Real Academia de Ciencias Económicas y Financieras

INCIDENCIA DE LAS RELACIONES ECONÓMICAS INTERNACIONALES EN LA RECUPERACIÓN ECONÓMICA DEL ÁREA MEDITERRÁNEA

• VI ACTO INTERNACIONAL CELEBRADO EN BARCELONA EL 24 DE FEBRERO DE 2011 •

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EL MEDITERRÁNEO DE NUEVO EN LA VANGUARDIA DE LA HISTORIA

Se dice que el Mediterráneo es una metáfora del mundo. Para nosotros es un espacio de diálogo en el que cada año la Real Academia de Ciencias Económicas y Financieras (RACEF) lo transforma durante una Jornada Internacional en distinguido foro de las mejores ideas de los académicos de todas sus riberas, hoy atravesadas por una nueva oleada de guerras y conflictos, pero también de esperanzas hacia un mundo mejor.

Este nuevo volumen que recoge, una vez más, las contribuciones de nuestros académicos constituye nuestra modesta aportación anual a la libertad de pensamiento, expresión y reunión en toda el Área Mediterránea, que creemos son el insustituible cimiento sobre el que los hombres libres edifican la ciencia, la política y la economía, elementos indispensables para el progreso de las naciones.

Este foro y la entera corporación que me honra presidir se han distinguido, desde su fundación y durante sus más de dos siglos de historia, por defender esos valores. En esta ocasión volvemos a alzar nuestra voz con más fuerza si cabe en favor de la ciencia y el progreso que florecen ya en todo el Mediterráneo, relegando las tiranías al lugar que les corresponde, que es el vertedero de la Historia.

Son tiempos de cambio, sí, y por eso mismo deben serlo también de reflexión, de fecundo intercambio de análisis, críticas e ideas. Los académicos y sus discursos reunidos en estas páginas se han asomado a la actualidad sin vértigo y con lucidez y han tomado el pulso al pálpito de los acontecimientos. Y todo ello, sin perder de vista en ningún momento el rigor que proporciona el poso de nuestra historia.

Las contribuciones de los mejores científicos sociales aúnan el rigor científico y la sensibilidad hacia las complejidades del espacio que nos es tan querido. Sus pensamientos nos hacen recapacitar sobre nuestro presente y nuestro futuro: ¿Qué nos aguarda a la vuelta de la próxima esquina de la Historia del Mediterráneo?

Tras la caída del vergonzoso muro que dividió Europa en Este y Oeste y nos separó durante casi medio siglo, trabajamos, ahora, para derribar el siguiente muro no menos ominoso, el Norte-Sur, que ha separado las dos riberas del Mediterráneo en dos regiones divididas no sólo por la religión o la ideología, sino también el nivel de progreso económico y tecnológico.

Nos honramos en reunir aquí, también, las contribuciones de académicos de esas dos orillas unidos por la Real Academia de Ciencias Económicas y Financieras en la causa común de la prosperidad a través de la ciencia: como los doctores Alessandro Bianchi o Giancarlo Elia Valori de Italia; Eugen Simion y Maya Simionescu de Rumanía o Janusz Kacprzy de Polonia; Iurii Kondratenko de Ucrania o Korkmaz Imanov de Azerbaiyán.

Y de otros, como Nashaat El-Khameesy de Egipto, pueblo del que siempre fuimos amigos y ahora además somos cómplices en su esperanzador camino hacia la plena democracia que, sin duda, redundará también en un mayor progreso científico, social y humano.

Nuestro académico y ex ministro Alessandro Bianchi nos acerca con buen pulso narrativo al tráfago de los cambios en el mundo árabe y se revela profético en sus extremos, puesto que creemos, con él, que los ciudadanos de esos países han decidido tomar su destino en sus manos y avanzar con paso firme hacia las reformas que les permitan disfrutar de los niveles de libertad y bienestar que gozamos en este lado del Mediterráneo.

No menos sugestiva resulta la apasionante aproximación a Turquía realizada por el doctor Valori. Turquía es una potencia emergente y una referencia insoslayable para todos los países que aspiran al progreso en libertad sin renunciar a su cultura musulmana.

Se observa, así, que ambos académicos conjugan un apremiante análisis de las causas y estado de la revolución árabe y una aproximación valiosa a lo que sería un destino deseable en la moderación, la apertura y el progreso económico.

Con estas aportaciones, nuestra Real Corporación muestra su visión independiente y rigurosa al análisis crítico del devenir histórico del área mediterránea: somos conscientes de que la Historia nos desafía, pero también nos estimula, al someter a su juicio inexorable todas las estructuras mentales e ideas preconcebidas que, a la postre, han demostrado estar alejadas de la realidad.

Nuestro deber como académicos es proporcionar a las sociedades civiles de nuestros países mediterráneos nuevas herramientas para el análisis y me permito concluir aquí, a la vista de la calidad y la profundidad del trabajo de nuestros académicos de Azerbaiyán, Egipto, Italia, Rumanía, Polonia y Ucrania, que nos encontramos ya en el buen camino para lograrlo.

Y desde la Historia, pero con innegable proyección de presente y futuro llega la semblanza del príncipe Dimitrie Cantemir realizada por el profesor Simion. Cantemir es un "Homo europaeus" del Este, un ilustrado pero también hombre de acción y de ideas, cuya trayectoria ilumina hoy a todos los amantes del progreso y la libertad; igual que nos anima a renovar nuestra confianza en el progreso y la razón el análisis de la profesora Simionescu: comulgamos con ella en la razonada convicción de que sólo la ciencia, libre de ataduras, dogmas y supersticiones, podrá hacer de nuestro Mediterráneo el espacio de convivencia que deseamos.

La ingeniería naval en sus máximos exponentes tecnológicos, convertirá ese deseo en realidad navegante por todos los confines de nuestro mar desde los más avanzados astilleros ucranianos del otro mar hermano, el Mar Negro, como propone el profesor Kondratenko, que nos ilustra de nuevo aquí con su precisión técnica y su claridad expositiva.

No menos brillante resulta la incursión en los modelos económicos azeríes a la luz de la lógica borrosa del profesor Imanov. Su lectura nos ha permitido vislumbrar el enorme potencial de la región del Cáucaso para el progreso Europeo y de cómo este pequeño gran país que es Azerbaiyán puede ponerse a la vanguardia de su desarrollo económico.

Hallamos aquí al político, al gobernante, al científico, al gestor y al ciudadano a través de la reunión de las contribuciones de nuestros académicos destinados a la construcción de ese espacio de diálogo, de análisis crítico y de progreso científico que deseamos para nuestro Mediterráneo en el siglo ya empezado.

Este volumen es un pequeño, minúsculo, paso en la historia milenaria de nuestros pueblos y de la Ciencia europeas. Se trata de un casi imperceptible avance que nuestra Real Academia de Ciencias Económicas y Financieras vuelve a dar como cada año al organizar estas jornadas cuyo único objetivo es contribuir al progreso en todas las orillas de nuestro mar.

MODERADOR

SR. D. JOAQUÍN LUNA

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actuó de Moderador del VI Acto Internacional sobre la

“Incidencia de las relaciones económicas internacionales en la recuperación económica del área mediterránea”

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LE PRINCE DIMITRIE CANTEMIR :UN ESPRIT MÉDITERRANÉEN, UN « HOMO EUROPAEUS » DE L'EST

Puisqu'on discute ici, à Barcelone, chaque année, grâce à l'Académie Royale de Sciences Economiques et Financières de l'Espagne (grâce, je veux dire, au Président Jaime Gil Aluja), puisqu'on y discute, je voulais dire, de *l'espace méditerranéen* et, ipso facto, de l'esprit méditerranéen, je voudrais vous faire attention en quelques mots sur un personnage intéressant, formé, cultivé intellectuellement dans l'espace méditerranéen(son côté sud-est européen) où plusieurs cultures se rencontrent: la culture byzantine, la culture grecque, la culture latine orientale (La Principauté de Moldavie et de Valachie), la culture ottomane (et, par son intermédiaire, la culture orientale) et la culture slave (russe)….Il les a connues toutes et presque dans toutes ces langues a écrit le Prince Dimitrie Cantemir, le personnage dont je voudrais parler dans ce prestigieux colloque où se rencontrent chaque année d'éminents économistes, sociologues, philosophes, juristes, gens de lettres et de sciences de presque tous les pays méditerranéens, d'une part et de l'autre…Même si nous venons de lieux différents et de mondes (civilisations, cultures) diverses, quelque chose de très profond nous lie: c'est surtout cet *esprit méditerranéen* commun qui nous lie qui est, comme on le sait, l'élément formateur et le ferment de *l'esprit européen*. J'ai discuté plusieurs fois sur ce sujet et, chaque fois, j'ai fait appel à Paul Valéry, lui-même un méditerranéen d'origine et d'esprit. Paul Valéry qui disait que l'esprit européen avait trois sources essentielles: *Grèce, Rome et les traditions juives-chrétiennes*. Des érudits plus nouveaux, parmi lesquels, le philosophe de la culture Denis de Rougemont, complète Paul Valéry, en soulignant que ces trois sources constitutives, n'ont pas apparu du néant et qu'ellesmêmes proviennent des cultures l'autre rive (africain) de la Méditerranée ou de la région des Balkan et même de la Mère Noire. L'idée est que *l'identité européenne* se fonde surtout sur le concept de pluralité des civilisations et des cultures et que la force et la garantie qu'elle résistera en temps dépend de l'acceptation du principe de la pluralité et du respect, pas seulement envers ce qui nous rapproche, mais aussi le respect envers ce qui nous différencie. La culture est un produit de la différence. Disons de nouveau: il n'y a pas une culture européenne unique, homogène, avec un seule code et une seule langue. Il y a seulement une totalité des différences et une totalité des codes culturaux, une richesse des nuances et un dialogue des langues, des traditions dans un procès interactif, enrichie des moyens modernes de communication.

Mesdames et Messieurs,

J'ai fait cette introduction afin que j'arrive au personnage que je veux vous le présenter.Un homme érudit de l'Est de l'Europe, un esprit complexe, cultivé- je l'ai déjà dit- dans un espace où se rencontrent plusieurs cultures. Un espace agité et une histoire turbulente, dominée à la fin d'une médiévalité tardive; par plusieurs empires .Après la chute de Byzance, sa culture n'est pas encore disparue. Dans cet espace tourmenté où se rencontre la philosophie grecque avec le fatalisme oriental et l'esprit actif, renouvelable de l'Occident européen, D.Cantemir fait son apparition (1673-1723), le fils du Prince de la Moldavie (Bogdania, comme le nommaient les Turcs) Constantin Cantemir, frère d'un autre Prince (Antioh Cantemir), lui-même Dimitrie,pour deux fois; Prince de la Principauté de la Moldavie. Dimitrie Cantemir est avant tout un homme érudit,pour les plus érudits de son époque. Il est peu connu en Occident. Il a été connu dans une certaine mesure après que, une de ses écritures, *L' Histoire de l'Empire Ottoman*, écrite en latin, a été traduite en anglais par Nicholas Tindal (le neveu du philosophe Matthew Tindal) en 1734-1735 et puis par le canonique M. de Jonquière en français (1743) [1]et par Johnn L. Schmit en allemand (1745).Peu connu, je veux dire en Occident, D.Cantemir nous donne de plus en plus le sentiment aujourd'hui qu'il est l'un des plus renommés de l'Orient Européen. De lui savaient, vraiment, Voltaire et Montesquieu et, en général, les encyclopédistes (l'Abbé Prévost et Jean Rousset de Missy avaient essayé de traduire la même *Histoire*, ils l'avaient abandonnée), mais plus tard il est cité par Chateaubriand et Victor Hugo. Son nom est inscrit, avec d'autres 799 noms, sur la façade de la Bibliothèque Sainte- Geneviève de Paris, mais, de nouveau son grande œuvre et pour tant de fois essentiel pour certains domaines intellectuels, n'est connue que par de spécialistes de son pays d'origine, la Roumanie, et d'une certaine mesure, en Turquie –où il est vécu pendant sa jeunesse et en Russie, où il est arrivé vers 38 ans en qualité de conseiller de Pierre le Grand et

1 Histoire de l'Empire Othoman , où se voyent les causes de son agrandissement et de sa décadence, par S.A.S Démétrius Cantemir, 2 vol, Paris, J.N.Le Clerc, 1743

où il est mort (à 50 ans). Beaucoup de ses écritures sont restées dans les archives et c'est seulement qu'à nos jours les archives (surtout ceux de Russie) ont commencé à être accessibles en totalité.

Mais qui est cet humaniste oriental qui en 1714 est élu à l'Académie de Berlin, fondée par Leibnitz et écrit, puis, en latin *Descriptio Moldaviae* et, en roumain, *Historia moldo-valahica*, c'est-à-dire la géographie et l'histoire de son peuple, et en 1915, l'année de la mort de Ludovic le XIV ème, il prépare *Incrementa atque decrementa aule othomanicae* (L'agrandissement et la décadence de la cour ottomane), œuvre finie probablement en 1719 et publié, comme on a déjà signalé, à Londres, à Paris et à Hambourg dans la cinquième décennie du siècle, dans une époque dominée par la philosophie des Lumières?

Cantemir est, décidément, un «homo europaeus» de l'Orient Européen. Il écrit en latin, parle et écrit en grec, connait le russe (slavonne), la langue des Perses, l'allemand, et, bien sur le roumain, il est ami (pendant qu'il est otage et *capuchehaie*-c'est-à-dire ambassadeur à Istanbul, les ambassadeurs occidentaux, et son œuvre est énorme: sa première écriture en roumain (le *Divan*, 1698) est un dialogue morale et philosophique entre le *Sage* et le *Monde*, c'est-à-dire entre l'*Esprit* et *l'Ame*), il a écrit, comme on a déjà précisé, une histoire de l'Empire Ottoman, un traité sur la musique ottomane (il a composé lui-même de la musique en style oriental), un livre sur la religion ottomane,un autre sur la logique, un roman allégorique en roumain (*l'Histoire hiéroglyphique),* un traité de théologie, une histoire des Roumains (au début en latin, puis en roumain) et, en latin une description de la Moldavie (*Descriptio Moldaviae*) à la sollicitation de l'Académie de Berlin…

Mais, avant tout, le Prince Cantemir, si érudit, est un moraliste cultivé intellectuellement, comme on l'a déjà précisé, dans l'espace de rencontre de plusieurs cultures: la culture sud-est européenne (balkanique), avec une forte tradition byzantine, la culture du proche orient, la culture proprement)dite de l'Est (la Russie) et, par l'intermède des lectures et des contacts avec les gens de France et d'Allemagne, la culture de l'occident européen. Du *Divan* on peut voir qu'il avait lu, à l'exception de la Bible, les auteurs grecs et latins et qu'il valorisait surtout les stoïques. Il cite Cicérone, Sénèque, Epictète, Saint Augustin. Il évoque une seule fois Erasme, pour deux fois Descartes et jamais Montaigne. Une source sure est pour le jeune Cantemir le polonais Andreas Wissowatius, un protestant érudit, l'auteur d'un livre – *Stimul virtutem, fraena peccatorum*, publié à Amsterdam en 1682. Wissowatius est un disciple d'Erasme et il croit que la cause du Mal est l'ignorance. Par érudition, l'homme peut aller au chemin de la vertu, écrasant en lui, dans cette manière, le Mal qui grandit dans les ténèbres de l'ignorance. Reprenant ces idées et amenant, lui-même d'autres en discussion, Dimitrie Cantemir reste fidèle à la théologie chrétienne, mais comme tout esprit créateur et, plutôt, comme un vrai moraliste, il ne se contente pas avec la reproduction des sagesses de l'*Evangile*, mais il les commente et en les commentant, il introduit ses idées et, comme on l'a souligné plusieurs de fois, les idées des philosophes païens.

Dans toutes ces réflexions, Cantemir fait preuve d'être, comme je l'avais dit, un esprit profond, un esprit de l'Orient européen, attentif à la construction fastueuse de la phrase. Si on admet que les deux symboles fondamentaux du baroque sont *Circé* et le *Paon*, c'est-à-dire le symbole de la métamorphose et du décoratif (comme l'écrit Jean Rousset), alors Cantemir est, par excellence , un baroquiste . Je dirais: un esprit baroquiste apparu et cultivé spirituellement dans l'espace dominé par les traditions byzantines.

Les thèmes du moraliste Cantemir sont variés et ils se rencontrent, souvent, avec les thèmes des moralistes occidentaux. Il discute, évidemment, sur les vertus de l'homme, sur les inutilités du monde, sur l'éducation de l'enfant, sur la bonne gouvernance et la morale du prince élu, sur la mort, sur l'amour (au sens chrétien), sur l'utilité du savoir (la connaissance) et le malheur du non savoir. Ce n'est pas le lieu, ici, de citer ses idées sur toutes ces choses ou sur les mélancolies de l'esprit ou sur la mensonge qui fait honte à l'esprit…

J'ai pensé que, pour conclure mon intervention, il irait mieux de faire une comparaison entre ce moraliste de l'Orient européen (chargé de traditions spirituelles) et les moralistes occidentaux de son siècle. Quand Dimitrie Cantemir est né (1673), l'année de la mort de Molière et du Cardinal Retz; les grands moralistes du siècle (La Rochefoucauld, Pascal, la Marquise de Sévigné, Madame de la Fayette, Boussuet) étaient morts ou ils se préparaient de finir leur œuvre, et la génération des encyclopédistes n'était pas encore fondée. Montesquieu nait en 1689, Voltaire en 1694, Rousseau en 1712 et Diderot en 1713. Dimitrie, le fils du moldave Constantin Voevoda, contemporain avec le Duc de Saint–Simon (1675-1755), il grandit spirituellement dans l'ambiance grecque et en tradition byzantine à l'intérieur d'un environnement cosmopolite, comme était une fois Istanbul. Il n'a pas lu certainement ceux qu'on a nommé auparavant, il a lu en échange la Bible et les philosophes grecs et latins et, autant qu'il a pu, quelques-uns des sages de l'Orient.

Son modèle est *l'homme vertueux* qui, en général, est l'homme religieux. Celuici a le cœur pure, qui ne se laisse pas tenté par les « mauvais appétits humains» et par les séductions du monde… Comme tout esprit grandi aux valeurs de la religion chrétienne, l'homme cantemiriste *apprend à mourir*…Au-dessus de tous les traits, il y a l'amour:

« L'amour a vaincu devant tous», écrit Cantemir dans le *Divan*. Il ne valorise pas les gloires éphémères du monde, mais, voyant sa biographie, on remarque facilement que lui non plus. Le prince Cantemir non les a pas mépris en totalité s'il a lutté pour deux fois à être le prince de la Moldavie. Quand il songe pourtant aux trahisons du monde, on observe que le Prince devient sceptique et il recommande la philosophie de l'ecclésiaste. Donc, *l'homme cantemiresque* sort de la sagesse de l'église et sa vie ne devrait être qu'une continue formation pour la rencontre avec le Jugement dernier.

On a observé il y a longtemps le fait que dans les maximes de La Rochefoucauld il manque, en général, la réflexion religieuse. Le Cardinal de Retz aussi écrit dans ses *Mémoires* plus sur la conscience de l'homme public que sur la conscience de l'homme religieux.Par la tentative de former une morale de l'homme religieux, Cantemir pourrait s'apparenter, jusqu'à un certain point, à Pascal. Lui aussi déteste l'homme qui abuse de bons mots (« diseur de bons mots, mauvais caractère») et il croit qu'à Dieu on peut le sentir avec le cœur, pas avec la raison. La différence entre ces deux philosophes de la morale chrétienne est, pourtant, grande, parce que Pascal croit que la grandeur de l'homme est de penser clairement sa condition misérable dans le monde, pendant que Cantemir croit que la seule dignité de l'homme est de s'humilier devant la divinité et qu'il doit suivre directement les règles de l'église. Pascal met Jésus entre l'individu pieux et Dieu disant qu' «il est non seulement impossible, mais inutile de connaitre Dieu sans Jésus Christ». Une phrase que Cantemir n'aurait jamais pu écrire. Ni même l'autre qui suit: «Jésus sera en agonie jusqu'à la fin du monde: on ne doit pas dormir pendant cette période.» Pascal se différencie de notre Cantemir en ce qui concerne aussi le silence, disant que le silence est «la plus grand persécution (« jamais les saints ne se sont tus»), alors que l'auteur du *Divan* croit que le silence est le symbole de la sagesse. Conjuguées, celles-ci assurent l'honorabilité « de celui digne (l'homme vertueux, l'homme respecté, l'homme pieux, préparé pour le grand essai de la mort) et son passage par la «douceur du monde».

J'aurais besoin de temps pour finir ma démonstration et convaincre que le Prince Cantemir, l'homme de lettres et l'homme d'armées qui est loué par Voltaire, est dans son époque et avec son style fastueux baroquiste de couleurs orientales, un moraliste de classe et que, Miron Costin, il commence un courent de pensée et un style moralistique qui arrive, enrichi, diversifié, jusqu'à la modernité et à la postmodernité européenne.

Messieurs et Mesdames,

J'ai discuté ici, où on discute sur les relations du monde européen, le cas de Dimitrie Cantemir, pour vous prouver ce que vous déjà savez, c'est-à-dire que l'esprit méditerranéen dépasse les bordes de ce *lac calme* et au lieu où il arrive (au Nord du Danube et même a Petersburg et Moscou) il amène une mémoire culturelle extraordinairement riche. Et en cette mémoire….(européenne) on ne voit pas la culture occidentale. Heureusement….Nous sommes tous, en effet, génération après génération, le produit de cette mémoire complexe. La mémoire de la pluralité méditerranéenne…..

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MEDITERRANEAN REGION: A DIFFICULT BUT NECESSARY ROAD TO INFORMATION SOCIETY AND KNOWLEDGE BASED ECONOMY

The purpose of this short note is to present my personal view of possible scenarios and required actions to be taken in the Mediterranean region with respect to education, research and development. I will concentrate on the area of broadly perceived ICT (information and communication technology), and more generally information society, which is related to my personal interests, and which can be viewed – first – as a best example of *high tech*, and – second – as the area of science, research and development, and manufacturing that has a decisive impact on economic and social progress, technological competitiveness, and generally prosperity of each nation, including those in the Mediterranean. My focus will be, first of all, on those aspects which are relevant and have far reaching consequences for higher education and research, in the context of broadly perceived ICT and information society.

