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Polish Management in Times of Change

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Introductory remarks

Change has been traditionally one of the fundamental interests of management research and management practice (Killman & Covin 1988; Dawson 1994.). Debate between proponents of "revolutionary" and "evolutionary" change (Meyerson 2001; Gersick 1991.) still remains open. Rather unexpectedly history offers a unique opportunity to study the most overwhelming, complex and multi-faceted type of management change: management in the post communist transition economies. Polish management and management education is considered here as a "change lab" of sorts, enabling to study organizational and educational responses to the environments characterized by "generalized uncertainty", or in other words: sudden, deep and prolonged systemic change.

This paper attempts to address three general questions:

1. How companies cope with dramatic and unpredictable changes of the business environment resulting form transition?

2. How behavioral, institutional and symbolic dimensions of change are interrelated in high uncertainty environment?

3. Is standard western management education model capable of developing skills necessary to cope with "generalized uncertainty"?

Analysis presented below will be based in part on personal experiences of the author who had the privilege to participate in the change process as manager, supervisory boards member and chair, expert, consultant, researcher and management educator. Author's perception will be confronted with the existing body of empirical evidence, as well as analysis and models of management change in Poland, developed both by Polish and foreign scholars.

In order to follow this line of reasoning one must abandon a set of stereotypes of communist and post communist Poland still widespread among western audiences (even professional ones). Among these stereotypes three seem particularly worth mentioning:

1. Homogeneous "socialist block" perspective based on conviction that all communist and post communist societies and economies of Central and Eastern Europe follow roughly the same pattern and are basically all alike.

2. Assumption that Polish society, as all the others emerging from communism, is characterized by complete lack of entrepreneurial tradition and spirit.

3. Is standard western management education model capable of developing skills necessary to cope with "generalized uncertainty"?

All three stereotypes are oversimplifications, if not completely false statements. Research published by sociologists (Sztompka 1992, 1996; Ploszajski 1995; Frentzel-Zagórska 1997), economists (Kolodko 2000, 2000a; Lavigne 1995; Nuti, Portes 1993), and management scholars (Kozminski 1988, 1990, 1991, 1993, 1996; Kozminski, Yip 2000; Kiezun 1991; Johnson, Loveman 1995) clearly point at several unique characteristics of Polish economy, society and management:

> Poland was the only country in the "socialist block", where communist system was abolished by massive, organized social movement ("Solidarność"). This movement was capable of creating political "counter-elite" (opposed to the communist power elite), its own ideology and symbols readily adopted by broader groups of society (including ex-members of the communist party). Polish opposition was strongly, and in the last years of communism almost openly, supported and influenced by the West.

> Communist Poland has the longest and the richest in the "bloc" history of economic reforms. All of them failed, but produced valuable experience. In the last years of the communist system even influential groups within the communist party were convinced that transition to full-fledged market economy was inevitable. The last communist government of Poland laid institutional foundations for transition to market. In the course of endless reforms and experiments (increasingly more and more market oriented) Polish economy gradually opened to the West and so were Polish academics in such disciplines as economics and management. Also managers and engineers were often exposed to western practices.

> Communist Poland had undoubtedly the largest in the "bloc" private sector including not only agriculture but also trade, crafts and small industry. The "last hour" communist reformers launched the idea of "mixed socialist economy" and in the last year of Polish communism (1989) private sector was already responsible for almost 20% of GDP and employed 30% of the workforce (Kozminski 1993: 50). Private sector was fueled by free access of private citizens to hard currency (introduced in the 70-ties) resulting in huge hard currency reserves in private hands steadily fed by earnings of large population of Poles working (legally and illegally) in the West.

> Polish management education and scholarship have a long tradition dated to pre-war times. It was suppressed only during relatively short period of Stalinism (1949 - 1956). Even under communism Poland was able to develop several departments of management in the universities, and management development centers dedicated to train "captains of socialist industry" or government bureaucrats. Surprisingly these institutions were often strongly influenced, and even financially supported by the West through such channels as Ford and Fullbright foundations or International Labor Office.

These unique characteristics of Polish situation make Poland an ideal "change lab" because development of management systems and management education falls into category of "change" not "creation" of something completely new from the scratch, as in the case of countries, where market mechanisms, management and management education were not present at all before the fall of communism, even in an embryonic form.

1. Three lines of change

Transition process can be perceived as composed of three interrelated streams of change: political, economic and managerial. Transition is perceived by social scientists and policy makers in two alternative (if not completely opposite) ways:

> as a "big bang" shock type radical change including macroeconomic stabilization, microeconomic liberalization and privatization (Balcerowicz 1996: 25; Sachs 1989) or

> as a complex set of time consuming gradual adjustment involving public policies, influenced by debate and democratic political process (Eatwell, Ellman, Karlsson, Nuti, Shapiro 1995).

Because of links to different political orientations these two views of transition gained some ideological flavor. "Big bang" was an initial idea of transition originally implemented in East Germany and in Poland. Polish Minister of Finance in the first non communist government and architect of the "shock therapy" Prof. Leszek Balcerowicz (1996: 24) puts it in the following way: "A pure shock-type or radical transition to a private market economy may be defined as transition whereby all the constituent processes are implemented at maximum possible speed". But even the most ardent proponents of "shock therapy" acknowledge that: "The maximum possible speed of various processes of transition differs, and these differences have practical consequences" (Balcerowicz 1996: 27). Such statements bridge the gap between two views of transition and open the way to more gradual views such as multiphase transition model (Kozminski 1992, 1996a).

political	early marketization	inflation control	institution building	antirecession policy	growth policy
abolition of communist political monopoly, resolution of conflicts, consolidation of democratic institutions	lifting of price controls internal convertibility of currency, lifting of private entrepreneurship barriers	elimination of subsidies, reduction of budget deficit, restrictive monetary policies	gouvernment restructuring, tax reform, banking reform, capital markets, privatization, social services reform	modernization of infrastructure agricultural policy, small business promotion, export promotion	european integration competiveness build-up pro-active employment policy

Fig. 1 Multi-phase transition model

The sequential character of the process implies that both 'premature' and 'delayed' policies bring complications and inhibit the transition process. Successful completion of

any one phase is conditioned by the implementation of measures included in earlier transition phases. Once one phase is completed the next has to be initiated without delay. Delays and lack of proper sequencing can easily lead to dangerous 'loops' in the transition process, meaning a return to earlier phases. Practical experience of transition countries in general, and Poland in particular, clearly demonstrates that such disturbances in transition process are inevitable. It means that transition inevitably brings to the business environment deep, uncertain and prolonged, multi-sourced change, in other words "generalized uncertainty".

The picture of transition becomes even more complex, and punctuated with sources of uncertainty, when sociological analysis comes into play. "The radical transformation of the economy, polity and culture toward democratic and capitalist forms requires time. And it does not proceed smoothly, without frictions, blockages, back-lashes, and huge social cost" (Sztompka 1999: 160). Overwhelming feeling of frustration caused by the social cost increases the risk of 'loops', 'unhappy returns' to the old ways, and to the old (post communist) political elites. If civic society is not strong enough to generate and to sustain constructive, balanced policies, the risk of socio-political crisis on the "thorny road of transition", as Kolodko (2000a) calls it, increases considerably. History of post communist Poland offers several examples of such crisis.

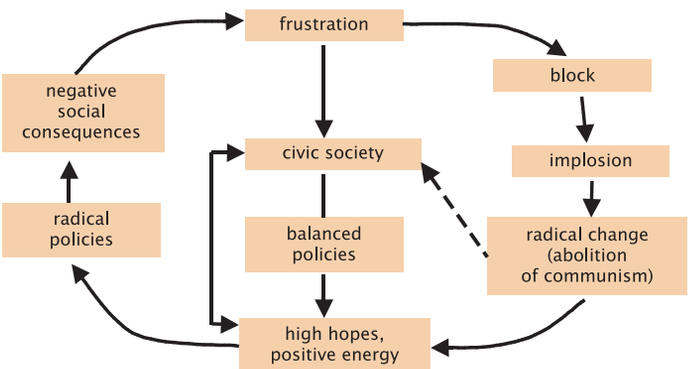

Fig. 2 Mechanism of social and political change in post-communist Poland

Managerial change is a consequence of combined pressures resulting from economic reforms and socio-political processes. Empirical evidence (based on analysis of cases) from Poland, but also from other post-communist countries, shows that managerial change takes form of series of "mini reforms" (waves of restructuring effort) on the micro economic (enterprise) level (Kozminski 1997; Johnson, Kotchen, Loveman 1995).

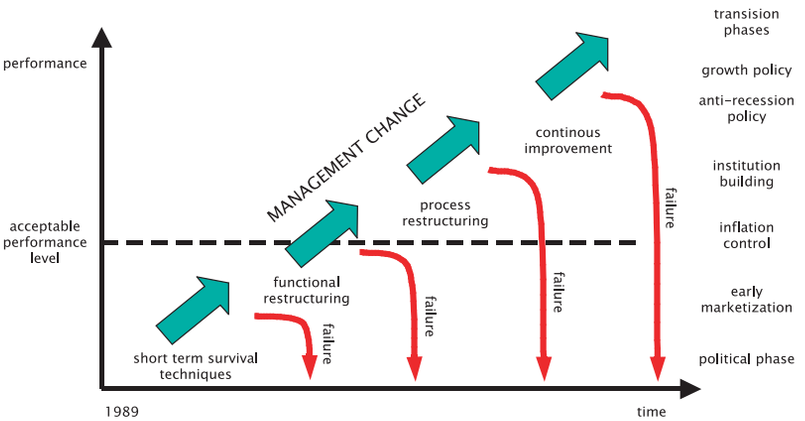

Fig. 3 Management change

Three intertwined lines of transition create the business environment climate the most fully characterized by the notion of "generalized uncertainty". Such a business climate called for different sets of managerial competences at different stages of management development of Polish companies exposed to transition processes. Under "generalized uncertainty" conditions nothing can be taken for granted. Passing from one phase of adjustment to another does not mean that due to another wave of unexpected change company will not find itself in a "square one" situation fighting for survival again, repeating (or at least fine tuning) functional restructuring (Pinto, Belka, Krajewski 1993).

2. Building up managerial competence

Survival competences were the first to be demonstrated at the very beginning of transition, when unprepared companies found themselves deprived of government protection and subsidies, and at the same time exposed to unregulated "wild capitalist" competition. Privatization could only theoretically solve the problems since foreign buyers were not ready yet to enter, and both capital and more sophisticated managerial skills were extremely scarce resources. Under such conditions 'street smarts' and 'instinctive entrepreneurship' (fortunately not lost under 'Polish edition' of communism) were crucial to survival. Political skills and connections still remained important to lobby for government support and to secure workers' and unions' acceptance of inevitable lay-offs as soon as possible. Selling and remaining close to the customer base was of key importance to protect liquidity and to "keep head above water".

Companies which managed to stay alive through the first shock period quickly discovered necessity to gain and sustain the ability to compete under gradually normalizing market conditions, to gain minimum acceptable level of performance, and to open the way to privatization. This required conventional western management skills in such areas as product development, operations management, marketing, logistics, purchasing, finance and service (Baczko 1996). Initially such skills were not readily available on the market. Bu this gap was closed relatively fast because of unprecedented explosion of management education and management development (Kozminski 1996), as well as inflow of foreign direct investment, foreign management and foreign consulting services.

As competition intensified, with more sophisticated foreign entrants joining the game (Obloj 1996; McDonald 1993), operational excellence in functional areas was not sufficient to maintain competitive edge. Process restructuring had to come into play. It calls for process mapping skills, customer and supplier management capabilities, and knowledge of best practices (benchmarking). Standard management education is not an answer to the process restructuring challenge. The answer is in diffusion of innovation vehicles (Weinstein, Obloj 2002: 656) such as:

> free flow of managerial personnel between foreign and Polish companies;

> specialized tailor-made in-company management development programs;

> influence of consultants;

> benchmarking against the best practices known in the field;

> copying of competitors' practices;

> failure of companies that fail to innovate.

These mechanisms can be observed in the best run companies.

After 15 years of transition Poland became a home base of some very serous players on the European or at least Central and Eastern European scale. Champion companies can be found in such industries as among others: automotive (FIAT Auto Poland; GM Poland, Delphi), furniture, building materials (Atlas), computer services (Prokom, Computerland), food and beverage, sports clothing (Alpinus). Such companies are exposed to double pressure: coming from transition process and from the most competitive global markets. To face such a challenge leaders embrace management philosophy called "continuous improvement" (Obloj, Cushman, Kozminski 1995). Continuous improvement is nothing else than constant, smooth adjustment to rapidly and unpredictably changing conditions, in other words flexibility pushed to the extreme, and permeating (Obloj, Cushman, Kozminski 1995: 14):

> organizational strategies (what to improve?);

> choice of environments (where to compete?)

> choice of sources of competitive advantage (how to compete?).

Such flexibility requires transformational leadership skills (ability to lead through permanent change), high quality teamwork and ability to form, manage and exit alliances. That kind of management potential can be only developed internally, eventually with some help of expert coaching.

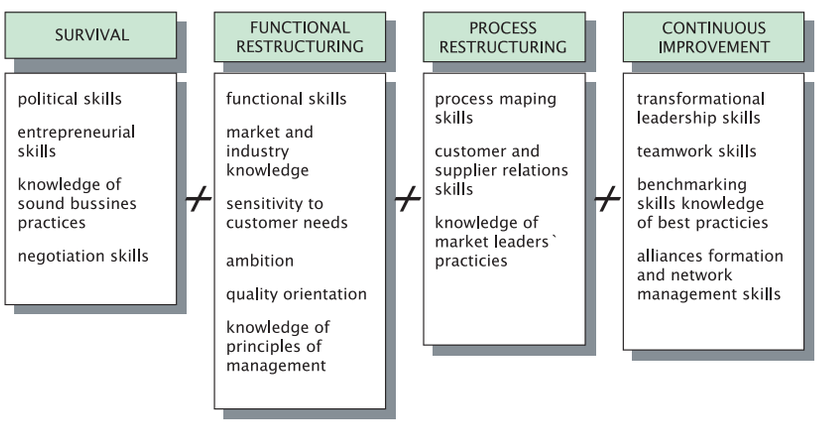

Fig. 4 Building up managerial competence

There are very few, if any, people who can travel personally all the way from survival to continuous improvement, accumulating quickly all the necessary skills. A feasible way of acquiring new skills and building up managerial competence leads through three parallel tracks:

1. changing top and partially middle level management when passing from one development phase to another;
2. adding new people (with new skills) to managing teams on all levels;
3. encouraging and facilitating new skills acquisition by already employed managerial staff.

