic content, idea...).

It must solve two central problems:

- the standardization of the material part of information

The necessary information in the expert system is either numerical (value, ratio...) or symbolic (a string such as the name of the farm, the production system ...). This information must be defined in a determined order and format so that the expert system can read them. Thereafter, once its signification has been defined (the homogenization) the information must be standardized in its presentation.

- the homogenization of the conceptual part of Information.

The analysis determines which kind of information must be used but a selection of Information is nevertheless necessary. Indeed, several types of information of the same nature can be used to present or explain a result. For example, the current profit can be used to explain the performance of a farm for one accounting period as can the net profit or the global margin. Moreover, one term can have several significations. So a choice must be made and this depends on three factors: the unanimity of expert's opinions, the availability of information, and its immediate utility.

The expert system uses technical, economic and financial information (Essentially from accounting) and some references (technical information on the farm and its environment: the legal status of the property, land distribution, the annual weather pattern). References have the same characteristics as information: they have a material and a conceptual part but they also play a special role in so far as they allow for an explanation and an interpretation of the results. Two main characteristics of references should be noted.

Firstly, as opposed to "internal information" (technical, accountable or financial data), stemming from the farm itself, references are "external information".

Secondly, the use of a reference depends not only on its semantic content but also on its value.

Therefore, references are technical, economic or financial information whose value is used as a measure of comparison in order to explain the results. To interpret a

result, most of the commentary comes from a comparison with references. This phase is often wrongly compared with intelligence because the software appears to be quite similar to human reasoning, that is to say nuances are introduced. In fact, the commentary includes expressions such as quite good, rather bad ... In the commentary, references are essential because they are used to assess the results: they are the basis of the evaluation produced.

As it is true with the other information, references used in the expert system require a common definition of their material part. But this is not sufficient: references imply a specific problem relating to the choice of their value (their conceptual part). The use of references is based on the comparison between their value and farm indicators. The relevance of the commentary depends on this comparison: this explains why the conceptual part of references is essential.

For normative references, the conceptual part is defined by the experts. It is a result of human reasoning divisible into two parts:

- The objective part. The value is determined by the experts relying on their experience and their knowledge of the problem. Even if this value does not precisely correspond to a statistical calculation, the result is quite similar.
- The subjective reasoning. The expert actually gives his opinion about the value of the normative reference. They establish the value more on a feeling than on a calculation.

For standard references, the conceptual part is given by a statistical treatment; the value is the result of a calculation: it is determined by means of a statistical tool which provides the average of an indicator for comparable farms. The standards refined can vary from one farm to another. For example, the wheat yields standard comes from an average of data collected in wheat-cultivating farms. But this average is different for each geographic area, so this disparity reappears in the values of standards. Standard references appear to be more reliable than normative references, which are partially subjective. However, the representativeness of the calculated average may itself pose a problem. The representativeness of standard references determines the relevance of the comparison with the farm indicator.

## **5. CONCLUSION**

In the long term, expert systems and other tools like them will provide the framework for the information revolution in agriculture.

The use of references is based on comparisons. From the comparison between the value of the reference and the value of the farm indicator there results an explanation (increase or decrease) or an assessment (good, quit good, quite bad...). That is why the value of the reference determines the relevance of the commentary. Nevertheless, a relevant value obtained for a reference does not necessarily mean a relevant diagnosis: the use of references also plays a great role.

The two parts (material and conceptual parts) of the reference must be clearly distinguished. Unfortunately, a universal reference is impossible. The heterogeneity of

the agricultural World requires differentiating references area to area, size to size etc. Therefore, to work at a collective level, it is first necessary to get a specifically approach for references.

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## **INVESTMENT IN EDUCATION, A MAJOR REQUEST FOR THE HARMONIZATION BETWEEN THE ROMANIAN AND THE EUROPEAN LEARNING**

**PETRE CIUNGU \***

**ABSTRACT:** *Investing in people and skills is a main objective of the “eEurope Initiative”. The European Union set as a priority objective for Europe to become “...a competitive and dynamic knowledge-based economy”. A special attention is given to the development of pro-active strategies and policies for the Central European EU accession candidate countries including Romania. The paper focuses on investments in education. It reveals the implications of the global revolution in knowledge for the development of knowledge & information based society. Globalization on Information and Communications Technologies (ICT) are creating new opportunities for growth and development in the new economy. A well-educated and skilled population contributes to create, share, use and manage knowledge as a critical requisite for a country to participate in the global knowledge economy. A network of universities, research centres, private enterprises and community groups can facilitate the effective communication, dissemination and processing of knowledge and information.*

**KEY WORDS:** *investment, education, European learning*

### **1. INTRODUCTION**

Investment in education is considered to be a key driven force in the knowledge-based economy and a major request for the harmonization between the Romanian and the European learning.

The emergence of the knowledge-based economy can be characterized in terms of the increasing role of knowledge and its impact on skills, learning, organizations and innovation.

Knowledge, and the ability to create, access and use it effectively, has long been a tool of innovation, competition and economic success, and a key driver of economic and social development more broadly. Yet several dramatic changes in

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\* Prof. at the “Virgil Madgearu” Commercial College of Tg-Jiu, Romania , Assoc. Lecturer at the “ULIM” University of Chisinau, Moldova

recent years have fundamentally increased the importance of knowledge, and the competitive edge that it gives to those who harness it quickly and effectively. The ability to process and transmit information, globally and instantaneously, has increased exponentially per unit of cost in recent years due to the combined effect of advances in computing speed, and competition, innovation and lower costs in global communications networks.

## 2. THE KNOWLEDGE ECONOMY

The impact of global information flows, and of the knowledge economy, on governmental and societal institutions is no less profound or important. In information-rich environments where knowledge flows freely and communications are abundant and multi-directional, pressures increase on governments to be more transparent, accountable and participatory. At the same time, the ability of governments to access and control information, and the uneven access to information and knowledge among sectors of society can, in certain circumstances, increase inequality and further entrench existing political and social elites. Unequal access to education and training can perpetuate and deepen inequality.

According to PETER SHEEHAN from the Centre for Strategic Economic Studies of Victoria University, "...we are undergoing an epochal transformation from a mass production system...to a new era of innovation-mediated production where the principal component of value creation, productivity and economic growth is knowledge...".

The Knowledge Economy is emerging from two defining forces:

- The rise in knowledge intensity of economic activities
- The increasing globalization of economic affairs.

The "knowledge communities" are found to participate in four distinct domains of innovative activity.

The adaptation and intensive use of new information and communication technologies (ICTs) - particularly as a tool to support productive transactions and professional communications along the actors inside communities and to enable new processes of codification and modes of interactive circulation of information throughout the society:

- The development of **new systems of learning** – which includes organized modes of acquiring new knowledge and the establishment of procedures to verify the effectiveness and the reliability of the knowledge acquired.
- The formation of **social norms and institutions** – through either the emergence of informal conventions or the deliberate and institutionalization of roles and relationships of responsibility.
- The adoption or creation of community-specific **mechanism of trust formation**- which operate to reduce the costs of transactions among individuals associated with the community.

### **3. INVESTMENT IN EDUCATION AND INNOVATION SYSTEMS FOR LEARNING**

In a knowledge-based economy, organizations search for linkages to promote interactive learning. Innovation is the result of numerous interactions between actors and institutions, which together form an innovation system. Investment in education called also more generally investment in people and skills is a key driven force of the knowledge-based economy.

A consequence of deregulation and advances in communication technologies has been the emergence of a new form of 'global competition'. Most firms are multinational or transnational. In this new environment, competitiveness depends increasingly on the synergy generated between a broad range of specialized industrial, financial, technological, commercial, administrative and cultural skills which can be located anywhere around the world.

Comparative advantages, advantages of location, will vary according to the firm's global strategy. Nations, states and locations need to attend to the development of coherent set of sustainable competitive advantages strategies based on investments in intangibles such as knowledge and innovations.

Networks and geographical clusters are an important feature of the knowledge-based economy. Many firms are becoming multi-technology corporations locating around centres of excellence in different countries. Skills and life-style are becoming increasingly important factors for technology clusters. Location that is attractive to knowledge assets will play a vital role for economic success of regions.

### **4. KNOWLEDGE AND LEARNING. THE KEY ROLE OF INVESTMENT IN EDUCATION**

Although the knowledge-based economy is affected by the increasing use of information technologies, it is not synonymous with the information society. As access to information becomes easier and less expensive, the skills and competencies relating to the selection and efficient use of information become more crucial. Capabilities for selecting relevant and disregarding irrelevant information, interpreting and decoding information as well as learning new skills are in increasing demand.

The accumulation of effectiveness knowledge can only be done through learning. Education and investment in education have to be the centre of the knowledge-based economy, and learning the tool of individual and organizational advancement.

Training and learning in non-formal settings, increasingly possible due to IT Care more common. Organizations themselves face the need to become learning organizations joined in networks of interactive learning systems.

## 5. KNOWLEDGE NETWORKS AND INNOVATION

E-Government was intensely promoted in the past two years as it is considered the best way of organizing public management in order to increase efficiency, transparency, accessibility and responsiveness to citizens, as well as to reduce bureaucracy and corruption, through the intensive and strategic use of communications and information technology in the inner management of the public sector, as well as in its daily relations with citizens and users of public services.

The knowledge-based economy places great importance on the diffusion and use of information and knowledge as well as on the creation of a network society.

National innovation systems and their knowledge distribution power are of key importance for the development of a knowledge-based economy.

An essential element for building knowledge economy is to **create an appropriate economic incentive, institutional regime and a legal framework** that encourages the widespread and efficient use of local and global knowledge in all sectors of the economy, that fosters entrepreneurship, and that permits and supports the economic and social transformations engendered by the knowledge revolution.

Thus, as part of an anti-corruption legislative package, the Government of Romania promoted concrete measures to insure the availability of all public information on line and the possibility to provide on line complex and complete governmental services. The legal obligations of the central and local public administration authorities will be established very clearly in order to have a functional system allowing all citizens' access to public information and services - from filling in different forms to processing them on line. This is the actual "**desk reform**" and it means that any Romanian citizen will be able to access the Internet, from home or other public place, even from the office, for interacting with the administration. The initiative is meant to improve the access to the information and services of public administration authorities and to simplify the bureaucratic procedures by standardizing the methodologies of work.

All studies previously performed, regarding success or failure of the systems, have identified support by the management as a critical factor of success. Without a full engagement of the management, whenever problems will occur (and they unavoidably will), the project will fail.

Inside any organization that works on a system project, management must be aware from the very beginning that the project will have serious delays. Managers must be prepared to make them visible and heard behind the project despite these delays, otherwise the project will be destined to failure.

In a system in which the advance of the implementation is hard and the users are about to show their discontent, if management will support the project, this will eventually succeed. If management will not be so engaged, the project will definitely fail.

If a project goes well, but a new manager will come, the project can actually disappear overnight. In fact, failed projects can be cancelled by a person who hasn't

met any member of the project development team. This leads to an important conclusion: a project cannot succeed if the manager doesn't think that it is successful. Managers must be informed about the process being used and their expectancies must be considered.

There is a real difference between system projects and buildings. When the building is half completed, one can see something. When a software project is half completed, there are very few things to see. Managers must know what and when they can see something. If they consider that they should see 50% of the systems running when 50% of the budget has been spent, they would probably start thinking about stopping a project which may actually run on schedule.

The key of managing for managers is bringing objective, high-level auditors, how can management know that they are not being deceived, or the project is not lead in a wrong way? These don't possess the necessary knowledge for evaluating the situation. A project can be stopped by managers just because they don't understand the actions of the development team. In such cases, a technical audit can validate the actions of the development team and the supply management with the requested information in order to continue supporting the project.

## **6. CONCLUSION**

The European Union set as a priority objective for Europe to become "...a competitive and dynamic knowledge-based economy". A special attention is given to the development of pro-active strategies and policies for the Central European EU accession candidate countries including Romania. The paper focuses on investments in education. It reveals the implications of the global revolution in knowledge for the development of knowledge & information based society.

Investment in education is considered to be a key driven force in the knowledge-based economy and a major request for the harmonization between the Romanian and the European learning. The emergence of the knowledge-based economy can be characterized in terms of the increasing role of knowledge and its impact on skills, learning, organizations and innovation.

Knowledge, and the ability to create, access and use it effectively, has long been a tool of innovation, competition and economic success, and a key driver of economic and social development more broadly. Yet several dramatic changes in recent years have fundamentally increased the importance of knowledge, and the competitive edge that it gives to those who harness it quickly and effectively. The ability to process and transmit information, globally and instantaneously, has increased exponentially per unit of cost in recent years due to the combined effect of advances in computing speed, and competition, innovation and lower costs in global communications networks.

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## **THE PERFORMANCE MEASUREMENT SYSTEM AND KEY PERFORMANCE INDICATORS**

**LIVIU CRĂCIUN, RADU CĂTĂLIN CRIVEANU \***

**ABSTRACT:** *Traditionally businesses have measured their performance solely in financial terms. this limited approach has been challenged, with the introduction of the concept of key performance indicators (KPIs) for non-financial results. however, their effective use has been limited. this paper reviews these and other construction KPIs and concludes that most of the kpis used are post event, lagging measures that do not provide the opportunity to change. this paper distinguishes between the types of measure and suggests a framework for their effective use within an overall performance measurement system based on change action driven by results.*

**KEY WORDS:** *performance measurement, strategic control, european quality model*

### **1. INTRODUCTION**

Competitive pressures from within the industry, as well as external political, economic and other considerations are forcing the industry to re-examine and improve its *modus operandi*.

The Royal Society of Arts, Manufactures and Commerce (RSA) said about the role of tomorrow's company: „To achieve sustainable business success in the demanding world marketplace, a company must use relevant performance measures”.

The weaknesses in the current practice and highlighted areas of further work necessary to ensure the use of performance measurement is sustained and adds value to the industry.

Andy Neely gives seven reasons why performance measurement is now on the management agenda. All of the points are relevant to any industry: the changing nature of work; increasing competition; specific improvement initiatives; national and international quality awards; changing organizational roles; changing external demands; and the power of information technology.

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\* *Lecturer, Ph.D. at the University of Craiova, Romania  
Ec., Ph.D. Student at the University of Craiova, Romania*

## 2. PERFORMANCE MEASUREMENT SYSTEMS (PMS)

Traditionally businesses have measured their performance in financial terms, profit, turnover, etc. These financial measures of performance have been the sole measures of a company's success. Performance measurement that has been based around financial measures has been deemed to be out of step with recent changes in industry, particularly relating to new technologies and increased competition.

Performance measurement is furthermore criticized because it often focuses narrowly on easily quantifiable criteria such as cost and productivity, while neglecting other criteria important to competitive success. The traditional performance measures, developed from costing and accounting systems, have been criticized for encouraging short-termism; lacking strategic focus; encouraging local optimisation; encouraging minimisation of variance rather than continuous improvement; not being externally focused.

The subject of performance measurement is vast and numerous authors continuously add to the body of literature on the subject. The amount of literature on the subject demonstrates the problems that exist with performance measurement and its importance within the business community. Most authors agree that managers measure for two main reasons. Either they want to know where there are and what they have to improve; or they want to influence their subordinate's behaviour. Strategic control includes both of these reasons. Initially strategic control was seen as enabling managers to see if their chosen strategies were being successfully implemented. This view has since been extended. Humans can be seen as "calculative receptors", their behavior can be influenced by a strategic control system. They receive a stimulus, interpret this, assessing the perceived costs and benefits of various responses and are likely to choose whichever course of action will maximise their gain. Control through measurement and feedback follows action. Rewards or sanctions are then used to reinforce or modify behavior depending on the employee's performance and on the appropriateness of the action pursued. A broader view is that strategic control systems will: co-ordinate the efforts of employees; motivate individual managers; and alter direction dependent on circumstances. Another view is that strategic controls can be used as a means of:

- clarifying what good performance is;
- making explicit the trade-offs between profit and investment;
- introducing individual stretch targets; and
- ensuring that corporate management knows when to intervene because business performance is deteriorating.

Andy Neely and Mike Bourne summarise that strategic control systems have multiple roles to play and, given that many authors argue that performance measurement is part of the strategic control process, then it follows that performance measures also have different roles to play. The multiple reasons why organisations measure performance can fall into one of four distinct categories.

(1) *Checking position.* Establishment of current status and monitoring of progress over time and against benchmarks.

(2) *Communicating position.* This can be a requirement, quoted firms must release annual reports, safety statistics must be submitted in construction, they may be expected by customers or employees, and also as a means of marketing themselves.

(3) *Confirm priorities.* Performance data provide insights into what is important to a business, exposing shortfalls allowing organisations to rationalise and focus on what the priorities should be.

(4) *Compel progress.* The measures can help the organisation focus on specific issues and encourage people to search for ways to change and improve performance. The measures communicate the priorities and can form the basis for reward.

J. Smullen identified five attributes for any PMS:

- (1) acceptable - they can be understood;
- (2) suitable - they measure important things;
- (3) feasible - they are easy to collect;
- (4) effective - they concentrate on encouraging the right behaviour; and
- (5) aligned - non financial measures must link to financial goals.

Other key attributes include:

- it must be the subject of a learning process;
- must be balanced;
- cascading scorecards;
- embody strength;
- not over financial; and
- it must be able to be implemented.

### **3. PERFORMANCE MEASUREMENT MODELS**

There are many types of performance model, for the purposes of this paper we will briefly consider two of the better known: the EFQM Excellence Model, the Balanced Scorecard.

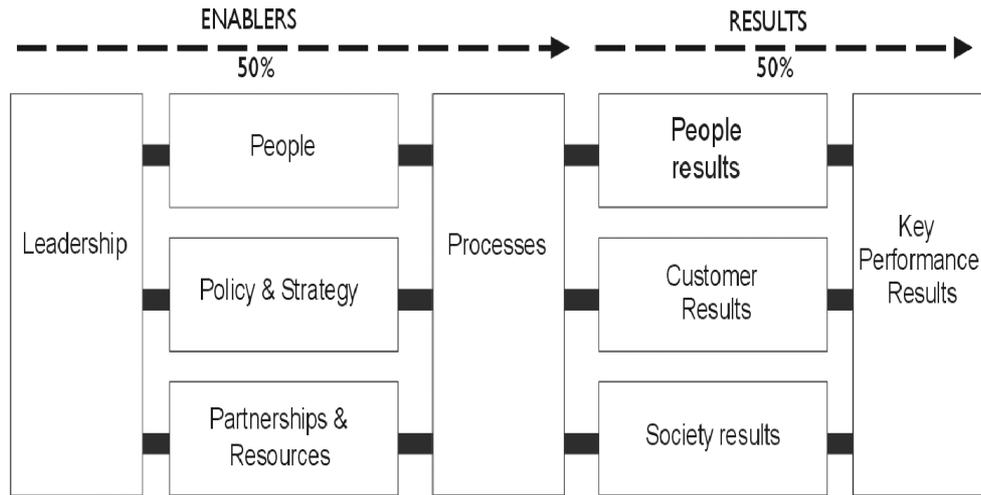
#### *The EFQM Excellence Model*

The EFQM Excellence Model is a non-prescriptive framework, designed to allow companies to assess where they are on "the path to excellence", understanding the gaps and stimulating solutions. It is a tool to help define and assess continuous improvement of an organisation, and is based on their eight fundamental concepts of excellence:

- (1) results orientation;
- (2) people development and involvement;
- (3) customer focus;
- (4) continuous learning, innovation and improvement;
- (5) leadership and constancy of purpose;
- (6) partnership development,

- (7) management by process and facts; and
- (8) public responsibility.

The Excellence Model has been developed to enable the assessment of excellence against the above fundamental concepts (see Figure 1).



**Figure 1.** The structure of EQFM Excellence Model

The model has nine criteria and starts on the left-hand side with Leadership, This is one of the five enabling activities which drive the four sets of results. The model flows naturally from the left to the right. The analogy of an arrow going through the centre of the model starting on the left, can be used to explain how the model works and how the different criteria are intrinsically linked. Any decision or action of an organisation requires leadership.

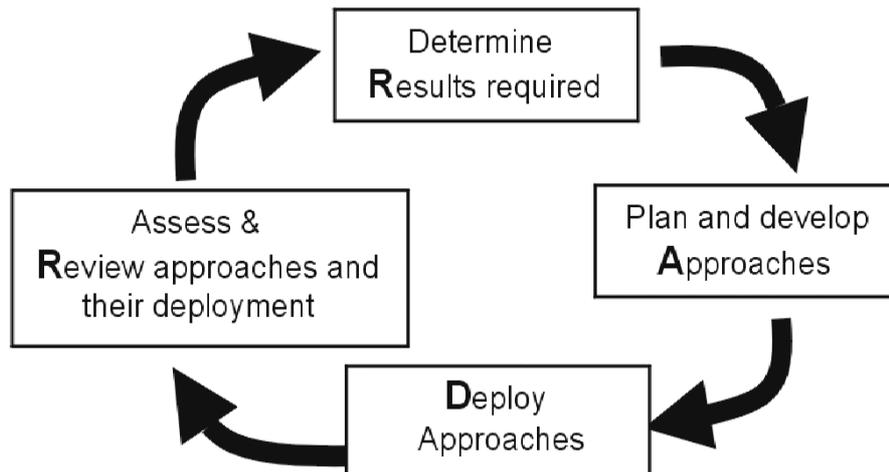
This leadership decides the company's policy and strategies, drawing on the capabilities of its people and its partnerships and resources. Having decided on its policy and strategy and ensured that its people, resources and partnerships are capable of supporting them, it then defines its processes which will deliver its customer results and its own key performance results. In delivering these results it also affects the employees (people results) and also the society in which it sits (society results).

The model also requires continuous improvement through innovation and learning, so having achieved the results, the leadership must review them, alter the policy and strategy accordingly, develop the people and resources to implement the changes required and ensure that the processes are adapted to deliver the desired results. The cycle is continuously repeated,

The model is devised to be used as a self-assessment tool, which enables a comprehensive, systematic and regular review of an organisation's activities and results referenced against criteria within the model. There are five different approaches to self-

assessment recommended by the EFQM. Dependent on the level of maturity with the excellence model, then the EFQM recommend the appropriate method of assessment. All the approaches deliver a score although only the more robust methods produce a score, which is comparable with those of the Quality Award Schemes.

The primary objective of the EFQM and their promotion of the use of the Excellence Model is to improve performance. The numeric score that is achieved is only used as a benchmark against which future performance is assessed. The primary objective of self-assessment is therefore the identification of strengths and of areas for improvement. The hope of the EFQM is that this process that will create the energy to improve the organisations performance. The EFQM have developed the RADAR Scoring matrix. The RADAR logic is cyclical and continuous, forms the areas of assessment on the matrix and is at the core of the EFQM Excellence Model. It can be applied to most business situations that involve a process (see Figure 2).



**Figure 2.** The RADAR logic

#### *The Balanced Scorecard.*

The Balanced Scorecard is a framework in which to understand the relationship between objectives, activities and results and integrate the management process. It can aid precise articulation of the organisation's objectives, the formulation of strategy, the generation of plans and budgets, and the setting up of an information system for performance monitoring and management. It also leads to a cascading set of indicators which will enable the units within the organisation to co-ordinate their targets and behaviour with the overall strategy of the organisation. The Balanced Scorecard uses specific KPIs to assess the companies' performance. They must measure key strategic mechanisms for implementing and judging strategy for business.

There are four areas where indicators are developed. These are:

- (1) The financial perspective. How do we look to our shareholders?
- (2) The customer perspective. How do our customers see us?
- (3) The internal perspective. What must we excel at?
- (4) The innovation and learning perspective. Can we continue to improve and create value?

There are key practical issues that are necessary for effective change within an organisation. These include top management support, and J. Smullen also recommends that a pilot project is used to develop the scorecard, suggesting that one is produced for a particular business unit and one for a critical business process. The other key issue is the development of and understanding of the strategy. The senior management must clearly identify the goals and how they are attempting to achieve these goals and also what are the constraints of the business in achieving these goals.

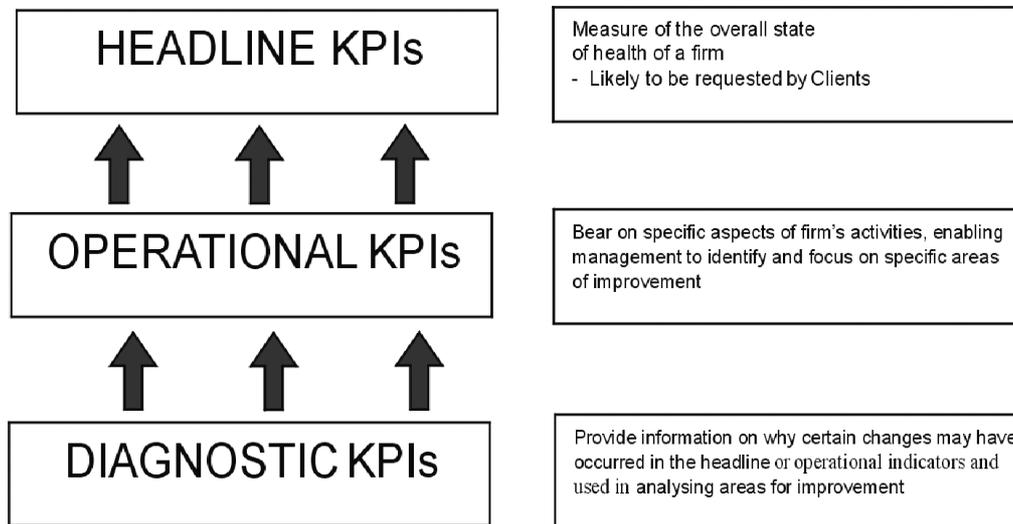
#### 4. TYPES OF PERFORMANCE MEASURES

As mentioned previously, for KPIs to be used successfully, they need to be part of a PMS. When developing the measures for a PMS a clear understanding of the different types and applications of measures is required. The most significant problem with the KPIs ,in their current format, was that they do not offer the opportunity to change. They are designed to be used as post result "lagging" KPIs. Lagging measures are used to assess completed performance results. They do offer the opportunity to change performance or alter the result of associated performance. They are used only as a historic review. Leading measures do offer the opportunity to change. They are measures of performance whose results are used either to predict future performance of the activity being measured and present the opportunity to change practice accordingly, or to enable future decisions to be made on future associated activities based on the outcome of previous activities.

The EFQM Excellence Model identifies three specific types of measures. They distinguish between KPIs, KPOs and perception measures.

**KPIs.** KPIs are measures that are indicative of performance of associated processes. An industrial measure of absenteeism within companies is also a KPI. A high level of absenteeism could be indicative of problems with morale, which may have been caused by a number of different reasons, poor leadership, lack of work, poor working conditions, etc. If this measure is used as a leading indicator, then it can be used to give an early warning, identify a potential problem and highlight the need for further investigation. This provides an opportunity to change and to take appropriate corrective action. The "cause and effect" relationship between the result being measured and the associated cause may be difficult to establish in a business environment. This is why a KPI can only be indicative of future performance.

The KPI s can be divided on three levels (see Figure 3).



**Figure 3.** The levels of KPIs

For all types of measures benchmarking is very important. It is particularly important for KPIs because they are only indicative of associated performance. It is therefore the understanding that the KPI is indicative of predictable performance. For the performance to be predictable then benchmarked data through experience are required. If benchmarked data are not available then the decisions based KPI data, are based only on intuition. This level has been set based on benchmarked data either through experience of use or through testing. The user therefore knows that action needs to be taken to prevent the problem occurring.

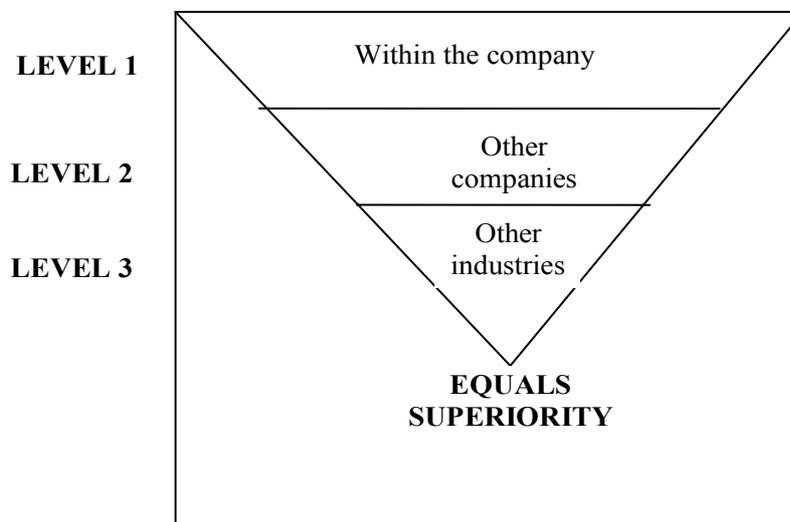
A key part of a PMS is the use of results to aid the decision-making process. A strategic benchmarking initiative has most to contribute towards their change culture, process, improvement of performance and productivity. Benchmarking enables an organisation to identify its performance gaps and opportunities, and develop continuous improvement programs for all stages of their process". Benchmarking is defined as:

A process of continuous improvement based on the comparison of an organisation's processes or products with those identified as best practice. The best practice comparison is used as a means of establishing achievable goals aimed at obtaining organisational superiority.

Richard L. Lynch and K.F. Cross suggest that there are three levels to benchmarking. Level 1 is internally, within the company, which allows comparisons between different departments and also progressive reviews to measure attainment of targets set. This can be used to identify areas of best practice within the company, which could be transferred throughout the company. The challenge to the company is

to identify the best practices that are transferable. Level 2 focuses on organizations' competitors, i.e. other companies within the industry.

This comparison attempts to compare the organization's processes with organizations that produce and sell the same products or services, particularly those with commercial advantage. Level 3 is the comparison with other industries, often referred to as functional/generic benchmarking. This type of benchmarking is thought to lead to the most change in an organization's process. This is because it involves comparisons with those that are best in class. Also, because the organizations involved are not in competition, they are more likely to be prepared to share the secrets of their success. This provides the greatest opportunity for superiority (see Figure 4).



**Figure 4.** The levels of benchmarking

Benchmarking is key to adding value to performance measurement. Results are compared to benchmarked data and decisions are taken based on this comparison. As mentioned previously companies have traditionally measured themselves with financial measures. Companies have used these financial measures both as internal benchmarks - Level 1 and also as competitive benchmarks - Levels 2 and 3 (e.g. share price). Financial measures are often externally audited and therefore they can be confidently used in benchmarking.

**KPOs** are results of a completed action or process. They therefore do not offer the opportunity to change. Business KPOs include measures of profit, share price, market share etc They can also be used to measure the results of processes and sub processes, whose results in themselves cannot be altered. However the results could be

used to make decisions to change how the next processes are carried out. For example, if one of the sub processes finished late by two days. The sub process KPO would indicate a two-day overrun. This sub process is complete and the result cannot be changed. However in order to achieve the overall result, additional resources could be utilised on the next processes to address this overrun. In this way the sub process KPO can be seen as a leading measure in the context of the overall result. The measure is of an enabling activity, a leading activity that will deliver a business result.

**Perception measures** can be used at any stage. They require direct feedback on past performance. They can be leading or lagging measures. For example, client satisfaction is measured after the completion of the project. This is therefore a lagging measure, which cannot be changed. However, if client satisfaction is measured at various stages during the project then these can be described as being leading indicators, ones which provide the opportunity to change future actions to affect the overall desired end result. Perception measures are usually carried out by direct question or survey. There is a danger that because employees and especially clients will become increasingly asked for feedback, the results could become negatively influenced. Some companies are starting to use employees to anticipate the perceptions of their clients.

It is clear from the research that performance measurement is only part of the business improvement process. Unless action is taken based on the results attained then the measures are meaningless, costing money to obtain and not adding value to business. Performance measurement must therefore be part of a system, which reviews performance, decides on actions and changes the way in which the business operates. It is the translation of the results into action that is crucial to achieving improved performance.

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## **METHODS OF EVALUATING PERFORMANCES FOR MARKETING STRATEGIES**

**IOAN CUCU \***

**ABSTRACT:** *There are specific methods for assessing and improving the effectiveness of a marketing strategy. A marketer should state in the marketing plan what a marketing strategy is supposed to accomplish. These statements should set forth performance standards, which usually are stated in terms of profits, sales, or costs. Actual performance must be measured in similar terms so that comparisons are possible. This paper describes sales analysis and cost analysis, two general ways of evaluating the actual performance of marketing strategies.*

**KEY WORDS:** *market share, sales analysis, marketing cost analysis, natural accounts, marketing function accounts, traceable common costs, nontraceable common costs.*

### **1. SALES ANALYSIS**

Sales analysis uses sales figures to evaluate a firm's current performance. It is probably the most common method of evaluation because sales data partially reflect the target markets reactions to a marketing mix and often are readily available, at least in aggregate form.

Marketers use current sales data to monitor the impact of current marketing efforts. For example, Godiva attempts to measure the sales of its chocolates during selected holiday seasons. However, that information alone is not enough. To provide useful analyses, current sales data must be compared with forecasted sales, industry sales, specific competitors' sales, or the costs incurred to achieve the sales volume. For example, knowing that a variety store attained a \$600,000 sales volume this year does not tell management whether its marketing strategy has been successful. However, if managers know that expected sales were \$550,000, then they are in a better position to determine the effectiveness of the firm's marketing efforts. In addition, if they know that the marketing costs needed to

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\* *Assoc.Prof.,Ph.D. at the University of Petroșani, Romania*

achieve the \$600,000 volume were 12 percent less than budgeted, they are in an even better position to analyze their marketing strategy precisely.

### **1.1. Types of Sales Measurements**

Although sales may be measured in several ways, the basic unit of measurement is the sales transaction. A sales transaction results in a customer order for a specified quantity of an organizations product sold under specified terms by a particular salesperson or sales group on a certain date. Many organizations record these bits of information about their transactions. With such a record, a company can analyze sales in terms of dollar volume or market share.

Firms frequently use dollar volume sales analysis because the dollar is a common denominator of sales, costs, and profits. However, price increases and decreases affect total sales figures. For example, if a company increased its prices by 10 percent this year and its sales volume is 10 percent greater than last year, it has not experienced any increase in unit sales. A marketing manager who uses dollar volume analysis should factor out the effects of price changes.

A firm's market share is the firm's sales of a product stated as a percentage of industry sales of that product. For example, Coca-Cola at one time sold 40 percent of all the cola sold annually in the United States and thus had a market share of 40 percent. Market share analysis lets a company compare its marketing strategy with competitors' strategies. The primary reason for using market share analysis is to estimate whether sales changes have resulted from the firm's marketing strategy or from uncontrollable environmental forces. When a company's sales volume declines but its share of the market stays the same, the marketer can assume that industry sales declined (because of some uncontrollable factors) and that this decline was reflected in the firm's sales. However, if a company experiences a decline in both sales and market share, it should consider the possibility that its marketing strategy is not effective.

Even though market share analysis can be helpful in evaluating the performance of a marketing strategy, the user must interpret results cautiously. When attributing a sales decline to uncontrollable factors, a marketer must keep in mind that such factors do not affect all firms in the industry equally. Not all firms in an industry have the same objectives, and some change objectives from one year to the next. Changes in the objectives of one company can affect the market shares of one or all companies in that industry.

For example, if a competitor significantly increases promotional efforts or drastically reduces prices to increase market share, then a company could lose market share despite a well-designed marketing strategy. Within an industry, the entrance of new firms or the demise of established ones also affects a specific firm's market share, and market share analysts should attempt to account for these effects. Kentucky Fried Chicken, for example, probably re-evaluated its marketing strategies when McDonald's introduced its own fried chicken product.

## **1.2. Bases for Sales Analysis**

Whether it is based on sales volume or market share, sales analysis can be performed on aggregate sales figures or on disaggregated data. Aggregate sales analysis provides an overview of current sales. Although helpful, aggregate sales analysis is often insufficient because it does not bring to light sales variations within the aggregate. It is not uncommon for a marketer to find that a large proportion of aggregate sales comes from a small number of products, geographic areas, or customers. (This is sometimes called the "iceberg principle" because only a small part of an iceberg is visible above the water.) To find such disparities, total sales figures usually are broken down by geographic unit, salesperson, product, customer type, or a combination of these categories.

In sales analysis by geographic unit, sales data can be classified by city, county, district, state, country, or any other geographic designation for which a marketer collects sales information. Actual sales in a geographic unit can be compared with sales in a similar geographic unit, with last year's sales, or with an estimated market potential for the area. For example, if a firm finds that 18 percent of its sales are coming from an area that represents only 8 percent of the potential sales for the product, then it can be assumed that the marketing strategy is successful in that geographic unit.

Because of the cost associated with hiring and maintaining a sales force, businesses commonly analyze sales by salesperson to determine the contribution each salesperson makes. Performance standards for each salesperson are often set in terms of sales quotas for a given time period. Evaluation of actual performance, accomplished by comparing a salesperson's current sales to a pre-established quota' or some other standard, such as the previous periods sales. If actual sales meet or exceed the standard and the sales representative has not incurred costs above those budgeted, that person's efforts are acceptable.

Sales analysis is often performed according to product group or specific product item. Marketers break down their aggregate sales figures by product to determine the proportion that each contributed to total sales. Columbia Pictures, for example, might break down its total sales figures by box office figures for each film produced. A firm usually sets a sales volume objective—and sometimes a market share objective—for each product item or product group, and sales analysis by product is the only way to measure such objectives.

A marketer can compare the breakdown of current sales by product with those of previous years. In addition, within industries for which sales data by product are available, a firm's sales by product type can be compared with industry averages. To gain an accurate picture of where sales of specific products are occurring, marketers sometimes combine sales analysis by product with sales analysis by geographic area or salesperson.

Analyses based on customers are usually broken down by types of customers. Customers can be classified by the way they use a firm's products, their distribution level (producer, wholesaler, retailer), their size, the size of orders, or other characteristics. Sales analysis by customer type lets a firm ascertain whether its marketing resources are allocated in a way that achieves the greatest productivity. For example, sales analysis by type of customer may reveal that 60 percent of the sales force is serving a group that makes only 15 percent of total sales.

A considerable amount of information is needed for sales analyses, especially if disaggregated analyses are desired. The marketer must develop an operational system for collecting sales information; obviously, the effectiveness of the system for collecting sales information largely determines a company's ability to develop useful sales analyses.

## 2. MARKETING COST ANALYSIS

Although sales analysis is critical for evaluating the effectiveness of a marketing strategy, it gives only part of the picture. A marketing strategy that successfully generates sales may also be extremely costly. To get a complete picture, a firm must know the marketing costs associated with using a given strategy to achieve a certain sales level. **Marketing cost analysis** breaks down and classifies costs to determine which are associated with specific marketing activities. By comparing costs of previous marketing activities with results generated, a marketer can better allocate the firm's marketing resources in the future. Marketing cost analysis lets a company evaluate the effectiveness of an ongoing or recent marketing strategy by comparing sales achieved and costs incurred. By pinpointing exactly where a company is experiencing high costs, this form of analysis can help isolate profitable or unprofitable customer segments, products, or geographic areas.

For example, the market share of Komatsu Ltd., a Japanese construction equipment manufacturer, was declining in the United States as a result of increasing prices because of the high yen value. Komatsu thus developed an equal joint venture with Dresser Industries, making it the second largest company in this industry. The joint venture with Dresser allowed Komatsu to shift a large amount of its final assembly to the United States, to Dresser plants that had been running at 50 percent capacity. By using Dresser's unused capacity and existing U.S. plants, Komatsu avoided the start-up costs of new construction and gained an immediate manufacturing presence in the United States. This cost-control tactic should enable Komatsu to use price more effectively as a marketing variable to compete with number one Caterpillar Tractor Co.

In some organizations, personnel in other functional areas—such as production or accounting—see marketers as primarily concerned with generating sales, regardless of the costs incurred. By conducting cost analyses, marketers can undercut this criticism and put themselves in a better position to demonstrate how marketing activities contribute to generating profits. Even though hiring a

spokesperson such as Joe Montana is costly, sales goals cannot be reached without large expenditures for promotion in the soft drink industry. Cost analysis should show if promotion costs are effective in increasing sales.

### 2.1. Determining Marketing Costs

The task of determining marketing costs is often complex and difficult. Simply ascertaining the costs associated with marketing a product is rarely adequate. Marketers must usually determine the marketing costs of serving specific geographic areas, market segments, or even specific customers.

A first step in determining the costs is to examine accounting records. Most accounting systems classify costs into **natural accounts**—such as rent, salaries, office supplies, and utilities—which are based on how the money was actually spent. Unfortunately, many natural accounts do not help explain what marketing functions were performed through the expenditure of those funds. It does little good, for example, to know that \$80,000 is spent for rent each year. The analyst has no way of knowing whether the money is spent for the rental of production, storage, or sales facilities. Therefore, marketing cost analysis usually requires that some of the costs in natural accounts be reclassified into **marketing function accounts**, which indicate the function performed through the expenditure of funds. Common marketing function accounts are transportation, storage, order processing, selling, advertising, sales promotion, marketing research, and customer credit.

Natural accounts can be reclassified into marketing function accounts as shown in the simplified example in table no. 1. Note that a few natural accounts, such as advertising, can be reclassified easily into functional accounts because they do not have to be split across several accounts. For most of the natural accounts, however, marketers must develop criteria for assigning them to the various functional accounts.

For example, the number of square feet of floor space used was the criterion for dividing the rental costs in table no 1 into functional accounts. In some instances, a specific marketing cost is incurred to perform several functions. A packaging cost, for example, could be considered a production function, a distribution function, a promotional function, or all three. The marketing cost analyst must reclassify such costs across multiple functions.

Three broad categories are used in marketing cost analysis: direct costs, traceable common costs, and nontraceable common costs. **Direct costs** are directly attributable to the performance of marketing functions. For example, sales force salaries might be allocated to the cost of selling a specific product item, selling in a specific geographic area, or selling to a particular customer. **Traceable common costs** can be allocated indirectly, using one or several criteria, to the functions that they support.

For example, if the firm spends \$80,000 annually to rent space for production, storage, and selling, the rental costs of storage could be determined on the

basis of cost per square foot used for storage. **Nontraceable common costs** cannot be assigned according to any logical criteria and thus are assignable only on an arbitrary basis. Interest, taxes, and the salaries of top management are nontraceable common costs.

The manner of dealing with these three categories of costs depends on whether the analyst uses a full cost or a direct cost approach. When a **full cost approach** is used, cost analysis includes direct costs, traceable common costs, and nontraceable common costs. Proponents of this approach claim that if an accurate profit picture is desired, all costs must be included in the analysis.

However, opponents point out that full costing does not yield actual costs because nontraceable common costs are determined by arbitrary criteria. With different criteria, the full-costing approach yields different results. A cost-conscious operating unit can be discouraged if numerous costs are assigned to it arbitrarily. To eliminate such problems, the **direct cost approach**, which includes direct costs and traceable common costs but not nontraceable common costs, is used. Opponents say that this approach is not accurate because it omits one cost category.

## 2.2. Methods of Marketing Cost Analysis

Marketers can use several methods to analyze costs. The methods vary in their precision. This section examines three cost analysis methods—analysis of natural accounts; analysis of functional accounts; and cost analysis by product, geographic area, or customer.

Marketers sometimes can determine marketing costs by performing an analysis of natural accounts. The precision of this method depends on how detailed the firm's accounts are. For example, if accounting records contain separate accounts for production wages, sales-force wages, and executive salaries, the analysis can be more precise than if all wages and salaries are lumped into a single account. An analysis of natural accounts is more meaningful, and thus more useful, when current cost data can be compared with those of previous periods or with average cost figures for the entire industry. Cost analysis of natural accounts frequently treats costs as percentages of sales. The periodic use of cost-to-sales ratios lets a marketer ascertain cost fluctuations quickly.

As indicated earlier, the analysis of natural accounts may not shed much light on the cost of marketing activities. In such cases, natural accounts must be reclassified into marketing function accounts for analysis. Whether certain natural accounts are reclassified into functional accounts and what criteria are used to reclassify them will depend to some degree on whether the analyst is using direct costing or full costing.

**Table 1. Reclassification of natural accounts into functional accounts**

<b>PROFIT AND LOSS STATEMENT</b>	<b>FUNCTIONAL ACCOUNTS</b>						
		<b>Adverti- sing</b>	<b>Personal</b>	<b>Transporta- tion</b>	<b>Storage</b>	<b>Marketing Research</b>	<b>Non- Marketing</b>
<b>Sales</b>	<b>\$250,000</b>						
<b>Cost of goods sold</b>	<b>45,000</b>						
<b>Gross profit</b>	<b>205,000</b>						
<b>Expenses (natural accounts)</b>							
Rent	\$14,000		\$7,000		\$6,000		\$1,000
Salaries	72,000	\$12,000	32,000	\$7,000		\$1,000	20,000
Supplies	4,000	1,500	1,000			1,000	500
Advertising	16,000	16,000					
Freight	4,000			2,000			2,000
Taxes	2,000				200		1,800
Insurance	1,000				600		400
Interest	3,000						3,000
Bad debts	6,000						6,000
<b>Total</b>	<b>\$122,000</b>	<b>\$29,500</b>	<b>\$40,000</b>	<b>\$9,000</b>	<b>\$6,800</b>	<b>\$2,000</b>	<b>\$34,700</b>
<b>Net profit</b>	<b>\$ 83,000</b>						

After natural accounts have been reclassified into functional accounts, the cost of each function is determined by summing the costs in each functional account. Once the costs of these marketing functions have been determined, the analyst is ready to compare the resulting figures with budgeted costs, sales analysis data, cost data from earlier operating periods, or perhaps average industry cost figures, if these are available.

Although marketers ordinarily get a more detailed picture of marketing costs by analyzing functional accounts than by analyzing natural accounts, some firms need an even more precise cost analysis. The need is especially great if the firms sell several types of products, sell in multiple geographic areas, or sell to a wide variety of customers. Activities vary in marketing different products in specific geographic locations to certain customer groups. Therefore the costs of these activities also vary. By analyzing the functional costs of specific product groups, geographic areas, or customer groups, a marketer can find out which of these marketing entities are the most cost effective to serve.

A similar type of analysis could be performed for geographic areas or for specific customer groups. The criteria used to allocate the functional accounts must be developed so as to yield results that are as accurate as possible. Use of faulty criteria is likely to yield inaccurate cost estimates that in turn lead to less effective control of marketing strategies. Marketers determine the marketing costs for

various product categories, geographic areas, or customer groups and then compare them to sales. This analysis lets them evaluate the effectiveness of the firm's marketing strategy or strategies.

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## **CONSIDERATIONS REGARDING COMPARATIVE MANAGEMENT IN THE EUROPEAN UNION**

**IOAN CONSTANTIN DIMA, CAMELIA MIHAI \***

**ABSTRACT:** *The comparative management represents the science that studies managerial processes and relations within those organizations which function in different cultural and national contexts, being centered on determining and analyzing managerial similarities and differences.*

**KEY WORDS:** *comparative management, international management, European management*

Over the time there were more definitions given to the concept of comparative management. Thus, *William Newman* considers that comparative management studied similarities and differences among managerial practices from different countries while *Ragh Nath* think that, in a broad sense, comparative management was concentrated on similarities and differences among management systems and economies form various contexts. *Edwin Miller* considers that comparative management studied management phenomena on a multinational basis, being centered on detecting, identifying, classifying, measuring and interpreting similarities and differences regarding elements, such as: management processes, concepts and techniques.

In fact, the comparative management represents the science that studies managerial processes and relations within those organizations which function in different cultural and national contexts, being centered on determining and analyzing managerial similarities and differences in order to allow international change of “*managerial know-how*” and to increase the functionality, effectiveness and efficiency of the organizations.

In this regard, certain premises must be taken into account: the objects of the comparison are only elements of management; the peculiarity of the examination consists in multinational cultural vision; the comparative approach is focused on

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\* *Prof., Ph.D. at the “ARTIFEX” University of Bucharest, Romania  
Student at the “Valahia” University of Târgoviște, Romania*

pointing out similarities and differences among managerial practices and theoretical elements; the objectives aimed are pragmatic, namely international change of “managerial know-how” and the increase the organizations’ effectiveness and efficiency.

Comparative management is closely connected with *international management* which studies the management and activity of international corporations, being focused especially on funds providing and controlling, individuals and information that cross national and political frontiers. In this context, international management represents part of comparative management.

The need for the formation and development of comparative management arise from the fact that for the human being comparison is essential because mankind goes through a period of strong international interdependences and a comparative study sharpen managers’ intelligence.

The main aspects that were not solved by comparative management are not liable to discourage researchers in this area, consisting of semantic problems, the omission of defining organizational effectiveness to a certain limit and the existence of considerable discrepancy.

There are several objectives of management. Thus, *William Newman* considers that these objectives are: discovering general managerial issues and techniques; identifying locale conditions characteristic to each investigated national area which require a particular adjustment of general managerial elements; assisting managers of international corporations in understanding managerial attitude and practice differences among different countries in order to increase the rationality and efficiency of economic activities.

In *Richard Farmer’s* point of view the objectives of management are the following: exploring relevant relations between the environment and management in order to determine those environmental factors that are the most relevant in a certain situation; analyzing various personnel behaviors within the managerial processes from different countries; laying down the efficient way of management; discovering the possibilities of improving economic performances.

The problems that comparative management has to deal with regards the processes, functions and principles of management, the management system of companies, the organizational culture, the strategy and policy of the firm, the organizational structure, the informational system, the decisional system, the management systems, methods and techniques, entrepreneurs and managers, the management of human resources, the management efficiency.

Both in practice and theory there are several models of comparative management, such as the Farmer-Richman model, the Negandhi-Prasad model, the Tung model, the John Child model. One of the most interesting approaches is the Greet Hofstede model regarding the issues of comparative management through five debate point: individualism versus collectivism, power distance, avoidance of uncertainty, masculinity versus femininity, short term approach versus long term approach (maintaining traditions in economic activities or embracing modern terms).

The direction of comparative management researches and studies is towards two methodological approaches: conceptualizing and synthesizing information. The particularities refer to the superior complexity of management in a standardized approach and to the emergence of equivalency elements in an equivalent approach.

Every complex comparative management study implies covering the following steps: goal setting (theoretically, developing an equivalent theory within cultures; pragmatically, outlining and developing certain management approaches or certain proper social behaviors within different cultures); subject defining (conceptual, meaning that the subject is equivalent, the subject's importance must be the same, the subject's specificity must be equal); sampling the investigational subjects (settling those subjects that take part in the research, judicious dimensioning of the sample, selecting investigational cultures); management phenomena measuring and scoring; investigation development administration; information analyzes regarding investigated managerial elements; conclusion drawing.

Comparative management studies can be: parochial (investigates a only one invariable culture); ethnocentric (initial investigations are projected and achieved within a culture, being repeated within a second culture); polycentric (achieved within certain specific structures); comparative (carried out by identifying similarities and differences between two or more cultures, assuming that there is no dominating culture); geocentric (the investigational area contains multinational corporations); synergetic (concerns investigating relations structure and managerial theories which can be applied when persons belonging to several culture are interconnected during the working process).

The comparative management study points out both strength and weaknesses. Thus, strength regards a large number of studies, various ranges of investigated methods and techniques, significant results obtained especially during empirical researches, getting a number of valuable methodological approaches. Weaknesses refer to descriptive approaches prevalence, insufficient strictness in methodological approach, important discrepancy between theoretical-methodological and empiric researches, insufficient abstracting and generalization.

**European management issues.** Beginning with the first oil shock industrialized economies entered into a crises period which involved a transformation based on labor productivity growth. There were important differences among developed European countries regarding development rank. For example, Great Britain, the winner of the World War II, was exhausted of resources but it succeeded in rebuilding its industry by using low equipped factories and old technologies. Labor employment degree grew, unemployment decreased, a restrictive monetary policy was applied, interest rate and current payment deficit increased.

Unlike England, France and Germany had rebuilt their industry, including infrastructure by appealing to new technologies, imported especially from USA. Inflation was kept under control and restrictive monetary policy was applied.

After the World War II, Italy registered a bigger rate of growth than Great Britain. That growth was characterized through an important deficit of public finance.

The government embraced a vulnerable convergent policy in relations with the main European partners, Germany and France.

Other European countries such as the Netherlands, Scandinavian countries, Spain registered an average growth rate included between low performances of Great Britain and post-war return of France and especially of Germany.

In the XX-th century the cultural inheritance was heterogeneous regarding different countries involving a number of impediments in treating Europe as an entity and speaking about a specific European management model.

In the second part of the XX-th century different actions regarding European integration were carried out. Beginning with 1945 there were no major conflicts or wars among countries from Western Europe and the reconciliation between France and Germany allowed peace consolidation in Europe and several agreements and organizations were formed. The drop of the “iron curtain” in 1989 represented the end of division from ideological, politic and economic point of view. The 12 members of the European Community created in 1992 the European common market within the member states.

If one compare the economic power of the states from the EU it is obvious that there are no significant differences regarding the GNP (gross national product). The expression “*European manager*” became well-known in the last years together with the concept of European common market.

The main objectives of the European common market refers to internationalization of activities for European firms, the need for global strategies, the internationalization of financial and capital markets.

The *European management* is a concept which includes the models of managerial behavior regarding problem solving and decision making at each organizational level by which the strategies, planning, implementing and change estimation European identity can be distinguished.

Taking into account the cultural diversity of the European context the “*diversity management*” concept emerged stressing out the importance of extending the process beyond the frontier of a country, promoting labor relations less hierarchical and finally forming trans-European organizations.

**Particularities of management in European countries.** As far as the particularities of management are concerned, P.R. Lawrence and J.W. Lorsch, experts in management, proved that organizations need two types of managers: a functional manager and an integrator manager able to provide the systemization of different interests of the functional departments.

Thus, there were identified three specific ways of recruiting and promoting:

- *the British model* regards recruiting managers from experts in different functions of the organization; thus, the decentralization of the management system is the embraced option taking into consideration the fact that the chosen experts have no integrator features and they are promoted at superior levels without any special abilities;

- *the German model* concerns the fact that the chosen experts are capable to develop certain qualities required by their future role of integrators; the same model is applied in Nordic countries, such as: Denmark, Finland, Nederland, Norway, Sweden or in Mediterranean countries, such as: Greece and Turkey;
- *the French model* states that the roles of the functional manager and those of the integrator manager are never combined (the functional roles are reserved to inferior and medium level managers and the integrating roles are reserved to superior level managers).

In English organizations there are several types of interest for owners, shareholders, managers, employers, suppliers and the public. The number of managers concerned with satisfying consumers' interests increased reaching 84% which means that we can talk about the "king consumer".

In France the involvement of the state represents the striking characteristic involving the establishment of the main directions of economic development and the involvement in certain sectors.

The protestant principles of *Max Weber* regarding the social efficiency of organizational structures had a powerful impact on the thinking process in Germany and on the behavior of the German manager. Thus, the concept of *market social economy* emerged.

With a few exceptions, English managers do not have properties in the production field and they do not use labour in their own interest, but they control and supervise it. They have considerable incomes (20 – 30,000 GBP/year) and autonomy in controlling others. But they are less qualified than managers from other countries, don't need academic education, usually are graduates from technical education and have a high mobility.

Due to certain studies of the Management Institute, in proportion of 40.6% English managers work more than 50 hours a week. In England a great importance is given to the independence in thinking and acting, the possibility of self-achievement, the material rewards and the certainty of the job.

In France family businesses prevail that is why there is an overlap between the concept of manager and owner. The business community can be characterized as a domestic capitalism which limits the promotion in the top of the hierarchy based on personal skills and competence without excluding professionalism. The significance of the term "*coare*" used to define the leader represents a French rank while in England the term "*manager*" describes only a position. The French personnel is considered the brain of the firms, they have an exceptional education and acquiring the title of "*cadre*" is equivalent to passing an intelligence test. French have a rational thinking according to which a logic argumentation admits only one conclusion.

German managers were influenced by three great economists: *Schmalenbach* who considered that the main objective of an economic activity is not the profit but the maximization of satisfying the needs of the community; *Nicklich* put the accent on the needs of the community pointing out the fact that the economic activity must take into

consideration the other activities; *Rieger* thought that the entrepreneur had no other motivation than the profit.

After the World War II *Erich Gutenberg* developed a theory according to which the managerial activity involves the setting of an optimal combination between the factors of production able to lead to profitability and the economic efficiency. German managers stress out the importance of quality, promotion of creative-innovating processes and cost reduction.

**Particularities of the structural organizing of the firm.** In England firms are organized in holdings with a flexible structure, being decentralized on different decisional levels.

The main characteristics of a holding regard the following aspects: a holding has a social headquarter which functions with relatively reduced personnel coordinating several branches; each branch has a board of directors, the product being produced and sold under its own brand; there are few exchanges among branches; in a holding with a divisional embryo certain divisions are organized including several branches; the general manager of the holding acts as a *banker*.

The structural organizing is carried out based on intellectual training and social position. The structure of the organization is one of command having deep roots in the educational system, the style is autocratic being organized in form of hierarchic pyramids, the authority is centralized, and there are significant salary differences and tendencies of individual autonomy. Due to a study developed by *Jaques Morovitz* regarding several firms from England, France and Germany the main accent is placed on specialization, delegation and coordination are less used and there are several superior managers in the firm.