First, to set the stage for the discussion, I will briefly present some specific features of the Mediterranean region which are of relevance for our considerations. Then, a wider perspective of the so called *digital divide* will be presented and its nature and specifics in the case of the Mediterranean will be indicated, concentrating on both technological and social aspects, and indicating why it is so dangerous for the homogeneity of the region, and how it can be alleviated by some concerted intra-regional and international actions. Then, I will consider in more detail an education related aspect of the digital divide and mention why it is of crucial importance for the case of the Mediterranean, and how it can be appropriately run. In the context of digital divide I will also comment upon the role of research and why it should be financed in all countries, both more and less affluent and developed. I will also comment upon the current situation we face virtually everywhere, that is, first of all, world wide financial difficulties, including problems in some well developed and affluent European Union Mediterranean countries. Second, I will mention some recent problems in the Middle East but will not discuss them in more detail because – in view of recent and prospective developments in the region – the situation is not clear, and hence not much, if at, can be said about the future in general, and that related to our interest, that is, education and research policies in those countries, in particular.

One should start with some general remarks concerning the geographic region I will be referring to. The Mediterranean region is one of the world's great "hyper-regions" or ``meta-regions'' which has been for so many centuries crucial for the world's culture, science, and social, economic and technological progress. The European civilization has been born there and the entire world has been ruled from there over so many centuries, at least the world known or imaginable to the people of that region. Other well developed civilization, like China or India, have been too remote, other great armies, like those of Central Asia or Central and South America, have been gaining victories in too remote a places to be even heard of, etc.

The Mediterranean region has attained some multifaceted uniformity that has probably started with the falling of virtually all Mediterranean countries under the Roman rule. The Roman rule has lasted many centuries and has had a crucial impact of the mentality and life style of all people in the region. The later Arab influence on the Southern part of the Mediterranean, but also on virtually all parts of Spain, and then the influence of the Otoman Empire have also had a strong impact on the nations and countries involved, and have also provided some sort of a geographic, cultural, mental, etc. unification. To some extent, in some parts of the region, notably in North-East Italy, Slovenia, Croatia, etc. one can also see the influence of the Austro-Hungarian Empire as some sort of a unifying factor but, on the other hand, as a bridge to Eastern Europe because one can even today see a close similarity in many respects of regions in Poland, Slovakia, Hungary, even Western Ukraine, which used to be part of the Austro-Hungarian Empire, to their fellow countries in the Mediterranean Region which also belonged to the Austro-Hungarian Empire.

One can also mention that the Mediterranean countries are characterized by religious differences. On the one hand, there are countries that are predominantly Catholic like Spain, Italy, Croatia, Portugal, Malta, etc., those which are predominantly Muslim like the Arab countries, Turkey, Albania, etc., those which are predominantly Orthodox like Greece, Serbia, Montenegro, etc. and Israel where Judaism is predominant. However, in spite of great differences and tensions between those faiths, their roots are common in that there are all monotheistic, and belong to the so called Abrahamic family of religions that basically comprise of Christianity, Islam, Judaism, Druzeism and the Bahá'í Faith. As different as these faiths are, they are certainly more similar to each other (if emotions and political reasons are put aside) than to many Asian faiths, like Buddism or Taoism.

One of further factors that has contributed to some sort of uniformity of countries in the Mediterranean region, at least if we consider the more privileged and better educated middle and upper class, is the fact that in most of those countries a strong influence of Europe may be felt, notably of France, like in Algeria or Tunisia, or England, like in Egypt, Jordan or Israel and Palestine. This has been through some sort of occupation, but a similar influence has also occur in other countries, like Turkey or Greece, through the fact that the intellectual elites have always been open to the world.

One can therefore say that, if one takes apart emotions and negative feelings which may be implied by history, notably the occupation periods, virtually all the countries in the broadly perceived entire Mediterranean region share many common values and, through a usually general exposure to the world languages like English and French since childhood, are quite open to the world.

The previous century, notably the period after World War I and II have brought about significant changes because many new countries have been reinstated after a long period of dependence, many new countries have been established, many countries have undergone serious political changes related to the fall of royal dynasties and the proclamation of republican states, etc. The post World War II period of Cold War period with a fierce competition between the United States of America and the Soviet Union has resulted in the division of the world, including the Mediterranean region, into the spheres of influence of the two world powers, with a clear detrimental effect on the homogeneity of the region. Last but not least, regional wars between both the world powers and the Mediterranean countries, like the Suez Canal war between the UK and France on the one hand, and Egypt and its allies and supporters on the other hand, or subsequent wars between Israel and its neighbors have to a large extent eroded the past Mediterranean feeling of belongingness to one big family, and of solidarity.

Yet, in spite of all those detrimental effects, one can still feel that the Mediterranean countries exhibit some uniformity and belongingness to one family. One cannot ignore here some intangible elements that are difficult to define like the Mediterranean *flair*, Mediterranean *joy of life,* Mediterranean *easy going style*, etc. This is still visible in virtually all countries in spite of their vastly different cultural, religious, social, economic, etc. ramifications.

A crucial importance of a vital importance and necessity of multifaceted cooperation and collaboration between the Mediterranean countries has been a key element of the agenda of the Royal Academy of Economic and Financial Sciences of Spain (RACEF), even before some formal acts have been proposed at a governmental level, notably the 1995 Euro-Med Barcelona Declaration at the regional level, and its bilateral Association Agreements and, since 2003, the European Neighbourhood Policy and its bilateral Action Plans. These undertakings have resulted in setting strategic and political priorities in the region for the next decade or so in four domains: political and security cooperation, sustainable socio-economic cooperation, education and culture, and migration. This has been an important act that has clearly and univocally expressed the existing needs and even dreams in a formal way. Some important aspects related to higher education and research have also been mentioned there, and I will be concerned with them in this note later on.

Unfortunately, as it has also been pointed out in many documents mentioned above in relation with the Barcelona Declaration, the level of both strategic, policy, as well as operational, on a day to day basis, cooperation and collaboration between the Mediterranean countries is far from being satisfactory. Notably, it is far from that encountered in some other “hyper-regions” or ``meta-regions’’ in the world, exemplified by the Scandinavian countries which can be viewed to be highly uniform in the sense of political systems, education, democratic institutions and freedom, etc. even in some of them, like Norway and Iceland, are not members of the European Union. The Mediterranean region is far from that uniformity and homogeneity which is quite natural in view of such big political, cultural, social, economic, technological, etc. differences that exist between the Mediterranean countries and which do not exist between the countries in Scandinavia. Naturally, a need for a close collaboration is deemed to be a big chance and challenge for the region, and many influential opinion makers even consider it to be a *sine qua non* condition for the prosperity of the region and its particular constituent countries.

There are multiple aspects of that necessary cooperation and collaboration, both at the bilateral and multilateral level. These aspect concern economic cooperation, trade agreements, educational and scientific exchange, cultural exchange, and even various issues related to the unification of legal, banking and fiscal systems, to name a few.

My personal interest is related to high technology and innovation, which are clearly closely related to higher education and research and development, and I will basically consider issues related to these aspects in the perspective of some recent worldwide, and regional difficulties of the financial, political and social character.

All these issues have a clear trans-national dimension and that is why regional approaches, that is, from the perspective of the Mediterranean regions as a whole, can offer an added value in comparison to purely national programs or undertakings. Notable ``traditional'' examples are here infrastructure network connections, regional economic integration among the Mediterranean partners, protection of the environment and the fight against illegal migration. This is also the case for the areas of my interest considered in this note, that is, higher education, research and development, which go widely between the national boundaries.

First, let me start with some general assessment of what is going on in the world today at the economic, and strategy and policy making level. Then, I will comment upon some recent developments that are of relevance for this note and topic of this paper.

First, the world is divided into the rich and the poor part, and it is no longer true that the North is rich and the South is poor as it has been said for so many years. By the rich and poor I mean here something else, namely what is the potential of a country or a region, what is its share in the world economy, and also what the perspectives for that country are. From this point of view, Japan is a very rich country but is unfortunately constantly loosing its leading position in innovation and manufacturing, while China and India are poor on the average but are taking the world markets by storm and continuously increasing their share in the world trade. What is noteworthy is that while some years ago they were associated with low level and low quality, though cheap, goods and products, they are now rapidly entering markets for high tech and high quality products in which much know how is included that needs not only copying solutions, products and technologies developed by the others but more and more is a result of highly funded research and development and pro-innovation programs run at the national level. This all is clearly coupled with high expenditures for high level education, research and development. This visionary yet pragmatic policy of governments of those countries is clearly working very effectively and efficiently. It clearly implies innovation and high productivity, that is, all what is needed to become and stay competitive.

Another aspect of the "rich vs. poor" division, which is extremely relevant for this note, is the famous concept of a *digital divide*. Basically, it is meant as a gap between people, both individuals and groups or societies, who have an effective access to digital and information technology and those whose access is limited or nonexistent. One should mention that this is related both to the access to technology, meant as the availability of hardware and software tools, and to having skills to be able to fully utilize the digital technology. Needless to say that this all has also to do with poverty as on the average in poor countries the access to the digital global world is much lower. Some people go even further and consider the digital divide to be closely related to so called *knowledge divide* which is considered by them as a crucial factor that determines an ability to proceed to knowledge based economy which is clearly what seems to be a necessary step for any country which intends to stay in the fierce race for prosperity in the present world. In fact, many scholars and scientists argue that the digital divide is a symptom, reflection, and even consequence, of a much severe and complex problem of persistent poverty and inequality. That *knowledge divide* is in fact what we are iin priciple concerned with here.

The above considerations have much to do with issues related to *information society* which is also one of key topics mentioned in any documents, status reports, policy statements, etc. worldwide. Basically, an information society is the one in which information, meant in the context of its elicitation, creation, manipulation, distribution, diffusion, use, integration, aggregation, etc. constitutes a significant economic, social, cultural and political factor. Its economic counterpart is *knowledge based economy* whose essence is that prosperity and wealth is created through the economic exploitation of information and knowledge. This new developments, that is, the emergence of information society and knowledge based economy are often said to be a sign of entering a new phase of modern society.

Also in the Barcelona Declaration, and its numerous follow up documents, the cooperation in the field of the information society is considered to be an essential factor to help attain the sustainable economic and social development of the Mediterranean region, and maybe even the development of the region enabling the growth of intra-regional trade in goods, commodities and services, and also that at the inter-regional and international scale.

All kinds of undertakings related to information society have much to do with IT (information technology), or more generally ICT, and involve an extremely strong involvement of higher education and research because of an extremely high progress in those areas of science and technology which requires, on the one hand, the establishing of modern, high level educational institutions, notably at the higher level (universities, universities of technology, etc.), with graduate, post-graduate and even Ph.D. programs, but also well developed continuous education and e-learning programs and systems. On the other hand, these challenges call for the development of research and development structures, notably national, regional and international research institutes and centers, with proper financing. These institutions should ideally be both financed by the government and private capital but this is often an utopia, notably is less developed countries and the public money is the only solution.

In well developed Mediterranean countries, notably those belonging to the European Union, there is a consensus that the above emphasis on and support of research are crucial for the development and competitiveness of the particular countries and of EU as a whole. Luckily enough, in more and more non-EU Mediterranean countries one can clearly see the same, and more and more departments at the existing universities rapidly develop their curricula and research programs related to ICT and other ``hot'' and modern areas, and also more and more new universities are founded, in many cases with a clear graduate and research orientation. This is a very good indication because of the fact that these topics belong to key interests of young people, and by providing them with a possibility to follow their interests at home may stop outmigration of well educated and highly motivated young people. This is very important for all countries in the region.

The above efforts have been, luckily enough, supported by some institutional initiatives, exemplified by the large EUMEDIS program (€ 65M, 2000-2006) which was meant to establish and facilitate interconnection between the European research networks and the Mediterranean research networks and the funding of many regional pilot information society projects in healthcare, e-commerce, tourism, cultural heritage, applied research, business and innovation, and education. On this project around 1,000 persons have been directly involved in implementations, and more than 10,000 participated in various events sponsored or endorsed by the project. Moreover, more than 30,000 students have uses the distance learning courses developed by various participating teams.

The distance learning and e-learning education related aspects are crucial for our purposes and it is important to note that it has been clearly recognized that the focus should be not only on the production of contents, but more on the capacity of end users (students, instructors) to fully benefit from the services developed. This has to do with the well established institutional cooperation to be able to unify the requirement and accreditation systems, delivery via international broad band connections and local hubs, possibility to use local languages, indexation of contents selection, etc.

The initiatives as mentioned above, which are proliferating, are very important from our point of view because they amplify the mutual cooperation and collaboration in the region, and make it possible to fully utilize the cultural and heritage homogeneity while preserving national specifics. They also help integrate poorer and less developed Mediterranean countries into the global regional system, and information society in general.

From the point of view of the younger generation, their participation in the forefront activities of the modern high tech world is extremely relevant because this makes them participate in a worldwide "race" in high tech, and to have access to the same education as their colleagues in more affluent countries, without feeling of being inferior or put aside because by the very essence of the Internet and WWW everybody is equal in the globally interconnected world.

Another aspect of efforts to overcome the digital divide is the new ideas related to the so called e-democracy and e-governance. Their most trivial reflections like blogs (web logs), wikis and mailing lists may become a significant factor of broadening the way democracy operates. And, indeed, they have played a signficant role in political changes that have happened in last months in the Middle East. Clearly, this all was initiated and animated by younger, better educated people for whom it had been natural to participate in the global Internet based society, and to use it purposefully. This is not so clear for the entire society of less affluent, maybe poverty stricken countries. The majority of their societies is not aware that the digital divide is widening the gap between the upper and lower classes because the more privileged ones will continuously use their skills and technology to go further and strengthen their social and economic position while the underprivileged will continue to fall behind. It is the role of the governments to try to find a way of out this dilemma that has far reaching detrimental effects. Only in such a way the less developed and less affluent Mediterranean countries will be able to participate at the world wide competition and be an equal right partner to more developed and affluent Mediteerranean countries. The latter countries should however help their less privileged counterparts bridge this gap. This may be considered to be in their own interest as it has been known for centuries, maybe millennia, that the best way to attain peace and stability is to follow the eternally valid inequity aversion attitide. A long lasting, and widening inequity in society brings about the eruptions of protests, even revolutions.

Coming back to what is going on in the world, the new big "tigers" of the new economic order, notably China and India, can enter – due to their sheer size and huge reserves of highly skilled and motivated human resources, and also huge money reserves – a wide array of diverse areas of production and manufacturing, from simple textile industry through shipyards to the high tech electronics or biotechnology, and – as a result – can support research in so many areas that may be crucial to maintain a competitive edge. This solution is unfortunately infeasible for the Mediterranean countries, and in general for virtually all small, medium size and even large (for instance, for the European standards) nations. In order to "survive", i.e. to stay competitive and not be excluded from the global "race", those countries should concentrate on some chosen areas of production, manufacturing or services and develop them to a level that will bring about a technological and economic advantage. That is, they have to offer something unique that is rarely (or not at all) offered by other nations.

This all is practically equivalent to the concentration of some chosen area of activities that is very knowledge intensive because only in such a way one can obtain economic advantage and an "added value". That is basically the essence of the so called knowledge based economy whose proponents argue that what matters, and will more and more matter in the foreseeable future, is knowledge and skills so that products and services can be appropriately priced leading to a competitive edge and prosperity.

This type of knowledge rich and innovative areas of activities can be in various areas, not only in high tech industries (as traditionally meant). They can also be, for instance, in agriculture – an area that is wrongly considered to be an example of only the traditional low tech production activity – and the important thing is just to gain a broadly perceived technological edge that can clearly occur in agriculture, animal breeding, wine making, etc. The search for the most promising areas in this respect should be highly discriminative and pro-active, and much vision is required.

There is however an important aspect related to the above. This is a result of an omnipresent globalization in all areas of human activities. That globalization concerns the education and interests of the young people which is relevant for the points to be made below. Namely, even in small nations there are good or even very good universities in which the students are offered instruction in most modern areas and at a very high level. The graduates are therefore not less prepared than their counterparts from similar universities in countries where high tech industries are booming. This is a bad situation because those students from less privileged (from the point of view of the development of high technology) countries would probably have to seek jobs elsewhere to pursue career in their area of interest. This situation is serious because young people in virtually all countries, no matter developed or not, are attracted to modern, high tech areas exemplified by all kinds of Web technologies, ICT, biotechnology, etc.

No country can afford to loose such enthusiastic and highly motivated group of young people, well educated at the expense of the country, and yet unable to self-realize at home. A solution is to establish some organizational frameworks to keep that huge human capital at home to make them work for the benefit of the nation. This should, on the one hand, include the launching of some national research centers or financial support programs for research and development. On the other hand, this should include a proper national pro-innovation system including novel solution for the easing to obtain venture capital for innovative initiatives, an innovation-friendly fiscal system, etc. When this all occurs, there should be a high chance that innovative products and services will appear even in smaller countries

Even in such happy circumstances that there is a political will and an adequate expertise for finding proper ways to organize, plan, finance, and evaluate such novel, highly innovative high tech research and development in a smaller country with limited human, organizational and financial potential, a good solution is usually to use experience of another country that has been successful in the above area of broadly perceived scientific policy.

A country that is close with respect to some aspects is clearly a best candidate. Natural candidates are here the Mediterranean countries due to so many common features they share, as mentioned before.

A natural question is how this synergistic cooperation and collaboration can proceed in the Mediterranean region. One the one hand, the well developed and affluent European Union Mediterranean countries, notably Spain, France, Italy, etc. have developed over the years a well developed and high level academic and research and development system, with many high stature and highly visible scholars and researchers, with its openness to the world, etc. This all is connected to a large extent with the excellent scholarly system, of high level universities, but complemented by research institutes of CSIC (Consejo Superior de Investigaciones Científicas) in Spain, CNRS (Centre national de la recherche scientifique) in France, CNR (Consiglio Nazionale delle Ricerche) in Italy, and many other similar governmental bodies and agencies in many different countries, can be a perfect partner for a mutually advantageous collaboration with other Mediterranean countries. As a rule those countries have a very good schooling and academic system, good demographic structure in the sense of absence of the problem of aging of the society, a wide availability of young people, also students and graduates, and many prominent scholars and researchers, sometimes working in other countries, can contribute with well prepared and highly motivated human resources.

These well prepared people would be able to pursue their research and scholarly career in their own countries if steps are undertaken by their own countries which would be determined to enter the stage of building information society and knowledge based economy. However, particularly in the first period, these people can help the more developed and affluent Mediterranean countries ease their lack of skilled workforce, notably scientists and engineers, which is a world wide phenomenon in virtually all developed countries and which is presumably most drastically visible in Japan where it is estimated that maybe half a million of such people, both graduates of departments of engineering and more experiences engineers and scientists, are lacking, and the demographical structure cannot promise to find a solution so that immigration is the only solution.

A similar need will be more and more pronounced in virtually all developed and affluent Mediterranean countries and the acceptance of skilled workforce, notably in ICT and similar high tech areas, will be the only solution. These people may feel somehow at home due to various similarities between the Mediterranean countries I have already mentioned. This may be a huge benefit for the region and a very valuable result of all bilateral, intra-regional and international (notably those undertaken by the European Union) efforts to integrate the Mediterranean region. A clear and significant role in this respect has been played for many recent years by RACEF that has for years made numerous attempts to draw attention of the scientific community, policy makers, business and media to an urgent need to work on the reinforcement of the Mediterranean "hyper-region" emphasizing its specifics, homogeneity, and a special role from the economic and political points of view.

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OPTIMISATION PROBLEMS IN MARINE TRANSPORTATION

Your Excellency, President Prof. Jaime Gil Aluja,
Members of the Royal Academy of Economic and Financial Sciences,
Distinguished Guests,
Ladies and Gentlemen,

It is with great pride and gratitude that I have possibility to wish great success all of you on the occasion of this VI International Act.

Let me cordially deliver a great friendship's feeling from the Ukraine, from the Academy of Shipbuilding Sciences, Regional Inter-University Centre and Petro Mohyla Black Sea State University.

As representative of the Black Sea region I think that a lot of the same research and development directions, problems and perspectives are common for both regions: Mediterranean and Black Sea.

First of all it concern creating modern marine transport and important cargo transportation corridors, increasing efficiency of shipbuilding industry and also optimisation of the marine transportation.

There is no doubt that all abovementioned factors are very important for Spain, Ukraine and for Europe as a whole.

Let me say a few words about our region and about Mykolaiv city which is unformal capital of shipbilding industry in Ukraine.

The development of Ukraine as a maritime state is impossible without the development of shipbuilding industry taking into account an extensive network of sea and river ports, a large maritime boundary line and unique transit's status.

At present, Ukrainian marine fleet is in critical condition [26]: the average age of dry and bulk cargo ships account - about 20 years, passenger - more than 25 years.

Almost a third berth fund is in poor condition, oil and gas complex engineering structures on the continental shelf operated for more than 30 years and require continued inspection of their technical condition.

All these problems are common for most marine countries and they were under discussion on the First International Scientific Conference "Innovations in shipbuilding and ocean engineering", which held (September, 2010) in Mykolaiv with participants from Great Britain, China, Turkey, Poland, Russia and Ukraine.

Why this International Conference was hold in Mykolaiv?

There are 4 shipyards in Mykolaiv: Chernomorsky, 61 Communars, Vadan Yards Ocean and Liman. The National University of Shipbuilding is the basic higher technical school for training shipbuilding, mechanical and electrical engineers for the whole country.

The Academy of Shipbuilding Science of Ukraine and Regional Inter-University Centre, which united 10 universities and colleges [17], were established in Mykolayiv.

Rector of the National University of Shipbuilding Prof. Serhiy Ryzhkov is a President of Academy of Shipbuilding Science of Ukraine and rector of the Petro Mohyla Black Sea State University Prof. Leonid Klymenko is a President of the Independent Association of Ukrainian universities.

Solving optimisation problems in marine transportation is a key for increasing efficiency of the marine industry and economic indexes of marine countries [23, 25].

Mostly, the ship's transportations are not only between countries in the same marine regions (Mediterranean Sea, Black Sea etc.), but also between continents.

Coal, cement, ore, grain and so on are transportated by ships [3,4,5].

Natural gas traditionally has been transported in pipelines, but ships are more efficient for transportation over long distances, using the LNG technology.

The LNG trade is one of the most promising sectors in energy shipping [12,14] and today the LNG shipping plays an important role taking into account that large volumes and high costs involved in this marine transportation [9].

The total number of LNG ships has increased during 10 years more than in 2,5 times. The cost of a new average-sized LNG ships is around 200–250 million USD and daily time charter rates are around 80 000 USD.

Marine LNG transportation is very important component for economic development of Mediterranean area because only in this region LNG plants are situated in Algeria, Egypt and Libya and regasification terminals are in Spain, France, Greece, Italy, Portugal and Turkey.

Ship routing and scheduling problems have special peculiarities [3, 4, 20], because:

– a ship's fleet is often mostly heterogeneous;

– sometimes the distance between two ports is uncertain;

– the weather may affect the ships during long trip;

– loading and unloading processes are usually deal with opening and closing time for cargo processing in the ports.