Constant headhunting, training and investment in human capital are the essence of building up managerial competence, provided that these processes are guided by a vision indicating clearly which skills are needed where and when.

In well governed western companies watchful supervisory boards representing shareholders' interests replace burned-out top executives who have exhausted their vision. Consultants and staff members are supposed to provide managers with "enlightenment" and "early warnings". In Poland such mechanisms are not in place yet (corporate governance being in early stage of development). Management culture is in the process of dramatic change itself.

3. Cultural change

Management culture change is driven by high performance pressure. The old culture inherited from "socialist management" is rightly perceived as inhibiting high performance in high uncertainty and high risk environments (Kostera, Wicha 1996). The old culture was functional in the old system: it efficiently protected individuals from the abuses of communism because it provided and legitimized "all the tricks in the book" helping people (and managers in particular) to beat the system and to survive, or even prosper (Kozminski 1997; Kozminski, Tropea 1982). By the same token new culture is emerging

ELEMENTS OF THE ORGANIZATIONAL CULTUR	DESIRED CHANGE		IMPACT OF PERFORMANCE
	from	to	
BEHAVIORAL PATTERNS	ritual, pretending, hierarchy driven, emotional demagogy	pragmatic, doing, cooperation driven, rational argument	ability to formulate objectives and to cooperate to achieve them
NORMS	egalitarian – lowpay, security	rewards based on contribution, efficiency	legitimation of rewards based on contributions
VALUES	protection of the wekest, gigantomania, "their property"	organization survival, promotion of the smartest, adequate fit, "our properity"	ability to formulate objectives and measure performance
"PHILOSOPHY"	inward oriented, resource maximizing	outword oriented client centered, market driven, net result maximizing	market and client driven organization
RULES OF THE GAME	by like everybody, information avoiding, political behavior	find your niche, information seeking, problem solving	specialization and cooperation to achieve individual and collective goals
"CLIMATE AND FEELING"	mistrust, closed, defensive	positive cooperation, open assertive	openness and assertiveness

Fig. 5
Impact of the organizational culture change

relatively quickly, because it provides individuals with "vehicles of success" in the market environment (Kozminski 1995). And Poles are known for their unusually high adjustment capabilities developed under foreign domination in the course of history.

Two strategies of cultural change can be identified:

> entrepreneurial based on personalized private ownership and leadership;

> institutional, based on systems, procedures guided development monitored and remote controlled by the top management of a large(the most likely multinational) company (Obloj, Kostera 1994).

TYPE OF STRATEGY / KEY ELEMENTS	ENTREPRENEURIAL	INSTITUTIONAL
DRIVING FORCE	entrepreneu r–manager	system+management team
PRECONDITIONS	private ownership	foreign acquisition and management control plus/or emergence of "turn–around" management team
STYLE	informal	elaborate but functional procedures
SIZE	small to medium	large
COMMON OBJECTIVES INSTRUMENTS	inducement of the market orientation – strong marketing dept. cost accounting – new accounting system improved production management – factory lay–out etc. elimination of redundant administrative personel and non–core workers linking compensation with performance, building teams	

Fig. 6 Two strategies of cultural change

Identity transfer of Polish managers is an underlying process of cultural change. It implicates the change of role definition, as perceived by managers themselves, and by wider social groups of role senders (Kostera, Wicha 1995; Kostera 1995).

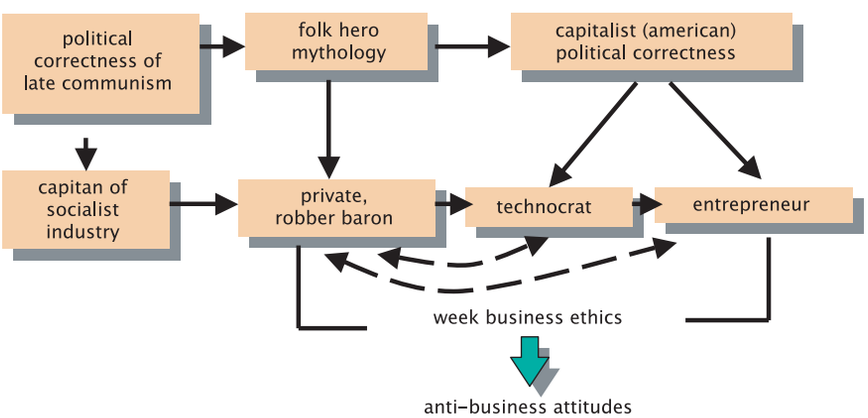

Fig. 7 Managerial identity transfer

Identity transfer takes place within the space of social consciousness tormented by systemic change exposing individuals to previously unknown chances, but also bringing threats of unemployment and insecurity, constant political fights, and strong influence of highly pluralistic and competitive media. Social perception of management is than highly heterogeneous if not completely contradictory, build out of conflicting opinions and attitudes. From one side management is perceived as highly desired path of career, from the other as morally doubtful, if not completely evil.

In such an environment cultural change appears as a key element and precondition of macro-economic transition and micro-economic enterprise restructuring. Because of the specific features of Polish communism (as mentioned above), on the surface of social life and management practice, cultural adjustment went relatively quickly and can be considered the core of management transition. Managers were quick to accept their new roles of entrepreneurs and technocrats. Entrepreneurs kept and developed street smart resourcefulness and sharp tooth of pirates (Kolvereid, Obloj 1992; Skapska 2002). Technocrats quickly adopted management jargon, quantitative management techniques, and western cult of credentials, as well as "yuppie" life styles and behavioral patterns (Kostera 1995). Such optimistic statements, however, call for a word of caution. Cultural adjustments are still relatively superficial. Deeper below them, fundamental layers of Polish culture remain unchanged and still do influence management practice and "philosophy".

First, Polish society liberated from communism by massive civic rebellion still remains "rebellious" after the fall of communism (Ekiert, Kubik 1997). Strikes, civil disobedience, protest, blocking of the roads, still remain fully legitimized, socially acceptable ways of fighting for group or even individual interests.

Second, Polish culture is still characterized by high power distance and preference for more authoritarian management styles (Barlik 2000). Such a management style is not consonant neither with contemporary requirements of competitiveness nor with gamesmanship of Polish employees.

Third, Poles are privately resourceful and full of initiative, while "officially" (in formal structures and roles) passive and pretending submission. In informal structures Polish actors are still capable of playing highly sophisticated individual and collective games to beat the system and to outsmart top management in order to get extra rewards and privileges (Kozminski 1995). Such cultural heritage is deeply embedded in "systemic culture" of communism, but also in the history of Polish nation confronting powerful invaders for over a century of partition. It calls for high proof "soft skills" in management.

Fourth, Polish attitudes toward authority and power are cynical and distrustful (Ekiert 1996). It makes private and public management difficult, because of almost impossible consensus, questionable compliance, and uncertain outcomes.

Fifth, Polish society is generally characterized by low level of trust in interpersonal and interinstitutional relations (Sztompka 1996; 1999: 151 - 190). Such a collective state of minds drives transaction costs up and inhibits mergers as well as formation of joint ventures, coalitions and alliances. In this way culture has a serious negative impact on competitiveness on micro and macro economic levels.

Future of Polish management practice depends upon the interplay between those different layers of organizational cultures: superficial, hastily imported from the West, and deeper; traditionally associated with survival patterns developed in the course of nation's

history and under communism in particular, when Polish entrepreneurship got its deviant flavor, as we see it from today's perspective. The most likely outcome of such an interplay of different layers of culture will be a unique blend of specifically Polish and "imported" cultural patterns of management. Interviews with foreign managers with long experience in Poland clearly demonstrate that this new management style is yet to emerge (Bialy 2004). For the time being Polish management culture remains incoherent: composed of the "new" and the "old" elements, often in open or hidden intrinsic conflict.

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Position and Role of Strategic Analysis in the Process of Strategic Management

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In the literature on the subject we have a big number of approaches and concepts concerning strategic management. One of the most general divisions in this matter is, on one hand, looking at formulating and implementing of the corporate strategy as the process similar to rational decision taking, and on the other hand there appears an approach indicating that activities concerning developing strategy are not logically organised in any way. Accepting the latter would mean that the only thing that could be done to develop the knowledge about strategic management is describing the process according to contingency theory, and possibly explaining 'a posteriori' decisions that have been taken. Therefore it would exclude the possibility of making any predictions or recommendations for company's managers, which in their nature must be taken 'a priori'. For that reason in the literature on the subject there are many more supporters of the rational approach, who try to make the complicated nature of the process discussed more logical. And possibly those attempts are reasonable because this is the only way of formulating the problem of strategic management which lets organise the knowledge available in this matter.

The supporters of the rational approach present a variety of models on the process of strategic management. Regardless of assumptions undertaken by specific authors each model of the process of strategic management has a strategic analysis as one of the very first stages. The dispute on that matter concerns, generally speaking, only the question whether the strategic analysis or setting goals of the company is the very first step of the whole process. Irrespective of the detailed suggestions offered by various authors, they all agree that the strategic analysis is a crucial and inseparable element of the process of strategy formulation. The aim of the analysis is to gather and provide decision makers with information allowing them to undertake strategic choices. Such a conclusion may be confirmed by the historic analysis which points to important interrelations between problems which are a part of the planning process and the methods used in it.

The aim mentioned above is implemented through specific functions performed by the strategic analysis. Among these functions we can find:

A/ descriptive, B/ explanatory, C/ evaluating,

D/ forecasting, E/ justifying.

The first four functions concern, above all, the process of formal formulating the corporate strategy, in which the strategic analysis is to describe elements of the environment and the institution itself which influence the organisation's activities. Its aim is also to examine and explain interrelations between those elements and evaluate the strength and character (positive or negative) of the processes and conditions for the company's situation. The analysis is to provide a clear picture of the organisation and its environment – to evaluate the strategic position of the organisation. Basing on that one can formulate forecasts concerning future changes of such a situation. And those forecasts may become a base for the process of strategy formulation.The justifying function is performed 'ex post' and concerns both an informal way of formulating the strategy, where the analysis may be used to search for facts that would justify previous decisions, as well as a formal way of developing strategy where the analysis is a base for specific strategic actions and is their justification at the same time. That function is especially visible when the strategy performed has failed. In those situations, the decision makers usually try to account for the reasons for their choice which was unsuccessful. The outcomes of the strategic analysis may be easily used for the purpose.

In conclusion it might be said that considerations presented in the article let us assume that content and role of the strategic analysis in the process of strategic management considerably go beyond the strict sense of the word 'analysis'.

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...I believe that economics and business would be more productive fields if we learned something important from evolutionists: that models are metaphors, and that we should use them, not the other way around.

Paul Krugman, addressing European Association for Evolutionary Political Economy in 1996.

Discovering Patterns and Models in Economic and Business Analysis

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Introduction

The paper attempts to make a series of reflections regarding the role of modeling and conceptualization in the process of economic and business reasoning. The essay headline proposes that most of existing economic models are heavily influenced by artificial thinking instruments and do not represent economic reality adequately. Neoclassical concept of the market emphasizes the role of a priori assumptions and does not see it as a place for learning and testing reality; thus its practical applicability is limited in scope at least. This has become unquestionable with the arrival of so called "new economy" - existing economic models can not explain new emerging patterns of the market and business strategies. Well-known problem of the bar El Farol is used to show forgotten features of the market (market ecology, role of human expectations, internal dynamics, agent-based modeling). Finally, using a simple example, I will introduce Partitioning and Tearing Method, and I will advocate the use of new approach in economic and business thinking, based on the Systems Dynamics, visual thinking, and computer supported modeling and simulation.

1. Levels and stages in economic thought

Understanding empirical phenomena is perhaps the most important task for economic science. Unfortunately, as theoretical studies and practical actions have shown, it has been failing in both, micro (enterprise) and macro (market) level. Numerous and mathematically advanced economic analysis, almost impenetrable for practitioners, do not provide a sufficient level of analytical insight for making decisions and defining growth policies and business strategy. It has become more and more clear that new approaches are required and new methodologies are waiting to be discovered/invented. That is basically the problem of reckoning economic complexity and finding suitable instruments that could tackle with complex phenomena in existing markets.

Stephen N. Durlauf (2002) wrote that complexity in economic analysis has been handled in three complementary ways. Historical study is first of them; if there is any rational explanation of economic processes, it should be provable in historic analysis. That would be feasible, if economic processes were the result of one, supreme logics and a common mechanism. What happens, however, if such a mechanism and logics does not exist and the production and distribution is governed by many simultaneously operating and different logics?

The identification of certain statistical properties in socio-economic populations has been another target in the analysis of complex economic systems. It is commonly referred to as Power and Scaling Laws. In general, a random variable is said to obey the Power Law if it has an associated distribution function following Pareto's model (e. g. Axtell 2001 on company's sizes). Those studies are usually conducted in connection with the Scaling Law where changes in variables existing in a given scale (e. g. firm size) lead to linked changes in other associated variables existing in different dimension (e. g. profit). Typically, the Laws of Power and Scaling are found in linear analysis.

Third way of dealing with the complexity in economic systems is the analysis of social interactions, in particular individual and social behavior in economic context. Dominant studies have attempted here to construct probability models enabling to predict behavior from a given set of assumptions on individual and group level variables. This is a critical problem in economic science - the questions if the market is a self-containing entity or the sum of individual behaviors still remain open; so does the problem of required market variables/agents aggregation.