## **STRUCTURAL FUNDS AND COHESION FUND – FINANCIAL INSTRUMENTS OF SOLIDARITY POLICIES WITHIN THE EUROPEAN UNION**

**OANA DOBRE-BARON** \*

**ABSTRACT:** *Solidarity among the citizens of the European Union, economic and social development as well as cohesion are declared objectives stated in Amsterdam Treaty; their accomplishment should be assured by the states – members owing to implementing European regional policy financed by the Structural Funds and the Cohesion Fund. The European Union does not simply play the part of a financer – it has its own vision regarding regional policy, and acts directly at a local and regional level, complementary to the national policies of the states – members in this field.*

**KEY WORDS:** *Structural Funds, Cohesion Fund, regional policy, social policy, EU.*

According to the European Union Treaty (EUT) adopted at Maastricht in December 1991, and put in force on December the 1<sup>st</sup> 1993, the Union supports itself upon three “pillars” represented by the three treaties regarding the European communities, still in force (CECO, CE, EURATOM), and completed with the disposals concerning foreign affairs, mutual security and co-operation in the fields of justice and internal affairs.

Common policies represent the first “pillar” of the European Union and are distributed according to two distinct categories:

- solidarity policies that are meant to harmonize the conditions and the production factors as well as to equalize circulation conditions;
- common action policies that concern all strongly integrated fields: common agriculture policy, energetic policy, transport policy, research and development, European environment policy.

Solidarity policies directly support the free circulation of goods, services and capitals within the European Union. These policies submit to competition and common market. Finally, solidarity policies concern the equality of chances and the

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\* *Assist.Prof. at the University of Petroșani, Romania*

accomplishment of fair social and economic conditions within the common European environment. Accordingly, solidarity policies concern the following sector policies: regional development policy; social policy.

The main instrument of implementing solidarity policies (regional development policy and social policy) is the package of the four structural funds:

- the European Fund of Regional Development (EFRD);
- the European Social Fund (ESF);
- the European Fund for Agriculture Orientation and Guarantee (EAFOG);
- the Financial Instrument of Fishing Orientation (FIFO).

Other funds concern structural reforms (the European Fund of Development) and the countries in transition (the Fund of Helping Economic Re-Organization).

The specific problems settled owing to structural funds can be grouped in six important objectives:

**The 1<sup>st</sup> objective. The economic development of the regions:**

- support for private initiative;
- tourism development;
- agriculture diversification and modernization;
- infrastructural improvement in the countryside;
- creation of new jobs.

**The 2<sup>nd</sup> objective. The support of the regions in industrial decline:**

- support for economic re-conversion of such regions;
- support for small and medium companies;
- refreshment of technological research and development.

**The 3<sup>rd</sup> objective. Long term unemployment control.** This objective has been revised and extended in 1989 so that, at present, it regards two main categories of target population:

- long term unemployed workers;
- persons exposed to social exclusion due to poverty, prolonged unemployment, illiteracy, physical or mental handicap, drug addiction, lack of access to social protection (emigrants).

**The 4<sup>th</sup> objective. The facilitation of adapting to industrial mutations and the evolution of the production systems:**

- anticipation of labor market evolution;
- providing flexible qualifications and permanent professional training;
- complementary measures in case of industrial mutations and massive re-organizations.

**The 5<sup>th</sup> (a) objective. Modernization of agriculture and fishing structures:**

- farms modernization and training the young farmers;
- providing compensatory allowances in the regions that are not suitable for agriculture;
- promoting food industry;
- marketing forest products.

**The 5<sup>th</sup> (b) objective. Facilitation of structural re-organization of rural regions:**

- encouragement of investments and creation of jobs in disadvantaged rural regions;
- support of small and medium companies in such regions;
- environment protection;
- development of professional training adapted to the specific needs of such regions.

**The 6<sup>th</sup> objective. Development of regions having a low population density and unfavorable climate in northern European countries.** It specifically regards the depopulated areas in northern Sweden and Finland, inhabited by Sami population.

**REGIONAL DEVELOPMENT POLICY.** The European Union is one of the most prosperous economic areas in the world; nevertheless the economic differences among the member states or among the more than 250 regions are tremendous. The evaluation of these differences is very difficult; the comparison of welfare levels of different countries and regions by comparing the internal gross product or other indices is not always satisfying. There are a lot of studies and attempts to prove the convergence achieved within the European Union until now, the results being often contradictory. Yet, there is a certitude: evident discrepancies at regional levels as well as at national levels; their elimination seems to be, at present, an objective impossible to be achieved, even the mere attenuation of them proving to be a tremendous attempt for the actual budget of the Union. It is important to know that the poorest countries of the EU, Greece, Portugal and Spain, have an internal gross product/ inhabitant of about 80 % of the EU average one, while Luxemburg exceeds it with over 60 %. Regarding the regions, the internal gross product / inhabitant of the most dynamic ten regions is three times that of the last less developed ten regions. Otherwise, not all Europeans have the same chances or advantages when facing globalization challenges. Location is very important, that is whether the region is prosperous or, on the contrary, poor, dynamic or in decline, in the centre of Europe or at a long distance from it.

Solidarity among the Union's citizens, economic and social development as well as cohesion are declared objectives that appear in the Amsterdam Treaty; their achievement should be assured by the member states by implementing European regional policy financed by the Structural Funds and the Cohesion Fund. The European Union does not simply play the part of a mere financier – it has a vision of its own regarding regional policy, acting directly at a local and regional level, complementary to the national policies of the member states in this field.

The implementation of the regional policy of the EU has in view the achievement of the following **objectives**:

- 1. Promoting the structural development and re-organization of the less developed regions.** The funds that support this objective are the following: the European Fund for Regional Development, the European Social Fund, the European Agriculture Fund of Orientation and Guarantee, the Financial Instrument of Fishing Orientation, the European Bank of Investments. Budget: 93.972 billion euros.

The eligibility conditions for these funds are the following:

- NUTS regions whose internal gross product is less than 75 % of the EU average;
  - list decided by the Council according to a majority qualified vote;
  - financing of maximum 75 % and minimum 50 % of the whole;
  - financing up to 80 % in the poorest countries of the EU.
- 2. Restructuring and re-orientation of the regions hugely affected by economic decline.** The funds involved in achieving this objective are the following: EFRD, ESF, FIFO, and EBI. Budget: 15,360 billion euros.
- The eligibility criteria for obtaining these funds are the following:
- unemployment rate during the last three years should be under the EU average;
  - the rate of industrial unemployment within total unemployment should be higher than the EU average, beginning with 1975;
  - regions affected by economic decline, beginning with 1975;
  - maximum 50 % financing and minimum 25 % of public expenses.
- 3. Long term unemployment control and facilitation of integrating young people and socially excluded people on labor market.** The funds involved are ESF and EBI. Budget (together with objective no.4): 15.180 billion euros.
- 4. Facilitating workers' adaptation to industrial changes and to those occurring within production systems.** Funds: ESF and EBI.
- 5. (a). Promoting rural development,** by accelerating the adaptation of farming structures within the reform of Common Farming Policy (CFP). The funds: EFAOG, EBI. Budget: 6.916 billion euros.
- 5. (b). Promoting rural development and structural re-organization in rural regions.** It deals with financing the regions that are not included in objective no.1. Funds: EFAOG, ESF, EFRD, EBI. Budget: 6.862 billion euros.
- Eligibility criteria:
- high rate of agriculture unemployment within total unemployment;
  - low level of farmers' incomes;
  - reduced population density or tendencies of depopulation of farming regions.
- 6. Promoting the development and structural re-organization of weakly populated regions.** As an example: arctic regions in Sweden and Finland (Lapland). Funds: EFAOG, EFRD, ESF, EBI. Budget: 0.697 billion euros.
- The instruments of achieving the policy of regional development of the EU are the following:
- A. Structural funds** are financial instruments that support solidarity policies. Unlike competition and free circulation policy supposed by the common market, solidarity policies have in view the promotion of social cohesion. Four financial instruments have been created with this in view:
- 1) The European Fund for Regional Development (EFRD),** initiated in 1975, is meant for less favored regions; it supports the development of infrastructures, telecommunications, energetic development, education and sanitary services, investments encouragement, environment protection.
- EFRD started with small sums of money initially distributed among the member countries on the basis of allocation shares determined by the Council of

Ministers, a fact that determined the spreading of limited funds. In 1979, the Commission introduced for the first time a 5 % allocation, besides the shares; the 1984 EFRD reform replaced the shares with indicative gradations according to the funds' allocation of each country.

The funds made accessible owing to EFRD have constantly risen during the years. The allocated sums represented subsidies for financing investment projects, mainly regarding infrastructural investments. Larger amounts of resources have been allocated to less developed countries or regions. Nevertheless, the total sums of money have remained insignificant when compared with the expenses meant for regional policy at a national level or even with EU expenses for agriculture.

**2) The European Social Fund (ESF)** has been stipulated by the Rome Treaty (1957) and represents a financial instrument according to which the EU invests in the human capital. This fund resorts to a confidence principle that completes the member states' efforts of improving the perspectives of getting a job and of properly qualifying people. The ESF directs financial means in order to allow member states attaining their mutual goals regarding the creation of better and numerous jobs. The fund has as main objectives the prevention and control of unemployment, a better qualification of the workers and European companies in order to face the challenges and to avoid the loss of contact with labor market.

ESF has the following main objectives:

- the support of underdeveloped regions;
- the re-organization of the regions affected by economic decline;
- long term unemployment control;
- the adaptation of labor market to the evolution of production systems;
- the development of rural regions;
- the development of the regions having a dispersed population or of unpopulated regions.

**3) The European Fund for Agriculture Orientation and Guarantee (EFAOG)** was established in 1962 and is responsible for the largest part of the EU budget; it is meant to be an important re-distributive mechanism for European farmers, although its general impact upon regional discrepancies has proved to be quite varied.

**4) The Financial Instrument of Fishing Orientation (FIFO)** was created in 1993 and regards fishing industry.

The structural policy in the field of fishing is also included in the cohesion policy and has as a goal the support and refreshing of the field owing to rationalizing and modernizing production.

Between 1994 and 1999, the communitarian budget allocated to structural measures represented 208 billion euros (about 35 % of the EC budget), and was distributed as follows: 90 % in order to develop regions, 10 % for "cohesion countries" (that is poorer countries, newly admitted, such as Greece, Portugal, Ireland).

**B. Cohesion Fund** was established in 1992 by the Maastricht Treaty (the initial allocation represented 15 billion euros, mainly administrated at a national level than at a regional level as it is the case of structural funds). It is a financial instrument

of achieving economic and social cohesion of the member states. It has the following characteristics:

- it contains funds meant for governments not for regions ( such as the IPARD fund in Romania);
- it gives priority to the countries having a national gross product inferior to 90 % of the EU average: Greece, Portugal, Ireland and Spain, called at present the Four Cohesion. A conditional element has been introduced regarding the cohesion fund: the countries that benefit by it should follow the economic policies that lead to the accomplishment of convergence criteria. Consequently, the connection with ECM has been clearly established;
- it focuses on major governmental programs having a polyvalent impact (as an example: the diminishing of public debt);
- it finances almost 80 % of the projects' costs, the rest being supplied by the participant states.

Between 1993 and 1999, the Cohesion Fund provided 15.1 billion euros.

**C. Other instruments** accessible for regional development are the following: The European Committee of Coal and Steel; The European Bank for Investments (non-profit loans or fiscal guarantees; support for transition countries); New communitarian instruments (for small and medium companies); Operations of integrated development; Mediterranean integrated programs.

At the beginning of this millennium, European regional policy should face the new challenges. The most important of these is the preparation in order to get new members whose economic and social conditions are more precarious than those of the less developed regions of the present EU. Consequently, it is necessary to provide a pre-adherence help. In a world in process of globalization, of liberalizing economic exchanges, the companies need the best conditions in order to survive and to increase their competitive character (we mainly refer to a modern infrastructure, quality services and qualified labor). The less developed regions should be helped in order to modernize their infrastructure and offer efficient services that might make them attractive for the companies which would like to deploy their activity in such regions.

In order to successfully face these challenges, new reforms have been put into practice, especially from a financial perspective, known as Agenda 2000; they represent the defining element for the financial policy of the EU during 2000 – 2006. A larger concentration is specifically foreseen. Consequently we are going to witness the focusing on four levels of action concerning regional policies:

- a) the thematic focusing within each of the six objectives;
- b) geographical focusing – 51 % of the EU population get support for objectives no.1 and 2; it will be diminished to 35-40 % in 2006;
- c) financial focusing – 2/3 of the resources belonging to the structural funds will be allocated for objective no.1;
- d) objectives focusing – the 6 objectives (in fact 7, due to the fact there is a 5a and a 5b objective) will be reduced to 3:

**Objective no.1** refers to the less developed regions (the national gross product is less than 75 % of the EU average), far away regions (the former 6<sup>th</sup> objective); objective no.1 will receive 2/3 of the resources belonging to the structural funds, so that 20 % of the EU population should benefit. The structural funds that contribute to this objective are: EFRD, ESF, EFAOG, FIFO.

**Objective no. 2** refers to the regions affected by social and economic conversion (re-organization, structural problems, adaptation to a new production system). As an example: singular industry regions, regions depending on agriculture or fishing. About 18 % of the EU population will benefit by objective no.2. Funds: EFRD, ESF, EFAOG, FIFO.

**Objective no.3** supports the adaptation and modernizing education, training and employment systems; it has in view only those regions that are not included in objectives no.1 and 2. Funds: ESF.

Structural Funds and Cohesion Funds can be used only by the member countries. There is also support for the new members or the 'candidate' countries (non-repayable funds - PHARE).

Accordingly, the following funds allocation has been foreseen:

**Table 1. Funds allocation**

	Billion EURO							
Year	1999	2000	2001	2002	2003	2004	2005	2006
Structural Funds (the 15s)	31.4	31.3	32.1	31.3	29.2	29.2	28.2	27.3
Cohesion Fund (the 15s)	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
New member countries	0.0	0.0	0.0	3.6	7.6	7.6	9.6	11.6
Support for preadherence	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
<b>TOTAL</b>	<b>34.3</b>	<b>35.2</b>	<b>36.0</b>	<b>38.8</b>	<b>40.7</b>	<b>40.7</b>	<b>41.7</b>	<b>42.8</b>

Source: Bîrzea C. - *Politicile și instituțiile Uniunii europene, București, Ed. Corint, 2001, p.91*

During the period between 2000 and 2006, Agenda 2000 stipulates the increase of budget allocations up to 213 billion euros (195 billion euros for Structural Funds and 18 billion euros for Cohesion Fund).

Besides these measures, the reform of structural funds stipulates the diminishing of community initiatives (programs focused on specific problems, completion of the major objectives referred to by structural funds), from 13 to 4. Accordingly, four community initiatives in the field of solidarity policies will emerge:

- **Interreg** that has as goal trans-bordering and inter-regional co-operation;
- **Leader** that refers to regional development owing to local action groups;
- **Equal** that struggles against access discriminations on labor market;
- **Urban** that encourages economic and social flourishing of towns and suburban areas in difficulty.

**SOCIAL POLICY.** It has recently imposed itself as an important community field. Initially, the Rome Treaty understood social progress as a natural consequence of economic progress (the principle of social equalization owing to economic progress).

The Unique European Act (1986) went further, extending the Union's competence to economic and social cohesion, social dialogue and workers protection. The Community Chart of Fundamental Social Rights (1989), although it is not a coercive instrument, contains an important list of social rights, admitted at the community level.

The process of elaborating a community social policy continued at the beginning of the '90s, by defining the "European social pattern" (of French inspiration), which is based upon the following co-ordinates: common social rights within the European economic area, workers representation at the level of the company, social partnership, the regulating action of the state regarding salary protection and the administration of the system of social protection.

The principles of the Chart of Social Rights (1989) have been applied by the Maastricht Treaty (1992) and the Protocol on Social Policy (1993) that contains an annex entitled "Agreement regarding Social Policy". This agreement refers to the following domains: the workers' health and safety; working conditions; employees information and consulting; equality of chances and equality between men and women; the integration of the individuals excluded from labor market.

When the Commission published in 1994 a White Chart called "European social policy: a way to be followed by the European Union", the Amsterdam Treaty (1997) strengthened common responsibility in the social field. This treaty considers occupation and employment the main factors that assure social cohesion and the fulfillment of fundamental human rights. Accordingly, the community social policy has, at present, the following objectives: free circulation of labor, social cohesion, the occupation and employment of labor, professional training, the improvement of living and working conditions.

The main financial instrument used in order to achieve these objectives is the **European Social Fund** (1957, the Rome Treaty). Of the five objectives of the community social policy mentioned above, ESF especially finances objectives no.3 and 4. ESF is the second structural fund from the point of view of its financial capacity (it receives 1/3 of EU budget). During the period 1994–1999, the 47,000 billion euros of ESF were mainly directed towards the following priorities: fight against long term unemployment; development of professional skills required by employers; promotion of equality of chances between men and women on labor market; encouragement of creating new jobs; unemployment prevention owing to adapting labor to economic evolution; development of education system and professional training.

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## **THE REASON FOR IMPOSING CAPITAL REQUIREMENTS ON BANKS**

**IMOLA DRIGĂ \***

**ABSTRACT:** *The impact of bank regulation on risk-taking behavior has been a major focus during periods of severe financial crises. While there is still an ongoing debate whether regulation is beneficial at all, regulation is an evolving process and a number of regulatory guidelines have been issued by the Basel Committee on Banking Supervision and by national regulators over time.*

**KEY WORDS:** *insolvency risk, minimum capital requirements, capital adequacy*

In the last decades, the business environment became more risky having a negative impact on the ability of commercial banks and other financial institutions to properly function within the economic system.

Therefore, the issue of an efficient and effective risk management in banking became an up-to-date necessity more than ever before. In fact, risks arise from every transaction and process in banking.

Banks, which are profit-making organizations acting as intermediaries between borrowers and lenders attracting temporarily available resources from business and individual customers as well as granting loans for those in need of financial support, are profitable only if they charge a price that exceeds the cost of delivering a product or service and the cost of any loss resulting from the risks that arise in carrying out the transaction. Consequently, it is essential that commercial banks identify all risks associated with each business they are entering into.

Since exposure to significant risks in banking reduces the present value of expected future cash flow, bank managers must increasingly have at their disposal effective risk management techniques in order to manage risks proactively.

One of the greatest risks faced by banks during their operating procedures and management decision making is the insolvency risk. In order to reduce it banks have to abide certain prudential regulations. The insolvency risk (also called the capital risk or the bankruptcy risk) can be defined as the possibility that a bank could face the

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\* *Assist.Prof. at the University of Petroșani, Romania*

situation of not having enough capital to continue its activity or the possibility that the bank doesn't abide by minimum capital standards set by the banking authority.

Thus, we can say that a bank is considered insolvent in case it cannot fulfill its obligations, the funds owned by the bank being insufficient to cover the loss resulted from current activities and this situation will negatively affect the entire amount of credit investments of the bank. Actually, the insolvency risk depends on the fluctuation of the expected returns and the level of expenditures covered from them. A bank is going to face serious difficulties in case it is unable to cover the loss with capital because, most of the times, the loss is higher than the equity capital owned by the bank.

Once materialized, the insolvency risk leads the bank to a stage of bankruptcy, which means that the insolvent bank is going to be closed by the banking authority. There are a number of reasons that determine the bank to become insolvent, but statistics show that most of the bankruptcies are caused by the inferior quality of bank assets.

A large scale breakdown of financial intermediation causes huge economic and social costs. Banking crises have not only shown that banks often take excessive risks, but that risk taking differs across banks. Some banks engage in more risks than their capital can bear in case the downside potential of the risks fully materializes, in which case these banks need to be intervened or even closed down. Others are more prudent and would be able to weather a banking crisis.

The banking industry is generally seen as unique in the sense that the importance of a sound banking system has probably led to more regulatory interference in this industry than in any other. Various policy measures have been initiated to improve stability in banking by ensuring an appropriate combination of official and market discipline for banks. It has also been a widely held view that official discipline which is implemented by supervision and regulation should, ultimately, be directed towards achieving the overall stability of the banking system.

There are broadly two sets of reasons often given for capital regulation in banking, namely depositor protection and systemic risk. Banks are often thought to be a source of systemic risk because of their central role in the payment system and in the allocation of financial resources, combined with the fragility of their financial structure. Banks are highly leveraged with relatively short-term liabilities, typically in the form of deposits, and relatively illiquid assets, usually loans granted to firms. In that sense banks are said to be "special" and hence subject to special regulatory oversight.

Bank regulators have long regarded the prevention of systemic risk as the fundamental reason for imposing capital requirements on banks. The assumption is that shareholders will not take account of the social costs of systemic risk in their capital decisions and so will tend to hold less capital than if these spillover costs were considered.

The main challenge is to capture the two major sources of systemic risk: first, banks might have correlated exposures and an adverse economic shock may directly result in simultaneous multiple bank defaults; second, troubled banks may default on

their inter-bank liabilities and therefore cause other banks to default inducing a domino effect. Among the two sources of systemic risk the correlation in exposures is far more important than financial linkages.

The central bank is responsible to use its authority and expertise to anticipate financial crises (including systemic disturbances in the banking system) and to manage such crises once they occur. The methods of modern risk management when combined with a careful analysis of financial linkages between banks provide a powerful set of tools to address this issue.

The impact of bank regulation on risk-taking behavior has been a major focus during periods of severe financial crises. While there is still an ongoing debate whether regulation is beneficial at all, regulation is an evolving process and a number of regulatory guidelines have been issued by the Basel Committee on Banking Supervision and by national regulators over time.

In fact, in order to deal with the insolvency risk, banks have to abide certain prudential regulations concerning the minimum capital requirements and capital adequacy ratio. Capital requirements are intended to diminish the risks of adverse selection by ensuring that the bank has at least some minimal level of resources to honor its commitments to its customers. Capital requirements are also intended to ensure that banks do not engage in fraud and avoid loss of equity value. To be effective in this role, capital requirements must be sensitive to the risks to which a bank is exposed.

The 1988 Basel Accord, one of the milestones in banking regulation, set up *minimum capital requirements* for banks. The idea is to oblige banks to hold capital as a safety cushion to ensure bank solvency. Banks holding riskier assets must hold more capital as they have a higher probability of failure. In this regard, commercial banks must permanently maintain their equity capital and funds at the level settled by the banking authority. Regulations concerning the minimum capital of banks are periodically updated as a result of inflation.

Formal and systematic bank capital regulation is relatively new. The 1988 Basel Capital Accord also called Basel I (Basel Committee on Banking Supervision – BCBS, 1988), which set minimum capital standards for internationally active banks, was really the first international accord of its kind. It succeeded at raising capital levels at a time when they were quite low.

In Romania, commercial banks must permanently maintain their equity capital and funds at the level settled by the banking authority. Regulations concerning the minimum capital of banks are periodically updated as a result of inflation.

The Rule no.11/2003 regarding individual and consolidated supervision of funds regulates minimum capital requirements as well as the methodology of determining and reporting them, repealing The Rule no.16/2002 regarding the minimum capital of banks which had established for the first time the compulsoriness for banks to maintain the funds owned by them at least at the level of equity capital.

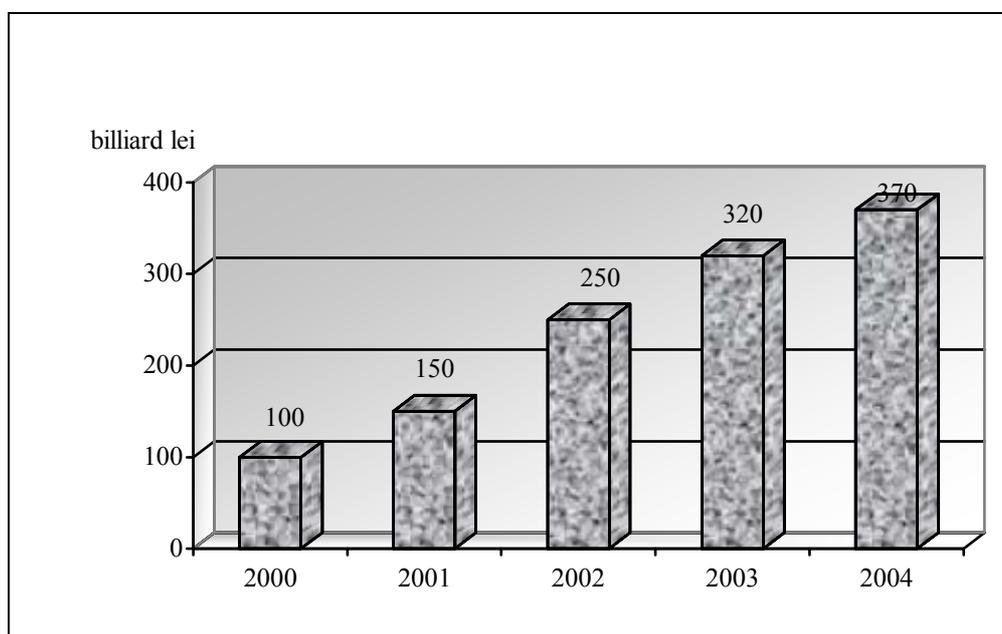
According to regulations in force Romanian banks and branches of foreign banks should have an amount of minimum capital around 370 billion lei until May 2004.

**Table 1. Indexes for estimating the relative variance of minimum equity capital of Romanian commercial banks during 2000-2004**

	Indexes with fixed base				Indexes with chain base			
	I <sup>01/00</sup>	I <sup>02/00</sup>	I <sup>03/00</sup>	I <sup>04/00</sup>	I <sup>01/00</sup>	I <sup>02/01</sup>	I <sup>01/00</sup>	I <sup>02/01</sup>
Minimum equity capital	1.50	2.50	3.20	3.70	1.50	1.66	1.28	0.15

**Table 2. The evolution of minimum equity capital during 2000-2004**

Date	2000	2001	2002	2003	2004
Value (billiard ROL)	100	150	250	320	370



**Figure 1. The evolution of minimum equity capital during 2000-2004**

Both the tables and the chart presented above show the fact that the trend of minimum equity capital in the banking system during 2000-2004 was growing. The biggest increase from a year to another took place in 2002 when the minimum capital for banks set by the National Bank of Romania grew 1.66 times in comparison with the previous year. So far, this policy of the NBR has prevented the proliferation of many weak non-viable banks and implicitly a chain of bankruptcies in the banking system.

In order to avoid bank insolvency, banks must have a solid financial situation, *capital adequacy* being the main way of preventing and hedging the insolvency risk. The Committee from Basle established international regulations concerning the indicator of capital adequacy (the ratio between the equity capital and the risk-adjusted assets of the bank) in 1988.

The 1988 Basel Accord defined what constituted bank capital and put in place minimum capital adequacy ratios for each type of capital as well as for total bank capital. Regulators as well as market participants, however, have come to rely on equity capital as the main constraint for controlling bank behavior. This convention was applied to every bank performing international activities.

Over the last decade, capital requirements have effectively replaced reserve requirements as the main constraint on the behavior of banks. Over the same period, the Basel Accord, originally developed for the G-10 countries, was gradually adopted by a large percentage of countries in the world. The supervising authorities have embraced the stipulations from this convention. In Romania, the National Bank has settled a certain level of solvency for the commercial banks, level that must be permanently assured.

It was the risk-adjustment of the assets which became the focus of regulatory reform resulting in the New Basel Capital Accord, also called Basel II (BCBS, 2001). The New Basel Accord for bank capital regulation is designed to better align regulatory capital to the underlying risks by encouraging more and better systematic risk management practices. Compliance with an even more risk sensitive capital ratio is only one of three pillars under the Accord. Revisions to the New Accord also introduce banks' internal assessments (subject to supervisory review – Pillar 2) of capital adequacy and market discipline (through enhanced transparency – Pillar 3) as key components or prudential regulation.

One way to address the problems with current capital adequacy ratios would be to develop more sophisticated ways of measuring capital adequacy. The Basel Committee on Banking Supervision has proposed three new capital adequacy frameworks to replace the 1988 Accord: a standard approach, the internal ratings based approach and the advanced internal ratings based approach.

However, the proposed standard approach may be subject to many of the same problems as the existing Accord as banks continue to enhance their ability to measure and manage risk. The two ratings based approaches rely on banks' internal risk ratings, which avoid the problem of banks exploiting weaknesses in the standard model.

Nevertheless, a potential problem with the internal ratings based approaches is with the verification of individual banks' ratings, especially given that the use of these ratings to trigger supervisory discipline would provide additional incentive to build ratings models that underestimate risk.

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## **ELEMENTS OF COSMOPOLITANISM AND GLOBALIZATION IN CONSTANTIN STERE'S WORK**

**GABRIELA DUMBRAVĂ, ADRIANA KORONKA \***

**ABSTRACT:** *The paper is an attempt to point out the cosmopolitan orientation of Constantin Stere's work, which offers an exquisite sample of modern thought, anticipating as early as the end of the nineteenth century such actual problems as nationalism, anti - Semitism culturalization and globalization. By using examples from two of his major works, this study focuses on the central doctrine of his writings, which are centered on the idea that the national feeling should not exclude the opening towards universal values as a background for the self-awareness and self-assertion of any nation.*

**KEY WORDS:** *national feeling, anti-Semitism, culturalization, nationalim, civilization, globalization.*

An article that appeared in the Socialist newspaper "Evenimentul literar" in Iasi on December 23, 1893 and was to become historic marked Constantin Stere's debut in the field of Romanian literary criticism. By exacerbating the 'national genius' of the Romanian people and slipping into a kind of folk mysticism which, in Eugen Lovinescu's vision, reflects a mentality of Slavic origin, Stere develops an ideology that was to underlie the literary doctrine of *Poporanism* ('the doctrine of the people'; rom *popor = people*). In the article mentioned above, he sets the two major coordinates of this doctrine, namely "it makes us love the people and know it better, and [...] it contributes directly to the enlightening and elevation of the people by means of a genuinely national literature." [1]

In order to understand the eagerness with which C Stere militates for the promotion of popular art and the interests of lower social strata, we should follow his implication as a man of culture and a social militant in the world of his time. His political articles stirred major polemics and protests both from the adepts of Orthodox Socialism, and from the Liberals. In their turn, literary critics accused him of populist rhetoric and chaotic vision of national genius.

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\* *Lecturer, Ph.D. at the University of Petroșani, Romania*  
*Lecturer, Ph.D. at the University of Petroșani, Romania*

The nebulous ideology of *Poporanism*, whose aim was to create a country of small owners, living in a strong rural democracy and being represented directly by its own parliament outlined the idyllic picture that was to stir a huge number of disputes. However, in spite of all the attacks against it, the doctrine of *Poporanism* resonated in the social life of the time, especially the political ideas pertaining to it.

As a social phenomenon, *Poporanism* appeared in Russia, rather as an intellectual and emotional atmosphere than as a doctrine or a well - defined ideal. Its constitutive elements are the love of people, the devoted protection of the interests of the masses who produce material goods, and the effort to elevate the people to self-awareness by culturalization.

Constantin Stere took over these elements and, without operating major changes, he projected them against the background of the Romanian social environment. Thus, his position regarding the evolution of the Romanian society relies on two basic ideas: the cultivation of a moderate nationalism that should not degenerate into isolation and the balanced implementation of foreign models by avoiding blind imitation. In this sense, Haralambie Corbu notices that Stere's work militates for "the harmonization of these two extreme orientations, [...] for the development of an integrating vision meant to preserve the national specific in a modern world of international cooperation." [2]

Stere's reflections on the national evolution and social changes in the context of world progress were developed in more detail in his study "Social Democracy or Poporanism?". The social doctrine set forth in this study militates for the assertion of peasantry, as a fundamental social class. The study is structured into six chapters, namely: 1. Social Democracy and Peasantry; 2. Social Democracy and Agricultural Countries. The Social Character of Peasantry; 3. Industrialization? The Terms of Social Evolution; 4. The National Problem and Social democracy. Anti-Semitism; 5. The Political Situation and the Problem of Social Democracy in Romania; 6. The Form of our Industrial Progress. These chapters cover and combine theoretical and practical aspects from the fields of economy, politics, history and culture into a flowing, Dynamic and colorful discourse that keeps its distance from the rigidity of scientific expression without losing substance. In fact, the pages of this work reveal Stere the writer rather than the sociologist.

With no polemic intentions, the study is written in reply to Karl Marx's "Communist Manifesto", which focuses on the so - called "dictatorship of proletariat" ignoring the peasants as a social class. Under the circumstances, Stere points out that "the small manufacturer, the small tradesman, the craftsman and the peasant jointly struggle with the bourgeoisie in order to stay alive as middle classes." [3]

Although the vehemence of the Marxist formula was subsequently diluted by the specification that, once in possession of the power, the proletariat was going to expropriate only the big land owners, Constantin Stere would never accept the doctrine which granted peasantry a secondary importance in the struggle for the foundation of social democratic Socialism.

The Romanian writer found this status humiliating and intolerable, and his desire to rehabilitate the dignity this social class was to predominate his entire political and social activity.

The arguments and the tools of his approach were extracted from the concrete analysis of the social situation of peasantry in relationship with the proletariat in such industrial countries as England, Germany and France. This analysis will lead to the conclusion that the social - democratic doctrine is relative, being limited spatially and temporally.

By applying this relativity concept to the Romanian social – democratic doctrine the author of the study concludes that in Romania, progress must rely on the economic consolidation of the peasants, their cultural elevation, and the ensurance of conditions for their free development. In other words, “the road to social progress cannot be opened to us otherwise than through the achievement of a genuine Romanian rural democracy.” [4]

This statement reveals Stere’s awareness of the fact that, in non – industrial countries, the social development of peasants is of tremendous importance. This is the source of the writer’s nationalism, whose basic concepts result from the adaptation of the foreign model to the concrete situation in our country.

As far as Stere’s nationalist doctrine is concerned, it should be pointed out that, in the spirit of the European modernism, it promotes a cosmopolitan vision according to which the national feeling does not exclude the acceptance of the social phenomena situated outside the borders of a country. In other words, it sets forth an idea that announces twentieth century cosmopolitanism, namely that, in order to avoid exacerbated nationalism, the love of one’s country and people should be necessarily placed into the context of a complex cultural reality, free from geographical limits.

One of the consequences of this vision is that the Romanian national problem is closely connected with that of anti – Semitism, approached in an unbiased manner and supported with scientific arguments and examples from international practice.

The exacerbation of Romanian nationalism and anti – Semitism were largely caused the European realities at the end of the nineteenth century. The anti – Semite politics of the neighboring countries led to a massive migration of the Jews to other countries, Romania included. The latter, being a newly – formed state, with a poorly developed economy, was unable to assimilate the immigrants either economically, socially, or ethnically. This situation led to a negative response from the local population, under the form of exaggerated nationalism, whose sources are to be found in the economic situation of the country and the insufficient education of the masses.

The problem of Romanian anti – Semitism at the end of the nineteenth century had been one of Stere’s major preoccupations long before this study appeared. However, it is only in its pages that the author approaches it from a scientific perspective. Starting from the comparison with the model of the United States as a form of genuine integrating democracy, the writer points out that, in a country like Romania, which lacks strong democratic structures, there are “conflicts and tensions, not only purely economic, but also interethnic, cultural, and national.” [5]

Therefore, the Romanian anti – Semitism is not a mere imitation of the Western one, as it contains an amount of specifically Eastern barbaric hatred and grossness that promote the degrading grudge, mass manipulation and triviality in the name of a noble cause.

These statements attracted prompt reactions from anti – Semites, who did not hesitate to accuse him of being a ‘Jew lover’. In spite of all these bitter responses, Stere never ceased to support the idea according to which nations are results of cultural and not biological evolution. In order to demonstrate this, he uses the example of the Romanians and the Bulgarians, who have an almost completely similar complex of primitive ethnic elements, having in view that, in both cases, the slavized Romance population was superimposed over the Dacian or Thracian deep layer. This is to prove that what keeps a people together is not race, but culture, which is the result of common living and feeling of a community, whose supreme manifestation is the national language.

In direct relation with this theory, the author notices that the assimilation of certain ethnic groups by a nation should begin with the duty of the former to learn the language of the respective nation, but in a climate of acceptance and tolerance from the part of the latter.

All these statements are not meant to minimize the legitimate right of any people to defend its economic, political, national and cultural status. This should be achieved, nevertheless, through a “firm and peaceful politics, [...] meant to attract positive feelings from the civilized world.” [6] Of all the statements in the study, this is the most explicit incrimination of the Romanian anti – Semites as enemies of the national cause. It also clarifies the author’s position against the revolutionary doctrine of the Social Democrats and in favor of smooth and balanced evolution, logically supported and opened to progress.

The problems debated upon in this study by using arguments from the fields of economy, history and sociology are approached on a more subtle level, with the tools of the philosophy of culture, in Stere’s essay “Hellenism and Judaism in Human Civilization” (1932). Actually, this is one of his fundamental works regarding the succession and intersection of civilizations from a regional and a global perspective. It is also the first official response of the writer to nationalism and especially to Fascism, which was in full ascension in Europe at the time.

The association of Hellenism and Judaism may seem surprising at first sight, but the author himself explains at the beginning of his essay that the whole European civilization is the result of the combination of the two. Moreover, all human wisdom, science, philosophy, art and poetry spring from both civilizations.

The author demonstrates the validity and actuality of the Jew philosophy and culture, which consolidated its system of values and judgement over two milleniums and provided the basis for the Christian culture. The ancient texts of the two civilizations are the source of “all the moral principles that underlie Christianity, all the norms of modern individual and social ethics, namely the love of one’s neighbor, justice peace among people, the apotheosis of work.” [7]

In spite of his being a convinced atheist, Constantin Stere proved to possess profound knowledge of the philosophical sources of Judaism that constituted the basis of Christianity. In this respect, he was of the opinion that the main role of religion is to clarify man's place in nature. If in the primitive age man was nature's slave, in the Hellenistic age, the work of such philosophers as Socrates, Aristotle and Plato marks the triumph of human reason over the blind forces of nature, not necessarily in the sense of the possibility to overcome them, but rather in the sense of the attempt to comprehend their deep resorts.

If Hellenism dealt with the problem of happy and harmonious life, Judaism has the historic mission to solve the moral issues of mankind. The author describes the origins of the Jews in a most idyllic manner: "In the narrow gorge of the Jordan Valley, at a depth of several hundreds of meters below sea level, surrounded by deserts and endlessly beaten by the storms of history stirred by the wars between great Eastern empires, a people was born and lived, not only refusing to admit nature's supremacy, but also denying the image of man as a mere adornment, blindly subordinated to the cosmic process. And its revolt, as well as its verse and aspirations, were crystallized in a book (the Bible) that remains unmatched in the whole civilization of mankind. Even if it were only for this isolated fact, it would be enough proof of the tremendous contribution of Judaism to the common heritage of human civilization." [8]

The series of arguments regarding the contribution of the two peoples to the progress of mankind naturally raise a question about the source of anti-Semitism and racism in general. Needless to say that this vision stirred violent reactions from the anti-Semites and extremists of the time. In this sense, it is relevant to quote an excerpt from a pamphlet published in the pages of a prestigious newspaper that appeared in Bucharest at the time, entitled "Nationalul": "The newspaper of the Jew lovers in Iasi, who pretend to be Socialists and exploit this doctrine in favor of their race, lay hands on a poor Christian, a man from Basarabia established in Iasi, who goes by the name of Sterea. This Sterea, a refugee from Basarabia, is today an employee of the Jews and swears at the ones who satirized the efforts of the obscure newspaper, claiming that they smear the national feeling." [9]

This incident confirms that the militant and the man of culture Constantin Stere was slandered for his democratic and pro-European inclinations, to which he remained faithful his entire life. The validity of his vision is historically demonstrated, especially nowadays when the general tendency is towards cosmopolitanism and globalization.

Constantin Stere operated in his works with arguments and facts from various fields, proposing solutions whose depth and subtlety still stir the interest of researchers as original manifestation of modern thought.

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## **TAGUCHI METHOD FOR IMPROVEMENT IN THE QUALITY OF PRODUCTION PROCESSES**

**CODRUȚA DURA \***

**ABSTRACT:** *According to the Japanese specialist Taguchi, in order to obtain quality, even the conceptual phase imposes efforts in designing production process parameters, efforts which consist of finding the best parameters so that the product should be hyposensitized against disturbances. In other words, the originality of the Taguchi strategy is that it does not aim to eliminate these parasites but to minimize their impact upon quality, eliminating the combination of parameters, which reduces unexpected effects.*

**KEY WORDS:** *signal/noise ratio, the optimization of production parameters, disturbances, experience matrix, standard deviation, validation process, factor adjustment.*

Since 1973, the original Taguchi concept regarding the improvement of quality has spread everywhere and has brought on important progress in the field. Taguchi's name can be heard more and more often together with the names of "the titans" Edward Deming, Kaoru Ishikawa or Joseph M. Juran. Taguchi's theory encroaches upon the quality assurance concept, stating that the efforts made for quality assurance and control lead to "off-line" quality domination, according to the concept, while the efforts made for execution lead to an "on-line" control. Thus, in order to obtain quality, even *the conceptual phase imposes efforts in designing production process parameters*, efforts which consist of finding the best parameters so that the product should be hyposensitized against disturbances. In other words, the originality of the Taguchi strategy is that it does not aim to eliminate these parasites (also called "noise factors" by Taguchi) but to minimize their impact upon quality, eliminating the combination of parameters, which reduces unexpected effects.

When estimating the efficiency of the products or the production processes, one must take into consideration both the completion rate of the set targets and the undesirable output, which must be avoided. In this respect, Taguchi introduces a synthetic performance indicator called Signal/Noise ratio (S/N), which implies, simultaneously, the value to be achieved (the average optimized characteristics) and

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\* *Lecturer, Ph.D. at the University of Petroșani, Romania*

the measured value variability (dispersion), that needs to be reduced. The greater the S/N value, the fewer the losses, and thus the more efficient the product and the production process are.

The Taguchi method is in fact an improved classic method of experiment plans, issued by Ronald Fisher and Jaques Hadamard. According to their theory, an experiment plan is defined as being a chain of organized attempts to quantize, very precisely, possible influences of different parameters upon the analyzed efficiency system. An experiment plan can take the form of a matrix. Though they are very useful, the statistical techniques developed by Fisher and Hadamard have not spread so widely within the industry, due to the complexity of its implementation. Taguchi is given credit for the elaboration of some “standard instruments”, which simplify the experiments and can be applied in many fields, meaning “a collection” of orthogonally divided experiment matrix and a set of “accessories” – triangular tables and linear charts (which facilitate the study of possible interactions among factors and allow standard matrix to adapt itself to certain situations).

The Taguchi method is well-known in industry. In the electric power field, for example, the optimization of production parameters is a problem that can be regarded from different points of view. This proves to be more difficult in the case of the production of mining equipment: if a machine or an electronic part functions only in certain circumstances, complex mining equipment is depended on the state of the ore (layer, block, slice, panel, etc.). Moreover, it is obvious that the underground environment in which the mining equipment functions can be characterized by a great corrosiveness. Among the anti-corrosive protection methods, the following are worth mentioning: galvanic coverage of the metal components through chrome plating, nickel plating and electrolytic cadmium plating.

In the following case study, the electrolytic cadmium plating within the reel is done in order to protect the characteristic components of the hydraulic equipment used in mining. The experiments conducted targeted the availability of some unitary layers and adherent, both at the interior and at the exterior, taking into consideration the complicated geometric pattern of the components. The quality criterion that must be analyzed is the thickness of the cadmium layer (target criterion); according to STAS norms, the possible thickness of the cadmium layer should be between  $20\mu\text{m} \pm 2\mu\text{m}$ . After a preliminary selection, 7 relevant factors have been identified (the first three factors will be tested on two levels only, while the next four can be extended on four levels). In table 1 you can see the set of controlled factors and their specific level.

It is possible to obtain an appropriate composition of the cadmium bath by using two alternate chemical recipes.

The experiment has been done using the experience matrix from table 2. For each of the 16 experiments, 10 components were loaded in the drum, from which 5 samples were taken and the thickness of the cadmium layer was measure for one compound out of two, in succession, as they were placed in the cadmium bath. The thickness values can be seen in table 3. for each experiment, the average results ( $\bar{y}$ ), the

standard deviations (s) and the Signal/Noise ratio (S/N) measured in decibels, have been represented in the same table.

**Table 1. Controlled factors in the Taguchi experiment**

No	Factor symbol	Factor label	Factor level			
			Level 1	Level 2	Level 3	Level 4
1	A	The composition of the cadmium bath	R1	R2	-	-
2	B	Voltage	3; 5 V	5 V	-	-
3	C	Anodic bath surface – cathode surface ratio $S_A/S_K$	1,5/1	2/1	-	-
4	D	The temperature of the cadmium bath	18 °C	20 °C	30 °C	35 °C
5	E	Reel revolution	11 rev/min	10 rev/min	9 rev/min	8rev/min
6	F	Cathodic current density	1 A/dm <sup>2</sup>	1,3 A/dm <sup>2</sup>	1,6 A/dm <sup>2</sup>	2 A/dm <sup>2</sup>
7	G	Operation period	40 min	44 min	47 min	50 min

**Table 2. Experiment matrix  
(3 factors on two levels and 4 factors on 4 levels)**

No. experiment	Controlled factors						
	A	B	C	D	E	F	G
1.	1	1	1	1	1	1	1
2.	1	2	2	2	2	1	2
3.	1	1	1	3	4	4	2
4.	1	2	2	4	3	4	1
5.	1	2	2	3	1	2	4
6.	1	1	1	4	2	2	3
7.	1	2	2	1	4	3	3
8.	1	1	1	2	3	3	4
9.	2	1	2	4	1	3	2
10.	2	2	1	3	2	3	1
11.	2	1	2	2	4	2	1
12.	2	2	1	1	3	2	2
13.	2	2	1	2	1	4	3
14.	2	1	2	1	2	4	4
15.	2	2	1	4	4	1	4
16.	2	1	2	3	3	1	3

The S/N ratio uses Taguchi's formula:

$$S / N = 10 \log[(\overline{y/s}) - 1/n] \quad [db] \quad (1)$$

Table 3. Experiment results: the average, standard deviations and S/N ratio

No. of experiment	Compound					Average (m)	Standard deviation (s)	S/N ratio
	1	2	3	4	5			
1	21,01	20,82	20,77	20,85	20,79	20,85	0,095	46,82
2	20,64	20,65	20,56	20,55	20,45	20,57	0,081	48,09
3	19,80	19,75	19,82	20,02	19,90	19,86	0,105	45,54
4	18,88	18,90	18,50	18,81	18,91	18,80	0,208	39,12
5	19,55	19,50	19,58	19,52	19,61	19,55	0,044	52,95
6	19,90	19,82	19,85	19,84	19,83	19,85	0,031	56,13
7	20,12	20,20	20,10	20,22	20,30	20,18	0,081	47,93
8	19,65	19,72	19,84	19,82	19,64	19,73	0,093	46,53
9	18,95	19,02	19,15	18,89	19,12	19,03	0,110	44,76
10	19,83	19,92	19,79	19,85	19,90	19,86	0,052	51,64
11	20,44	20,38	20,50	20,32	20,48	20,42	0,074	48,82
12	19,97	20,10	20,18	20,20	20,09	20,11	0,091	46,88
13	18,52	18,93	19,05	18,87	19,12	18,90	0,233	38,18
14	19,65	19,92	19,51	19,78	19,83	19,74	0,160	41,82
15	20,12	20,03	20,25	20,18	20,21	20,16	0,086	47,40
16	20,44	20,23	20,35	20,19	20,10	20,26	0,134	43,59

The average results for the levels of the controlled factors can be determined using simple arithmetic means of the results obtained during the experiments in which the factor is at a certain level.

The average  $\bar{T}$  of the set of experiments should correspond with the average results for each level of the factors:

$$\frac{\bar{A}_1 + \bar{A}_2}{2} = \frac{19,92 + 19,8}{2} = 19,86 \text{ } (\mu\text{m}) \quad (2)$$

respectively

$$\frac{\bar{A}_1^{S/N} + \bar{A}_2^{S/N}}{2} = \frac{47,89 + 43,59}{2} = 46,64 \text{ } (dB) \quad (3)$$

The average effect of each factor level can be determined by relating it to the average. In the case of the values measured, the medium effect of factor A at the first level is:

$$E_{A1} = \bar{A}_1 - \bar{T} = 19,92 - 19,86 = +0,06 \text{ } (\mu\text{m}) \quad (4)$$

The effect at the second level is a reduction:

$$E_{A2} = \bar{A}_2 - \bar{T} = 19,8 - 19,86 = -0,06 \text{ } (\mu\text{m}) \quad (5)$$

The medium effects for the S/N ratio are determined in the same way:

$$E_{A1}^{S/N} = \bar{A}_1^{S/N} - \bar{T}^{S/N} = 47,89 - 46,64 = 1,25 \text{ (dB)} \quad (6)$$

respectively:

$$E_{A2}^{S/N} = \bar{A}_2^{S/N} - \bar{T}^{S/N} = 45,39 - 46,64 = -1,25 \text{ (dB)} \quad (7)$$

It is obvious that  $E_{A1} = -E_{A2}$  și  $E_{A1}^{S/N} = -E_{A2}^{S/N}$  (the equations hold true for any factor with two levels).

In the case of a factor with four levels, the results and the effects in the two situations is similar –the thickness values measured for the cadmium layer and the S/N ratio is similar. In the case of the D factor with 4 levels, we have the following equation:

$$E_{D1} + E_{D2} + E_{D3} + E_{D4} = 0 ; \text{ respectively } E_{D1}^{S/N} + E_{D2}^{S/N} + E_{D3}^{S/N} + E_{D4}^{S/N} = 0 \quad (8)$$

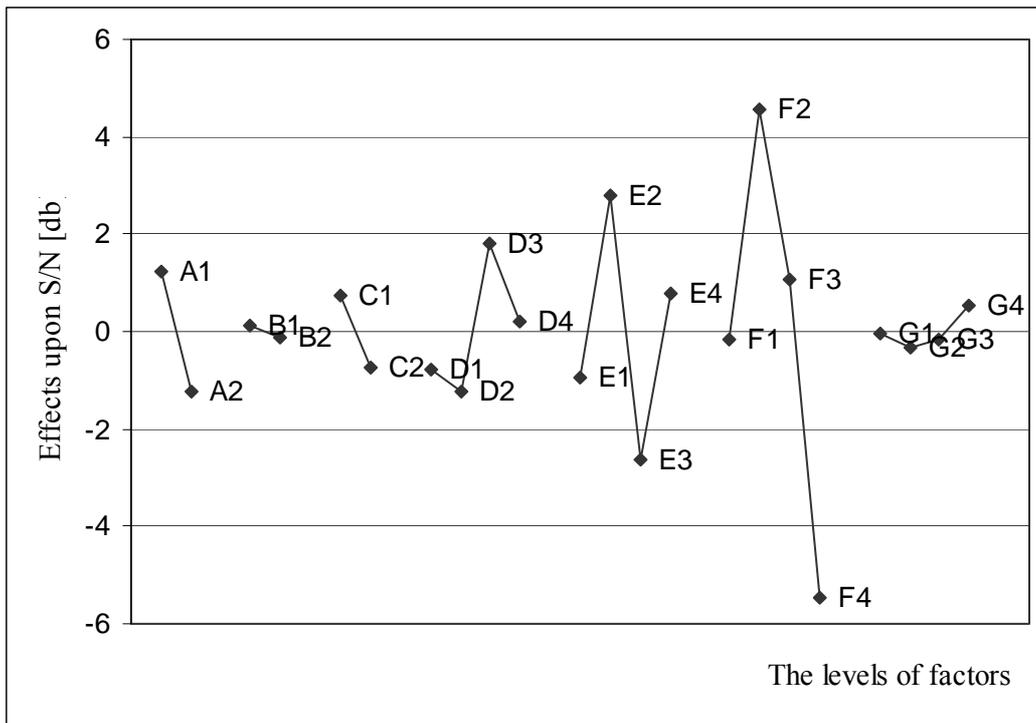
In the case of other factors that have been tested – B and C with 2 levels and E, F, G with 4 levels – determination procedures are identical. The results can be summed up in a table with results (table 4).

Thus it can be noticed that there are some differences between the effects upon the measured values and the effects upon the S/N ratio. We must be reminded, in this respect, that in the first case, only the average thickness values of the cadmium layers are being accounted for, while in the case of the S/N ratio the result theoretical comes into picture. The greater the algebraic S/N values, the fewer the losses are, therefore the efficiency of the cadmium plating can be improved. The S/N ratio must be used primarily in order to choose correctly the level of factors.

**Table 4. Table of results**

The effect upon the S/N ratio (dB)				Factors	The effect upon determined values (μm)			
Level 1	Level 2	Level 3	Level 4		Level 1	Level 2	Level 3	Level 4
1,25	-1,25	-	-	A	+0,06	-0,06	-	-
0,11	-0,11	-	-	B	0,10	-0,10	-	-
0,75	-0,75	-	-	C	0,05	-0,05	-	-
-0,77	-1,23	1,79	0,21	D	0,35	0,03	0,02	-0,40
-0,95	2,78	-2,61	0,78	E	-0,28	0,14	-0,14	0,29
-0,17	4,56	1,08	-5,47	F	0,60	0,11	-0,16	-0,55
-0,04	-0,32	-0,18	0,54	G	0,11	0,03	-0,06	-0,08

In order to compare the effects of each of the 7 factors, charts reviewing the results given in the previous tables are very useful and representative (figure 1, 2).



**Figure 1.** Effects upon the S/N ratio

Analyzing the table of results and the charts, we can notice that the factors D, E, F have the most important effects upon the layer of cadmium. However, in order to choose the best production process configuration, one must take into account the arbitration among the levels of factors for a double objective: minimizing the variance and obtaining an average thickness closer to the target value of  $20\mu\text{m}$ .

In table 5, a first configuration of the production process optimization can be noticed, taking into consideration the improvement of the S/N ratio.

While estimating the theoretic resulting S/N ratio, the following conclusion has been reached that if all factors are adjusted at their best levels, their S/N individual values should satisfy the additivity principle.

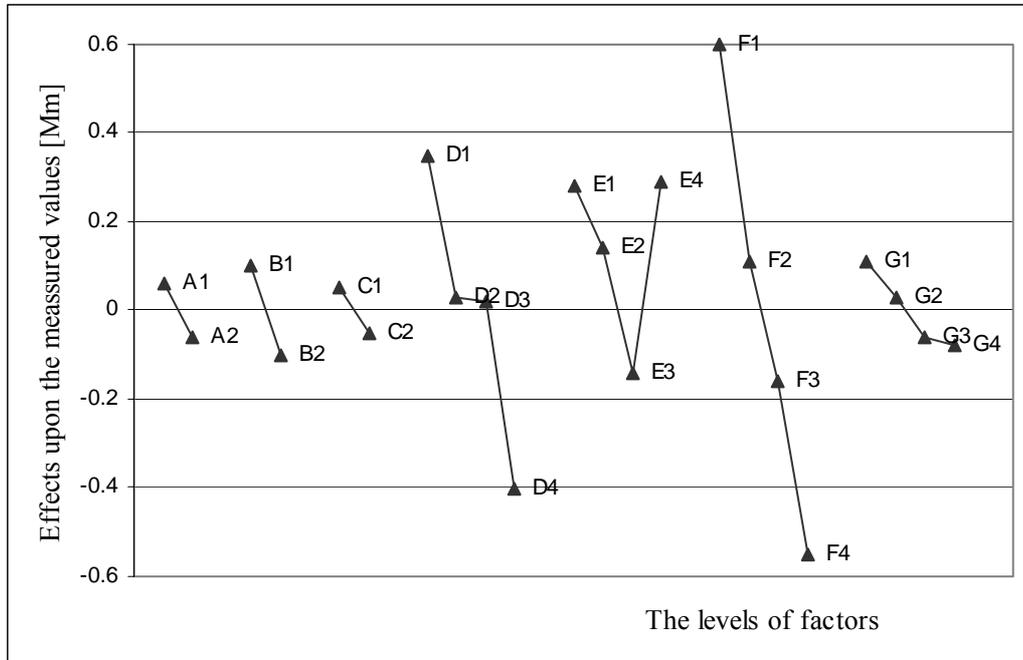


Figure 2. Effects upon the measured values

Table 5. First optimization according to the S/N ratio

Factor symbol	Factor label	Proposed level	Effect upon S/N dB	Effect upon the $\mu$ value
A	Composition of the cadmium bath	1	1,25	0,06
B	Voltage	1	0,11	0,10
C	$S_A/S_K$ ratio	1	0,75	0,05
D	The temperature of the cadmium bath	3	1,79	0,02
E	Drum revolution	2	2,78	0,14
F	Cathodic current density	2	4,56	0,11
G	Operation period	4	0,54	0,08
<i>Theoretic resulting S/N ratio [ dB ]</i>			57,77	
<i>Average S/N [ dB ]</i>			46,64	
<i>Average thickness of the cadmium layer ( <math>\mu m</math> )</i>				19,86
<i>Theoretic measured resulting value ( <math>\mu m</math> )</i>				20,26

In order to determine the theoretic S/N ratio, only the major effects have been considered for the chosen configuration – A1B1C1D3E2F2G4 (because the experiment error can be found in each of the determined means):

$$\mu (\text{Raportul Theoretic } S/N) = T + E_{A1} + E_{C1} + E_{D3} + E_{E2} + E_{F2} = 57,77 [\text{dB}] \quad (9)$$

Taking into consideration the additive effects of the influential factors, the theoretic thickness of the cadmium layer, which results from the configuration from above, is as follows:

$$\hat{g} = T + E_{A1} + E_{B1} + E_{C1} + E_{D3} + E_{E2} + E_{F2} + E_{G4} = 20,26 (\mu m) \quad (10)$$

The A1B1C1D3E2F2G4 configuration reduces the dispersion of the production process, as it interferes with the transition from an average S/N value of 46.64 dB, constant during the 16 experiments, to a greater value of 57.77 dB.