The maritime transportation problems for the planning horizon can be classified into strategic, tactical and operational levels [3,4].

The main components of planning and optimisation problems on the strategic level are: market and trade selection, ship design, network and transportation system design, fleet size and mix decisions, terminal location, size and design.

Among the planning and optimisation problems of the tactical level are: adjustments to fleet size and mix, fleet deployment, ship routing and scheduling, inventory ship routing, berth and crane scheduling, container management.

The operational level consist such kind of planning problems as: cruising speed selection, ship loading, environmental routing.

Decision about any contract signing can be seen as decision making on all three levels. Nevertheless, the preference for decision making on the strategic level is a long time charter contracts, but on the operational level - a one voyage contract.

According to up-dated classification for modes of operations, ship operations can be divided into three different categories: liner, tramp and industrial operations [3,4], but there are no clear borders between the abovementioned categories.

The fleet size and mix decisions have to be based on an estimate of demand for the transportation services [18,19,21,22]. The demand forecast is highly uncertain, and stochastic techniques for considering the uncertain information are relevant for solving such strategic planning problems.

In tramp shipping, contract evaluation and fleet size issues are closely related. A shipping company has to find the best split between fixed long-term cargo contracts and spot cargoes. This split should be based on estimation of future prices and demand.

The development of efficient models and algorithms to solve routing problems is an important contribution of operations research [28], fuzzy sets [29] and optimisation to theory and practice.

One example is routing problem for bunkering tankers [16, 18, 19, 27]. Marine practice shows that very often the information about fuel demands of served ships and ports is uncertain [21, 22]. It is possible to represent such kind of orders by fuzzy numbers with corresponding membership function.

A lot of approaches are proposed for solution of vehicle routing problem with time window (VRPTW), in particular, genetic algorithms, simulated annealing, tabu search and others [7,10].

Fuzzy multi-criteria decision making methods also can be successfully applied for solving VRP with time windows in uncertain conditions [1,2,11,13,15].

There exist many uncertainties in a logistics system, such as unknown demand, unsteady fuel cost, machine breakdowns, and different accidents [24]. Logistics management is difficult because decision makers must solve a global optimization problem, which includes eliminating as much uncertainty as possible, finding effective methods of managing uncertainty [8], and operating the entire logistics system effectively.

So, it is very important to develop new approaches, algorithms, models, corresponding software and intelligent decision support systems [6] for optimization in marine transportation.

International multimodal transport corridors connect countries for delivering cargos with assurance of delivery reliability while minimizing transit time and costs. Different economic standards of the countries can affect the overall performance of the routes taking into account interconnections and interoperability.

Robustness is an important factor in maritime transportation. Non-controllable factors may induce delays to planned schedules and it may be important to consider robustness in models used for planning and optimization.

The main idea of this presentation deals with marine transportation based on the optimisation approaches which can provide increasing efficiency of marine shipping and growing economy of marine countries, including countries of Mediterranean and Black Sea basins.

No doubts that we should consolidate our scientific-industrial cooperation in marine industry in the framework of Mediterranean - Black Sea region for mutual benefit and for decresing negative factors of current world's economic crisis.

I gratefully acknowledge the support of this research work and this presentation by Deutscher Akademischer Austauschdienst (DAAD, Germany), Royal Academy of Economic and Financial Sciences (RACEF, Spain) and Petro Mohyla Black Sea State University (PMBSSU, Ukraine).

Thank you very much for your attention.

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SCIENCE - THE RIGHT ARM OF ECONOMIC RECOVERY

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Excelentísimo Señor Presidente de la Real Academia de Ciencias Económicas y Financieras,
Excelentísimos Señores Académicos,
Señoras y Señores,

I am deeply honored to be invited and to talk to the VI International Act of the great Real Academia de Ciencias Económicas y Financieras de España.

The topic chosen for this Act is of great interest not only for the Mediterranean area but also for the entire world. I would like to discuss four points:

1. THE ACTUAL STATE OF AFFAIRS

The annual United Nations document entitled the "World Economic Situation and Prospects 2011" emphasize as the high risk for global economic recovery the elevated unemployment rates, fiscal tightening and the risk of international currency wars. The world Economic Situation and Prospects for 2011 are not encouraging. "After a year of uneven recovery, the global economic growth started to decelerate in mid-2010 and this slower growth is expected to continue in 2011 and 2012".

The slow recovery in major developed economies impedes the global economic recovery ad further stability. It is unquestionably a long-lasting process.

The expert professionals in the field and myself believe that at this point, science and technology are the key elements to secure the rapidity of the economic recovery. But this assumption lead us to the second point.

2. IS SCIENCE IN CRISIS, TOO?

I dare to say that the answer is “to a certain extent”. This is because science depends on the economy and economy depends on science. However, science and economy can and should assist each other. Well-informed governments and individuals consider that the investment in science is an investment in the future well being of the population, from all points of view, economic, financial, health, jobs and many others.

To face the challenges of the crises, and to help economic recovery, scientists and the governance should keep a close interaction and a permanent cross talk with the purpose to contribute to a new dimension in solving problems. Science can improve policy decisions and governments can improve science.

3. SCIENCE AND TECHNOLOGY HAVE A VITAL ROLE IN THE ECONOMIC RECOVERY.

During the last century, the world as a whole and each country in particular passed through several economic crises. However, each time and each generation found the ability to overcome the multifaceted problems of the crisis, to uncover new opportunities, novel stimuli and strategies to defeat its negative effects over the population.

The government regulations are essential in taking the right decisions at the right time. If they have visionary adviser and consultants, the authorities will comprehend that the scientific and technological innovation always was and still is the engine of economic recoveries. One of the best descriptions for economic recovery is that of U.S. House speaker, Nancy Pelosi, which said that there are four words to describe the economic recovery package: “science, science, science and science.”

Why for the economic recovery, investments in research, education, science and technology should be a major priority? Because technology and engineering will build the infrastructure for the future and the science will create the innovation for the society. Robert Solow, Nobel Prize in economics demonstrated that the technological and related innovations are the most significant determinants in economic growth. Investments in physical infrastructure will create decent jobs and poverty alleviation, and will lead to concrete action at national and regional levels. Investments in human infrastructure will improve healthcare and education that is obligatory to pave and secure the way out of crisis.

The exploitation of the power of science and of technological talent pool is today more important than ever and has to start with increasing science subjects in schools, in universities and throughout the life of the modern individuals. This is because the scientific and engineering knowledge will be critical in driving the economic future. I deeply believe that close co-operation between industry, education and government could help any country to go out of crisis faster, better, and start the economic recovery.

In this context, I believe that the National Academies have a major role to find and give skillful solutions. My conviction is endorsed by this VI International Act of the Real Academia de Ciencias Economica y Financieras de Espana that obviously has as main purpose to search and find the way(s) out of crisis and the economic recuperation not only of Spain but of the entire Mediterranean area.

4. LESSON FROM NATURE

Obviously, I cannot give to the specialists in economy, advises, recommendation or opinions. However, as a biologist, and as a scientists that observed the life of the cells, I can convey to you that there are many similarities between the human society and the society of cells that form our body. Therefore, I can tell you the lessons I learned from the nature and the life of the cells.

The economy of the cells of our body is very strictly regulated, There are no jobless cells, they function at maximal efficiency, have strict rules and they function with maximal efficiency because there is a rigorous division of labour. As a result of this firm and well-structured organization, our cells contribute to the whole body economy and prosperity, live in harmony and keep us vigorous, strong and healthy.

However, occasionally, due either to changes or to aggressive factors that often occur in the surrounding environment, the cells of our body go through crises too. In order to recover, the cells have to adjust and adapt to these "danger signals". Usually, the cells respond to the danger signals and they recover through the most economical way. As a reaction to the new aggressive conditions, the cells take intelligent solutions: modulation of their functions, asking for help from professional cells that are experts in defence, working together and taking and applying those solutions that would have a positive outcome. The cells talk to one another, they are in a continuous dialogue (similarly with the human social dialogue) and cooperation until they recover from crises. There is a lesson to learn from Mother Nature and from the organization of our own millions of cells. I believe that we should watch the nature outside and within ourselves, and the means by which other life communities function together to overcome crises.

In conclusion, global crisis need global solutions but in the same time regional decisions, such as the economic recuperation of Mediterranean area are essential in solving the worldwide crisis. The launch of the Euro-Mediterranean Social Dialogue Forum in Barcelona on March 2010 may play a strong role in promoting the social dialogue at the regional level within the framework of the Union for the Mediterranean. This Forum highlights the importance of continued cooperation in the Euro-Mediterranean region to overcome the crisis and to commence the economic recuperation of Mediterranean area. The continuous development sciences for the economic recovery are indispensable. The implication and the responsibility of the national Academies are substantial and significant.

Functioning together, the governments and the scientists will definitely find the best solutions for faster economic recovery and for giving back to the citizens the fundamental rights to a high quality, decent and respectable life.

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FUZZY-PROBABILITY MODEL EVALUATION OF THE FINANCIAL STABILITY INDEX

Abstract

In paper fuzzy approach to evaluation composite financial stability index and fuzzy markov model of the forecasting financial state to the next period proposed. The methods by using factual and calculated financial and macroeconomical information of the Azerbaijan Republic demonstrated.

Key words: Fuzzy logic inference, fuzzy markov model, financial stability index.

Introduction

For sustainable socioeconomical development of the state very important problem of the government are warning and control risks of financial crisis.

Under financial crisis understand reducing or increase of the financial-credit indicators of the economical system from requering threshold, which created social tension, political risks and losses rate of economical growth.

Today the problem of financial stability of the states is a global problem. Beginning from 90-th years of XX century by scientist constructed some early warming systems, between which may be underline the works of G.Kaminsky, C.Reinhart

"The Twin Crisis: The Causes of Banking and Balance of Payments Problem" [1], M.Goldstein, G. Kaminsky, C. Reinhart "Assessing Financial Vulnerability" [2], D. Reagle, D. Salvatore "Forecasting Financial Crisis in Emerging Market Economies" [3].

In the paper [1] analyzes the links between banking and currency crisis, the macroeconomic background of the Crisis, anatomy of crisis and indicators [2]. In the book [2] presents a comprehensive battery of empirical tests on the performance of alternative early warming indicators for emerging-market economies that should prove useful in the construction of a more effective global warming system. Not only are the authors able to draw conclusions about which specific indicators have sent the most reliable early warming signals of currency and banking crisis in emerging economies, they also test the out-of-sample performance of the model during the Asian crisis and find that it does a good job of identifying the most vulnerable economies. In addition, they show how the early warming system can be used to construct a "composite" crisis indicator to weigh the importance of alternative channels of cross-country "contagion"of crisis, and to generate information on the recovery path from crisis. In the paper [3] annual data for six financial idnicators were gathered and compared to the critical levels found.

In these works for evaluation of composite financial stability index used statistical and probabilistic models. However, as seen from these investigations all indicators, which analyzedin tnese works are fuzzy. In this paper we try to construction the fuzzy model forecasting of the index of the financial stability of Azerbaijan. For solution this problem we mainly used information of IMF, WB, Journal of Institutional Investor, Central Bank of Azerbaijan.

Presses of modeling enclosed 3 stage:

- Selection indicators and information processing;

- Assessment composite financial stability index;

- Forecasting level of financial state.

2.Information processing and evaluation composite financial stability index.

For fuzzy modelling of the financial crisis by us used indicators and threshold, which proposed in [1]. It is noted in the table 1.

Indicators of the Early Warning System of the Financial Crisis – 1

Optimal thresholds (percentile) : Table 1.

		Banking crisis	Currency crisis
• 1. M2 multiplier;	- MMV	89	90
• 2. Domestic credit / nominal GDP;	- DOC	88	90
• 3. Real interest rate on deposits;	- RIR	88	80
• 4. Ratio of lending rate to deposit rate	- LED	88	87
• 5. Excess real M1 balance	- EMB	89	88
• 6. M2 (in US dollars) / reserves (in US dollars)	- MRE	90	90
• 7. Bank deposits	- CBD	15	20
• 8. Exports (in US dollars)	- EXP	10	10
• 9. Imports (in US dollars)	- IMP	90	80
• 10.Credit rating	- CRA	11	11
• 11.Terms of trade	- TRA	10	19
• 12.Real echange rate	- PRE	10	10
• 13.Reserves	- INR	10	20
• 14.Domestic-foreign interest rate differential on deposits	– IRD	89	81
• 15.Output	- OUT	10	14
• 16.Stock prices (in US dollars)	- SMI	15	10
• 17.Overall budget balance / GDP	- BUD	10	14
• 18.Current account balance a share of GDP	- CAB	20	14
• 19.Current account balance a share of investment	- CAI	15	10
• 20.Short-term capital inflows	- SCI	85	89
• 21.Foreign direct investment (FDI)	- FDI	16	12
• 22.General government consuption / GDP	- GGC	90	88
• 23.Central bank credit to the public sector / GDP	- CBC	90	90
• 24.Net credit to the public sector / GDP	- NCR	88	80

At the table 1 for variables such as international reserves, exports, the terms of trade, deviations of the real exchage rate from trend, commercial bank deposits, output and the stock market index, credit rating for which a decline in the indicator increases the probability of crisis, the threshold is below the mean of the indicators.

Indicators of the table 1 permit constracted terms – stable, threshold, crisis and intervals of linquistic variable "financial state" of the country, which illustrated in the table 2. Terms values was used a percentile of distribution, which was equal to the arithmetic mean of the values available from researches [1], [2].

Terms of linquistic variables financial state and its intervals (percentile)**.**

Table 2

No	Indicators	Stable			Threshold			Crisis		
1	INR	100.00	57.50	15.00	20.00	15.00	10.00	15.00	8.00	1.00
2	EXP	100.00	55.00	10.00	12.50	10.00	7.50	10.00	5.50	1.00
3	TRA	100.00	57.25	14.50	19.00	14.50	10.00	14.50	7.75	1.00
4	DRE	100.00	55.00	10.00	12.50	10.00	7.50	10.00	5.50	1.00
5	CBD	100.00	58.75	17.50	20.00	17.50	15.00	17.50	9.25	1.00
6	OUT	100.00	56.00	12.00	14.00	12.00	10.00	12.00	6.50	1.00
7	SMI	100.00	56.25	12.50	15.00	12.50	10.00	12.50	6.75	1.00
8	CBC	1.00	45.50	90.00	87.50	90.00	92.50	90.00	95.00	100.00
9	CRA	100.00	55.50	11.00	8.50	11.00	13.50	11.00	6.00	1.00
10	CAB	1.00	9.00	17.00	14.00	17.00	20.00	17.00	58.50	100.00
11	CAI	1.00	6.75	12.50	10.00	12.50	15.00	12.50	56.25	100.00
12	DOC	1.00	45.00	89.00	88.00	89.00	90.00	89.00	94.50	100.00
13	IRD	1.00	43.00	85.00	81.00	85.00	89.00	85.00	92.50	100.00
14	EMB	1.00	44.75	88.50	88.00	88.50	89.00	88.50	94.25	100.00
15	FDI	1.00	7.50	14.00	12.00	14.00	16.00	14.00	57.00	100.00
16	GGC	1.00	45.00	89.00	88.00	89.00	90.00	89.00	94.50	100.00
17	IMP	1.00	43.00	85.00	80.00	85.00	90.00	85.00	92.50	100.00
18	LED	1.00	44.25	87.50	87.00	87.50	88.00	87.50	93.75	100.00
19	MMV	1.00	45.25	89.50	89.00	89.50	90.00	89.50	94.75	100.00
20	MRE	1.00	45.50	90.00	87.50	90.00	92.50	90.00	95.00	100.00
21	NCR	1.00	42.50	84.00	80.00	84.00	88.00	84.00	92.00	100.00
22	BUD	1.00	6.50	12.00	10.00	12.00	14.00	12.00	56.00	100.00
23	RIR	1.00	42.50	84.00	80.00	84.00	88.00	84.00	92.00	100.00
24	SCI	1.00	44.00	87.00	85.00	87.00	89.00	87.00	93.50	100.00

Azerbaijan financial and macroeconomical indicators for 2007.09-2008.08.

Table 3

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
INR	3135.7	3237.4	3370.4	4015.2	3929.8	4015.5	4256.9	4315.5	4323.4	5225.7	5223.7	5338.2
EXP	324	503.9	641.8	596.7	626.2	571.6	346.2	2313.4	11011.9	2619.7	17189.3	3025.2
TRA	-168.7	-9.9	63.3	-112.2	132.6	130.9	-71.7	1741.2	10473.9	1998.9	16372.3	2419.7
DRE	93.4	92.4	92.7	95.1	96.5	98	97.2	100.3	102.6	103	102.5	105
CBD	3403.8	3539.17	3612.43	3762.44	3697.74	4293.81	4293.88	4432.43	4667.35	5067.03	5010.77	5023.24
OUT	1211.16	2748.88	2126.87	3340.74	2392.76	2414.15	3559.3	3101.66	3946.76	3043.55	3979.33	2321.98
SMI	79.93	85.93	93.93	92.11	93.66	96.81	105.1	109.95	123.24	134.05	133.9	115.08
CBC	0	0	0	0	0	0	0	0	0	0	0	0
CRA	40	40	40	40	40	40	40	40	40	40	40	40
CAB	0.41	0.57	0.59	0.28	0.64	0.59	0.42	0.82	0.78	0.49	0.46	0.72
CAI	1.08	1.98	2.02	1.2	3.96	2.95	2.66	3.89	3.66	2.6	2.36	2.35
DOC	0.11	0.13	0.14	0.05	0.03	0.02	0.04	0.09	0.25	0.03	0.05	0.04
IRD	11.91	12.17	12.12	12.12	11.97	12.21	12.39	0	0	0	0	0
EMB	30.7	54.3	100	91.32	82.6	74.79	111.68	114.78	85.48	4.12	-13.03	0
FDI	0.16	0.09	0.09	0.06	0.09	0.08	0.05	0.07	0.06	0.04	0.05	0.09
GGC	10	10	10	10	10	10	10	10	10	10	10	10
IMP	492.7	513.8	578.5	708.9	493.6	440.7	417.9	572.2	538	620.8	817	605.5
LED	1.4	1.4	1.4	1.4	1.4	1.6	1.8	1.7	1.5	1.5	1.5	1.74
MMV	1.88	1.91	1.91	1.72	1.84	1.94	1.83	1.89	1.96	1.85	1.85	1.77
MRE	18.1	16.9	17	17.6	16.5	18.6	16.8	19.2	20.2	19.3	20.7	16
NCR	21	21	21	21	21	21	21	21	21	21	21	21
BUD	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
RIR	10.76	10.2	8.78	9.26	9.26	8.45	7.49	7.32	8.26	10.49	10.79	9.48
SCI	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

For assesment composite financial stability index we used fuzzy logic inference. As informations we used Azerbaijan financial and macroeconomical indicators for 2007.09 – 2008.08 (table 3). Note that in Azerbaijan financial statistics absent indicator CBC. That is why we used 23 indicators.

Firstly we expression indicators in percentiles (table 3).

At next stage we fuzzificated indicators and constructed membership functions. For this purpose we defined three terms of linquistic variables (stabil, threshold, crisis) and in fuzzification prosses were used Gaussian function of normal distribution (fig.1). Then were constructed rules determing financial state index (FSI). Using method of composition we receive the aggregated fuzzy set, which is area of values fuzzy variable – FSI (fig.2). By centroid method were carry out procedure of defuzification and find meaning of FSI = 25.48, which conform to stable state. From figure 2 we can see, that 66,6 parts of support of the fuzzy set are in stable state and 33,4 parts in the threshold state.

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Azerbaijan financial and macroeconomical indicators for 2007.09 – 2008.08. (in percentiles)

Table 4

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
INR	26.61	28.85	31.78	45.96	44.08	45.97	50.42	50.85	50.91	57.53	57.51	58.35
EXP	40.59	41.15	41.59	41.44	41.54	41.37	40.66	46.85	58.08	47.81	64.56	49.09
TRA	40.7	41.2	41.44	40.88	41.66	41.65	41	46.79	58.22	47.61	64.49	48.95
DRE	31.68	27.89	29.02	38.14	43.45	49.15	46.11	52.63	55.54	56.04	55.41	58.57
CBD	27.68	31.32	33.29	37.32	35.58	50.54	50.54	51.78	53.89	57.47	56.97	57.08
OUT	16.33	47.94	35.15	53.37	40.62	41.06	54.87	51.73	57.53	51.33	57.75	39.16
SMI	26.66	32.18	39.54	37.86	39.29	42.19	49.81	51.42	55.5	58.81	58.76	53
CBC	0	0	0	0	0	0	0	0	0	0	0	0
CRA	40	40	40	40	40	40	40	40	40	40	40	40
CAB	34.04	50.2	50.89	20.58	52.62	50.89	35.07	58.83	57.45	42.32	39.22	55.38
CAI	23.95	39.8	40.51	26.07	58.22	52.29	50.59	57.81	56.46	50.24	46.49	46.32
DOC	52.34	54	54.83	42.14	37.17	34.69	39.65	50.69	63.93	37.17	42.14	39.65
IRD	54.3	54.53	54.49	54.49	54.35	54.57	54.73	31.12	31.12	31.12	31.12	31.12
EMB	38.7	47.39	54.74	53.67	52.6	51.64	56.17	56.55	52.95	28.92	22.61	27.4
FDI	64.48	52.19	52.19	40.79	52.19	50.44	35.52	46.05	40.79	30.26	35.52	52.19
GGC	10	10	10	10	10	10	10	10	10	10	10	10
IMP	39.07	42.19	50.58	57.01	39.21	31.39	28.02	50.27	45.77	52.67	62.33	51.91
LED	35.46	35.46	35.46	35.46	35.46	52.71	60.26	56.48	46.79	46.79	46.79	57.99
MMV	51.42	53.84	53.84	15.47	44.54	56.27	42.11	52.23	57.89	46.96	46.96	27.54
MRE	50.09	37.17	38.26	44.81	32.8	51.91	36.08	54.1	57.74	54.46	59.56	27.34
NCR	21	21	21	21	21	21	21	21	21	21	21	21
BUD	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
RIR	57.18	54.58	44	50.22	50.22	39.4	26.05	23.69	36.76	55.93	57.32	51.24
SCI	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

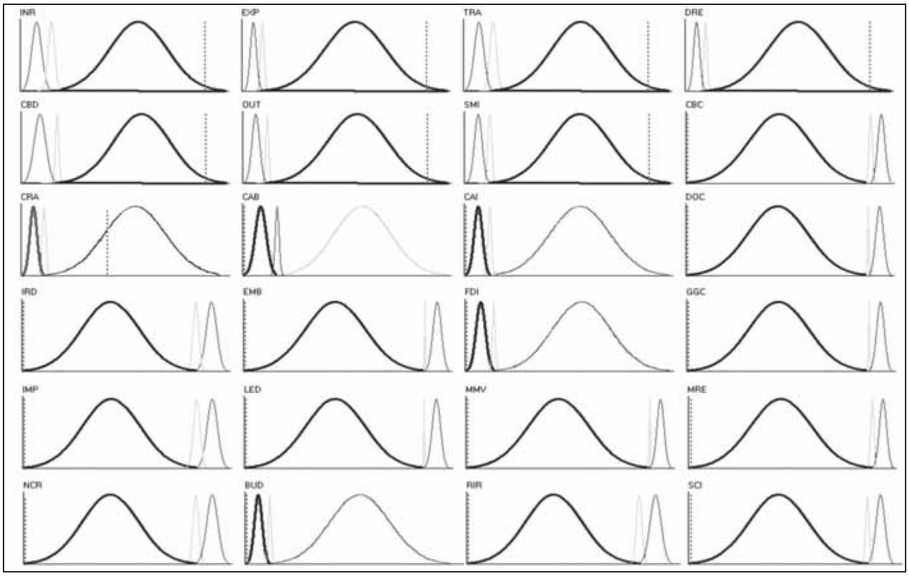

Fig.1 Fuzzy sets of the input indicators of the model.