None of these approaches has been proved successful in practical analysis. It seems that increasing sophistication of mathematical modeling in economic analysis is more connected to mathematical tools themselves than to the contents of the market problem. There is an opinion that the development of mathematics has evolved from the concept of "place" to "pace" and to "pattern". "Place" refers to Euclidean geometry in the ancient world. "Pace" refers to the discovery of calculus by Newton and Leibniz in the 17th century along with linearity as a proof of ultimate scientific correctness. Both have marked dominant paths in analysis, emphasizing locality and present time in economic thought. It has been accompanied by traditional research methodology where hypothesis testing and results formalization (theory creation) is a common pattern. Moreover, increasing formalization of economic models has reached such a point that ontological assumptions underlying economic models are mathematical models themselves (Sergeyew 1997). Vital connections between real life economic phenomena and theoretical thought have been cut off and, gradually, lost or replaced by other methodological approaches. Dogs are wagging owners...

"Pattern" concept is accessible through current terminology in science; many buzzwords and phrases like chaos, complexity, emergent properties, and self-organizing systems are only few examples. We can interpret a pattern as an internal order/structure of a problem that equally (author's underline) depends on modeled reality as on a person conducting analysis. A pattern, therefore, is a set of assumptions (frequently not articulated explicitly) concerning internal relationships among linked variables - components of the problem under analysis. An interesting feature of those "patterns" is that they are grounded not in old but new sets of assumptions rather; they possess clearly different ontological foundation which is frequently undefined, fuzzy, and intuitive. That new emphasis on pattern (as distinct from formal hypothesis-testing using simple refutable statements to be tested with data) calls for a metaphor and mental models and make them an increasingly prominent instrument in economic science. Place, pace, metaphors, and mental models of patterns are recognizable levels (stages) in economic and business thinking.

2. Complex, adaptive, non-linear economic systems

Thus, metaphors are recent substitutes for formal mathematical tools. Metaphors are implicit statements that hold in tension two incompatible or opposite meanings which

reveal a new insight into the analysis. The metaphors and mental models allow discussing about yet undefined concepts, thus they stimulate new thinking. For instance, a basic (mathematical) metaphor for the neo-classical model of the market has been the construct of mechanical equilibrium according to which even small deviations of the market from the point of equilibrium produce counteracting forces regaining the equilibrium state.

The metaphor of mechanical equilibrium and whole neo-classical economics confines economic analysis to rational framework, within which all economic agents (producers and customers) try to make sense of available information and attempt to act accordingly. Thus, that specific metaphor enforces equally specific cognitive pattern for the market:

> Economic agents are born rational and deprived of emotions.

> They constantly assess existing uncertainty.

> They try to reduce statistically the uncertainty, using formal reasoning and on-going information analysis (e. g. Bayesian theorem).

> At a certain point of time, they feel sufficiently confident to choose a course of action that maximizes their expected utility.

> All acting agents meet in a impersonal setting (market) where they can only see results of decisions made by other agents, thus:

> They do have a similar amount of knowledge and information about each other, and:

> They do not learn from each other.

Neo-classical concept of the market is based then on a very simple set of assumptions. The market is not a space in which agents can reduce the uncertainty in interactive way but the place for maximizing local rationalities. The sum of local rationalities creates a hierarchical structure on the top of which we find the state described as the market equilibrium. The equilibrium state, as well as any deviation from it, is immediately detected by acting agents, and - as they can not learn from each other - it stabilizes cognitive structure of the market existing in their minds.

What happens, however, if that simple set of cognitive assumptions does not work and the market follows a different pattern (W. Bryan Arthur 1997)? Set of opposite assumptions would be a viable alternative for the neoclassical concept of the market and economy. Accordingly we find here:

> Instead of many independent players we have interactions of a large number of dispersed and heterogeneous agents acting in parallel. The action of any given agent depends upon the anticipated actions of a limited number of other agents and on the aggregate state these agents co-create.

> Market does not control agents' behavior. Controls are provided by mechanisms of competition and coordination between agents, part of which is consciously undertaken and another part does not depend on anyone.

> Market has many levels of organization and interaction. Instead of linear hierarchy we have a complex construction of behaviors, actions, strategies, and products that typically serve as `building blocks' for making up units at the next higher level. The

overall market organization is more than hierarchical, with many sorts of crossing and entangling interactions.

> Behaviors, actions, strategies, and products are revised continually as the individual agents accumulate experience - the market constantly adapts to individual learning processes occurring in it.

> Constant adaptation is based on experimentation and novel behaviors. Complex structure of new markets, new technologies, new behaviors, and new institutions creates the pressure toward ongoing, perpetual novelty.

> Interactions, competition/coordination, complex structure, and constant improvements create the state where mechanical equilibrium can not endure. Instead, there is a stable market in changing environment. W. Bryan Arthur uses the term "out-of-equilibrium dynamics" here; market stability stems from its dynamic changes.

3. Expectational economy

Neoclassical notion of the market and economy is oriented towards outcomes. Its counter-alternative emphasizes processes that yield those outcomes. They differ in the sense that the former sees economic agents' behavior as subject to the state of equilibrium, and the latter considers deviations caused by them as the source of market dynamics, determining - in a long run - market stability and survival. The difference is not only semantic - the term "market dynamics" is a key concept here. Neoclassical market contains a negative feedback mechanism; interactive and agent-based market (non-linear economic systems) uses positive feedback. The concept of increasing return, impossible in neoclassical economy and unseen in traditional markets, has become reality.

W. Bryan Arthur is probably the best known defender of the increasing return economy. He proposes to describe that new economic reality as "expectational economy" - the economy where processes and not outcomes play the most important role, negative feedback is sometimes suppressed by positive feedback mechanisms, and where processes and outcomes depend on individual learning, expectations, and interactions.

W. Bryan Arthur's El Farol Bar Problem is my favorite example here (W. Bryan Arthur 1999). El Farol is a cozy bar in Santa Fe (New Mexico), the town hosting famous Santa Fe Institute. El Farol is a popular place to visit for local bohemia and scientists who want to listen to Irish guitar music or Mexican Mariachi. One hundred of visitors decide independently each weekend whether to show up at their favorite bar or to stay home. The rule is that if a person predicts that more that 60 (arbitrary value) will attend, he or she will try to avoid the crowds and stay home; if the prediction is that fewer than 60 will be in the bar, he/she will go. The main question is: how the bar-goers each week might predict the numbers of people showing up in El Farol, and what is the resulting dynamics of El Farol attendance.

There are two features of the El Farol problem. First, it will become quickly obvious to the agents that predictions of how many will attend the bar depend on others' predictions of how many attend (attendance determination). Similarly, others' predictions in turn depend on their predictions of others' predictions. If agents use only their deductive capabilities, there is an infinite regress and no rational decision can be made. No "rational" set of expectations can be assumed as agents' common knowledge, and from their viewpoint, the problem is ill-defined. Second - any commonality of expectations gets broken up: if all expect that few will go, all will go, invalidating initial assumption.

Similarly, if all believe that more than 60 will go, nobody will go, thus invalidating that belief.

In 1993 W. Bryan Arthur (who actually designed and conducted El Farol experiment) modeled this situation by assuming that while the agents visit the bar, they act inductively–they act as conscious statisticians, each starting with a variety of subjectively chosen expectational models or forecasting hypotheses. Each week they act on their currently most accurate model. Thus agents' beliefs or hypotheses compete for use in an ecology these beliefs create. Computer simulation (Fig. 1) shows that the mean attendance quickly converges to 60. In fact, the predictors self–organize the population into an equilibrium "ecology", in which of the active predictors 40% on average are forecasting above 60 and 60% below 60. This emergent ecology is organic and self–organizing in nature.

Interestingly, if we change active proportion from 60/40 to, say, 70/30 or 90/10, emerging structure will show exactly the same properties. After a while the mean attendance will follow initial hypothesis and expectation and converge to 70 and 90, respectively. Another interesting point – attendance adjustment to individual expectations does not mean that a fixed set of customers will be attending El Farol. Different persons will be in the bar within the same evolving ecological structure which has been proved by empirical observation and computer simulation.

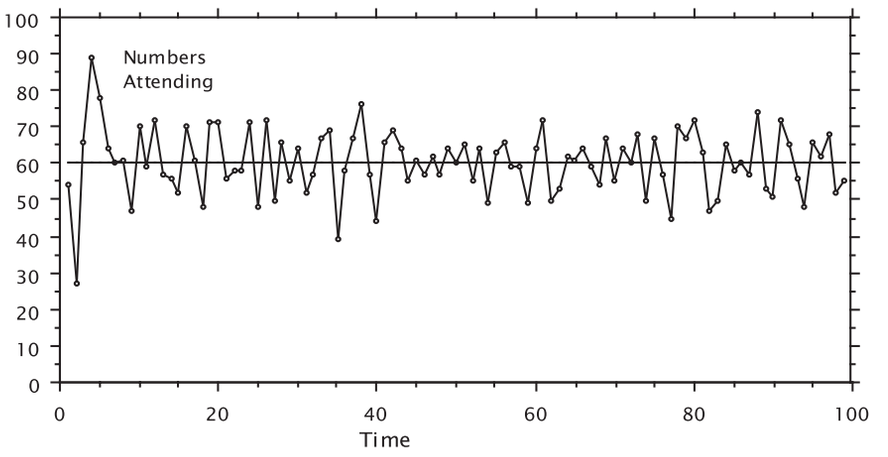


Fig. 1. El Farol Attendance

Source: W. Bryan Arthur 1999.

4. Discovering patterns in complex, economic systems

El Farol is a miniature of expectational market and economy. It is an apparently simple problem with highly complex behavior that can not be explained by standard economics. More often those complex, agent–based entities are ever–changing, showing perpetually novel behavior and emergent phenomena. Complexity, therefore, portrays the economy not as deterministic, predictable and mechanistic but as process–dependent, organic and always evolving. As such, there is no rational prediction and predetermined state does not exist. Instead, continually learnt behaviors and modified expectation become market

driving forces that govern the market. Agents must acquire the knowledge about those driving forces unless they "do not care about El Farol" (disappear from the market). Standard theories of financial markets assume rational expectations–that investors adopt uniform forecasting models which are on average validated by forecasted prices. The theory works well at the beginning only; market "anomalies" such as unexpected price changes, sudden price variation, and demand changes caused by speculation remain out of range for these theories. Holland, LeBaron, Palmer, and W. Bryan Arthur (1997) have created a model which relaxes rational expectations by assuming, as in the El Farol problem, that investors can not assume or deduce expectations but must discover them (underline by author). Our agents continually create and use multiple "market hypotheses"–individual, subjective, expectational models–of future prices and dividends within an artificial stock market on the computer. The result was a self-contained, artificial financial world, where - like the bar El Farol - it is a "mini-ecology" in which expectations compete in a world these expectations create. Can metaphors and mental models create the reality?

Fifty years ago R. Merton described such a situation and introduced the term "self-fulfilling prophecy". The market works as a self-fulfilling prophecy; agents have (formulate) some assumptions at the beginning and their actions are compliant with those assumptions. What happens then, however, has nothing to do with assumptions; actions (even if based on false premises) lead to results confirming them and further actions depend less and less on initial assumptions and more and more on the learning process. When problems are too complicated or when they are not well-specified, agents face not a problem but a situation. They must deal with that situation; they must frame the problem, and that framing in many ways is the most important part of the decision process. Therefore, what lies between the problem and the action is human cognition. Agents work with mental models, metaphors, and "selective abstractions" of the reality in which they act. They learn and reason; they can apply many different ways of making inference about the population, test them, make decisions, and act. A mental model of their reality will have, thus, utmost importance.

Is it possible to predict the behavior of El Farol customers? W. Bryan Arthur's work have proved that described situation is predictable not in terms of statistical decision theory but as the result of an on-going learning and modifications of previous mental model. Moreover, such a prediction is not only possible for an external expert advisor - it is equally available for El Farol customers. Although most known formal simulations of this problem were made in SWARM-C computational environment (simulation software elaborated in Santa Fe Institute), interested agent can do the same. Any market agent is able to rationalize decisions and acts using some methodological and technical support for understanding a pattern underlying market reality.

5. Problems and complexities

System dynamics is a methodology developed for studying and managing complex feedback systems, such as one finds in business and other social systems. The concept had been developed by Professor Jay W. Forrester at Massachusetts Institute of Technology in the early 1960s. At that time, he began applying what he had learned about systems during his work in electrical engineering to everyday kinds of systems. Traditional analysis focuses on the separating the individual pieces of what is being studied; in fact, the word "analysis" actually comes from the root meaning "to break into constituent parts". Systems thinking, in contrast, focuses on how the thing being studied interacts with the other constituents of the system–a set of elements that interact to produce

behaviour–of which it is a part. Therefore instead of isolating smaller and smaller parts of a system (local rationalities), systems thinking involves a broader view, looking at larger and larger numbers of interactions. Once a pattern underlying defining interactions is detected, systemic structure of the problem under analysis is found. Therefore, understanding behavior without the structure is impossible and modifying structure of the problem is the only way of solving it; solution is the intervention into the structure. From that standpoint, System Dynamics is the art and science of making reliable inferences about behavior of a problem by developing an increasingly deep understanding of structures underlying that behavior.

The dependence of behavior upon structure is the core concept of the theory of autopoietic systems (Varela, Maturama 1987). Described sometimes as the property of recursiveness, the theory states that components of the problem participate recursively in the same network of relationships that produced them, and they realize the network of relationships as a unity in the space in which the components exist.Autopoiesis is a process whereby a system produces its own organization and maintains and constitutes itself in a space. Autopoiesis is the archetype of pattern. The secret of understanding El Farol behavior lies in determining its autopoiesis.