At the same time, the proposed configuration does not optimize the resulting thickness of the cadmium layer, as it exceeds the maximum limit of the tolerance (-20.20 $\mu\text{m}$ ). Therefore, it is necessary to adjust the resulting thickness value of the cadmium layer with the help of some influential factors, which have an effect upon the measured value, but which reduce as little as possible the S/N ratio. The table of results points out the factor F (cathodic current density) as the most suitable one. At level 3, the F factor makes the necessary adjustment, as it jumps from +0.11  $\mu\text{m}$  to -0.16  $\mu\text{m}$ , which means -0.27  $\mu\text{m}$  compared to the previous level. Moreover, this correction is easy to attain; since it practically reacts upon the current density (the value of 1.3 A/dm<sup>2</sup> is significant). The final configuration can be seen in table 6.

**Table 6. The final optimum configuration**

Factor symbol	Factor label	Proposed level	Effects upon S/N dB	Effects upon value $\mu\text{m}$
A	Composition of the cadmium bath	1	1,25	0,06
B	Voltage	1	0,11	0,10
C	S <sub>A</sub> /S <sub>K</sub> ratio	1	0,75	0,05
D	The temperature of the cadmium bath	3	1,79	0,02
E	Drum revolution	2	2,78	0,14
F	Cathodic current density	3	1,08	-0,16
G	Operation period	4	0,54	-0,08
Theoretic resulting S/N ratio [ dB ]			54,29	
Average S/N [ dB ]			46,64	
Average thickness of the cadmium layer ( $\mu m$ )				19,86
Theoretic measured resulting value ( $\mu m$ )				19,99

The final configuration in this table differs from the first one as far as the F factor is concerned for which level 3 has been chosen. Thus, for the formula A1B1C1D3E2F3G4, the S/N ratio is somewhat better than the average one resulted from the 16 experiments:

$$\begin{aligned}\mu_o (\text{Theoretic resulting } S/N \text{ ratio}) &= T + E_{A1} + E_{C1} + E_{D3} + E_{E2} + E_{F3} = \\ &= 46,64 + 1,25 + 0,75 + 1,79 + 2,78 + 1,08 = 54,29 \text{ [ dB ]}\end{aligned}\quad (11)$$

This configuration leads to a theoretic measured value for the cadmium layer thickness which is closer to the nominal value of 20  $\mu\text{m}$ :

$$\begin{aligned}\hat{g} &= T + E_{A1} + E_{B1} + E_{C1} + E_{D3} + E_{E2} + E_{F3} + E_{G4} = \\ &= 19,86 + 0,06 + 0,10 + 0,05 + 0,02 + 0,14 - 0,16 + 0,08 = 19,99 (\mu\text{m})\end{aligned}\quad (12)$$

According to this theoretic value of the cadmium layer thickness, the standard deviation can be predicted. Thus, if the 1/n ratio is omitted from the S/N ratio (it has a small value), we have the following:

$$\hat{y} \approx 10 \log (\mu / s)^2 \quad (13)$$

resulting 
$$s = \sqrt{\frac{y^2}{10^{(\mu/10)}}} \quad (14)$$

Replacing the equation above:  $s = 0,0385$

This predicted value for the standard deviation is in fact a proof for a healthy process of electro-chemical cadmium plating for the hydraulic equipment used in mining. Any statistical experiment conducted using the Taguchi method must finalize with an attempt to validate the theoretic results obtained. In the case of electro-chemical cadmium plating, the validation process uses a combination of levels of the factors from table 7.

**Table 7. Levels of factor adjustment through validation**

Nr.	Factor label	Factor label	Adjusted level
1	A	Composition of the cadmium bath	R1
2	B	Voltage	3V
3	C	$S_A/S_K$ ratio	1,5 / 1
4	D	The temperature of the cadmium bath	30 <sup>0</sup> C
5	E	Drum revolution	10 ture / min
6	F	Cathodic current density	1,3 A / dm <sup>2</sup>
7	G	Operation period	50 min

The purpose of the validation process is that it verifies if the predicted level has been reached. The resulting value for the thickness of the layer of cadmium was of 19.97 $\mu\text{m}$ , which proves to be close to the predicted value. The little difference between the two values – predicted and achieved – can be explained either by the presence of some slight interactions among the controlled factors, or by a non-linear variation of

the effect of the current density. On the whole, it can be seen that the reproducing principle of the experiment is pretty good (the amperage works as it should).

Taking into account the great number of calculations that need to be done in order to choose the configuration, which is most appropriate for the production process, computers can be used, as they make calculations more rapidly and thus this method proves to be more efficient.

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## ROMANIA-EU ACTUAL AND POTENTIAL TRADE

ANNA FERRAGINA, GIORGIA GIOVANNETTI,  
FRANCESCO PASTORE \*

**ABSTRACT:** *This is a companion paper to Ferragina, Giovannetti and Pastore (2005) and focuses on Romania-EU actual and potential trade. The Romanian trade potential with five EU members (France, Germany, Italy, Spain and UK) is computed using an “out-of-sample” methodology for the period 1995-’01. The coefficients are taken from panel estimators of the gravity equation relative to intra-EU15 trade. The analysis suggests the existence of an important unexploited trade potential with Romania, which, nonetheless, is not different in size from that of other CEECs. The potential to actual trade ratio ranges from 2.2 to 2.7 and is sharply declining, suggesting that further dramatic economic integration is to be expected in the near future.<sup>#</sup>*

**KEY WORDS:** *Romania; Europe Agreements; Eastward Enlargement; Gravity Equation; Trade Potential*

### 1. INTRODUCTION

In the last decade, gravity models have been extensively used to forecast potential bilateral trade relations and integration effects between EU (or OECD) countries and the former CMEA members<sup>1</sup>. The aim of this paper is to compare the degree of integration of Romania with a sample of EU countries (France, Germany,

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\* *Corresponding author, ISSM-CNR, Italy  
University of Florence, Department of Economics, and Italian Foreign Trade  
Commission, Italy  
Ass.Prof.Ph.D., Second University of Napoli, Department of Law and Economics, Italy*

<sup>#</sup> Previous versions of Ferragina, Giovannetti and Pastore (2005) have been presented at the ETSG, University of Nottingham; at a CNR Study Group on International Trade, *Università Commerciale Luigi Bocconi*; and in a seminar held at the Romanian Academy of Science in 2004. We thank Paolo Epifani, Rodolfo Helg, Lelio Iapadre, Paolo Malanima, Mariana Nicolae, Lucia Tajoli and one anonymous referee for useful comments.

<sup>1</sup> Section two reports the results of the existing literature (see also Brenton and Gros, 1997).

Italy, Spain, UK), indirectly providing an assessment of the relative success of the Romanian Europe Agreements (REA), also in view of the coming EU accession of the country<sup>2</sup>. This study uses gravity analysis, which is the best alternative when intertemporal extrapolation of trade patterns is not feasible, as it is the case of CEECs, due to their past economic isolation, distorted pricing structures and recent transition from a planned to a market economy.

A panel data specification of the gravity model and an “out-of-sample” methodology have been adopted to estimate trade potential. In other words, the parameters extracted from a gravity equation of intra-EU bilateral trade flows are used to predict trade between Romania and several EU members. This analysis aims at answering the following main questions: 1) What degree of trade integration could have been achieved if the trade elasticity with respect to economic and geographic variables (relative mass, physical distance, common language, common land border, colony links) had been like those achieved in intra-EU trade? 2) Has the REA induced a reduction of the gap between potential and actual trade via “trade creation and diversion” activated by the liberalisation process? 3) How much additional trade could be created if integration would be pushed further (trade enhancing effect)?

From an econometric point of view, this study differs from previous works on CEECs, which have hardly used panel analysis, and even more rarely coupled panel analysis with out-of-sample methods<sup>3</sup>. The analysis provides evidence of substantial unexploited trade, which is in contrast with previous results relative to EU trade with CEECs: many studies predicted that trade potential was almost fully exploited already in 1992. The differences between our and previous results might depend on three factors. This study a) focuses on intra-EU trade, rather than on trade with a larger, but less homogeneous group of countries, as a reference to estimate the elasticity of trade

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<sup>2</sup> The Europe Agreements (EAs) were initiated by the EU with each CEEC separately. The first agreements with Poland, Hungary and Czechoslovakia were signed in December 1991 and came into force only in 1994. On 1<sup>st</sup> February 1993, similar agreements were signed with Bulgaria, Romania as well as the newly established countries of the Czech Republic and Slovakia. They came into force in 1995. In 1998, EAs were implemented with the three Baltic States, followed by Slovenia on 1<sup>st</sup> February 1999. The EAs were aimed at fostering trade integration, but also the political dialogue and cultural and economic cooperation between the partners, while providing a basic outline for the gradual EU accession of CEECs. Over the period before the agreements came into force, Interim Agreements provided for an anticipated and temporary application of trade provisions. Their aim was to establish a free trade area for industrial goods for ten years on a reciprocal, but asymmetric basis: the EU had to remove its trade barriers more quickly than the CEECs. This led to the total removal of all tariff barriers on industrial products from the EU on 1<sup>st</sup> January 2002. However, for some “sensitive” industrial sectors a special discipline was created, in particular for textiles, iron and steel, car industry (only for Poland) and a much more gradual liberalization was applied to agricultural goods and fisheries.

<sup>3</sup> To our knowledge, only Baldwin (1994), Gros and Gonciarz (1996), Mathyas (1997) and Egger (2000; and 2002) use panel analysis, while Gros and Gonciarz (1996) use both panel analysis and an out-of-sample method.

determinants; b) applies an out-of-sample method to compute potential trade; c) concentrates on a later period, 1995-2002, when GDP in CEECs in general and in Romania, in particular, was rapidly increasing. The results are remarkably stable across different specifications and estimation methods. The work is organised as follows. Section 2 contains a survey of the literature. Section 3 discusses the methodology adopted and the results of the gravity model. Section 4 provides measures of the ratio between potential and actual trade. Some concluding remarks follow.

## **2. A SURVEY**

Gravity models have been widely used over the past decade or so to evaluate EU-CEE trade potential, and to compare it with the actual level of trade. More specifically, gravity equations have been estimated relative to the already integrated EU15 to obtain the coefficients of the main determinants of bilateral trade, namely national income and population size of the two countries involved, distance, common land border and common language. These coefficients have been used in similar equations, but with variables relative to EU-CEECs, in order to assess trade potential. The aim of these exercises has been to determine whether the integration process was already completed before accession, or whether one can expect further trade integration, which may continue to affect the labour markets in the two areas concerned.

The results of such exercises available in the literature are mixed, and they depend closely on the period considered, specification and estimator, as well as on the computation method used to calculate trade potential. Wang and Winters (1992) find that East-East trade was large in 1985, while East-West trade was only a fraction of what it would have been in an integrated Europe. Hamilton and Winters (1992) adopt a similar approach, finding that trade within the former Soviet Union and the Eastern Europe bloc (SUEE) was static or falling, while trade with Western Europe may increase by up to five times. Baldwin (1994) finds that potential EU12-CEE exports and imports are twice the actual 1989 exports and imports.

All the studies which have used data on the early transition period in order to estimate trade potential support a different conclusion. Most of them suggest that a level of integration between Eastern and Western countries which is high and above the potential level has long since been reached. This indicates that adjustment is complete and that there is no need for special protection in Western countries (Gros and Gonciarz, 1996; Brenton and Di Mauro, 1999; Nilsson, 2000). For instance, Gros and Gonciarz (1996) correct Baldwin's estimates on the grounds that he used a GDP which was overvalued because it was calculated on pre-transition data (the per capita GDP used by Baldwin was much higher than the 1992 GDP for CEECs). Combining the parameters from Baldwin (1994) with the 1992 data on GDP, Gros and Gonciarz end up with a downward revision of Baldwin's projections of CEEC-EU trade, and their results suggest that the adjustment is complete.

Two recent studies on trade integration measured by gravity models (Egger, 2000; 2002) have cast doubt on the results of the above-cited literature. They make 3 main criticisms: 1. most of these results are based on cross-section gravity models which are mis-specified because they do not take account of exporter and importer effects, while only few authors make use of panel econometrics; 2. those authors who do use panel analysis to compute potential trade adopt a random effect model (the exception is Egger) which may be affected by the problem of correlation between the explanatory variables and the unobserved time invariant effects; 3. most analyses obtain information on trade potentials using the ‘in-sample’ prediction approach; that is, the residuals of the estimated equation are interpreted as the difference between potential and actual bilateral trade relations, but this is in contrast with the fact that, in the case of proper specification, the estimators are consistent and efficient and therefore should exhibit white-noise residuals, rather than identifying large systematic differences between observed and in-sample predicted values among country groups.

### 3. METHODOLOGY

This contribution combines a panel data analysis of intra-EU15 trade with an “out-of-sample” calculation of potential EU-Romania trade relative to the period 1995-’02. In other words, we estimate the parameters of a gravity model for intra-EU15 trade<sup>4</sup> and then plug them into the regression of trade between Romania and her main European trade partners (Italy, Germany, France, UK, and Spain) to obtain potential trade. This potential or normal trade is then compared to actual trade volumes to assess the dimension of trade potential not exploited in the short run.

As Ferragina, Giovannetti and Pastore (2005) discuss in more detail, the following specification has been used to analyse the determinants of intra-EU15 trade.

$$X_{ijt} = \alpha_i + \beta_1 POP_{it} + \beta_2 GDPPC_{it} + \beta_3 POP_{jt} + \beta_4 GDPPC_{jt} + \beta_5 D_{ij} + \beta_6 CLB_{ij} + \beta_7 CL_{ij} + \varepsilon_{ijt} \quad (1)$$

where:  $i$  are the countries of origin,  $j$  are the destination countries and  $t = 1995-2001$  is the period under examination<sup>5</sup>;  $X_{ijt}$  are exports of country  $i$  to country  $j$  in real terms;  $\alpha_i$  is the bilateral constant;  $POP_{it}$  and  $POP_{jt}$  are the populations at time  $t$  of country  $i$  and  $j$  respectively;  $GDPPC_{it}$  and  $GDPPC_{jt}$  are per capita GDP of country  $i$  and  $j$  at time  $t$  in real terms;  $D_{ij}$  is the geographical distance in Km between the capital city of country  $i$  and of country  $j$ ;  $CLB$  is a dummy equal to one, if the two countries share a common land border and/or have ex-colony links and zero otherwise.  $CL$  is a dummy

<sup>4</sup> We include 13 EU countries in the empirical analysis, since for Belgium and Luxembourg data were missing for some years.

<sup>5</sup> Notice that while the gravity equation has been estimated over the period 1995-’01, potential trade is computed over the years 1995-’02. This is because some observations for the year 2002 were missing. They have been substituted by average values relative to the previous three years.

for common language taking a value of one if the trade partners speak the same language and zero otherwise and  $\varepsilon_{ijt} \sim IID(0, \sigma_\varepsilon^2)$ . All the variables in our equation, except for the dummies, are in natural logarithms and therefore the estimated parameters can be interpreted as elasticities.

According to Feenstra et al (2001, p.432) the constant term should represent the impact of world income on bilateral trade within the sample.

Bilateral exports are expected to be positively influenced by: a) the importer demand and exporter supply, as proxied by their population (POP) and per capita income (GDPPC), respectively. A higher per capita income means a higher import demand and export supply, as it is a proxy of the economic development of the country. The effect of population is more ambiguous: a larger population means a large domestic market, a higher degree of self-sufficiency and less need to trade. At the same time, a large population entails a deeper labour division and scale economies in production which are generally associated in the theoretical models with a larger need for trading. Therefore, the effects of this variable are ambivalent. b) dummies such as sharing a land or a sea border, ex-colony links, common language capture the geographical closeness, the better information, the lower cultural differences, the lower “home bias” and research and communication costs associated with proximity (familiarity with custom regime, institutions, legal system). Conversely, bilateral exports are expected to be negatively influenced by: c) distance which can be expressed as geographical distance, but also by the surface of host’s markets, the level of trade costs, the presence of a “home bias” effect and of time and search costs

As detailed in Ferragina, Giovannetti and Pastore (2005, Table 2), all the available test statistics support the adoption of a REM with exporting and importing countries’ and years’ dummies. This model has consistent coefficients like the fixed-effect model, while being more efficient. In the preferred specification, the variables have the expected sign and are highly significant. The explanatory power of the model is also high. The statistical significance of distance in explaining the trade intensity of EU countries suggests that transport costs still have an important impact on the export performance. The estimated parameter for distance is stable across different specification and is in line with that typically found in earlier studies (- 0,7).

Also the coefficients are reasonable. Similar to previous studies, the coefficient for the per capita GDP of the exporting country is lower than that of the importing country. This is to be expected, considering that exports are more related to the income level of the importing, rather than of the exporting country. The coefficient of the per capita GDP of the importing country is slightly greater than 1, which is what one would expect if the propensity to import from EU countries was constant over time and the share of EU over total imports was constant.

#### 4. ROMANIA-EU TRADE POTENTIAL

A short discussion of the recent evolution of Romania-EU trade patterns seems useful to put the discussion about trade potential into context. Romania is not much

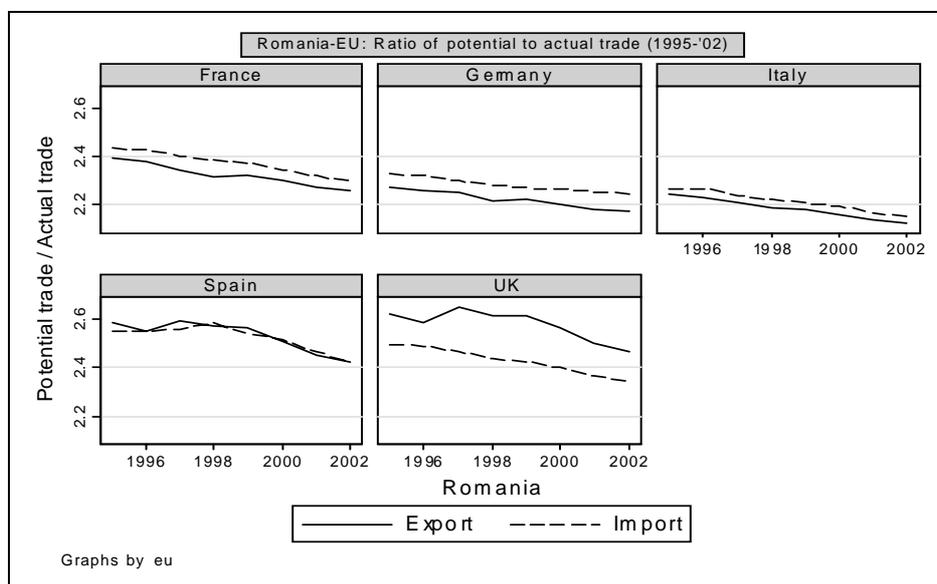
different under this respect from other CEE countries. Asymmetric trade with the EU afflicts CEECs. In 2003 exports to CEECs as a share of total EU exports had become more than 12% from only 5% in 1990 and, for imports, the share was above 10%. The average share of exports and imports that CEECs devote to EU is more than 60 and 55% respectively. In few years exports to the EU as a share of total exports have become on average more than 60% of CEECs total exports (according to Eurostat they range from a minimum of 48% for Lithuania to a maximum of 70% for Poland with some impressive increases over the period 1990-2003 from 4 to 70% in the case of Estonia, from 6 to 55% in the case of Bulgaria from 5 to 48% in the case of Lithuania). The average share was only 30% in 1990. Imports are on average more than 55%, starting from an average of 32% in 1990, with some peaks like Poland and the Czech Republic (more than 60%), followed by Romania (57%).

As already noted, to check whether Romania-EU trade approached its potential level in the period under consideration, we apply the estimated coefficients from the gravity equation of intra-EU15 trade to the same specification for CEE-EU trade flows. These parameters are used as a “benchmark” to estimate the potential integration that CEECs and Romania, in particular, might obtain if the elasticity of trade determinants were the same as those observed in the case of intra-EU15 trade. Trade volumes are then considered “normal” trade, which could be obtained with a deeper integration according to the predictions of the gravity model. We applied the same procedure to EU-CEE trade.

Figure 1 contains the trends in the trade ratio between potential trade (i.e. the “normal” trade estimated in the way described above) and actual trade between each of five EU main trade partners (France, Germany, Italy, Spain and UK) and Romania over the period 1995-02. A ratio of one suggests that potential trade equals actual trade. The higher is the ratio, the higher is the gap that has to be filled and therefore the possibility to create new trade. A decreasing (increasing) trend of this ratio over time suggests that trade is increasing (decreasing) and tends to approach its potential level. It is worth mentioning that the results contained in Figure 1 are robust to different estimation methods, with only some small variations.

The analysis suggests the existence of an important unexploited trade potential with Romania. The potential to actual trade ratio ranges from 2.2 to 2.7 from one country to the other, suggesting that further dramatic economic integration is to be expected in the near future. This is also confirmed by the clear downward trend of the potential to actual trade ratio. The decline is especially clear in the case of trade with Italy and Germany, which already had the lowest ratio at the beginning of the period considered. This suggests in turn that there is no catching up in the trade relationships between Romania and EU countries, but rather a strengthening of existing trade links.

The existence of large unexploited trade potential is typical also of other CEECs. Ferragina, Giovannetti and Pastore (2005) report similar results for other nine CEECs. The trend is marked by a large decline of the ratio in all cases: they start from a ratio of around 2 and further close the gap (especially in the case of countries which started from the worst positions such as the Baltic Republics and Bulgaria, which show



**Figure 1.** Ratio of potential to actual trade (1995-2002)

the most dynamic trend). The trade potential between EU and CEECs is quite close to being exploited in 2002: the ratio is between 1 and 2.5 (for instance in the case of Italy is between 2.2 and 2.6 for exports and 1.7 and 2.4 for imports). This suggests a tendency to close the gap. However, the gap should not be underrated. Without external positive shocks, the analysis carried out here suggests that much time is still necessary to Romania to close the gap. In fact, assuming a constant population of the countries considered and taking for realistic the World Bank forecast of a 5% rate of per capita GDP growth for Romania over the period 1993-'97, the EU export to Romania will increase by about 6.4 and the EU imports from Romania by 5.3 per year. Spain and the UK should perform slightly well, essentially because of their faster GDP growth rate. This means that even if Romania grows at the same rate also in the years after 1997, ten years are still insufficient to close the gap.

The projected/actual ratio of imports systematically exceeds that of exports. Only in the case of Romania-Spain trade, the two lines cross each other. This result is consistent with the EU trade surpluses with the CEECs. It indicates also that there is wide scope for an increase in imports more than in exports and might also suggest that the CEECs within the EAs have not benefited of a total and preferential opening for their exports to the EU.

## 5. CONCLUDING REMARKS

The results of our gravity analysis confirm that there is still a large trade potential between EU and Romania, though the trend is towards a dramatic decline. If

the World Bank optimistic predictions regarding Romania's economic growth will come true, the catching up will happen in not less than ten years. Considering also the low growth rate of the EU, a decline in Romanian growth is bound to cause also a decline in economic integration with the EU. These results, in turn, are worrisome if one thinks of the possible further adjustment process, which might take place in the labour market of EU members and of associate countries in the next few years.

The result that trade potential is still not exhausted is in line with Baldwin, but not with other studies. Gros and Gonciarz (1996), for instance, suggest that the trade potential had been already reached in 1992. But they base their analysis on a very negative period for the CEECs, unlike Baldwin. In the first half of the 1990s, the CEECs were in the descending part of the J-curve of transition. GDP was much lower than the current level suggesting that potential had already been exploited. Baldwin considers the much higher income level of the pre-transition period and obtains results quite similar to ours. In all CEECs, GDP almost doubled between 1992 and 2002, which translates into a progressive reduction in the potential and a trend towards convergence with actual trade.

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## **ECONOMIC AND SOCIAL EFFECTS OF MINING INDUSTRY RESTRUCTURING IN THE JIU VALLEY**

**ALINA FLEȘER**\*

**ABSTRACT:** *The most important impact determined by the applying re-organizing directions is that upon the human entities, due to the fact that one of the conditions imposed in order to turn N.P.C. to profit is to reconsider the number of the company's employees.*

*According to some studies of the region we can draw the conclusion that the impact of re-organizing the mining industry upon the human element has been mostly negative. In this case the paper proposed to identify a few economic and social consequences of the mining industry re-organization.*

**KEY WORDS:** *restructuring, unemployment, staff number*

Due to the geographical position and to the subsoil resources, the coal basin of the Jiu Valley has witnessed an intense economic activity based on extracting, preparing and processing pit coal and brown coal. This region has a specific one-industry character; the activity of extracting and processing coal takes place within 20 companies, coordinated by the National Pit Coal Company (N.P.C.).

In order to sustain this industry (the production costs of mining products have been and are now bigger than the export selling prices), during the period following 1990 (after the fall of the communist regime and the transitional period of adapting to the market economy) the Romanian state had to offer a large amount of subsidies. Yet, according to the estimations done by the specialists of the ministry of Industries, the mining industry of the Jiu Valley has been seen as unprofitable – during the period 1991 – 1998; accordingly, it has registered losses of about 2 billion dollars, out of which, over one billion represented subsidies. Therefore, it was absolutely necessary a economic re-organizing that should determine the bringing into profit of certain mines and or the closing of other ones.

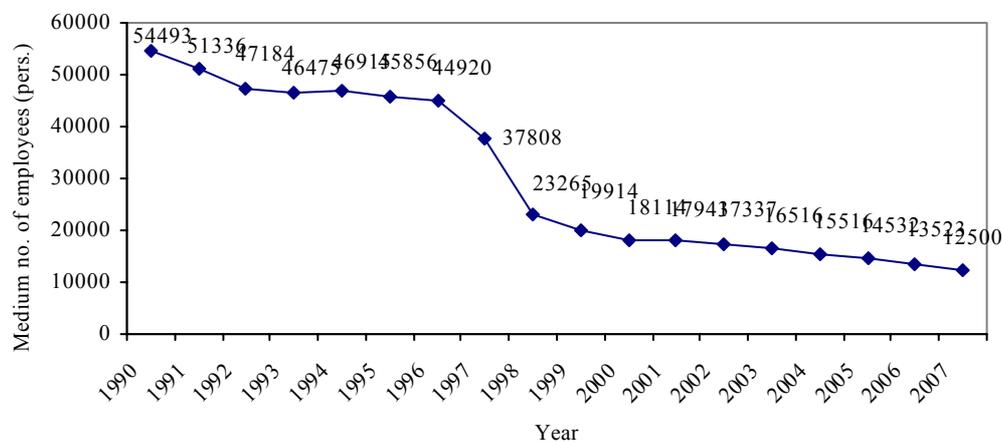
The re-organizing of the essence of the mining industry has been formulated and materialized according to some directions: 1. the technological re-organizing of

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\* *Assist.Prof. at the University of Petroșani, Romania*

production that had as an effect the limitation of subsoil production and the increase of the production obtained within quarries; the increase of the amount of energetic pit coal and the diminishing of the pit coal used in order to prepare coke; the increase of extracting and preparing copper and precious metals ore and the beginning of the activity of modernizing the huge lignite quarries; 2. the organization and management re-structuring that meant the spring from within the mining companies of certain complementary activities and their organization as distinct trade units; 3. the staff re-organizing within the mining companies and, especially, its significant diminishing due to the spring of activities and their organizing as trade companies, to retirement and limitation of work time, and to the work cessation with compensatory payments; 4. the limitation or cease of productive activity of certain mines having limited geological reserves, hard geological conditions that determined huge production costs.

The most important impact determined by the applying re-organizing directions is that upon the human entities, due to the fact that one of the conditions imposed in order to turn N.P.C. to profit is to reconsider the number of the company's employees. Thus, the number of the staff of N.P.C. has continually diminished; the most significant descendant evolution has been registered between 1996 and 2000, due to work cessation with compensatory payments determined by the re-organizing process. Subsequently, the descendent evolution has been gentle, although the descending trend has maintained itself (figure 1).



Source: The Pit Coal National Company

**Figure 1.** The evolution of staff number during 1990 - 2007

According to some studies of the region we can draw the conclusion that the impact of re-organizing the mining industry upon the human element has been mostly negative. Its effects may be synthesized as follows:

1. the development of unemployment among the miners due to mines closing;
2. the diminishing of the living standard of the whole population of the Jiu Valley; taking into account the fact that, in the Jiu Valley, 80 % of the persons who ceased work receiving compensatory payments, have been the only incomes purveyors in their families, we can imagine their difficult situation. The majority live at present under a minimum subsistence level, practicing occasional works, few in number, without any possibilities of paying their debts;
3. the de-population of the Jiu Valley and other secondary demographic effects (as an example, the disorganization of the families and the ageing of the population in the region – taking into account the fact that miners retire earlier than the average of the other economic branches in Romania, that is at the age of 45, with 20 years of work);
4. the increase of criminality in the region and of the number of social conflicts (mainly of work conflicts);
5. the increase of the number of socially assisted persons (after the miners' ending of financial resources and/or the ending of the payment terms of unemployment allowances). The large number of the members of the miners' families or of the unemployed persons coming from the mining field (that is the large number of children to be supported) will increase the poverty of the families in the Jiu Valley;
6. the increase of the number of pupils that abandon school and of the degree of illiteracy as a consequence of the low level of the incomes meant to support the pupils at school and of the diminishing of the degree of schooling at all levels;
7. the degradation of the housing conditions as a consequence of diminishing or exhausting the sources of income both at the level of the population in the region and at the level of the local public administration (the diminishing of the local budget due to a reduced collecting of taxes);
8. the quality of the people's standard of living, in general, and of the work standard in the coal mines, in particular, have a very poor level.

A study done in the Jiu Valley, with the support of the World Bank, by a team of sociologists of The Institute of Sociology of The Romanian Academy, has exhibited a hierarchy of the main worries of the population: unemployment – 92,5%, the high cost of living – 92,3 %, alcoholism – 65,9 %, corruption – 66,2 %, pollution – 62,0 %, housing conditions – 54,0 %, criminality – 44,7 %. All these negative effects determine huge financial costs of social and medical assistance under the circumstances of a very low budget, year after year.

According to the actual re-organizing conditions we may also infer certain positive effects, such as: 1. the diminishing of the number of work accidents both individual and collective and, especially, of the number of the deaths caused by the insecurity of the working conditions in the mines of the region. The accidents of the Jiu Valley have always been a reason of concern for the entire community of the zone. Mining has always implied a “degree of a special risk due to the imminent occurrence of situations causing work accidents” (the Collective Work Contract, 1998 – 1999). All the statistics of the Ministry of Labor have given to the district of Hunedoara and the region of the Jiu Valley an undesirable first place regarding “work accidents”, “deaths”

and incapacity of work. The halving of the employees of the mines in the Jiu Valley determined a diminishing of the number, but not of the risks of those who remained; 2. the diminishing of the number of professional diseases specific for mining due to the introduction of programs of ecological protection in the region of the mines, to the replacement of the old technologies in the mines and due to the ecological works within the mining regions that will be shut down; 3. the changing of the employees' mentality (miners) regarding the necessity of making mining profitable as well as of the unemployed or former unemployed regarding the necessity of work; 4. the development of the entrepreneur spirit in the region and of a series of services that are not so many at present (especially in tourism and infrastructure – highways, roads, and connected services); these must regard mainly the young people in the schools and the faculties in the region.

In order to reduce the rate of unemployment – this being the most negative aspect of re-organizing – a series of active measures have been identified; such measures, on short, medium or long term, may determine the labor's occupation. Thus, an important part has been played by the programs financed by the World Bank, Phare, and by other international organisms. At the same time, we should take into account the local labor's qualification and re – qualification courses regarding jobs demanded by the labor market.

Under the circumstances of consistently applying the programs of regional development, we are able to create within the following 20 years almost 20,000 jobs in other fields than mining. It is estimated that an important part in the economic progress of the region will be played by investments in modern, “clean”, activities. Such activities include: industrial branches based especially upon intellectual capacity (information technology and telecommunications); health products, special food, diagnosis and support services; professional training, activities of qualification and re-qualification; industries that have as a basis the tourist potential of the region.

Consequently, in the future, we should pay attention to the consistent orientation towards the active policies of labor market, the re-consideration of the human dimension, of reform, and the adopting of a strategy of healthy and lasting economic growth due to the development of occupied labor.

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## **CYBERMARKETING AND BUSINESS PERFORMANCE IN THE INFORMATIONAL SOCIETY**

**MONICA PAULA FLITĂR \***

**ABSTRACT:** *This paper tries to reveal the effects of the actual information society on services marketing in general, to clarify the cybermarketing concept (that interferes marketing and information technology), its premises and its possible advantages for the services organizations.*

**KEY WORDS:** *cybermarketing, information society, direct marketing, information technology, marketing know-how, on-line publicity, targeting, tailoring.*

Under today's circumstances of TIME - industry development (telecommunications, information technology, media and entertainment) and of gradual replacement of the industrial society with the informative society, the Internet becomes of ongoing importance for the marketing area. This importance is a tactical one (as a framework and as a tool for marketing communication) and a strategic one, on a macroeconomic level, to be more precisely, it produces the remodelling of all the economic sectors, but it also happens on a microeconomic level, by offering the proper tools and applying the marketing know-how into each firm's activity.

The Internet can be considered a revolutionary tool for the information world at the beginning of the new millennium. It is a special type of media and a promotional tool that combines, at the same time, the characteristics and the advantages of publicity and direct marketing.

Cybermarketing represents the most modern form of direct marketing that uses information technology in the most efficient way, especially in the promotional activity.

Being placed at the limit between marketing and informational technology, the cybermarketing gathers a sum of actions, methods and techniques, created and applied by an organization through the Internet (both the World Wide Web and the e-mail) or online services, in order to raise the efficiency of commercial actions.

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\* *Assist.Prof. at the "Romanian-German" University of Sibiu, Romania*

The marketing activity is changing permanently as a result of the extension of technology and of the social relationships. In the information society, marketing is a digital principle that doesn't take into consideration space or time, an interactive and dialog directed marketing and a strong fact related one. The marketing services are realized in relation with the to the client's preferences. These are the effects of a market transparency that will set up gradually through direct communications, on-line marketing and cybermarketing.

The Internet brings important advantages to the marketing activity, like: real-time travelling of information; customers taken as individuals on the global market; the customers' active role in terms of communication (communication became interactive); the total sovereignty kept by the customer (he's the one who makes decisions about the company's future) etc.

The purpose of cybermarketing is to use the information technology in the most efficient way in order to get commercial performances. On-line publicity actions, electronic commerce, virtual selling are only some of the sub-domains, which are using cybermarketing.

Starting publicity champagne on the Internet requires the existence of a budget, which should include costs of the plan in order to fulfil all of the firm's established aims. Romanian firms' experience revealed that marketing budgets in general, as well as publicity budgets are not yet considered of great importance.

Acknowledging, informing, developing relationships between producer and consumer make the buying free from obstacles, offering new using solutions are just some of the objectives which should shorten the distance between supply and demand.

The fundamental objective of a publicity campaign is to obtain a measurable commercial finality that can be measurable and expressed in terms of attitudes.

The main objectives of Internet publicity champagne are:

- winning new customers by attracting relative no customers, attracting competitor's clients, targeting new market segments.
- increasing the consumption of the gained clients by increasing consumption's intensity, reducing the period of time between two successive buying, suggesting new ways of using the firm's products.
- creating attitudes and behaviours that are profitable for the company by inciting the client to buy "generic products", using strong concepts, considering the brand as the best choice, creating loyalty to the brand, reflexive association of the brand with the type of product, creating the need of getting more information.
- creating a positive attitude of the public by taking into consideration: the consequences for the customers (the product's existence, its way o use, its distribution locations etc.), their believes determined by attributes, feelings, sensations, impressions etc.

The general accepted principle, which says that dimension gives power, isn't right anymore in the informational society (era), where the best are considered those who prove an efficient and fast communication capacity in achieving the customers' trust.

The cybermarketing is based on the following principles:

- *Digital thinking.* In the last decades the new technology is mainly based on digital technique. Of course, there will be developments of technology and it's more than known that they'll take place in the digital domain. Information is going to be digitally visualized, there will no longer be paper copies but only magnetic support. Although the information is going to be useful only if it gets to the right person in time.
- *Attractive presentation of information.* The users of information from the network are looking for correct and subtle but also funny information. From now on, hiding and embellishing facts wouldn't be useful anymore, because it is required to give proper and honest information.
- *Data represents the most valuable capital of cybermarketing.* Possessing data means keeping the options to identify changes and to do immediate adaptations.
- *Being disposable for potential clients.* These clients can use on-line media anytime. That's why suppliers have to be prepared to satisfy any customer's wish.
- *Treating the customer as a special individual.* The most important thing is the customer's e-mail address, not the phone or fax number, because with the help of the e-mail address the supplier can inform the client anytime about the new changes on the market.

Nowadays, database is the marketing activity's groundwork. Making use of database in the marketing department and connecting with clients through them represents a new tendency that shouldn't be ignored. To progress in the database domain requires to use specific procedures and to adapt marketing to a great number of individual clients.

Therefore, data ware based marketing can be considered an instrument of customers' identification in the most precise way and also a mean of individual approaching of them. The real on-line marketing offers first of all dialogue to the clients. Cybermarketing is transforming the dialogue into an individual relationship having the purpose to obtain customer's loyalty and fidelity.

Data ware based marketing brings a great contribution to the market segmentation by offering required marketing methods. The classic 4P's of the marketing mix are completed by the 4T's: targeting, tailoring, tying, tapping.

- Targeting has the meaning of “micro marketing”. It is not about the raw segmentation of the market, but about an orientation and concentration on the targeted public.
- Tailoring is the adaptation of the offer to the buyer. Before the offer’s elaboration takes place a communication with the customer. It will be a successful communication if the change of information happens in terms of a deep knowing of the client and if the information about the client is offered by the organization’s data ware.
- Tying means attracting and keeping the customer. It is synonymous with “controlling the client”.
- Tapping is expressing the fact that the good usage of the “relationship” between databases and supplier leads to an increase of the business amount (with the condition to calculate everything right). The best advertising that a firm can get is a satisfied client.

In order to use its data warehouses properly, the organization has to create a giant deposit that should gather all relevant information (data) for the client and also make them accessible to those who are interested in it. The stockade of data in giant deposits is known as “data warehousing”. The search of information - in a data warehouse - can be made easier by using a searching engine. Both the collecting and stockade of data are standardized (it is recommended to protect data and this can be made by offering some access rights).

By using data warehouse based marketing, the organization gets the advantage of addressing in a unique way to the client. This kind of communication is made through various telecommunication means. In today’s practice traditional instruments of direct marketing (post, coupons, catalogues etc) are used together with modern communication tools (telephone, videotext, satellite television etc).

The easiest to use mean of communication is the Internet, which also has the largest cover area. Being limited at the beginning to an academic and non-commercial environment, the Internet transformed itself into a global on-line marketplace and it’s suffering a continuous development.

The essence of marketing on the Internet - respectively of cybermarketing - is to find and combine those techniques and methods which attract the potential customer and than to make him buy the product or service. Product promotion through the Internet (and creating the firm’s web page) wants to facilitate the discovery of new products and services to the client and also to attract potential customers who know nothing about the existence of the product or service offered by the firm.

Although, under these circumstances of replacement of the industrial society with the informational one - and the Internet is gradually getting strategic value - Romanian companies confront them with following problems:

- incapacity of those which create the web site to understand completely the complex process of making the decision to buy a product/service;
- shallowness in collecting and using data (information) about the visitors of the web site;
- inflexibility in the research of the visitors' psychology on the Internet;
- rigidity in modelling the product in accordance with the motivation and wishes of the client, or even by collecting some information for extra services;
- incapacity of correct and exact evaluation of data;
- the product/service isn't made touchable enough by the information supplied to the visitor of the web site;
- incapacity of visualizing and creating the web site from the perspective of the customer (e.g. few photos of the promoted product or service, which are also little and with no essence or substance).

Beside these problems, which are mainly related to the product/service's creation and promotion through the Internet, there are also others referring to ethics. Some of the ethic problems which reveal in the direct relation with the client are: the lack of seriousness in actualisation of the site and also in reservation acknowledgement, as well as the impossibility to pay on-line the value (price) of the wanted service.

Finally, to maintain a competitive position on the market, organizations have to understand very well the way in which the results of their actions are affected by the Internet, and also to use efficient the components of the so called "cybermarketing-mix" and find solutions for solving this kind of problems.

Acknowledging and understanding the expectations and the exigency of the potential customers and also by creating a web site in accordance with those can achieve the success of a virtual company.

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## **SOME ELEMENTS OF THE MANAGERIAL CONTROL SYSTEM IN NEW ORGANISATION OF THE NATIONAL POWER SYSTEM**

**MIHAELA GHICĂJANU \***

**ABSTRACT:** *In this paper present new and principal elements of the managerial control system in power energy system. Exchanges on managerial control system was causes of the principal actions: Introduction of the competition; Liberalisation and privatisation of the electricity and heat sector; Private investments; Prices substantiated based on costs; Creation of the internal electricity and heat market Consolidation of the related sectors and regulations (technical, trade, economics etc.)*

**WORDS KEY:** *managerial control system, power system, privatization, objective, reform, restructuring, change, regulations, procedure, performances standard, strategy, competitive market, interest, mission, regulatory framework.*

### **1. INTRODUCTION**

The National Strategy for Privatisation and the main objective of the reform politics in the electricity and heat sector foresees the completion of the sector restructuring; to this effect the most important actions are:

- create the legislative and institutional frameworks with a view to implementing the rules of market-oriented economy in the sector;
- continue the restructuring of the commercial companies from the sector by unbundling, setting up independent trading entities to be privatised subsequently;
- create the Commercial Operator (of the market), the mechanisms and infrastructure for the Electricity Exchange Pool and prepare the detailed procedures for their operation;
- increase the interconnection of the Romanian electricity system with UCTE systems.

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\* *Lecturer at the University of Petroșani, Romania*

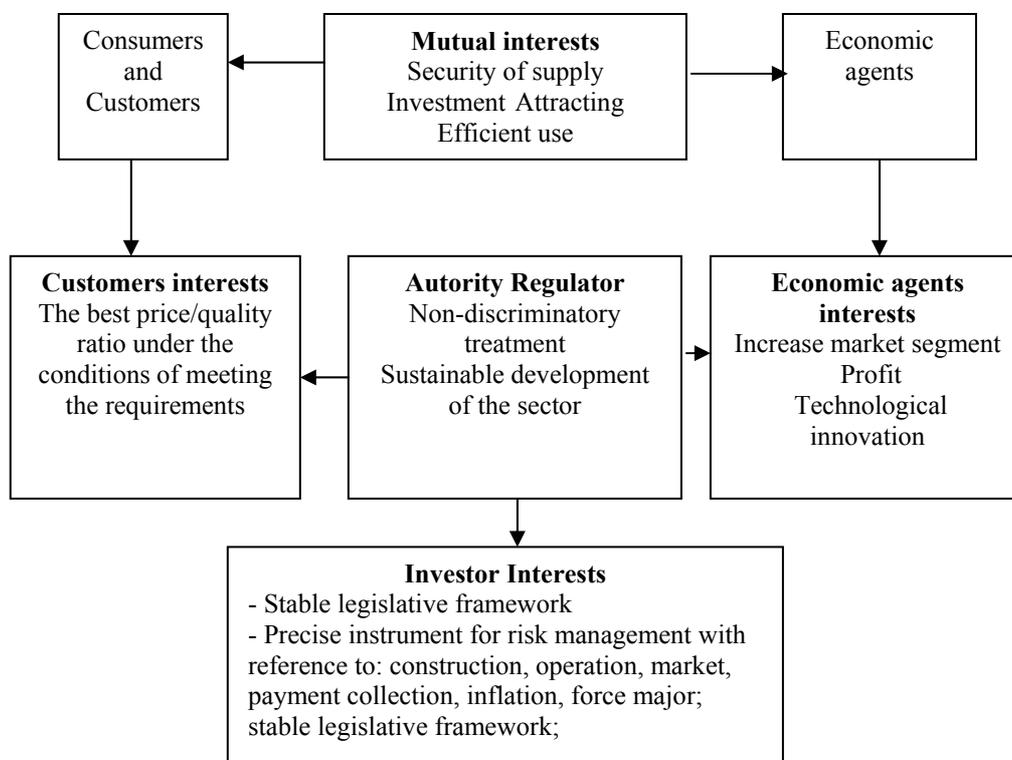
This all actions induce extensive changes as well as in the managerial control system on this sector of the national imperative and safety.

## **2. NEW ELEMENTS MANAGERIAL CONTROL SYSTEM IN NATIONAL POWER SYSTEM**

Privatisation of the actions implies change in the managerial system and managerial control system, these is:

- The setting up, organisation and operation of the *National Electricity & Heat Regulatory Authority - ANRE* as an autonomous public institution of national interest, whose mission is to create and enforce the system of regulations required for the proper operation of the sector and of the electricity and heat market under conditions of efficiency, competition, transparency and protection of the consumers.
- Satisfying the requirements of the economy and population with reference to the supply of electricity and heat, promotion of a competitive market-oriented economy in the electricity and heat sector in association with the observance of the international obligations assumed by the Romanian State and the harmonisation of the national regulations with the provisions of the UE Community Directives in the field;
- General conditions are established as well as the procedure to apply for/release of authorisations and licenses for activities of electricity and/or heat generation, transmission, dispatching, distribution and supply.
- Monitoring the application of the issued regulations will develop on a permanent basis - ANRE - Romanian Electricity and Heat Regulatory Authority -shall inspect, control and direct regulations implementation. The experience gained during the previous inspections contributes to the improvement of the contents of the regulations when they are to be revised; it will contribute also to elaborated and applied of the policy for the promotion of quality activities and results of these activities ( power distribution and supply);
- Economic performances and financial reports will analyses of the holders of licenses for distribution and supply. Contract based trading activities supervision and solving of pre-contractual divergences that may appear between economic agents;
- Performance standards generalization in the supply of electricity and heat . The value of the performance parameters, either guaranteed or general ones, achieved by each supplier represents the basis for ANRE's Annual Reports on Quality of Activity, these reports have a public character;
- The standard applies for the suppliers/consumers. About in the performance standard for the electricity supply service defines the indicators and levels of performance for this activities;
- Supervision of Market Operator activities as well as the activities of the System and Transmission Operator;

- Changes on the energy power system shadow satisfying all interests their implication agencies in this sector: *Consumer and customer interests*: the best price/quality ratio under the conditions of meeting the requirements; *Investors Interests*: Precise instrument for risk management with reference to: construction, operation, market, payment collection, inflation, force major; stable legislative framework; *Economic agents interest*: Increase market segment; Profit; Technological innovation; *Mutual interest*: Security of supply; Investment Attracting; Efficient use; *Regulator interest*: non-discriminatory treatment; sustainable development of the sector (figure 1).



Sours: ANRE- White Paper

Figure 1. Interests harmonized for all agencies

### 3. INFORMATION ABOUT ANRE - ROMANIAN ENERGY REGULATORY AUTHORITY

The **Romanian Energy Regulatory Authority** – ANRE was established and functions as per the Government Emergency Ordinance 29/1998 (GEO 29/1998) and GEO 63/1998 on electricity and heat. The **Romanian Energy Regulatory Authority**

– ANRE is a public autonomous legal body of national interest, which is entirely financed from sources outside the state budget. Its mission is to create and implement the appropriate regulatory system to ensure the proper functioning of the sector and of the electricity and heat markets under conditions of efficiency, competition and transparency and consumer protection.

ANRE tasks and competencies are the following:

- Set up mandatory regulations for sector companies;
- Grant, amend, suspend or withdraw authorisations and licenses for electricity sector companies;
- Issue and approve calculation methodologies to set up tariffs and prices;
- Set up prices and tariffs operating among electricity sector companies, tariffs for electricity system services, transmission and distribution services, prices and tariffs for activities;
- Set up supply framework contracts and contracts operating among sector companies on the sale, purchase, transmission, system service and distribution of electricity;
- Monitor the enforcement of the specific electricity sector regulations;
- Notify the relevant ministry and the Competition Council with respect to the abuse of the dominant position on the market and the breach of the legal provisions referring to competition whenever non-compliance with the regulations on competition and transparency is found;
- Create and administrate a national data base required for the unfolding of its own regulatory activity;
- Issue the regulation for electricity supply to consumers, subject to governmental approval;
- Set up requirements, criteria and procedures for the eligibility of electricity consumers and qualify the eligible customers;
- Approve technical and commercial regulations for sector companies;
- Perform control activities in order to assess sector companies compliance with the existing regulations, with the pricing and tariff system in force and to levy penalties for non-compliance;
- Set up the procedure for the resolution of pre-contractual disputes and settle possible disputes occurring among sector companies upon the conclusion of contracts and of the electricity supply contracts as well.
- Set up its own monitoring and control procedures in order to assess compliance of sector companies with the existing pricing and tariff system;
- Draw up, as per the provisions of the law, its own regulation for the identification, notification and penalisation of violation of sector regulations;
- Draw up the regulation for electricians authorisation and sector companies certification to design, construct, verify and operate energy capacities, respectively facilities;
- Draw up the regulation regarding users' connection to the public electricity networks, subject to Government approval;

- Inform the relevant ministry on the unfolding of its own activity through annual reports to be subsequently published.

#### **4. A FEW WORDS ABOUT OF THE WHOLESALE ELECTRICITY MARKET**

The wholesale electricity market from Romania is established and developed on the basis of the following principles:

- Market operates through trade arrangements between the participants to the market with reference to electricity and associated services ( defined by the *Commercial Code of the Wholesale Electricity Market*);
- The regulatory framework provides for an equally non-discriminatory and transparent treatment for all the market participants;
- At the level of the producers and suppliers the market becomes gradually competitive; for the transmission and distribution activities the market remains fully regulated;
- Access on the market is made through authorisations and licenses;
- Any participant to the market to have regulated access to the transmission and distribution networks;
- The market of the contracts with regulated prices and quantities operates in parallel with the competitive market of the negotiated bilateral contracts and spot sales and purchases;
- Wholesale market deliveries are established through a specific mechanism defined in the *Scheduling and Dispatching Rules* of the National Power System on the basis of the producers' offers;
- The eligible consumers can choose the electricity supplier with whom negotiated (quantities and prices) bilateral contracts are concluded;
- The connection to the electricity transmission and distribution networks represents a public mandatory, regulated service that has to be performed;
- Any new participant to the market is treated like the pre-existing ones;
- The access on the market and prices practised are non-discriminatory for the technologies of generating electricity and energy resources used, except for the cases when legal provisions stipulate specific measures;
- The administrator of the market (OPCOM)- spot market organization, register wholesale electricity market contracts, scheduling the generating units based on merit order, establishing system marginal price, establishing market settlement;
- Participants to the market (license holders registered at the Commercial Operator of the Market) are the producers: *SC Termoelectrica SA and SC Hidroelectrica SA, Nuclearelectrica SA, independent producers and assimilated, self-producers*; buyers: *distributors, suppliers - Electrica producers, eligible consumers*; Transmission Operator and System Operator.

## 5. CONCLUSIONS

The transformations in the Managerial Control System are cause of the:

- Liberalisation and privatisation of the electricity sector - international trends;
- Restructuring of the Romanian electricity sector. Continue the restructuring of the commercial companies from the sector by unbundling, setting up independent trading entities to be privatised subsequently;
- Create the legislative and institutional frameworks with a view to implementing the rules of market-oriented economy in the sector. The existing regulatory framework and new framework (authorisation and License Release, Technical Requirements, Trade arrangements, regulation of Prices and Tariffs; Establish wholesale electricity market;
- Increase the interconnection of the Romanian electricity system with UCTE system.

*The new elements of base in Managerial Control System are:*

1. The Romanian Energy Regulatory Authority – what draw out and issue norms for field electricity and heat and monitor, through inspections and audits, the observance of its decisions and of the legal provisions in the filed;

2. Existence of the Performance Standard for the electricity and heat supply service at regulated tariffs with: General performance indicators and Guaranteed performance indicators generating penalties or tariffs reductions according to the electricity supply contract.

3. Establish wholesale electricity market and electricity market monitoring - draw up of periodic reports (monthly, quarterly, yearly) concerning the wholesale market functioning, draw up of reports/analyses requested by ANRE management and other interested institutions.

All this exchanges was objectives within the energy field:

- sustainable development and environment protection;
- accessibility - supply of modern energy services for everyone;
- availability - maintain the continuity and quality of energy supply;
- acceptability - combine harmoniously the social and environmental issues.

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## **CONSIDERATIONS REGARDING THE STRUCTURE OF THE NATIONAL POWER SYSTEM IN ROMANIAN**

**MIHAELA GHICĂJANU \***

**ABSTRACT:** *In this paper present new structure of the National Power System and principal institutions in order hierarchy levels. Present general information of the main services and public utilities on inside National Power System, respectively: TERMOELECTRICA, HIDROELECTRICA, NUCLEARELECTRICA and INDEPENDENT POWER PRODUCERS (IPP) AND SELF PRODUCERS (SP)- generation power; ELECTRICA - distribution and supply electricity power; TRANSELECTRICA - Transmission and system operator; OPCOM- Commercial operator.*

**KEY WORDS:** *power system, electricity, distribution power, producer power, generation power, supply power, transmission power, commercial operator, objectives, mission vision, services energy, subsidiary*

### **1. INTRODUCTION**

Desire accession to the European Union represents a strategic option for Romania and this is because many changes in national economy inside, include electricity and heat sector. In least years, Electricity Sector registering many changes in frameworks on the legislative, institutional and operational

Compliance with the provisions of the *EU Community Directive 96/92 EC*, creation of an internal electricity market Romanian involve actions much witch among:

- unbundling generation, transmission / dispatching and distribution / supplying activities;
- liberalisation of the market - open access to the T&D networks correlated with the eligibility of the consumers. Introduction of the competition in distribution/supply is thus encouraged and generation offer improved.

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\* *Lecturer at the University of Petroșani, Romania*

## 2. PRINCIPAL INSTITUTIONS ON HIRARCHY LEVELS

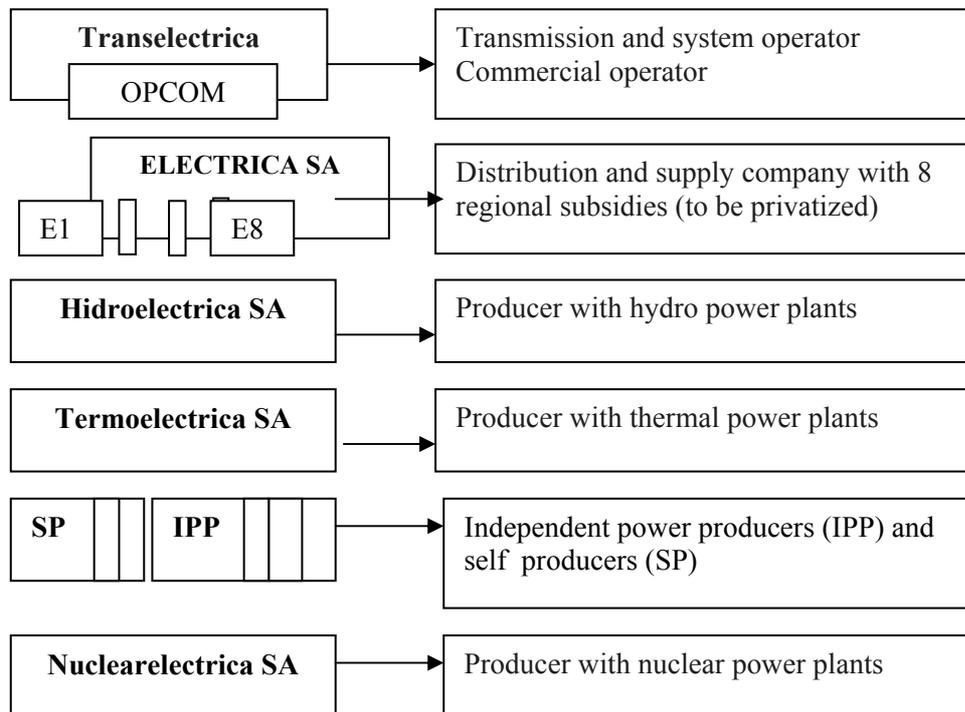
**1). National coordinator - Ministry of Economy and Trade (MEC) -** strategies, policies-development and implementation:

- Strategy and Energy Efficiency;
- Renewable Restructuring and Energy Sector Market;
- Restructuring and Oil and Natural Gas Sector;
- Mineral Resources Strategy Directorate;
- Mines and Mining Reconversion.

### **2). Regulatory and implementation institutions**

- ANRE - Romanian Electricity and Heat Regulatory Authority
- ANRGN - National Natural Gas Regulatory Authority
- ANRM - National Mineral Resources
- ARCE - Romanian Agency for Energy Conservation
- ANRSC - National Regulation Authority for Public Services

### **3). Main services and public utilities (figure 1)**



**Figure 1.** Romanian electricity sector structure

**a. Power & Heat:**

- TRANSELECTRICA S.A. - power transmission;
- OPCOM - power commercial transactions supervision;
- ELECTRICA S.A. - power distribution and supply;
- TERMOELECTRICA S.A. - heat and power generation; heat transport and supply(*Termoelectrica subsidiaries: Electrocentrale Braila, Borzesti, Doicesti, Paroseni; Termoelectria territorial branches: Electrocentrale Bucuresti (ELCEN), Electrocentrale Turceni, Electrocentrale Rovinari*);;
- HIDROELECTRICA S.A. - power generation;
- NUCLEARELECTRICA S.A. - power generation.( *It includes three branches: - CNE PROD - operating Unit 1 - CNE Cernavoda; CNE INVEST- completion of the Units 2-5 - CNE Cernavoda; FCN - Pitesti - the nuclear fuel company* );
- INDEPENDENT POWER PRODUCERS (IPP) AND SELF PRODUCERS (SP) (tabel nr.1).