Meaning of input indicators of the model for september 2007 year (in percentiles)

Table 5.

Indicators		Month 1	Term
International reserves	- INR	26.61	E1
Exports	- EXP	40.59	E1
The terms of trade	- TRA	40.7	E1
Real exchage rate	- DRE	31.68	E1
Commercial bank depositts	- CBD	27.68	E1
Output	- OUT	16.33	E1
Stock prices	- SMI	26.66	E1
Central Bank credit to the public sector / GDP	- CBC	0	E1
Credit rating	- CRA	40	E1
Current account balance / GDP	- CAB	34.04	E3
Current account balance / Investment	- CAI	23.95	E3
Domestic credit / GDP	-DOC	52.34	E1
Domestic-foreign interest rate differential on deposits	– IRD	54.3	E1

Excess real M1 balance	- EMB	38.7	E1
Foreign direct investment / GDP	- FDI	64.48	E3
General government consumption / GDP	- GGC	10	E1
Import	- IMP	39.07	E1
=Ratio of lending rate to deposit rate	- LED	35.46	E1
M2 multiplier	- MMV	51.42	E1
M2 / reserves	- MRE	50.09	E1
Net credit to the public sector / GDP	- NCR	21	E1
Overall budget balance / GDP	- BUD	0.02	E1
Real interest rate on deposits	- RIR	57.18	E1
Short-term capital inflows / GDP	- SCI	1.5	E1

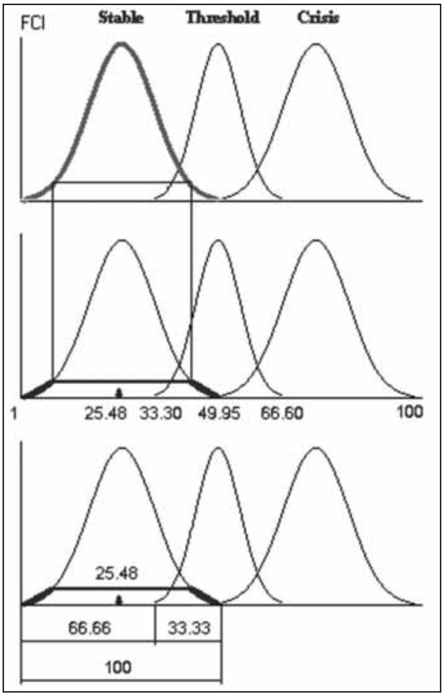

Fig.2 Fuzzy sets of the FSI.

The problems solved for 12 months of 2007-2008 years and as results for all periods in crisis state were indicators **CAB**, **CAI**, **FDI**.

3.Fuzzy Markov model forecasting of the state of the composite financial stability index.

Fuzzy Markov model expressed by following equation:

$$U_x^{(n)} = U_x^{(0)} \circ M^{(n)} \tag{1}$$

where $U_x^{(0)}$ - initial state vector describing the probability of the state composite financial stability index;

$U_x^{(n)}$ - probability vector of the state composite financial stability index in the n periods;

$M^{(n)}$ - transition matrix, elements which represents grade of membership of the trasition going from one state to another;

– union and intersection basics operations.

For solution equation (1) we used idea, which described in [4] and [5].

In our case initial vector of probability of the state evaluated from composite financial stability index, which we received by application fuzzy logic inference. It is necessary to underline that grade of importance for every indicator we take equivalent.

As seen from the table 3 from 23 input indicators only 3 indicator allocated in crisis state. If the probability to get of every indicator in crisis state are equivalent, then probability of state of the financial system at the crisis sitauation are equal 0,13 (3/23).Naturally meaning of probability in the threshold state will equal 0,87.

Distribution of the probability arise of 3 events - S1 (stable), S2 (threshold), S3 (crisis), defining by following table:

Number of indicators	Probability of the indicators at the crisis state
1 – 3	0 – 0,13
4 – 6	0,17 – 0,26
7 – 12	0,30 – 0,52
13 – 23	0,57 – 1

This table give us possibility to define of t he distribution of the probability of arise following 4 state of the Financial Stability Index:

Very high stability	(VH)	1 – 0,87;
High stability	(H)	0,87 – 0,74;
Law stability	(L)	0,74 – 0,48;
Very law stability	(VL)	0,48 – 0.

Comformable membership function for (VH), (H), (L) and (VL) are follows:

$$\mu_{VH} = 0/0.87 + 0.154/0.88 + 0.308/0.89 + 0.462/0.9 + 0.615/0.91 + 0.769/0.92 + 0.923/0.93 + \\ + \mathbf{1}/\mathbf{0.935} + 0.923/0.94 + 0.769/0.95 + 0.615/0.96 + 0.462/0.97 + 0.308/0.98 + 0.154/0.99 + 0/1$$

$$\mu_{H} = 0/0.74 + 0.154/0.75 + 0.308/0.76 + 0.462/0.77 + 0.615/0.78 + 0.769/0.79 + 0.923/0.8 + \\ + \mathbf{1}/\mathbf{0.805} + 0.923/0.81 + 0.769/0.82 + 0.308/0.85 + 0.615/0.83 + 0.462/0.84 + 0.308/0.85 + \\ + 0.154/0.86 + 0/0.87$$

$$\mu_{L} = 0/0.48 + 0.077/0.49 + 0.154/0.5 + 0.231/0.51 + 0.308/0.52 + 0.385/0.53 + 0.462/0.54 + \\ + 0.538/0.55 + 0.615/0.56 + 0.692/0.57 + 0.769/0.58 + 0.846/0.59 + 0.923/0.6 + \mathbf{1}/\mathbf{0.61} + \\ + 0.923/0.62 + 0.846/0.63 + 0.769/0.64 + 0.692/0.65 + 0.615/0.66 + 0.538/0.67 + 0.462/0.68 + \\ + 0.385/0.69 + 0.308/0.7 + 0.231/0.71 + 0.154/0.72 + 0.077/0.73 + 0/0.74 \qquad (2)$$

$$\mu_{VL} = 0/0 + 0.0417/0.01 + 0.0833/0.02 + 0.125/0.03 + 0.167/0.04 + 0.208/0.05 + 0.25/0.06 + \\ + 0.292/0.07 + 0.333/0.08 + 0.375/0.09 + 0.417/0.1 + 0.458/0.11 + 0.5/0.12 + 0.542/0.13 + \\ + 0.583/0.14 + 0.625/0.15 + 0.667/0.16 + 0.708/0.17 + 0.75/0.18 + 0.792/0.19 + 0.833/0.2 + \\ + 0.875/0.21 + 0.917/0.22 + 0.958/0.23 + \mathbf{1}/\mathbf{0.24} + 0.958/0.25 + 0.917/0.26 + 0.875/0.27 + \\ + 0.833/0.28 + 0.792/0.29 + 0.75/0.3 + 0.708/0.31 + 0.667/0.32 + 0.625/0.33 + 0.583/0.34 + \\ + 0.542/0.35 + 0.5/0.36 + 0.458/0.37 + 0.417/0.38 + 0.375/0.39 + 0.333/0.4 + 0.292/0.41 + \\ + 0.25/0.42 + 0.208/0.43 + 0.167/0.44 + 0.125/0.45 + 0.0833/0.46 + 0.0417/0.47 + 0/0.48$$

Using above designation of probability were constructed the next transition matrix of probability:

$$M^{(1)} = \begin{pmatrix} VL & VH & VH \\ H & VL & H \\ L & L & VH \end{pmatrix} \tag{3}$$

Mainly this matrix constructed by experts, depend from financial situation of the state.

Initial state vector $U_x^{(0)}$ defined by using financial stability index, which evaluated by using of the fuzzy logic inference. As since in our case financial stability index include 3 indicators, which are in crisis state, that is why the probability to stay at the threshold state equal 0,87 and at the threshold and crisis state respectively equal 0,07 and 0,06. To take into account this fuzzy initial state vector $U_x^{(0)} = (VH, VL, VL) = (0.87, 0.07, 0.06)$.

Using meaning of $U_x^{(0)}$ and M^1, we calculate meaning of vector $U_x^1 = U_{(x)}^{(0)} \circ M^{(1)}$ for next period:

$$U_x^1 = (VH, VL, VL) \circ \begin{pmatrix} VL & VH & VH \\ H & VL & H \\ L & L & VH \end{pmatrix} \tag{4}$$

Respectively to logical multiplication:

$$(VH \wedge VL) \vee (VL \wedge H) \vee (VL \wedge L) = VL \vee VL \vee VL = VL$$
$$(VH \wedge VH) \vee (VL \wedge VL) \vee (VL \wedge L) = VH \vee VL \vee VL = VH$$
$$(VH \wedge VH) \vee (VL \wedge H) \vee (VL \wedge VH) = VH \vee VL \vee VL = VH$$

If the matrix M^1 change in (4) by matrix $\overline{M^1}$, then

$$\overline{U_x^1} = (VH, VL, VL) \circ \begin{pmatrix} VH & VL & VL \\ H & H & L \\ L & L & VH \end{pmatrix}$$

Respectively to logical multiplication:

$$(VH \wedge VH) \vee (VL \wedge H) \vee (VL \wedge L) = VH \vee VL \vee VL = VH$$
$$(VH \wedge VL) \vee (VL \wedge H) \vee (VL \wedge L) = VL \vee VL \vee VL = VL$$
$$(VL \wedge VL) \vee (VL \wedge L) \vee (VL \wedge VH) = VL \vee VL \vee VL = VL$$

Creasp meaning of logical variables defined by (2), by means of the choice of probability, which correspond to maximal meaning of the membership degree:

$$\Pi^{1}_{-} = (VH, VL, VL) = (0.93, 0.24, 0.24) \qquad \overline{\Pi}^{1}_{-} = (VH, VL, VL) = (0.24, 0.93, 0.93),$$

Fuzzy-Markov forecasting model is better at long-term forecast than short-term [6]. We thing so, in both case transition matrix must be constructed with participation highly qualified experts, because result of the forecasting depend from transition matrix.

Inferences.

In this paper we use fuzzy logic inference system for evaluation composite finance stability index of state. Fuzzy Markov model has been utilized to predict the possibility meaning FSI next month. As we underline that, in our case importance degree of the indicators are accepted it is equivalent. It is very important that in the future we must be define importance degree for every indicator.

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BUSINESS INTELLIGENCE TOOLS FOR NEW INFORMATION ECONONMY

Abstract

Recent years have witnessed the emergence of new interleaved terms coining information economy, intelligent decision making and information technology. Moreover, the transition to a new information economic era involves far more than just technology while sound business practices must be applied simultaneously to old and emerging economic circumstances. However, much remains the same, but much is also changing leading managers in particular to understand the economic ecology in order to thrive in a contemporary role of management. That is why managers must understand the informational features of economic activity, the emerging new value propositions, the effects of globalization, and the digitization of so many business activities, all set within the context of emerging political realities.

In this paper, the main focus is given to spot lighten three major aspects: (i) dynamics encountered by new era of information economy, (ii) Business Intelligence(BI) impact on information economy and (iii) how does the use BI to enhance economical decisions. In order to justify the added value of employing BI approaches in a typical application problem, this paper also presents a BI model centered on data mining to provide managers with better decision support regarding one typical application problems facing many software industry projects. The proposed model is applied on a typical case study based on intelligent inference engine based on data mining in an attempt to unlock the mystery of Software project management. Better success op-

portunities can be improved via investigating, analyzing and retrieving indicators and discovering knowledge from history software projects. Finally, the ongoing inspiring e-revolution in Egypt has stimulated the author to link his model to the adoption of such BI models towards better adoption of BI in analyzing and planning for the future economy of Egypt.

Keywords:

Business Intelligence (BI), Information economy, Inference Engine, Data Mining, e-revolution

1. Heading towards New Eara of Information Economics:

During the last three decades the term "information economy" has been coined and used frequently to refer to the ongoing progress of information technology and to spotlight the addressed impact of the rapid development in internet applications. Most researchers, business observers of the business and economic landscape have agreed upon the conclusions that even the "advanced nations" of the world were leaving the Industrial Era behind and were headed into the Post-Industrial Age, one marked by economic activity not rooted in the manufacture of goods. Although, there has been a common vision of a world blessed with the benefits of information technology, there has been also a clear sign of headings towards new dynamic era however, at the same time all were pummeled with hype about the future. Many researchers have commented more soberly about the same trends taking in considerations that economic and business circumstances were changing rapidly in core while still looking same at surface. By the early 1970s, yet we were still manufacturing and selling goods, and still eating farm-grown food. Were so many people just wrong about economic and business realities, or was something else going on that proved difficult to see ten, twenty, or thirty years ago?

Meanwhile, what is happening is the fact that transformation is occurring simultaneously in different ways and speeds around the world. For instance, the role models upon which most industrialized nations based their proclamations heralding the arrival of the age of Information. The industrialized nations, first the United States, next Western Europe, and, briefly, East Asia have a greater sense that information technologies are having an important influence on the nature of business. A flash back spanning some historical and recent figures from USA show that beginning in the 1920s, when corporate industrial capitalism finally reached the form it would maintain for the next half dozen decades, the American economy again changed rapidly. For instance, in 1920 manufacturing and agriculture dominated the economy, with services a blip but by 1980, services accounted for more than half of the economy, manufacturing for roughly a fourth of the action, and agriculture less than 10 percent. The implication from this remarkable shift is that as the source of jobs and income shifted during the twentieth century away from agriculture and manufacturing and to services, the nature of work did too. Recently compiled data suggests that the growth in the percentage of the U.S. workforce population made up of knowledge or office workers between 1910 and the end of the century went from less than 10 percent to over 70 percent. From 1960 to 1980, the rate of growth in this portion of the workforce ran annually at about 3.5 percent, versus just 1.1 % for the workforce as a whole. In 1960 about 42 percent of all workers could be categorized as knowledge workers; by 1980 that total had climbed to 52 percent. In the 1990s, it reached the 70 percent figure just cited. While definitions remain fuzzy, and economists are still quibbling about percentage points here and there, the trend is no longer disputed. It is clear, dramatic, and important. The computer in particular became very evident, first at work, then almost everywhere heading the nation long accustomed to inventing and applying technology in highly innovative, advanced, and successful ways, it seemed natural that Americans would include use of computers in their bag of tools. Advanced nations with different start up ranging from mid 1950s to early 1960s on, technology and computers became almost synonymous; Americans viewed automation and computers as one and the same, and also as a familiar part of their working environments. Large European and Asian corporations had already embraced telecommunications and large system computing for over two decades, also providing innovations in both hardware and software. In short, by the end of the 1990s, computing had become a very familiar aspect of modern work life across the industrialized sections of the world, and to a growing extent in developing nations. What is particularly remarkable is the intensity of interest and the speed with which this technology became popular everywhere in the whole world.

On the other hand, the new post-Industrial Age, however, missed one of the most profound changes to occur; specifically, the growing reliance on information as a source of wealth and income, and more precisely, the extent to which technology-driven firms became sources of new wealth and centers of economic activity. Both American and West European government agencies that measure features of national economies have only just begun to actually refer to the “information economy.” They are now publishing task force reports with more attention to the arrival of this new economy, but they are just barely beginning to reflect that reality in their routine economic data-gathering activities. The published reports on the "information economy" are still sporadic events, occasional, and more or less a matter of the subject of press coverage as new news. In addition to not yet institutionalizing the collection of hard economic data on the changing economy is the fact that we still do not have solid agreement among economists or government agencies about what makes up this new sector. In the United States, for example, the government still uses industrial- age industry codes that categorize everything in economical attributes from asbestos manufacturers to zoo keepers. Also, the OECD, one of Western Europe's major economic data reporting agencies, is also very industrial in its perspective about European economics. Efforts that have been made to redefine work (labor content, assets, and monetary values such as revenues) suggest several clear patterns. First, various important government agencies in industrialized nations recognize that they need to reform their reporting on economic matters and, therefore, have started the slow process of reform. It appears this process is replicating efforts governments went through between the two world wars to set up the reporting mechanisms they have for today's industrial economy. Second, there is growing recognition among economists and government officials that information technology is adding economic value and, increasingly, is having a positive effect on the rates of national productivity of both workers and physical assets. There is still a struggle going on over the question of how to value soft assets like software, however. Third, that second issue has not slowed the attempts of national governments to continue supporting national champions. For example, the Japanese still support microelectronics and software development, the Americans support improvements in chips, software, and telecommunications, while the Europeans increasingly are supporting telecommunications and application software projects. This third trend began in the 1950s and early 1960s with governments supporting computer manufacturers but, after the Americans and then East Asians came to dominate the hardware business, they moved on to other leading edge technological opportunities. The implications of the changing economy are becoming increasingly obvious. One is that people earn more income and increasingly live out their work lives in a market richer in ideas and data. Those who like to hype the issue in essentially negative terms speak of the end of work and the de-skilling of people as computers and robots get "smarter." Instead, something quite different has already happened. To gain more insight into the matter consider the reported surveys about average working hours which states that the number of hours people work has not gone down since the enemies of automation began scaring workers as early as the 1950s; rather, they are up, and most so in the United States and Japan.

The demand for better-educated, skilled workers to use all this new sophisticated technology has also gone up over the course of the past half century. These currents of change—automation, de-skilling, richer information content, and so forth—are some elements of the new economy. Products also have information and services wrapped around them. A quick example illustrates the point. In the 1960s, almost all of IBM's revenues came from the lease of computers and related hardware. At the start of the new millennium, nearly half its revenues came from hardware; the rest came from providing services offered by highly skilled employees. In other words, IBM was generating tens of billions of dollars by renting out their people's brains.

On the other hand, information economics also affect firms not traditionally thought of as being in the information business. Many North American trucking firms are equipped with onboard PCs that communicate their inventory, status of their delivery efforts, and query corporate systems for directions. UPS, another transportation firm, tracks every package in its possession, making it possible for customers and employees to know at every step of the way where things are. The objective is to make the right piece at the right time, with minimal investments in warehousing and inventory. For example, Apparel manufacturers are very high-tech, data-intensive industries today, operating in many countries, closely linked to Web sites and to their retail partners around the world. The Internet has provided yet another wave of convenient technology, forcing important structural changes across almost every major industry around the world, and all in less than a decade. The problem is never the change or trend itself; it is the unintended, or even worse, unpredictable, consequences that catch a company off guard, spoiling anticipated performance.

2. Business Intelligence Analytics: The Tools for efficient Decisions:

Business Intelligence (BI) refers to application and technology which is used to gather, provide access to, and to analyze data and information about the company operations**.** Meanwhile, BI can be viewed in a number of perspectives: (1) discipline perspective is centered on integrated practices, (ii) SW perspective which is centered on adopting SW to aggregate data from various business applications to deliver information and to discover knowledge in context business and operational performance and (iii) value perspective which is centered on measuring effectiveness of strategies using operational data and delivering real time information and knowledge indicators to guide daily decisions. Figure (1) below depicts the three main perspectives of BI.

Figure (1) Main Perspectives of BI

On the other hand, the justification to the need to BI can be illustrated by considering the following five main questions along the time domain: past, present and future:

- What happened?
- What is happening?
- Why did it happen?
- What will happen?
- What do I want to happen?

On the other hand, the evolution of BI has also gone with the dynamics of business requirements being challenged with tough competition between business firms and challenges facing management decisions. The need to analytical figures and results has evolved over the three decades raising needs from just reporting up to current state of action and decisions based on business intelligence. Figure (2) illustrates the evolution of BI along two main axioms: user interaction and analytical features. On the other hand, the availability of many BI SW tools raises the important issue of the problem of selecting the appropriate SW tools. Consequently, to guide such a proper selection, one should consider the important question, «What are the key factors for selecting the best-fit Business Intelligence Software Tools?. Figure (3) illustrates the main factors guiding proper selection of SW tools along two major axioms: (i) Level of functionality and (ii) Level of user needs.

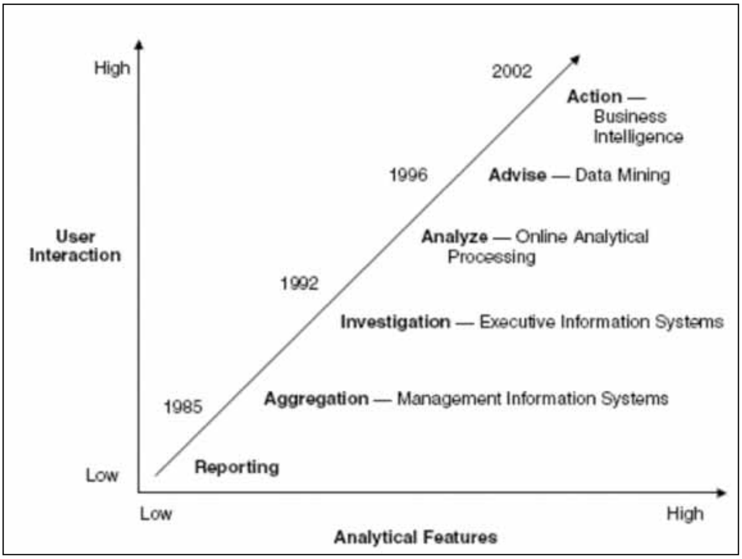
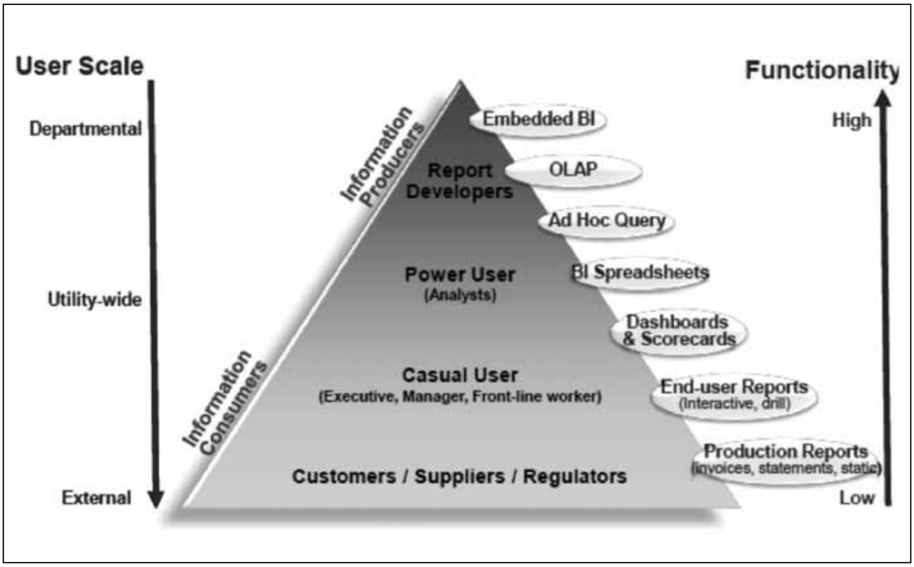


Figure (2) Evolution of BI Analytics



Figure(3) Key Factors Guiding The Selection of Proper BI Tools

The setup of appropriate BI tools will differ based on whether the target is a traditional BI solution or BI tool is handled as service which is shown in figure (4).