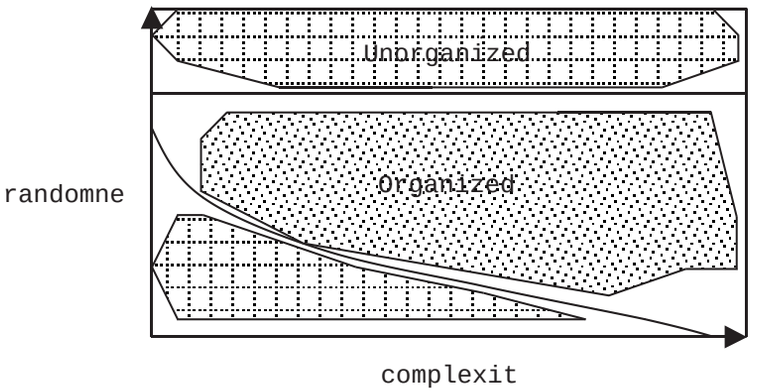
One may ask how it is possible that such a simple situation as the one described in El Farol case can produce such a complex behavior. The answer lies in the concept of complexity – the construct explaining even most complicated behavior patterns. Oryginal root meaning of the term (from Latin "complexus") signifies "entwined", "twisted together". This may be interpreted in the following way: in order to have a complex we need two or more components, which are joined in such a way that it is difficult to separate them. Similarly, the Oxford Dictionary defines something as "complex" if it is "made of closely connected parts". Intuitively, a system would be more complex if more parts could be distinguished, and if more connections between them existed.

Those two aspects of the complexity – distinction and connection – determine two dimensions characterizing complexity. Distinction corresponds to variety, to heterogeneity, to the fact that different parts of the complex behave differently. Connection corresponds to the connectivity where behavior of one part cannot be explained and predicted without a functional reference to the behavior of other connected parts.

Thus, we have two types of complexity; if there are many variables composing a whole we use the term of "detail complexity". Most people think of complexity in terms of the number of components in a system or the number of combinations one must consider in making a decision. But there is another type of complexity. The second type is "dynamic complexity" – situations where cause and effect are subtle, and where the effects of interventions are not obvious over time. Conventional tools and analysis methods are not equipped to deal with dynamic complexity as many complex and behavior patterns arise from a system composed of few parts (as, for instance, the structure of El Farol presented further). Dynamic complexity arises from the interactions of the problem components over time (np. Sterman 2000, p. 21). In the case of El Farol detail complexity is very low; eventually all bar customers can be divided into two groups – those who go and those who do not.

It would be interesting to classify problems according to their complexity dimensions. Two aspects could be used here – type and change in complexity and predictability/randomness of behavior. The combination of both provide us with three areas picturing different problem categories along with different ways of thinking and solving them (see: Fig. 2).

Fig. 2. Types of problems



Source: author's elaboration based on: Weinberg 1975, p. 18

Organized complexity contains mechanistic problems where they can be disassembled and re-assembled again without loosing functional character of their parts. For those problems we can use analytic approach and, typically, problem is decomposed into a number of indepent sub-problems which, in turn, can be solved witout affecting the correctness of the whole problem (machines and engineered systems are typical examples). Unorganized complexity is the universe of problems containing very large number of elements, behavior of which - even if random - can be translated into a mathematical or statistical equation. Statistical populations (sometimes called "aggregates") are usual examples of unorganized complexities (e. g. statistical quality control problem). For both, organized simplicities and unorganized complexities science has developed a number of analytical tools so we know how to tackle with these problems. Drawing upon technology history and develoment we can see that handling their complexity (static or detail complexity) depends on the reduction of problem components, thus their behavior becomes manageable and predictable.

Most interesting area extends between organized simplicities and unorganized complexities - this is the area of organized complexity. This area contains problems showing high dynamic complexity, even if the number of problem components is not high. As von Bertalanffy suggested, methodologies appropriate for the first two are useless in dealing with organized complexity. Most, if not all, economics and business problems fall in that category.

For organized complexity problems dynamic complexity yields behavior that can not be characterized by ordinary statistical tools. The problem behavior lies "in-between" rather than "within". This results in sometimes strikingly different conclusions than those generated by traditional forms of analysis, especially when what is being studied is dynamically complex or has a great deal of feedback from other sources, internal or external. As dynamic complexity stems from relationships existing among all problem components we need an approach focusing on those relationships instead of problem components and so far Systems Dynamics is the only one explicitly invoking relationships (feedback structures) as a focus.

6. Partitioning and Tearing Method

Problem systems can be best described by their structure and semantics. The structure, in addition to traditional descriptive way, can be represented by a graph or matrix showing which parts affect what other parts. The semantics concern is how the effects occur. Both do contribute to the understanding and explanation of a problem, and simple matrix calculus and algebra allow us to move beyond the limits of spoken language and advance to a higher degree of problem modeling. The method is called Partitioning and it is usually accompanied by its complement (Tearing Method) allowing to split complex linear equations systems into smaller chunks; both were proposed by G. Kron (1963). The Partitioning Method is using an ordinary graph ordering algorithm where vertices represent problem variables and relations between them become arcs.

The analysis of problem structure and behavior and resulting Problem Influence are in close proximity to other problem solving techniques that have been extensively used in recent years – "storytelling" and mental modeling. Both techniques, propagated by Learning Organization Center of Massachussetts Institute of Technology, see a problem not only as the discrepancy between "what is" and "what should be" but as the path linking decision maker with the future. D. Ingvar showed in 1985 (Ingvar 1985, p. 127–136) that while solving problems part of our mind remains connected with our foreseen future crafting a sequential time oriented graph where variables integrate our future to present problem thinking. Moreover, that graph is not simple and usually has many returns and dependencies on earlier events. Our "future memory" is activated by arising problems – otherwise remains dormant.

Storytelling, Influence Diagrams (result of using Partitioning Method) and similar have proved to be useful in practical decision making (Huff 1994). For problems containing dynamic complexity (feedback loops) our intuitional understanding is rarely sufficient; we need a complement from outside and Partitioning Method is a tool of invaluable importance for modeling dynamic problems. Partitioning Method was extensively used in solving extremely complex problems; e.g. managing schooling and medical services in Northern Australia (Warfield 1976) or Klein – Goldberger model of the United States economy (Klein, Goldberger 1955). The method assumes that:

> Structure of a problem is represented by the graph showing which parts affect which other parts.

> There is a path from vertex xi to xj if and only if the behavior of xi affects the behavior of xj.

> Semantics of the problem concerns the rules for the behavior of its parts and their effect on each other.

> Effect is represented by an arrow.

Partitioning Method is a simple matrix algorithm enabling us to divide any complex set of interrelated variables into a set of "blocks". A block is a set of variables among which a clear feedback loop does exist. The above statement means that for a blosk it is impossible to establish clear and understandable cause- effect relation and such effect is lost. Within each block there are paths in both directions from every vertex (problem variable) to every other vertex in the same block and between a vertex in one block and a vertex in another block there can be at most a path in one direction. Thus, blocks contain variables linked with feedbacks and they constitutes dynamic parts of a problem (all variables are simultanously depending on each other). There are no two way links between blocks – different blocks are linked with simple relation.

We explain the Partition Method using a simple example of a problem describing relationships among production process, production output, and market demand. The semantics of the problem is straightforward and probably easily understandable for any practitioner. What is difficult to conceive is a very complex behavior pattern generated by a set of simple feedback loops within the problem structure. Let's suppose that story told by one practitioner is as follows.

> *"Our production process depends largely on production capacity. The final product is transferred instantly to the market and – in most cases – is not stored. In our market niche we have never satisfied existing demand and cash inflow occurs immediately after the product reaches the market. We have never had problems with our customers; they pay in timely manner and we never had to request operational loan from the bank. Current sale helps to cover future production expenses. Given our market and demand, we are optimists. Market size justiies that opinion. We do not expect future problems – we will always sell our product."*

Step 1 – Inventory of variables

We begin with translating problem story into a set of variables that constitute the story. In all cases it is a subjective operation, although itis relatively easy to reach an agreement regarding variables participating in problem description. We discern here:

> production process > production volume > production capacity

> sale > revenue > production input

> current demand > future demand > market size

Step 2 – Construction of symmetrical matrix

In constructing symmetrical matrix of the problem all variable defined in Step 1 should be included in the same order in columns and rows od the matrix. All matrix cells are spaces for marking simple cause-effect relations existing between any pair of variables. Diagonal cell will represent relation between the same variable and will be excluded from the analysis. Fig. 3 shows resulting symmetrical matrix:

	production capacity	production process	production input	revenue	sale	production volume	current demand	future demand	market size	New number	Assigned
production capacity	●										
production process	X	●	X								
production input			●	X							
revenue				●	X						
sale					●	X	X	X			
production volume		X				●					
current demand						X	●		X		
future demand						X	X	●			
market size									●		

Fig. 3 Matrix representation of problem *Source: author's elaboration (for all following matrices).*

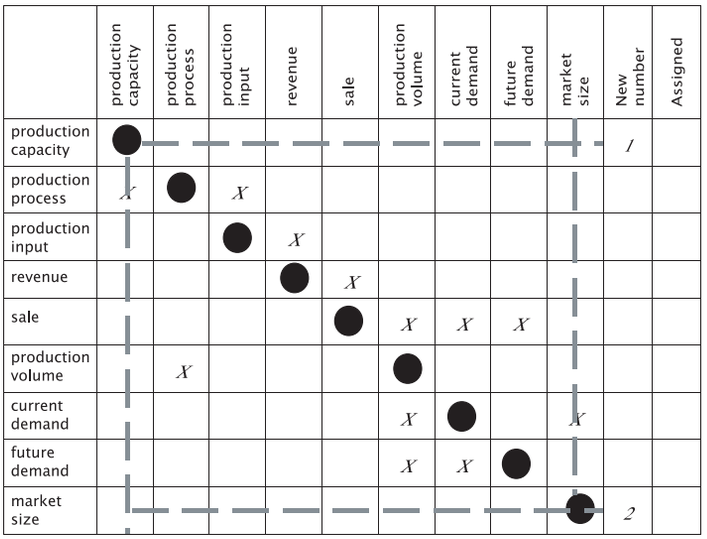


Fig. 4 Ordering relations for variables not involved in feedback

"X" in the matrix represent perceived simple relations between variable, where columns are predecessors (variables influencing) and rows are successors (variables influenced). For instance, mark "X" in second row (production process) and first column (production capacity) tells that production capacity (predecessor) will immediately affect production volume (successor). If that matrix were ordered one, all marks X above the diagonal would have shown feedback loops existing in the matrix (problem).

There are special columns on the matrix right side; "new number" will assign to any variable its new consecutive number determining its position in future ordered matrix; "assigned" columns, in turn, will subordinate variables belonging to a feedback loop to a variable representing that loop. New number is given to a variable that no longer is affected by any other variable and can be excluded from the matrix without loosing problem structure semantics.

Step 3 - Ordering relations for variables not involved in feedback

Since a variable does not belong to any circuit, there is no mark "X" in that variable row. We found two such variables in our problem (production capacity and market size) and these variable receive first two consecutive number (1 and 2). After assigning new number to variables, they remaind beyond our concern (all marks in variables columns and rows are crossed/eliminated). Fig. 4 show matrix with these two variables arranged.

Step 4 - Ordering relations for variables not involved in feedback

If all remaining variables have preceding X marks, we choose one of them. Let's pick up "production process"; we see that "production process" has one predecessor ("production input") which - in turn - is preceded by "revenue". We continue backwards until we arrive at the same variable twice (beginning and end of the loop). If that occurs we choose one variable as representative for that loop and assign all remaining variables in the loop to this variable. In our case we found: production process - production input - revenue - sale - production volume - production process. We can see that "production process" appears in the loop twice - it opens and closes the first detected feedback loop (Fig. 5).

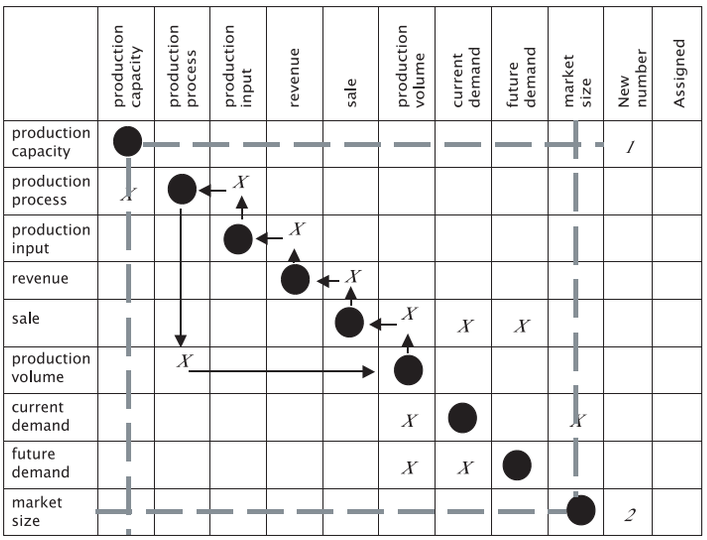


Fig. 5 Ordering relations for variables involved in feedback

Thus, we subordinate all variables in the loop to "production process" (see: column "Assignment" where subscripts 1 through 5 show the order of assignment) and cross all marks showing their involvement with other variables. This time, as opposed to variables not involved in feedback, we should respect relationship marks transferring them to respective variables denominated either as predecessors or successors (we use symbol ^ for transferred relations). Fig. 6 shows results of the operation.