**Tabel 1. List with Independent Power Producers (IPP) and Self Producers (SP)**

IPP	SP
CET GOVORA CET Braila HIDRAL INVEST ENET Focsani SA MARC FAVRE ROMANIA TERMICA Botoşani NUON SIB	S.C. SOFERT S.A ; S.C. UPSOM S.A. ; S.C.“ZAHARUL” S.A. Regia Autonoma pentru Activitati Nucleare ; S.C. GRIRO SA S.C. VIROMET S.A ; S.C. "ZAHARUL" Ludus ; S.C. ELECTROCENTRALE DEVA ; S.C. C.E.T. ENERGOTERM RESITA ; S.C. Uzina Termoelectrica GIURGIU SA ; S.C. Uzina Electrica ZALAU SA ; S.C Centrala Electrica de Termoficare ARAD S.C. VEST-ENERGO S.A. ; S.C. TERMICA S.A Suceava ; S.C. Centrala Electrica de Termoficare Iasi SA ; S.C. Centrala Electrica de Termoficare Brasov SA ; S.C. C.E.T. S.A. Bacau

**b. Natural Gas:**

- **TRANSGAZ** - transport
- **ROMGAZ** - exploration, production and storage
- **DISTRIGAZ NORD SA** - distribution
- **DISTRIGAZ SUD SA** - distribution
- **GAZEXPORT** - imports from Russia

**c. Oil and derivatives**

- **CONPET** - oil transport

➤ **SNP PETROM** - oil exploration, production, refining and distribution; associated gas production and distribution.

**d. Coal:**

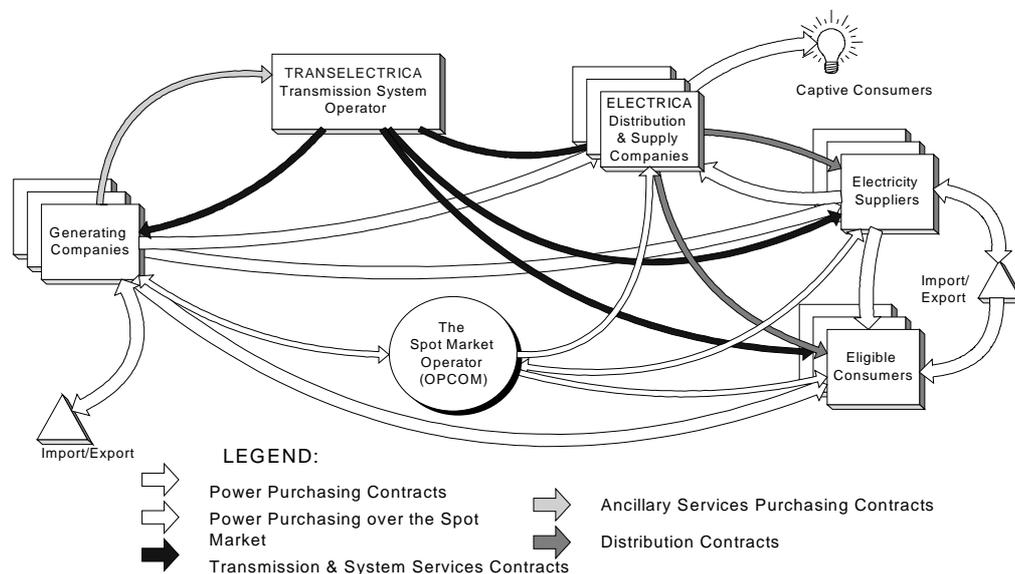
- The National Lignite Company Oltenia (CNLO)
- The National Hard Coal Company (CNH)
- The National Company Coal Ploiesti (SNCP)
- The Trade Company "Banat" Anina

**4). Design and research institutes in the field**

- **ICEMENERG** - National Research and Development Institute for Energy;
- **ISPE** - Institute of Power Studies and Design
- **IPCT** - Building Design, Research and Software Institute for Construction

### 3. GENERAL INFORMATIONS ABOUT MAIN SERVICES AND PUBLIC

Participants to the market (license holders registered at the Commercial Operator of the Market) are the **producers**: *SC Termoelectrica SA and SC Hidroelectrica SA, Nuclearelectrica SA, independent producers and assimilated, self-producers*; **buyers**: *distributors, suppliers - Electrica producers, eligible consumers*; **Transmission Operator and System Operator** (fig. no. 2).



Sours: ANRE - Romanian Electricity and Heat Regulatory Authority

**Figure 2.** Wholesale market arrangements

**1). S.C. TERMOELECTRICA S.A.** SC Termoelectrica-SA has as main object of activity the generation of electricity and heat by the firing of the fossil fuels. In parallel this company more realising complementary activities , among which the most important are:

- Perform technical revicions, overhauls, planning and pursuance of the repairing and maintenace;
- Perform rehabilitation and modernization works;
- Promote, plan and run investment programs for developments and rehabilitation;
- Promote and run programs for attenuating the impact of the power plants on the environment;
- Perform import-export operations Purchase fuels and technical-material supplies needed for the basic activity;
- Perform activities specific to the labor safety and personnel occupational health, including the fire-fighting
- Improve the information flow by achieving the own information and telecommunication systems;
- Prepare studies and technical-economic and financial analyses for the own activity field.

In 2003, SC Termoelectrica SA had the following organizational structure:

- subsidiaries – joint stock commercial companies for electricity and heat generation, with legal personality; (*Termoelectrica subsidiaries*: Electrocentrale Braila, Borzesti, Doicesti, Paroseni; *Termoelectria territorial branches*: Electrocentrale Bucuresti (ELCEN), Electrocentrale Turceni, Electrocentrale Rovinari);

- own branches for electricity and heat generation;

- 12 subsidiaries – joint stock commercial companies for maintenance and servicing, with legal personality in which there had operated a total of 17 (coal and hydrocarbon fired) thermal-electric power generation plants, located all over the country.

S.C. Termoelectrica S.A. remains even under the new organizational structure the main generator of electricity and heat from Romania, it being a state-owned commercial company, under the authority of the Ministry of Economy and Trade.

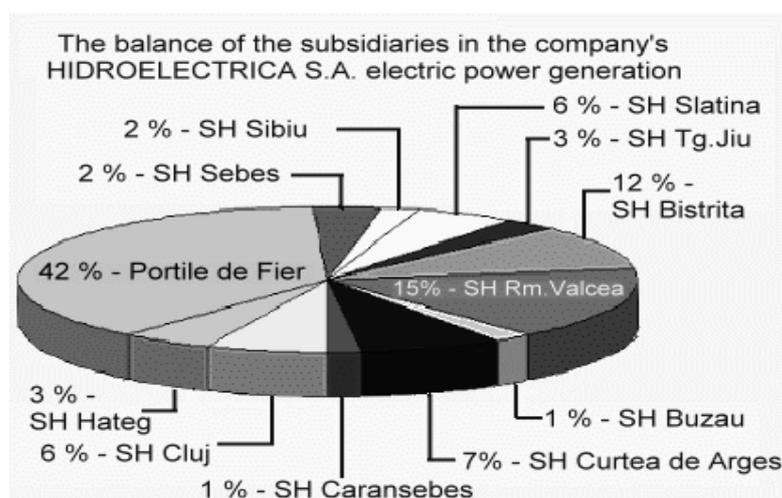
**2). S.C. HIDROELECTRICA S.A.** HIDROELECTRICA S.A. is a trade state-owned company wich has as its main ojective of activity to generate electrical energy by using hydropower resources from ROMANIA.

**Mission is** - leaders in power generation and ancillary services in an environmental snd socially liable manner.

- work based on highest professional standard;
- client demand orientation as well as consolidated partnering relationship;
- alignment of entire activity to quality assurance requirements;
- respectfulness towards employees who are the most valuable asset;
- responsible management of the utmostly precious resource: water.

HIDROELECTRICA S.A. has in administration 350 hydropower plants and power pumping stations summing up an installed power of 6288,44 MW (from which 81,5 MW in power pumping station) with a power generation in an average hydrological year of 17298,35 GWh.

From the administrative point of view the hydropower plants are organized in 12 secondary headquarters having a non-legal person subsidiary statute. The balance of the subsidiaries in the company's electric power generation is presented in the following pie chart (fig.no3).



Sours: Annual Report 2004, Hidroelectrica S.A.

**Figure 3.** The balance of the subsidiaries in the company's electric power generation

**3). NUCLEARELECTRICA S.A.** Since July 27 1998 "Nuclearelectrica" - SA is registered with the Register of Commerce, Chamber of Commerce and Industry. SNN SA is reporting to the Ministry of Economy and Trade and the state owns 100% of the shares.

"Nuclearelectrica"-SA has three branches, no legal person:

- "CNE PROD", operating the Cernavoda NPP Unit 1 and the auxiliary services;
- "CNE INVEST", including Units 2 to 5, actually in charge with the Unit 2 completion and U3-U5 preservation;
- "FCN - Pitesti", the Nuclear Fuel Plant.

Established on July 2, 1998 the National Company "NUCLEARELECTRICA" S.A. (SNN SA) has, as main mission, the production of nuclear power, of nuclear fuel and the projects development at the Cernavoda Nuclear Power Plant site. To recognize nuclear power as a reliable, competitive and clean source of industrial electricity.

**Objectives activity**

- To maintain the Cernavoda NPP Unit 1 at full power within the limits required by the licensing documents;
- To maintain the control and manage the configuration of the plant;
- To maintain the material condition of the plant at high standard;
- To maintain and improve the existing business process in an efficient manner;
- To turn to good account the operation experience;
- To continuously develop and motivate human resources;
- To maintain good contacts in the nuclear industry and international community;
- To attract domestic and foreign capital and financing for the completion and commissioning of Unit 2;
- To maintain a good image of the company and permanent contacts with the public and media.

**4). S.C. ELECTRICA S.A.** Company distribution and supply electricity power are principal objectives activity:

- *distribution electricity power*

- Distribution Coordination, Dispatcher, Monitoring Behavior Constructions [CDDUCC]
- Protections, Automations, Measure, Process Information Technology [PRAM-IP]
- Technical
- Management Information System [MIS]
- Communications
  - *supply electricity power* - ensures the supply of electricity to customers, structured in three categories, big customers, small customers and domestic customers, based on licenses for providing electricity;
  - *energy services*
- Electric power maintenance and repair services;
- Workshop and laboratory repairs, check-outs and analyses;
- Design and consulting;
- Transportation;
- Trading and related activities.

**5). S.C. TRANSELECTRICA S.A.** TRANSELECTRICA ensure the Romanian Power System reliable and stable operation at quality standards, while providing the national electricity transmission network under transparent, non-discriminatory and fair conditions to all market participants.

TRANSELECTRICA has the following key functions:

- transmission and system operator of the Romanian Power System;
- Commercial operator of the electricity market-its subsidiary OPCOM;
- Metering operator for the wholesale electricity market-its branch OMEPA;
- Telecommunication and IT operator – its subsidiary TELETRANS.

**6). OPCOM S.A.** OPCOM plays the role of electricity market administrator, as stated in the primary and secondary legislation in force, providing an organized, viable and efficient framework for the commercial transactions traded within the

wholesale power market, in conditions of consistency, fairness, objectivity, independence, equidistance, transparency and non-discrimination.

The Commercial Operator has the main functions:

- Registration of the market participants.
- Contract registration and monitoring.
- Coordination of the electricity consumption forecast activity aimed at the operational scheduling of the National Electricity System (SEN).
- Setting up of the merit order of the dispatchable units, by ranking them according to their capacity, offered quantities and prices, turned into the operational schedule of the dispatchable units.
- Setting up of the system marginal price for each programming interval.
- Publication of the system marginal price and other relevant market information.
- Scheduling of the ancillary services traded daily as a component of the operational programming of the dispatchable units for each programming interval.
- Settlement among market participants, for each settlement interval, of the power and ancillary services quantities traded, of the transmission volumes and market administration fees.
- Conciliation of the disputes among market participants and submission of the unsolved litigates to a Committee (CADPEE) appointed by ANRE.
- Temporary suspension of the market participants in case of unfair behaviour and disturbance of proper market operations, as stated by ANRE regulations.
- Contribution to the improvement of the electricity market operation by elaborating new procedures to be submitted to ANRE approval.
- Assistance and consultancy for the market participants, elaboration of surveys and studies as well as of specific analyses and syntheses on specific themes.
- Domestic and international cooperation.

#### 4. CONCLUSIONS

The main objective of the reform politics in the electricity and heat sector foresees the completion of the sector restructuring. Under the circumstances the strategic options of the electricity and heat sector are represented by the final defining of restructuring process, gradual introduction of competition in generation and supply, privatisation followed by the promotion of the efficiency and private capital attracting

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## **SELF-FINANCING CAPACITY – AN INTERNAL FUNDING SOURCE**

**TEODOR HADA, SORIN-CIPRIAN TEIUȘAN \***

**ABSTRACT:** *The present paper discusses self-financing capacity seen as a particular indicator that reflects the financial potential determined by the profitable activity of a company. We present the ways in which it can be calculated as well as a case study.*

**KEY WORDS:** *internal sources, indicator, self-financing capacity, method*

The most important aspect for a company is to possess internal funding sources on time and in the quantity required for its normal functioning.

The advantage of using internal funding sources is due to:

- The low cost of funding, as these sources appear at first sight to be “free of charge”;
- The capital market does not always have at its disposal enough funding sources;
- Time saving (following the formal methods to obtain external funding sources sometimes takes a lot of time).

Likewise, internal sources are the barometer for the efficient use of assets, stimulating companies to judiciously administer their resources.

Internal funding, also known as self-financing, signifies obtaining financial means from the administrative unit’s own funds. It is a financial activity, through which economic agents use their own resources to satisfy their needs, without resorting to loans. It is a basic component of economic and financial management, as well as a financing method used to cover a company’s expenses regarding investments, circulating assets, stimulating personnel etc. Self-financing creates a direct dependence between a company’s economic and financial results and its own funds for development and personnel interest. It is in tight connection with the economic unit’s policy regarding loans, profit distribution and depreciation. It represents a particular

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\* *Assoc.Prof., Ph.D. at the University “1 Decembrie 1918” Alba Iulia, Romania  
Assist.Prof., Ph.D. Student at the University “1 Decembrie 1918” Alba Iulia,  
Romania*

modality to finance small firms, who have much lower market stability than medium and large firms, as they are much more sensitive to market random fluctuations. Self-financing, just as financing in general, can aim at holding on market, or it can aim at development or growth.

Self-financing capacity is the indicator reflecting the financial potential determined by a company's profitable activity at the end of a time period, intended to remunerate its own capitals (through dividends) or finance future development (through the profit share meant for own sources); it also reflects if fixed assets have been kept or renewed (through depreciation).

*Self-financing capacity (SFC)* can be determined by two methods:

- The deductive method;
- The additive method.

*a)* Through the deductive method, self-financing capacity is calculated as difference between incomes to be collected (corresponding to present or future receipts) and expenditure to be paid (corresponding to present or future payments).

A starting point in determining the self-financing capacity is the gross operation surplus (treasury potential surplus), to which we add all revenue liable to be collected and from which we subtract all expenditures liable to be paid. By the elements from the structure of the profit and loss account, we have the following situation:

$$SFC = GOS + OI_{ex} - OE_{ex} + I_{fin} - E_{fin} + I_{exc} - E_{exc} - Ti \quad (1)$$

where:

GOS – the gross operation surplus;

$OI_{ex}$  – other incomes derived from operation, minus the incomes from asset factors transfer and quotas from subsidies for investments transferred on the exercise results.

$OE_{ex}$  – other expenditures derived from operation, minus the accounting net value of the transferred asset factors;

$I_{fin}$  – financial incomes;

$E_{fin}$  – financial expenditures, without adjusting the value of financial immobilization and financial investments held as circulating assets;

$I_{exc}$  – exceptional incomes;

$E_{exc}$  – exceptional expenditures;

Ti – income tax.

*b)* The additive method is much easier to calculate and highlights accounting elements, which do not generate money flows and which participate in the calculus of the self-financing capacity.

$$SFC = Rn_{ex} + Aj_{ap} - Q_{sin} - It_a + Vn_{ac} \quad (2)$$

where:

$Rn_{ex}$  – the net result of the exercise;

$A_{jap}$  – adjustments regarding depreciations and commissions;  
 $Q_{sin}$  – Quotas from subsidies for investments transferred on the exercise results;  
 $It_a$  – incomes from asset factors transfer;  
 $Vn_{ac}$  – net accounting value of transferred asset factors;

Self-financing capacity is an expressive indicator of a company's financial power, a guarantee of its security and independence. Enterprises that finance themselves are less exposed to market risk, being able to ensure needed financing sources.

Self-financing capacity enhances the firm's liquidity and solvability, increasing its reliability; thus, the firm becomes more credible for commercial banks, which grant it financing more easily as compared to other firms and it becomes more credible for the business environment.

As to debt, banks require firms to keep within certain limits. Regarding long and medium term requirements, the condition that banks impose is that the debt does not exceed a certain multiple of self-financing capacity, and namely:

$$\frac{\textit{Fixeddebts}}{\textit{Self-financingcapacity}} \leq 4 \quad (3)$$

The more the self-financing capacity increases, the more the firm has the possibility to use credits. In these circumstances, credits are a positive factor for the firm, as the obtained profitableness covers its interest; the firm is left with a profit that it uses to pay production factors, the state, etc.

Certain connections appear among the self-financing capacity components. Thus, depreciation has a neutral influence on self-financing: by increasing costs through depreciation, profit increases, and vice versa, so that we cannot count on another quantum for the self-financing resources that that generated by operation.

If enterprises apply methods that increase the volume of depreciation (the accelerated method, the degressive method), the obtained profit is smaller and the distributions of profit to personal funds are smaller as well.

There is also a tight connection between the self-financing policy and the policy for profit distribution. Giving smaller or larger dividends obviously influences the size of personal funds and self-financing eventually. If during the transition period, profit distributions in the case of enterprises with a majority state-owned capital is established by the Law, in the case of private capital enterprises, they are established by the shareholders' general meeting. In the latter case, profit is distributed in the form of dividends or it is used for development, being the shareholders' property. That is why, the policy towards profit distribution is after all a liquidity policy: if personal funds are constituted, the enterprises' liquidities increase and with it, the self-financing possibilities; larger dividend distributions lead to a decrease of liquidities and thus to a reduction of the enterprise's self-financing capacity.

However, in reality, not all the self-financing capacity remains at the enterprise's disposal. If we deduce the distributed dividends, the employees' participation to the profit and the managers' quota from the self-financing capacity, we obtain global (total) self-financing.

Therefore:

$$TS = SFC - Div_d - Pep - Qm \quad (4)$$

where:

TS – total self-financing;

Div<sub>d</sub> – distributed dividends;

Pep – the employees' participation to the profit;

Qm – the managers' quota.

Total self-financing has two components:

❖ Maintenance self-financing;

❖ Net self-financing.

Mathematically, it can be represented as such:

$$TS = MS + NS \quad (5)$$

where:

MS – Maintenance self-financing;

NS – Net self-financing.

Maintenance self-financing comprises sources used for future expenses regarding the maintenance of the productive potential.

The main component of maintenance self-financing is depreciation, to which we also add commissions. *Net self-financing* is the share from gross self-financing from which the enterprise's own sources are formed, over the necessary required by the re-construction of the invested capitals, resulting in a patrimony increase; therefore:

$$NS = GS - Empp \quad (6)$$

where:

NS – net self-financing;

GS – gross self-financing;

Empp – expenditure for the maintenance of the productive potential (depreciation expenses).

With the purpose of reflected the above-mentioned information, we shall calculate the indicators mentioned on basis of data from the annual financial positions of a society. Thus, we have the following data:

- Fixed debts 11.859.786 thousand ROL;
- Sold production 16.003.051 thousand ROL;
- Immobilized production 25.551 thousand ROL;

- Incomes from merchandise sale 2.274.819 thousand ROL;
- Other income from operation 140.600 thousand ROL;
- Financial incomes 29.546 thousand ROL;
- Exceptional incomes 2.038.154 thousand ROL;
- Expenditure regarding merchandise 1.968.501 thousand ROL;
- Expenditure regarding raw materials and consumables 6.369.153 thousand ROL;
- Other managerial expenditure 377.408 thousand ROL;
- Energy and water expenses 272.885 thousand ROL;
- Personnel expenses 4.544.861 thousand ROL;
- Depreciations and commissions for the depreciation of corporal and non-corporal immobilizations;
- Adjusting the value of circulating assets 56.558 thousand ROL;
- Expenditure regarding external labour conscriptions 1.545.925 thousand ROL;
- Expenditure for other taxes, fees and assimilated payments 1.487.008 thousand ROL;
- Expenditure for compensations and donations 95.503 thousand ROL;
- Overall financial expenditure 2.024.923 thousand ROL;
- Adjusting the value of financial immobilizations and of financial investments held as circulating assets 1.234.919 thousand ROL;
- Exceptional expenditure 80.632 thousand ROL;
- Profit tax 0 ROL;
- Net result 1.066.843 thousand ROL;
- Distributed dividends 600.000 thousand ROL.

Determining the gross operation surplus (GOS), necessary for calculating the self-financing capacity through the deductive method, imposes the determination of other previous intermediate balances, respectively of the commercial margin, of the exercise production and of the added value.

Commercial margin = 2.274.819.000 – 1.968.501.000 = 306.318 thousand ROL

Exercise production = 16.003.051.000 + 25.551.000 = 16.028.602 thousand ROL

Added value = 306.318.000 + 16.028.602.000 – (6.369.153.000 + 377.408.000 + 272.885 + 1.545.925.000) = 7.769.549 thousand ROL

GOS = 7.769.549.000 – 4.544.861.000 – 1.487.008 = 1.737.680 thousand ROL

Through the deductive method, the self-financing capacity is:

SFC = 1.737.680.000 + 140.600.000 – 95.503.000 + 29.546.000 – (2.024.923.000 – 1.234.919.000) + 2.038.154.000 – 80.632.000 = 2.979.841 thousand ROL

The same, through the additive method::

SFC = 1.066.843.000 + (56.558.000 + 621.521.000 + 1.234.919.000) = 2.979.841 thousand ROL, proving the equality of the result through the two different methods.

As regards keeping within the limit required by the bank, it is accomplished:

$$\frac{11.859.786.000}{2.979.841.000} = 3,98 \leq 4$$

The calculus of total self-financing, through the two different methods and of net self-financing, based on the above-mentioned formulae, is presented as such:

$$TS = 2.979.841.000 - 600.000.000 = 2.379.841 \text{ thousand } ROL$$

or

$$TS = 1.912.998.000 + 466.843.000 = 2.379.841 \text{ thousand } ROL$$

and

$$NS = 2.979.841.000 - 1.912.998.000 = 466.843 \text{ thousand } ROL$$

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## **BUSINESS COMMUNICATION STRATEGIES**

**LAVINIA HULEA \***

**ABSTRACT:** *General communication processes rely on messages implying contents, communication channels, a receiver and clear objectives. Once accepting the importance of defining objectives, three strategies, narrative, implicative, and decisional, seem to be specific for most business communications. While narrative business communications convey information with a view of simply transmitting information and depend on accuracy, complexity, and clarity, implicative business communications convey information in order to determine a certain behavior of the receiver and rely on credibility, logic, and motivation; decisional business communications transmit information having a negative or positive connotation and depend on message, tone, and language.*

**KEY WORDS:** *business communication strategies, narrative business communication, implicative business communication,, decisional business communication, objectives, information*

In order to strengthen their market positions companies have to approach communication in a complex manner. Communication is regarded as an essential component of any successful company, allowing it to convey its capacity of solving a problem, offering a profit or satisfying a need.

As general communication processes rely on messages implying contents, communication channels, a receiver and clear objectives, the focusing on a certain objective determines the emitter to clearly choose the receiver, to set out the goal of the message and its implications.

Written or oral reports, press communications, notices, all imply the process of conveying information that should constantly have in view several co-ordinates: the receiver of the message, the emitter of the message as well as the general context of communication. Accordingly, within a company, information can be conveyed both vertically-from the leading staff to the employees-and horizontally-within the leading staff level or within the employees level. Each of these ways of transmitting information compels the emitter to possess data regarding the educational level of the

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\* *Assist.Prof. at the University of Petroșani, Romania*

receiver and the amount of information the message contains. When conveying information, the emitter should also take into account the various levels of signification that may be different from a receiver to another. Rapid analyses of previous communications are able to supply data concerning the amount of information the receiver acquired when exposed to a certain subject.

The main objective of narrative business communication is message understanding, the emitter being aware that the receiver grasps the meaning of the communication. Messages effectively influence the receiver's ideas, opinions or behavior according to the emitter's communication goal which, in its turn, is the consequence of the motivation that determines the initiation of the communication process.

The specific objectives of narrative business communication concern the conveying of information. An efficient business narrative communication has in view both the general and the specific character of information. A narrative communication, which is generally written, that includes a too large amount of enunciations has a too general character. The decoding of such a narrative communication may puzzle the receiver and make subsequent communications difficult. A similar deficiency occurs in case of narrative communications that abound in explanations or details. Decoding such a narrative communication is usually very difficult as information is not logically set out.

Coherent narrative business communications should be accurate, clear and able of conveying the whole amount of information. While accuracy concerns the ability of handling information, clarity regards the conception and conveyance of the message in a manner that allows its easy decoding and understanding; the capacity of conveying the whole amount of information concerns the volume and the well-grounded character of the conveyed information.

Business narrative communications mainly transmit information. The maximum impact upon the receiver is achieved when narrative communication focuses both on general and on specific items of information and when clarity, accuracy and complexity are used at their most.

As narrative business communications do, implicative ones also convey information from the emitter to the receiver. Yet, they are far from being alike. While the first ones transmit information with a view of simply conveying it, the second ones intend to determine the acceptance of information by the receiver as well as a certain behavior. Accordingly, these two characteristics become the main objectives of implicative business communications.

Implicative communications may often induce the impossibility of continuing the process of communication: it is the case of those messages that focus upon the emitter while neglecting the receiver or of those communications which, in order to impress the receiver, employ sophisticated phrases and, subsequently, determine a state of inferiority as felt by the receiver.

Coherent implicative business communications rely on a few basic features: credibility, logic, and motivation. In order to determine the receiver to accept the

message, the emitter should be credible and make use of a clear and sincere communication. When the receiver trusts the emitter, he will also accept the latter's ideas.

Logic is needed as well in case of implicative business messages. It is connected to the use of coherently structured information that allows the receiver to easily grasp the meaning of communication. As a result the message is logically, that is correctly, received. Logical implicative communications either start with the main ideas or end with them with a view to strengthen the communication content. Key words are usually employed in order to underline certain ideas supposed to have an important impact upon the receiver; such key words may also be repeated according to the communication's exhaustiveness.

Logical implicative communications may also use blanks to focus on main ideas being an efficient means of easily noticing really important information.

Implicative business communication should as well take into account the receiver's motivation which is especially important for a successful process of communication. A good knowledge of both the receiver's needs, wishes or expectations, and of his / her convictions, beliefs, attitudes or behaviors has a benefic impact upon the response he / she is going to give.

Implicative business communications convey information and, at the same time, intend the receiver's acceptance of the transmitted information as well as his / her response behavior. Its maximum impact on the receiver is achieved when it appeals to credibility, logic, and motivation.

Decisional business communications may be generally connected to a positive or negative connotation of the emitter's message. People frequently attach negative connotations to decisions though there are situations when decisional communications are favorable for the receiver. Nevertheless, the most important goal of a decisional business communication is to determine the receiver to remain the emitter's partner.

In order to eliminate or change the usually negative connotations of decisional communications, the emitter should have as a main goal a neutral or even a positive connotation of his / her message. The emitter has to effectively diminish the negative connotations otherwise he / she will have to face the collapse of the communication.

Message, tone, and language actively take part in decisional business communications and are meant to help the improvement of the emitter's image as perceived by the receiver as well as the improvement of the receiver's personal image or of the receiver's image as perceived by third parties.

A negative connotation of the message determines a poor self image of the receiver, while a positive connotation possibly induces an over evaluation of the emitter as seen by the receiver. Decisional business communication should take into account such risks as they create non-objective interpretations of the message, implicitly determining false perceptions of both the emitter and the receiver.

Within decisional communications the tone plays an extremely important part. A neutral or a positive tone is most able to convey a decision which may have a negative connotation.

Nevertheless, tone is conveyed through language, and, accordingly, the latter must transmit the message in a manner that is not supposed to harm the receiver's own sense of personality.

Decisional business communications imply certain connotations, either positive or negative, and involve a certain "action" that regards the message that has been transmitted. Their main goal is to make the receiver accept the position of a relational partner of the emitter and they rely on message, tone, and language.

Business communication strategies mainly depend on the clearly established objectives meant to be attained by communication. In case they are not set out in a proper manner, the receiver commonly has to face confusion, frustration or anger. While narrative business communication simply convey information, implicative business communications both transmit information and expect a certain behavior from the receiver; decisional communications convey information having a negative or a positive connotation.

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## **RISK ANALYSIS AND INVESTMENT DECISIONS**

**MIRELA ILOIU \***

**ABSTRACT:** *Time adjusted measures of risk is useful for management in order to estimate how much risk is allowable with a given project while still meeting the desired return standard. In this paper I have presented two such measures: present value payback and annualized net present value and I've also presented the ranges of estimates and their application in probabilistic simulation.*

**KEY WORDS:** *risk, uncertainty, estimates, sensitivity, investment decision, return, present value, payback*

### **1. INTRODUCTION**

The estimates used to analyze capital investments are projections of future conditions. Therefore capital investments involve risk because of the uncertainties surrounding the key variables involved in the analysis. Consequently, the analyst making the investment calculations and management using these results for decision purposes must allow for a whole range of possible outcomes. Even the best estimates can go wrong as events unfold, yet the decisions have to be made ahead of time.

As a result, the risk inherent in the variations must be ascertained. Such risk analysis can take many forms. One of them is sensitivity analysis as a formal means of testing the impact of changes in key assumptions.

This can be very informal, back-of-the-envelope reasoning, or it can involve systematically working through the impact of assumed changes in revenues, operating savings, costs, size of outlays, recovery of capital, and so on, either singly or in combination. We also discuss ranges of estimates, either for the total result or for individual key variables. These allow management to examine the most optimistic and pessimistic cases as well as the most likely figures, and are superior to single-point estimates.

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\* *Lecturer at the University of Petroșani, Romania*

Time-adjusted measures help management ascertain how much risk is allowable with a given project while still meeting the desired return standards. In this paper we will discuss two such measures, present value payback and annualized net present value, both of which are related to the net present value criterion discussed earlier. We will also discuss the use of ranges of estimates, and their refined application in probabilistic simulation. Finally we will touch on risk adjusted rates. Only the first two measures will be taken up in detail, while the other areas will be covered just enough to indicate to the reader the potential value of studying these concepts further.

## **2. PRESENT VALUE PAYBACK**

This measure derives the minimum life necessary for an investment to operate as expected to meet the earnings standard of the present value analysis. In other word the present value payback is achieved in the period in which the cumulative sum of the positive present values equals the present value of the outlays.

It is the point in the project's life at which the original investment and sequential outlays have been amortized and a return equal to the earnings standard has been achieved on the declining balances / the point at which the project becomes economically attractive.

The minimum time needed to recover the investment and earn the return standard on the declining balance, when compared to the economic life, is an overall expression pot potential risk. The measure does not specifically address the nature of the risk, but rather serves as a risk allowance.

Management can then judge whether the risk entailed in the combined elements of the project, or in any one key variable in particular, is likely to outweigh the cushion of safety implied in the additional time the project may operate once it has passed the present value payback point. It is important to remember, however, that the measure focuses on the life of the project, with the implicit assumption that the estimated operating conditions will hold.

If uneven and complicated cash flows are projected, a condition we will examine later, the minimum life or present value payback requires a year-by-year accumulation of the negative and positive present values.

We are looking for the condition under which the present value of the outflows is exactly equal to the present value of the inflows. Inasmuch as net investment (outflow) must be recovered by the inflows, we can change the formula to:

$$\text{Net investment} = \text{Factor} \times \text{Annuity} \quad (1)$$

Because we know the annuity which is represented by the annual operating cash inflows, we can find the factor that satisfied the condition:

$$\text{Factor} = \text{Net investment} / \text{Annuity} \quad (2)$$

The test for present value payout or minimum life with any given return standard thus becomes one more factor in assessing the margin for error in project estimates. It sharpens the analyst's understanding of the relationship between economic life and acceptable performance, and is a much improved version of simple payback. The measure is a useful companion to the net present value criterion. It does not, however, address specific risk elements and in fact leaves the assessment of any favorable difference between the minimum standard and economic life to the judgment of management.

### **3. ANNUALIZED NET PRESENT VALUE**

Another approach to making an allowance for risk involves estimating how much of an annual short fall in operating cash inflows is permissible over the full economic life of the project while still meeting the minimum return standard. The net present value calculation normally results in either a cumulative excess or deficiency of present value benefits vis-à-vis the investment outlays.

If the net present value is positive, the amount can be viewed as a cushion against any error in estimating future cash inflows. Unless a project has highly irregular annual flows, it is often useful to transform this net present value cushion into an equivalent annuity over the project's economic life. These annual equivalents, which express the allowable margin of error, can then be directly compared to the raw estimates of annual operating cash inflow.

This is possible because the overall net present value cushion has in effect been "reconstituted" into equivalent annual cash flows on the same basis as the estimates themselves, that is, in terms of annual flows unadjusted for time value.

Annualization has a more general application as a very practical and quick preliminary test of the desirability of an investment project that has not yet been fleshed out in detail. In effect the method reverses the normal investment analysis by finding the approximate annual operating cash flow required to justify an estimated capital outlay when the specific operating benefits have not yet been established.

Given an estimate of the economic life and an earnings standard, we can employ the formula:

$$\text{Operating cash flow} = \text{Net investment} / \text{Factor} \quad (3)$$

to find the annual cash flow equivalent that will be the average minimum target. The analyst must be careful to interpret this figure properly. Because it is an aftertax cash flow, the result has to be properly modified by the assumed annual depreciation to arrive at the minimum pretax operating improvement necessary to justify the outlay.

The concept is a useful tool for arriving at a first assessment of the chance that an investment will "be in the ballpark". As such it is a first crude assessment of risk. The process simply involves working "backward" through the analysis, recognizing that cash flow by definition consists of the sum of aftertax operating profit and annual depreciation.

Needless to say, annualization is quickly performed using a programmed calculator so that the present value tables are unnecessary. While a calculator makes the process “automatic”, working the calculation through as we have just done, will give the reader a feeling for the reasoning behind the method.

#### **4. RANGES OF ESTIMATES**

Risk can be defined as the degree to which all possible cash benefits levels of an investment can vary. The greater the range of these possibilities, the greater the risk. Therefore, using a range of estimates is a more direct approach to investment risk analysis. This effort may not be necessary for all types of investments, however, because degrees of risk vary widely among business and financial investments.

The risk involved in holding a government bond, for example, is very small indeed, because default on the interest payments is extremely unlikely. Therefore, the range of possible benefits from the bond investment is narrowly focused on the contractual payments - in effect no range at all.

In contrast, the risk of a business investment for a product or service is a function of the whole range of possible benefit levels that may go from very positive cash flows to negative loss conditions. The uncertainty surrounding these outcomes poses a challenge to the analyst and the decision maker.

The “single point” estimates of annual cash flow projections we have used so far are the expected results based on the best judgment of the analyst and the information available. In effect, they are the average of the possible outcomes, implicitly weighed by their respective probabilities.

By introducing a range of “high” and “expected” levels of annual cash inflows and outflows, the analyst can use a form of sensitivity analysis to indicate the consequences of expected fluctuations in the annual results – and thus the degree of risk.

At times, past experience can provide clues to the range of future outcomes, but essentially the projection of future conditions has to be judgmental and based on specific estimates.

The decision maker must assess the likelihood that the range of outcomes estimated fairly expresses the characteristics of the project, and that the expected outcome is sufficiently attractive to compensate for the possibility that the actual results may vary as defined.

Risk assessment in essence comes down to how comfortable the decision maker is with the possibility of adverse results – that is, a very personal risk preference. Stipulating a range helps the responsible person or group to visualize the possible extremes in the expected results.

## **5. PROBABILISTIC SIMULATION**

A more refined approach involves estimating ranges not only for the annual cash flows, but also for the individual key variables making up these cash flows. Probability distributions are then assigned to the likelihood of the outcomes for each of the variables; any interdependencies between variables are defined; and the outcomes of the project can then be simulated by running many iterations on the computer.

The method is an extension of sensitivity analysis in that the possibilities of changes in many variables are simultaneously evaluated.

The result is a range of possible annual cash inflows in the form of a probability distribution, or even a range of net present values or internal rates of return arrayed by probability.

Such a "risk profile" allows the decision maker to think about the relative attractiveness of a project in terms of statements such as "chances are nine out of ten that the project will meet the minimum standard of 10 percent", or "there is a probability of 60 percent that the net present value of the project will be at least 1 million or better".

The relative ease with which computer simulation can be done does not eliminate either the practical issues involved in assigning probability distributions to the individual variables in the first place or the problem of interpreting the final results. Judging both the likelihood of an event and the decision maker's own attitude toward the risk thus expressed are highly personal and defy precise quantification.

Investment decisions in a business setting are as much a function of complex personal and group dynamics as they are of the analytical results, the quality of presentation, and the specific economic data.

## **6. RISK ADJUSTED RETURN STANDARDS**

Another way of adjusting for risk is to modify the return standards to include a risk premium where warranted. In a sense, the reasoning behind this is quite simple - the greater the risk, the higher the return desired from the investment. This approach is intuitively attractive to business decision makers, because the process parallels the way we think about personal investments.

Thus, investments in businesses subject to wide profit swings and competitive pressures would command a premium above the return standard, while with fairly predictable businesses a less-than-average return may be acceptable. The concept rests on the assumption that a diversified company can derive a range of standards that, in combination, represent an appropriate return to the shareholders and also fairly reflect the relative risk of the individual lines.

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## **RISK AND RISK MANAGEMENT**

**MIRELA ILOIU**\*

**ABSTRACT:** *Risk exists whenever the future is unknown. This paper deals with the concepts of risk and uncertainty, risk attitudes and reaction to risk. It is explained the distinction between objective risk and subjective risk. Also, it presents risk attitudes and factors affecting them and the economic costs of risk: costs of unexpected losses and costs of uncertainty.*

**KEY WORDS:** *risk, uncertainty, losses, gains, pervasiveness, risk attitudes, reaction to risk, costs of risk*

### **1. RISK**

Risk has been defined as the variation in the possible outcomes that exists in a given situation. As was true for probability a distinction can be made between objective risk – the variation that exists in nature and is the same for all persons facing the same situation; and subjective risk – each person's estimate of the objective risk. In order to measure the variation that exists in nature, one would have to know the underlying probability distribution and how to assess the variation inherent in that distribution. For example, a gambler skilled in probability theory may be able to calculate precisely the probability of each hand that might be dealt in a game of cards. In other words, the gambler has an exact picture of the underlying probability distribution. Nevertheless, he or she still does not know what cards will be dealt; there are many possible outcomes. The variation in the results can be measured by using one or more commonly accepted yardsticks which will enable the gambler to compare the objective risk in one situation with the objective risk in another.

In most situations, however, one does not know the objective risk inherent in the situation. Instead this risk must be estimated. For example, if one must rely upon subjective probability distributions instead of objective probability distributions, one must clearly rely upon subjective estimates of risk. The variation in the estimated probability distribution might be calculated in the same manner as the risk in an

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\* *Lecturer at the University of Petroșani, Romania*

objective probability distribution. Even if one knows the underlying probability distribution, one may not know how to calculate the variation in the potential outcomes, and thus one forms a subjective estimate of the risk. The estimated variation may be greater or less than the true variation.

## **2. UNCERTAINTY**

Uncertainty is the doubt a person has concerning his or her ability to predict which of the many possible outcomes will occur. Uncertainty is a person's conscious awareness of the risk in a given situation. It depends upon the person's estimated risk – what that person believes to be the state of the world – and the confidence he or she has in this belief.

A person may be extremely uncertain about the future in a situation where in reality the risk is small; on the other hand, this person may have great confidence in his or her ability to predict the future when in fact the future is highly uncertain. Unlike probability and risk, uncertainty cannot be measured by any commonly accepted yardstick.

## **3. REACTION TO RISK**

A person's reaction to risk is the way in which he or she behaves or responds in an uncertain situation. One factor affecting this reaction is the person's uncertainty. Other things being equal, one would expect the person to react more strongly, either positively or negatively, the greater this person's uncertainty. Other factors that may be of equal or greater importance are the magnitude of the potential gains or losses involved and the effect of these gains or losses upon the person's economic status. For example, one may react more strongly to a situation where the uncertainty is the same but the potential gains and losses are  $\pm\$10,000$  instead of  $\pm\$10$ . A person may also react differently if he or she is wealthy instead of poor. A wealthy person may be more uncertain than a poor person about the future, but the wealthy person may fear the future less because of his or her greater ability to withstand adversity.

Even if all these conditions (uncertainty, potential gains and losses, and economic status) are the same, however, people may react differently because their personalities, as determined by their heredity and their environment, vary. Indeed, the same person may have a different affinity for or aversion to risk at different ages and in different situations.

Individuals making decisions under risk should be aware of the effect of their own risk attitudes upon their decisions. Upon closer inspection they may decide to alter these attitudes. If they are making decisions on behalf of a family or a business, they should examine the extent to which they should adopt the attitude of others. Persons delegating these decisions to someone else should also study that person's attitude toward risk and how it affects the decisions he or she makes. In some instances it may be appropriate to specify the attitude that should be assumed in making decisions.

#### **4. FACTORS AFFECTING RISK ATTITUDES**

Many researchers have investigated the demographic characteristics, personality traits, and environmental conditions that determine a person's reaction to risk. These investigations have contributed substantially to the understanding of how persons behave in situations involving risk. They suggest that such behavior is extremely complex, depending upon a host of factors and varying over time. They also indicate that a person may react differently to financial risks than to physical and social risks.

Investigations that have attempted to describe a person's reaction to risk in terms of one demographic or personality trait have generally yielded contradictory results. For example, some studies suggest that women tend to be more averse to risk than men; other suggest no difference in risk aversion between men and women. Similar contradictory evidence exists concerning the effects of age, of intelligence, and of education.

One extremely interesting and important finding is that individuals tend to be more willing to accept risk after they participate in a group facing the same risk than they would have previously as individuals. Consequently group decisions tend to be riskier than the average decision made by the members of the group prior to their group experience. The most popular explanation of this risky shift is that individuals view themselves as being at least as willing as their peers to accept risks. Recent experiments, however, suggest that groups do not always behave in this way. Indeed, under certain circumstances the group decision may be more cautious than the average of the individual decision.

#### **5. PERVASIVENESS OF RISK**

Most human activities involve some risk and uncertainty. This pervasiveness of risk can be illustrated by the following examples, which could be multiplied almost without limit. Placing a new product on the market or purchasing a new plant may prove to have been an unwise business decision; a gambler may lose on a particular bet; increasing use of technology may affect the social structure of our population in some unpredictable and unfortunate ways; because of a new statute or court decision, certain persons may unexpectedly become guilty of violating the law; a hopeful suitor may receive a negative response to a proposal.

The potential losses in a situation involving risk can be classified according to whether their effects are economic, social, political, psychological, physical, or legal. Of course, the same loss can have economic and social effects or involve some other combination of effects. Since it is impossible to handle all the aspects of risk, this paper deals especially with the economic effects. On the other hand, most of the general discussion on the principles and tools of risk management would also be of value in handling the other aspects of risk. Furthermore, the economic effects of risk

can seldom be completely isolated, and in discussing the handling of economic risks, it is necessary to pay some attention to the associated noneconomic effects.

## 6. ECONOMIC COSTS OF RISK

Life without any risk or the uncertainty that it creates would be difficult and not entirely pleasant. We take pleasure in anticipating gains that may never be realized and even more pleasure in realizing unexpected gains. Life is more interesting, and the human race more alert and imaginative, because of risk and uncertainty. As Friedrich Nietzsche said, "A heart full of courage and cheerfulness needs a little danger from time to time or the world gets unbearable."

Still, we do not enjoy being concerned about losses even if they never occur, and to suffer unexpected losses is clearly painful. Life is insecure, and the human race is more frustrated, worried, and afraid because of this insecurity. Only these negative aspects are present in pure-risk situations, because there are no gain possibilities.

The economic costs of uncertainty have been discussed by many writers. A. H. Willet refers to the costs of uncertainty arising out of a) the unexpected losses that do occur and b) the uncertainty itself even if there are no losses.

a) each day some businesses and families suffer losses. For example, a fire destroys a warehouse, an explosion causes a store to shut its doors until the damage is repaired, a customer injured by a defective product sues the manufacturer, the key executive of a business is killed in an automobile accident. Some of these losses are minor. Others have disastrous effects.

b) the first cost of uncertainty itself is the physical and mental strain caused by fear and worry. Most people, if fully informed about their exposures to risk, worry. The intensity of this worry depends upon the factors already listed as determining their reaction to risk; the second cost of uncertainty refers to the existence of uncertainty that may produce a less than optimum allocation of resources among individual firms - this uncertainty may cause "safe" industries to be overdeveloped and "risky" industries to be underdeveloped.

In summary the costs of uncertainty, in addition to the costs of the losses that do occur, are generally 1) a reduction in well-being because of fear and worry and 2) less than optimum production, price levels, and price structures.

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## **FACTS ABOUT THE RELATIONSHIP BETWEEN THE PROJECT MANAGEMENT (PM) AND THE QUALITY MANAGEMENT (QM) IN COMPLIANCE WITH THE PRESENT STANDARDS**

**ANDREEA IONICĂ \***

**ABSTRACT:** *This paper intends to underline the aspects which connect the Project Management (PM) to the Quality Management (QM). The innovative perspective lies in the emphasis on those aspects of Quality Management, which have not yet been underlined in connection with Project Management (PM). These aspects are present in the series of quality standards ISO 10006 and ISO 10007, which led to some interpretations which link Project Management (PM) with Quality Management (QM).*

**KEY WORDS:** *Project Management (PM), Quality Management (QM), ISO 10006, ISO 10007, leadership*

### **1. QUALITY, PROCESSES, PROJECTS**

The quality management is achieved by managing processes. According to standard ISO 10007, processes are correlated when crossing different functional processes. Projects are considered temporary and distinct entities with internal structures based on communication. The barriers of traditional functional domains are disregarded as interfaces between them are set up using a “common language” of all participants to the project, which lays the basis of processes correlation. Standard ISO 10006 defines the project management as “an aggregate of processes which are correlated and focused on a unique aim covered by leadership”.

### **2. INTERPRETATION OF THE PM-MQ RELATIONSHIP**

The following points of view will be developed in our paper:

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\* *Lecturer, Ph.D. at University of Petroșani, Romania*

1. The implementation of the Quality Management System (QMS) is correctly done if approached by way of the project;
2. Once implemented the QMS generates new projects;
3. The QM and the PM are two intermingling management systems.

1. The implementation of the Quality Management System (QMS) is correctly done if approached by way of the project. In this case, the objectives of the project are written as the objectives of quality and the plan and development of the project will follow the audit and certification stages according to the methodology in force (ISO 10015/2003).

2. Once implemented the QMS generates new projects. In this case, the two management systems co-exist, and are included in one another. The organization's politics related to quality is mirrored by the objectives of the projects. They translate the general objectives correlated with the politics of quality to the project team level. The projects put to practice the principles of quality management, and the methodology of project development is based on Deming's PDCA (Plan-Do-Check-Act-) cycle of continuous improvement.

3. The QM and the PM are two intermingling management systems.

This idea is supported by the following:

- work methods which are applicable to both management systems: team work (brainstorming, problem solving), strategic planning (SWOT analysis, Logical Framework Approach), Quality Policy Deployment, Quality Function Deployment, Pareto analysis, Ishikawa, affinity diagram, histograms, the cost-profit analysis, issuing of flux diagrams, process map, Work breakdown structure, Gantt diagrams.

- the organizational forms of the project management (team and matrix) correspond to the QM organizational forms (centralized and decentralized). Both management systems tend to soften the firm's organizational diagram.

- the projects are used to implement some step-by-step, continuous improvements, not major changes. Thus, they come closer to the quality management.

The projects are a way of showing the staffing and the leading. According to the new standards, the project team is self-constituted and self-organized based on the affinity of the participants, and the team leader is the project manager. The correspondents of the self-constituted teams are, for the quality management, the teams for process quality control, the teams for quality improvement, the quality associations or the Kaizen teams.

Any attempt of an organization to assimilate a new culture, a new philosophy (either PM or QM), based on team work, may be a fiasco. The work/project teams should not be imposed, they have to form naturally around the process, based on the mutual ideas and concepts, and on the mutual desire to cooperate, to be better and better and to follow the leader.

The project management becomes part of the organization's culture when it is not performed by only some persons, but by the whole organization. The number of staff implied in the project can even be an evaluation criterion for the general performance and for each employee. The objectives and involvement in the project

### 3. PERKIN-ELMER CASE

should be part of the job description. In this situation, the PM is more than a top approach; it becomes a way of life.

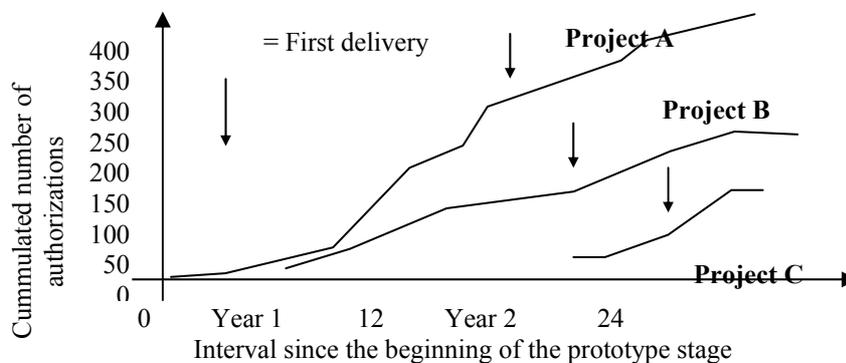
Perkin-Elmer is the biggest company in the world that produces apparatus for chemical analyses. This company has become a pilot-station for the Juran Institute to test the stages proposed by Juran in order to redesign the production process.

In order to confront with the Japanese competition, it was necessary to improve things in three areas: to satisfy the domestic and foreign clients' needs; to reach a competitive quality level; to rapidly respond to the needs of the market. The key for improvement was the redesign of the production process.

The results obtained by the activity of a so-called "early team" of the project were spectacular. The relationship between the members of this team was different from the traditional ones, and it was based on communication, implication, self-organization, self-training, and the team leader was the project manager himself.

The new process was presented to about 100 participants. The presentation focused mainly on the philosophy behind the redesigned process and on the way the team worked, and less on the details of the stages of the new product.

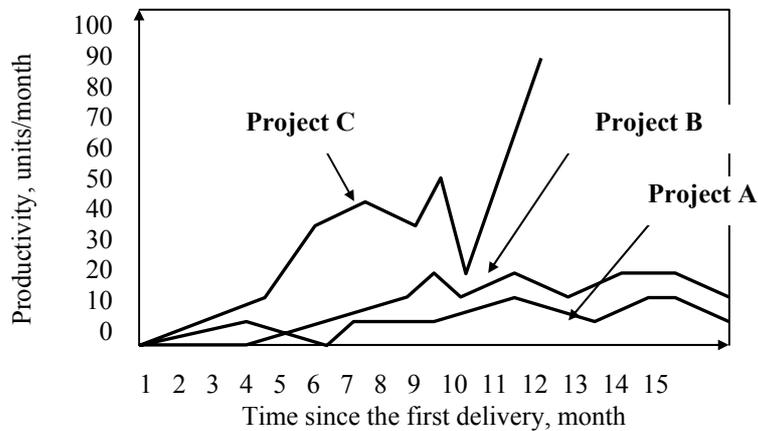
The diagram below presents the comparative results of three projects A, B, and C. Project C is totally based on the activity of "early teams", project B uses only some such teams, while project A had no such teams and developed using the classical variant.



**Figure 1.** Number of authorizations for the technological changes after the beginning of the prototype stage

Project C has 75% fewer authorizations than project A and 50% fewer than project B. The date of first delivery is at the outset. Project C reached the normal several months before projects A and B.

Another indicator of success is the percentage of faultless systems installed. Project C had the best results. B had satisfactory results, while A had some difficulties.



**Figure 2.** Time necessary to work at normal capacity

In the USA there have been achieved encouraging results for projects which totally benefit from the activity of early teams, in companies in which PM and QM coexist: a 50% reduction of the component stock; 25-55% reduction of manufacturing costs; reduced bills of quantities, which make the total control of production easier (Just-In-Time)

#### 4. CONCLUSIONS

The PM was approached as an independent management system, with well-outlined main characteristics, forms, advantages and disadvantages. Today, due to the new approaches of the quality standards, the PM intermingles with other management systems such as the Q. the two systems are characterized by mutual objectives generated by the elements that support the importance of quality as a factor in determining the competitiveness of a company. One has to bear in mind that the internal setting of a company may facilitate or hinder the implementation of these systems.

But, if we wish to learn from the experience of others, we should remember that: it takes time to establish a connection between the functional interfaces; these connections can be made only through people; the teams of the project are the ones which make these connections and then make them functional; the way these teams are constituted and function ensure the improvement of the environment in a company.

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## **PERFORMANCE ASSESSMENT IN PUBLIC ADMINISTRATION**

**SABINA IRIMIE, RAREȘ MUNTEANU \***

**ABSTRACT:** *In order to achieve a high quality in management, we need to ensure a high quality of the human resource. Thus, the evaluation of the employees becomes very important since it offers an image of the human quality as a part of the total quality in a company or institution.*

**KEY WORDS:** *organization, employees, evaluation, public administration, performance assessment*

### **1. INTRODUCTION**

The assessment of the human resources is a process by which the level of professional development of the employees and the collaborators in an organisation is assessed. The evaluation is focusing on the progress, as well as on the actions to be taken for a continuous improvement of the results.

A leader must know at any time “WHOM” he can rely on, not only “WHAT” he can rely on. Achieving this objective requires a difficult process, because the humans are the most difficult to be evaluated. This is not about counting of those working in an organization, this is about an objective assessment – as much as possible – of the value and the results of those referred to. Therefore, the qualification and competence, the unused potential must be counted. For a wise organization, people are what they can be.

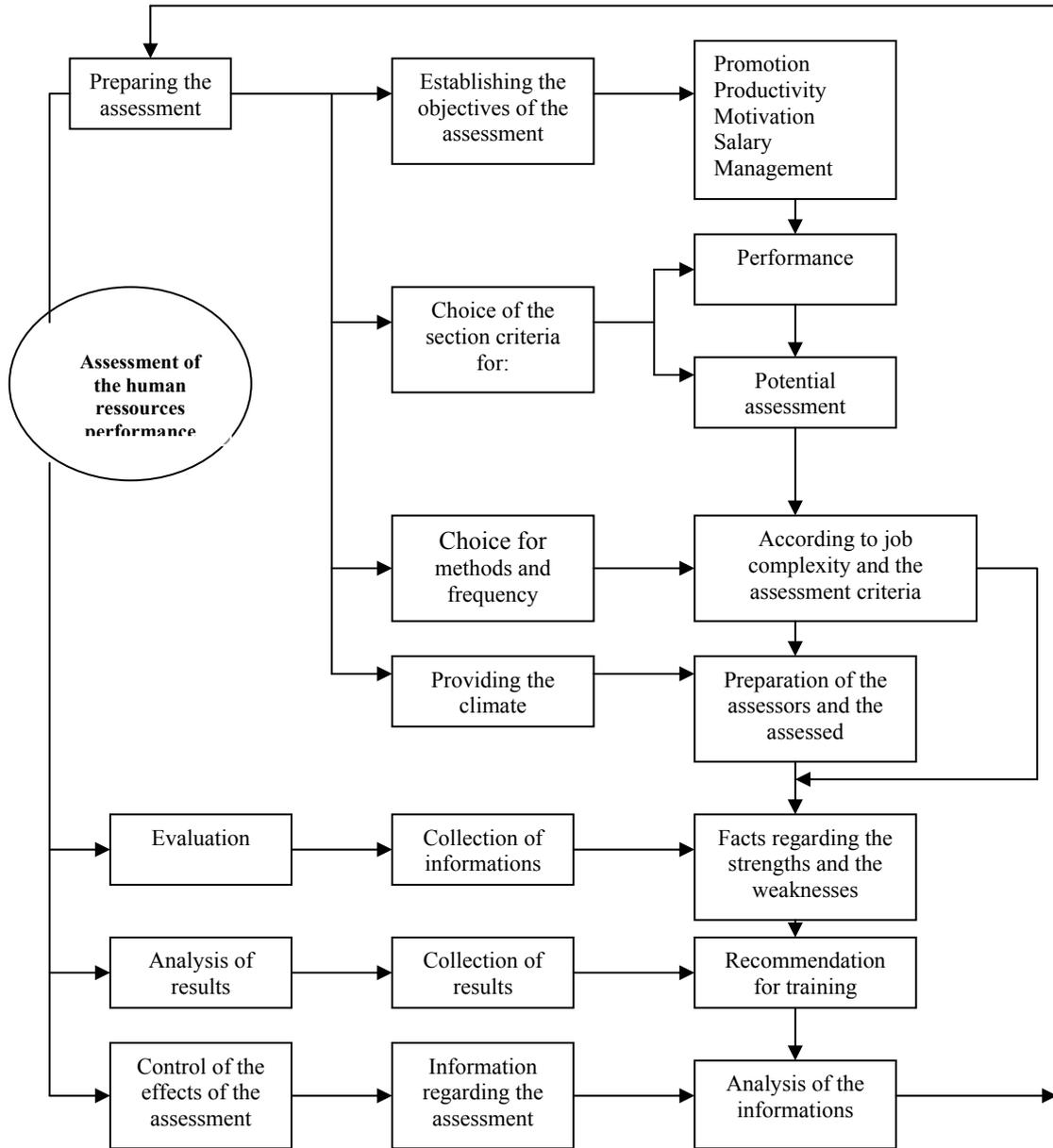
In order to get the necessary information, a professional system for performance assessment of the employees must be devised. This system can use interviews, records of professional results, psychotests.