BI Setup	Traditional BI Solutions	BI Software as a Service
Design and deployment time	Months	Days
Application design team	In-house IT and/or BI consultants	SaaS vendor
Deployment team	In-house IT and/or BI consultants	End user
Special skills required for setup	DB, DW, ETL, OLAP, reporting	None

Figure(4) Comparing BI Tools

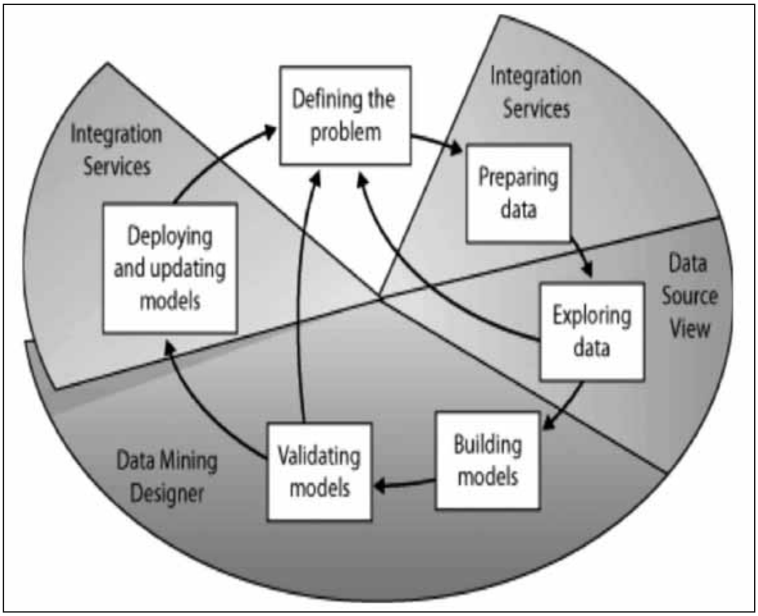
Meanwhile, BI users are beginning to demand Real time BI or near real time analysis relating to their business particularly in front line operations. They will come to expect up to date and fresh information in the same fashion as they monitor stock quotes online. monthly and even weekly analysis will not suffice

2.1. Data Mining:

Data mining is frequently described as "the process of extracting valid, authentic, and actionable information from large databases." In other words, data mining derives patterns and trends that exist in data. An important concept is that building a mining model is part of a larger process that includes everything from defining the basic problem that the model will solve, to deploying the model into a working environment. This process can be defined along the following six basic steps:

1. Defining the Problem
2. Preparing Data
3. Exploring Data
4. Building Models
5. Exploring and Validating Models
6. Deploying and Updating Models

Figure (5) presents a diagram which describes the relationships between each step in the process.



Figure(5) relationship between Major Steps of the Building Process of Data Mining Model

After defining the structure of the mining model, then comes the processing via populating the empty structure with the patterns that describe the model, this is known as training the model. Patterns are found by passing the original data through a mathematical algorithm. For example, SQL Server 2005 contains a different algorithm for common types of built models. One can use parameters to adjust individual algorithms employed in the developed model. The main algorithms commonly used are:

1. Association Rules Algorithm.
2. Cluster Algorithm.
3. Naïve Bayes Algorithm.
4. Decision Tree Algorithm.
5. Neural Network Algorithm.

Such algorithms can be compared along three major aspects:(1) How the Algorithm works, (2) The predictive ability of the mining models in a mining structure and (3) identifying and estimating the accuracy with real data records .

2.2. The Predictive Ability of Mining Models

It's quite important to validate the accuracy and to compare the predictive ability of the mining models in a certain mining structure as it's helpful when trying to choose the correct algorithm to use or to know how to adjust parameters within an individual algorithm. Most tools provide facilities and options for this step such as the case with the "Mining Accuracy Chart" in SQL Server 2005. Such validation is an important step in the data mining process giving more faith in how well the adopted mining models perform against real data to deploy the models into a production environment. For example, the Mining Accuracy Chart uses "Lift Chart" and "Classification Matrix" which are used to compare the accuracy prediction of each mining model. Lift Chart is created by plotting the results of prediction queries from a testing dataset against known values for the predictable column that exist in the dataset. The following diagram provides an example of this kind of chart as depicted in Figure (6).

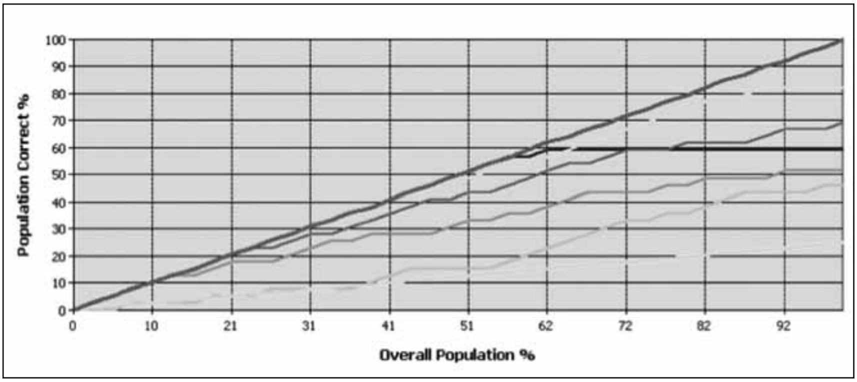


Figure (6) Example of Lift Chart

In Figure (6), the X-axis of the chart represents the percentage of the test dataset that is used to compare the predictions while the Y-axis of the chart represents the percentage of values that are predicted to be the specified state. Meanwhile, The chart displays a line for the results of the mining model, together with two other lines: one line that represents the results that an ideal model (Red Line) would produce, with perfect predictions that are never wrong, and one line that represents the results of a random guess (Yellow Line). The results of your models (Other Colors) will fall somewhere between the ideal model and the random guess. Any improvement over the random line is called *lift*, and the more lift that the model demonstrates, the more effective the model is.

2.3. Classification Matrix:

Classification Matrix provides another way to examine how accurately the mining models in a structure create predictions. A classification matrix is built as a comparison of actual values that exist in the testing dataset against the values that the mining model predicts. The matrix is a valuable tool because it not only shows how frequently the model correctly predicted a value, but also shows which other values the model most frequently predicted incorrectly. For Example, consider the case where a model has been constructed to predict the type of Project is Low or High or Very High. Assume we have 11 Projects Low, 18 Projects High, and 10 Projects Very High in our test database as depicted in the following table.

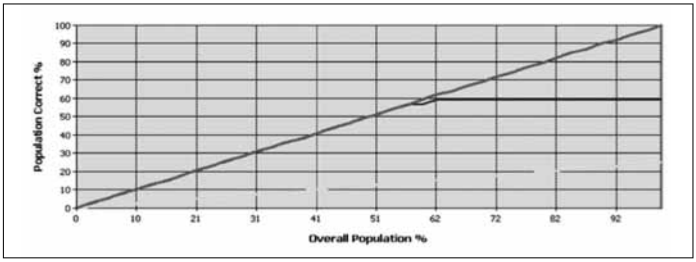
Predicted	LOW (Actual)	VERY HIGH (Actual)	HIGH (Actual)
LOW	10	0	3
VERY HIGH	0	8	1
HIGH	1	2	14

The values that run diagonally from the upper-left corner to the lower-right corner of the matrix give the correct number of values that actually exist in the testing dataset. Columns in the matrix represent items that have been predicted in the testing dataset. Rows represent the actual state of the attribute as it exists in the testing dataset. Look at how the mining model predicted the projects which has results low, high and very high. The value for the intersection of the LOW column and the LOW row would represent the actual number of LOW Projects in the testing database. The value for the intersection of the LOW column and the HIGH row would represent the number of cases that were incorrectly predicted to be HIGH, when actually they were LOW. The number of incorrectly predicted values for LOW would be the summation of the intersection of the LOW column and VERY HIGH row, and the LOW column and HIGH row.

To gain an insight into basic difference between the aforementioned techniques: the Lift Chart and the classification Matrix following consideration will illustrate the issue along the comparison of results based on the common algorithms. Following diagrams will consider the results of a typical case based on the adopted algorithms according to Lift Chart:

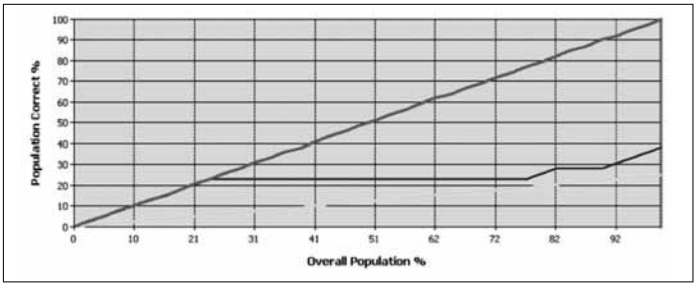
1- Association Rule Algorithm

- For M-Success Project



Population Correct % is 58.97%

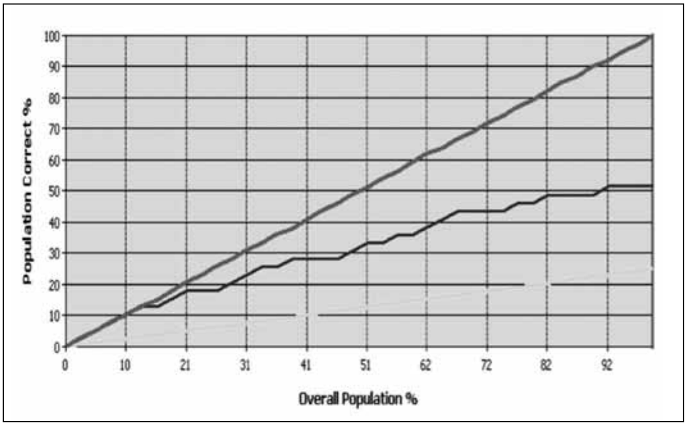
- <u>For R-Success Projects</u>



Population Correct% = 38.46%

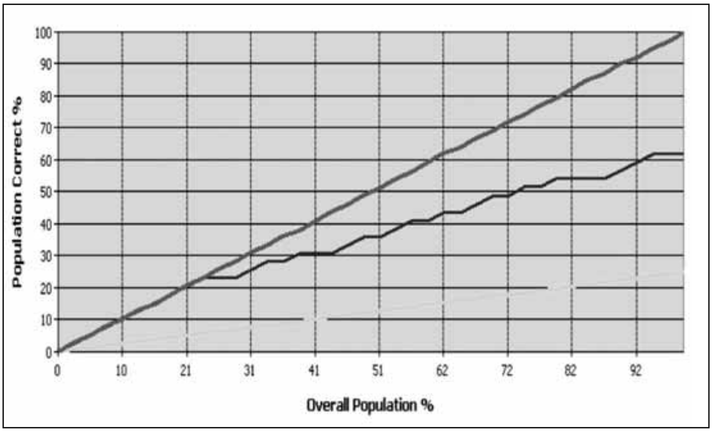
Results based on Cluster Algorithm

- For M-success Projects



Population Correct% is 51.28%.

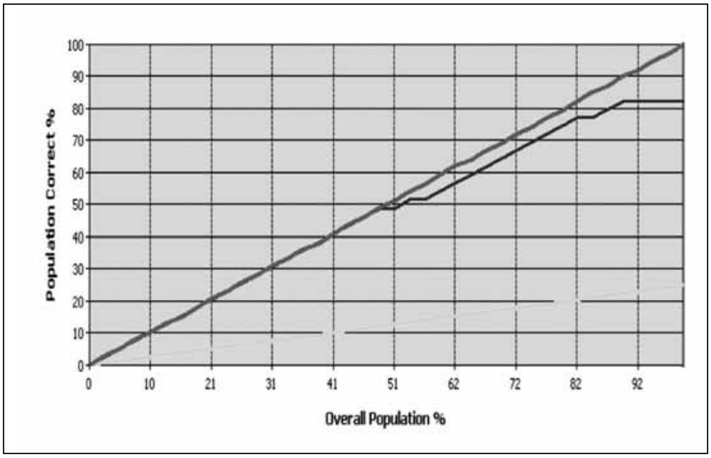
- For R-Success Projects



Population Correct% = 61.54%

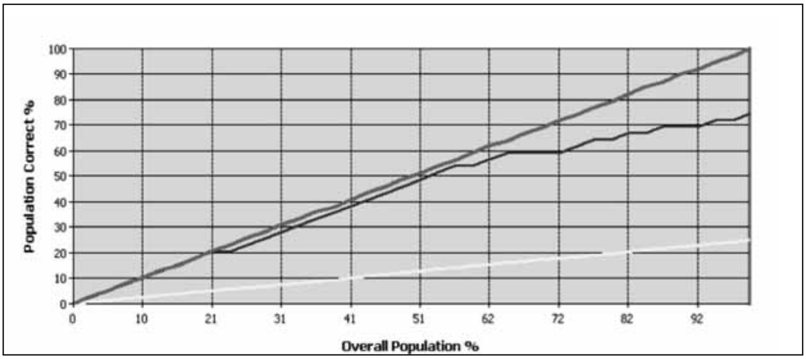
Results Based on Naïve Bayes Algorithm

- For M-Success Projects



Population Correct% = 82.05%

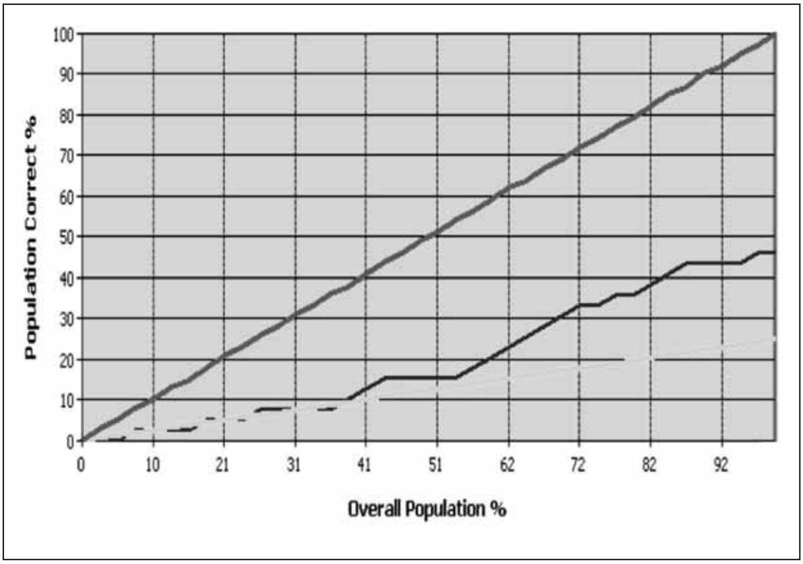
- For R-Success Projects



Population Correct% = 74.36%

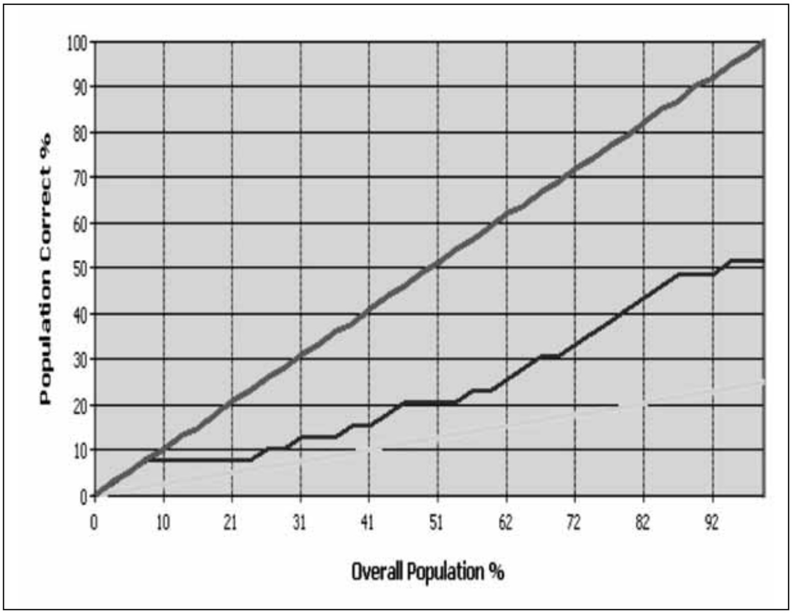
Results Based on Decision Tree Algorithm

- For M-Success Projects



Population Correct% = 46.15%

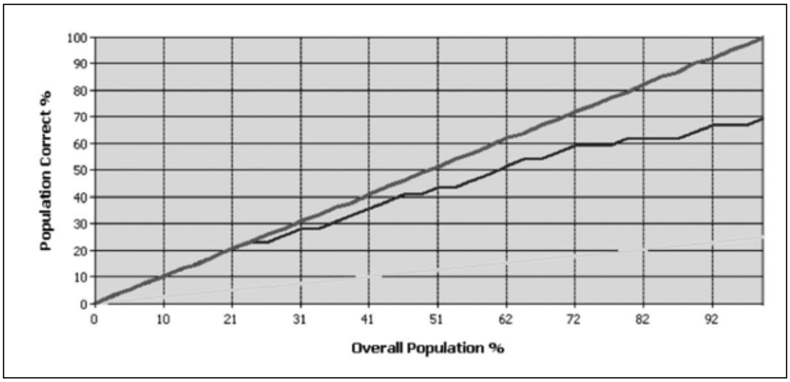
- For R-Success Projects



Population Correct% = 51.28%

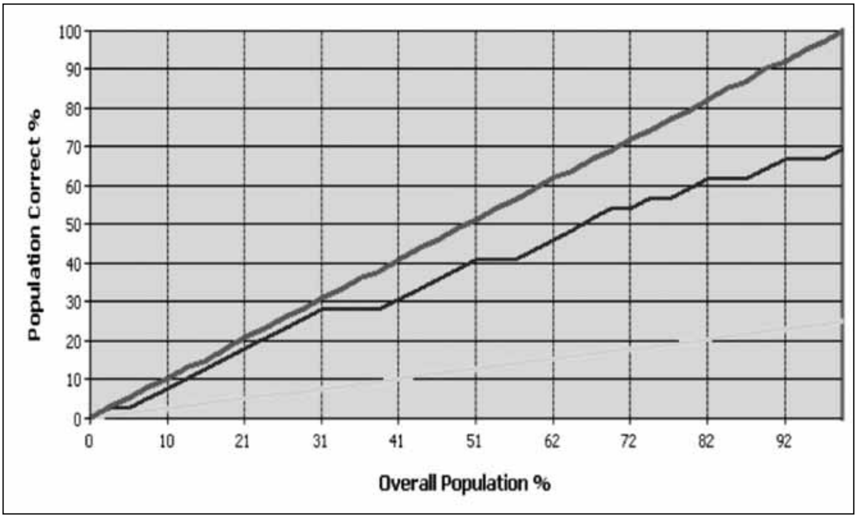
Results Based on Neural Network Algorithm

- For M-Success Projects



Population correct% = 69.23%

- For R-Success Projects



Population correct% = 69.23%

On the other hand, comparing results according to Classification Matrix along the related algorithms, following is a brief listings of the comparable results.