There are still two variables showing predecessors; for "production process" previously transferred mark points to "future demand" as predecessor and for "future demand" "production demand" plays the same role. It is obvious that at the beginning of the process no one would argue that there is such direct relations between these two variables. Neither they did not exist in the original matrix nor were considered in the initial problem story. We perform exactly the same operation, this time only with two variables

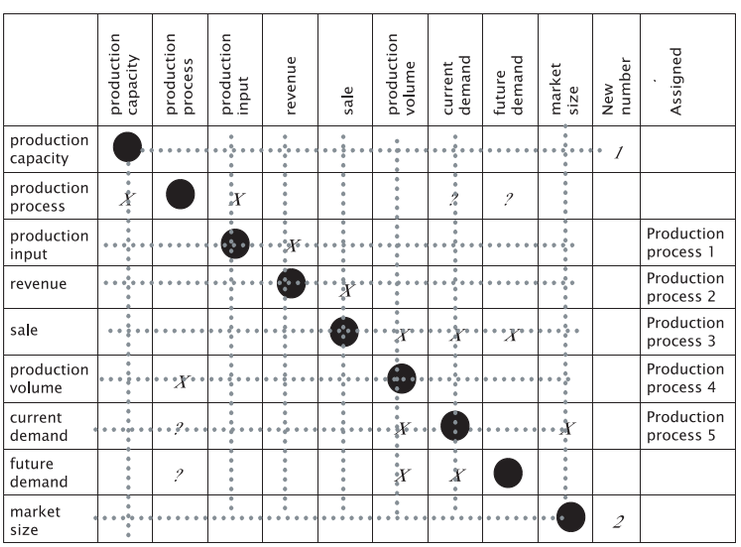


Fig. 6 Ordered matrix structure for "production process"

("production process" and "future demand"). After that operation "future demand" is subordinated to "production process" and all variables but one have been eliminated from the matrix. The variable "production process" is free, means that there is no predecessor affecting the variable. Whenever this happens we should assign a new consecutive number to that variable and all other assigned variables. In our case "production process" is receiving number 3 and all other variables receive following numbers in accordance to assigning them to the "production process".

	production capacity	production process	production input	revenue	sale	production volume	current demand	future demand	market size	New number	Assigned
production capacity	●									1	
production process	X	●	X				2	2		3	
production input			●	X						4	Production process 1
revenue				●	X					5	Production process 2
sale					●	X	X	X		6	Production process 3
production volume		X				●				7	Production process 4
current demand		2				X	●		X	8	Production process 5
future demand		2				X	X	●		9	Production process 6
market size									●	2	

Fig. 7 Partitioned matrix structure (without ordering)

Next step relies in re-writing the matrix, respecting all original relationships, with a new order determined by numbers assigned to all variables. That matrix is called ordered and all marks above the diagonal show real feedback loops existing in the matrix (problem structure). As it can be noted the matrix had originally 7 marks and after ordering there are only 6 of them. That means that our problem structure does contain 6 feedback loops with corresponding dynamic complexity. Fig. 7 and 8 shows the results.

Ordered matrix has a number of blocks. We identy blocks by analyzing variables along with their predecessors located above the diagonal for that variable. For variables "production capacity" and "market size" there are no such predecessors, therefore they will form single-variable blocks (independent variables in problem structure). All remaining variables have predecessors. Further blocks identification requires drawing within original matrix a set of symmetrical sub-matrices leaving no mark above the diagonal. For instance, block containing variable "production process" extends beyond that variable for if we close the block with that variable and "production input"only, a mark between "production input" and " revenue" would be left alone. Thus, we proceed until we identify another block containing all remaining variables. Fig. 9 presents all three blocks of our problem.

	production capacity	market size	production process	production input	revenue	sale	production volume	current demand	future demand
production capacity	●								
market size		●							
production process	X		●	X					
production input				●	X				
revenue					●	X			
sale						●	X	X	X
production volume			X				●		
current demand		X				X		●	
future demand						X		X	●

Fig. 8 Partitioned matrix structure (after ordering)

	production capacity	market size	production process	production input	revenue	sale	production volume	current demand	future demand
production capacity	●	*1st block*							
market size		●	*2nd block*						
production process	X		●	X					
production input				●	X				
revenue					●	X		*3rd block*	
sale						●	X	X	X
production volume			X				●		
current demand		X				X		●	
future demand						X		X	●

Fig. 9 Partitioned matrix structure (with blocks)

Third block has seven variables linked by feedback loops. We could present the structure of the problem without ordering these variables; the result of that, however, would be obscure and we would not be able to identify its internal structure. At this moment we may proceed with the analysis using the technique called Tearing Method. At this stage of the analysis we know that even with such a simple structure of the problem its behavior will show quite complicated pattern. Thus, it may be important to go further and order the 3rd block. We proceed as follows:

> Choose any variable in the block as starting variable.

> Trace its predecessor (preceding variable).

> Trace predecessor of that variable.

> Continue the process until we find return to starting variables.

> Remove all marks in identified path.

> Return to stage 1 and continue until all marks from above the diagonal are removed from the block.

Fig. 10 shows that operation; arrows point to the sequence of analyzed variables. Fig. 11 presents the structure of the problem based on partitioned and three times torn matrix.

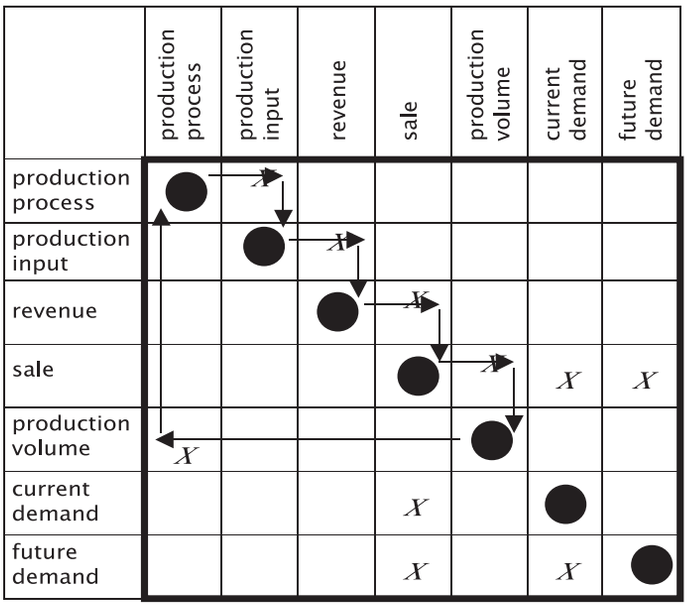


Fig. 10. Analysis of block No. 3

7. Systems Dynamics

Sometimes we can estimate dynamic hypothesis directly through data experiments or even experiments in the real system. Most of the time, however, the conceptual model is so complex that its dynamic, behavioral impications are unclear. In other cases we are more interested in detail complexity (e.g. technical or statistical problems) where traditional simulation, aimed at numerical results instead of seeking for behavior pattern and displaying problem dynamics, is more appropriate. For organizaed complexity dynamics of the behavior is more important than numerical results of simulation. For those reasons Systems Dynamics modeling and simulation environment is far better option.

Feedback structures are responsible for most mistakes and fallacies made during problem solving and decision making processes. It has been repeatedly proven that while dealing with problems equipped with such a structure people continously mispercept and misjudged feedback impact on the problem (Sterman 2000, p. 26–27), reaching eventu-

ally solutions that ignore dynamic properties of the problem. Using Partitioning and Tearing methods, particularly for complex, dynamic problems, we reach the stage in problem modeling that allows us to use further procedure and simulate problem.

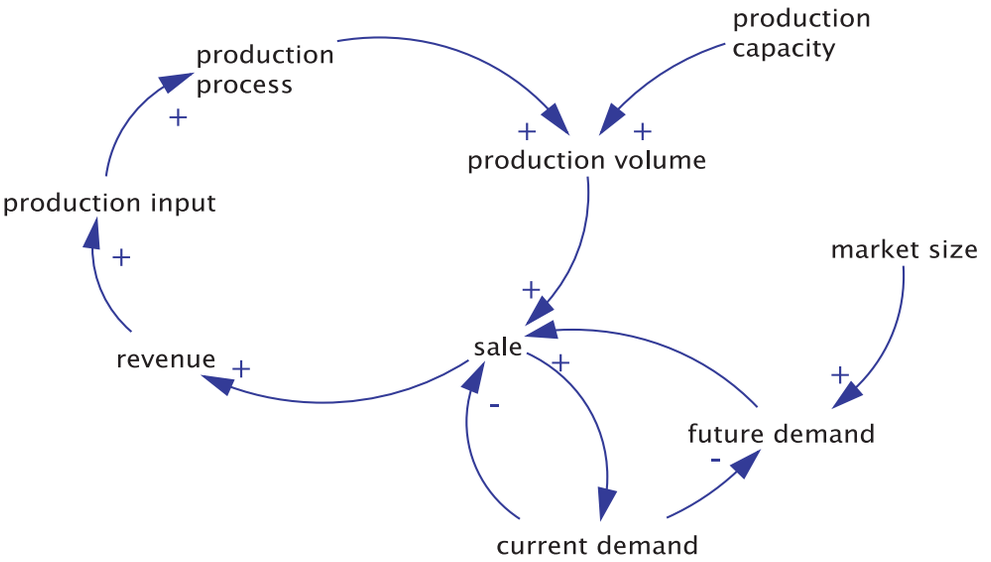


Fig. 11. Problem structure
Source: author's elaboration.

The creation of market and business patterns within Systems Dynamics framework possesses a set of special features which – for our purposes – can be reduced to the semantics and grammar of visual thinking. Semantics seeks best ways for representing the reality – accordance between the reality components and used symbols is a key issue here. It may be surprising that even for complex systems we do not need more that four generic construct that can reflect with sufficient precision behavioral properties of the components. They are:

> Stock variables; they change over time and stand for anything important for a model that accumulate and/or decrease their value. Comparing visual thinking to the structure of language, stock variables play the role of nouns. Stock variables are equipped with a "memory" (their present state depends, in addition to flow variables' influence, on their previous state) and are the best representations of a system. By default, stock variables are determined by differential calculus.

> Flow variables; they conduct external influences to and from stock variables. There is no other way of changing stock variables but through flow variables. Flow variables are like verbs describing changes in which stock variables participate. Flow variables assume values from accepted integration method.

> Converters; adjectives of the simulation language. They represent fixed (or arbitrarily predetermined) values existing in a model and they modify flow variables. Unlike stock and flow variables, converters can only conduct information (no physical values allowed)

> Links; they put together all other variables and close required feedback loops constituting the dynamics of a problem.

There are many available Systems Dynamics software packages enhancing our thinking capabilities. They all use the same or similar concepts and icons picturing above variables. We have chosen Vensim™ (by Ventana Systems) software; Fig. 12 present basic modeling resources (variables icons) used by software:

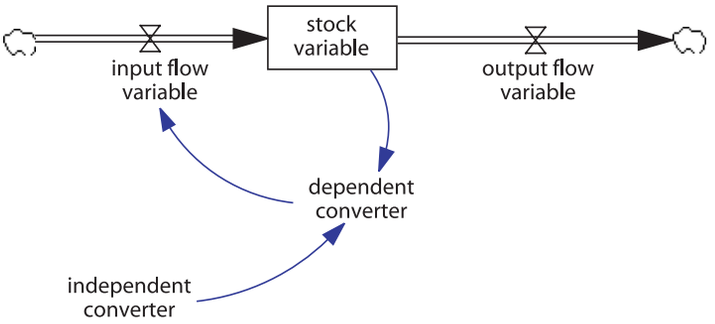


Fig. 12. Hypothetical use of modeling variables
Source: author's elaboration.

Let's go back to our El Farol problem. Having known how to use systems dynamics thinking tools and methodology, we do not have to wait and learn upon our experience (what ordinary customers must do). We can uncover bar attendance structure (visual thinking), build a graphical model, define mathematically or graphically its variables, simulate, and test problem behavior. We can learn without actually participating in the experiment and going/not going to the bar. Fig. 13 shows one possible structures for El Farol problem.

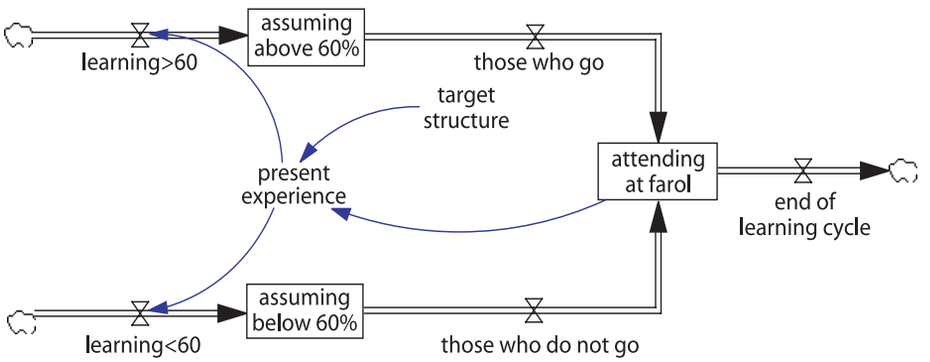


Fig. 13. El Farol dynamics in VENSIM™ environment
Source: author's elaboration.

Given the variety and richness of all available to El Farol customers' strategies, it would be impossible to understand its dynamic structure otherwise. Similarly, if we use classical interpretation of the bar dynamics (local rationality, maximizing strategies), our understanding would be incomplete at least and would not reveal the complexity of the problem. Using presented way of unleashing the El Farol (market) dynamics we can clearly identify patterns symptomatic for complex systems – butterfly effects, turbulent boundaries, transforming feedback loops, fractals, attractors, self-organization, and coupling. The market lives through El Farol case; the market lives through our mental model containing feedback structure as both show complex, non-linear dynamics.

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Should the Polish Power Industry be Integrated and If So, How?

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Introduction

The question posed herein is two fold. It refers to an on-going public debate on the issue of another modification of the state policy regarding structural transformations of the Power and Gas Sector, as proposed by The Ministry of the Treasury and supported by some part of the power industry. However, it is of a more fundamental nature, since it is in regards to the appropriateness of the basic change in the state strategy concerning this issue which took place following the last parliamentary elections in 2001.

The first case refers to a proposal to allow vertical integration of the national power and gas sector, which will entail incorporating distribution companies that are also undergoing consolidation, into two presently-created groups of electricity producers (Polska Energia – Polish Energy, created on the basis of the Southern Power Concern, and BOT, which consists of Bełchatów, Turów and Opole power stations and two (2) brown coal mines). The change in the state strategy was marked by the abandonment of a policy of blocking integration activities until competition emerged in the sub-sectors of power generation and sales, as well as privatization of these sub-industries, an approach which was unquestionably adopted throughout the 1990's. It is worth mentioning, that the structure of the domestic power and gas industry, which developed in the beginning of the 1990's, was characterized by a high degree of demonopolization, both vertical (with the existence of three (3) independent sub-industries: generation, transmission and distribution) and horizontal (with fourteen (14) large electricity producers and thirty-three (33) distribution companies). However, after 2001, a modification of the state structural policy called only for horizontal integration processes, i.e., integration of producers and distribution companies into large groups of power producers and distributors.