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\* *Assoc.Prof., Ph.D. at the University of Petroșani, Romania*  
*Assist.Prof. at the University of Petroșani, Romania*

**2. OBJECTIVES OF THE ASSESSMENT**

The assessment system – as shown in fig. 1 – provides the connection between



**Figure 1.** Performance evaluation system

the reward an employee hopes to get and the productivity achieved by him, the order being: productivity – performance assessment – reward. If one of these elements is missing or is not correctly defined, the employees do not get the reward they deserve any more. Due to the performance assessment, the increase of salaries is according to the merits and not to the seniority. The manager has the role to evaluate correctly the subordinates, by comparing different levels of performance. In spite of this, few employees see the connection between the level of their performance and the salary they get.

Nowadays, the sequence productivity – performance assessment – reward in the state owned organizations in Romania happens only for one part of the employees, as their results can be counted by number of pieces, number of operations, value of sales etc. In this case, the assessment aims only the aspects related to quantity. For the rest of the staff, the individual performance loses its meaning for sizing the salary, other factors, unstimulative ones, having more importance.

This problem is even more difficult in the case of the public clerks, as the working of the whole society depends on their activity (administration, companies, public units etc). In order to have an effective public administration, the employees must be well trained, have good intentions, as the personal qualities and the relations with the citizens they get in touch with and the colleagues at work have an outstanding role.

As long as the paying system is based on the old criteria (education, seniority, difficulty etc) and the performance is taken into account only theoretically, the performance assessment will be more or less formal.

Even if it does not aim directly the level of the payments, the performance assessment is an important source of informations about the employees with good results, as well as about those with worse results and possibilities to improve their performance.

On the other hand, the employees can get information about their progress and the aspects they still need to improve in order to get an increase for their payments or a promotion. Quite often, the employees do not know how to enhance their performance, and this is a task for the managers. The manager is like a coach, he must reward the good results and make them known, explain the possible improvements, where and how they can be implemented.

A fair system does not exclude the managers. The best ones should get on top due to a system based on performance and merits. The evaluation of the managers can be done quite correctly by general objectives (turnover, earning per share, etc) intermediary objectives (basic competence in production systems, the capability to sell goods/services etc.). In order to have a correct result, for management positions there must be a multicriteria evaluation as well as an evaluation based on the opinion of all those who get in touch with the top and middle management.

There are two major types of evaluation::

- conventional (formal), systematically and based on a plan;

- unconventional (informal), the continuous performance assessment of an employee done by his manager during the usual activity. This type of evaluation is on the spot, based on intuition and on evidence of the results obtained; this makes it a secondary product of the daily relation between the manager and his subordinate.

The organizations make procedures for evaluation due to several reasons:

- to identify the level of labour performance for an employee;
- to identify the strengths and the weaknesses of an employee;
- to allow the employees to enhance their performance;
- to provide a basis for the rewarding system of the employees according to their contribution for achieving the goals of the organization;
- to stimulate the individuals;
- to identify the needs for training;
- to identify the potential for performance;
- to get the necessary information in order to plan the succession.

### **3. PARTICULARITIES OF THE ASSESSMENT IN PUBLIC ADMINISTRATION**

The efficiency of the public services in the state owned administration is determined in great measure by the quality of the personnel. A system of the public administration that has enough material and financial resources, but low quality of the clerks cannot achieve its goals. [2].

The best administrative laws do not produce the expected results if they are not enforced in the benefit of the community by well trained clerks.

The professional and public management competence are absolutely necessary in order to obtain the efficiency of the administration by foreseeing the evolution, organization of the activity, managing the resources, motivating the employees and the control of the processes.

In order to get a fair evaluation of the clerks in public administration, the Government has issued the Decision no. 749 / 23.10.1998. This refers to the personnel assessment in the budgetary area and working in the accountancy office, finance office, supply office, investment office.

The job assessment is based on criteria covering more aspects:

- professional training required for the job:
  - fundamental training
  - special training
- the experience required for the specific operations of the job:
  - work experience
  - specific experience required by the job
  - the training period for specific operations regarding the job
- the difficulty of the operations specific for the job
  - the complexity of the job, meaning the diversity of the operations to be done
  - the degree of autonomy for actions

- the intellectual effort specific for the operations of the job
- the need for special abilities
- special technique to be known
- the responsibility regarding the job
  - the responsibility to lead, coordinate structures, teams, projects
  - the responsibility to prepare take some decisions, respect for the confidentiality
- relational area (to get in touch, to respond)
  - the requirements from the internal structures of the public institution
  - the requirements from the external structures of the public institution
  - the requirements from the citizens and / or the beneficiaries of the services offered by the public institution

The performance standards used to assess the activity of the employees are expressed by the following indexes and quantified according to every specific job:

- ▶ quantity; ▶ quality; ▶ cost; ▶ time; ▶ use of resources; ▶ way to be used.

The process of professional performance assessment for each person is based on the job description and the evaluation criteria for individual performance. Based on these elements, the evaluators follow the following steps: give points from 1 to 5 for each criteria, then each grade is given a mark according to the importance.

The assessment has no value taken as a singular event. It must be continuous and followed by actions meant to improve the quality of the processes in the company and as a result to enhance the performance of the company. Thus, the performance assessment is periodical and organized, within the human resource department. The results of the assessment are used for:

- training staff with a view to:
  - establish the skills and education required for each job
  - monitor the results / cost ratio obtained after the training process
  - drawing up a strategy for continuous training
- recruitment /selection of the personnel for teams involved in programmes / projects
- establishing the professional performance in time
- distribution of the wages

The performance assessment is learned within the training programme.

The Department for Local Public Administration is stimulating the regional centres for training by supporting them to access international programmes for technical assistance. These aim the reform of the local public administration. The partner is the Government of Romania and they are intended to be included to the European Network of the Training Organization that is functioning by the Council of Europe.

In the training programmes organized by the National Institute of Public Administration and the following take part the following:

- the prefects and the vice-prefects;
- directors and their deputy in the ministries and others structures of the Government and public administration;

- office managers in ministries and other specialized offices of the public administration;
- the heads of the centralized public services of the ministries and other central specialized organizations of the public administration as well as their deputies;
- the general directors of the prefectures as well as the other categories of technical staff;
- the secretaries of the County and Local Councils;
- the staff of the civil status, the higher authority, the authority for guarding the under age persons;
- other types of clerks, if required and can fit in the budget.

The extension of this type of training would be rewarding both for the public institutions and for members of the local communities. [2].

#### 4. CONCLUSIONS

Although a problem regarding the human resources management by its essence, the personnel assessment is deeply involved in the quality of the activity within a company or an institution. A process of performance assessment is necessary in the organizations starting from the medium size, otherwise they become opaque, as nobody knows where they are placed among other 200. A correct system for performance assessment is useful not only for the top management, but also for the employees / collaborators.

We must take into consideration that an unprofessional system for personnel assessment can cause more damage than the absence of the evaluation. In such cases, it is not the employees who have bad results, it is the system wrongly reporting. This is why the design and the implementation of a professional system for assessment of individual performance both of the persons and of the organizations, requires the work of certified specialists and not just words.

The complexity of the public management generates a high specialization of the clerks having public jobs, and requires a rich general training that is developing by turns of the jobs and public positions of the public clerks.

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## **THE COMPANY FINANCIAL DIAGNOSIS INFORMATIC SYSTEM**

**ALIN ISAC, CLAUDIA ISAC \***

**ABSTRACT:** *Specialists consider a financial diagnosis necessary for measuring the profitableness of invested capital and for estimating the economic and financial equilibrium, which has a certain influence on the economic, financial, and bankruptcy risk rate. Thus, the main purpose of any financial diagnosis is to point out the financial state of the company in order to identify possible causes and effects. A financial diagnosis starts with determining and interpreting a set of economic-financial indicators, which are calculated based on the financial balance sheet.*

**KEY WORDS:** *financial diagnostic, rule base, fact base, inferences motor, risk rate, informatic system.*

In specialized literature there are several definitions for software systems, each of them pointing out that these are intelligent systems based on the symbolical representation of information, and implemented on a hardware characteristic for the application, which processes a lot of information in order to solve difficult problems in case of difficult activities, just like human experts. Therefore, we can say that software systems are decision software that comprises more or less information of a human expert.

Numerous software systems designed to solve problems from different field can be classified as follows: according to the purpose of their design:

- software systems with a data base inferred from structural, functional or typological analysis of strategic or dynamic behaviours of the managing process;
- software systems for modelling complex phenomena the configuration of which is very difficult to be made by human experts because of the many concentration and formality possibilities and which depends on the problem to be settled; software systems designed to solve problems that

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\* *Asist.Prof. at the University of Petroșani, Romania  
Lecturer at the University of Petrosani, Romania*

use both algorithms and heuristic methods in reaching a solution, thus, the information representation is based on functional or typological analysis;

- according to the analogisms used: determined software systems that use fixed rules to reach a conclusion from an assumption;
- probable software systems which link conclusions with probabilities that take into consideration some aleatory factors used in analogisms;
- fuzzy software systems which use heuristic methods in making analogisms when the analysed processes are not well known; from a functional point of view: systems that help the user in a structural selection of conclusions for real problems; systems that underlie the solving process by reaching the final conclusion with every detail; systems that offer a large number of solutions for real problems as a result of the interaction between the user's qualitative data and the quantitative data of the hard-soft functional structure;

According to the type of operation: ready-to-use software systems with a data base that can be used by inexperienced users; specialized software systems, which return to the beginning or to the middle of the data base as they are unfinished soft made for a specific application; software system generators which are not real soft but instruments that generate specialized software systems.

As a whole, software systems are a unique and modern technology, adopted very rapidly by big enterprises due to the flexibility and efficiency of economic activities and to an increases productivity that brings about substantial profit. Therefore, managers have to define a clear strategy regarding the opportunity to use software systems in solving complex decision problems; they also have to analyse the alternative of whether to keep he existing software – a less expensive solution for the time being – or get hold of new equipment and software.

In case they choose to implement new intelligent systems, managers have to take into consideration some expenditure from the following budgets: the budget for purchasing equipment needed for development; the budget for development preparation; the design development budget; the budget to correct, add or modify previous phases, including new tests that need to be run; the actual development budget; hardware purchase budget for the final user to operate the software system; the implementation budget; the soft evaluation budget. According to these data, we can compare the conclusions reached after implementing software systems in management; thus, we are able to make efficient calculations, which will later be used by managers in deciding whether to implement software systems or not.

The impact of computers upon the company depends, in the first place, on the type of problems needed to be solved, economic or technical problems, respectively, and the level at which they are used. The implications of computers in the economic field can be divided into: the impact upon the decisional process as the decisions made by these systems are not influenced by personal emotions and they are consistent, that is to say that keeping to precise established standards, all hesitant manifestations when making a decision in the same context are gone; the impact upon the organization

structure in a company which has three levels of management, top, middle and inferior, respectively, as many of the decisions made by middle management can be eliminated because decision roles and responsibilities can be divided among managers.

More and more specialists point out three phases in the evolution of software systems in management, phases that are linked to a certain type of software used especially in decisional activities. At first, in management, computers were used to automate some routine and administrative activities in order to create decision systems more or less complex that encouraged and replaced the person making the decision, thus providing us with the possibility to test various alternatives and design new models.

These systems have been used a lot, on the one hand to create data bases through which users can have ready access to different information, and on the other hand as decision evaluation systems based on performance criteria and systems that make decisions using estimations. Next, there are base software systems – open systems which can be updated according to the changes and developments in the field.

The third phase is characterized by hardware equipped with artificial intelligence also called management systems, which is considered the most modern information technology. The tendency is for these systems to comprise more software systems for different fields of activity by introducing a data base system. The objectives the management system has in view are: to reduce risks, to stimulate creativity, to get involved in decision making and through its filtration and information gathering possibilities and results, the company can be dynamically managed.

Within these systems there are diagnosis analysis software systems - management software used in financial diagnosis. Specialists consider a financial diagnosis necessary for measuring the profitability of invested capital and for estimating the economic and financial equilibrium, which has a certain influence on the economic, financial, and bankruptcy risk rate. Thus, the main purpose of any financial diagnosis is to point out the financial state of the company in order to identify possible causes and effects. A financial diagnosis starts with determining and interpreting a set of economic- financial indicators, which are calculated based on the financial balance sheet.

In order to do a financial diagnosis, a software system can be created that calculates and analyses the following indicators, according to their value: general liquidity, current liquidity, at sight liquidity, general solvability rate, financial independence, trading capital, necessary trading capital, net treasury, debt rate, immobilization evaluation.

This financial diagnosis software is a standard soft with the following elements:

- A *database* with all the specialized data introduced by man. This information is a description of the characteristic fields, of the relations between them, of particular cases, exceptions and resolving strategies, as well as a set of application conditions. This database can be done by storing information in using the software that has the role of gathering,

calculating data about circulating assets, current assets, treasury assets, immobilization assets, permanent capital, base capital, outstanding debts, treasury credits, current debts, service debts, etc.

### Logic Block

```

1 [Lg] >=200
2 --> [Punctaj] = 1
3 [Lg] >=150
  [Lg] >=150
4 [Lg] <200
5 --> [Punctaj] = 0.75
6 [Lg] <150
  [Lg] <150
7 [Lg] >=100
8 --> [Punctaj] = 0.5
9 [Li] >=80
10 --> [Punctaj] = 1
11 [Lv] >=20
12 --> [Punctaj] = 1
13 [Rs] >=20
14 --> [Punctaj] = 1
15 [Ifin] >=50
16 --> [Punctaj] = 1
17 [FR] >=0
18 --> [Punctaj] = 1
19 [NFR] >=0
20 --> [Punctaj] = 1
21 [TN] >=0
22 --> [Punctaj] = 1
23 [Rd] <=50
24 --> [Punctaj] = 1
25 [Rd] >50
  [Rd] >50
26 [Rd] <=60
27 --> [Punctaj] = 0.5
28 [Delta_I] >0
29 --> [Punctaj] = 1

```

- A *rule base* contains rules that link fact. In order to analyse the financial situation, the rule base has some restrictions, which attach a value to each indicator, estimated according to the period of time in which they vary.

### Rules:

**Block: Calcul punctaj Row:2**

IF:

[Lg] >=200

THEN:

Punctaj atribuit: Confidence = 1

**Block: Calcul punctaj Row:5**

IF:

[Lg] >=150

AND: [Lg] <200

THEN:

Punctaj atribuit: Confidence = 0.75

**Block: Calcul punctaj Row:8**

IF:

[Lg] <150

AND: [Lg] >=100

THEN:

Punctaj atribuit: Confidence = 0.5

**Block: Calcul punctaj Row:10**

IF:

[Li] >=80

THEN:

Punctaj atribuit: Confidence = 1

**Block: Calcul punctaj Row:12**

IF:

[Lv] >=20

THEN:

Punctaj atribuit: Confidence = 1

**Block: Calcul punctaj Row:14**

IF:

[Rs] >=20

THEN:

Punctaj atribuit: Confidence = 1

**Block: Calcul punctaj Row:16**

IF:

[Ifin] >=50

THEN:

Punctaj atribuit: Confidence = 1

**Block: Calcul punctaj Row:18**

IF:

[FR] >=0

THEN:

Punctaj atribuit: Confidence = 1

**Block: Calcul punctaj Row:20**

IF:

[NFR] >=0

THEN:

Punctaj atribuit: Confidence = 1

**Block: Calcul punctaj Row:22**

IF:

[TN] >=0

THEN:

Punctaj atribuit: Confidence = 1

Block: Calcul punctaj Row:24

```

IF:
  [Rd] <=50
THEN:
  Punctaj atribuit: Confidence = 1
Block: Calcul punctaj Row:27
IF:
  [Rd] >50
  AND: [Rd] <=60
THEN:
  Punctaj atribuit: Confidence = 0.5
Block: Calcul punctaj Row:29
IF:
  [Delta_I] >0
THEN:
  Punctaj atribuit: Confidence = 1

```

- A *fact base* contains positive information in order to analyse the specific field and it processes the data introduced by the expert using the rule base. Thus, the financial diagnosis soft calculate the following set of indicators: trading capital, necessary trading capital, financial independence, the volume of investments, general or current liquidity, the acid test, debt rate, general solvability rate, net treasury;

The inferences motor operates the database, works out analogisms that deduce new facts and adopts decisions for modifying databases in succession until all the rules have been used up or until a conclusion is reached.

Thereby, the financial diagnosis soft will calculate the final value that characterizes the financial situation and allows the analysed company to be integrated in a category according to the total score (TS) reached: if TS is less than 5.5, then the financial state of the company is weak; if TS is more or equal to 5.5 and less than 7.5, then the financial state of the company is satisfactory; if TS is more or equal to 7.5 and less than 8.75, then the financial state of the company is good; if TS is more than 8.75, the financial state of the company is very good.

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## **COORDINATES OF PRODUCTION FACTORS COMBINING IN ORDER TO INCREASE THE ELECTRICAL PLANTS EFFICIENCY**

**CLAUDIA ISAC \***

**ABSTRACT:** *Energetical strategies drawn up by the international research institutes reflect the premises and the effects of the main production factor substitution, the energetic resource, with the unconventional resources. Their use, on a large scale, in the close future will determine a flatter iso-quantum curve as a consequence of the raw materials cost reduction or annulation and also of the amount of labour decrease, taking into account the fact that obtaining power energy from unconventional resources is an automatic process.*

**KEY WORDS :** *energetic resource, main production factor substitution, input flows*

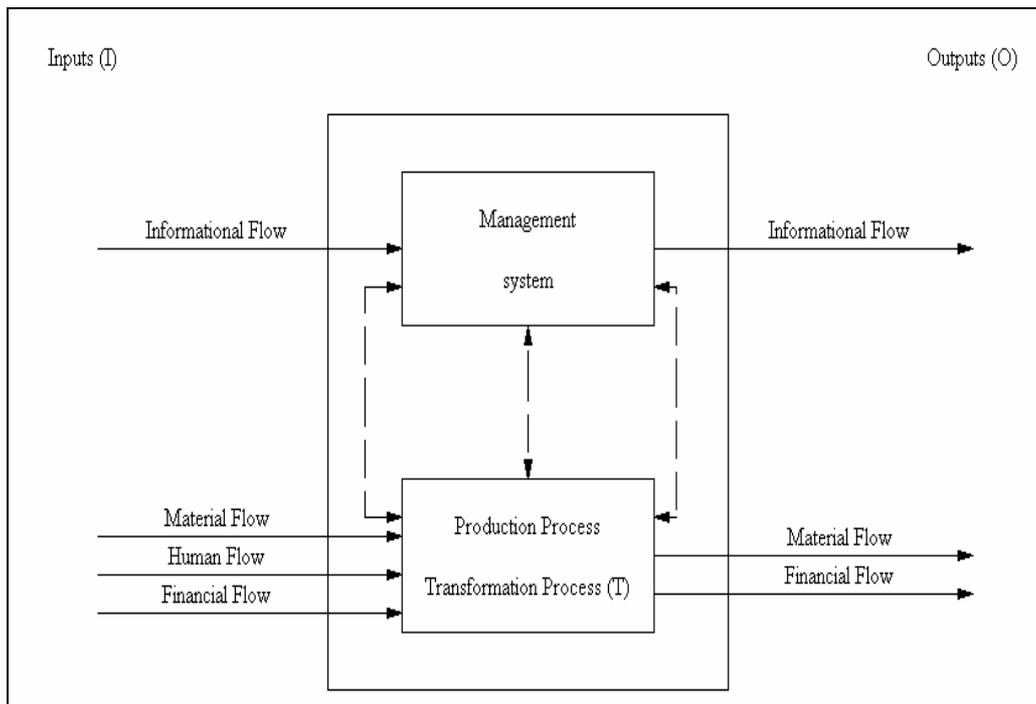
The production system turns a set of elements (inputs) into a specific set of elements (outputs) in accordance with some pre-established objectives with the help of a transformation structure.

The evolution of production systems during the last decades, as it is reflected in the specialized literature, imprints a dynamic character upon these production factors, a reason why they materialize into *input flows*. Thus, if circulating assets and material immobilization are part of the *material flow* and man-power is part of the *human flow*, financial resources like circulating capital, bank loans, influx, the purchase of title or investment deeds are part of a separate flow, which is the *financial flow*. Against an informational revolution, which is more and more intense, the impact of information technology upon the functionality and performance of a company is substantially amplified, even more specialists think of the informational flow as an important element of the in-flowing subsystem, which can be the predominant flow according to the type of activity. The four categories of flows interact not only with the exterior of the company but also with the interior of the company, which reacts to them and turns them into flows or outputs of higher quality. (Figure 1)

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\* *Lecturer at the University of Petroșani, Romania*

Economic literature and practice prove the existence of several possibilities of showing the interaction among the elements systematically presented above. Thus, some specialists analyze the production factors from a point of view that refers to combining them in order to produce goods and another point of view regarding their substitution, which means substituting a certain quantity of a production factor by a determined quantity of another factor, so that the production stays the same.



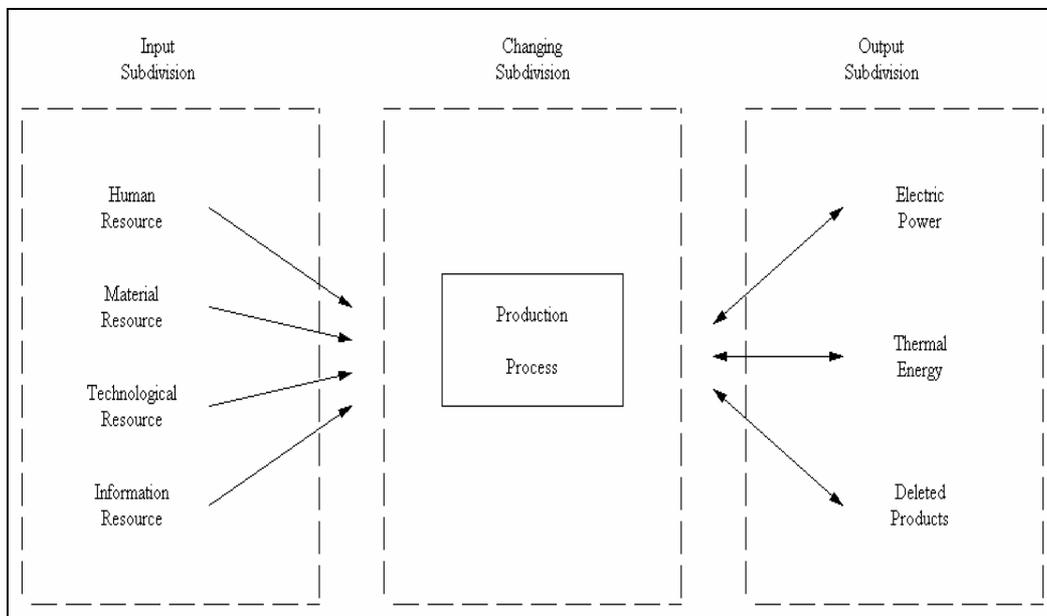
**Figure 1.** The system of input and output flows

The substitution of production factors is represented by the isoquantum curve, which is the complex of possible combinations between two or more factors, each of them being able to supply the same production volume. Energetic strategies elaborated by international research institutes in this field present the premises and the effects of the substitution of the main production factor, the energetic resource respectively, by non-conventional energetic sources. Their use on a large scale, in a near future, could lead to the flattening of the isoquantum curve due to the decrease or even annihilation of raw material costs, on the one hand, and to the decrease of the labour volume, on the other hand, as the technology to get electric power by using non-conventional energetic sources is automated.

Correlated analysis of the production factors in energetic industry must start from the characterization of the production process, which directly influences both the use of human resources and the technologic factor. Regardless of the type of raw

material used, the production process in the energetic industry is a complex process with operations that have a continuous flow and the different types of machines or assemblies are placed according to the sequence of operations. Due to the inflexibility of the variation in quantity and/or in value of the material flow, it is obvious that the process of electric power production cannot bring out a continuous and floating production function, which might imply a great number of sets of production factor combinations and a study based on mathematics methods applied to production functions with substitute factors. Thus, the technologic source, that is to say the value and quantity of the fix capital cannot be altered during a certain period of time, not even during a short or medium period of time, on condition that the common investment of a technologic group amounts to hundreds of millions of dollars, and the period of time needed to raise this capital is minimum three years. Similarly, the other component of the material flow, that is to say the raw material, cannot reduce its quantity too much, because the activity of an energetic unit depends on a certain amount of coal and taking into consideration the purchase price, it is imposed on the market only by one domestic producer, C.N.H. Petrosani (National Coal Company) respectively, since the pit coal is the main energetic resource.

However, statistics regarding input and output flows in thermo-electric plants, together with technical characteristics of the productive process enable to lay down a mathematic model divided into three subdivisions: input, output and production process. (Figure 2)



**Figure 2.** Interdependency among the input subdivision, the changing and the output subdivisions of a company.

$X_j^i(t)$  – expenses matrix with the resource  $R_i(t)$  for electric power and thermal energy production during the period  $t$ ;

$I_j(t)$  – physical immobilization matrix during the period  $t$ ;

$P_j(t)$  – electric power and thermal energy production matrix during the period  $t$ .

For an easy comparison of the elements from the input subdivision with elements from the output subdivision, the final product, which is electric power and the secondary product, which is thermal energy, must be taken into consideration. Assimilating the final product to the secondary product, thermal energy can be turned into electric power and electric power can be obtained theoretically by adding up the two products (electric power and altered thermal energy). For the assimilation process, the measuring units must be transformed according to the following formula:  $1 \text{ kcal} = 1,163 \times 10^3 \text{ kWh}$ . Because the entire production of the thermo-electric plant is conveyed in electric power based on estimations, we can notice that  $j=1$  in the expenses matrix and the production matrix, although the process finalizes with one product; therefore, the specialized literature writes about a homogenous process and the production matrix turns into a vector ( $P_j(t)$ ).

The activity of a company or of a department from a company implies the use of many production factors, which makes it hard to analyze this activity according a single consumption factor. In this respect, in energetic industry, work must be divided into energetic departments groups, and after that the main factor should be determined. Although the structure of the expenses generated by the production of electric power shows a preponderance of material costs, some of the consumed factors (like additional materials, energy, water, salary expenses) are only secondary factors, which contribute to the functioning of the installations in the energetic department, and they can be attached to the main factor (the energetic department), as they can make it operational. In order to validate the technological resource as the main factor, a correlation coefficient must be calculated between the expenses of a department and the hours per machine of functioning. (Equation 1)

$$r = \frac{\sum_{i=1}^n C_i \cdot H_i - n \cdot \bar{C} \cdot \bar{H}}{\sqrt{\sum_{i=1}^n (C_i - \bar{C})^2 \cdot \sum_{i=1}^n (H_i - \bar{H})^2}} \quad (1)$$

$r$  – correlation coefficient;

$C_i$  – costs implied by the energetic department for semester  $i$ ;

$H_i$  – hours of functioning per machine in the energetic department for semester  $i$ .

Given the actual conditions that thermo-electric plants need to reduce the quantity of raw materials used but at the same time they have to supply the same quantity of electric power to the national electro-energetic system and the same quantity of thermal power supplied to industrial and domestic consumers, the

production process within a thermo-electric power plant begins with optimization objectives, that is to say with an appropriate distribution of electric and thermal charge between the departments within a power plant and its components, in order to minimize total production costs.

The main issue of the production process in a thermo-electric power plant is the distribution of electric and thermal charge among units and the efficient control of the use of fuel. In order to diagnose the economic function it is necessary to explain and localize over-consumption and compare it to base line consumption, and it also implies the use of computer programs. In fact, the entire processes within the energetic industry are computerized either partially or completely, and that makes an efficient analysis of the results possible. These computer programs can supervise and verify the production and this can fall into the responsibility of the logistic manager, but most often, such a task is carried out by a group of employees under the supervision of the logistic manager, who verifies the functioning parameters of the technological process on a daily basis.

Computer programs get out all the deviations that appear in the functioning of the installations, errors which need to be brought to the attention of the manager responsible with the production process, most often to the attention of the logistic manager, in case the supervisory control cannot fix them. Thus, the management of a company is informed about the deviations that occur in the production process by the supervisory control in order to limit the unfavorable influence of these disturbance factors over the production process and to eliminate the causes that brought them on. An efficient use of the technological resources and materials depends, primarily, on the optimum functioning of the production process; due to this fact, the control of the production process becomes very important and implies a great variety of aspects, mostly, technical aspects; thus, they fall into the responsibility of engineers.

In order to supply with energetic resources an electrical power plant there must be a correlation between production demands and stock level both for determined periods of time and for longer ones, as shown by forecast studies. The best strategy for resource management must take into account, besides the equilibrium between the generation of electricity and the safety stock, some disorders that may appear when supplying with, carrying and stocking on these resources.

The substance of this strategy takes into consideration the characteristic continuous flow production in electric energy, the possibility to reduce specific fuel consumption and energy expenditure, the influence of weather upon supplying procedures and the organization of other activities like discharging and stocking on energetic resources.

Safety stock optimisation in these power plants raises more complex technical and economic problems than stock management in other industrial branches. The main criteria, on which the volume of coal supply is based, in power plants that use solid fuels, are:

- A planned rate for the generation of electric and thermal energy, the distance between mines, coal dressing stations and the power plant;

- The great quantity and quality variations of the supplied coals as a result of the implementation of mechanized mining (changes in the sterile-coal seams) along with an instable calorific power and coal composition, which varies from one mine to another and even within one single mine;
- A great quantity of coal is stored in the coal yards because of the low calorific power of the coal and therefore, the area assigned to fuel storage widens;
- Coal must be stored in a coal yard for a limited period of time according to its physical property (for example, spontaneous firing in the case of pit coal and low calorific power in the case of lignite);
- Falling reliability of equipment with which fuel depots are fitted;
- Some economic, political and social aspects, which may affect mining stations (for example, the closing down of mines, staff dismissal, a.s.o.).

All these characteristics, which form the database for coal storage optimisation in power plants, have the following consequences: coaling systems and most importantly, the fuel depots of steam power plants are more and more complex because of the new flow-process charts and the automation of the operating process; the concept regarding the rating of the fuel supply system is now changed because presumable methods based on the randomness of the supply sources and on the availability of equipment have been implemented; new and more efficient flow sheets regarding coal grinding and burning have been introduced, which can compensate for the changes in quality of the fuel; old methods for removing slag and de-ashing, and for ash storage as well, have been updated (in the case of many plants they haven't been modified ever since they started running).

In power plants, the supervisory control is in charge of the production management by dispatching the production. In this case, the objective of the dispatching system is to maintain a constant debit of the production flow, which is set according to expenses and the quantity of electric power required by the national power supervisory control.

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## **CAPITAL MARKET IN ROMANIA – EVOLUTION AND PERSPECTIVES**

**LILIANA IVĂNUȘ\***

**ABSTRACT:** *Analyzing the evolution trend on the Romanian capital market in the last three-four years we can observe that, as the years go by, financing thru the specific mechanisms turns into a real alternative to financing by loans or profit reinvestment.*

**KEY WORDS:** *capital market, Bucharest Stock Exchange, Rasdaq Electronic Market, stocks, bonds, transactions, capitalization*

Resumption of economic growth as of 2000, the main macroeconomic indicators stabilization, the deflation process, followed by a drop in interest rates in the banking system, and a decline in the yield rates of Government bonds issued on the domestic market have determined that part of the savings in the Romanian economy shift towards the capital market and the Bucharest Stock Exchange listed companies.

As a consequence, in this period, the Romanian capital market evolution has a continuous increasing trend, as the figures in table 1 show.

So, the total transactions value (stocks and bonds) registered an increase of 716,22% in 2004 regarding 2000 (from EUR 93,24 mil. to EUR 667,81 mil.), despite a decrease of number of listed companies (from 114 to 60). Also, the positive market tendencies are reflected in the price earning ratio (from 3,98 in 2000 to 35,18 in 2004) and the capitalization value (an 1957,51% increase in 2004 regarding 2000).

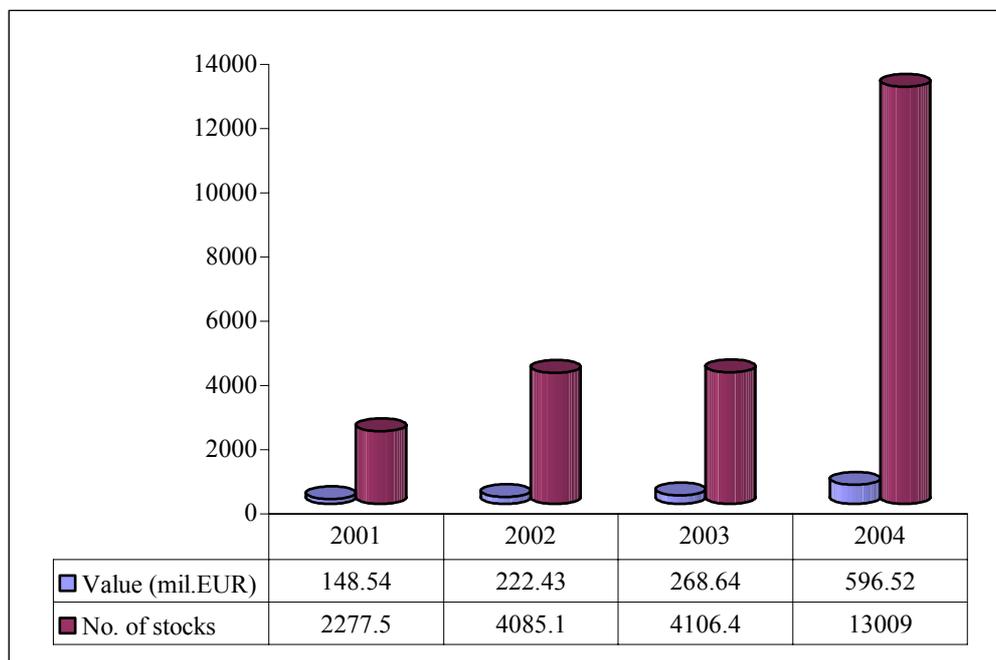
Especially the year of 2004 shows that financing thru the capital market mechanisms turns into a real alternative to the loan financing or profit reinvestment. If, at the beginning, only few companies turn to account the advantage of being listed, every year more and more companies chose to finance their development projects by securities issues. The evolution of stocks and bonds transactions at Bucharest Stock Exchange is shown in figure 1 and 2.

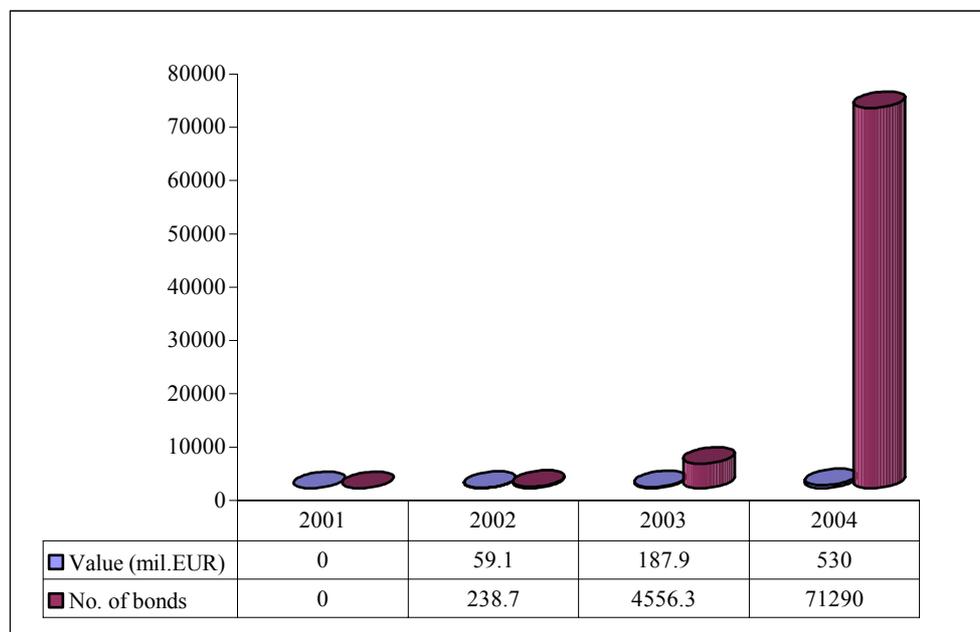
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\* *Lecturer at the University of Petroșani, Romania*

**Table 1. Evolutions at the Bucharest Stock Exchange**

Main indicators	2000	2001	2002	2003	2004
Total transactions value:					
- mil. EUR	93,24	148,55	222,67	273,20	667,81
- bil. ROL	1.852,47	3.815,15	7.097,67	10.234,01	27.049,85
Number of companies	114	65	65	62	60
Capitalization					
- mil. EUR	450,51	1.361,08	2.646,44	2.991,02	8.818,82
- bil. ROL	11.018,89	38.573,20	91.580,21	121.865,54	341.473,66
Transaction rate	21,31%	15,82%	10,43%	9,59%	10,29%
Price earning ratio	3,98	4,92	9,12	13,10	35,18
Market price/Nominal value	0,41	0,45	0,84	1,01	2,29
Dividend yield	7,48%	6,70%	4,97%	2,00%	1,45%

**Figure 1. Stocks transactions at Bucharest Stock Exchange**



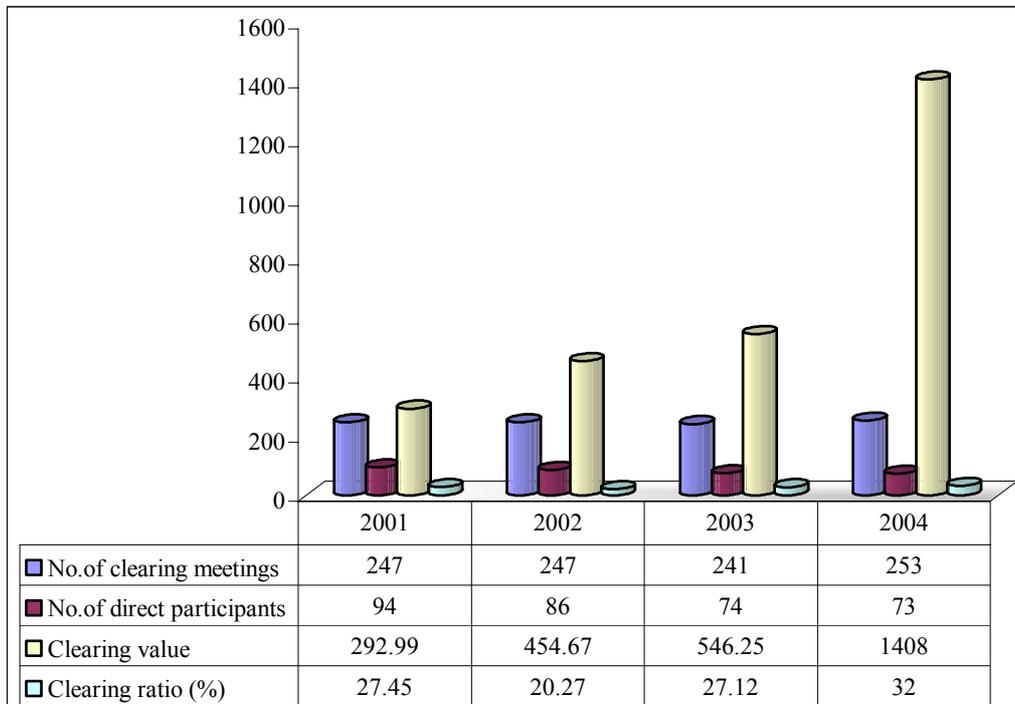
**Figure 2.** Bonds transactions at Bucharest Stock Exchange

In 2004 the number of stocks deals registered an 571,19% increase related to 2001 (from 2277 to 13009) and in terms of value the rise was of 401,58%. Regarding the bonds transactions, we can observe that the deals began only in 2002, but this market knows a spectacular development – 896,78% increase as value and 29865,94% as number – in the last years.

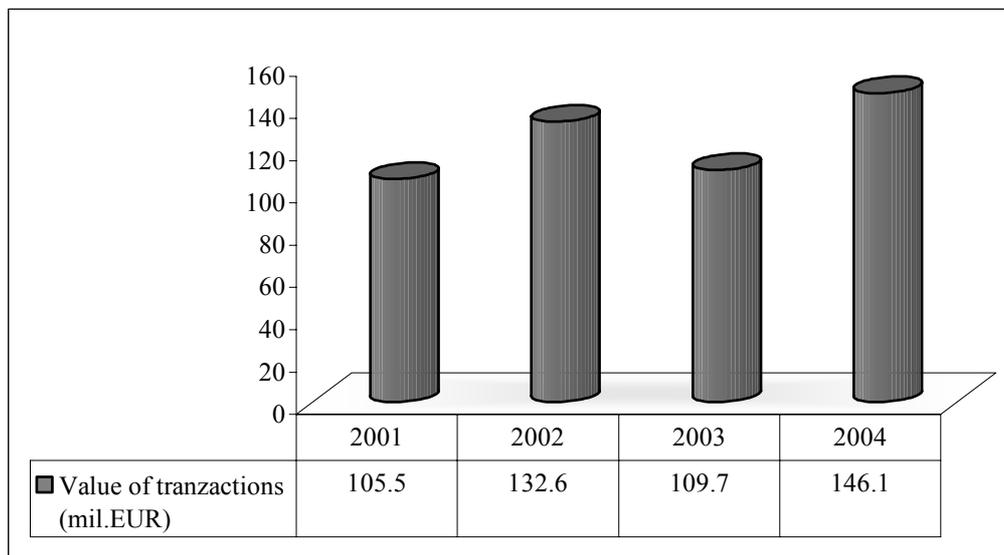
The clearing process of the securities transactions conclusions was carried on by the Bucharest Stock Exchange electronic system without any delays, according to its own procedures and rules and also to the international standards. Its evolution is presented in figure no. 3.

In the number of 253 clearing meetings in 2004, the value of the settlements was EUR 1408 mil. and the clearing ratio was 32%, which indicates an increase of the liquidity needful for final clearing.

Regarding the other component of the Romanian capital market, Rasdaq Electronic Market, its evolution matches the general trend, the value of transactions reaches a total of EUR 146,1 mil. in 2004, which means a 138,48% increase related to 2001, as the picture no. 4 shows. However, in 2003 the value of transactions diminished to EUR 109,7 mil. from EUR 132,6 mil. in 2002. As a number, 111 thousand transactions were registered in 2004, with a 68% increase from 2003, as a consequence of a public greater interest.



**Figure 3.** Evolution of clearing activity at Bucharest Stock Exchange



**Figure 4.** Transactions at Rasdaq Electronic Market

In figures, the Rasdaq Electronic Market activity for the past two years can be resumed as in the following pictures (figure 5 and 6), which show a decrease in the number of listed companies, but also an increase of the market indexes. In 17 th december 2004 the Rasdaq C index reaches a historical maximum of 1783,59 points rising with 59,44% related to the beginning of the year.

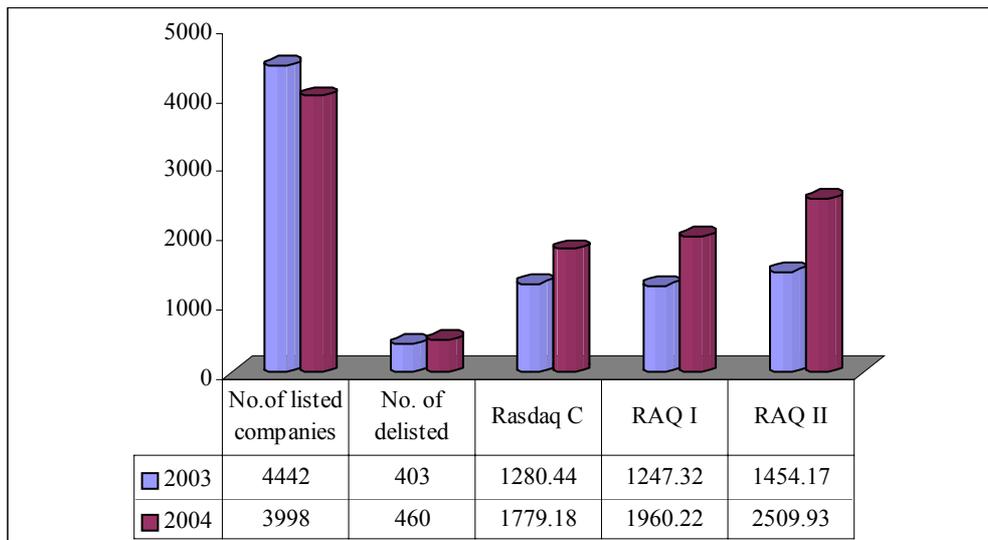


Figure 5. Evolutions on Rasdaq Electronic Market

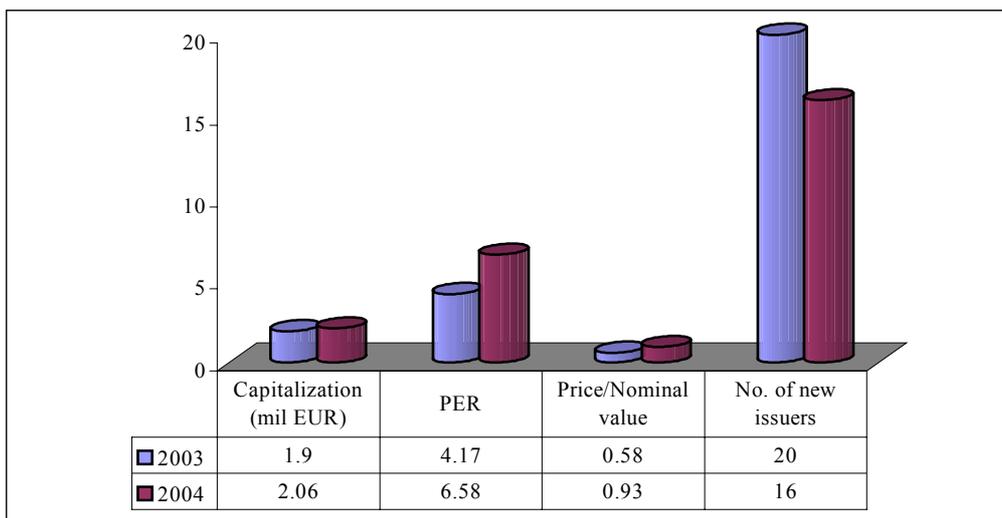


Figure 6. Performances of the Rasdaq Electronic Market

The Rasdaq Electronic Market capitalization reaches, at the end of 2004, a level of EUR 2,06 bil.. In ROL, this value maintains relatively at the same level as in 2003 although the prices were rising. This fact can be explained as a consequence of the delisting process of 460 issuers. Their market value is ROL 30 thousand bil. and represents 37% from the capitalization in 2004. Also, in 2004 the average transaction value was ROL 23 bil.

Though not impressive in absolute value, the presented figures reflect the Romanian capital market dynamics, suggesting the magnitude of investors interest in securities traded on the Bucharest Stock Exchange and on the Rasdaq Electronic Market. The last few years have seen a rise of demand for securities issued by Romanian companies. Medium and long-term estimations show that this tendency will continue, being interrelated to the development of the other financial market parts and particularly to life insurance and private pension funds.

Consolidation of the local institutional investors sector has been completed in the last three years by the dynamics of retail investors sector on the stock market. In this way conditions have been put in place for capital market players and institutions in Romania to accept the financing role for the real economy.

An image over the financing resources available on capital market is shown by the important amount of money subscribed by the Romanian investors in the issuing process of the greatest Romanian company – Petrom. Also, the changes on the bonds primary market reflect that the conditions for the next years to bring new companies on the capital market are created. Stock markets can also help to establish the necessary routes for financial resources available in the capital market to be efficiently channeled to productive areas of economy.

An immediate effect of stock market consolidation will be that the capital market will turn into a financing alternative for the real economy. Looking from a broader angle, the capital market is bound to an indirect contribution to the real economy restructuring by selecting and financing only projects that, even entailing a greater risk, can bring higher profit than traditional projects. A normal functioning capital market is performing this selection process continuously, which enables national economies to be flexible enough to adjust to changes in the structure of domestic and international demand for goods and services.

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## **SOME ECONOMIC ASPECTS REGARDING THE USE OF MECHANIZED COMPLEXES IN MOTRU BASSIN COAL MINES**

**FERENC KORONKA** \*

**ABSTRACT:** *The option for the quarry or underground mining is determined by the concern for environment protection in the first case, whereas in the second case the determining elements are complex mechanization, production concentration and productivity increase in order to ensure the coal quantity demanded on the market, economic efficiency focusing on cost reduction.*

*The technical – economic performance results from the analysis of all the performance indices, both technical and economic, expressing the capacity of a complex technical system to turn to account all the technical, technological, constructive, functional and managerial resources with a view to ensuring maximal results with minimal resources in given conditions.*

**KEY WORDS:** *lignite mines, performances, mechanized complexes*

### **1. INTRODUCTION**

In lignite mines, the results obtained with mechanized face complexes have been more encouraging than in the Jiu Valley. The technological solution regarding the equipment used and the working technology being the result of previous research and validated in practice, this does not involve major changes, partly due to the decreasing importance of underground lignite mining. However, improvement can be proposed regarding the parameters of working faces.

The main parameters of working faces influencing performance are: the working face length, the working face height, the working field length, the intensive index, and the extensive index.

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\* *Prof., Ph.D. at the University of Petroșani, Romania*

## 2. THE WORKING FACE LENGTH

The length of the working face has always been a highly debated on subject, with arguments for and against longer or shorter faces. This is the reason why superior technologies are applied with remarkable results to face lengths situated within extreme ranges of less than 50 m, or over 200 m.

As the situation of the advantages and disadvantages of short faces in comparison with long faces is reversed, we shall present only the advantages of each solution of deposit preparation.

- a. Advantages of long faces:
  - less production losses in the pillars between the faces;
  - optimal use of the cutter – loader operation time, as time losses are reduced at the ends of the face;
- b. Advantages of short faces
  - more suitable for small or uneven deposits;
  - more economic support;
  - favorable pressure regime due to the possibility of rapid advance;
  - constant pressure regime on the whole length of the face;
  - better surface protection through large sinking areas.

Besides the theoretical considerations, face length is also influenced by the technical possibilities of transport. As to the pressure regime in the working face, calculations and practice have confirmed that the duration of the face cycle cannot be longer than three hours.

That is why, taking into consideration the power necessary for the coal transport in the face (1 kW for each meter of conveyor length) for the complexes of the CMA groups the optimal length was established between 70 and 100 m, according to the mining conditions, in the sense that, for more difficult conditions, a lesser length is adopted.

In the Motru basin, the faces being mined at the moment fall into the length categories previously specified. The working face 4/6 at Ploștina mine, and a face at Horăști are 70 m long, but they were outlined in this way to fit the mining area.

In Jilț basin, the two faces being mined are outlined at a length of 90 m.

Table 1 shows the working face lengths in each basin.

**Table 1. The working face lengths**

Specific	Face 5/14	Face 6/14	Face 4/12	Face 8/VI	Face 12/VI	Face 1/6	Face 2/6	Face 4/6	Face 8/3	Face 6/3
Basin	MOTRU								JILȚ	
Working face length (m)	65	70	75	80	80	80	80	90	90	90

### 3. THE WORKING FACE HEIGHT

The working face height in both basins is primarily conditioned by the thickness of the coal seam, the latter also determining the type of support. Under the circumstances, the faces height at Motru is 2.4 m, and at Jilț it is 2.8 m for the CMA – 2M complex, and 3.6 m for the 20KP 70 complex.

### 4. THE WORKING FIELD LENGTH

When the dimensions of the working panels are not limited by the dimensions of the mining field or by different tectonic anomalies, the length of the working field is determined so that the expenses related to mining, working maintenance, transport, water discharge and ventilation should be minimum. The dimension of a panel is actually established so that the corresponding operation time of the mechanized complex should correspond to the one between two overhauls in order to avoid dismantling for repairs within the same mining field.

Table 2 shows the working field lengths in each basin.

**Table 2. The working field lengths**

Specific	Face 5/14	Face 6/14	Face 4/12	Face 8/VI	Face 12/VI	Face 1/6	Face 2/6	Face 4/6	Face 8/3	Face 6/3
Basin	MOTRU								JILȚ	
Working field length (m)	850	850	505	750	780	820	750	750	950	720

### 5. THE INTENSIVE INDEX

This is expressed through the ration between the gross production of the working face and the effective operation time (of the cutter loader). By analyzing the intensive index for the complex types operating at E.M.S. Motru over a one - year period, it can be noticed that the best values are obtained in the case of the mining with CMA – 2TE complexes. The face with the CMA – 2T complex had 54 components in comparison with the other two types (61 components for CMA – 3TE, and 65 for CMA – 2M).

### 6. THE EXTENSIVE INDEX

This is characteristic for cutting equipment such as cutter – loaders and headers. It is expressed through the percentage ratio between the effective operation time and the available operation time of the cutting equipment.

The cutter – loaders that have operated on the three complex types are of CA – 1 type and they have had a good index within the analyzed period.

## 7. CONCLUSIONS

The further improvement of the performances of working faces containing mechanized complexes, it is recommended:

- to adopt face lengths of 100 – 120 m, possibly by redimensioning the drive of flight conveyors;
- to increase heading speeds by improving activity management in the faces and by increasing the speed of cutter – loaders;
- to reduce accidental time losses to a minimum by improving equipment and maintenance quality;
- to use a maximal working field length according to the geological and mining conditions.

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## **ASPECTS CONCERNING THE INFORMATIZATION STRATEGY FOR THE CONTROL ACTIVITY AT THE ROMANIAN COURT OF COUNTS**

**ION LUNGU, TEODORA VĂTUIU \***

**ABSTRACT:** *The paper suggests the presentation of aspects concerning the informatization strategy for the control activity at the Romanian Court of Counts. The introduction of the audit assisted by computer through the accomplishment of an IT system and the required training of the personnel represents a priority in the short time and CCR medium strategy.*

**KEY WORDS:** *informatization strategy, audit and control assisted by computer*

### **1. GENERAL CONSIDERATIONS**

The application of the informatization strategies doesn't represent a purpose itself, but a major managerial instrument for the proficiency of the administration and the rise of the organisation's competition in this domain. The strategy indicates the trajectory, the modality of accomplishing some performing and competitive informatics systems. The strategy, through its advocacy on anticipating the contextual evolutions and through the compression of the accomplishment modalities, determines a substantial reduction of the risks which come with every activity.

In what concerns the elaboration of the accomplishment and implementation of the informatics systems strategy, the accent falls on the premises of the elaboration strategy, after the establishment of the objectives and the implicated resources. In this way it is made the transition to the carefully study of all the factors from the ambient medium of the organization.

The preparation of the strategy's implementation is much more profound and analytical than its adoption and effective implementation and must be accomplished in the context of an ample redesign of the organization's managerial system.

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\* *Prof., Ph.D. at the Academy of Economic Studies of Bucharest, Romania  
Assoc.Lecturer, Ph.D. at "Constantin Brâncuși" University of Tg-Jiu, Romania*

The informatics systems must answer in perspective not only to maintain or to extend the market share, using as a key factor the cost, but also to the quality and reliability requirements.

## **2. THE INFORMATIZATION STRATEGY AT THE ROMANIAN COURT OF COUNTS**

The Court of Counts is the only one which is competent, after the verification of the counts, to decide upon the transactional disruption and to establish the responsibility concerning the utilization and administration of the public funds.

The big volumes of dates, the complexity of the administration and processing of the technologies procedures, the exigencies concerning the supply in utile time, by the informatics system, of valid and relevant dates, necessary and adequate to the administration and functioning of an administration, are definitive characteristics, in report with the informatization problem at this level.

Obvious, this doesn't exclude, but suppose a dynamic and creative attitude of the users, in report with the exploitation and development of the existing informatics system, in collaboration with the computer scientists.

It is imposed the design and the implementation on some informatics systems which are based on a refined technique of data organization, which include a series of mathematical models and which are capable to imprint high performances to the informatics system and the base activities.