1-Association Rules Algorithm

- For M-Success Projects

Predicted	LOW (Actual)	VERY HIGH (Actual)	HIGH (Actual)
LOW	11	0	5
VERY HIGH	0	10	11
HIGH	0	0	2

Actual LOW is 11 out of 11 => 100%

Actual HIGH is 2 out of 18 => 11%

Actual VERY HIGH is 10 out of 10 => 100%

- For R-Success Projects

Predicted	LOW (Actual)	VERY HIGH (Actual)	HIGH (Actual)
LOW	6	8	11
VERY HIGH	0	1	1
HIGH	0	4	8

Actual LOW is 6 out of 6 => 100%

Actual HIGH is 8 out of 20 => 40%

Actual VERY HIGH is 1 out of 13 => 7%

Results based on Cluster Algorithm

- For M-Success Projects

Predicted	LOW (Actual)	VERY HIGH (Actual)	HIGH (Actual)
LOW	6	0	4
VERY HIGH	0	0	0
HIGH	5	10	14

Actual LOW is 6 out of 11 => 54%

Actual HIGH is 14 out of 18 => 77%

Actual VERY HIGH is 0 out of 10 => 0%

- For R-Success Projects

Predicted	LOW (Actual)	VERY HIGH (Actual)	HIGH (Actual)
LOW	2	0	0
VERY HIGH	4	3	1
HIGH	0	10	19

Actual LOW is 2 out of 6 => 33%

Actual HIGH is 19 out of 20 => 95%

Actual VERY HIGH is 3 out of 13 => 23%

Results Based on Naïve Bayes Algorithm

- For M-Success Projects

Predicted	LOW (Actual)	VERY HIGH (Actual)	HIGH (Actual)
LOW	10	0	3
VERY HIGH	0	8	1
HIGH	1	2	14

Actual LOW is 10 out of 11 => 90%

Actual HIGH is 14 out of 18 => 77%

Actual VERY HIGH is 8 out of 10 => 80%

- For R-Success Projects

Predicted	LOW (Actual)	VERY HIGH (Actual)	HIGH (Actual)
LOW	5	1	0
VERY HIGH	0	6	2
HIGH	1	6	18

Actual LOW is 5 out of 6 => 83%

Actual HIGH is 18out of 20 => 90%

Actual VERY HIGH is 6 out of 13 => 46%

Results Based on Decision Tree Algorithm

- For M-Success Projects

Predicted	LOW (Actual)	VERY HIGH (Actual)	HIGH (Actual)
LOW	0	0	0
VERY HIGH	0	0	0
HIGH	11	10	18

Actual LOW is 0 out of 11 => 0%

Actual HIGH is 18 out of 18 => 100%

Actual VERY HIGH is 0 out of 10 => 0%

- For R-Success Projects

Predicted	LOW (Actual)	VERY HIGH (Actual)	HIGH (Actual)
LOW	0	0	0
VERY HIGH	0	0	0
HIGH	6	13	20

Actual LOW is 0 out of 6 => 0%

Actual HIGH is 20 out of 20 => 100%

Actual VERY HIGH is 0 out of 13 => 0%

Results Based on Neural Network Algorithm

- For M-Success Projects

Predicted	LOW (Actual)	VERY HIGH (Actual)	HIGH (Actual)
LOW	10	1	2
VERY HIGH	0	3	2
HIGH	1	6	14

Actual LOW is 10 out of 11 => 90%

Actual HIGH is 14 out of 18 => 77%

Actual VERY HIGH is 3 out of 10 => 30%

- For R-Success Projects

Predicted	LOW (Actual)	VERY HIGH (Actual)	HIGH (Actual)
LOW	4	3	0
VERY HIGH	1	4	1
HIGH	1	6	19

Actual LOW is 4 out of 6 => 66%

Actual HIGH is 19 out of 20 => 95%

Actual VERY HIGH is 4 out of 13 => 30%

3. The Proposed Inference Model Based on Data Mining: Case Study of SW Project Success Vs Failure Assessment:

The proposed model presented here is centered on intelligent data mining based inference in which data mining algorithms are used to identify the factors leading to project success or failure. Such algorithms are applied on project data collected from the Egyptian software industry as a case study. In this section, is we present the primary efforts of an ongoing research supervised by the author and his research data mining based inference engine with application to the success and failure opportunities of SW projects. A web based survey and interviews are used to collect project data, about requirements, project sponsor and customers. Data mining tools such as association, neural networks, clustering; naive bays and decision tree are used to discover common characteristics and rules that govern project success and failure. The results show the power of data mining algorithms to discover the most important factors and associations in project success and failure. Results showed that each mining algorithm has a particular strength to provide knowledge and make predictions about project success opportunities.

3.1. SW Projects: Success Vs. Failure Challenges:

Software Projects are not risk-free ventures. According to the *Standish Group's* study in 2004, only 29% of projects Succeeded, 53% were challenged (delivered late, over budget and/or with less than the required features and functions), and 18% failed (cancelled prior to completion or delivered and never used) [4, 8]. It is therefore worthwhile to investigate factors that determine whether or not a project will be successful. Numerous authors have identified a variety of factors that are critical to the success of a software project. Some of the most important factors include how good the initial effort estimation and practices are [1], requirements goodness, customers/users involvement and effective project management practices that are able to deal with project complexity [3]. Many researchers recognized the importance of the use of process model oriented planning and reliable effort estimation using historical project data [1, 5]. Common practices of project managers under the pressure tight project schedules go along the decisions of adding staff late to cope with such an aggressive schedule. Such a decision presented in fact another common reason for project failure [1]. Many researchers claim that there is a huge difference between the project participants' and managers' perceptions of projects success and failure [2, 15]. In the literature, case study approaches and questionnaires with enough data points are used to analyze the success and failure factors [1, 2, 4, 6, and 7]. Statistical analysis is normally used to deduce the rules from data while Data Mining refers to extracting or mining knowledge from large amounts of data. The last decade has witnessed the maturity of many efficient data mining tools which have become recently more effective and available and they tend to be inexpensive [8, 9]. Data Mining is used to determine characteristics of association, classification, clustering, prediction and estimation within data sets [10].

3.2 DATA CAPTURING AND ANALYSIS SUB-SYSTEM:

The approach here is based on an implemented user-interactive web site to enable users to fill a simplified form of the questionnaire defined in [2]. The simplified form contains three input sections that consider the project environment: (1) management, (2) requirements, (3) customers and users. The survey contains an additional section to gather data about the project output. This is done in the form of two major questions: (a) Did management consider the project a success (MSUCCESS) and, (b) was the project a success from the respondent's point of view (RSUCCESS)?

The original survey defined in [3] contains other sections about (4) estimation, and scheduling, (5) the project manager, (6) the software development process, and (7) development personnel. A block diagram of the proposed data capture and analysis system is shown in "Fig. 7".

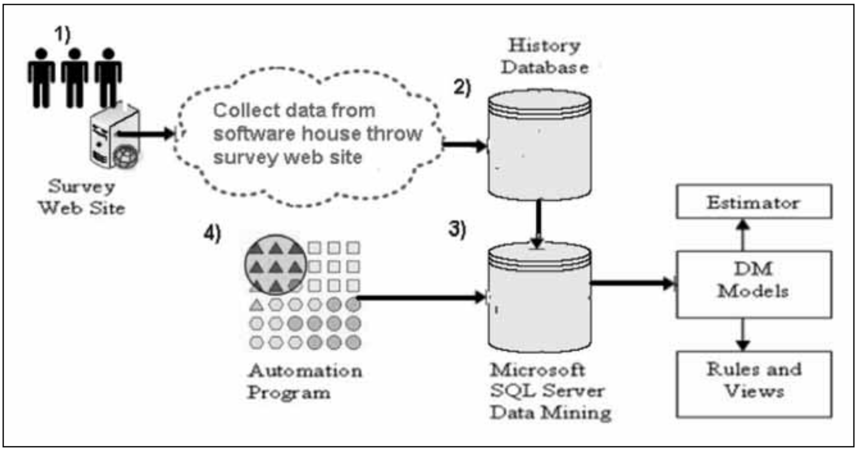


Figure (7). Block Diagram of the proposed System

The survey web site populated the history database with records. Microsoft SQL Server Data Mining is invoked by an automation program to generate data mining models. These data mining models are used by viewers to display the mining results to users. The estimator component uses the data mining model to predict the probability of future and current projects success. Data capturing is centered on a developed web site which provides a direct interview by a team consists of 23 members. The reason was to ensure full respondents understanding of survey, questions and answers as many of the reported publications agree on that questions appeared ambiguous to some outside readers [2]. URL refer to survey web site that developed to collect data from software house until now web site was published at my pc and in the feature I will publish web site at hosting server to be accessible throw internet .

3 Assumption: Data is collected through direct interview by a team consists of 5 members The collected data represents 40 Egyptian software development projects made. The projects were carried out in a number of different software houses ranging from small local companies to large multinational enterprises. About 31% of the projects in the case study are considered failure. RSuccess and MSuccess values were to some extent similar, showing that management and practitioners agreed partially on the project outcomes. This is different from what was reported in previous researches [2, 15] and could be reported as a culture specific result. The questionnaire respondents are selected to span most of the jobs in software development cycles. Respondents' jobs include project management, system analysis, development, software configuration management and quality assurance.

3.3. RESULTS AND COMPARISON

Data is analyzed using five different data mining algorithms. The results are presented in the following subsections under the headings association algorithm, Naïve Bayes algorithm, decision tree, neural network algorithm and clustering algorithm. The section is finalized with a comparison between algorithms.

A. Association Algorithm

Association Algorithms make correlations between items and deduce rules that define relationships. It finds which characteristics are common for project success or failure. For example: the projects which are poorly managed with creeping requirements usually fail. The algorithm works as follows: it considers each attribute/value pair (such as Q1/No) as an item. An item set is a combination of items in a single transaction. The algorithm scans through the dataset trying to find item sets that tend to appear in many transactions. The results of Association are visualized using the item sets viewer and is shown in "Fig. (8)".

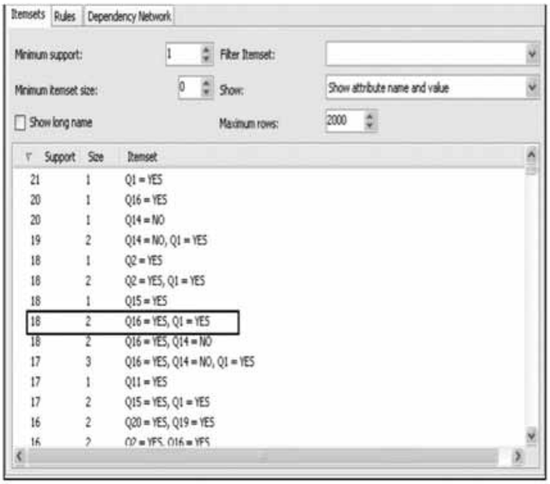
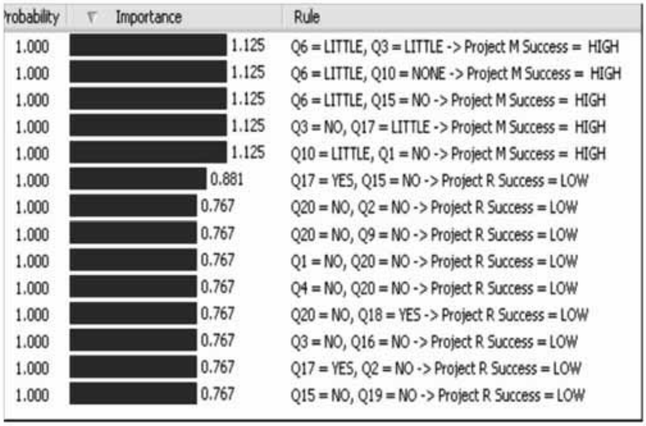


Figure (8) Results of Association via Item Sets Viewer

Figure (8) displays the list of item sets that the model identified as frequently found together. The marked record tells the project manager that out of the entire projects history database, 18 people who answered Q16 (Is Scope will defined) with yes also answered Q1 (Existence of full authorized project manager) with yes. The Association Algorithm Rules Viewer displays the discovered rules as shown in Figure(9). It displays the values of probability (The likelihood of a rule occurring), Importance (a measure of the usefulness of a rule) and the rule itself.



robability	Importance	Rule
1.000	1.125	Q6 = LITTLE, Q3 = LITTLE -> Project M Success = HIGH
1.000	1.125	Q6 = LITTLE, Q10 = NONE -> Project M Success = HIGH
1.000	1.125	Q6 = LITTLE, Q15 = NO -> Project M Success = HIGH
1.000	1.125	Q3 = NO, Q17 = LITTLE -> Project M Success = HIGH
1.000	1.125	Q10 = LITTLE, Q1 = NO -> Project M Success = HIGH
1.000	0.881	Q17 = YES, Q15 = NO -> Project R Success = LOW
1.000	0.767	Q20 = NO, Q2 = NO -> Project R Success = LOW
1.000	0.767	Q20 = NO, Q9 = NO -> Project R Success = LOW
1.000	0.767	Q1 = NO, Q20 = NO -> Project R Success = LOW
1.000	0.767	Q4 = NO, Q20 = NO -> Project R Success = LOW
1.000	0.767	Q20 = NO, Q18 = YES -> Project R Success = LOW
1.000	0.767	Q3 = NO, Q16 = NO -> Project R Success = LOW
1.000	0.767	Q17 = YES, Q2 = NO -> Project R Success = LOW
1.000	0.767	Q15 = NO, Q19 = NO -> Project R Success = LOW

Figure (9) The Association Algorithm Rules Viewer displays the discovered rules

Figure (9) showed that the association of Q16 (Project Scope Defined) = NO, Q19 (Existence of single central requirements repository) = NO is the most important rule leading to project failure. It showed also that projects which have no sponsor (champion) without a central repository are likely to fail. Another way to show factors that affect projects failure is using the dependency network viewer shown in figure (10). Figure (10) shows the high possibility of project failure if there is high customers/users turnover (the rate at which they enter and leave the project) and with low or medium confidence from the customers/users towards project management team members.

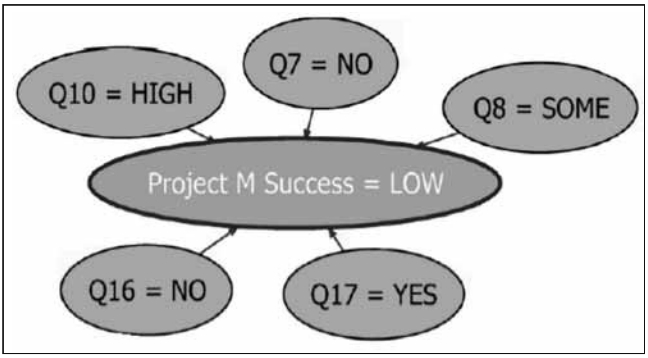


Figure (10). Dependency Network of Association Algorithm

B. Naïve Bayes Algorithm

A Naïve Bayes algorithm builds mining models that can be used for classification and prediction. It calculates probabilities for each possible state of an input attribute, given each state of the predicted attribute; this can be used later to predict an outcome of the predicted attribute based on the known input attributes. The algorithm supports only discrete or discredited attributes, and it considers all input attributes to be independent. The results of the algorithm can be displayed using a dependency network as described earlier. Figure (11) shows the attribute discrimination viewer which displays the effect of each factor's answer on the RSUCCESS. As shown in Figure (11), projects with well defined scope usually have high success values. Projects that have no particular methodology for requirements gathering are likely to fail, and projects with high stakeholder turnover are likely to fail. The same analysis is done to determine factors that lead to low value of project success from the respondents' point of view (RSUCCESS). Results show that the most important factor is Q17 (scope changes during the project). The second most important factor was Q9 (customer/user involvement in schedule estimates). The third important factor was Q14 (requirements completion and accuracy at the start of the project).

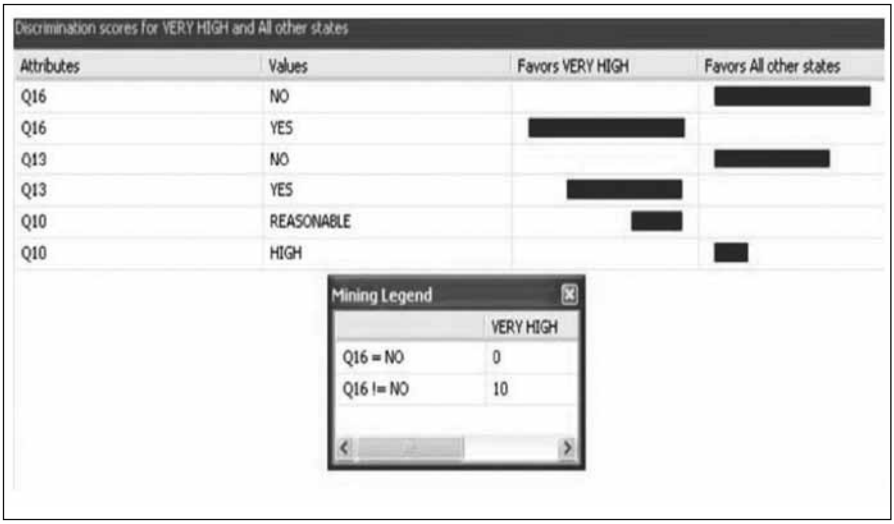
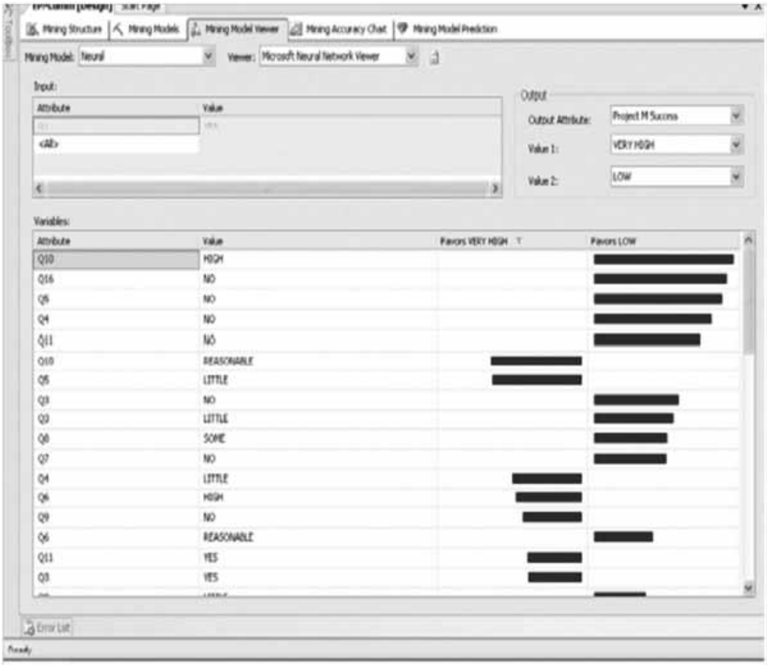


Figure (11)The Attribute discrimination viewer of Naïve Bayes Algorithm

C. Neural Network Algorithm

The neural network algorithm creates classification mining models by constructing a multilayer perception network of neurons. The algorithm processes the entire set of cases, iteratively comparing the predicted classification of the cases with the known actual classification of the cases. The errors from the initial classification of the first iteration of the entire set of cases is fed back into the network, and used to modify the network's model for the next iteration, and so on till the error vanish to a very small value. The main strength of neural network algorithm is to provide a better view of project success factors for users. It enables the project manager to specify fixed factors that cannot be changed in the project environment. Then other factors are sorted according to its importance as in Figure (12).



In figure (11), it's shown that projects which have a project manager full authorized to manage the project, will fail if Q16 (scope is not defined), and Q8 (customer/user don't have high confidence in the project manager and team members), and Q7 (customer/user involvement doesn't stay right through the project), and Q3 (the sponsor (Champion) commitment through the project was low or absent).

D. Clustering Algorithm

This algorithm uses iterative techniques to group records from a database into clusters containing similar characteristics. This is shown in Figure (12). Figure (12) shows that most project with high MSUCCESS values are mainly in cluster 1 and cluster 2, respectively. The fill color of the cluster is determined by density of projects.

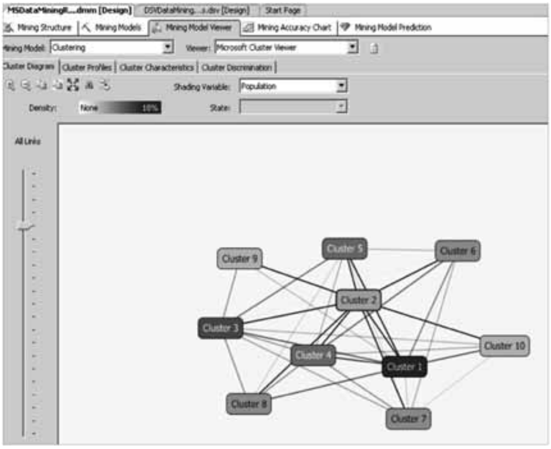


Figure (12)

Details of the characteristics of a cluster are shown via the cluster characteristics viewer which is shown in “Fig. (13)”.

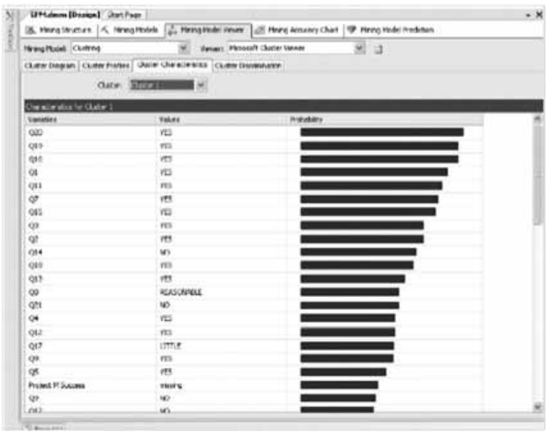


Figure (13) Clustering Characteristics Viewer

Figure (13) showed that Cluster 1 which represents highly successful projects from the management point of view has the following characteristics sorted by probability:

- Q20: Requirements results in well defined s/w deliverables.
- Q19: A single central requirements repository exists.
- Q16: Project Scope is well defined.
- Q1: There is a fully authorized project manager.
- Q11: Customer/user had realistic expectations.
- Q7: Customer/user involvement stays right through the project.
- Q15: Requirements are completed and accurate before the end of the project.
- Q3: Sponsor commitment throughout the project.
- Q2: Sponsor commitment at the start of the project.

The clustering algorithm could be used to show comparisons between clusters. This is done through the cluster discrimination viewer shown in Figure (14).

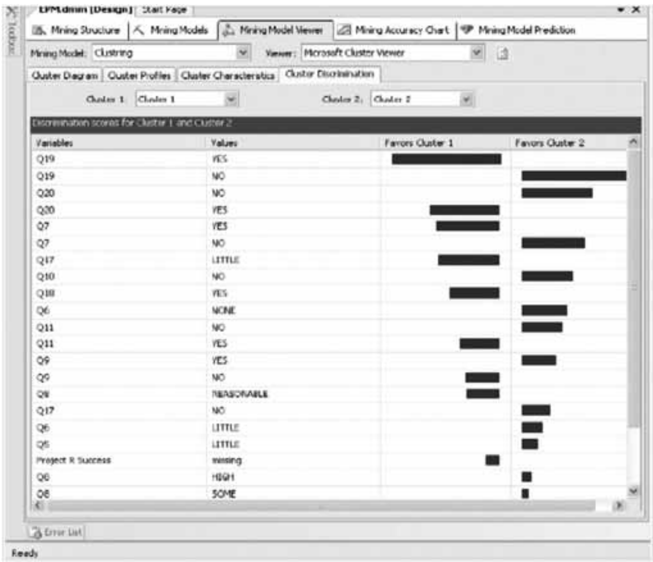


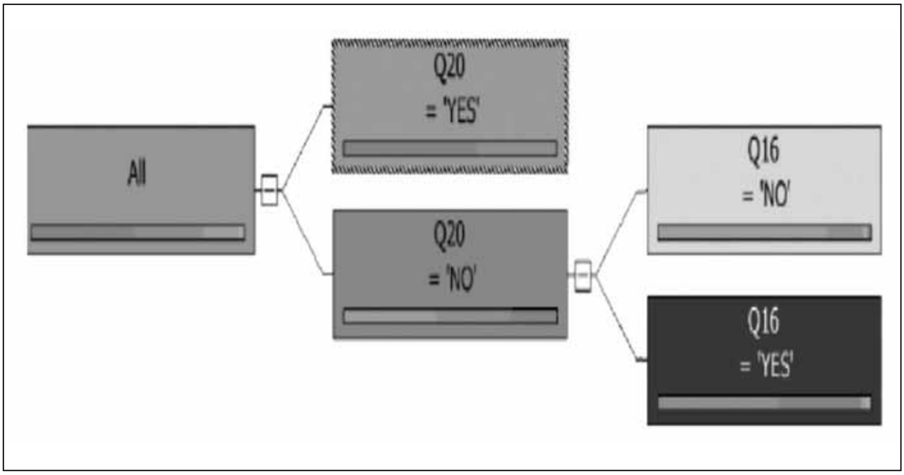
Figure (14) Clustering Discrimination Viewer

The first two records of figure (14) show that existence of central requirements repository leads to project success and lack of it leads to failure. Reasons for success and failure are sorted by probability.