The scale and intensity of the merger and acquisition (M&A) process in the power sector that has lead to the integration of power and utility sectors worldwide, including Europe, provides an important background to the question posed at the outset. This process, vigorously advocated by proponents of integration of the domestic sector, seems to confirm not only the legitimacy of the redirection, from the passive state policy regarding structural transformations that started after 2001, but it also confirms the rationality of the presently advocated ideas to expand the on-going integration process to allow also vertical integration.

An examination of the motives behind the integration activities in the European power and gas sector leads to an obvious conclusion that the goal here is to strive to achieve economies of scale as well as benefits resulting from the vertically integrated power companies (synergy benefits) and benefits from convergence (not only in the case of combining activities in the power sector with those in the gas sector). The fall of Enron has strengthened a conviction, held by the power sectors of most countries, of the advantages of an integrated enterprise structure that is based on material assets (used in generation and/or networks). It applies primarily to power generating and sales companies, whose financial status is in particular jeopardy in cases when the former have no direct access to power markets, while the latter do not have their own sources of power generation.

1. Problem Formulation

Notwithstanding the importance of the microeconomic arguments presented here, (such as benefits of scale, synergy, and convergence, as well as minimizing market risk) that are in favor of integration, it is worth noting, that the issue of integration of the domestic power sector has been the subject of controversy for the last several years. Recently, this controversy has substantially increased, following the publication of the vertical integration proposition. It is important to note that the differences in opinions on the issue of integration that appear here have emerged not only within the sector itself, and among experts and analysts of processes of the market transformation of the network-based sectors, but also among regulators, which are the most important element from the point of view of the decision-making power in the sector. So far, the vertical integration scheme promoted by The Ministry of the Treasury has met with staunch opposition from the Ministry of Economy and Labor, the Office of Competition and Consumer Protection, as well as The Power Regulatory Office.

The level of controversy proves that it is necessary to take into consideration other arguments and to assess the validity of the scheme for vertical integration of the power industry, together with the course of consolidation processes that have taken place so far. It seems that the crucial criterion for such an assessment should be the question whether these transformations serve well in accomplishing the strategic goal of the power policy. Despite a number of serious reservations caused by the way the power policy has been executed so far , the author assumes that the strategic goal of this policy is still to create conditions conducive to the fast emergence and effective performance of a competitive market in generating, wholesale sales, and retail supply of the power industry.

For it should be noted that competitive market mechanisms are not only the most effective way of inducing an increase in internal efficiency at the company level but also, of ensuring often overlooked allocative efficiency, which is of key importance for both power producers and suppliers. In case of the former, the goal is to ensure that the benefits from increased internal efficiency are passed on to consumers. In case of the latter, the goal is to guarantee that companies will not be affected by increases in the costs of power generation and supply, which are independent from them. This translates into a lower risk of operations in power generation and sales.

If the goal of the power policy, as formulated above, is to be seriously considered, then to answer to the question posed at the outset, the following is required.

> Firstly, a familiarity with the conclusions drawn from the course of the power sector

deregulation processes that have taken place so far, including the structural transformations that have occurred. This applies in particular for a country such as Poland, where competitive mechanisms in the power generation and supply sector are not in place, and where the number of companies in which the sole shareholder is The Ministry of the Treasury dominates the market;

> Secondly, based on these conclusions, to conduct an assessment of the results brought on by the change in the national strategy with respect to the structural transformations of this industry;

> Thirdly, to define what the national structural policy regarding the power sector should be based on.

2. Power Liberalization and the Industry Structure

In fact, the problem of a relationship between liberalization and the structure of the liberalized industry posed here refers to the main concern caused by the intensity and scale of the existing consolidation processes in the world power sector. Namely, do these processes reject the method, also popular in Poland in the 1990's, of reforming the power sector, (as well as other network infrastructure-type industries), based on the model of horizontal and vertical demonopolization of the industry, also known as the British model. This concern seems justified even more so when we take into account the fact that intensive integration processes, including vertical and cross-industry (convergence) integration, have been taking place in Great Britain itself for some time now.

From the Polish perspective, confirmation of the concern raised here would mean that we question the national policy that was adopted in the early 1990's and enforced until 2001. This policy was based on the assumption that the vertically and horizontally demonopolized structure of the national power sector, which emerged at the beginning of the previous decade, would facilitate an inherently difficult process of creating competition in network-based industries. This would mean that those who criticized the redirection of the policy, the author included, which postponed the starting of the vital integration processes in the sub-sector of power generation and distribution until mechanisms of competition would be up and running and privatized, were wrong. This would also encompass those groups and state agencies which are now critical of the integration of the already consolidated power generating companies with the consolidated distribution companies.

Published papers have been appearing more frequently, which summarize over thirty (30) years of experience in the liberalization of network-based sectors, first in the USA and then in Great Britain, as well as other countries. These papers leave no doubt about the fact that the structure of the liberalized sectors, with respect to the degree of both horizontal and vertical concentration, plays a vital role, in particular during the initial period of launching a competitive and regulated power market. This fact is further proved by experiences of both those countries which were successful in creating an efficient market as well as those in which these processes have been taking a longer time. This is despite their declarations concerning the need to introduce fast changes and to implement necessary reforms that would abolish formal obstacles impeding greater competition.

This conclusion does not mean, however, that it is the only factor influencing the success or failure in obtaining the full benefits of a competitive market. Stated in brief, the pace

and positive effects of market transformations of network-based industries depend on the degree of horizontal and vertical integration of these industries, the quality of regulatory infrastructure, the effectiveness of pro-competitive regulations, and in countries like Poland who ultimately intend to privatize these sectors, on the way ownership reforms are carried out. In this respect, the most important conclusions may be formulated in the following way.

> The higher the degree of industry integration the longer time it takes and the bigger the role of regulators in stimulating competitiveness.

> The faster the privatization of a demonopolized industry occurs, the quicker the customers will benefit from lower power generation and supply costs.

> Privatization of corporations that have too strong of a market position may, in fact, contribute higher revenues to the state budget and ensure an increase in the internal efficiency of these corporations. However, it would deprive consumers of the benefits due to them, which, in turn, would generate strong pressure to increase the degree of regulation in sub-sectors which are officially competitive. As a result, regulatory risk would grow (invoked by a fear whether it would be possible to pass onto consumers cost increases that are outside of the control of corporations), accompanied by costs of capital and, in the long run, prices.

> Privatization also has an important regulatory effect since it removes the conflict which exists between the ownership and the regulatory functions of the state. It makes it easier for regulators to undertake energetic pro-competitive actions that would often endanger the interests of state-owned companies.

> Although private companies are more susceptible to the stimuli of a competitive market, public corporations may also react positively to this kind of stimuli.

> When the following occurs: a) an effective competitive market has emerged that is characterized by a large number of generators and suppliers, low barriers of market entry and exit, as well as properly diversified price and quality selection, b) regulation of network activity works effectively and c) the costs of changing suppliers are low, the related procedures are simple, and when consumers' experiences in exercising their right to change suppliers are firmly-rooted, then conditions are right to consider both horizontal and vertical integration.

From the perspective of our discussion on integration, the example of reforms in British infrastructure-based sectors best illustrates the conditions, costs, and resulting dilemmas addressed by the state policy, which undertakes to liberalize and privatize network-based sectors to varying degrees of horizontal and vertical integration. It also illustrates a changing approach in the state policy to grassroots integration processes, due to the development of effective mechanisms of a competitive and regulated market. These British experiences, together with the experiences of other countries that have already launched effective competitive markets, indicate clearly that this goal may be reached in the easiest and fastest way in a vertically and horizontally demonopolized power sector. However, even when the network-based sector is fully monopolized, it is possible to demonopolize it in a relatively short period of time and to institute effective mechanisms of competition, but this requires a very active, and thus a very controversial, pro-competitive regulation. This special type of regulation, called 'assisted entry', is one in which the regulator uses various solutions that facilitate access for new entities to the market at the expense of

corporations 'well-established' in the market as well as regulations that offer consumers a real selection of power suppliers.

The effects of competition in the area of power generation and sales will grow if the market mechanisms reforms are accompanied by ownership reforms. This will then create the proper conditions for companies to search for their optimal structure that would allow them to obtain benefits related to their scale, vertical integration, and convergence, as well as protect against market risk, credit risk, and the risk of market instability. It is in this context that we should consider the above-mentioned vertical integration processes of the British power sector. By weakening its previously rigorous policy of blocking submitted merger and acquisition proposals that would lead to vertical integration, the British regulator believed that the well-developed competitive mechanisms and the established competitive market structure would minimize the ensuing risks caused by reduced competition. Thus, despite the vertical integration that has been taking place in the British power sector recently, there are still as many as six (6) companies able to compete on the national scale. However, the regulator and cooperating anti-monopoly agencies have already started indicating that the degree of integration of the British power sector has reached the level which must not be exceeded.

The importance of the market structure, as it relates to the development of competition, is also acknowledged by the European Commission. It is exemplified both in the New Directive regulations as well as in assessments regarding the insufficient progress in deregulating the power sector as published in the annual Benchmarking Reports. The former contains an elaborate set of regulations whose purpose is to reduce the negative influence on development of competition caused by the domination of vertically-integrated power companies in the member states. From this perspective, the most important decisions of the Directive include.

Firstly, strengthening of the regulatory infrastructure which will facilitate implementation of the TPA (Third Party Access) principle, and removing barriers limiting electricity sales within the EU.

Secondly, introduction of more restrictive laws concerning the separation, out of the structures of vertically integrated businesses that dominate in the EU, of the network activities in form of a commitment to establish legally separate transmission systems operators (as of July 1, 2004) and distribution systems operators (as of July 1, 2007)Thirdly, introduction of a pricing mechanism for trans-border transmission services and principles of managing capacity allocation in trans-system connections.

The latter case refers to an opinion, repeated in consecutive Reports, that a high degree of integration of domestic generation markets poses one of the key obstacles to the development of competition at the domestic market level. It is documented by indicators that measure the combined share of the three largest generators in domestic potentials of installed capacity. Whereas in countries that have a well-developed competitive market, these indicators reach a level significantly lower than 50%, in the remaining countries they range from 60% to 97% .

3. Assessment of the change in national policy regarding structural transformation of the sector

In view of the above statements, it is clear that the change in the state policy regarding market transformations of the domestic power sector, which entails a reversal of a

previously-enforced sequence of actions, leads in a direction that is in conflict with the recommendations based on previous experiences in market transformation of the power sector. If the integration continues further, beyond the already completed projects of horizontal integration in the generation and distribution sub-sectors, and in particular when vertical re-integration occurs, the domestic power sector structure will become comparable to the standards used in the majority of the member states. These are the standards which are commonly believed to constitute the major factor hindering the deregulation progress that benefits consumers.

This negative evaluation of the current state structural policy should be further reinforced when taking into account the effects of implementing the policy that allows integration prior to the launch of the market's and the sector's privatization.

Firstly, the on-going debate regarding power sector integration has not only distracted authorities and the public from the problems which can be solved by developing competition, but it has also led to the dominance of the belief that the degree of efficiency in power generation and supply is primarily a function of the enterprise's size. This approach leads to reducing the significance of the mechanisms of competition, as it relates to stimulating increased efficiency and passing the resulting benefits on to consumers. It also leads to ignoring the importance of delays in introducing market competition.

Secondly, another negative effect of the change in the state structural policy towards the power sector is an unleashing of integration proposals. It is enough to mention that the primary, and until recently, officially declared purpose of integration planners was to allow only horizontal integration in both sub-sectors. At present, the start of vertical integration is being advocated, and more and more often one can hear proposals to bundle the whole power sector in two or even one national concern. Undoubtedly, the increased support for such a proposal may be attributed to the fact that the chances for domestic competition are slim when, after Poland's accession to the EU, we become an element of the European energy market. As a result, the arguments of integration opponents has been undermined with the argument that effects of integration should be evaluated in reference to the whole European market and not only the domestic market. Such statements have been disproved by both the insufficient degree of integration of the European power market and by the lack of prospects for quick changes regarding this issue. This is caused mainly by limited inter-system transmission capacities, as is the case of big European countries including Poland, (an average EU ratio is nine percent (9%), while the Polish ratio is ten percent (10%)) high costs of expansion of the transmission facilities, and the difficulties connected with obtaining required licenses due to associated environmental impacts.

Thirdly, we must not overlook the growing negative consequences of continuing the integration process for a further round of, and the effects on, privatization. It will not only put an actual stop to privatization but it may also lead to other numerous dangers which, at best, will obstruct the resumption of the ownership transformations of the energy sector, and in particular of the distribution sub-sector. Previous cases of privatization of the two biggest distribution companies revealed a huge degree of resentment, or even an outright opposition to such a type of privatization by a large group of politicians, on behalf of the general public. The integration of power generation and distribution companies, in particular, their vertical integration, may only reinforce the arguments used by opponents of privatization.

Fourthly, increasing demands by the unions for social benefits and packages, and the dependence on the union's consent for integration, constitute an important factor which

may hinder further privatization and negatively influence revenues generated by it. On this point, there is no doubt that a state owner is less effective in curbing social demands, in particular those regarding employment guarantees. The overly generous guarantees affect power plants to a larger extent than distribution companies because of their overstaffing. Introducing excessively generous social packages will not only postpone the beginning of the necessary processes of labor restructuring, which should constitute a part in restructuring of the consolidated firms, but it will also decrease their value to potential investors. This, in turn, will further slow the public approval of their privatization.

4. What Should the Structural Policy be Towards the Sector?

The list of reservations concerning the scheme of structural transformation of the power sector implemented after 2001 should be extended to include those of a more systemic nature. These include two issues.