The design at a micro and macro economical level of informatics systems which can use the data base technique and which contain a series of mathematical models and the inform-report situations have a character of preventive signalization for the deflections from the system's normal state, represents a superior form of data organization and processing. This conception revolutionises the entire system and transforms it from a passive observation, consignment and analyze of economic phenomenon and processes instrument, into an active prevision, command and control instrument.

Regarding the Romanian Constitution's provisions, The Court of Counts has a financial control function upon the forming, administration and usage way of the state's and public sectors financial resources and also upon the way of public and private state patrimony's and administrative- territorial unit's segmentation.

Inside the negotiations concerning Romania's adherence to the European Union, the Court of Counts has brought its contribution to the redaction and negotiation of the Romania's Position Document for Chapter 28- Financial Control, where it has been reiterated the institution's designation concerning the consolidation of its institutional capacity, regarding the accomplishment of its strategic objective and the alignment of its practices and procedures to the best standards and practices from the domain, adopted by similar institutions from the member states of the EU.

The control programme on the year 2005, approved by the Court of Counts' Plenum, reflects the present preoccupations of the institution, in the light of the

established strategic objective, of the new attributions resulted from the extension of its mandate through the modification of the legal organization and functioning cadre, but also from the ascertainment and recommendations made in the Public Report on the year 2003, published in December 2004.

The general strategic objective of the Court of Counts in the perspective of Romania's adherence to the European Union is the consolidation of its institutional capacity, so that it becomes an independent, professional and trustful institution, capable to contribute in a competent way to the transaction's disruption or to the establishment of the responsibility in what concerns the utilization of funds by the public administration and to present Romania's Parliament and European Union trustful and high quality reports on the way the public money has been used.

For accomplishing this objective, The Court of Counts has benefited and will benefit from the financial assistance of the European Union through Phare 2000 and Phare 2002 Programmes, concretized through the professional performance of the personnel for the adoption and alignment of the INTOSAI Audit Standards, to the European directory lines for the implementation of the INTOSAI Audit Standards and the good practice in the domain.

Through this programmes, the Court of Counts will ameliorate its informatics infrastructure through the acquisition of informatics technology and will assure the personnel's training concerning the implementation in practice of the audit assisted by computer techniques. In the same time, the institution will benefit from technical consultancy and assistance from the experts from the member states of the EU, wanting to certificate a part of the speciality personnel as international auditors. After the law number 77/2002, which completes law number 94/1992 of organization and functioning, has come into force, the Court of Counts has received new attributions for control and financial external audit and performance audit.

The extension of the institution's mandate has lead to the necessity of raising the speciality personnel number and also to the improvement of its professional training as to answer to the new requests.

Also, there have been important changes in the organizational structure of the institution, at a central and territorial level, which should permit a better adaptation to the new control/audit responsibilities and also to the requests and commitments taken by the institution. This way, a specialized division for the control of employee buy-out actions has been constituted, also a division concerning the performance audit and a division for the audit concerning the funds allocated to Romania by the EU through the pre-adherence programmes.

The final purpose is that, through the accomplishment of the strategic objective, Romania's Court of Counts should be capable to carry out its obligations as a supreme audit institution of a member state of the European Union.

### **3. THE ACCOMPLISHMENT OF AN INFORMATICS SYSTEM FOR THE AUTOMATIC TRANSACTION OF THE BUDGETARY ACTIVITY AT THE ROMANIAN COURT OF COUNTS**

The introduction of the audit assisted by computer through the accomplishment of an IT system and the required training of the personnel represents a priority in the short time and CCR medium strategy. Through this, the credit coordinators from the control programme can transmit through the existent computers from the Court of Counts some dates which are important for the auditor.

The periodic tracing of the income encashment and of the budgetary spending can be realized easier through the implementation of an informatics system for the automatic transaction of the budgetary activity at the Romanian Court of Counts.

A major request of the informatics society's development is the autoimmunization of one of the most complicated transactional systems of an economy, the transaction from the budgetary activity.

The execution of the budget consists in the encashment of the incomes and in the effectuation of the spending approved by the legislative forum. This ample process demands the participation of a high number of budgetary operators, beginning with the financial counter, with all its central and territorial structures, continuing with the economical directions of the administrating territorial entities and ending with the budgetary institutions.

The accomplishment of the informatics system lends support to the external auditor who must give his verdict in real time upon the legality and suitability of the public money transaction.

For the automatic tracing and the tracking of the eventual deviations concerning the public money transaction, the supplement of the public institutions with calculation and specialized soft equipment is necessary, lending support to the central localization of CCR in tracing the countable activity of the public institutions.

The connection between the Courts of Counts from the counties, the controlled unites and the Romanian Court of Counts can be made through the INTERNET.

We propose a presentation of an informatics system through which you can obtain and operate information in a real time, trying to obviate the negative phenomenon which could appear.

We have started the accomplishment of this application from the study of the incomes and spending from the budgetary state law study, which is organized on parts, chapters, subchapters, titles, articles and alignments.

In the purpose of systemizing the dates in tables which can be interrogated for answering to the application's requests and requirements, we have suggested the levels:

- „**Chapter**” Level- which corresponds to table **V\_C\_NIVEL1**

The rational structure of table **V\_C\_NIVEL1** data base is:

General Constraints Storage Options Statistics Constraints Storage

Name: V\_C\_NIVEL1  
 Schema: VATUIU  
 Tablespace: VATUIU

Table:  Standard  Organized Using Index (OT)  Use Abstract Datatype

Columns

Name	Datatype	Size	Scale	Nulls?	Default Value
COD_NIVEL1	VARCHAR2	10			
DENUMIRE	VARCHAR2	250		✓	
TIP	VARCHAR2	1			

- „**Article**” Level – which corresponds to table V\_C\_NIVEL2. The rational structure of table V\_C\_NIVEL2 data base is:

General Constraints Storage Options Statistics Constraints Storage

Name: V\_C\_NIVEL2  
 Schema: VATUIU  
 Tablespace: VATUIU

Table:  Standard  Organized Using Index (OT)  Use Abstract Datatype

Columns

Name	Datatype	Size	Scale	Nulls?	Default Value
COD_NIVEL1	VARCHAR2	10			
COD_NIVEL2	VARCHAR2	10			
DENUMIRE	VARCHAR2	250		✓	
TIP	VARCHAR2	1			

- „**Alignment**” Level – which corresponds to table V\_C\_NIVEL3. The rational structure of table V\_C\_NIVEL3 data base is:

General Constraints Storage Options Statistics Constraints Storage

Name: V\_C\_NIVEL3  
 Schema: VATUIU  
 Tablespace: VATUIU

Table:  Standard  Organized Using Index (OT)  Use Abstract Datatype

Columns

Name	Datatype	Size	Scale	Nulls?	Default Value
COD_NIVEL1	VARCHAR2	10			
COD_NIVEL2	VARCHAR2	10			
COD_NIVEL3	VARCHAR2	10			
DENUMIRE	VARCHAR2	250		✓	
TIP	VARCHAR2	1			

Taking in count that we will work with budgetary units from counties and situations at the level of budgetary, counties and countries units will be requested, the dates have been organized on the next levels:

- The “County” level .The rational structure of table **JUDET** data base is:

The screenshot shows the Oracle SQL Developer interface for the table **JUDET**. The table is located in the **VATUIU** schema and tablespace. It is a standard table. The columns are:

Name	Datatype	Size	Scale	Nulls?	Default Value
JUDET	VARCHAR2	20			
SIMBOL_JUDET	VARCHAR2	2			

- “Budgetary institutions” level .The rational structure of table **INSTITUTII\_BUGETARE** data base is:

The screenshot shows the Oracle SQL Developer interface for the table **INSTITUTII\_BUGETARE**. The table is located in the **VATUIU** schema and tablespace. It is a standard table. The columns are:

Name	Datatype	Size	Scale	Nulls?	Default Value
ID_INSTITUTIE_BUGETARA	NUMBER	10	0		
INSTITUTIE_BUGETARA	VARCHAR2	30			
SIMBOL_JUDET	VARCHAR2	2		✓	
ADRESA	VARCHAR2	50		✓	

- “Trimestrial Anticipations” level – which corresponds to table **PREVEDERI\_TRIMESTRIALE**

The screenshot shows the Oracle SQL Developer interface for the table **PREVEDERI\_TRIMESTRIALE**. The table is located in the **VATUIU** schema and tablespace. It is a standard table. The columns are:

Name	Datatype	Size	Scale	Nulls?	Default Value
COD_NIVEL1	VARCHAR2	10			
COD_NIVEL2	VARCHAR2	10			
COD_NIVEL3	VARCHAR2	10			
ID_INSTITUTIE_BUGETARA	NUMBER	10	0		
TIP	VARCHAR2	1			
ANUL	NUMBER	4	0		
TRIMESTRU1	NUMBER	18	2	✓	
TRIMESTRU2	NUMBER	18	2	✓	
TRIMESTRU3	NUMBER	18	2	✓	
TRIMESTRU4	NUMBER	18	2	✓	
TRIMESTRU4R	NUMBER	18	2	✓	

- “Payment and Encashment” level– which corresponds to table PL\_IN

Name	Datatype	Size	Scale	Nulls?	Default Value
COD_NIVEL1	VARCHAR2	10			
COD_NIVEL2	VARCHAR2	10			
COD_NIVEL3	VARCHAR2	10			
TIP	VARCHAR2	1			
DATA	DATE				
NR_DOCUMENT	NUMBER	10	0	✓	
EXPLICATII	VARCHAR2	256		✓	
VALOARE	NUMBER	18	2	✓	
ANUL	NUMBER	4	0	✓	
LUNA	NUMBER	2	0	✓	
ID_INSTITUTIE_BUGETARA	NUMBER	10	0		
VALOARE_TOTALA	NUMBER	18	2	✓	

#### 4. CONCLUSIONS

You can obtain reports on different levels, in the same time with the signalization of the inadvertences between anticipations and accomplishments.

Judet Gorj  
Salarii de baza  
**Credite aprobate, plati si cheltuieli efective**  
Capitol 02      Articol 10      Aliniat 10.01

MISCAREA ALOCATIEI TRIMESTRIALE		Trimestrul I	Trimestrul II	Trimestrul III	Trimestrul IV
Alocatia trimestriala initiala		3,000,010,000	2,000,200,000	1,003,000,000	1,900,000,000

Data	Z. luna	Nr. explicatii	Cont. Coreesp.	(Credite cont 942)				PLATI DE CASA				Cheltuieli efective (cont 410)		
				Cred. deschise	Cred. reduce	Sold	Plati	Restituirii	Plati mete de casa	Disp. credite (col. 8-11)	Debiti	Credit	Sold	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
01	01	1	0000	00.01								1,000,000		1,011,000,050
<b>Total luna:</b>		<b>1</b>										1,000,000		1,013,000,050
02	02	2	0000	00.01								2,000,000		1,014,000,050
<b>Total luna:</b>		<b>2</b>										2,000,000		1,014,000,050
03	03	3	0000	00.01								1,000,000		1,014,000,050
<b>Total luna:</b>		<b>3</b>										1,000,000		1,014,000,050
<b>Total trimestrul:</b>		<b>1</b>										10,000,000		4,000,000
04	04	4	0000	00.01								1,500,000		1,015,500,050
<b>Total luna:</b>		<b>4</b>										1,500,000		1,015,500,050
05	05	5	0000	00.01								2,000,000		1,017,500,050
<b>Total luna:</b>		<b>5</b>										2,000,000		1,017,500,050
<b>Total trimestrul:</b>		<b>2</b>										200,000.00		3,500,000

Institiua bugetara dddd      Adresa      mmm

At all report levels appear signalizations through colors:

- **red** for excess (in the case of spending) and for the no encashment (in the case of incomes) of the trimestrial anticipations at the correspondent level of report;
- **blue** for no excess (in the case of spending) and for over encashment (in case of incomes) of the trimestrial anticipations at the correspondent level of report.

The distinction in the report takes place at a level of primary payment and encashment document with payment's date, document's number, monthly sum, etc. This distinction has as a purpose keeping the operator's attention and also maintaining control upon the inadvertences as:

- spending bigger sums than the one approved by the budget;
- the spending which have not been approved b the budget have been ordonnanced in the allowance;
- when taking dates from the primary documents(receipt) there have appeared errors in the calculation;
- there has appeared budgetary spending in s derogatory way, meaning that until their accomplishment the legislative organ hadn't approved the budget through law.

An operative and efficient analyze of the credit coordinators can be accomplished with maximum responsibility only by using an adequate informatics system, which is benefic not only for the public authority, but also for the external audit.

The presented system offers the possibility of an analyze in a real time of the dates which characterize the economic phenomenon and assures efficiency in the control's and audit's accomplishment, giving the possibility of taking measures in a real time.

The presented informatization strategy is based on the implementation of this kind of informatics system, realized by using the relational data base, from the applications offered by Oracle9i.

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## **DEFINITE COORDINATIONS OF THE ROMANIAN MINING INDUSTRY REORGANIZATION**

**DORINA MAGDA\***

**ABSTRACT:** *The new economic environment based on efficiency, competition and competitive experiments has deeply changed all levels of the national economy; thus, it has affected the evolution and the present and future development of the industrial branches in different ways.*

*As it has been avoided for quite a while because of its “strategic” character, the Romanian mining industry has entered the “chain” of reorganization processes and it has experienced a harsh period of changes, which prove to be long, complex, numerous, with social and economic regional influences.*

**KEY WORDS:** *strategic branch, reform, reorganization, mining strategy, sustainable growth*

If, prior to the events in 1989, the strategy of the development of the Romanian economy targeted a forced industrialization, based on self-support in providing mineral resources, which also brought into the economic circuit some ores that were technically and economically not feasible and their consequences over the environment were neglected, the change of regimen determined a re-evaluation of the system of priorities, which reconsiders the importance of the criterion of efficiency.

The “strategic” character given to the mining industry, enabled this industry to meet with a favourable treatment of the government, materialized in financial help, that is subventions which balance out the losses generated by the demand of mineral and energetic resources, thus the consequences resulted from the transition of the market economy are easier to bear.

The analysis of the way the Romanian mining industry has adapted itself to the changes in the general economic environment must delimitate the evolutions registered before and after 1997 – when the mining reorganization process started. Between 1990 – 1996, the mining production was marked by divergent evolutions resulting in a decline of the production between 1990 – 1992 and a slight increase between 1993 –

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\* *Assist.Prof. at the University of Petroșani, Romania*

1996 in the case of the pit coal and the lignite, while the brown coal is still following a descendent trend. Because of the insignificant dynamics of the average number of employees and because of some pressures coming from the trade unions in order to get significant salary increases, the losses increased and “cropped up” from one year to another. The analyses revealed that most of the companies functioned at a loss or with low profit (beside the lignite and the salt ores, the mining of other minerals was possible only with subventions regarding production, investments and social transfers from the state).

**Table 1. The losses of the mining industry recorded between the years 1991 and 1997**

- mil. USD -

	1990	1991	1992	1993	1994	1995	1996	1997
Subventions	528,4	295,5	489,9	386,9	331,5	402,5	384,9	145,5
Budgetary allowances for capital costs	229,5	188,3	204,4	137,2	293,0	215,7	160,6	50,0
Transfers	-	-	-	-	-	79,0	75,0	45,0
Excavation losses	263,6	21,4	30,2	5,2	108,8	123,5	128,3	75,1

Source: Stanciu Ion - *Strategia industriei miniere din România, Revista Minelor nr.5/2000, p.3*

As the perceptions of the consequences generated by the early orientation of the budget, funds toward supporting non-productive activities is more intense, central authorities bring up more often the subject of a reorganization strategy in the Romanian mining industry according to the requirements stated by the reform regarding the national economy as a whole; the target is to gradually reduce subventions until they are completely eliminated. An efficient integration of the mining industry in the general long-term development strategy implies:

- Meeting the requests of the energetic sector and of other branches which use coal and correlating the development of the coal mining sector with their predictable evolution;
- Developing a flourishing coal mining sector by reducing and eliminating subventions intended to cover exploitation, transfer and investment losses;
- Increasing allowances for closing down non-viable mines, refreshing the environment and reducing the social impact;
- Re-technologisation and modernization of coal extraction processes in order to maintain and develop a viable production capacity; the possibility to attract capital investments, especially from private investors;
- Perfecting the legislative and the institutional terms, which facilitate concessions, the closing down of mines, private investors, the origin of the capital and the operators' nationality, the accomplishment of a competitive system which equally involves all economic agents from the mining field, regardless of their ownership and the recovery of the environment according to EU regulations;

- Complete privatization of economic agents in the mining sector or in some sectors or mines with positive results or with geological reserves, which strategic investors in this field find very interesting.

The first steps that targeted a complete reorganization of the coal industry were mainly related to:

1. **technological reorganization of the production**, the effects of which were: the restriction of the underground production and the increase of daily lignite production; the increase of energetic pit coal supplies and the reduction of the quantities of pit coal prepared for coke; starting modernization activities of the great lignite quarries in the coal basins from Oltenia;
2. **management reorganization**, which consisted in breaking out some additional or even basic activities within the mining units and turning them into separate companies;
3. **staff reorganization**, which meant reducing the number of employees from the mining sector, as a result of the following steps taken: some activities broke out and were turned into separate companies, working hours were reduced, employees had to retire beforehand or they were dismissed, not without an advance payment;
4. **limiting or suspending productive activities** in the case of the mines with low geological resources, as well as with very difficult geological conditions, which generate high production costs and losses; the production of coal was undertaken by the mines that were still functioning.

Reorganization activities in the mining sector that were carried out rapidly and on a large scale, starting with 1997, resulted in:

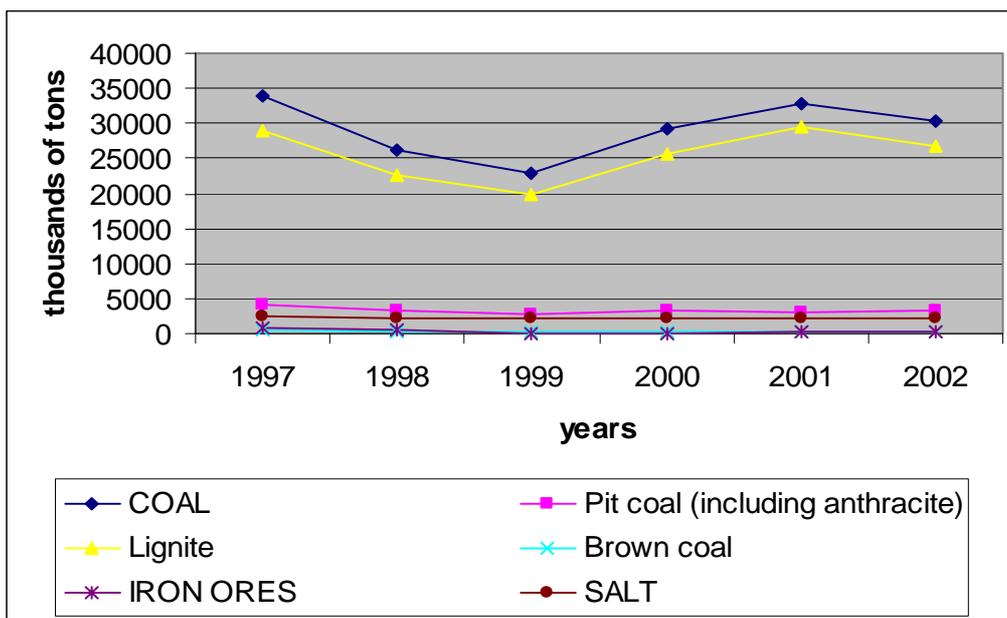
- suspending the production in 230 unprofitable mines, which are going to be shut down, followed by a mass dismissal, offering an advance payment of up to 20 salaries;
- disbranching service activities from the mines and setting up companies;
- increasing investments for production modernization in the case of the mines that were believed to become profitable;
- high and critical unemployment rate, amplified social pressures in the mining towns;
- a negative influence over the social and economic situation of the mining communities.

Mining regions have never experienced the process of mine closing and environment recovery after it was affected by mining activities, nor have they experienced economic reconstruction, which meant reconverting the areas severely affected by the reorganization of the mining industry and creating new jobs for the dismissed labour power; for this reason, collaboration with the World Bank was started. According to the agreement with the Romanian Government, the Bank of Investments for Reconstruction and Development (BIRD) ratified the loan of 44.5 million dollars intended to finance the Project of mine closing and social impact

attenuation; the objective of this project is to make a powerful and viable mining region according to the market requests.<sup>1</sup>

Taking into consideration the fact that according to the agreement financed by the World Bank 29 out of the 230 mines which stopped functioning will be shut down, the Romanian government initiated its own programme for closing down the other mines, using money from the budget; this programme has already been applied in the case of 40 mines since it was started in 1999. After finalizing the pilot-project “Mine closing and social impact attenuation” (2005), a new project financed by the International Bank for Reconstruction and Development - “Mine closing and social economic recovery” - is going to support financially the closing down of 20 mines and mining regions.

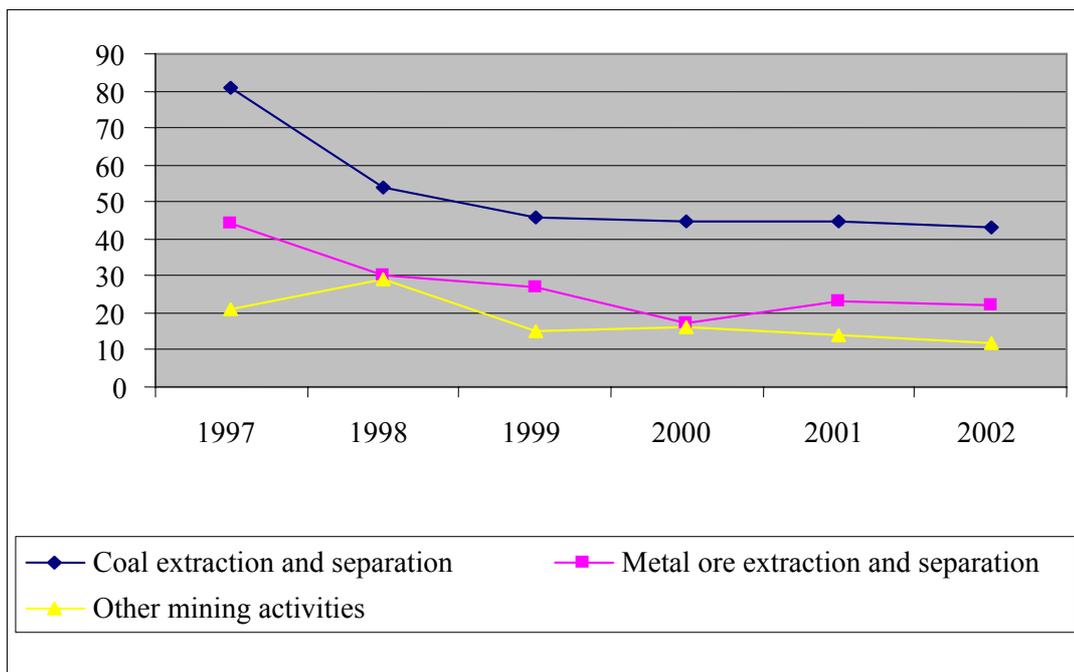
In order to clearly point out the changes brought about by the reorganization and dismissal processes within the mining industry, the evolution of some indicators like the production of the main mining products or the average number of employees, have been permanently supervised starting with the year 1998 – it is now that the first effects of these actions are being felt.



**Figure 1.** Production evolution of the main mining products between the years 1997 and 2002

<sup>1</sup> Ordonance 11/2000 referring to the ratification of the Loan Agreement between Romania and the International Bank for Reconstruction and Development, regarding the Project of mine closing and social impact attenuation, which amounts to 44.5 million dollars, out of which 26.5 million dollars are intended to closing down the mines and the rest to attenuate the social.

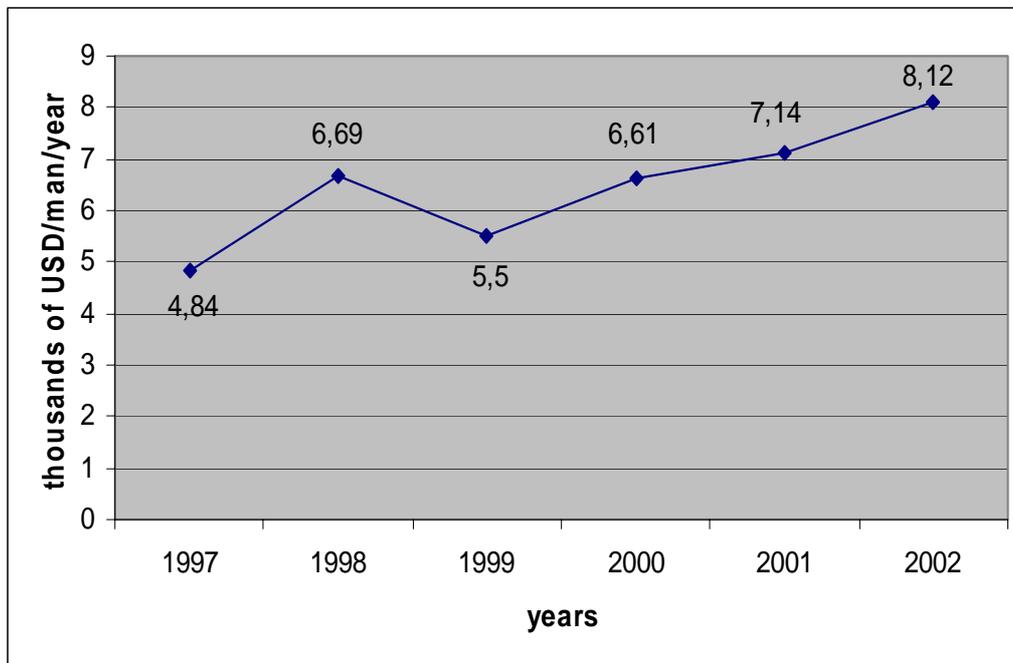
During the analyzed period, the production of the main mining products registered divergent evolutions as follows: between 1997 – 1999 the big decline of the coal production is shown by the small quantities of every type of coal (lignite, pit coal and green coal), which continue to decrease until 2001; the production of lignite slightly recovered by the year 2001, while the production of pit coal scaled down in 2001 compared to the year 2000.



**Figure 2.** The evolution of the average number of employees in the mining industry between 1997 and 2002

One can notice the constantly descending dynamics of the personnel from the mining sector; after a high descending rate between 1997 – 1999, this curve finally recovers.

Figure 3 shows the effects of the production dynamics over the labour productivity in the mining industry.



**Figure 3.** The dynamics of labour productivity in the mining industry after the year 1997

Despite the fact that some indicators like productivity, exploitation costs, investments, subventions and transfers from the state budget have improved, the authorities admitted that the results of the reorganization process during this time had caused new problems:

- a sudden decline of the economy of the mining regions that were affected by the reorganization process;
- social problems have amplified in these regions;
- the rate of poverty has increased;
- unsatisfactory economic-financial performances of some mining companies (“On the 30<sup>th</sup>, January 2001 [...], some of the mines spent 5000 lei for the production of coal that was worth 1000 lei”).

As a solution to this economic situation, the Government worked up the Mining Industry Strategy for 2004 - 2010, which points out the main objectives that need to be accomplished in the following years:

- *starting a commercial approach of the activities in the mining industry*: exploiting coal at competitive prices and valorizing the production on the free market, reconsidering the excavation area, optimizing the number of employees and the salaries so that the mines could function efficiently;

- *minimizing the implications of the Government and gradually attracting investors from the private sector: privatizing viable and efficient mines, encouraging the public – private partnership, facilitating a management oriented towards the market and economic efficiency;*
- *performing mining activities and protecting the environment;*
- *attenuating social problems generated by the closing down of the non-economic mines and recovering the economy in the areas affected by this process: encouraging dialogue so that the employees could be informed about the situation and the perspectives of the mine they work in, consulting the personnel over the most appropriate forms of social protection which are going to be adopted, training employees so that they have better chances on the labour market, getting the dismissed employees involved in communitarian activities, etc.*

Being aware of the consequences such a reorganization process might have over the social economic development at a regional or national level, the Ministry of Commerce and Economy expressed its will, together with other competent institutions (the Ministry of Labour, Social Solidarity and Family, the Ministry of Public Finances and the National Agency for the Development and Implementation of the Mining Regions), to find and identify the solutions, taking the most appropriate steps in order to reduce the effect of the social consequences generated by the closing down of mines and financing the projects for social economic recovery of the affected areas (help was also required from some international financial organizations like the World bank, the European Council, B.E.I., etc.).

Due to its importance within the general economy, as well as to the complexity of this economic field and the effects it has over the national economy, numerous institutions and foreign and domestic organizations have been encouraged to make a successful reform for the Romanian mining sector.

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**THEORETICAL CONSIDERATIONS REGARDING THE  
METHODS OF ACCOUNTING PRODUCTION STOCKS IN  
THE COMPANIES BELONGING TO  
THE COAL MINING INDUSTRY IN ROMANIA**

**MARIANA MAN, SERGIU CALINCOVSCHII \***

**ABSTRACT:** *Generally, the stocks originating in the production process of the company are meant for sale. For this category of stocks the accounting circuit is strongly influenced by the moment or the moments chosen by each national accounting system in order to identify the incomes.*

**KEY WORDS:** *accounting standards, administration accounts, conversion table*

Generally, the stocks originating in the production process of the company are meant for sale.

For this category of stocks the accounting circuit is strongly influenced by the moment or the moments chosen by each national accounting system in order to identify the incomes.

Under these circumstances, accounting operates with two main conceptions, namely:

- the economic conception. According to this conception the incomes' identification should be done during the whole business cycle, that is production – delivery – payment;
- the juridical conception. . According to this conception the incomes' identification should be done during in the moment when the probability of obtaining them is at its most.

There are, at present, two moments of identifying incomes in Romania, namely:

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\* *Prof., Ph.D. at the University of Petrosani, Romania  
Ph.D. Student at the Mine University of Moscow, Russia*

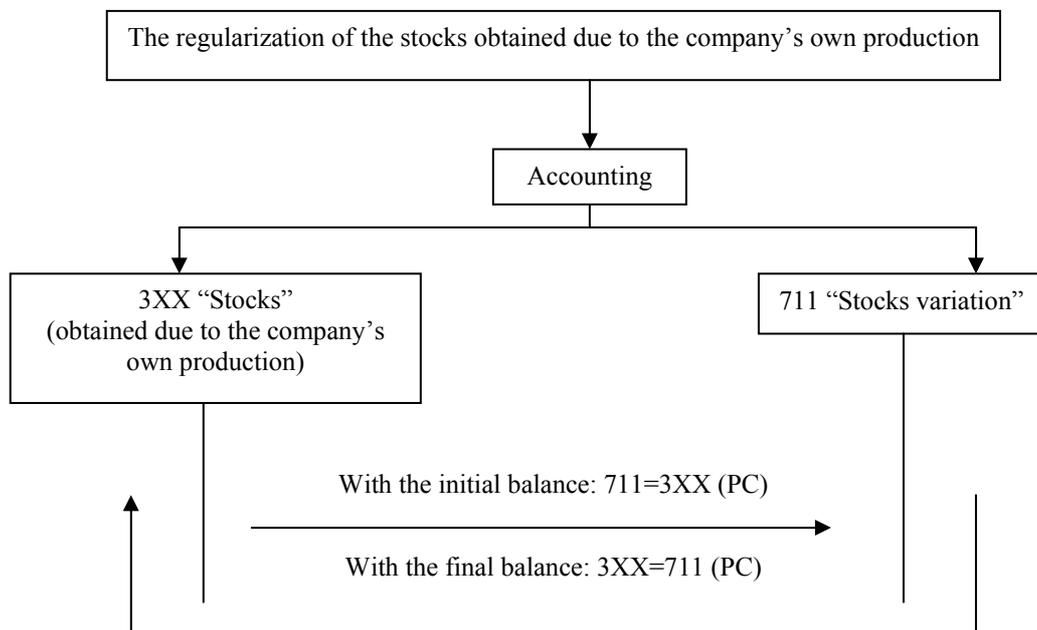


When we apply intermittent inventory to the stocks obtained due to the company's own production, we get the following procedure:

- the obtainment, that is the achievement of the production is not accounted;
- de-stocking, that is the re-stocking of the production is intermittently accounted, usually at the beginning and at the end of the financial exercise, based on fact inventories (as it is shown in figure 2.).

On principle, the stocks accounting may be both the object of financial accounting, when the adoption of permanent inventory is imposed, and of administration accounting, when it is easy to transfer the permanent inventory of the stocks in this latter accounting circuit, retaining only the intermittent inventory in financial accounting.

The Romanian accounting standards stipulate the obligation of accounting the stocks both from the point of view of their quantity and of their value, using permanent inventory or intermittent inventory. These standards do not precisely state the accounting circuit (financial accounting or administration accounting) where the stocks accounting based on a permanent inventory should be organized. The lack of stocks accounts within the structure of administration accounts (the 9<sup>th</sup> class) and their presence only in the structure of balance accounts (the 6<sup>th</sup> class) determined the practitioners to choose the organizing of permanent inventory in financial accounting.



**Figure 2.** The intermittent inventory of the stocks obtained due to the company's own production

A prospect location of the place of stock accounting in administration accounting would simplify the channels of accounting registrations in financial accounting and would bring nearer the stocks inventory to their scientific administration. The transfer of the permanent inventory of the stocks from financial accounting to administration accounting determines the establishment of a group of stock accounts within the structure of the 9<sup>th</sup> class, "Administration accounts". Such a group of accounts could be called: 94 "Stocks", and is detailed in operational accounts of the 1st and 2nd degrees correlated with the structure of the 3<sup>rd</sup> class, "Stock and production accounts in execution" of the financial accounting, according to a "conversion table" (table 1).

**Table 1. Table of symbolization's conversion of the stocks accounts from financial accounting in administration accounting**

Financial accounting			Stock and production accounts in execution (3 <sup>rd</sup> class – 94 group)	Administration accounting	
Group	Accounts			Accounts	
	Gr. I	Gr. II		Gr. I	Gr. II
30			Material stocks		
	301		Material	941	9410
	302		Material goods	942	9420
		3021	Auxiliary goods		9421
		3022	Fuels		9422
		3023	Materials foe packing		9423
		3024	Spare part		9424
		3025	Seed and materials for planting		9425
		3026	Fodders		9426
		3028	Another materials goods		9428
	303		Objects of inventory	940	9403
	308		Differences of price to materials	940	9408
33			Production in execution	943	
	331		Products in execution		9431
	332		Services in execution		9432
34			Products	944	
	341		Not finished products		9441
	345		Finished goods		9445
	346		Residual products		9446
	348		Differences of price to products		9448
35			Stocks detained by third parties	945	
	351		Materials detained by third parties		9451
	352		Objects of inventory detained by third parties		9452
	354		Products detained by third parties		9454
	356		Animals detained by third parties		9456

	357		Goods in consignment by third parties		9457
	358		Packing detained by third parties		9458
36			Animals	946	
	361		Animals and birds		9461
	368		Differences of prices on animals and birds		9468
37			Goods	947	
	371		Goods		9471
	378		Differences of price on goods		9478
38			Packing	948	
	381		Packing		9481
	388		Differences of price on packing		9488

When organizing the permanent inventory of the stocks in administration accounting, it is necessary to do a “conversion” of the stocks between the two accounting circuits, namely:

- at the beginning of the financial exercise. It is necessary to take over the stocks from financial accounting in the administration accounting. The next step is the accounting registration according to the following accounting formulae

1. In financial accounting:

a) For the stocks determined by supplying activities:

60XX “Raw materials, materials and goods”	=	%	X
		30X “Stocks of raw materials and materials”	X
		35X “Stocks detained by third parties”	X
		37X “Goods”	X
		38X “Packing”	X

b) For the stocks obtained due to the company’s own production:

711 “Stocks variation”	=	%	X
		33X “Production in progress”	X
		34X “Products”	X

2. In administration accounting:

a) Irrespective of the stocks’ origin, one may register:

94XX “Stocks”	=	901X “Internal discounts regarding stocks”	X
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- at the end of the financial exercise. It is necessary to take over the stocks from administration accounting in the financial accounting. The next step is the accounting registration according to the following accounting formulae:

1. In financial accounting:

a) Irrespective of the stocks origin, one may register:

901 “Internal discounts regarding stocks”	=	94XX “Stocks”	X
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2. In financial accounting:

a) For the stocks determined by supplying activities:

	%	=	60XX "Costs regarding stocks"	X
30X "Stocks of raw materials and materials"				X
35X "Stocks at third parties"				X
37X "Goods"				X
38X "Packing"				X

b) For the stocks obtained due to the company's own production:

	%	=	711 "Stocks variation"	X
33X "Production in progress"				X
34X "Products"				X

Because of these "conversion" registrations of the stocks the present economic content of the account 901, "Internal discounts regarding expenses" considerably enlarges becoming an account that displays not only the expenses but also the stocks. Consequently, an adequate determination of the content might be 901X, "Internal discounts regarding stocks". In order to correlate it, "X" may have the value "3", becoming 9013, "Internal discounts regarding stocks". As a result of conversion registration of stocks between the two accounting circuits, at the end of the financial exercise, the stock accounts of administration accounting are balanced.

The permanent inventory of the stocks in administration accounting allows, from this point of view, the registration of any accounting operation regarding the existence and the movement of stocks in one of the following groups of accounting registrations:

- the taking over of initial stocks from the financial accounting in the administration accounting;
- the inputs or the increases of stocks;
- the outputs or the movements of stocks;
- the taking over of final stocks from administration accounting in financial accounting.

The operations of stocks taking over (conversion) between the two accounting circuits are influenced by the stocks origin; the operations of in-coming and out-coming the stock are influenced by only one main factor, namely, the stocks destination for production and trade, as well as by a secondary factor, that is the registration price which can be effective or standard (previously calculated).

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## **TENDENCIES QUALITATIVE AND CHANGES IN THE AUTOMOTIVE INDUSTRY**

**SIMONA MANEA \***

**ABSTRACT:** *The late privatization of Dacia Company delayed the investments in the horizontal industry. Unlike the rest of the countries from Central and Eastern Europe, where car industry developed rapidly because of the investments made by big world producers, in our country this process is only at the beginning. A really new model of Dacia was produced in series only at the middle of this year.*

**KEY WORDS:** *automotive industry, foreign investments*

The late privatization of Dacia Company delayed the investments in the horizontal industry. Unlike the rest of the countries from Central and Eastern Europe, where car industry developed rapidly because of the investments made by big world producers, in our country this process is only at the beginning. A really new model of Dacia was produced in series only at the middle of this year, unlike Skoda, for example, which is already a new mark imposed on international markets.

New projects were started beginning with last year among them being the PSA Group in Slovakia and Renault in Russia. Also, the factories existing in Hungary, Audi and Suzuki will modernize and increase their production capacity. Foreign investments were mainly oriented to the countries that already joined the European Union. Poland, Hungary, Czech Republic, Slovakia and Slovenia are the countries where were built factories for assembling vehicles. A large part of these investments are green field and don't proceed from the privatization process.

The volume of foreign investments in Romania increased, especially in the last 4-5 years. The purpose of the foreign investors is to benefit from cheap working hand from Romania. The majority of the elements produced by the foreign companies in Romania remarks because of the high degree of labor included and a low degree of technicity.

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\* *Assist.Prof. at the University of Pitești, Romania*

For example, the Romanian factory largely produces cables for all types of vehicles produced in the European Union, or car upholstery. Making electric cables is a process that can not be automated their execution being made totally manual. In the last years, over 20 German, French, American and Japanese Companies invested 500 of euro in the planes of expending on the low costs markets.

According to the DVA report for 2003, the association of German car constructors, Eastern Europe is placed on the first place in a top of the main investments destinations made across the border by the German suppliers of car spare parts in the last 5 years. The main motives of placing or replacing production units in the countries of this region were the low operating prices, cheap working hand-qualified-, and also, geographical position.

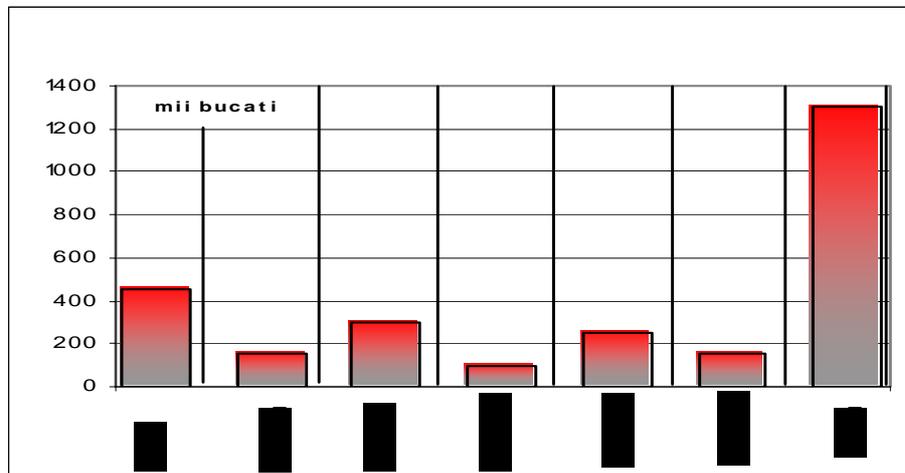
Also it is still very small in comparison with European Union, the car market of the Central Europe is very dynamic. Growing rhythm is very rapid, although the incomes of the population are very low. The approach of this market was first realized by Volkswagen that created the Skoda models sold in Western Europe. This model was adopted by Renault that created the Logan model especially for these markets.

Although the main investor is French, German companies dominate this field: Continental AG, Thyssen Krupp AG, BOS Automotive, Leoni AG and Lixa Draxlmaier already consolidating their position on our market. Rowel AG and Brandl GmbH prepare important investments. Among Japanese companies Sumimoto Electric Wiring Systems and Yazaki remark, they have already started electric equipments production.

With small exceptions, foreign producers of spare parts and components started work at Timisoara, Arad, Sibiu, Pitesti, Ploiesti. The American group Honeywell announced the intention to set up an engineering center at Bucharest. The center will supply industrial software solutions for the Honeywell divisions from Central and Eastern Europe. The American company is present on the local market with production capacities for subassemblies for car industry and also with sales activities.

Car vehicles from Central and Eastern Europe is one of the most dynamic in the world. This draw attention of the big producers, which moved a large part of their activities in these countries. Production is also growing, investments made in the last years concerning not only the local market, but also that from the euro zone. Competition unfolds, in the present, at the level of production costs, prices decrease representing one of the measures of sales increase (figure 1).

The attention given to the developing markets is proved by the launching of the models especially created for those with small incomes.



Source: Capital Magazine

**Figure 1.** Producers top from Eastern Europe (2004)

After the force regroupment that took place in the car field, a few concerns. One of the most heterogeneous is the one made of Renault, Nissan, Dacia and Samsung. Although the cultural differences from this nation are enormous, this group “started with the right foot” and functions better and better.

Renault increased slowly, but safely, while Nissan had a slow recovery after an important fall, and Dacia seems to have a starting point for a spectacular growth.

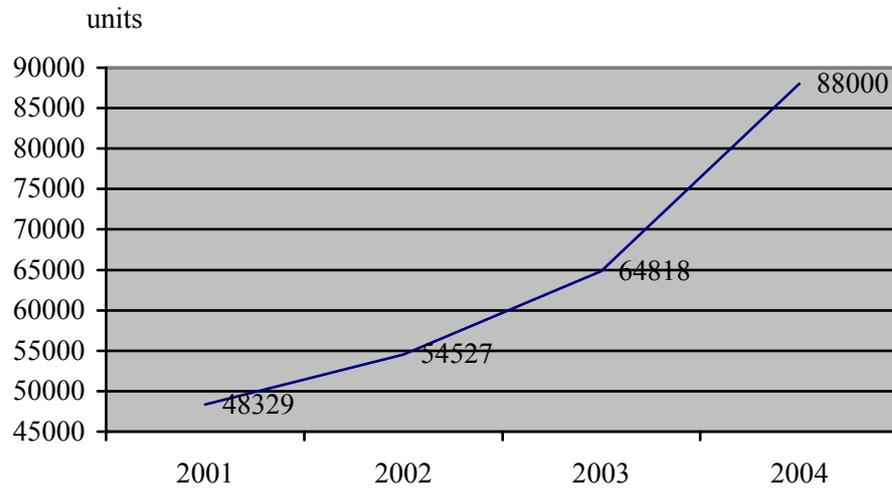
During the last decades of the last century, Romania gained a good experience in car production and sales. In this period a large group of designers in this field formed also a group of production specialists and a group of specialists in managing activity in car industry.

In the present, Romania combines institutional reforms and those connected with market formation. At the same time, because of a low income per inhabitant, Romania makes efforts to reduce the economic disparity that has in comparison with the European countries for joining European Union.

After the year 2004 in which the sales on the car market increased a lot and this tendency will maintain in the following year (figure 2, 3). Appreciation rhythm of the car market will be slower. If in the year 2004 car sales closes to 18.000 units, with 30% more than in previous year, for the year 2005 an increase of 15% is foreseen.

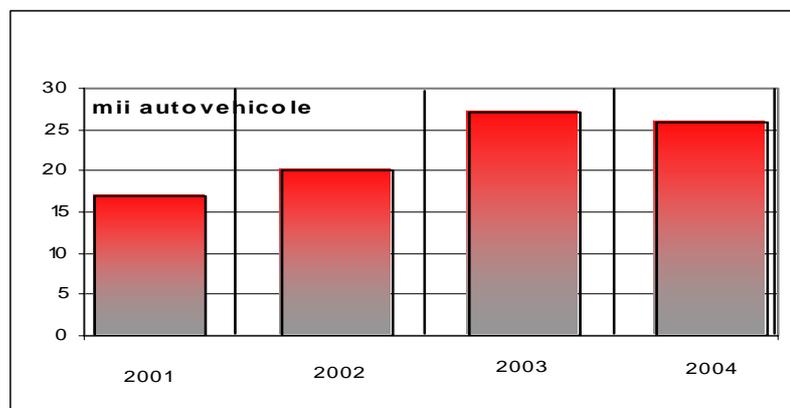
The numbers demonstrate that Romania needs not only local capital, but also it needs foreign investments. Of course, foreign investments in car industry in Romania have particular features, taking into account the rapid changes that take place in this field characterized by a callous competition.

Using only local sources of capital, car industry can't modernize and can't make important steps so that it can confront with other producers from the same field, so that attracting foreign capital is a necessity.



Source: *Statistic Annual of Romania, National Direction*

**Figure 2.** Car sales



Source: *Statistic Annual of Romania, National Direction*

**Figure 3.** Numbers from Daewoo Vehicles Romania

One can not say that the South-Korean investor from Craiova and the French one from Pitesti didn't make large investments, but bigger sums are needed.

A special attention should be given to the production of road vehicles "Aro" type. This factory will have to find a strategic foreign investor for modernizing production and fiability improvement of these vehicles, taking into account the demand from the international market.

The challenges and defiances of the present economic restructuration processes, and especially ones connected with industrial restructuration, divide on two dominant directions:

- rapid technologic mutations
- substance economic and geopolitical restructurations realized through competitiveness and global-monetary financial and speculative factors and, respectively, through controlled movements of capitals.

Each of these components and directions of the world evolutive processes change independently or by codetermination the national industrial and economic structures, efficiency and competitiveness conditions, interval and external positions of the states, national economies, industries, companies, socio-professional groups and individuals.

Given the profound structural changes that affect industry, the car builders renew not only the production organization methods, but also defined their position in the field of the world car industry strategy, in developing alliances with competitors, reorganizing international implantation. The notion of alliance stresses the horizontal character of the relations between companies and also the partnership developed at vertical level between suppliers and those that equip cars. The alliance correspond a collaboration associating competitor car builders but especially component producers. These alliances cover a vast variety of forms and objects. They can be only contractual, as supplying a competitor with its own components (motors, transmission shafts) or refers to commercializing models made by other producer.

In what concerns marketing, these agreements reflect in putting at the disposal of one partner a part of proper distribution network to sell models of the competitive mark. So, Japanese builders ensure marketing of a part of European cars sold in Japan, as a sale under their product mark built by a allied competitor. This frequent practice for the American and Japanese streng thens the reciprocity degree.

In what concerns production, the agreements establish the place of different versions (for example: Honda Concerto and Rover 200 in Europe) that admit a common activity in model conception. The integration degree of the common conception is variable, this activity having the possibility of being limited to a simple adaptation of a existing product or going up to fulfilling the whole project (for example: the monospacial Sevel Nord, co-factory Fiat and PSA), that points out a real association of two partners.

Although, even in this last case, a repartition of obligations tends to be achieved between partners. These associations overcome the simple frame of contractual agreement and lead to co-companies (factories). In the car industry this formula mainly exists in the developing countries, being limited to foreign investment the builders being forced to associate with a local partner (as in India or Turkey). This

method extended today among the main car companies, associating western producers, especially the American and the Japanese ones.

This extension of alliances explains itself through three categories of factors. In the first place, an alliance represents the way to achieve the competences of the partners. Co-factories from USA from the 1980 largely respond to the demand of the Americans to know the content of the Japanese models of financial administration, to learn from them. Reciprocally, the Japanese took opportunity to get familiar with the financial administration practices of the American industry, marketing methods, access to financial resources, relations with suppliers, etc.

This penetration way was equally a way to get access to the north-American sale market, without brutally diminishing the production capacity.

Because of new impulses, as the opening of the East-European markets, a single market in the Western Europe, the agreement regarding the appearance of the free-exchange area in North America, there became stronger the process of car production internationalization.

The rationalization of productive activities and also the development of the economies constitute the second fundament of the agreements between car builders. The argument becomes stronger as the horizontal segmentation (countries) and the vertical one (types of products) diminish the costs of an isolated construction. It, thus explains the largest part of the associations made in certain peripheral regions, as small volume segments: monospace (Ford – VW in Europe, Ford – Nissan in USA). In the case of a new segment of the expansion market, the alliance allows a distribution of the non-covering initial the financial engagements risk.

Sharing inherent risks for a not-recovered investment constitutes the third important factor of these alliances. The uncertainty can be economical nature, of financial nature (uncertainty of changes and hyperinflation from Latin America, for example), but especially of technical nature. The split of the investments made in research – development and the risk of non-profitableness is the argument that justifies the considerable upsurge of the associations in this field C&D named precompetitive, meaning in the van of the product industrialization phases.

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## **ASPECTS CONCERNING ROMANIAN'S ECONOMIC STRATEGY IN THE PROSPECT OF THE FUTURE UE INTEGRATION**

**VASILE POPEANGĂ, TEODORA VĂTUIU \***

**ABSTRACT:** *Since the creation of the European Union its purpose has been to unite the European continent into one cohesive organization. In order for this goal to be fully realized all European nations must be included under this conglomeration of states. Unfortunately the process is not quite so simple. It takes years of careful evaluation of numerous factors most importantly including economic status, respect for international law and basic human rights, and military status amongst other numerous yet equally important facts. Before a state can be admitted it must first be determined that by admitting the state that it will have a generally good affect on the community as a whole and not simply benefit any single nation.*

**KEY WORDS:** *European Union, economic strategy*

### **1. RELATIONS OF ROMANIA WITH EU**

Romania is the first country of Central and Eastern Europe to have official relations with the European Community: An agreement including Romania in the community's Generalized System of Preferences in 1974 and an Agreement on Industrial Products in 1980 are signed.

Romania's diplomatic relations with the European Union date from 1990. Following Romania's return to democracy, a Trade and Co-operation Agreement is signed 1991. The Europe Agreement enters into force on February 1, 1995, trade provisions having entered into force in 1993 through an "Interim Agreement". Romania submits its application for EU membership on June 22, 1995.

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\* *Prof., Ph.D. at the "Constantin Brâncuși" University of Tg-Jiu, Romania  
Assoc. Lecturer at the "Constantin Brâncuși" University of Tg-Jiu, Romania*

In July 1997, the Commission publishes an "Opinion on Romania's Application for Membership of the European Union". In the following year, a Regular Report on Romania's Progress Towards Accession" is produced. In its second "Regular Report" on Romania published in October 1999, the Commission recommends starting the accession negotiations with Romania conditional, among others, on the improvement of the situation of children in institutional care and the drafting of a medium-term economic strategy.

Following the European Council's decision in December 1999's Helsinki summit, EU accession negotiations are started with Romania on February 15, 2000 (negotiations are also started with Malta, Slovakia, Latvia, Lithuania and Bulgaria). At the end of 2001, accession negotiations on nine (Company law (5), Fisheries (8), Statistics (12), SMEs (16), Science and research (17), Education and training (18), Consumers and health protection (23), External relations (26) and CFSP (27)) of the 31 *acquis* chapters are already provisionally closed; negotiations on eight of them are being processed .

The defining elements of the negotiating strategy for the year 2001 consisted in the quantitative approach of this process being concentrated on the analysis of the whole communitarian *acquis*, as well as on the mainly internal orientation towards the development of the negotiation among the institutions from the National Deputation and towards consultations with the social partners, political parties and the parliamentary commissions. Romania also added other dimensions to the process of elaboration of the documents for the negotiations that is an ample process of technical consultations with the European Commission with the member states and with the negotiating teams of the nominee states.

The new strategically and institutional approach allowed substantial step forward in the preparation of the negotiating process. Thus, in 2001 Romania officially elaborated and sent a number of 31 documents position (17 documents of position, 8 documents of complementary position, 4 documents of revised position and 2 documents referring to the *acquis* on 2000). Until the end of the year 2001 the documents of position for all the 29 chapters of negotiating were officially communicated to the European Union.

During the Swedish and Belgian presidency (at the intergovernmental conference of Adhesion Romania-EU from March, June, July, October, November and December), The negotiations for 8 chapters were opened (chapter 4-The free circulation of the capital, chapter 5-the right of commercial society, chapter 8-Fishing, chapter 9-politics in the field of transports, chapter 10-Taxing, chapter 13-The region politics and the working force, chapter 23-Customer and health protection, chapter 25-Customs Union) and the negotiations for three chapters were closed for the time being (chapter 9-Fishing, chapter 23-Customer and health protection, chapter 5-The right of commercial society). Thus till the end of 2001, Romania started the negotiations for 17 chapters, 9 of which were closed for the time being.

For the year 2002, the main objective of negotiations was the beginning of all the negotiations chapters, closing for the time being of as many chapters of

negotiations as possible based on step forward of the preparations for adhesion as well as the accomplishment of the commitments taken through negotiations. In 2002, the national deputation for the Negotiation of Romania's Adhesion to EU continued the speeding up of preparing the negotiations in accordance to the strategy of extension elaborated by the European Commission in November 2001 and with the decisions of the European Council from Laken for the radical advancement of the adhesion negotiations through the opening of all the chapters in 2002.

The strengthening of administrative capacity of Romania was the first priority based on the plans of action for administrative capacity and Phare approved by the European Commission and presented to the member states.

Consequently, 13 chapters of negotiations (1-The free circulation of goods, 2-The free circulation of people 3-The free circulation of services 7-Agriculture, 11-UEM, 14-Energy, 15-Industry of policy, 21-Regional policy, 22-The environmental protection, 24-Justice and internal affaires, 28-Financial audit, 29-Foresights for budget, 30-Institutions) were opened during the Conference of Intergovernmental Adhesion from March, April, June, July, October, November and December 2002 and 11-UEM, 13-Social Policy, 15-Industrial Policy, 19-Telecommunications and information technology, 20-Culture and Policy in the field of Media, 25-Customs Union and 30-Institutions were closed for the time being.

In 2003, chapter 4-The free circulation of capital was closed for the time being during the Conference of Intergovernmental Adhesion from April. In June they were also closed for the time being chapter 1-The free circulation of goods and chapter 10-Taxes. In 2003, also chapters 2-The free circulation of people respective, 9-The policy in Romania-EU at a ministry level which took place in Bruxelles, Tuesday, 9<sup>th</sup> December and it was also confirmed the closing of 28 chapters-Financial audit.

During the Irish presidency at the Conference of Adhesion Romania-EU from 4<sup>th</sup> of June 2004 were closed for the time being chapter 7-Agriculture and chapter 29-Foresights for budget. The chapter of negotiation 14-Energic was closed for the time being during the Conference of Adhesion Romania-EU which took place in Bruxelles Wednesday 30<sup>th</sup> June 2004. Romania ended the negotiations for the chapters 3-The free circulation of services and 21-Regional policy and coordination of structural instruments during the Conference of Adhesion Romania-EU which took place in Bruxelles on Wednesday 23<sup>th</sup> September 2004.

Romania closed for the time being the chapters 22-the environmental protection and 31-Varried Items at The Conference of Adhesion from 26<sup>th</sup> November 2004. Romania ended the negotiations of adhesion through the closing of the last two chapters of negotiations: 6-Competition and 24-Justiceand internal affaires. The closing of these 2 chapters took place during the Conference of Adhesion Romania-EU which took place in Bruxelles in the evening of 8<sup>th</sup> December 2004. Thus, now, Romania closed for the time being all the chapters of negotiation. Romania's aim is to gain EU membership in 2007.

## 2. STAGES OF NEGOTIATIONS

In its 1997 Opinion, the Commission concluded that Romania fulfilled the political criteria. Since then the country has made progress in consolidating and deepening the stability of its institutions guaranteeing democracy, the rule of law, human rights and respect for and protection of minorities. This has been confirmed over the past year. Romania continues to fulfil the Copenhagen political criteria.