E. Decision Tree Algorithm

Decision tree algorithm builds mining models that can be used for classification and prediction. In building a model, the algorithm examines how each input attribute in the dataset affects the result of the predicted attribute, and then it uses the input attributes with the strongest relationship to create a series of splits, called nodes.

Figure(15) showed that the most important points that lead project success in the responders' point of view are the requirements result is in well defined software deliverables, If not so the scope should be well defined. The importance order sorted descending from parent node.



Figure(15) Decision Tree Algorithm Viewer

F. Comparison

Many measures are used to compare the predictive ability of the mining models. "Lift Chart", "Classification Matrix" and "Estimation Accuracy" are used to compare the different mining models. Results are found in Table 1 and figure (16).

TABLE I
MINING ALGORITHMS MEASURES COMPARISON

Algorithm	Lift Chart/ Classification Matrix	Estimation Accuracy
Association	58%,38%	39%,17%
Naïve Bayes	82%,74%	48%,51%
Neural Network	46%,51%	43%,39%
Clustering	69%,69%	53%,49%
Decision Tree	51%,61%	N/A

The table values show that in spite of limited number of records (40 only), mining models accuracy was acceptable specially Naïve Bayes, Neural Networks and Clustering. It's clear that estimation accuracy values are less than lift chart/ classification matrix due to the use of only 75% of data as a training set. Although Decision tree highlighted the order of importance for factors of success or failure, the predictive ability of decision tree was very poor because number of records was very small.

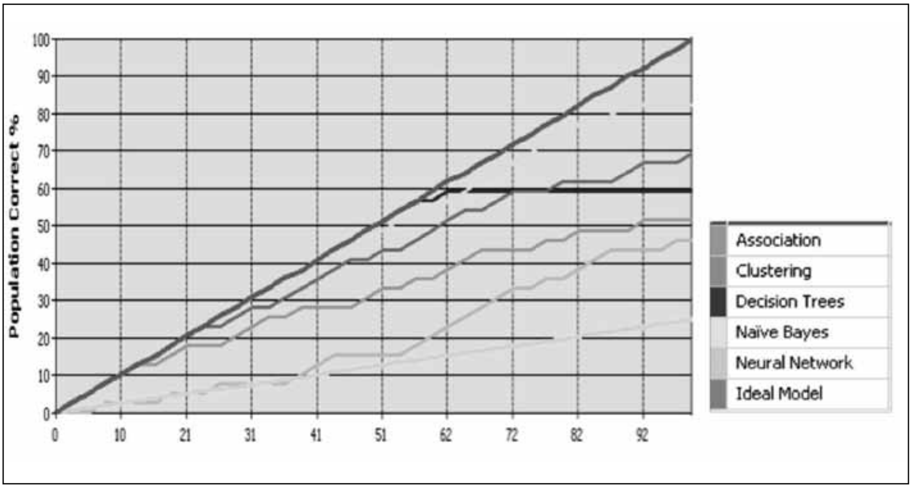


Figure (16). Lift Chart of mining models

4. CONCLUSION

This research shows the power of using a data mining approach in order to indicate the most important Indicators that gain software development project success. The added value of visualization provided by different mining model viewers was crucial to the project managers who are not specialists in data mining. Mining results of the collected data showed that Egyptian case study has generally the same picture obtained in previous researches in other countries. Scope Definition, Central Requirements Repository Existence, Fully authorized Project Managers, Committed Customer/User who trust the project management group and low value of turnover. The main difference between results collected in our case study in Egypt and other research was the partial alignment of views between respondents and management.

In the future, additional measurements of the project manager skills could be added to the survey and identify which technical capacity, technical tasks, testing skills , configuration management , business requirements type and communication skills are most important to have a successful projects. The work could be extended to show which factors are worldwide global and which are culture specific.

Out of Agenda: Motivation of Freedom: 25th January Peaceful Egyptian E-Revolution:

The authors being inspired by their young students' Egypt 25th January peaceful revolution has been stimulated to adapt the applicability of their developed model towards the future economy of Egypt. Same approach has been used to collect and capture many economical data via web interactivity. The crisis in Egypt can soon turn from a political uprising to an economic catastrophe and humanitarian emergency if things don't return to normal operation soon. Many examples and indicators due to reported data as well measures induced by the inference engine are given to illustrate the issue. For example, though reports claim that some ports are closed, the Suez Canal is apparently open to shipping traffic. Shipping companies, however, are hesitant to enter the area. If the Suez Canal should close, it would not only spell disaster for a country already in serious turmoil, but it would also mean a worldwide shipping disruption. Moreover, the nation's tourism sector has taken a huge hit that is expected to last for some time. Foreigners are struggling to flee the country, tour and cruise companies are seeing cancellations and a growing list of Western and Arab nations are sending in flights to evacuate their nationals. The tourism sector is vital for Egypt — and is among one of the four top sources of foreign revenue for the country as it accounts for 5 to 6% of the country's GDP. At $13 billion in annual revenues, tourism is the country's most important income stream. The recent protests shut down tourism completely — at the height of the tourist season, no less. The Egyptian government estimates the losses to date at about $1.5 billion. A third example is Call Centers and Online Retail industry. Egypt is home to numerous call centers and IT outsourcing companies. But little can be done when the government cuts internet access throughout the entire nation. For instance, Microsoft one of the 120 companies in Cairo's Smart Village, an area built for major multinational and local, high-tech companies, reported that it "is constantly assessing the impact of the unrest and Internet connection issues on their properties and services during the days of the e-revolution. The bottom line is that even in the best of times Egypt faces severe financial constraints — its budget deficit is normally in the range of 7 to 9 percent of gross domestic product (GDP) — and with the recent political instability, these financial pressures are rising.

The bottom line that freedom and democracy of Egypt are already prepaid by young Egyptians and now comes the role of researchers to find ways how to help economy of new Egypt. Initial investigation using the suggested data mining inference base engine of this research could be very helpful. For instance, results and indicators driven from many of the reported fail projects have verified hidden causes which were hardly to predict. For examples, almost 30 % of the surveyed high budgeted SW projects failed due to corruption reasons. Meanwhile, inferred conclusions due to collected data from different diverse sources have initially come up with surprising results regarding the number of hidden very rich people in Egypt. For example, over 5,000 Egyptians own a min of 500M and also it's inferred that over 15000 persons; each owns a min of 1 million, while over 45% of the Egyptian survive under poverty line. More results can be induced by adopting same approach of the inference mining engine. The Authors target further enhancement to adapt their model to stimulate more research and projects towards better economy of new Egypt. God bless Egypt, God Bless a peaceful loving world.

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APPENDIX A: SURVEY QUESTIONS

Q1: If there is a project manager, was he given full authority to manage the project?

Q2: Did the project start with a committed sponsor (Champion)?

Q3: Did the commitment last right through the project?

Q4: Was the sponsor involved in the project decisions?

Q5: Were the other stakeholders committed and involved, and if there was a lack of commitment and involvement would that affect the progress of the project?

Q6: What was the level of involvement of the customers and users, as customers and users involvement increases what is the chances of the project success from the point of view of the management and developers?

Q7: Did the involvement customer/user stay right through the project?

Q8: What level of confidence d id the customer/user have in the project manager team members will this effect the project?

Q9: Were the customer/user involved making schedule estimates?

Q10: What level of customers/users turnover (the rate at which they enter and leave the project) did you have to contend with?

Q11: Did the customer/user have realistic expectations, and do customer expectations make any difference in project success as management is concerned?

Q12: Did the large number of customers and users involved lead to problems?

Q13: Were requirements gathered by using a particular method?

Q14: Were the requirements complete and accurate at the start of the project?

Q15: If the requirements were not complete and accurate, at the start were they completed adequately, and will this affect the progress of the project?

Q16: Was the scope of the project well defined?

Q17: Did the scope change during the project?

Q18: Did customers/users make adequate time available for requirements for gathering?

Q19: Was there a single central repository (where things are stored or may be found) for the requirements?

Q20: Did the requirements result in well defined software deliverables?

Q21: Did the size of the project negatively affect requirements elicitation; did the size of the project make the requirements more difficult?

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A FUTURE FOR THE MEDITERRANEAN AREA

This important meeting on the mediterranean area is holding in a very particular moment. Within a few weeks, all the balances in this grat area have been challenged and situations change from day to day.

For this reason the speech I prepared seems to me out of time and so I prefer to replace it by making some remarks on what is happening in the mediterranean area and what is its future.

I summarize these remarks in three questions.

First question: what is happening in the South Mediterranean?

It's happening - with amazing speed as history holds for us in times of *epochal transitino – that in* the entire area we call Maghreb, is in progress an *upheaval* that will completely change *the political, institutional and social system* of five major Countries: Morocco, Algeria, Tunisia, Libya, Egypt.

We're talking about a population of nearly 150 million people (now almost equal to France, Italy and Spain together) that lives in extremely poor conditions both economic and social, and that more than fifty years from the end of the various colonialism, is governed by regimes variously named - People's Democratic Republic in Algeria, Constitutional Monarchy in Morocco, Republic in Egypt, Presidential

Republic in Tunisia; Socialist People's Arab Jamahiriya in Libya – but that are really para-dictatorial systems, oligarchic or familistic, deeply corrupt, held up by massive police apparatus.

Moreover this is the condition desired by the West for the second phase of colonialism: not that of armed conquest and plunder of resources but of the market penetration, the dependence on the dollar and the watchful military presence. This policy, which had as alibi the danger of Islamic fundamentalism, has allowed the leaders of those regimes to remain standing so long, to spread corruption and to accumulate vast personal wealth.

Now all that has suddenly jumped, the Countries of the Maghreb are in flames and when the fire will be extinguished everything will be different.

Second question: what will happen in the future?

This is a question that is almost impossible to answer. I believe we can only fix a few points that may help us to peer into the future.

The first one is that the riots in the course don't have the imprint of Islamic fundamentalism which, indeed, seems to have been taken by surprise and now is planning to wedge.

The second one is that those are not popular uprisings in the sense that the protagonists are not the poorest and most marginalized of society, which also take part. The protagonist is a sort of middle-class, made up of people that has a fair incom level, a good level of education, that knows the great importance of the means of communication and has familiarity with its tools.

Even without to go into details of this aspect of the analysis, we can say that if will be confirmed the hegemony of this social component, we can expect a seamless transition to a democratic system which, without aping the Western systems, is open to the global world but is respectful of the values, traditions and local cultures.

Certainly this perspective is affected by two major risks: the Islamic fundamentalism will be able to return to the game; the various armies could decide to play on his own instead of remaining in the service of democracy.

These are two tremendous risks, which must take into account both the protagonists of local revolts and European Countries.

This raises the third question.

Third question: what have to do Europe?

First of all we have to say that Europe must absolutely do something because we can't be sure that the crisis remains limited to economic and social conditions or to the problems of emigrations.

The crisis could concern the perspective of peace or war, because nothing can be ruled out that today it could trigger an open conflict. We know that the Palestinian question - that is the mother of all problems - is still open and that Israel isn't an inert spectator to what is happening, as well as Iran and Syria.

So do something is an absolute necessity. But that means do something? It means develope a policy for the mediterranean area coming out from the exitancy wich is showing the European Commission. That for not tell about the slovenliness of Italian Prime Minister, who has proved once again to be wholly unfit for the important post he holds and so is bringing discredit upon the italian people.

A part from that Europe must wake from its slumber and set a common policy towards the countries of the South Bank of the Mediterranean, taking into account two key points.

The first one is the awareness that the emigration from these countries to Europe will increase dramatically. It's a phenomenon expected for many years but has neverbeen adequately addressed, particularly from the government of Italy –that's to say the Country most affected – that has beeen able to put into practice only an ineffectual policy of rejections and now doesn't know what can do in front of what promises to be a real epic emigration.

Europe must be aware that as long as this government is standing Italy can't be a point of reference and therefore has to practise a policy that empowers all European countries - including Germany, that is the main goal of these emigration flows - which can only start from an agreement with the countries of the Maghreb, Libya in the first place.

The second strong point is that in creating this policy Europe have to forget all the legacies of the past, give up all the colonian patterns and look with new eyes to the events that happen around the mediterranean area: the revolutions in progress in North Africa but also to the emerging role of Turkey; the increasingly explosive Israeli-Palestinian question; the presence of an intransigent state like Iran; the precariousness of the situation in Iraq; the power of commercial attraction that China and India have on the countries of the Near East.

In these way it's possible to build a sound policy in the mediterranean area and this is a task to which Europe can not fail because otherwise in a few years would become marginal in the world balance, with all the consequences that could be entailed.

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TURKEY, A HISTORY FOR EUROPE

So far Turkey has developed a complete geostrategic analysis of the effects that the end of *cold war* had on its global geopolitics. Turkey is no longer subjected to Russia's pressures – which were the primary reason for its adhesion to NATO in 1952 – and has reshaped its own expansion to Central Asia and the Caucasus, along the lines of the Turkish diaspora from Azerbaijan to Turkmenistan up to reaching the Islamic areas of Chinese Xinkiang, with a view to generating stability. The new free trade area between Jordan, the Lebanon, Syria and Turkey, which is to be opened in 2011[1], will be a key factor of the new foreign policy doctrine that RecepTayyp Erdogan's AKP has developed so far with the decisive help providedby the Foreign Affairs Minister Davutoglu, namely "zero problems" with neighbouring countries[2]. The "slant" of Davutoglu's theory is basically culturalist: according to the Turkish Minister, the Islamic civilisation is a whole and is inherently superior to the non-Islamic *koinè*[3] insofar as the *ummah* is united vis-à-vis the other global civilisations. In this regard, the various economic integration systems, such as the Middle East's, the "Platform for Stability and Cooperation in the Caucasus",[4] or Erdogan's bilateral diplomacy in the phase of tensions between Russia and Georgia with the war in Abkhazia and South Ossetia[5], are all Turkish regional operations which – to put it in the Turkish Foreign Affairs Minister's words – are designed to reach the "strategic depth"

1 See IISSStrategicComment,*Turkey's bid to raise influence in Middle East,* 2010,see.www.iiss.org

2 See.http://www.foreignpolicy.com/articles/2010/05/20/turkeys_zero_problems_foreign_policy

3 A. Davutoglu,*Civilizational Transformation and the Muslim World,* TheHaven,UK,Quill,1994

4 SeeCarloFrappi,*La Turchia e la Piattaforma per la Stabilità e la Cooperazione nel Caucaso* (TurkeyandthePlatformfor StabilityandCooperationintheCaucasus), ISPIPolicyBrief,issueno.106,Milan,November2008

5 http://www.intelfutures.net/site/index.php?option=com_content&task=view&id=34&Itemid=32

that the new Anatolic-Caucasian system needs to hold a dialogue with the European Union and – considering Iran's growth and the new configuration of the Mediterranean Middle East - become a middle power and not a mere Eastern "offshoot" of the Atlantic Alliance[6]. The "depth" mainly regards the Caucasian axis where Turkey wants to be decisive as *power broker* in the region and, hence, become the centre of gravity for the security of the European Union's and the whole Mediterranean basin's energy supply. This is the sense in which we must interpret the stabilisation policy implemented by Turkey in Northern Iraq to avoid the Kurdish supremacy in the Iraqi oil extraction areas and, in particular, to define a new relationship between Turkey and the Kurdish system in the Suleymanya and Kirkuk area, where Turkey has basically acknowledged the federal structure of the new Iraq in exchange for a gradual reduction of the region and Kurdistan' strategic weight[7]. From this viewpoint, however, it would be a mistake to think of a Turkish geopolitics targeted only to the East, after experiencing the slow pace and difficulties incurred by this country in its accession to the European Union[8]. While, as many econometrists maintain, Turkey could grow by at least 0.8% of its GDP thanks to the *full membership* of the European Union, it is also true that the Turkish migration to "central" European countries could depress the Turkish GDP, thus reducing average wages in the "old" Europe[9].

Nevertheless, should Turkey remain basically alien to the European Union, Western Mediterranean countries would *de facto* be prevented from penetrating the Middle East and Caucasian economic areas, with effects also on the bilateral and multilateral policies between the European Union and the old Middle East countries, not to mention the far harder presence of European forces in the Persian Gulf and, finally, in the area where the *Silk Road* starts. Should the European Union close door to Turkey, Iran's interdiction power in the region would increase proportionally and the European geoeconomy and its global strategy would reach the Caucasian system with extreme difficulty and by determining a new interdiction power both for the Russian Federation and Iraq. Hence, Erdogan's and Davutoglu's policy cannot be simply defined as a *shift to the East.* Quite the reverse: in the new Turkish power projection, this country intends to become the "necessary ally" for the whole West, with a view to resolving tensions in the Middle East, the Caucasus and the Balkans. The Turkish Foreign Affairs Minister' "strategic depth" applies both to the East and

6 With reference to the concept of "strategic depth", see http://en.qantara.de/webcom/show_article.php/_c-476/_nr-1201/i.htmlWithreferencetotheconceptof"depth"intheregionalcontext,seehttp://en.qantara.de/webcom/show_article.php/_c-476/_nr-1305/i.html

7 See C.Frappi,*La Politica estera turca e l'Iraq del Nord (*Turkey'sForeignPolicyandNorthernIraq*),* ISPIPolicyBrief,issue no.45,Milan,December

8 See A.M.Lejouretalii,*Assessing the Economic Implications of Turkish accession to EU, issue no.* 56,CPBPapers,Den Haag,2004

9 See www.cie.bilkent.edu.tr/papers.html

the West, and Davutoglu's new "zero problem" policy with neighbouring countries will become the primary axis of the Central Asian *Heartland*' stabilisation, of which the Middle East will become a peripheral element[10]. Hence, the new Turkey of Erdogan's AKP will insist on its being essential as *Eastern pillar* of the Atlantic Alliance and, by reformulating the NATO strategic concept, Turkey wants to have "free hands" for trading both in Central Asia and Europe. This is the fundamental criterion of its new geopolitics "towards the East", which will become the bargaining chip with which to define a geoeconomic relationship not subordinated to the European Union and the remaining "First World" economies. Therefore, the issue of bilateral relations between Turkey and Israel becomes essential also from the Turkish global "strategic depth" viewpoint[11]. The relationship between Israel and Turkey is strategically relevant for both parties. As early as the 1990s, Israel has seen Turkey as a "near friend" which allows to geopolitically overcome the *constraints* of the "near enemies". It is an axis which enables Israel to get around the basic sealing of borders by the opposing Arab powers and to connect both with NATO and the United States, which have a "special relationship"[12] with Turkey – and this is the strategic sense of this operation. This "special relationship" is based on the efficacy of the Turkish regional opposition to the Soviet Union, both at the level of bilateral activities and at the level of area interdiction power for the Arab and Islamic groups or countries which are most opposed to Israel. If, and when, Turkey experiences the U.S. renewed interest in the Caucasus and particularly Northern Iraq, together with a curbing of the demands voiced by Kurdistan which, after all, has already strong points of contact with Iran, the tensions between the United States and Turkey, generated by the U.S. lack of interest in the Sulemainyiah region, can slacken and have effects also on the relations with Israel. Turkey's recent mediation between Syria and Israel is an indication of this role of "unbiased third party" that Turkey will not fail to repropose in a future phase[13] to avoid denying its "zero problem" policy with neighbouring countries. However, should Turkey wish to reiterate the tensions which have characterised the very recent relations with Israel, such as Erdogan's reaction to the Davos *Forum*[14] or the sending of the *Mavi Marmara* to Gaza (which was targeted to the PNA coasts

10 See Chatam House, RIIA, Transcript, H.E. Ahmet Davutoglu, *The Role of Transatlantic Relations in the New World Order,* London, 8 July 2010

11 With reference to the issue of the *Mavi Marmara* heading for Gaza and the consequence son the Turkish-Israelibilateral relations, seehttp://www.jpost.com/Opinion/Op -EdContributors/Article.aspx?id=177087

12 Mustafa Kibaroglu, *Turchia, Stati Uniti e NATO: un'alleanza all'interno dell'Alleanza (*Turkey, the United States and NATO: an Alliance inside the Alliance*),* ISPI Policy Brief, issueno. 30, Milan, December 2005

13 Efraim Inbar, *Regional Implications of the Israeli-Turkish Strategic Partnership ,*Middle East Review of International Affairs, MERIA, vol.5, issueno. 2, summer 2001.

14 See the video of Erdogan's reaction vis-à-vis Peres on the web link
http://www.youtube.com watch?v=OrbQsHkVQ_4&feature=fvw

with a direct order of the Turkish AKP)[15], it would be faced with a contrasting set-up of U.S. foreign policy in the Caucasus and, particularly, with scarce credibility of Davutoglu' strategy of Turkey "at the core of everything", as well as trapped by the Islamic radical states which are interested in opposing Turkey's expansion towards Central Asia and the Persian Gulf. Obviously there also exists an ideological relationship between Turkey and Israel, considering the Kemalist secularism of modern Turkey and the modernising nature of Israeli Zionism, but these are geocultural issues which can be changed quickly thanks to a different attitude by governments[16].