Firstly, the situation in which integration processes occur before the launch and initial stage of operation of competitive market mechanisms and the privatization of power companies is not conducive to the process of market transformation in this sector. Integration should be correlated with the degree of market development and based on incentives and information generated by these markets. Private owners, who in turn at their own risk and expense (since integration does not guarantee commercial success), should implement particular integration projects under the supervision of specialized state agencies responsible for competition protection and regulation of these markets. Thus, one can assume that it is more favorable to follow a sequence of actions in which the privatization of companies is preceded by introducing mechanisms of competition, and the integration process that follows allows the sector structure to adjust to real and constantly changing market conditions. This occurs in such a way that it is possible to find a compromise between benefits associated with economies of scale and the degree of operations integration and requirements for ensuring effective performance of competitors.

Secondly, adoption of the strategy that implies the state's direct engagement in creating a market structure raises serious doubts. One can pose a question here about the role of the state in influencing processes of market transformation of the power sector. The author believes that, in view of the announced privatization of companies, the state should not interfere in business decisions, such as those concerning mergers, but rather focus on creating conditions for their operations. This means, on one hand, creating conditions conducive to the growth of competition, where there are prerequisites for it to function effectively. On the other hand, this also entails setting forth a clear regulatory framework in cases where competition cannot bring satisfactory results as measured by categories of economic efficiency, customers' welfare, or important political interest, such as the energy policy.

The structural aspect of the state policy toward the power sector should be based on defining and publishing clear principles and conditions in which the state is going to allow inevitable changes to take place. Of key importance should be the principle that makes the approval to more important mergers or acquisitions conditional on an assessment of the level of development of the competitive market. It is important for both actual and potential market players to know the criteria on which such assessment would be based. The criteria would include not only the number of enterprises and the market share they each have, but also other factors that are important due to the specific nature

of the power market. According to the British regulator, it is important to assess the conditions and variation in frequency of market entry and exit, as well as the number and quality of price options available on the market, other conditions of electricity purchase, customers' knowledge about and experience in market participation, rates of supplier changes by various consumer groups, and the status and characteristics of grid limitations.

Finally, a key element of the structural policy should be a clearly stated position towards the issue of vertical integration, in particular in a country like Poland, where vertical re-integration has not occurred on a large scale yet. Although, especially among regulators, it is still believed that separation of generation and service chains (performed in various ways, starting with an accounting method and including an ownership method) is a vital factor in enhancing the development of competition, a view which appears to dominate more and more often holds that together with strengthening of competitive mechanisms it is possible to reduce the restrictions in this area. Curiously enough, certain restrictions would still be valid, in particular those that require the separation of business activities in competitive markets from grid/network operations which will remain a regulated activity, at least in the near future.

Relaxation of restrictions would refer to both allowing vertical integration of electricity producers with trading companies, as well as to more freedom in integration activities of grid sub-sectors, implemented both horizontally and cross-sectorally. It would create conditions for flexible structural transformations and an emergence of infrastructure-based companies with very diversified structures, as it relates to their scale of operations in the domestic, regional, or local market. Moreover, similar processes might occur in reference to enterprises operating in competitive markets.

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1. This change was authorized by a document Ocena realizacji i korekta Założeń polityki energetycznej Polski do 2020 roku, (Progress assessment and revision of the Directions of the Polish power policy until 2020),approved of by the Council of Ministers on April 2, 2002, in particular, Annex 2 to this document titled: "Obywatel, rynek, konkurencja – Przekształcenia organizacyjne, strukturalne i własnościowe sektora paliwowo-energetycznego". (Citizen, market, competition – Organizational, structural and ownership transformations of the power and gas sector).

2. Processes of integration of the worldwide power sector and an analysis of their causes is a subject of numerous research reports prepared mainly by leading consulting companies e.g., Power Deals, Annual Report PriceWaterhouseCoopers(PWC)., www.pwc.com/pl/powerdeals or Movers and Shapers. Utilities – Europe 2003, PWC www.pwcglobal.com/moversandshapers .

3. Cf: (Parmar 2003: 23)

4. The author has considered this issue in greater depth in: (Szablewski 2003: 211) and following.

5. One of the first publications which contained a detailed presentation of the key importance of the network sector structure to the development of competition was: (Vickers 1988). It is worth noting though that it was the American experiences with privatization of the telecommunications industry that paved the way for such approach to the role of the structural issues in the liberalization of network-based sectors. These experiences showed that the break-up of AT&T into smaller entities, done as a result of prolonged pressure from American anti-trust and regulatory bodies, made it possible for the telecommunications market to be opened up to other entities, whose earlier efforts to enter the market and compete with the huge AT&T had proved nearly futile. For more information on this topic see e.g.,: (Crandal 1990).

6. Cf: e.g., Czy konsolidacja nie zaszkodzi rynkowi, "Nowe Życie Gospodarcze" 2001, no.7, Restrukturyzacja i prywatyzacja sieciowych sektorów infrastrukturalnych-przypadek elektroenergetyki, Address to the Social-Economic Strategy Council under the Prime Minister: Prywatyzacyjna i technologiczna restrukturyzacja gospodarki, Warszawa, June 2001, Krytycznie o konsolidacji, "Rzeczpospolita" , August 25, 2001.

7. More important works dealing in greater depth with the importance of the sector structure to the course of liberalization of the power sector and other network-based sectors, based on experiences of various countries include: (Competition 1998) and (Newbery 1999). These issues has been discussed in Polish in : (Szablewski 2002, No. 3).

8. The idea of an assisted entry and its use by the British regulator of the telecommunications and gas industry has been presented in detail in: (Szablewski 2003, Chapter 3 and appendix).

9. Cf: (Cornwall 2003: 16).

10. Cf: (Palmer 2002: 12).

11. More in Polish on the contents and importance of the New Energy Directive in: (Michalski 2004).

12. Cf e.g., Second benchmarking report on the implementation of the internal electricity and gas market, Commission Staff Working Paper, Brussels, SEC. Similar concerns over the negative impact of the excessively-monopolized structure of domestic energy sectors on the course of deregulation in the member states have been raised in the already released draft of the Third Report prepared by the Commission.

13. A synthetic review of structures of European energy sectors in Polish is presented in a Report: Konsolidacja pionowa v. Separacja - ich wpływ na koncentrację firm na rynku energetycznym - tendencje europejskie, Cf Program realizacji polityki właścicielskiej Ministra Skarbu Państwa w odniesieniu do sektora elektroenergetycznego, a government document approved by the Council of Ministers on January 28, 2003 (final version).

14. Cf: (David 2003).

15. The author refers here to a case when unions of one of a group of distribution companies under integration managed to gain a ten-year employment guarantee for their members. Cf: (Berger 2004).

16. Cf: (Cornwall 2003: 16).

17. It is the direction of vertical integration of the British energy sector. Cf: (Palmer 2002:12).

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The Role of Transnational Corporations in the Entity Structure of World Economy – A Contribution to the Verification of G.S. Yip's Proposition

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Introduction

The purpose of this paper is to reflect on the structure of the participants of the modern world economy. In particular, it attempts to refer to the basic problems of the 'global strategy', as formulated by G.S. Yip, in form of the question: What is the real degree of globalization of a given industry and what impact does it have on the strategies of transnational corporations operating in the global market . According to G.S. Yip's proposition, it is the degree of an industry's globalization that determines the nature of the process and is the most significant characteristic of modern international relations. When formulated in this way, the subject may be analyzed from three different perspectives. The first perspective is an identification of the nature of the globalization process – its representations, forms, and conditions. The second is from the perspective of the transnational corporation, a specific type of company that is both a designation of globalization and a category which is used to explain its causes and consequences. In turn, the third perspective is an empirical attempt to answer the fundamental question of the article, namely the real degree of globalization of various economic sectors.

1. Reasons and Conditions for Globalization of the World Economy

In general terms, globalization means a process of intensification of political, cultural, and economic relations, on an international scale. Thus, it is a phenomenon of increasing connections and co-dependencies among countries, clusters of countries, their economies, and corporations. When examining this characteristic of modern international relations from the economic point of view, which is fundamental to the subject matter of this article, it can be stated that globalization constitutes a complex and dynamic process of connections and dependencies of systems of manufacturing and trade in goods, services, and capital, on an international scale. It also means an increase in the internationalization of state economies and a dramatic penetration and convergence of the world markets. The opening of goods,

services, and capital markets of an increasing number of countries, mainly the most highly developed ones, creates the globalization process. This has led to the emergence of a new system of international economic and political relations, a 'signum temporis' and a dominating feature of modern international economic relations.

It is in this macro-social and macro-economic dimension in which A.G. McGrew and P. Lewis viewed this process when they stated that "globalization refers to a multitude of connections and links between countries and societies which create the present system of the world. It describes the process in which events, decisions and activities in one part of the world have significant consequences for individuals and whole societies in distant parts of the world. Globalization is characterized by two dimensions: range [...] and intensity [...]. On one hand, this term describes a series of processes that cover the majority of the globe or that occur worldwide, the concept thus has a spatial connotation. On the other hand, it implies intensification on levels of mutual influence, association and mutual dependence between countries and societies which create the world community. Global processes are not only spreading but also deepening. Although globalization is not an abstract concept, it expresses one of the best known features of contemporary existence. Of course, globalization does not mean that the world is becoming more politically united, culturally interdependent and culturally homogenous. Globalization is spread very unevenly and varied in its consequences."(Grupa Lizbońska 1996, 50).

Globalization, as a fundamental megatrend in the development of the modern world, is a complex and multi-dimensional phenomenon because it covers the majority or even all areas of social, cultural, political, and economic activity that extend beyond national boundaries of a country, its society, and its economy. Globalization processes have an impact on markets' and corporate performance strategies, finance and technology systems, research and development environments, as well as general knowledge, lifestyles, models of consumption, access to culture, management styles, and legal regulations.

Globalization has become an object of an increasing amount of interdisciplinary research conducted within various subsystems of economics and management, as well as other scientific disciplines (political science, law, sociology, etc.). This process can be considered from many different points of view, appropriate for the scope, intended audience, and methodology of a particular discipline. Therefore this paper cannot claim to offer a deep insight into the issue of globalization. Its purpose, however, is to consider the basic problems of globalization and the challenges they pose for corporations in the international marketplace. We have identified these challenges based on a selective approach to the issue, and by formulating the proposition that globalization is a fundamental feature of the modern world economy and its scope, in reference to the supply side of the economy, can be expressed by the degree of globalization of separate economic sectors.

The factors of globalization cause more dramatic tendencies for the liberalization of foreign trade, increasing internationalization of manufacturing and distribution systems, shortening of life cycles of a growing number of goods and services, and increasing spending on R&D and technological advancement in general, in particular information and telecommunication technologies, all of which is transforming the world into McLuhan's 'global village.' These factors may be put into four, interdependent groups of phenomena and processes.

- Development and proliferation of new information technologies. Scientific, technical, and technological advancements result in a significant reduction in costs of shipment, telecommunications, and computerization, which is conducive to market-integrating tendencies on a global scale.

> Emergence of the world financial market and a dramatic increase in foreign direct investment.

> Changes in political and economic systems of many countries of the modern world (including privatization, liberalization, and deregulation), as expressed by the opening of their economies to the world and lifting barriers to free distribution of production factors.

>Transformation of the mechanisms and characteristics of competition among transnational and multinational corporations.

Consequences brought on by globalization processes are vast and can be considered on different levels and from different perspectives. An on-going debate regarding the outcomes of globalization reveals various, often opposite, approaches, which express positive (the optimistic approach) and negative (pessimistic, critical approach) consequences. Without focusing on this issue further, the authors of this paper would like to emphasize only the principal results of globalization. Undoubtedly, it creates a favorable climate of stable economic growth and an improvement of living standards and welfare on an international scale, through creating a broader market, with easier access to capital, technology, and information. This provides the advantages of economies of scale, as well as reducing prices, increasing opportunities for broader and better selection of goods and services through more specialization, a new, international labor division, better use of resources, etc. Moreover, it creates the conditions for certain higher concentrations of capital in the huge transnational corporations, and with it, a certain range of social and economic consequences.

The results of globalization, as an objective process of development of the modern world economy, are varied, multi-dimensional, and have many aspects. All countries and corporations that participate in the international labor division and aspire to play a significant role in it must participate in this process. Understanding of an objective, and inevitable, characteristic of this process will not only allow a corporation to minimize its potential costs and threats, but it also constitutes one of the fundamentals of strategic management and marketing. Ph. Kotler (Kotler 1994, 157) specifically described a need to identify the main factors in the environment when he wrote that: 'the basic duty of a corporation is to know trends and megatrends that characterize present macro-environment and a careful monitoring of actions and behavior of the "actors in the micro-environment" . Though this conclusion must be considered important, it must be modified slightly. The subject of observation should be not only the current environment but also a future, potential environment, which is characterized, to a large degree, by the widespread and deepening processes of globalization of the world economy in general, and in particular, the degree and forms of market globalization and sector globalization.

It is to this last issue, namely the globalization of economic sectors and the search for the correct strategy of operating an enterprise, specifically a transnational corporation, in international and global markets, that G.S. Yip has devoted his vast study. G.S. Yip focused his attention on the economic aspects of globalization by searching for answers to the basic problems facing each enterprise that represents "the international class" , regarding globalization factors, the decision to participate in the global market, and the enterprise's character. These issues constitute an important and the primary distinguishing factor of G.S. Yip's concept of globalization, since he concentrated his reflections on the identification of global strategies of corporations operating in particular sectors

and did not take into account other, non-corporate dimensions of globalization such as social, political, and cultural ones. While studying globalization, G.S. Yip posed an important question from the cognitive and methodological point of view, namely, how global a sector (field) of corporate activity is and how global should its operating strategy be (Yip 2004, 28). This paper is an attempt to find an answer to the first of the above-mentioned questions, namely what is the real scope of globalization of sectors in the world economy and what is the role of transnational corporations in those sectors.