The launch of a major programmed of administrative reform is an important development and ensuring the successful implementation of these reforms should be considered as a priority. Significant progress was also made with the decision to demilitarize the police. This will increase the public accountability of police officers - although further actions are needed to ensure the proportionality of their actions. New institutional structures have been created for fighting corruption, which remains a cause for very serious concern, but they have yet to have an impact. Romania still needs to improve the decision making and legislative processes. In particular, the Government's reliance on emergency ordinances should be reduced and parliament's ability to scrutinize legislation increased. Reform of the judiciary has been limited. A lack of resources means that the judicial system is severely strained and the executive's involvement in judicial affairs has not been reduced in practice. In order to address these issues, judicial reform should be made a political priority and a comprehensive strategy to improve the functioning of the judicial system should be drawn up.

Romania continues to respect human rights and freedoms. It has made significant progress with child protection, reducing the number of children in residential care and improving actual living conditions. Progress has also been made in promoting equal opportunities between men and women, with developing structures to reduce trafficking in human beings and with setting up the institutional framework to fight discrimination. The development of a probation system has continued although prison conditions remain extremely poor. Additional steps need to be taken to strengthen safeguards for freedom of expression.

Positive developments took place with regard to the treatment of minorities. Legislation extending the official use of minority languages was implemented relatively smoothly. Important steps were taken to implement the National Strategy for Improving the Condition of Roma, with the aim of effectively combating discrimination and improving living conditions, although additional financial resources will be necessary to make further progress.

Romania has continued to make progress towards being a functioning market economy, for which the prospects have improved. Sustained and full implementation of planned measures together with the completion of the reform agenda should allow Romania to be able to cope with competitive pressure and market forces within the Union in the medium term. Some significant gains on macroeconomic stabilization have been achieved over the last years. A more appropriate policy-mix is decreasing inflation, while growth has resumed and the external position remains sustainable. Considerable progress has been made on the creation of the necessary market

institutions. The ongoing overhaul of the banking sector, the successive improvements in the supervisory and regulatory framework for the financial markets and the advances in privatization have progressively tightened enterprises financial discipline. Price and trade liberalization coupled, over the last year, with a significant adjustment of energy tariffs and important reforms of the tax system have set the stage for a more efficient allocation of resources. Restructuring is advancing in a number of sectors.

To build upon this progress, the authorities should give priority to establishing a track record on macroeconomic stabilization grounded on further disinflation, by maintaining an appropriate policy mix and underpinning it with the enforcement of enterprises financial discipline. Commitments to restrict the total wage bill in the public sector should be respected. The recent sharp growth in money supply and credit requires careful monitoring and a readiness to take prompt actions. Establishing enterprise financial discipline requires improved tax administration and compliance, a consistent and transparent implementation of the latest measures to reduce the arrears of energy users, a determined and transparent use of the recently approved legal provisions for accelerating privatization, and a readiness to liquidate loss-making enterprises. Completing privatization in the banking sector, continuing the reform of public expenditures and budgetary procedures, and ensuring the implementation of improved regulatory and legal frameworks would also support the establishment of a functioning market economy and the development of Romania's capacity to cope with competitive pressure and market forces within the Union.

Since the 1997 opinion, Romania has made steady progress with the adoption of the *acquis*. However, in many areas, there has been an increasing gap between progress in legal transposition and the limited ability of the Romanian administration to implement and enforce the newly adopted legislation.

Over the last year, Romania has accelerated the process of legislative transposition and has continued work, albeit at a slower pace, on developing the administrative structures required by the *acquis*. Overall, and in view of Romania's target date for accession, Romania's progress has been reasonable and national legislation has been aligned with the *acquis* in many areas. Administrative capacity building will require a comprehensive, structural reform of both the public administration and the judicial system.

In the area of the internal market, framework legislation on the New and Global Approach has allowed accelerated alignment with the sector-specific *acquis* on *free movement of goods*. Considerable progress has also been made in the establishment of bodies to administer the *acquis*. Further efforts should concentrate on improving standardization and certification, on reinforcing market surveillance systems, on re-structuring the food control system, and on effectively implementing public procurement legislation. The foundations for future progress with the *free movement of persons* have been laid, although further transposition is necessary to address shortcomings in the area of mutual recognition and administrative capacity should be strengthened in all areas. Considerable efforts have been made to facilitate the *free movement of services*, although the newly developed institutional framework

for supervising financial services still needs to be supported. Liberalization has continued in the area of *free movement of capital* and

Romania is committed to a timetable for dismantling exchange controls and other restrictions on capital movements. Further efforts are particularly needed to revise the legal framework in the area of money laundering. Romania has aligned with most of the *acquis* on *company law*; although the level of piracy and counterfeiting remains a serious problem and enforcement should be improved. In the area of *competition policy*, some progress has been made with the transposition of the *acquis*, mainly in the field of anti-trust, but Romania's enforcement record in respect of both state aid and anti-trust needs to be improved. The restructuring of the steel sector will need to be closely monitored. Romania has made steady progress towards alignment with the *taxation acquis* although further adjustments are needed and the ability to implement and enforce tax legislation remains limited. Despite a high level of harmonization with the *customs acquis*, further legislative alignment is needed, as are efforts to reduce levels of corruption within the customs administration. Work should continue on developing IT systems to allow the exchange of computerized data between Romania and the EC. In order to develop a successful *industrial policy* and to promote *SME* development further efforts are needed to simplify and stabilize the business environment.

Alignment with the *acquis* on *agricultural policy* has accelerated, although legislative developments have not yet been matched by the development of administrative structures able to effectively implement the *acquis*. Structural reforms have only been slowly introduced. Inspection arrangements should be improved in the phytosanitary sector and, even more urgently, in the veterinary sector. In the area of *fisheries*, Romania has adopted the necessary framework legislation, although there have been delays in the establishment of the required administrative structures.

On *social policy and employment*, some progress has been made but considerable further work remains on legal transposition in the areas of labour law, equal opportunities, and health and safety at work. Progress with *regional policy* has been slower and Romania does not yet have a clear and consolidated cohesion policy. Work has begun on developing administrative capacity, but continued efforts are needed to design management and implementation systems. Romania's progress in the *transport* sector has been mixed: good with regard to road and railway transport, reasonable in the area of aviation, but only limited in the case of maritime safety. The key issues facing Romania are developing institutions able to enforce recently adopted legislation and securing the funding to make the heavy investments required by the *acquis*. Despite progress in terms of legislative alignment, many structural issues still have to be addressed in the *energy* sector and new operating structures need to be consolidated. Despite having transposed a considerable amount of *environmental* legislation, Romania has neither the administrative nor the financial resources to implement it. Future efforts should focus less on legislative alignment and more on developing implementation capacities as well as securing resources for environmental investments. Alignment with the *consumer protection acquis* has continued and

implementation structures are in place - although inter-institutional co-operation should be improved.

Steady progress has been made with aligning with the *telecoms acquis* and progress has been made with preparing for the liberalization of the communications and postal markets. Future efforts should focus on developing the newly established regulatory administration into a truly efficient and independent body, and on the evaluation of the economic implications of full implementation of the universal service *acquis*.

Romania has started to make structural reforms in the area of *justice and home affairs*, although a considerable amount of work remains to be done on legal approximation and above all on strengthening administrative and judicial capacity. Despite recent reforms, including the adoption of a Schengen Action Plan, the efficiency of all police forces is limited and border infrastructure and management need to be improved. Major efforts are required to increase the efficiency of the judiciary.

In the area of *external relations*, trade barriers have been progressively eliminated, and Romania has achieved a generally high level of alignment with the *acquis*.

Progress has been made with regard to *financial control* and modern systems of financial management and control are being introduced. Further work is necessary to protect the Communities financial interests, administrative capacity needs to be strengthened with regard to public internal financial control, and the independence of the Court of Audit should be guaranteed.

The overall *capacity of the public administration* to implement the *acquis* remains limited and represents a major constraint on Romania's accession preparations. While certain parts of the administration are able to function effectively there are many important sectors where the weakness of the administration is a serious cause for concern. These concerns extend beyond adoption of the *acquis* and also apply to the management of EC financial assistance. This issue is beginning to be addressed by the Government which has announced a major reform programmed. However, these reforms are only at the design stage and still need to be carried out.

In the accession negotiations, 13 chapters have been provisionally closed. The commitments made in the negotiations are with a view to accession in 2007 and are generally being met.

*Macroeconomic stability* has improved noticeably in Romania although progress with the *implementation of structural reforms* has been slow. The *privatization process* has continued, but only slowly, and the Government has not been able to meet its own privatization programmed. A variety of measures have been taken to *stimulate domestic and foreign investment*, but although Romania witnessed a steady growth in both domestic and foreign investments, overall levels of investment remain low. Despite a number of high-profile initiatives, actual progress in *simplifying legal and administrative procedures* has been limited and the *rules governing privatization and business operation* still suffer from instability and a lack of transparency. New

*bankruptcy procedures* were introduced in 2002 but it is not yet possible to assess if the new legislation is being effectively implemented. A revised *plan for restructuring the steel sector* has been produced and progress has been made with the implementation of restructuring measures. Romania is in the process of developing *individual viability plans* for steel enterprises. *Restructuring of the national air carrier* has continued and a cost reduction programmed has led to a significant *reduction in losses* € although additional reforms will be needed to reach a financial equilibrium. The *land market* in Romania is progressing, although the market in land sale lags behind the rental market.

Efforts have been taken to develop a *policy for agricultural land consolidation*, and progress with the *issuance of land titles* is continuing, albeit more slowly than. Romania has not yet developed a *policy framework for rural credit and rural financial infrastructure compatible with IFI and EC financial support*. In line with the provisions set out in the Action Plan, Romania has taken a number of initiatives to 135 support SMEs € notably through the implementation of an Action Plan for the Removal of the Administrative Barriers from the Business Environment. Despite these efforts, the overall *economic, legal and administrative environment* remains difficult. New legislation has attempted to *simplify the registration for new companies* but there has been no substantial progress with the *simplification of enterprise licensing*.

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## INFORMATION APPLICATION FOR MULTICRITERIAL OPTIMUM

MIRCEA PREDA \*

**ABSTRACT:** *The management activity does not only include the techniques and methods of programming, organizing and allocation of resources, starting and control of operations, interventions but it also implies a great number of decisions regarding the launching, carrying on, modifying and carrying out of activities or choosing one of the possible variants so as to ensure that the goals should be reached.*

*The activity of choosing one variant from several possible ones is often met with in maintenance management, such as: the selection of an optimum equipment, the choice of a firm for after/sale service, for supplying materials or spare parts which implies taking into account a large number of factors.*

*The choice based on fundamental mathematic methods becomes feasible by using the current automatic data processing devices and this paper presents the "Xomc" application of establishing the multicriterial optimum.*

**KEY WORDS:** *maintenance management, multicriterial optimum, fundamental mathematic methods*

### 1. MATHEMATICAL MODEL FOR THE MULTICRITERIAL OPTIMUM

Let  $S = \{S_i / i = 1 \dots k\}$  be the set of possible solutions or propositions within the framework of market economy. The choice of the optimum solutions from the S set should take into account the endogenous and exogenous factors in relation with the activity of the modeled body, also the financial, human organizational, technical, conjectural, informational and management factor, enough reasons for this solution to be optimal.

Because of these considerations, in practice we use mathematic methods which enable us to choose the optimal variant from several possible variants on the basis of the criteria defined by the beneficiary.

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\* *Lecturer, Ph.D. at the University of Petroșani, Romania*

The mathematic model uses the following stages in choosing the optimum:

- defining the criteria for particularizing solutions;
- determining the criteria weight;
- drawing up the variant table;
- normalizing and weighting variants;
- establishing the optimum.

### 1.1. Defining the criteria and the weight function

We define the criteria to be taken into account in choosing the solution and in establishing the weight of the each criterion at this stage.

The criteria will be established function of the body type and the nature of its activity, volume, frequency and other economic, technical, differentiations of solutions S;

In defining criteria, the following features will be taken into account:

- criterion code;
- criterion designation or the solution characteristic;
- type of optimum pursued (MIN, MAX, UTI);
- unit of expressing the criterion.

Let  $C = \{C_1, \dots, C_n\}$  be the set of criteria underlying the estimate of solution S and  $X = \{0, 1, 2\}$  the set of values where the function, the weight of criteria is thus defined:  
 $p: C \times C \rightarrow X$

$$p(c_i, c_j) = x_{ij} = \begin{cases} 2 & \text{if } c_i > c_j \\ 1 & \text{if } c_i = c_j \\ 0 & \text{if } c_i < c_j \end{cases} \quad (1)$$

where the relation between the criteria is given by the importance of criterion  $C_i$  in relation with  $C_j$  for any  $i \neq j$ . The criterion importance is established by the beneficiary.

The following function properties result from the definition:

$$x_{ij} + x_{ji} = 2 \text{ for any } i \neq j \quad (2)$$

$$x_{ij} = 2 \text{ implies } x_{ji} = 0 \quad (3)$$

$$x_{ij} = 1 \text{ implies } x_{ji} = 1 \quad (4)$$

$$x_{ij} = 0 \text{ implies } x_{ji} = 2 \quad (5)$$

In accordance with the list of criteria established and the rules stated we proceed to determine the weight of each criterion function of the others, but in order to do it, the criteria table is drawn up, its structure being given in Tab.1.

**Table 1. Table of criteria weight**

CxC	c <sub>1</sub>	...	c <sub>j</sub>	...	c <sub>n</sub>	$p_i = \sum_{j=1}^n x_{ij}$
c <sub>1</sub>	x <sub>11</sub>	...	x <sub>1j</sub>	...	x <sub>1n</sub>	p <sub>1</sub>
...	...	...	...	...	...	...
c <sub>i</sub>	x <sub>i1</sub>	...	x <sub>ij</sub>	...	x <sub>in</sub>	p <sub>i</sub>
...	...	...	...	...	...	...
c <sub>n</sub>	x <sub>n1</sub>	...	x <sub>nj</sub>	...	x <sub>nn</sub>	p <sub>n</sub>

The values  $p_1, p_2... p_n$  which establish the criterion weight on the whole, will be used in assessing the variants and they are show to check the relation:

$$\sum_{i=1}^n p_i = n(n-1) \tag{6}$$

**1.2. Drawing up the table with variants**

As soon as the criteria have been established and the variants have been collected of defined for appraisal, the normalization is made depending on the position of the current value, the type of optimum specific to the criterion and the real values  $Q_{max}$  and  $Q_{min}$  specific to the criterion, according to the normalization function  $f(x)$  defined below :  $f : [Q_{min}, Q_{max}] \rightarrow [0, 1]$  thus defined

$$f(Q_{ij}) = \frac{Q_{ij} - Q_{min}}{Q_{max} - Q_{min}} = \eta_{ij} \tag{7}$$

The function  $f(x)$  is defined for the MAX criterion and if it is of MIN then a summarizing table is drawn up, according to the model in Tab.2 where you can simultaneously find criteria and solutions with the real values of the attributes  $Q_{ij}$  which are positive real values established with a view to normalization.

**Table 2. Combine criterion and solution table**

Criteria		TypOptim	UM	Set of solutions			
Cod	Name			S <sub>1</sub>	S <sub>2</sub>	...	S <sub>k</sub>
c <sub>1</sub>		MAX		Q <sub>11</sub>	Q <sub>12</sub>	...	Q <sub>1k</sub>
c <sub>2</sub>		MIN		Q <sub>21</sub>	Q <sub>22</sub>	...	Q <sub>2k</sub>
...		...		...	...	...	...
c <sub>n</sub>		UTI		Q <sub>n1</sub>	Q <sub>n2</sub>	...	Q <sub>nk</sub>

**1.3. Normalization and weighting of  $S_i$  solutions**

In order to be able to compare the variants subject to evaluation, they will be normalized, that is, they will be brought to a value between 0 and 1 in accordance to the type of optimum specific to the criterion so as to enable us to compare them.

$$f(Q_{ij}) = \frac{Q_{\max} - Q_{ij}}{Q_{\max} - Q_{\min}} = 1 - \eta_{ij} \tag{8}$$

In order to accomplish the normalization and weighting operation Tab.3 is drawn up, it will contain the weight factor of each criterion  $p_i$ , for each solution  $S_i$  the normalized value for each criterion  $\eta_{ij}$  completed according to the rules established above, according to which the weighted value of the criterion  $\pi_{ij}$  is calculated by multiplying the criterion weight by the normalized value of the variant, that is:

$$\pi_{ij} = p_i \cdot \eta_{ij} \tag{9}$$

**Table 3. Table of the normalized and weighted values of the solutions  $S_i$**

Criteria				Normalized values of $S_i$			Weighted values of $S_i$			
Cod	TypeC	UM	$p_i$	$S_1$	...	$S_k$	$S_1$	$S_2$	...	$S_k$
$c_1$	MAX		$p_1$	$\eta_{11}$	...	$\eta_{1k}$	$\pi_{11}$	$\pi_{12}$	...	$\pi_{1k}$
...	...	...	...	...	...	...	...	...	...	...
$c_i$	MIN		$p_i$	$\eta_{i1}$	...	$\eta_{ik}$	$\pi_{i1}$	$\pi_{i2}$	...	$\pi_{ik}$
...	...	...	...	...	...	...	...	...	...	...
$c_n$			$p_n$	$\eta_{n1}$	...	$\eta_{nk}$	$\pi_{n1}$	$\pi_{n2}$	...	$\pi_{nk}$
Summary							$\Pi_1 = \sum_{i=1}^n \pi_{i1}$	$\Pi_2 = \sum_{i=1}^n \pi_{i2}$		$\Pi_k = \sum_{i=1}^n \pi_{ik}$

**1.4. The choice of the optimal variant**

As soon as the Tab.3 has been drawn up, we can proceed to establish the number of points accumulated by each variant by adding up the weighted values. The number of points obtained  $\Pi_k$  by each solution is found by adding up the afferent normalized values

$$\Pi_k = \sum_{i=1}^n \pi_{ik} \tag{10}$$

The optimal variant is the one that accumulates the maximum number of points, that is

$$S_{optim} = MAX (\Pi_j | j = 1 : k) \quad (11)$$

The optimal solution or a classification of the solutions can be offered, resulting from arranging the values  $\Pi_j$  in a decreasing order.

Although the assessment method seems to be able simple also a large amount of work is required in making the calculations which makes it less attractive, although its efficiency would be evident from the savings generated through the choice of the optimum solution. This led to the working-out of an information application for solving this kind of problems.

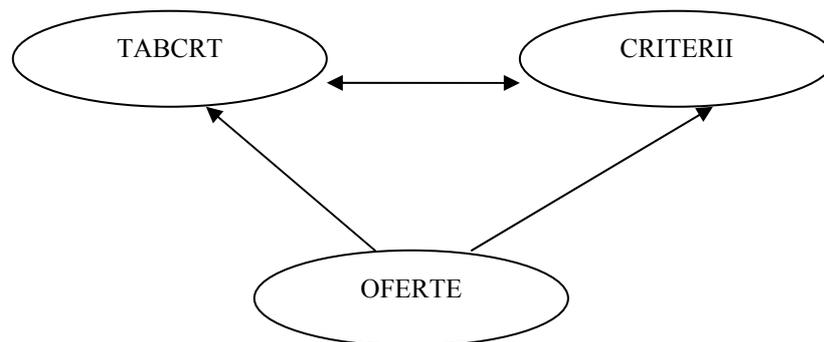
## 2. DESCRIBING THE INFORMATION SOLUTION

In carrying out the computer science application the object was to observe the mathematic model presented and to offer the user some facilities referring to the reuse of certain criteria from one stage to another. The technical solution is based on knowledge structured in the data base and procedure well suited to such problems and it gives the user the possibility to define new criteria, sub criteria and solutions while the applications is to determine the optimum solutions and to display the classifications of solutions.

### 2.1. The Structuring of information in the Data Base

With the view of solving the problem of multicriterial optimum from the facts presented in *Chapter1*, the following categories of main information stored in the data bases mentioned below are necessary: the available criteria stored in *TABCRT*; the afferent sub criteria storied in *CRITERII*;the solutions afferent to a criterion stored in *OFERTE*, whose structured is given below.

The relation between the data bases being the following:



**Figure 1.** The relation between the data basses

Besides the permanent bases, there is a category of temporary data bases used in the processing process but there are not described here because of lack of space.

#### L1STRDBF – The structure of the bases utilized

Cn	Symbol	Type	Size	Decimals	Field significance
Base designation: 1. TABCRT.DBF					
1.	Code code	N	3	0	optimum establishing criterion
2.	Designation	C	40		optimum Critérium designation
3.	Date	D	8		date of criterion modification
Base designation: 2 CRITERII.DBF					
1.	Code	N	3	0	criterion code
2.	CN	N	2	0	consecutive number in criterion
3.	Designation	C	40		sub criterion designation
4.	Optimum criterion	C	3		optimum type specific to the
5.	UM	C	10		specific unit of measure
6.	TIPUM measure	C	1		type of specific unit of
7.	DATE	D	8		date of modifying the criterion
Base designation:3 OFERTE					
1.	CODC	N	3	0	criterion code
2.	CODO criterion	N	3	0	proposition code for the
3.	NRC number	N	2	0	sub criterion consecutive
4.	Value propositions	N	12	0	criterion value in the

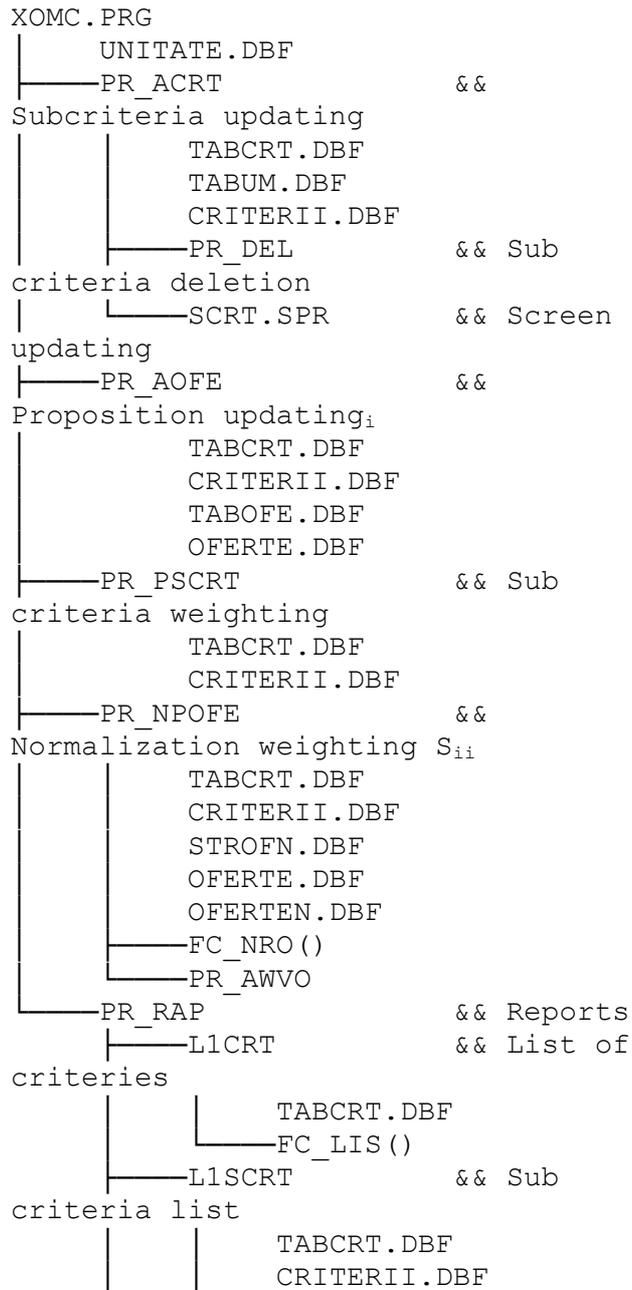
### 2.2. The function and the application structure

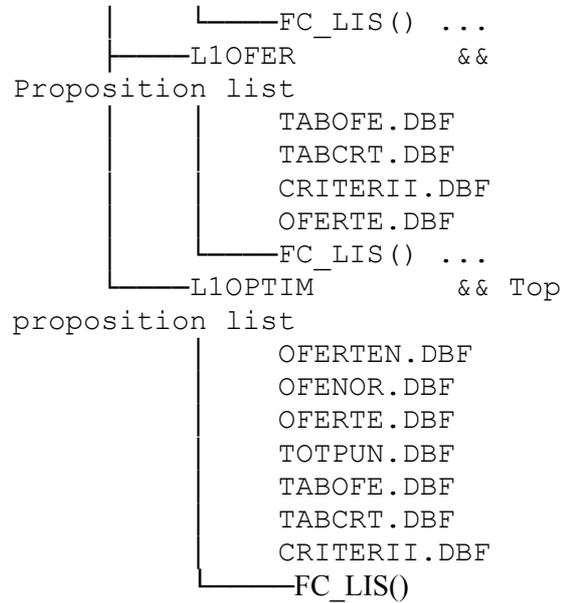
In order to solve the problem of multicriterial optimum on the bases of the data defined in 2.1. and of the method defined in 1, the application has been established to fulfill the following functions which try to observe the stages of the defined model:

- Sub criteria and criteria updating
- Proposition updating;
- Sub criteria weighting;
- Solution normalization and weighting;
- Reports
- Ending

In order to fulfill these functions, several procedures and functions have been conceived and assembled in the application **Xomc-** Multicriterial optimum whose structure is given below:

System: Multicriterial Optimum  
 Author: Preda Mircea 04/03/2005  
 22:55:28  
 Tree Diagram





The image of the main menu and that of the reports is shown below.



Figure 2. Main menu

```

Program XOMC.PRG
set talk off
set date to dmy
set century on
set safety off
set proc to e:\disk_e\sl\foxfnc
clear
  
```

```

ON KEY
sele 0
    use unitate
    go top

wautor='> P & M <'
wlopt=''
wlopt=wlopt+'\<1.Actualizare Criterii ;'
wlopt=wlopt+'\<2.Actualizare Oferte ;'
wlopt=wlopt+'\<3.Ponderare subcriterii ;'
wlopt=wlopt+'\<4.Normalizare+Ponderape ;'
wlopt=wlopt+'\

```

The presentation of all information's components would take too much space and they can be requested from the author for a more thorough analysis of the technical solutions adopted or for applications.

### 3. CONCLUSIONS

The information application **Xomc.app** can be successfully used in solving management problem's , which imply the choice of a solution from several possible ones using multicriterial optimum methods frequently met with in decision making processes.

The consistent use of the application leads to improvement of the decision-making process through the use of scientific solutions to the constant upgrading of the sub criterion set to shortening the time for preparing the decision making act; with positive economic effects for the activity or for the unit concerned.

It can also be useful for teaching students by presenting the mathematic method, the use of the application for checking the solutions given by other methods or even in solving various problems during the seminars. The application can be integrated in the information system of a business unit with minimum effort.

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## **MAIN CHARACTERISTICS OF REGIONAL DEVELOPMENT IN SOME COUNTRIES FROM EUROPEAN UNION**

**ILIE RĂSCOLEAN, GABRIELA SLUSARIUC \***

**ABSTRACT:** *European Union countries has performing economies, however this countries have relative disparities, to the viability of the economic structure and labour utilization, between these countries but even inside.*

**KEY WORDS:** *regional development, labour, European Union countries, disparities, technologic inovation.*

European Union countries has performing economies, however this countries have relative disparities, to the viability of the economic structure and labour utilization, between this countries but even inside. In each of the state from the European Union appear some of the problems about territorial structure of economy, and this problem must be solving on the medium term. Like a necessity and a recognizing of the regional problems of the most European Union countries, European Economic Community has found European Funds of Regional Development and the Regional Polices Committee.

Regional problems, respectively intraregional and interregional disparities in level of economic development of the country from EU, have appeared as a result of an inhomogeneous geographic development. Diversities of the economic and geographic conditions from the country of European community had generated problems in regional development, this outlining in some type of inequalities: geographic and demografic differences, differences in employment, economic differences. On the base of this relevant differences and unequallites, at the EU exists four groups of countries:

1. Northern and continental countries (Belgium, Austria, Denmark, Holand, France, Great Britain, Luxemburg)
2. Northern countries (Sweden and Finland)

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\* *Assoc.Prof., Ph.D. at the University of Petroșani, Romania*  
*Assist.Prof., Ph.D. at the University of Petroșani, Romania*

3. Countries with dual economy (Germany and Italy)
4. Less developed countries (Greece, Ireland, Portugal, Spain)

Northern and continental countries has a major common problem – industrial restructuring with its instant effect, rising unemployment. Their concern is reducing the unemployment, developing the labour market and the technological market. The second categories of states are the nordic countries respectively Sweden and Finland. Their endorse to European Union in 1995 brought unknown previous problems in the community. These two countries have vast areas with harsh climate, little population and situated far from the main urban centers. Countries with dual economy are Germany and Italy, these being characterised by extreme differences between internal regions.

Viewing the regional fizionomy of the economy of some countries which now compose the European Union leads us to the conclusion that the integration processes could not reduce semnificatively the disparities between countries and regions. An accurate analisys of develop characteristics in teritorial profile in European Union permit the indentification of 3 types of regions:

**Table 1. Maxim and minim Domestic Gross Product from some european countries**

No.	Country	Regions with DGP maxim	DGP relative	Regions with PIB minim	PIB relative	Rapport max/min
1.	Great Britain	Inner London	246.3	Merseyside	71.6	3.43
2.	Belgium	Bruxelles	223.1	Hainaut	71.8	3.11
3.	France	Ille-de-France	154.1	Reunion	50.9	3.02
4.	Germany	Hamburg	183.4	Dessau	63.2	2.9
5.	Cehia	Prague	121.6	Sredni Cechy	48.5	2.51
6.	Hungary	Kozepmagyarország	72.4	Eszak Alföld	32.5	2.23
7.	Italy	Lombardi	136.1	Calabria	61.9	2.2
8.	Spain	Madrid	108.1	Extremadura	50.3	2.15
9.	Austria	Vienna	150.6	Borderland	70.9	2.12
10.	Poland	Mazowieckie	55	Lubelskie	27.6	1.99
11.	Portugal	Lisbon	101.1	Acores	52.2	1.94
12.	Romania	Bucharest Ilfov	35.3	North-East	19.1	1.85
13.	Finland	Uusimaa	137.2	Itä-Suomi	74.9	1.83
14.	Nederland	Utrecht	143.4	Flevoland	81.3	1.76
15.	Greece	Sterea Ellada	81.5	Ipeiros	47.3	1.72
16.	Bulgaria	Yugozapaden	35	Severoza Paden	22.2	1.53
17.	Sweden	Stockholm	133.9	Vastsverige	89.9	1.49

➤ **Prosperous region**, who are engines of the economic development for their countries. Prosperous regions, for example Baden-Wurtemberg in Germany, South-East of England, Lombardia in Italy, Catalonia in Spain, Rhone-Alpes in France, have success because they made a combination between industrial traditions and

international trade made. In these countries exists a strong relation between the level of country development and the dynamism of regions economy. The labour is highly qualified and has been created a very development network of institutions, which are providing technological innovation.

➤ **Regions with industrial tradition**, which now make important efforts for rise its competitiveness. Regions with industrial tradition representative are: , Liguria in Italy, Lorena in France, North of England, and North of Renania -Westfalia in Germany This region constituted essential issues in industrialization of those countries. But since 70s due to major changes operated in international division of labour, these zones have begun to experience a series of difficulties in continuous sustaining of economical rise and the employment. In this regions, the base industry (coal minings, steelworks) have important weigh.

➤ **Regions with structural shortcoming (deficiency)**, which are situated all the time behind the development average of the on the whole Union.

➤ **Regions with fragile economic structures**, for example Castilia – La Mancha in Spain, Auvergne in France, Campagnia in Italy, Scotland in Great Britain, lands from East of Germany.

This type of regions need a special analysing. So, are distinguished two groups:

- *less favoured regions*, due to certain geographical, historical factors and natural conditions. For reducing the disparities is needed a considerable time horizon. The majority of these regions are situated in the South European Union.

- *regions with blocked development*, with reasons that are not of local economy (shifts in commercial waves, reorientation of the international economic interests), shifts in political and institutional frame. Examples are the lands in Eastern Germany.

In EU has been created a complex institutional frame for attenuate the intensity of regional disparities. The main instruments for regional policy are: a) the existence of Coesion Fund and Structural Funds at European Union level; b) the development of local initiative as a decisive element of economic dynamism and founding new jobs.

From Coesion Fund many countries had received allocations during the time. So in 1990, received funds: Greece (National Domestic Gross/per inhabitant in 1995 represent 65.8% from European Union average), Portugal (72,3%), Spain (75,7%) and Ireland (78,9%) for infrastructure development and environment protection. In 1999 at European Council from Berlin had decided to allocate for Coesion Fund in 2000-2006 period a budget of 18 billion Euros distributed in this way: Spain 61-63,5%, Greece 16-18%, Portugal 16-18%, Ireland 2-6%. The repartition has been done beginning from National Domestic Gross/per inhabitant and country area.

All members of European Union can benefit of the structural funds. The objectives of these funds were:

- *objectiv no.1* the economic adjustment of regions which development is left behind;
- *objectiv no. 2* economical conversion of industrial regions in decline;
- *objectiv no.3* unemployment control in a long period of time and facilitate the integration of youth in lifework and the persons with exclusion risk from the labour market;

- *objectiv no.4* the workers facility to adapt to industrial changes and to productive systems;
- *objectiv no.5* adjustment acceleration of agricultural structures and economical diversification of rural areas;
- *objectiv no.6* regions development with a low population from Sweden and Finland.

Analysis studies from 1989-1993 show us the positive impact that Structural Funds had for modernization of infrastructure, for improvement of productive environment, for technology transfer and for making small and middle enterprises.

Structural Funds supports infrastructure development, the access of small enterprising to the new technologies, the stimulation innovational process and the competitiveness of the economical agents by improving the report between the tangible and intangible investments and supporting the interest for continuous briefing of labour force not only in traditional branches but the new activity domains.

According to Structural Funds reform, for 2000-2006 it had proceeded to a concentration of objectives:

- *objectiv no.1*: development and structural adjustment of regions with low development;
- *objectiv no. 2*: sustaining economical and social conversion of regions that meet structural difficulties;
- *objectiv no. 3*: policies and educational systems adjustment and modernization, professional briefing and labour force.

For supporting the initiatives of the local communities had been conceived four programs: ***Interreg III*** reserved cooperation between countries and regions with the aim of encouraging a well-balanced development and an area planification of European territory; ***Leader+*** reserved to rural development with the help of integrates programs and cooperation between local action groups; ***Equal*** destined to transnational cooperation for promoting new approaching in combating all forms of discrimination and inequality concerning the access on the labor market; ***Urban*** destined to economical and social revitalization of cities and their surroundings being in crisis with special attention accorded to promoting durable urban development.

The resources allocated for these funds are around 195 billion Euros (in 1999) transferred as shown: 69,7% for objective no.1, 11,5% for objective no. 2, 12,3% for objective no. 3. However, 0,5% are accorded for pisciculture development, 5,35% for sustaining the initiatives of local communities.

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## **TRAINING – A NEW METHOD OF IMPROVING COMPANIES PERFORMANCE**

**BOGDAN RĂVAȘ \***

**ABSTRACT:** *Together with the development of the society and its needs, the competition on the service market continues to grow. The companies that offer this kind of services need the best card in order to impose themselves on the market.*

*As the first two elements can also be used by the competitors, the attention must be straightened towards the third which is the quality of the persons engaged in the activity. The ability of learning quicker and faster than the competitors can be the only advantage worth to be followed.*

**KEY WORDS:** *training, trainer, development, employees, enterprising*

### **1. THEORETIC ASPECTS REGARDING THE CONCEPT OF TRAINING**

Together with the development of the society and its needs, the competition on the service market continues to grow. The companies that offer this kind of services need the best card in order to impose themselves on the market.

A company can gain an advantage towards their competitors by:

- using the best modern technologies;
- using the most efficient ways of work;
- benefiting of highly prepared personnel;

As the first two elements can also be used by the competitors, the attention must be straightened towards the third which is the quality of the persons engaged in the activity. Trained people will be able to use properly the endowment of the company, can find the most efficient ways of using the equipment and they can discover very performant devices. The ability of learning quicker and faster than the competitors can be the only advantage worth to be followed.

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\* *Assist.Prof. at the University of Petroșani, Romania*

The concern for the human resources at an aggregate level needs the fixing of some basic rules. The ensemble of rules form the company politics in comparison with the human resources. In many cases The Human Resources Department must express the initiative regarding the introduction of new politics, to re-examine the existent ones in a frequent matter or to remove them if the situation calls it. The Human Resources Management has a very important contribution in the achievement of the company's goals. An essential goal for any company can be the reaching of the performance standards established for their employees. An effective solution for reaching this level of performance is considered to be: the training.

The training is a planned process in order to change attitudes, knowledge or behaviors through the experience gain by study, in order to achieve the right level of performance. The way of work follows the development of the individual abilities in order to satisfy the needs of the present and future labor power.

An efficient training program expects:

- to improve individual, team and company performances regarding the quality, speed and productivity;
- to improve operational flexibility through the extension of the qualification scales;
- to reduce recruit costs by new qualification, by changing the orientation and by acquiring of great and new knowledge of the staff members;
- to draw the proper employees by offering good opportunities for preparation and development, rising the level of competence and the qualification sphere which makes possible to obtain a larger satisfaction.;
- to increase employees interests by supporting them in order to identify themselves with the company's tasks and objectives;
- to develop a positive culture inside the organization;
- to decrease work incidents by qualification in the work protection area;
- to produce a more receptive attitude to the changes in the external environment by offering the people the proper knowledge and qualifications in order to be able to put up with new situations;
- to ensure the highest quality for the services provided to the costumers;

Knowing all this benefits, the training must not be considered an article of luxury but a necessity. Its purpose is to help the company in reaching its goals by adding value to its key elements: the employees.

Training implementation ensures the most adequate methods by giving the possibility to the participants to acquire the abilities, the knowledge and the levels of competence required.

According to the space where the training takes place there are used the following techniques: on-the-job and off-the-job.

**ON-THE-JOB** takes place at the company's own training centers and it can be used every day as part of a special training program.

The methods used in this case are:

- Evidence- is the method through which the trainers explain to the participants how to perform a state of work and after that they are given the possibility to perform by themselves. It is the most practical training method because of its direct character and it involves the operative participation of the employees.
- Coaching- is the method intended to develop the aptitudes, knowledge and individual abilities. This method presumes: helping people to find out their level of competence, using the new situations for self learning, ensuring the orientation of the way of execution for some required tasks, properly, by using the help granted to the employees in order to learn without any further instructions.
- Rotation of jobs/ planned experience- this method follows the increased experience of the employees by changing one another's positions in the company. It can be very un-efficient and very defrauded if it is not used in a proper matter.
- Mentoring- it consists in using the selected and specially trained persons in order to ensure the orientation and the advising of the employees. Mentoring supplements the training by ensuring an individual orientation granted by experienced managers.

**OFF-THE-JOB** takes place outside the working station, inside or outside the company. It is often used in training. It includes:

- Lecture- a discussion with a small participation with the exception of the part of questions and answers at the end of the course. It is used to transfer information to the auditory with a controlled content and time. The efficiency of the lecture depends on the trainer's ability to present the material with the help of some visual instruments.
- Discussions- this method is used to: make the listener engage himself operative into the study, give the chance to the participants to learn from other people's experience, help the participants comprehend other points of view and to develop the capacity of expression. The trainer's purpose is to establish the group's direction; he must stimulate the desire of talking, to orient the discussion on the established directions and to come up with a conclusion.
- Situations- detailing of an event or circumstances analysed by the participants in order to diagnose the causes of some problems and find the right solutions. The situations are used specially as part of training for managers and department leaders, because they rely on the believe that manager's proficiency and capacity of comprehension can be achieved best by studying and discussing the events.
- Acting- the participants elaborate a situation by taking the parts of the characters involved. In this phase there are interactions between two persons or inside the group. Every participant is given directions and it is explained his part in the act. Acting is used in order to give the managers, department leaders, sales executives, the possibility to apply real situations such as; interviews, team leadership, counseling ability, assessment meetings regarding the performance of the company, brainstorming, etc.
- Simulation- is the training method which combines situations and acting in order to obtain the right amount of realism. The purpose is to make easier the

assimilation of the new knowledge by imitating the situations that are similar to the real life. In this way the participants are given the opportunity to exercise their behavior in identical situations with those they are going to confront with in their day by day work.

- Group practice- the participants examine problems and develop solutions for solving them with the group. The purpose of the group practice is to achieve the skills needed together with the other group members and to have the internal view of the way that the group is reacting in approaching the problems and taking decisions. Group practice can be used as part of building the team and to develop interactive abilities.
- Shop works- it consists in a group of participants specially gathered , who with the help of an expert examine the company' s issues.

## **2. TRAINING'S NECESSITY**

Training's necessity shows up as a lack of employees performance, performance that can be improved by using an adequate method of training. The necessity of training can be caused by: introduction of new tehnology, changes in the legislation, new products/ services, reorganization, merging, liquidation, personnel oscillation, low productivity, less team spirit, the need to stay competitive on the market.

The analysis of training's necessity is focused on the difference between what the employees know and can accomplish and what they should be able to realize. The needs for training can be identified at different levels of the company such as: the aggregate level, the department level, team level, individual level. The company's needs transpose into the needs of the departments, teams and in the end they join individual needs. The analyze of training's necessity crosses the following steps: preparation, data collection, data interpretation, recommendation, acting plan.

The most frequent used data sources in analyzing training's necessity are: deeds (job description, performance assessment, reports, personnel statistics, company' s business plan), interviews, lists of question, observation, aptitude tests, discussion groups.

The objectives of the training program are: to reach the performance standards established for each job, to improve the quality regarding the work relations, to increase the employees motivation.

## **3. REACHING THE TRAINING' S OBJECTIVES**

In order to estimate as accurate as possible the training's effects to the company, one must keep in mind all the elements that contribute to the growth of the employees performance and productivity.

These elements are: the new products, modern tehnologies and the most important one: the training.

The company estimates to gain by developing a training program the following effect: increased performance for the staff members, reduced study costs, reduced selection costs, less work incidents, to satisfy the customer's demands at the highest level, to create a more receptive attitude, to improve services, to diminish personnel oscillation, to increase motivation, to improve the communication process, to grow productivity.

Training organizers can estimate in what measure the training program will improve the company's performance. They estimate the following immediate effects: growth of individual performance, increased motivation, higher satisfactions, an increased number of experts, an increased flexibility, an increased individual value on the labor market, chances for internal promotions, increased wages, better relation between the levels of competence, improved communications.

The training is also responsible for reactions; the reactions guide the learning process; learning process can produce improved attitudes which lead to changes for the better inside the company and that can contribute to achieving the final objectives.

#### **4. TRAINING- A NECESSITY FOR THE COMPANIES IN THE JIU VALLEY REGION**

Training's efficiency is proved all over the world. Large companies and corporations include training programs in their development process and into their budgets.

The Romanian companies in their pale attempt to reach a certain level of performance through higher qualification of their staff members began to organize frequently training and specialization courses at their own locations and in specialized centers inside the country or abroad.

The necessity of training in The Jiu Valley Region is imperative due to the abundant campaigns of disposals in the mining department and the appointing of the personnel resulted from this process into other local sectors of activity or from other areas in the country or abroad. Although training activity must not be mistaken to the re-conversion and formation courses. The training is actually a superior level that follows the phase of professional forming and it consists in the specialization of the labor power in a certain area by achieving some indispensable knowledge in this period of permanent innovation in which the information and the access to information stands for the main resource.

Unfortunately at this moment in The Jiu Valley Region the training programs have a very low frequency and are situated at an inferior level in comparison to other regions in the country. With the exception of a few large companies with subsidiary branches in the area the term of training is practically unknown to most of the local enterprisings. The attempts of promoting this kind of activities are still reduced and they don't benefit of enough support. The explanation for the lack of interest in training can also be found in the small number of large investors on the local market.

In these circumstances, small enterprisings who can hardly manage to pay their taxes don't bother too much with training programs as their activity is aiming for maintenance and not for development.

On the other hand, training programs are very prolific on the part of NGO's and non lucrative companies. The NGOs benefit of training invitations for the personnel engaged in their activity from some similar ones or from some developed branches and in some cases with financial support from international organisms.

A more and more demanded form of training with a large interest manifested from the companies and individuals is represented by the training courses held by correspondence with a smaller price and a fractioned way of payment. The major disadvantage in this form is represented by the lack of practice approach.

With the existing situation, low specialization of the labor power in The Jiu Valley Region, training programs will become indispensable for the future investors.

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## **THE EVOLUTION OF UNEMPLOYMENT IN JIU VALLEY AFTER RESTRUCTURATION OF MINING INDUSTRY**

**GABRIELA SLUSARIUC \***

**ABSTRACT:** *Unemployment is a negative phenomenon present in all states of the world. In economical and social activity of Jiu Valley, National Company of Pit coal from Petrosani has over 90% of weight so almost entire population depend directly or indirectly of this company.*

*The most powerful impact of implement the restructuration measures included in the program which was elaborate, is the one that affect the population of Jiu Valley because the most important measure for making the National Company of Pit coal from Petrosani efficient refers to the necessity of reducing the number of employers in mining coals.*

**KEY WORDS:** *unemployment, labour market, industrial restructuration, negative phenomenon, mining coals, rate of unemployment, mobility, job*

Labour market can be defined as economical place where demand of labour, represented by capital holders as buyers, and supply represented by labour owners meet, confronts and negotiates.

Unemployment is a negative phenomenon present in all states of the world. In terms of labour market, unemployment represents the surplus of supply comparatively to demand of labour. Some economists like Gilbert Abraham Frois consider that a low demand is an essential cause, but not the only in explanation of the contemporaneous unemployment. On the base of this phenomenon are more other causes determined by the mobility rising of labour and reducing the time of employment because of industrial restructuration

A research project of labour market can be concentrated upon one or more priority problems, respective, certain labour groups with major impact in a region as:

- long lasting unemployment;
- youth employment;

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\* *Assist.Prof., Ph.D. at the University of Petroșani, Romania*

- poverty reducing in some categories, which are defavored in labour market;
- restructuration impact within employment.

Labour market characteristics in Jiu Valley are different to those at national level, and can be synthesize as:

- Labour market in Jiu Valley was and is a forming market, and unemployment rate is very high;
- Chronic unemployment growth;
- The external migration rise and internal one decrease.

In economical and social activity of Jiu Valley, National Company of Pit coal from Petrosani has over 90% of weight so almost entire population depend directly or indirectly of this company.

The most powerful impact of implement the restructuration measures included in the program which was elaborate, is the one that affect the population of Jiu Valley because the most important measure for making the National Company of Pit coal from Petrosani efficient refers to the necessity of reducing the number of employers in mining coals.

Inhabitants of this zone are generally qualified in professions which have minimal search (miner, mechanic miner) and their families are usually numerous and supported by one member of the family who works in mining coal.

The evolution of the main analytical indicators of labour market in period of starting the process of reorganization and restructuration of economical activity in Jiu Valley is presented in table 1.

**Table 1. Indicators of labour market from Jiu Valley**

<b>Indicators</b>	<b>1992</b>	<b>1997</b>	<b>1998</b>	<b>2000</b>	<b>2001</b>	<b>2003</b>
Total Population	167456	172823	162665	161462	157600	150739
Work resources	105162	102930	100672	98950	99700	95350
Active Population	75716	81167	59892	59338	52064	32152
Engaged Population	67650	62607	47476	38590	43201	42164
Unemployed worker	6897	15293	15303	17235	11350	6784
Rate of activity rate of Work resources	72%	78,8%	59,5%	59,9%	52,22%	33,72%
Rate of employment	64,3%	60,82%	47,15%	39%	43,33%	44,22%
Rate of unemployment	9,1%	18,8%	25,5%	29,1%	21,8%	21,1%

Source: AJOFM Hunedoara

The ratio between the active population and work resources recorded decreasing values in time between 78,8% and 33,72% (at national level the average report is 82%), which means the existence of a large reserve of persons with working age (especially women) who can contribute to the extension and diversifying the economical activities. Analyzing the unemployment report in 1990-2004 periods, we can remark its evolution in table 2, respectively the evolution of the number of unemployed and dole.

**Table 2. The Evolution Of Unemployment Workers from Jiu Valley Between 1990-2004**

Years	Total	Beneficiaries of dole	Beneficiaries of professional integrate dole	Beneficiaries of grant support	Unemployment Works unpaid
1990	4200	2800	-	375	1025
1991	5436	3450	-	936	1050
1992	6897	4083	-	347	2467
1993	4468	1835	-	837	1796
1994	6875	781	192	541	5361
1995	9215	462	334	393	8026
1996	9903	270	265	170	9198
1997	15293	10767	493	317	3716
1998	15303	2416	492	6568	5528
1999	17241	2845	1026	4284	9086
2000	17235	3405	1450	3025	9355
2001	11350	2244	475	2143	6488
2002	6865	1612	364	813	4076
2003	6784	2299	241	314	3930
2004	7288	1897	267	326	4798

Source: AJOFM Hunedoara

The large number of unemployed workers who passed the dole reveals in fact the impossibility of gaining a job. The weight of the number of unemployed workers without grant support in the total number of unemployed workers is presented in table 3. This one too, make us notice one more time, a negative aspect – the inexistence of the economic alternatives for Jiu Valley and the inefficiency of reconversion programs unreel until now in this zone.

The rate evolution of the unemployment in Jiu Valley, calculated according to the number of unemployed workers and active population, in the analyzed in this period (1990-2004) has recorded an upward tendency, presented in table no. 4. However, we consider that the unemployment rate does not express sharp enough the true proportions of lack of poise between demand and supply on labour market. On a more and more flexible market, the unemployment rates overhear and measures only a part of the real dimensions of work supply.

According to the dates provided by ANOFM, the number of unemployed workers registered in Romania at the end of 2004 was 557, 9 thousand persons. The unemployment rate recorded in December 2004 was 6, 2%. A high unemployment rate is recorded in Hunedoara 10, 9%.

Table 3. Rate of unemployment between 1990-2004

Years	Romania	West Region	Hunedoara	Jiu Valley
1990	2,9	1,8	2,1	3,2
1991	3,0	2,5	4,5	5,7
1992	8,2	6,8	7,2	9,1
1993	10,4	8,8	8,3	9,8
1994	10,9	9,2	10,3	10,7
1995	9,5	7,5	12,0	11,8
1996	6,6	5,9	10,8	13,3
1997	8,9	8,3	15,0	18,8
1998	10,4	10,6	18,7	25,1
1999	11,8	12,6	21,3	28,8
2000	10,5	10,4	16,4	29,1
2001	8,8	9,5	15,3	21,8
2002	8,4	6,6	9,8	21,4
2003	8,6	6,2	10,7	21,1
2004	6,2	-*	11,3	23

Source: Iuhas V.- *Dezvoltarea economică regională*, Editura Emia Deva, 2004, *Revista de statistică - județul Hunedoara*;

The unemployment rate in Jiu Valley has recorded a slow growth in 1992-1997 period, and an extremely high ascent in the next period after the massive reorganization at the end of 1997 and the beginning of 1998, reaching an average of 25,05%, afterwards increasing to 29,1% in 2000, as a result of the reduced possibilities to employ in the last period because of the low efficiency of qualification activity.

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## THE CONCEPT OF CRISIS

ION STEGĂROIU \*

**ABSTRACT:** *The concept of crisis is very hard to define. It has its origin in the Greek word “krisis” which means the evolution stage of a situation in which a decision should be taken. This concept describes a break in the evolution of a phenomenon in which decisions are hard to take.*

**KEY WORDS:** *crisis, surprise, uncertainty, eventful approach, procedural approach*

### 1. INTRODUCTION

The concept of crisis is very hard to define. It has its origin in the Greek word “krisis” which means the evolution stage of a situation in which a decision should be taken. This concept describes a break in the evolution of a phenomenon in which decisions are hard to take. The concept of crisis rather means the lack of conditions in which it is impossible to take a certain decision ([6], 149-163). A normal crisis situation is characterized through three fundamental elements (figure no.1).

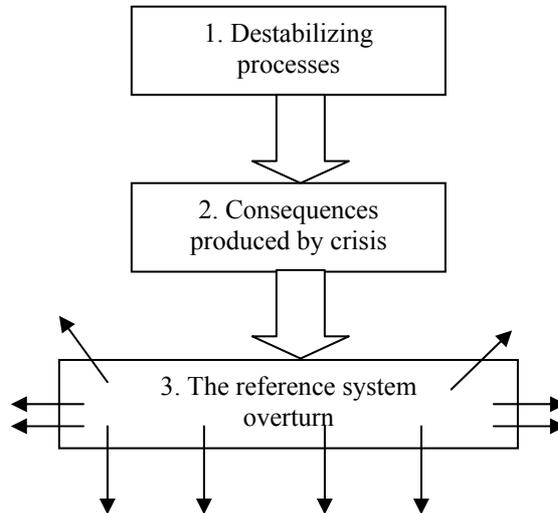
In order to understand the concept of crisis there were proposed two approaches: first, an eventful approach which provides information regarding the nature of the releasing event for the crisis and its consequences; second, a procedural approach which places the crisis in a more plentiful context and gives to organizations information regarding the source and their development dynamic.

### 2. THE EVENTFUL OR SYMPTOMATIC APPROACH

The crisis is understood as a brutal and punctual event and it often can be confused with the releasing event which creates symptoms in a determined period of time and in a certain place. The crisis is materialized in surprise, impermissibility and improbability. It concentrates the attention upon symptoms or precise events which have started it.

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\* *Prof., Ph.D. at the “Valahia” University of Târgoviște, Romania*



**Figure 1.** The elements of the crisis situation

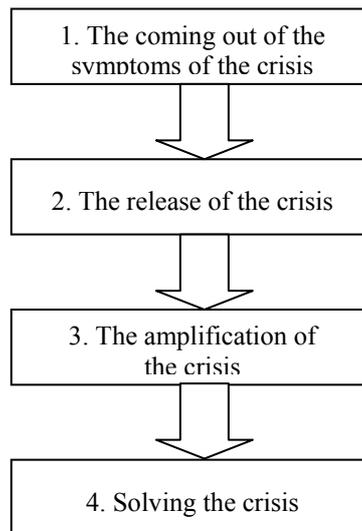
The concept of crisis can be defined as a situation which threatens the priorities of the organization being an element of surprise for managers, reducing the reaction period and generating stress. B. Forgues emphasizes the element of surprise in crisis producing meaning the impossibility of releasing itself ([2], 9). The uncertainty and the unknown are other two elements which should be taken into consideration when defining the term crisis, meaning that it can appear within an organization without planning the circumstances when it occurs ([4]). Other specialists introduce new element such as frequency and consequences. The crisis is defined as an event with a reduced probability of appearance, but which has important consequences for the surviving of the organization ([10], 115-143; [5], 83-107).

The concept of crisis can also be defined in accordance with the rapidity of the decision taking process and the movement of events associated to surprise, on one hand ([8], 59-76) and in accordance with the releasing event regarded as a serious threat for the survival of the organization, on the other hand ([3], 143-160). The eventful approach represents a study of the exact crisis, meaning that the crisis is released by an event.

The management of an organization expresses an opinion regarding the crisis from the moment it was generated. The management chooses a reactive position in order to maintain the organization in a relative stability (crisis management). There have to be applied certain specific methods and instruments in order to manage the crisis that has occurred. The unforeseeable, improbable and surprising characteristic of a crisis determine the organizations to concentrate their efforts so that to limit the negative consequences of a crisis.

### 3. THE PROCEDURAL APPROACH

Unlike the eventful approach that took into consideration the unforeseeable and improbable characteristic of a crisis, the procedural approach point out the intensity and perceptibly of a crisis. We can determine the main stages of a crisis (figure no.2).



**Figure 2.** The stages of the crisis

The procedural approach of crisis is developed taking into consideration several points of view: genealogy, normality, systems.

**The genealogy of crisis.** Every crisis has an origin and a genealogy. They are not the result of hazard but they occur as a result of a cumulative and permanent process of organizational dysfunctions, meaning an accumulation of probable events at one level or the entire organization which breaks off the operational functioning of the organization at present or in the future, affecting individuals and communities at physical and psychological level ([7], 49). Thus, a crisis does not occur as a necessary, unexpected and isolated event, but rather as a result of cumulative and permanent process of organizational dysfunctions that can get off managerial control.

B. Bowonder and H. Linstone demonstrated that with some exceptions a crisis has certain consequences before reaching its highest form ([1], 183-202). In this way was explained the crisis occurred as a result of an accident, such as: from Bhopal, India (1984); the explosion of the Challenger (1986); the contaminated blood affair in France (1995). The causes of these crises can not be understood only from the perspective of dysfunctions and strategic choices, but from the perspective of political and economic orientations of governments in that period.

The issue does not involve the aspect of specifying the moment, the probability to occur or the form of the crisis at its highest level, but rather to identify the hidden

manifestation or the dysfunctions that can lead to a crisis. Referring to these dysfunctions, C. Perrow offers a critical perspective which points out the importance given to crisis. If the crisis doesn't occur, it is better for the organization, but every organization must be aware of the crisis that other organizations are confronting. In other words, they must learn from others' mistakes. It is very difficult to explain the predictable characteristic of the crisis only through forerunning signs. Thus, it is absolutely necessary to take into account the attitudes towards risk of organizations.