Certainly, for Turkey, the *Mavi Marmara* tension was designed to create an image of Islamist hegemony over the "Arab world" and, to other extents, to overshadow the Iranian *hold* on Hezb'allah, the "Islamic Jihad" and now also on HAMAS itself, which depends on the Iranian logistics for its light weapons supply[17]. Therefore the core of the issue lies in seizing the time and grasping the opportunity when Turkey is interested in "stifling" the Palestinian insurgents to avoid being regarded as another state of the region playing the game of penetrating the Middle East to hegemonise its "near abroad", whereas it wishes – and has the power - to play the great game of the hegemonic correlation between Europe and Central Asia, by bringing peace to the Middle East which is still haunted by the *cold war* ghosts disguised as *word and sword jihad.* The point break could be an agreement before Turkey's *compliance*with the 35 "chapters" of the *acquis communitaire* - which have already led to the opening of the chapters regarding environmental *issues* (December 8, 2009) and food safety, veterinary and phytosanitary policy *issues* (June 30, 2010) - in which a form of cooperation between Turkey and the European Union could be envisaged on the security of regional seas and the fight against terrorism, similar to the *Shanghai Cooperation Organization* in the East and obviously open to Israel's contribution, besides envisaging – before the *acquis* - a special treaty between the MEDA region and the new free trade area between Turkey, the Lebanon, Jordan and Syria which is being established. With reference to the relationship between the United States and Turkey, both countries must understand that preserving the Atlantic Alliance is and will always be essential for the Turkish region. Hence, the new terrorist and *non-state actors'* threats, that the United States consider to be prominent in the new NATO Strategic Concept[18], are certainly grounded, but do not

15 See Barry Rubin, *What really happened on the Mavi Marmara and some Revealing Events in the Middle East Today,* GLORIA Center, on the web link http://www.gloria-center.org/gloria/2010/07/what-really-happend-on-the-mavi-marmara

16 See RUSI, Royal United Services Institute, *The Urgency of Restoring the Israel-Turkey Relationship,* London 2010

17 See Robert Baer, *Iranyana,* Milan, Piemme Editori, 2010

18 With reference to the new NATO strategic concept, see the web link http://www.nato.int/lisbon2010/strategic-concept-2010-eng.pdf For an assessment of the global strategy of the

rule out a reformulation of the alliances between *state actors.* Should this assumption of a new geopolitical link between States be integrated into the Atlantic system – which, in the future, could ensure the geopolitical independence and autonomy of the whole axis stretching from the Balkan fault zone up to the Suez Canal and the Indian Ocean rim – Turkey could accept to bargain its more determined fight against the Islamist insurgents in exchange for its primary role in the expansion to the East of NATO's and *Partnership for Peace'* system of alliances. Faced with the slow pace of its accession to the European Union, Turkey can see the failure of Kemal Ataturk's line, which considered his country a "European nation inside the Islamic world" [19]. The resurrected project of the "Ottoman Empire", which is at the core of Minister Davutoglu's "zero problem" geopolitics, can become a reproposition of this Kemalist model - considering that the European Union does not succeed in developing a strategy forpenetrating the Great Middle East and the Caucasus, and the United States are now far from Kurdistan - or turn into a geopolitics of systematic interdiction of European interests in the region under the Turkish influence. At this juncture, the energy issue becomes essential: Turkey shifts to the Caucasus particularly for defending its oil and gas interests and for ensuring the security and stability of the hydrocarbons supplies crossing its territory to reach the European Union and which – to other extents – have fostered the economic take-off recorded over the last few years. For the time being, the oil and gas transport axis is the BTC, the Baku- Tbilisi-Ceyhan gas pipeline[20], fully located in the "Turkic" area (Azerbaijan- Turkey) and completed in 2006, besides the planned Samsun-Ceyhan oil pipeline. Therefore, Turkey is in a position to determine the choices of Middle East and Central Asian oil and gas actors, in relation to Europe's and NATO *Western pillar's* economic cycles and strategic interests, and has no interest in fomenting regional wars or attritions and conflicts between States, which would jeopardise the supply quantity and the suppliers' geopolitical reliability. Hence, the issue also regards NABUCCO, the *pipeline* which, as from 2012 (the related works for this pipeline up to the Turkish coasts and well beyond will end in 2015), will transport Caucasian and Middle East oil and gas to Austria through Bulgaria, Romania and Hungary[21]. Should Turkey succeed in becoming the junction point both for BTC and NABUCCO, its strategic *leverage* vis-à-vis the European Union will be such as

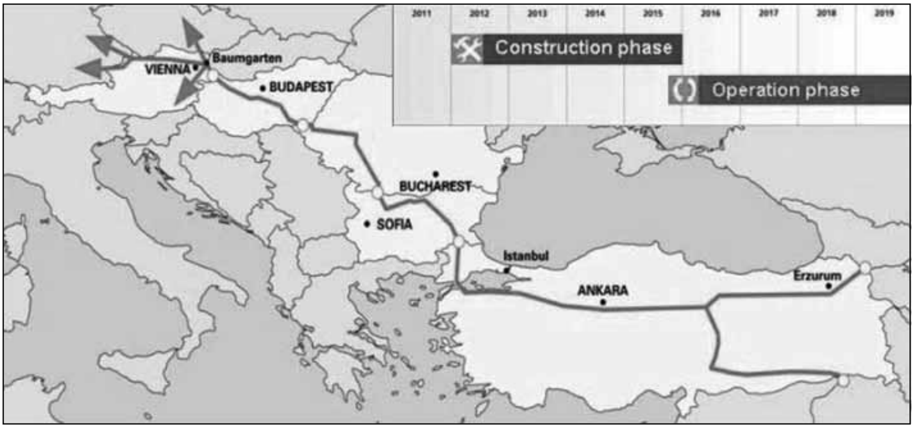
NATO SC, see Marco Giaconi, *Il Nuovo Concetto Strategico della NATO* (The New NATO Strategic Concept), in "Affari Esteri" (ForeignAffairs), issueno. 164, autumn 2009

19 Yakan Yavuz, *Turkish-Israeli Relations Through the Lens of the Turkish Identity Debate,* in "Journal of Palestine Studies", vol. 27, issue no.1, autumn 1997

20 Seet he most recen tdata a bout the BTC on the web link http://www.hydrocarbons-technology.com/projects/bp/specs.html

21 http://www.loccidentale.it/articolo/con+il+gasdotto+%22nabucco%22+il+monopolio+russo+del+gas+inizia+a+trab allare.0075267

to enable it to play an effective role as "European country inside the Islamic world" for mediating and mitigating the Islamist and jihadist tensions from the Middle East up to the Caucasus and, hence, a new role in the NATO region and the united Europe's geoeconomy.



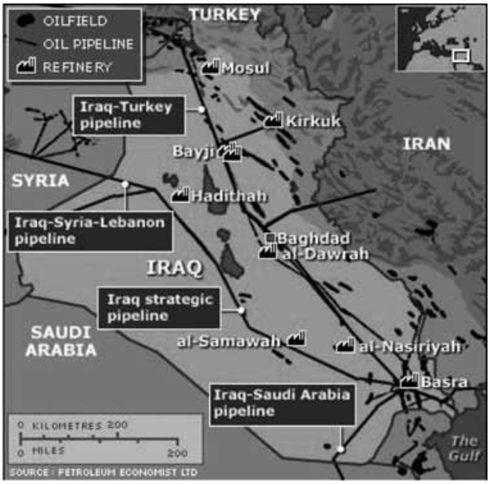
Source http://www.nabucco-pipeline.com/portal/page/portal/en/pipeline/timeline_steps

Nevertheless, NABUCCO - which could make Zacharia's prophecy of the homonymous opera by Giuseppe Verdi, namely "*servendo a Jehova sarai de' regi il re!*" (Serving Jehovah, you shall be king of kings!) come true - has not yet reached the sufficient quantity of sure supplies to support its efficacy and cost-effectiveness. Only Azerbaijan has ensured the supply, with ever greater doubts[22], but it ensures only about 8 billion cubic metres, while at least 31 billions would be needed to make the project *viable*. Iraq has ensured the supply of 15 billion cubic metres[23] but, understandably, the issue also regards the Kurdish *dispute*, that certainly Turkey would not fail to raise in relation to the gas issue[24].

22 See http://www.eurasianet.org/departments/insight/articles/eav041008a.shtmlehttp://www.eurasianet.org/departments/insightb/articles/eav032509a.shtml

23 See http://www.euractiv.com/en/energy/nabucco-pipeline-confirms-feeder-lines-iraq-georgia-news-497069

24 With reference to the link between Iraq-Turkey-Iran and the Kurdish issue, see http://www.payvand.com/news/09/jan/1281.html

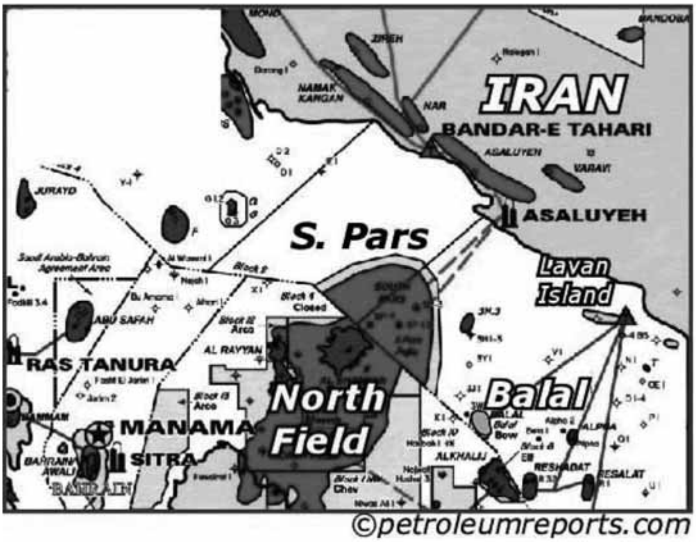


http://1.bp.blogspot.com/_v63oTveUEGI/SlKC1J74qjI/AAAAAAAAI58/RIrW3faQHhs/s400/iraq_oil_map355.gif

Another supplier of NABUCCO may be Turkmenistan which, however, must transfer possible sea supplies and has always wished to strongly diversify its own end markets[25]. If Turkmenistan opens – as is already doing – its own market to China, the NABUCCO supply system, strongly wished by the United States to avoid Russian pressures in the Caucasian region and in the transport routes towards Turkey, we would be faced with a Caucasian oil and gas geopolitics determined by the bilateral strategy pursued by Russia, which could offer more to suppliers, or China, which is eager for hydrocarbons and would be interested in determining – thanks to its Turkmen and Azeri oil and gas purchase cycles - global liquidity and the real inflation rate of its European and U.S. *non-oil* sector[26]. Nevertheless, the NABUCCO supply issue also regards Turkey itself, which must support both its strong economic development, with an aggressive policy on the *pipelines'* passage rights, and the *end user* natural gas and oil supplies, which inevitably record an opposite trend compared to the hydrocarbons quantities heading for the European Union. This issue also entails a cost for route security and for repairs which, as can be easily imagined, cannot be related to the price cycle for oil and gas end users[27]. Hence, if Turkey wants to "go its own way" to acquire hydrocarbons for its development and for autonomous supplies to

25 http://www.stratfor.com/memberships/142196/analysis/20090714_azerbaijan_turkmenistan_nabucco_impasse
26 See http://www.wantchinatimes.com/news-subclass-cnt.aspx?cid=1102&MainCatID=11&id=20101227000092
27 With reference to the tensions related to security and the extraction cycle in Iraq, see Http://www.wantchinatimes.com/news-subclass-cnt.aspxcid=1102&mainCatID=11&id=20101227000092

the European Union, its primary interest will be a *competitive* strategy compared to the strategy of the NABUCCO U.S. and E.U. funders. This will lead to a strong presence of Turkish troops – as, after all, has already occurred, in Northern Iraq and at the borders between Anatolia, the Russian Federation and Iran, in full opposition to U.S. and NATO interests in the area. An option for supporting NABUCCO regards Iran, considering that Turkmenistan is more interested in energy bilateral trade with Russia[28], which is likely to add Turkmen gas to Russia's gas transport networks to the European Union. Iran can boast 16% of all world's proven natural gas reserves, but also records a high level of natural gas internal consumption and, as Turkey, is faced with a sort of "prisoner's dilemma": if it consumes its gas, the economic development rate increases but exports decrease, thus reducing public finances[29].



South Pars' oil field in Iran, source http://www.eia.doe.gov/cabs/Iran/Full.html

However, *South Pars* cannot be operational without foreign capital, which inevitably has a geopolitical *tag*: if – also by means of its aggressive position on nuclear issues – Iran succeeds in forcing the Sunni OPEC capital to make *South Pars*

28 With reference to the economic data regarding Turkmenistan, which will record a 6.5% growth of the GDP in 2011, see http://www.adb.org/documents/books/ado/2010/TKM.pdf

29 With reference to the prisoner's dilemma, see the non-cooperative equilibrium formula $b + rb + r^2b + r^3b + r^4b + ... = \frac{b}{1-r}$ which could be used to calculate Pareto's *optimum* in the choice between internal consumption and the acquisition of capital for "take-off", both in Iran and Turkey.

fully operational, Iran's ability to put pressures will increase for possible supplies to NABUCCO through Turkey. Nevertheless, should this not happen, Iran would be likely to play the card of a regional financial *pool* between Turkey, the Russian Federation, China and, probably, India. It would be the end of European and U.S. hydrocarbons geopolitics in the region[30]. Furthermore, the NABUCCO funding was reaffirmed also with a E.U. Commission's loan to the tune of 200 million U.S. dollars[31], but German Chancellor Angela Merkel who, after all, is opposed to Turkey's accession to the European Union, supports non-E.U. policies for funding the *pipeline.* Obviously, Chancellor Merkel is interested in developing her supply networks in the North and is scarcely interested in a pipeline distributing the Central Asian natural gas especially to Mediterranean Europe, with only one gas terminal in Austria. She is not even interested in fostering the Turkish geoeconomic and strategic *leverage* on the European Union, which would be strengthened by the definitive opening of NABUCCO[32]. Chancellor Merkel wants to make the European Union fund both NABUCCO – which is scarcely relevant for Germany – and South and North Stream, in which Germany has a primary interest – by preventing the creation of a "seller's market" for the gas supplied by Turkey to the European network. If, as probable, this does not happen, Germany will go its own way, with evident repercussions on the infra-E.U export policies and a new distribution of the euro external value between Mediterranean Europe and "Rhine" Europe. Moreover, should Azerbaijan wait too long for opening NABUCCO, the Azeri natural gas would go to the Russian market.

Considering that hydrocarbons are limited and every state is interested in extending the extraction time - with a view to turning the oil and gas domestic price into an optimal unearned income, a real rent - it results that if there is gas for Russia, there will be no gas for the European Union and the marginal share of the Azeri hydrocarbons will be proportionally more expensive for the marginal buyer[33] (but this holds true for all producing countries). Moreover, at geopoliti-

30 The Iranian Oil Minister Mirkazemi has stated that inI ran's Fifth Development Plan(2010-2015, the *real* dates of Iran's nuclearisation) the Iranian government will issue 5 billion + 10 trillion rials in *bonds* to fund South Pars (960 million USD), but it is not well-clear what the final market for these bonds will be. See http://www.presstv.ir/detail/157173.html

31 See http://austrianindependent.com/news/Politics/2010-03-04/1377/EU_commissioner_gives_thumbs_up_to_funding_Nabucco

32 With reference to the German policy for NABUCCO, see http://www.jamestown.org/single/?no_cache=1&tx_ttnews%5Btt_news%5D=34679

33 With reference to the GAZPROM presence on the Azeri gas market, see http://www.upstreamonline.com/live/article228542.ece and with reference to the balance between NABUCCO and the Azeri supplies, see also http://www.rferl.org/content/Does_Gazprom_Deal_Mean_No_Azerbaijani_Gas_For_Nabucco_/1565375.html

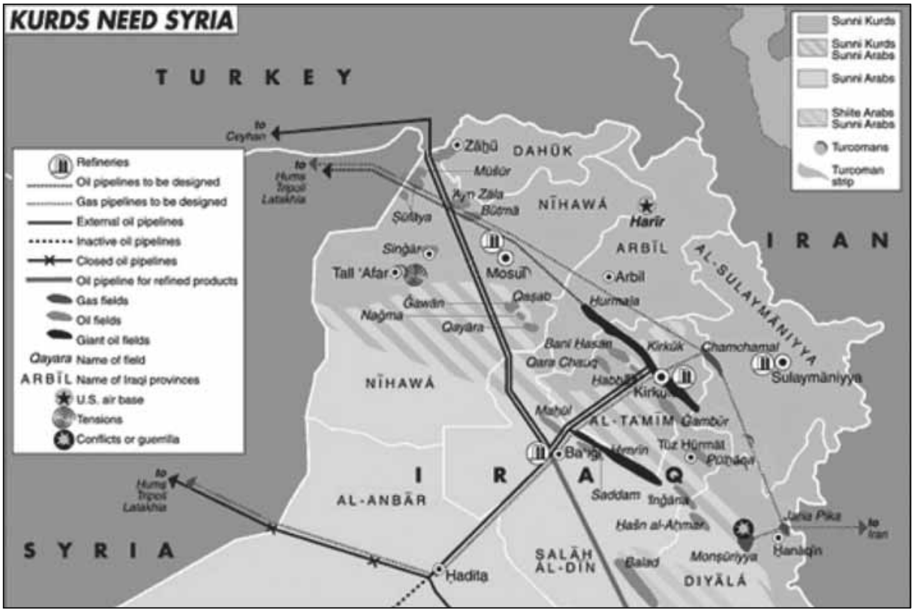
cal level, while the new configuration of Turkish interests is still focused on the Mediterranean and the special relationship with the European Union - which depends on Turkey's accession to the E.U., but materializes with the availability of the growing Turkish market for European and South Mediterranean goods – it is mainly projecting itself onto the Caucasus, where the Georgian issue is still decisive for Turkey which has no interest in favouring the United States against Russia, nor any reason for pushing away the United States from that strategic region. Quite the reverse, if there is a Turkish *complaint* vis-à-vis the United States, it is exactly the fact of having gone too far away from that area to reshape and focus their own centres of gravity on the Afghani-Pakistani *Heartland* and the Iraqi system where, after all, the game between Turkey and the United States cannot be cooperative, considering the strategic correlation existing between the Kurdish movement and the U.S. forces in the region, with the aim of opposing Iran and the jihadist forces[34]. Furthermore, if Russia keeps its strong presence on the Turkish oil and gas market - with 65% of gas going from Russia to Turkey, and 40% of oil always supplied by the Russian Federation [35]- the level at which the relations between Turkey and the United States can still become strongly positive raises. This is due to the fact that the United States want an anti-*global jihad* NATO and, conversely, Turkey wishes an Atlantic geopolitics more linked to a multipolar hegemony over the whole Central Asia to "encircle" Iran and counterbalance the axis between Russia, Iran and Syria, the transit country potentially competing with Turkey[36]. Obviously, the other "golden" option for Turkey is China, with whichit has good commercial and energy relations, but also a strong *dispute* on the Uyghur issue, caused by a people of Turkish ethnic origin. Therefore, should the Turkish Islam support the Uyghur "brothers", the pan-Islamist tension will be bound to reiterate the tensions recorded between China and Turkey with the Kemalist secular nationalism[37].

34 With reference to the relations between the United States and Turkey, interms of Turkey's "strategic shift" towards the "U.S. enemies",see http://www.heritage.org/research/reports/2010/07/countering-turkey-s-strategic-drift,whereas in relation to a less pessimistic view, see http://sofiaecho.com/2010/09/08/957172_turkey-us-re-examine-relations

35 With reference to the Iran-Turkey-Russia unavoidable triangle, see http://www.strategic-culture.org/news/2010/09/09/iraqi-kurdistan-and-the-future-of-the-russian-gas-business.html

36 See http://blogs.voanews.com/breaking-news/2010/09/20/iraq-syria-oil

37 See http://www.todayszaman.com/news-205744-159-turkish-chinese-relations-in-the-shadow-of-the-uyghur-problem.html



The *pipelines* between Iraq and Syria, source http://temi.repubblica.it/UserFiles/limes-heartland/Image/Maps/map_kurds_need_syria_500.jpg

Hence, the following dilemmas are faced: a) Turkey accepts a "collaborative game" with the United States between the Iraqi border and the Caucasus, which ensures the Turkish power projection onto the West and fosters Turkey's accession to the European Union, but the Turkish government must strongly differentiate energy supplies that Russia would not fail to manipulate for its strategic goals or b) it accepts a *de facto* break with the United States within NATO, from which Turkey has no interest in withdrawing, but this creates pressures with Israel, which is a significant partner for the Turkish economy, considering that every year it exports 1.53 billion USD/year worth of goods to the Jewish State[38] and basically this would *isolate Turkey in the regional pan-Islamic context,* thus forcing it to follow Iran's and Syria's lines – often opposed to its own interests, since these two countries are now customers of the Turkish *booming* economy, but also potential strategic opponents, especially in Iraq and the South-Mediterranean region. Conversely, c) if Turkey plays the card of Islamism *for the purposes of its own regional expansion,* inevitably it will be pushed away from the European Union, which could no longer accept not only its *full*

38 See http://www.todayszaman.com/columnists-211951-a-look-at-turkish-israeli-economic-relations-after-the-crisis.html

membership but also the current structure of bilateral relations. This would definitely inhibit Turkey's economic development potential and would sorely try Turkey's credibility both on the NABUCCO and the *South Stream* issues. Nevertheless, if option c) materializes, the tension between the Turkish Islamized voters and the national ruling classes - where the tension between secular Kemalism and AKP Islamism is still very strong, as shown by the case of the dissolution of the secret society Ergenekon[39] - would be such as to cause a structural destabilisation of the Turkish political system, which would stifle growth and, in particular, would enable Iran and Syria to start *covert operations* in Turkey, as well as a series of "active measures" towards the political class capable of definitively distorting the Turkish European geopolitics and destabilising the whole NATO *Southern Flank*. At that juncture, the combination of Hezb'allah destabilisation actions against Israel and the *de facto* closure of all the channels useful for the Jewish State from Turkey would probably mark the end of this State, concurrently with the end of Turkey[40]. Moreover, if Iran replaces the United States in supporting Turkey against the PKK "sanctuaries" in Northern Iraq[41], the geopolitical and also symbolic *shift* would be epoch-making in the Turkish public opinion. In this case, however, Turkey's strategic balance would be distorted both vis-à-vis China – which would no longer accept a *special relationship* with a destabilized Turkey - and vis-à-vis Russia, which could no longer stabilise the Western flank of its Chechen insurgency in the Caucasus and would probably witness an increasing spread of the jihadist "contagion" in relation to the Iranian-Turkish destabilization actions in the region. Furthermore, it is worth recalling that President Ahmadinedjad spent a few years of his life "under cover" as professional Islamic revolutionary in Anatolia[42]. Therefore the best option for the United States is support both Davutoglu's policy of "zero problems with neighbouring countries" and actions which can make Turkey's leadership understand that the Turkish "strategic depth" is possible only if the "Turkey at the centre" theory can create opportunities for a cooperative game also in the West and South of Istanbul. Otherwise, Turkey would be forced to overlap with the Islamic powers of Central Asia and the Persian Gulf, which have not the same long-term interests as Turkey: neither in the passage of hydrocarbons, nor in regional security, nor even in the Turkish hegemonic position over the Panturanic space stretching from Anatolia to Xingkiang, which would be forbidden to Turkey and would also prevent any positive relationship with China.

39 With reference to the Ergenekon case, see http://www.fas.org/irp/world/turkey/ergenekon.pdfV.http://defense-update.com/analysis/analysis_250208_turkey.htm

40 See http://defense-update.com/analysis/analysis250208turkey.htm

41 See http://www.worldaffairsboard.com/international-defense-topics/44977-turkey-iran-sharing-intelligence-launching-coordinated-pkk-raids.html

42 See http://www.intelfutures.net/site/index.php?option=com content&task=view&id=33&Itemid=1

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