The unpredictable characteristic of a crisis arise from the fact that participants to the economic and social life can generate the release of a crisis. From this point of view, not only the crisis is unpredictable but the probabilities of occurring remain very weak. The procedural approach suggests that the weak frequency of crisis does not necessarily means a guarantee of comfort. Organizations are aware of dysfunctions and weaknesses that in their majority can be controlled or corrected before generating a crisis. In every moment, such dysfunctions and weaknesses can combine and amplify. Organizations themselves are generators of crisis, their existence and activity generate weaknesses that can lead to a crisis. Dysfunctions, crises are characteristic to organizations.

**The normality of crisis.** In 1984, C. Perrow developed the theory of normal accidents that is based on a study developed in nine industrial risk sectors, such as: nuclear, petrochemical, air, railway and sea transport, mines, aerospace, weapons, genetic engineering ([9]).

The theory of normal accidents operates with two important concepts that allow the characterization of industrial systems with high risk: the complexity degree of the systems; the interdependence degree of the activities of the system. The factors that determine the complexity of an industrial system are; the number of components that characterize the system; the number of interactions among the components of the system. The exploitation of the system implies the interaction of operators, procedures, equipments and environment regarded as components of the system. C. Perrow demonstrates that the majority of accidents are not caused only by the errors of the system, but by the brutal combination of failures occurred in each component of the system. For C. Perrow complexity is a characteristic of modern industrial systems and the probability of interaction of more local dysfunctions is powerful enough to lead to major accidents: "if the interactive complexity and the close coupling inevitably produce an accident, I believe that it is fair to talk about normal accident or system accident. The singular term normal accident shows that, taking into account the characteristics of the system, the interactions of multiple and unexpected failures are inevitable. This is a characteristic of systems and not an expression of frequency" ([9]; [5]).

The interactive complexity is just a part of the issue. The tendency of an accident to expand fast can be explained through the coupling of activities: on one hand, the activities of organizations are very independent and they do not leave any operating space for participants; on the other hand, certain organizations have an absorption and limitation capacity of important breaks. These organizations are

considered easy coupled, the manual labour margin and the reaction capacity are sufficient in order to insure a better interdependence between activities and performers. This situation enables the organization to have a better responding time and flexibility of operations being capable to reduce the amplification of breaks when they occur. Crises are rare but inevitable events. They do not represent a surprise because they are characteristic to systems which generate them ([9]).

**The concept of systemic and multidimensional crisis.** Crises are characterized through the ambiguity of its cause and effect. A crisis results from funds circulation that crystallizes an ensemble of dysfunctions which are gradually managed by the organization. Crises turn up as an effect of corroborating human, technical and organizational weaknesses: these releasing events are actions that initiate a significant damage. Threats and damages can be physical, psychological or social. The damages affect the whole system or a part of it and they are enough to produce structural changes. The releasing events can take the form of industrial accidents, the collapse of the market, the competition threats and pollution ([4]; [12]). The releasing event is only the starting point of a more extensive dynamic.

The implications of crises regarding their management are important. The procedural approach enables to develop the attention field of the organization before the releasing event so as to take preventive measures and then to identify the dysfunctions and instabilities which lead the organization to crisis. The procedural view of crises leaves a significant space to develop an instruction process.

#### 4. CONCLUSION

In conclusion, we can say that the two types of approach present certain characteristics (table 1).

**Table 1. The characteristics of the two types of approach**

<b>Characteristics</b>	<b>The eventful approach</b>	<b>The procedural approach</b>
The nature of the crisis	Surprise - the crisis is unpredictable	Stages, progress in intensity and prediction / the crisis is preceded by symptoms that predict it
Frequency	The crisis is improbable	Crises are rare but normal and characteristic to systems
Observational angles of the crisis	The consequences of the crisis	The dynamic of release, amplifying and resorption
The sources of the crisis	The releasing event (centered on a symptom )	The interaction of multiple factors and performers
The explanation of the crisis	The principle from the cause to effect	The systemic approach
The management of the crisis	The concentration upon reaction	The concentration to preventing the crisis, reaction and instruction
The attitude of the organization	Waiting / fatalism	Proactivity

In this context C. Roux-Dufort define several managerial recommendations ([11], 30):

- the crisis is not identical with its releasing event; even if specialists insist upon this moment or upon the consequences of a crisis, it is important to make the distinction between them; crises are the result of dysfunctions that were not managed in time by the organization;

- crises are characteristic to organizations; having in mind the complexity of organizations, their activity in multiple sectors and expected and unexpected interactions among the components of the organization and its environment; crises are unavoidable features of modern productive systems;

- the procedural approach is more abundant in programmatic information than the eventful approach for learning what a crisis represents: crises are part of the normal business life and they deserve a constant attention from organizations; crises are not unpredictable, the majority presents certain symptoms before turning up which must be taken into consideration in order to adopt preventing measures; crises are never have a unique cause, there is a complex argument that determines a multidimensional approach of the crisis.

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## **OPTIMIZATION OF MAIN TECHNOLOGICAL PARAMETERS AFFERENT FOR THE MINING METHODS WITH UNDERMINED COAL BANK APPLIED FOR THE CONDITIONS OF THICK COAL SEAMS IN JIU VALLEY**

**DANIEL SURULESCU, ION STAMIN PURCARU,  
GHEORGHE CHIRIL, SABINA IRIMIE \***

**ABSTRACT:** *Utilization of mining methods with undermined coal bank in the case of thick coal seams in Jiu Valley coal basin has lead to the increase of efficiency obtained and to significant decrease of production costs, but the establishment of coal fields has been made without performing an accurate analysis regarding the influence of main technological parameters' variation of this method (length of face line „ $l_{ab}$ ”, length of face field „ $l_p$ ”, and the thickness of undermined coal bank „ $h_b$ ”) onto the achieved technical and economical indexes.*

**KEY WORDS:** *optimization, model, methods, coal, costs.*

### **1. CONDITIONING**

Establishment of optimum values of above mentioned parameters should take into account the following criteria:

1. Establishment of optimum dimensions of coal field length „ $l_{ab}$ ”, „ $l_p$ ”, „ $h_b$ ” according the criteria of minimum mining costs.
2. Variation of advancing speed depending on the face length („ $l_{ab}$ ”), the undermined coal bank's thickness ( $h_b$ ) and working technology in that face.
3. Influence of geo – mechanical characteristics of coal onto the thickness of undermined coal bank.
4. Establishment of undermined coal bank thickness in accordance with the criteria of minimum dilution.

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\* *Eng. at the National Hard Coal Company S.A. Petrosani, Romania  
Eng., Ph.D. at the National Hard Coal Company S.A. Petrosani, Romania  
Eng., Ph.D. at the National Hard Coal Company S.A. Petrosani, Romania  
Lecturer, Ph.D. at the University of Petroșani, Romania*

## 2. METHOD USED

Establishment of optimum dimensions for the coal field length ( $l_p$ ), coal face length ( $l_{ab}$ ) and height of undermined coal bank ( $h_b$ ), in accordance with the criteria of minimum mining costs. In order to solve the optimization problem it will be used the criteria of minimum cost ( $c$ ) onto the product unit, as the following relationship:

$$c \rightarrow \min, \quad \text{with restriction } P \geq P_{plan}, \quad P - \text{output}, \quad (1)$$

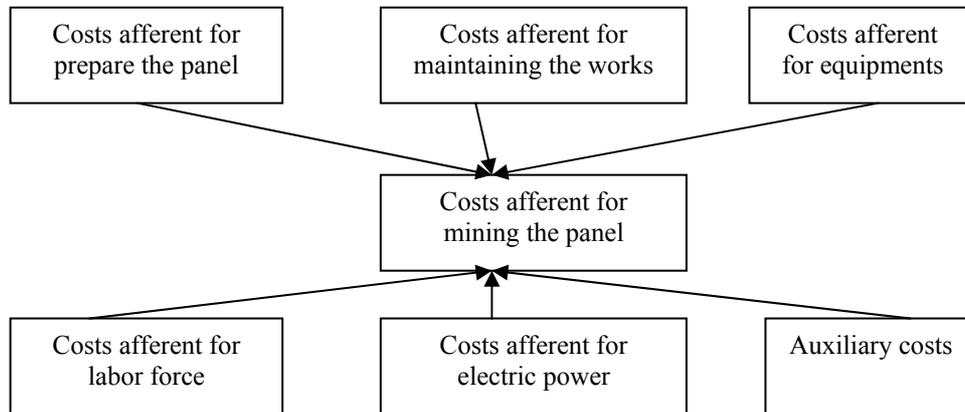
Establishment of economical and mathematical model that has to lead to solution of the optimization problem starts from identification of sub – systems that are components of total mining costs system, but only those costs with significant importance in the total mining costs's value. Starting with the above presented, the costs afferent for mining the coal field can be expressed with following formula:

$$C = \sum C_i \quad (2)$$

Where:  $C$  - represents the costs afferent for mining the coal field;

$\sum C_i$  – sum of partial costs of afferent subsystems

The analysis of costs system afferent for the technological unit to be optimized lead to identification of subsystems of partial costs (fig.1).



**Figure 1.** System of costs afferent for mining the coal field and afferent subsystems [1]

In this case:

$$\sum C_i = C_p + C_i + C_u + C_m + C_e + C_a \quad (3)$$

Where:  $C_p$  - costs afferent for preparatory works;  
 $C_i$  - costs afferent for maintaining the preparatory works;  
 $C_u$  - costs afferent for equipments (supporting, transporting, cutting, etc.);  
 $C_m$  - costs afferent for the labor force needed for mining the coal panel;  
 $C_e$  - costs afferent for electric power;  
 $C_a$  - auxiliary costs (repairs, materials, etc.).

In the same time the production unit costs are expressed by the relationship:

$$c = \frac{C}{R_p} \quad (4)$$

Where:  $c$  - unit costs;  
 $C$  - total mining costs;

$$R_p \text{ - industrial reserve of coal panel: } R_p = S_p H_p h_{ex} \gamma k_1 \quad (5)$$

Where:  $S_p$  - coal field dimension on direction;  
 $H_p$  - coal field dimension on declivity;  
 $H_{ex}$  - thickness of mined coal slice;  
 $\gamma$  - specific gravity of coal;

$$k_1 \text{ - coefficient that depend on the recovery degree and dilution: } k_1 = \frac{\tilde{\eta}}{1 - \tilde{\rho}};$$

$\tilde{\eta}$  - recovery degree;

$\tilde{\rho}$  - dilution.

Expressing the coal field reserve depending on the main parameters from relationship (5), it results:

$$R_p = l_p l_{ab} (h_{ab} + h_b) \gamma k_1 \text{ (tones), } k_1=0,8 \quad (6)$$

or:

$$R_p = 1,2 l_p l_{ab} (h_{ab} + h_b) \text{ (tones)} \quad (7)$$

In this case:

$$c = \frac{C_p + C_i + C_u + C_m + C_e + C_a}{1,2 l_p l_{ab} (h_{ab} + h_b)} \text{ (ROL/tones)} \quad (8)$$

relationship that express the production costs afferent for the mining method with undermined coal bank used for mining the coal field reserve.

In order to establish the economical and mathematical model based on relationship (8), it is required to establish the calculation relationship depending on the three considered parameters, for every of partial costs, as follows:

- *Costs afferent for preparatory works, [2]*

$$C_p = 2l_p c_g + (c_p + c_{pa}) l_{ab} \quad (\text{ROL}) \quad (9)$$

Where:  $c_g$  - unit cost for drilling and supporting one linear meter of underground gallery;

$c_p$  - unit cost for drilling and supporting one linear meter of inclined plane;

$c_{pa}$  - unit costs for drilling and supporting one linear meter of inclined plane of attack.

- *Costs afferent for maintaining the preparatory works*

In this case certain specifications should be made, as follows: the costs afferent for maintaining the preparatory works shall represent a percentage from the total value of preparatory works, as follows:

$$C_i = k_i C_p \quad (\text{ROL}) \quad (10)$$

Where:  $k_i$  - coefficient representing the ratio between annual value of maintaining works in comparison to initial value of works.

As result of difficult underground conditions in Jiu Valley, the value of maintaining works carried out onto the entire duration of coal field mining period reaches for the most difficult conditions 70 – 90 % from initial value of the work, in this way an annual volume of maintaining works equal to 15 % from the initial value of preparatory works can be considered as sufficient, and for this reason:

$$C_i = 0,15C_p \quad (\text{ROL/year}) \quad (11)$$

relationship that express the value of maintaining works carried out during one year.

In order to express the costs afferent for maintaining the preparatory works for entire mining period of the coal field, starting from the restriction  $P \geq P_{plan}$  and considering the planned daily advancing speed  $V_z$  as main parameter influencing the daily output, it is established the mining period of that coal field:

$$T_p = \frac{l_p}{V_z} \quad (\text{days}) \quad \text{or} \quad T_p = \frac{l_p}{256V_z} \quad (\text{years}) \quad (12)$$

In the same time, it should be taken into consideration the fact that the length of the two direction underground galleries it is continuously reduced as result of mining the coal field, and implicitly the volume of maintaining works it will be considerably reduced. An enough accurate approximation we are performing consist in that only half of these two underground works' length it will be carried out maintaining

works during the entire mining period of underground coal field. Under these circumstances:

$$C_i = \frac{0.15c_g}{256V_z} l_p^2 + \frac{0.15c_p}{256V_z} l_p l_{ab} \text{ (ROL)} \quad (13)$$

$$C_i = 0.0006l_p (l_p c_g + l_{ab} c_p) \frac{1}{V_z} \text{ (ROL)} \quad (14)$$

relationship that express the value of costs afferent for maintaining the preparatory works of coal field.

- *Costs afferent for equipments*

Due to the fact that in the production cost there are included only part of the costs afferent for equipments, due to their depreciation rate, the costs afferent for equipments shall be expressed by the following relationships:

$$C_u = \frac{l_p}{256V_z} \left( \frac{C_{ut}}{T_{A1}} + \frac{C_{us}}{T_{A2}} + \frac{C_{uT}}{T_{A3}} \right) k_m \text{ (ROL)} \quad (15)$$

Where:  $C_u$  - costs afferent for equipments;

$C_{ut}$  - costs afferent for transportation equipments;

$C_{us}$  - costs afferent for supporting equipments;

$C_{uT}$  - costs afferent for cutting equipments;

$T_{A1}$  - depreciation period of transporting equipments;

$T_{A2}$  - depreciation period of supporting equipments;

$T_{A3}$  - depreciation period of cutting equipments;

$k_m$  - coefficient that takes into account the equipments' assembly costs:

$k_m=1,1$ .

$$C_u = 0,004l_p \left( \frac{n_1 c_{ta}}{T_{A1}} + \frac{n_{uT}}{T_{A3}} \right) \frac{1}{V_z} + 0,004l_p^2 \frac{c_{tg}}{l_u T_{A1} V_z} + 0,004l_p l_{ab} \frac{c_{us} d}{T_{A2} V_z} \text{ (ROL)} \quad (16)$$

Where:  $n_1$  - number of transportation equipment in coal face  $n_1= 1$  or  $2$ ;

$n_2$  - number of transportation equipment in underground gallery:

$$n_2 = \frac{l_p}{l_u} \quad n_2 \text{ is integer number} \quad (17)$$

$l_u$  - length of transportation equipment (catalog data);

$c_{ta}$  - cost of one transportation equipment for coal face;

- $c_{tg}$  – cost of one transportation equipment for the underground gallery;  
 $c_{us}$  - cost of supporting unit;  
 $d$ , - supporting density (number of supporting units onto the coal face length unit), having the value of  $d = 1.25$  for individual supporting;  
 $n_{uT}$  - number of cutting equipments;  
 $c_{uT}$  – unit cost of cutting equipment.

- *Costs afferent for labor force*

Due to the fact that within the unit cost of preparatory works there are included the costs afferent for labor force, in this paragraph we will refer only at the labor force costs afferent for transporting the mined output onto the base direction underground gallery and to those afferent for performing the mining process itself.

- *Costs afferent for the labor force involved in transporting the mined output*

$$R_{mt} = 2l_p^2 \frac{c_{mt}}{l_u V_z} \text{ (ROL)} \quad (18)$$

where  $c_{mt}$  represent the average wages of transport workers (ROL/man – shift).

$$R_{mt}^1 = 3,098l_p^2 \frac{c_{mt}}{l_u V_z} \text{ (ROL)} \quad (19)$$

$$C_{mt} = 4,46l_p^2 \frac{c_{mt}}{l_u V_z} \text{ (ROL)} \quad (20)$$

Where:  $R_{mt}$  – direct wages for transport activity;  
 $R_{mt}^1$  - direct wages and bonuses for transport activity;  
 $C_{mt}$  - total costs for transport activity.

- *Costs afferent for the labor force involved in mining the underground coal field reserve*

Establishment of these costs' volume can be made only after analyzing the production system and after designing the simple production system in the aim of establishing the labor force consumption required by achieving the plan advancing speed  $V_y$ .

Balance relationship of labor force consumption is:

$$nt = \sum M_i + \sum M_s \quad (21)$$

Where:  $n$  - number of workers in coal face;  
 $t$  - duration of one working shift,  $t=360$  min;

$\sum M_i$  - sum of labor force consumptions afferent for the complexes of operations that are repeated during a production cycle;

$\sum M_s$  - sum of labor force consumptions afferent for the complexes of operations that are not repeated during a production cycle.

In the case of longwalls with individual supports (supporting poles type SVJ and supporting beams type CSA) the coal from the face is cut partially by means of drilling and blasting and with pick – hammers. In this case the undermining step is established by articulated beams' length (1.25 m), and in this case the number of man shifts required for achieving certain advancing length  $b_s$  will be:

$$n = 0,913l_{ab} + 0,038l_{ab}h_b + 0,256h_b + 6,18 \quad (22)$$

and the number of man shifts performed for mining the entire coal field reserve is:

$$N = 0,73l_p l_{ab} + 0,03l_p l_{ab}h_b + 0,212l_p h_b + 4,944l_p \quad (23)$$

Taking into consideration the above mentioned specifications, it results:

$$R_t = Nc_{ma} \quad (24)$$

$$R_t^1 = 1.799R_t \quad (25)$$

$$C_{ma} = 1.44R_t^1 = 2.59Nc_{ma} \quad (26)$$

where  $c_{ma}$  is average wage of workers working in the face.

In this case the costs afferent for labor force involved in mining the coal field reserve are:

$$C_{ma} = c_{ma} (1,89l_p l_{ab} + 0,08l_p l_{ab}h_b + 0,55l_p h_b + 12,8l_p) \quad (27)$$

- Costs afferent for electric power are expressed by following relationship:

$$C_e = C_{et} + C_{eT} + C_{es} \quad (28)$$

Where:  $C_{et}$  - costs afferent for electric power required for transporting the output;

$C_{eT}$  - costs afferent for electric power required for cutting the coal;

$C_{es}$  - costs afferent for electric power required for supporting the face.

$$C_e = c_e l_p l_{ab} \left[ \frac{h_{ab} + \eta h_b}{k_u} \left( \frac{l_p P_{tg}}{2l_u Q_{tg}} + \frac{n_1 P_{ta}}{Q_{ta}} \right) + \frac{P_t}{vb} + \frac{P_s t_1}{dbk_s} \right] \text{ (ROL)} \quad (29)$$

Where:  $T_{fi}$  – operating time of conveyors for mining the entire reserve of coal field;  
 $c_e$  - price of electric power;  
 $P_{fi}$  - nominal power of conveyor's driving unit „i”;  
 $N_{fi}$  - number of conveyors with the same technical characteristics;  
 $k_u$  - coefficient of utilization the conveyor's technical flow;  
 $Q_{tg}$ ;  $Q_{ta}$  - technical flow of gallery, respectively face conveyor;  
 $P_{tg}$ ;  $P_{ta}$  – nominal powers of gallery, respectively face conveyors;  
 $v$  - cutting speed of shearer;  
 $b$  - depth of the kerf cut by the shearer;  
 $d$  - supporting density;  
 $t_1$  - operation time of hydraulic unit required for performing necessary moves by a supporting unit;  
 $K_s$  - simultaneity coefficient at the stride of supporting system.

- *Auxiliary costs*

*Costs afferent for repairs,  $C_{ar}$ :*

$$C_{ar} = 0,1C_u \text{ (ROL)} \quad (30)$$

$$C_{ar} = 0,0004l_p \left( \frac{n_1 c_{ta}}{T_{A1}} + \frac{n_u T C_{uT}}{T_{A3}} \right) \frac{1}{V_z} + 0,0004l_p^2 \frac{c_{tg}}{l_u T_{A1}} \frac{1}{V_z} + 0,0004 \frac{c_{us} d}{T_{A2}} \frac{1}{V_z} \quad (31)$$

*Costs afferent for materials*

a) *Metallic wire net:*

$$C_{pm} = 2,1l_p (h_{ab} + d_1) \rho_p c_{pm} \text{ (ROL)} \quad (32)$$

where:  $\rho_p$  weight of one  $m^2$  of metallic wire net;  $\rho_p = 8.2 \text{ kg/m}^2$ ;

$c_{pm}$  - price of metallic wire net (ROL/m<sup>2</sup>);

$h_{ab} = 2,5 \text{ m}$ , high of the face i;

$d_1 = 3,5 \text{ m}$ , width of preparatory works.

$$C_{pm} = 9,02l_p l_{ab} c_{pm} + 103,32l_p c_{pm} \quad (33)$$

b) Wood

$$C_l = l_p c_l (0,08h_{ab} + 0,588) \text{ (ROL)} \quad (34)$$

$$C_l = 0,788l_p c_l \quad (35)$$

Where:  $c_l$  is the price of wood (ROL/m<sup>3</sup>).

c) Explosives and detonators

$$C_{ex} = 0,5h_p l_{ab} k_2 c_{ex}; \quad C_{cx} = h_p l_{ab} k_2 c_{cx} \quad (36)$$

Where:  $h_p = 1,3$  m, is the high of the face cut by means of drilling and blasting;

$k_2 = 1,28$ , density of holes;

$c_{ex}$  - unit price of explosives;

$c_{cx}$  - unit price of detonators.

$$C_{ex} = 0,832c_{ex}; \quad C_{cx} = 1,664c_{cx} \quad (37)$$

Based on above presented relationships, the function of unit costs (8) can be written as follows:

$$c = \frac{A + El_p h_b + Fl_p + Kh_b}{1,2l_{ab}(3,2 + h_b)} + \frac{B}{1,2l_p(3,2 + h_b)} + \frac{Cl_p + Dl_p h_b + Gl_{ab} + Hl_{ab} h_b + Ih_b + J}{1,2(3,2 + h_b)} + \frac{L}{1,2l_p l_{ab}(3,2 + h_b)} \quad (38)$$

Where, the coefficients A, B ... L, result from calculation.

Establishment of absolutely minimum point of the costs function (which establishes the optimum values for considered technological parameters) can be made by solving the equation system obtained by making equal the partial derivatives of the costs function depending on the three variables considered with zero, respectively:

$$\frac{\partial c}{\partial l_p} = 0; \quad \frac{\partial c}{\partial l_{ab}} = 0; \quad \frac{\partial c}{\partial h_b} = 0 \quad (39)$$

### 3. CONCLUSION

Establishment of absolutely minimum value of the costs function based on relationships (38) can lead to values of parameters that are outside the limits imposed by the real conditions of coal deposit, or at values that do not comply certain technological restriction. In this case, by applying the criteria 2, 3 and 4, there are established the values of parameters complying all geological and mining restrictions, and the costs function allow the estimation of mining cost afferent for the coal reserve located in pre – established conditions. In this case the value of costs will be decisive in making the decision afferent for mining respective coal field.

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## THE CONSEQUENCES OF TAX-EVASION

MELINDA SZASZ \*

**ABSTRACT:** *The professor Dan Drosu Șaguna considers that the definitions given to tax-evasion phenomenon in legislation and in doctrine are incomplete and believes that tax-evasion phenomenon could be defined as representing the logical resultant of defects and inadvertences of an imperfect legislation, of bad methods of application and of legislator's inability, too; any state's excessive fiscality makes the legislator as guilty as those who commit it.*

*We made a brief presentation of the tax-evasion's principal effects, because we wanted to underline the negative effect of this phenomenon on national economy. We, also, wanted to show how important is that the fiscal phenomenon to be stopped, or at least decreased substantially, to remove this chain of negative effects.*

**KEY WORDS:** *tax-evasion, taxes and excises, contributor, taxes and contributions to state's budgets and local's budgets, prejudices*

### 1. GENERAL CONSIDERATION CONCERNING THE TAX-EVASION PHENOMENON

The great number of fiscal obligations for contributors had as effect to stimulate, in all times, their cleverness to elude the law and to raise the interest for the tax-evasion phenomenon.

Nowadays all the world's states are confronted with a complex social-economic phenomenon of maximum importance - the tax-evasion. Even if they seek to limit the undesirable consequences of this phenomenon, they are all aware that the phenomenon's eradication is, practically, impossible.

Tax-evasion is defined in the law regarding the tax-evasion's refusal as representing the circumvention by any means from paying taxes, contributions and any other sums due to state's budgets, local's budgets, social assurance's budgets and special funds' budgets by any natural or legal person, Romanian or foreigner.

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\* *Assist.Prof. at the University of Petroșani, Romania*

Whatever is the definition given to tax-evasion, this phenomenon is doomed everywhere, and any state has the fate to systematically and efficiently concern about the prevention and limitation of this phenomenon.

According to our fundamental law – all the citizens are bound to participate, by paying taxes and excises, to public expenses<sup>1</sup>.

Otherwise the item 13 from Human's rights Declaration establishes that each member of society has the right to be protected by the state, but correlatively he has the obligation to contribute to expenditures necessary to realize this objective, in accordance with his goods and incomes, and to its prosperity.

Therefore, taxes are their through nature - legal, and their classic destination is a contributive obligation that citizen has towards state to cover the state's needs and to achieve the necessary conditions for society's development.

The citizen contributes to the alimentation of the state's incomes through excises<sup>2</sup> and taxes<sup>3</sup>. These have innumerability functions, starting with the basic function of state budget and ending with its social and even political functions.

The excise is that exclusive pecuniary take-off imposed to contributors, natural or legal persons, wherethrough is followed the public expenses' defrayal. In doctrine is considered that reducing the taxation quote can be found a way to recover economy by liberating the contributors from fiscality's weight and to make contributors to not search middles to elude fiscal bound, because the taxes are little.

Lately, the specialists showed that, for instance, the settlement of impositions on income to a unique quotation of 18% wanted to be a measure of fiscal relaxation. We believe that, indeed, this is a step forward in the fiscal relaxation, but this measure has first a popular and politic real reason, and advantages those persons with big and very big incomes.

Referring to taxes' notion and functions it can be noticed the fact that tax-evasion provokes many effects type: social effect, economical, political and on states' incomes.

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<sup>1</sup> *Constituția României revizuită*

Art. 56: Contribuții financiare:

(1) Cetățenii au obligația să contribuie, prin impozite și prin taxe, la cheltuielile publice.

(2) Sistemul legal de impuneri trebuie să asigure așezarea justă a sarcinilor fiscale.

<sup>2</sup> Impozitul este o sursă de venit bugetar, care are la bază legea, iar ca subiecți plătitori persoanele fizice și juridice, denumite generic contribuabili. El a apărut odată cu apariția statului, cu scopul de a asigura funcțiile acestuia și alte servicii publice. Terminologic cuvântul impozit sugerează ideea de a impune, de a obliga. Conform legii 500/2002 impozitul este definit ca fiind o "prelevare obligatorie, fără contraprestație și nerambursabilă efectuată de către administrația publică pentru satisfacerea necesităților de interes general".

<sup>3</sup> Conform legii 500/2002 taxa este definită ca o "sumă plătită de o persoană fizică sau juridică, de regulă pentru serviciile prestate acesteia de către un agent economic, o instituție publică sau un serviciu public".

## **2. THE ECONOMICAL EFFECTS OF TAX-EVASION PHENOMENON**

The state's budget is a middle to assure the general economic equilibrium, as well as a middle to correct the economic conjuncture. But, to carry out these functions the state's budget needs secure and grown-up volume incomes. The provisions regarding interdiction and punishment of tax-evasion were made because it was necessary to settle and receive, in the quantum and at the term provided by the law, the excises, taxes and other state budget incomes<sup>4</sup>.

Tax-evasion phenomenon generates prejudices to state, because he is deprived to its incomes necessary to achieve its attributions and to contributors, too, because total taxes are distributed to smaller incomes.

Tax-evasion phenomenon can determine a considerable diminution of the state budget's incomes, affecting the contributors who respect their fiscal obligations, and, also, the contributors who don't respect their fiscal obligations.

Because of a high fiscal pressure, and therefore of a grown taxes quotation, there is a big difference, in the economic plan, between the contributor that respect their fiscal obligations and those who don't.

The contributors who discharge to the state's budget a big part of their incomes through taxes shall be deprived of financial middles and shall have difficulties in continuing their activity in good conditions.

The contributor who don't respect their fiscal obligations and don't pay their budgetary book debts - will obtain certain incomes that can not follow its natural course in the economic cycle, because even if they will obtain a sum of money, they can not use it in the economical licit process. This way, undeclared incomes will arrive in a hidden account from his country or from foreign countries, or will be used to develop underground economy, and this phenomenon will increase the tax-evasion.

Because the state's budget will be affected through the decrease of incomes and tax-evasion phenomenon, state won't offer any subvention and fiscal facilitations, at time or in the pledged quotation; and that will affect many contributors who could receive those exonerations, samplings or moratoriums.

## **3. THE SOCIAL EFFECTS OF TAX-EVASION PHENOMENON**

The fiscal system must always searches to make a compromise between the incomes necessity and the care for social equity, respectively for payments proportionality with each contributor's capacity.

Observing social equity is very important, because taxes hurt contributors in their most important interest: money. Because of that, all contributors are very sensitive when it's about any informality or any iniquity in this area.

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<sup>4</sup> Ioan Gliga – Drept financiar, Ed. Humanitas, București, 1998, pag. 193

Thus, in doctrine was underlined, that in the case in which a fair contributor sees the consequences of big taxes quotations of his economic activities, noticing, in the same time, the economic situation of the contributor who doesn't pay his fiscal obligations, he can arrive at the conclusion that is more profitable to apply tax-evasion method. This is what represents a profound iniquity regarding the fair contributor in comparison with the un-fair contributor, who lives better.

The iniquity appears, also, in those situations when Romanian state offers a series of facilitations for foreign investors, with the clear intention to developed economy through foreign capital's attraction. In situations like that the Romanian investors is in a net disadvantage in comparison with foreign investors. The foreign investors dispose of a voluminous capital, a grown experience in the area of economic management, and above all these have the fiscal advantage offered by Romanian state; therefore, in such economic fight, Romanian economic agents have no chance to gain.

In a society with numerous tax-evasion phenomenons, this will be reflected on living standards, too, causing profoundly feelings of social iniquity, and a lot of other negative effects - like the drastic diminution of contributors' thrust in public authority and its politics.

The tax-evasion, corroborated with the state's impossibility of outfacing it, is a phenomenon that brings seriously touch to the populations' respects for fair labour, equity and justice, this having gravely consequences in psychological and social plan.

#### **4. THE POLITICAL EFFECTS OF TAX-EVASION PHENOMENON**

Tax-evasion phenomenon is an important generating factor of social iniquity, of contributors' distrust in the public powers, generating, also, mistrust in current politic power.

Besides many another factors - social, economical, and politic, tax-evasion phenomenon causes citizens mistrust in the political powers responsible with the government. And that, because, the majority of contributors are burgess, which means that all these dissatisfactions can easily reflect on elections results.

The citizens' dissatisfactions determined by the feeling of social and economic iniquity, amplified by the tax-evasion phenomenon can have a grown influence on the evolution of political system.

#### **5. THE OF TAX-EVASION'S EFFECTS ON STATE INCOMES**

Tax-evasion's effects on state incomes are multiple; the immediate and direct consequence is the diminution of state's incomes. This diminution will, obviously, provoke a less budget that won't permit to the states to carry out its basic functions.

Tax-evasion phenomenon negatively influences the volume of state's incomes through two mechanisms: directly through tax-evasion phenomenon which deprives state's budget not paying the fiscal obligations according to current legislation; indirectly through tax quotation increased by the central public administrations, leading

to the enlargement of fiscal pressure and the contributors resistance to pay taxes.

In doctrine was shown that state receives taxes, because must achieve some objectives, such as welfare, security and social justice.

In the presence of tax-evasion phenomenon, the state is confronted with an acute absence of financial funds and his only immediate measure is to grow the tax quotations or to establish new taxes, phenomenon that will, also, generate the breed of fiscal pressure. The fiscal pressure, at its turn, has as main effect the appearance of tax's resistances and, therefore, the appearance of tax-evasion phenomenon.

So, appears a vicious circle from which state can come out only with the condition to reduce the tax-evasion phenomenon (tax-evasion decrease causes an immediate growth of state's incomes volumes), and, in the same time, the fiscal pressure. Also, to pay and collect the state's incomes at time help budgetary execution, and if it is not like that this can generate grave consequences, causing state budget's unbalance.

The state's budget unbalances are amplified, sometimes, and even generated, by the existence and the amplitude of tax-evasion phenomenon, which drives to an incorrect achievement of state's functions. In the conditions of a free enterprise, in transition and without a solid economic base, the non-execution of state's functions causes a series of negative effects at economic, social and, even, political, level. When state's necessity of money is satisfied, and the money funds are secure and in good time, state can even take the measure to diminish tax quotations.

## **6. CONCLUSIONS**

Although we can't say that tax-evasion is a specific phenomenon for Romania, it is one of the social-economical problems wherewith our country is confronted. This phenomenon has some undesirable consequences and that's why it must be limited, because its eradication is practically impossible.

That's why state must concern about the limitation of this phenomenon. State can, also, incite to tax-evasion, because it wants to stimulate the capital or when it supports some groups of interest.

To limit tax-evasion, first, there must be removed the causes that produce or conduce to this phenomenon. And for that, there must be realised a profound and systematic analysis.

The most efficient attitude in front of this phenomenon is to administrate it, at the identification, prevision, control and capitalization level.

As the recentness information we underline the modified form of the law who prevent and struggle with tax-evasion, which provides bigger punishments that go up to 20 years of prison.

This law is the most important point from the actual government program in the campaign of fight against corruption. According to this law, tax-evasion infraction shall be punished exclusively penal and shall be assimilated with crime. The novelty of

this law is that the punishments with prison for this infraction will be as big as in the crimes against life and persons integrity, like murders. This law, also, provides other facts that bring gravely prejudices to state's budget - like the traffic with delivery-notes, so often met in our country.

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## **NATIONAL ELECTRONIC SYSTEM AND COMPUTER ASSISTED EDUCATION SYSTEM IN ROMANIA**

**TEODORA VĂTUIU, VASILE POPEANGĂ \***

**ABSTRACT:** *The impact of global information flows, and of the knowledge economy, on governmental and societal institutions is no less profound or important. In information-rich environments where knowledge flows freely and communications are abundant and multi-directional, pressures increase on governments to be more transparent, accountable and participatory. At the same time, the ability of governments to access and control information, and the uneven access to information and knowledge among sectors of society can, in certain circumstances, increase inequality and further entrench existing political and social elites. Unequal access to education and training can perpetuate and deepen inequality.*

**KEY WORDS:** national electronic system, computer assisted education

### **1. INTRODUCTION**

Knowledge, and the ability to create, access and use it effectively, has long been a tool of innovation, competition and economic success, and a key driver of economic and social development more broadly. Yet several dramatic changes in recent years have fundamentally increased the importance of knowledge, and the competitive edge that it gives to those who harness it quickly and effectively. The ability to process and transmit information, globally and instantaneously, has increased exponentially per unit of cost in recent years due to the combined effect of advances in computing speed, and competition, innovation and lower costs in global communications networks.

E-Government was intensely promoted in the past two years as it is considered the best way of organizing public management in order to increase efficiency, transparency, accessibility and responsiveness to citizens, as well as to reduce bureaucracy and corruption, through the intensive and strategic use of communications

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\* *Assoc. Lecturer at the "Constantin Brâncuși" University of Tg-Jiu, Romania  
Prof., Ph.D. at the "Constantin Brâncuși" University of Tg-Jiu, Romania*

and information technology in the inner management of the public sector, as well as in its daily relations with citizens and users of public services.

## 2. ECONOMIC INCENTIVE & INSTITUTIONAL REGIME

An essential element for building knowledge economy is to **create an appropriate economic incentive, institutional regime and a legal framework** that encourages the widespread and efficient use of local and global knowledge in all sectors of the economy, that fosters entrepreneurship, and that permits and supports the economic and social transformations engendered by the knowledge revolution.

Thus, as part of an anti-corruption legislative package, the Government of Romania promoted concrete measures to insure the availability of all public information on line and the possibility to provide on line complex and complete governmental services. The legal obligations of the central and local public administration authorities will be established very clearly in order to have a functional system allowing all citizens' access to public information and services - from filling in different forms to processing them on line. This is the actual "**desk reform**" and it means that any Romanian citizen will be able to access the Internet, from home or other public place, even from the office, for interacting with the administration. The initiative is meant to improve the access to the information and services of public administration authorities and to simplify the bureaucratic procedures by standardizing the methodologies of work.

## 3. INFORMATION INFRASTRUCTURE

**Building a dynamic information infrastructure** that fosters a variety of efficient and competitive information and communications services and tools available to all sectors of society. This includes not only "high-end" information and communication technologies such as the Internet and mobile telephony but also other elements of an information-rich society such as radio, television and other media, computers and other devices for storing, processing and using information, and a range of communication services. In this regard, the launching of the **Electronic National System** in 2003, the portal organized as a one-stop-shop in the relation with the Government, that will provide forms for download and on line services, was the beginning of a general digital reform in the Romanian Society. The system will make the overall interaction with the administration more efficient and comfortable, while reducing costs for both public and private entities and increasing the public trust in the administration. The portal is developed for the public administration with the purpose that every individual or institution with Internet access, both within the country or abroad, could access online to information and services provided by the government without knowing in advance which specific entity has to contact. This service will be available 24 hours a day and 7 days a week.

The National Electronic System is a secure, centralized point of access for all government-related services and information and has two main components: one-stop-shop for electronic public services and one-stop-shop for electronic administrative forms. The goal of **one-stop-shop for electronic public services** section is to provide the Romanian Government interoperability and transactional hub capabilities required to accelerate e-Government initiatives at the national, regional and local levels, therefore providing critical government services within and between government institutions and efficiently extending public services to business and citizens alike.

The second section, **one-stop-shop for electronic administrative forms**, allows the download or consultation of administrative forms. For the beginning, 164 forms are available for download, involving 465 public institutions, and the number shall be gradually extended: thus we expect to reach several thousands in number by the end of next year.

Providing administrative forms through electronic means takes into account the fact that most of the interaction between citizens and the administration is done through forms. The one-stop-shop for electronic administrative forms is an effective tool to fight bureaucracy. It provides public information and administrative forms "here and now", 24/24, 7 days per week and provides transparency of Public Administration, being also an efficient tool to fight against corruption.

#### **4. INNOVATION SYSTEMS**

Until today were implemented many services on-line for citizens: declaration regarding nominal record of insured employees and payment obligations towards national insurance budget, deduction regarding VAT, driving licenses, the electronic collection system of statistical data, quarterly and annual balance sheet for the most important contributors, visa online, online customs declarations, electronic System for Allocating International Transport Authorizations, electronic System for Public Acquisitions. All these services are functional and are used by more and more citizens, but the most successful are Electronic System for Allocating International Transport Authorizations and Electronic System for Public Acquisitions.

The Electronic System for Public Acquisitions demonstrated it can lead to important savings in public spending, as well as to an increase in transparency for public acquisitions and a decrease of corruption in this sector. It was launched on March 4th, 2002, with 159 public authorities using the system, for 7 categories of goods. Today, **1050 governmental agencies** and over **8000 providers** have asked to use the system, there are **80 categories of goods** involved, comprising thousands of individual products, and the results are **75 million euro** savings and over **250 000 closed transactions**. By procuring electronically, the Romanian Government proved it can lower the cost of inputs, also encouraging the private sector to move to B2B and creating the premises for lowering corruption, reducing bureaucracy and ensuring transparency, in the effort of building efficient and accountable public sector institutions, capable of sustaining long term development.

Also, [www.e-guvernare.ro](http://www.e-guvernare.ro) has an e-democracy feature, providing the possibility for visitors to express their opinions on which forms should be introduced in the portal and even which of them should be transformed in electronic services, the opinions received being evaluated periodically.

National Electronic System was selected for the World Summit Award at the World Summit on the Information Society and won "**The Best Digital Content Award**" in e-Government section.

## 5. EDUCATION AND TRAINING

Consequent to its aim of leading Romania towards the full and proper integration into The European Union, the Romanian Government has approved a proposal, made in 2001 by The Group for Promotion of Information Technology), to launch and operate a project dedicated to the implementation of an education system benefiting from the ICT.

The project, known by the acronym SEI, started in 2001 with a pilot phase and a budget of about 6 million €. The pilot phase ended in 2002. As result, a number of 120 high schools have been provided with educational platform. A platform consists of 25 work stations, interconnected to a server; it is provided with necessary peripherals and benefits from Internet connectivity. A dedicated "operating system" (known as AEL) was specially designed to provide educational contents management and also to offer the support for the administrative activities associated to the teaching. A relatively small number of lessons were also offered to the students.

The second stage of SEI brought 1,100 more platforms and the number of available lessons has increased to 230. A great deal of emphasis was placed on training the teachers as users of SEI. This proved to be a formidable task. Given the general economical level of the country, important quantitative indicators, such as the number of computers per 100 inhabitants, are quite behind the EU targets and, consequently, the level of computer illiteracy is too high. A great deal of effort was spent to train around 13,000 teachers, who, in turn, became trainers for their colleagues. Much attention was paid to the process of motivating teachers to adapt or amend existing lessons and, even more, to create lessons according to their likings.

The second stage, which benefited from a budget of around 55 million €, was successfully concluded by the end of 2003, which coincided with the launching of SEI 3, which will provide platforms for all high schools in Romania, will bring approximately 150 new lessons and will offer ICT means for nation-wide examination, a portal exclusively dedicated to education. The same high attention will be focused on teacher training, the key to success.

The use of ICT in education is by no means a fashion, but a MUST. There are many concepts and notions far better understood when the student has the opportunity to search, discover and experiment by himself/herself, in parallel with the classical ways of studying. The availability of a nation-wide computer based educational system

guaranties that each and every high school graduate is fluent in using a computer, thus is better prepared for a successful and rewarding career.

The main ingredient for the success of the system is the teacher training. By no means does an ICT based training system remove the teacher from the process or diminishes his/her role. Moreover, although attention is now focused on student rather than teacher, the latter has the more delicate responsibility of properly directing, "from the shadow", the student.

Although Internet is not a means of education, but one of getting informed, availability of a proper Internet connection is indispensable in the process of converting the student into a person prepared to face and succeed the challenges of the contemporary world. The need for skills of searching for information, of acquiring it after filtering it out and of eventually using it is axiomatic in knowledge based economy.

By tradition, the high schools are located mostly in big towns and cities. It follows that the rural media, already one step behind the urban, are further pushed out of touch with modern developments if proper and resolute action is not taken.

The results of Project SEI for high schools represent a strong encouragement to expand it to the lower levels of the education. Since the gap between town and village is an unwanted historical heritage, it would be wise to start expansion with the rural collectivities. The benefits are many-fold:

1. The human potential of the rural areas is huge, very much unknown and insufficiently used. This goes hand in hand with the need to offer equal opportunities to all population;
2. Given the scarcity of resources, the infrastructure created primarily for schools can be efficiently used to train by using eLearning procedures the personnel employed by the local authorities (town hall, tax collectors, civil servants of all kinds etc);
3. Availability of ICT resources would allow their use by the local community at large. The family and the local authorities alike would come closer to school and, in turn, this will help in better understanding of the aims and needs of the school;
4. Last, but not least, the creation and management of such "Telecenters" would serve as incentive for developing nuclei of business into rural areas, for example a sort of specific stock exchanges, teleshopping etc., let alone the wealth of information such telecenters could provide to the users.

The initiatives of the Romanian Government promoting the increasing use of electronic means and technologies in reforming the administration, tested step by step, from pilot applications to national programs, based on a clear plan of enforcement and realistic budgeting, having in centre the accountability for concrete results, proved successful till now and promise to deliver in short time **a new, modern, more efficient and transparent administration in Romania.**

But even in advanced economies there are rural and remote communities or disadvantaged regions that have been left behind in terms of educational and technological equity and access. An important component of the new system is the

telecenter. This is located in a specified site that provides public access to ICT resources and its aim is to provide wide access to information and knowledge.

The availability of a telecenter can represent a good incentive for entrepreneurs to invest in its operation and development. Such an approach could attract valuable financial resources. In fulfilling these goals, they are expected to have a positive impact on the socio-economic development of the communities they serve, helping to:

- develop rural and remote infrastructure;
- provide rural regions with better public services and improved local administration;
- generate employment and foster socio-economic development;
- integrate relatively isolated communities into the national and international information network and thus accelerate exchange of private goods and services;
- give local producers access to market information, thus reducing the need for middlemen and increasing rural incomes.

The human potential of the rural areas is huge, very much unknown and insufficiently used. This goes hand in hand with the need to offer equal opportunities to all population. Availability of ICT resources would allow their use by the local community at large. The family and the local authorities alike would come closer to school and, in turn, this will help in better understanding of the aims and needs of the school.

The design and the deployment of the system would encourage penetration of Internet into rural areas. Other communities could follow suit, even without having to start with a big investment in computers and associated software.

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## **THE OBJECT-ORIENTED TECHNOLOGY; PROCESS ANALYSIS AND COST ESTIMATION OF THE SOFTWARE DEVELOPMENT**

**TEODORA VĂTUIU, VASILE POPEANGĂ \***

**ABSTRACT:** *The Object-Oriented Technology (OOT) is expected to faster the software development process industrialization. In fact, it can increase the process productivity and flexibility, requiring a change of the firm management practices.*

*In particular, cost management has to be re-defined according to the OOT peculiar characteristics, introducing changes consistent with the actual OOT spread in software firms. In the paper, the object-oriented software development process is discussed. Then, after the analysis of the results of a survey of Italian software producers aimed to investigate the actual spread and the characteristics of the OOT practices adopted, a model for the cost estimation of the object oriented software development is proposed.*

**KEY WORDS:** *The Object-Oriented Technology, process analysis, cost estimation*

### **1. INTRODUCTION**

The Object-Oriented Technology (OOT) is introducing remarkable technological and organizational innovations for both users and producers of the software industry. Although the OOT cannot be considered a very recent innovation, its spread in the last years and the forecasts of its future wide adoption in the whole software industry are impressive. Among the main innovative characteristics of the OOT, those, which probably produce a great transformation in both the software design and use, are the software modularity and reusability.

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\* *Assoc. Lecturer at the “Constantin Brâncuși” University of Tg-Jiu, Romania  
Prof., Ph.D. at the “Constantin Brâncuși” University of Tg-Jiu, Romania*

Modularity is the possibility of splitting simple as well as complex software products in many autonomous units, which can be developed and maintained independently of the other components of the software application. Reusability means that the software components, i.e. modules, classes and objects, can be easily used in different applications, especially if they are to be reutilized with originally designed. As a consequence, the adoption of the OOT also requires that some management practices in the software firm should change consistently with the development process. In particular, the costing estimation and control process should be re-defined according to both the OOT characteristics and their effects on the software development process. It could be expected that, due to the higher standardization of the OOT, the object-oriented (OO) software provide a more accurate cost estimation of the product development than the procedural software.

## **2. THE OBJECT-ORIENTED SOFTWARE DEVELOPMENT PROCESS**

A software development process can be schematized by the sequential phases of system feasibility, problem analysis, software design, coding and testing. For procedural software, these phases usually follow a waterfall development process model. This model assumes that the software is developed in subsequent stages and every requirement is known up front, so that tasks can be executed one at a time.

Errors in the earlier steps of the process would result very expensive, due to the difficult software adjustments. Different software development models, such as the evolutionary model, consist of many cycles of the process development, so that the software can be iteratively and incrementally modified.

The iterative development supports the cyclic improvement of the system components. The incremental development allows splitting the system in different parts, which can be developed in subsequent steps. Iterative and incremental development can be used alone or together. This kind of development model, however, generally cannot be applied to procedural software.

For the OOT, on the contrary, the logic underlying the waterfall model, single-project oriented, does not perfectly match with the typical OO logic of modularity and component reusability, while the application of the evolutionary model allows exploiting the OOT characteristics. In fact, the OO software can be developed starting from a few known problem requirements, thus building an initial, transient version of the software, and then, as the problem requirements are more defined, the software can be completed by adding new software components and/or improving the existing ones.

After each phase of the software development process, different representation models of the software system are built, each focused on certain aspects of the system:

- ❖ Requirement model: it describes the functional requirements of the system;
- ❖ Analysis model: it provides the abstract object-based system representation;
- ❖ Design model: it provides the detailed software structure for the specific application;

- ❖ Implementation model: it is the software developed in the source code;
- ❖ Test model: it includes the test results.

The high modularity of the OO software, allowing developing software partitioned in autonomous modules has important effects on the human resources organization involved in the development process. In fact, organization structures and procedures are defined on the basis of the software modules definition and on their integration in the whole software. Each module seems particularly suitable to be developed by inter-functional teams. In fact, inter-functional teams can integrate analysis, design, coding and testing competencies, so that the development of can be autonomously carried out.

Finally, the assembling of the different modules can be carried out by specific organization units, charged to test the whole software application.

### **3. THE OOT IN EUROPEAN SOFTWARE PRODUCERS**

In order to investigate the actual spread of the OOT in the software producers and to analyze the characteristics of their OOT practices, a survey has been carried out in the software market. The survey was based on a questionnaire sent by e-mail, distributed at some conference sites, and available on an IBM web site. Often is asked the question of the lifetime is enough important characteristic because if the life is longer there is more justified investment. We received 50 answers. The questionnaire was divided in four sections: technology, development, process, costing. A discussion of the main results of the investigation follows.

### **4. TECHNOLOGY**

The percentage of object-oriented software applications produced in 2002 referred to the total software production is ascending. In almost half of the firms (46%) this percentage is lower than 20%, but in a relevant number of firms (30%) the production of OO software is at least 80% of the total. The remaining firms present production rates ranging between 20% and 80%. The results show that the new technology is quite spread in the European market, even if not as in the USA.

The adoption of the OOT is likely to be delayed by the high training costs. Only in the 8% of the firms the programmers that have always worked in OOT are more than 80%, while in most cases (57%) more than two thirds of the personnel has been reconverted to OOT from the traditional software technology. The most used programming language is C++ (29%), followed by C (21%), Visual Basic (13%), Java (11%), Smalltalk (3%).

Referring to the spread of the OO methodologies in the analysis and design phases of the software development process, it can be observed that more than one third of the firms (35%) do not use any methodology. The most known of them, e.g. Booch (11%) and Rumbaugh (6%), have been adopted by the 43% of the firms. The

22% provided no answer. Referring to the software development support tools, more than half of the firms (54%) do not use any tool, and the no answer percentage is 20%.

The remaining firms adopt tools such as Visual Basic, Rational Rose, Object Master, MIN power plant. The most used object communication protocols are OLE (34%) and CORBA (10%). However, more than one third of the firms do not use any protocol (35%).

## **5. DEVELOPMENT PROCESS**

A large part of the sample (75%) makes use of prototypes during the software development process. In particular, the frequency of prototyping is very high for the 38% of the firms, while it depends on the product for the 24% and on the client for the 13% of the sample. The use of teams during the software development process is rather common (68%). For more than half the firms (53%) the team size depends on the product complexity, and one third (33%) on the software size.

For fewer firms, the team size depends on the delivery schedules and on the number of classes to be developed (8% and 4%, respectively). A team very often gathers personnel of different competencies (in the 69% of the cases). In a smaller percentage (19%) the team competencies are homogeneous.

The results also show that only a small percentage of firms (20%) use a metric to control the process quality, while two thirds of the sample (64%) does not use any metric. The firms were also asked to provide their options on how productivity can be increased, by rating four key factors in a 0-3 scale. The results have shown that personnel training and motivating is still considered more important than exploiting factors related to technological issues, such as the development of reusable components, the reuse of existing components, or the adoption of innovative software technologies.

Although reusability is not judged as the most efficient way to increase productivity, most firms produce in-house software components for a future reuse (66%). Reusable components can be produced during the development of a specific software application (50%), or they can be the result of a devoted activity (23%).

External suppliers also purchase reusable components. The percentage of firms that do not purchase is equal to the purchasers one (44%). The software components are usually upgraded yearly or half-yearly (40%), and only the 16% of the firms depreciates them. The weight of the purchasing costs on sales is lower than 10% for most firms (69%), while it is lower than 20% for the 19% of the firms, and it rises to 30% for a smaller number (12%).

## **6. COSTING**

The first aim of the questionnaire section was to achieve an outline of the cost classification in the software producers. The rate of no answers was higher than in other questionnaire sections (from 32% to 56%).

The analysis and design/coding personnel are the most evident direct costs and, together with hardware and software resources, present the highest values of *and* costs. The remaining resources are usually considered as overheads. Many firms use traditional cost accounting techniques to compute the product full cost (47%), while a smaller number is interested in computing the cost of specific activities (20%). The only parameter resulting for cost allocation is the effort, measured in man-months.

No further evidence about other allocation parameters has been provided. Frequently the costing techniques directly stem from experience rather than from literature (41% versus 13%, respectively). The cost estimation process is affected by errors varying in a wide range (10% to 100%). Their distribution has a mean error of 26.4% and a standard deviation of 25.7%. The high rate of no answers (54%) can be due either to the confidentiality of cost data or to the difficulty of evaluating a mean value of the estimation error, because of its high dependence on the specific software product.

They show that some of the factors causing the estimation unreliability, such as platform compatibility and requirement changes and misunderstanding, can be deeply affected by the software technology. The 18% of the firm sample perform the cost estimation after the phase of requirements definition, about one third after the analysis phase (35%), the 15% after the software design. A few firms wait the phases of coding and testing (5%). In the 48% of cases the cost estimation can be improved during the development process, and only the 12% of the firms is not able to improve the estimation.

## 7. CONCLUSIONS

The first empirical evidence of the survey is a remarkable interest in the OO technology. However, even if many firms seem aware of the potential benefits of the OOT, it seems that they do not know how to profit from OOT.

There is not yet a well-structured application of the OOT, and the body of knowledge seems to be still rather poor. Some evidences justify this. First, formal development methodologies, support tools and protocols are scarcely diffused. Second, most firms do not use any metric for the process control. Third, firms make a large reuse of standard components, but this is considered less important than, for instance, personnel motivation to increase productivity. The empirical analysis can also provide some indications for the design of a cost estimation model for the OO software development process.

The costing models actually used by the surveyed firms are aimed to compute the full product cost. While a remarkable number of firms are interested in quantifying also the costs of the single activities, the costing techniques adopted are still not very accurate. For instance, the man-months are used as the only allocation criterion. From the survey results it can be also inferred that the estimation process is likely to be improved in an OO environment. In fact, the impact of the factors recognized as causes of estimation errors can decrease when the technology turns from procedural to OO.

In particular, the OOT is expected to decrease the risks associated with the product requirements misunderstanding and changes, as well as the dependence of the software on the hardware platforms reliability. The reliability of purchasing, the effectiveness of the management techniques and the predictability of productivity are also expected to increase.

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**Index of Authors**

- A**  
ACHIM, M.I. (15)
- B**  
BARON, M. (21)  
BIVOLARU, D. (39)  
BRICIU, S. (45)
- C**  
CALINCOVSCHII, S. (217)  
CHIRIL, G. (267)  
CIUNGU, C. (51)  
CIUNGU, P. (57)  
CRĂCIUN, L. (63)  
CRIVEANU, R.C. (63)  
CUCU, I. (73)
- D**  
DIMA, I.C. (81)  
DOBRE-BARON, O. (87)  
DRIGĂ, I. (95)  
DUMBRAVĂ, G. (101)  
DURA, C. (107)
- F**  
FERRAGINA, A. (117)  
FLEȘER, A. (125)  
FLITĂR, M.P. (129)
- G**  
GAVRILĂ-PAVEN, I. (15, 45)  
GHICĂJANU, M. (135, 141)  
GIL-ALUJA, J. (5)  
GIOVANNETTI, G. (117)
- H**  
HADA, T. (149)  
HINESCU, A. (15)  
HULEA, L. (155)
- I**  
ILOIU, M. (159, 165)
- IONICĂ, A. (169)  
IRIMIE, S. (173, 267)  
ISAC, A. (179)  
ISAC, C. (179, 185)  
IVĂNUȘ, L. (191)
- K**  
KORONKA, A. (101)  
KORONKA, F. (197)
- L**  
LUNGU, I. (201)
- M**  
MAGDA, D. (209)  
MAN, M. (217)  
MANEA, S. (223)  
MIHAI, C. (81)  
MUNTEANU, R. (176)
- P**  
PASTORE, F. (117)  
POPEANGĂ, V. (229, 283, 289)  
PREDA, M. (237)  
PURCARU, I.S. (267)
- R**  
RĂSCOLEAN, I. (247)  
RĂVAȘ, B. (251)
- S**  
SLUSARIUC, G. (247, 257)  
STEGĂROIU, I. (261)  
SURULESCU, D. (267)  
SZASZ, M. (277)
- T**  
TEIUȘAN, S. (45, 149)
- V**  
VĂTUIU, T. (201, 229, 283, 289)

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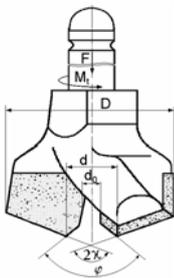


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