2. The Transnational Corporation as a Subject of the Global Market

A certain type of an enterprise, the transnational corporation, is a subject/target of globalization in the area of international economic relations. They should be considered from 2 different aspects: firstly, as a prerequisite of internationalization and the globalization processes, and secondly, as their consequence. Companies, with their motives of foreign expansion and objectively conditioned strategies of entry into foreign and international markets, are undoubtedly a significant factor that influences liberalization and deregulation of economic activity in the international arena. However, the opposite thesis is also true, the one that emphasizes a different sequence of activities, namely, it is the intentional policies of countries and international institutions (WTO, IMF, World Bank, etc.,) that create the favorable conditions for the development of international cooperation and contribute to the spread of globalization. Such thesis is emphasized by, among others, B. Liberska, who stated that a dynamic development of transnational corporations is a consequence of deep changes taking place in their environment and which are reflected in lifting barriers to communication, capital transfer, new technologies, and findings of research and development work. Such market and technological factors have created an opportunity to act from afar in the global dimension, and have increased access to new markets and new industries for corporations (Globalizacja 2002).

Previous studies in this field have described the activities of transnational corporations in two dimensions: firstly, in the context of globalization processes and consequences and, secondly, in an attempt to find rational and effective methods of international management. Such studies include the works of C.K. Prahalad and G. Hamel, Ch. Barlett and S. Goshal, J.H. Dunning, as well as E. Cyrsoń, A. Zorska and A. K. Koźmiński and others.

For the purpose of this paper, without developing this question further, it was assumed that the transnational corporation refers to a certain type of enterprise which operates in international and global markets. This is an important assumption since one can find different definitions of companies functioning in foreign markets. Companies can be referred to as international, transnational, multinational and global firms, where the differences between them are explained through their degree of internationalization, their degree of control over resources located abroad, their method of organization and management of activities, as well as the enterprise's size and area of activity. For the purpose of this paper, following P. Dicken's (Dicken 1992, 226) definition, it was assumed that the transnational corporation is an enterprise that coordinates its activities (manufacturing, trade, and services) of its various foreign affiliates from one headquarters which constitutes the center for its strategic decisions. It can operate in both multinational and global markets. G. S. Yip has formulated a special designation to describe a transnational corporation as a global corporation by saying: "a truly global corporation is such a corporation whose companies are located not only in the western and eastern hemispheres but also in the northern and southern hemispheres. In this way distances between companies get bigger and time zones in which they operate are maximally

differentiated. Following an opening to the world of many markets in Asia, Central America and Central and Eastern Europe, limiting their activities to the area of "the Triad Region", which comprises North America, Western Europe and Japan, is becoming insufficient for international corporations [...]. A global corporation does not need to be present everywhere but it needs to be ready to launch its operations everywhere, to obtain all resources and global maximizing of profits"(Yip 200, 38-39). Further developing this statement, one can add that a global corporation is a special type of enterprise with regards to its range and effectiveness in the international (worldwide) environment and must clearly mark its position in the global industry sector. It is the degree of capital concentration, the market value and value of other marketing assets, its dynamics and petrifaction on the industry scale, which determine the real degree of globalization of the world economy and the role of transnational corporations in the entity structure of world economy.

3. Degree of Globalization of Sectors of the World Economy

A sector, which constitutes a homogenous area of associated business producers and sellers, is the economic structure that creates a real set of conditions for the operation of any enterprise. It is from this perspective that a firm determines its ability to operate and develop; it identifies the barriers of entry and the legal conditions for operating as well as reaching a particular market segment; it is where it faces activities of competitors, who offer the same or similar form of satisfying a particular need; and it is on this very level it positions its product on the consumer perception map, etc. Referring back to the G.S. Yip's proposition, this section reflects a real degree of globalization of the supply side of the world economy. Obviously, this is not the only measure of globalization. Other factors describing a degree of internationalization of corporate activities are also significant. However, they are secondary in the assessment of the degree of a sector's globalization.

At the beginning of the empirical analysis, it was necessary to formulate two methodological remarks.

The first set of data used was the Global 1000, an annual presentation of the 1000 biggest corporations in the world, as prepared by the renowned business magazine BusinessWeek. This publication uses each company's corporate market value as its main criterion in the ranking. This figure is determined by the number of all shares issued by a corporation, multiplied by the share price on a particular day (in the ranking in question, it was May 30, 2003). In order to ensure comparability, the corporate market value for those corporations based outside the US, was then converted and quoted in US dollars. The primary data was prepared by Morgan Stanley Capital International Inc., in cooperation with Standard & Poor's.

Secondly, the world economy was then analyzed using the sector classification as described by the Global Industry Classification Standard (GICS). It provides a basis for classification of corporations into separate sectors or industries of the world economy. The 2003 ranking was based on the following 10 sectors.

- Energy (S-10 Sector)
- Materials (S-15 sector)
- Industrials (S-20 sector)

> Consumer/Discretionary (S-25 sector)

>Production and distribution of food, beverages, tobacco and household and personal products (S-30 sector)

> Health Care (S-35 sector)

> Financials (S-40 sector)

> Information Technology (S45 sector)

> Telecommunications Services (S-50 sector)

> Utilities (S-55 sector).

The classification used in the 2003 ranking of the Global 1000 is slightly different from the earlier classifications. For instance, in 2000, the Global 1000 was based on the classification of the world economy into 7 sectors (Energy, Materials, Capital Equipment, Consumer Goods, Services, Finance, and Other) within which a total of 39 types of economic activity were identified. This difference makes full comparison and a dynamic analysis difficult or even impossible.

In general, while characterizing the Global 1000 for 2003, one can formulate the following, fundamental conclusions relative to the methodology and the subject matter:

> The Global 1000 comprised a ranking of the 1000 biggest transnational corporations of the world, based on the corporate market value, and sorted according to the country of origin. It provided information about the role of the biggest firms in the entity structure of a country's economy and, due to the aggregated data provided, it presented an indication of the significance of a given country on the list of the world's strongest economies.

> A detailed analysis of the corporations was conducted on the basis of the following indicators: Global 1000 rank, market value, price per share, % change from previous year, price/book value ratio, P/E ratio, yield, sales, profits, assets, and return on equity.

> The 1000 biggest transnational corporations, as far as the capital value is concerned, came from 23 countries. Geographically, 488 companies were located in the U.S., 129 in Japan, 77 in Great Britain, 48 in France and 35 in Germany. 275 corporations were located in the remaining 18 countries. This data clearly indicates how dominant the corporations from the 5 countries are in the structure of the world economy and it fully proves the thesis on 'the rule of the Triad'("Macht der Triade"), formulated by K. Ohmae.

> The Global 1000 confirms the dominating role of the US in the world economy. The 488 largest U.S. corporations were valued at $9,421,381 million i.e., 56.5% of the total market value of all companies in the ranking. Moreover, the total value of the companies from the first five countries amounted to $13,700,000 million, i.e., 82.1% of the total value of the companies in the ranking.

> The highest valued corporations were U.S.-based and included: General Electric ($286,10 billion), Microsoft ($263,9), Exxon Mobil ($244,93), Pfizer ($244,89) and Wal-Mart Stores ($232,22). The top ten of companies with the biggest market value contained 8 American corporations and 2 European ones (UK and Netherlands: Royal Dutch/Shell Group - $155,48 and BP - 153,24 billion).

> The report, presented periodically, is interesting in and of itself and was based on a detailed examination of primary data. Nevertheless, it does not provide information about the real degree of globalization in reference to the sectors of the world economy. What follows are the results of the data analysis from such point of view.

Table 1 presents the sector structure of the world economy in 2003, based on the analysis of the 1000 largest corporations. The sector classification of the world economy was based on the Global Industry Classification Standard (GICS) that identifies 10 basic sectors. Therefore, it is of an aggregate nature and does not allow for a deeper analysis in reference to "the type of business" and structure of a homogenous market field, which constitute the basic level of sector analysis and studies, as well as the measurement of the intensity of competition dynamics in the sector. However, it does have some cognitive value and allows the authors to formulate assessments of the degree of globalization of the world economy in regards to selected sectors. The major findings of the analysis are presented below.

The first, most significant sector of the world economy as far as the firms' accumulated value is concerned, was the Financials sector (S-40). Out of the 1000 world's largest companies, 236 were banks and insurance institutions from 22 countries. In 2003, the total value of the firms in the Financials sector amounted to $3,948,994 million, which constitutes 23.7% of the total market value of all the Global 1000 firms. Moreover, this sector leads the ranking with regards to two other criteria, namely profit generated by the companies in their sector and value of their assets. The profit made by the biggest financial institutions on the Global 1000 in 2003 reached $194,784 million, i.e., 34.3% of the total profits earned by the 1000 world's biggest corporations. The financial sector's share of the accumulated value of assets of the 1000 companies was even larger at 70.6%. The total sales revenue of the financial institutions placed this sector in the third place; however, such assessment is not very precise. Many banks and other institutions that belong to the S-40 sector do not publish financial information regarding their revenue ('data not available' for 118 out of 242 firms in this sector), which makes it impossible to perform an accurate comparison. Despite the lack of data on sales revenue, all institutions of the financial sector submitted information about their financial results.

The biggest institutions of this sector, based on capitalized market value were: Citigroup (US$ 210,862 mil.), American International Group (US$ 150,097 mil.), HSBG Holdings (US$ 126,972 mil.), Bank of America (US$ 111,055mil.) and Berkshire Hathaway (US$ 108,981 mil.).

The second group comprises the sectors with 'medium' accumulated market value. These include.

> The "Consumer/Discretionary (S-25)" sector had an accumulated market value of US$ 1,991,442 mil., which represented 11.94% of the total value of the Global 1000 firms. In this group, the most valuable corporations included: Toyota Motor (US$ 86,322 mil.), Viacom (US$ 80,183 mil.), Home Depot (US$ 75,564 mil.), AOL Time Warner (US$ 68,356 mil.) and Comcast (US$ 67,206 mil.).

>The "Healthcare (S-35)" sector had an accumulated market value in 2003 of US$ 1,965,605 mil., i.e., 11.78 % of the total market value of the Global 1000 firms. This sector is internally more diversified than the others and comprises pharmaceutical companies, producers of medical equipment, etc. The most valuable firms in this sector were: Pfizer (US$ 244,886 mil.), Johnson & Johnson (US$ 161,359 mil.), Merck (US$ 124,808 mil.), GlaxoSmithkline (US$ 118,955 mil.) and Novartis (US$ 113,087 mil.).

Sector of the world economy	Number of the Global 1000 corporations in the sector	Number of countries represented	Market value of the sector companies	Sales of the sector companies	Profits of the sector companies	Assets of the sector companies
1. S-10: Energy	49	11	1,200,925	1,418,121	62,203	1,415,827
2. S -15: Materials	59	13	526,210	642,005	23,387	884,928
3. S -20: Industrials	115	16	1,399,477	1,225,600	64,301	2,202,062
4. S-25: Consumer/ Discretionary	161	14	1,991,442	3297,369	5,134	2,919,685
5. S-30: Consumer Staples	82	13	1,739,548	1,257,355	81,243	1,062,655
6. S-35: Health care	82	9	1,965,605	711,380	79,071	882,645
7. S-40: Financials	236	22	3,948,994	2,688,170	194,784	39,626,199
8. S-45: Information technology	108	9	1,905,616	592,737	-15,716	858,063
9. S-50: Telecommunications Services	45	19	1,280,077	744,610	-17,364	1,756,983
10. S-55: Utilities	63	12	659,152	680,741	26,341	1,718,965
Total:						

Table 1. Sector structure of the world economy based on the analysis of the Global 1000 in 2003 (in US$ mil.)

> "Information technology (S-45)". The accumulated market value of this sector reached US$ 1,905,616 mil., i.e., 11.42% of the value of the firms in the ranking. The top five firms of the IT sector included: Microsoft (US$ 263,990 mil.), IBM (US$ 148,795 mil.), Intel (US$ 136,038 mil.), Cisco Systems (US$ 115,165 mil.) and Nokia (US$ 86,086 mil.).

>"Production and distribution of food, tobacco, beverages, household and personal products (S-30)". The total market value of companies in this sector amounted to US$ 1,739,548 mil., i.e., 10.42% of the total value of the Global 1000 companies. The top of the list was occupied by: Wal-Mart Stores (US$ 232,219 mil.), Procter & Gam-

ble (US$ 118,879 mil.), Coca - Cola (US$ 112,973 mil.), Altria Group (US$ 85,434 mil.) and Nestle (US$ 82,997 mil.).

- The "Industrials (S-20)" sector had an accumulated market value that reached US$ 1,399,477 mil., i.e., 8.38% of the total market value of the Global 1000 companies. The biggest companies in this sector were: General Electric (US$ 286,098 mil.), United Parcel Service (US$ 69,922 mil.), 3M (US$ 49,429 mil.), Siemens (US$ 42,203 mil.) and Tyco International (US$ 35,343 mil.).

- The "Telecommunications services S-50" sector had an accumulated market value of US$ 1,289,077 mil., i.e. 7.76%, of the total market value of the Global 1000 companies. The most valuable companies in this sector were: Vodafone Group (US$ 147,992 mil.), NTT DoCoMo (US$ 105,306 mil.), Verizon Communications (US$ 103,549 mil.), SBC Communications (US$ 84,532 mil.) and Deutsche Telekom (US$ 62,850 mil.).

- The "Energy S-10" had an accumulated market value of US$ 1,200,925 mil. i.e. 7.19% of the total market value of the Global 1000 companies. Of the largest from the market value point of view were: Exxon Mobil (US$ 244,932 mil.), BP (US$ 153,240 mil.), Total (US$ 103,779 mil.), Royal Dutch Petroleum (US$ 94,911 mil.), ChevronTexaco (US$ 75,788 mil.) and ENI (US$ 64,576 mil.).

Companies in the following two sectors had the smallest accumulative market value.

- The "Materials (S-15)" sector had US$ 526,210 mil., i.e., 3.15% of the total market value of the Global 1000 companies. The market value of the richest companies in this sector was substantially lower than in the sectors above and included, DuPoint -US$ 41,865 mil., Dow Chemical - US$ 29,114 mil. BASF - US$ 25,285 mil., Rio Tinto PLC - US$ 20,877 mil. and BHP Billiton Ltd. - US$ 20,815 mil.

- The "Utilities (S-55)" sector had an accumulated market value of US$ 659,152 mil. which represented 3.95% of the total market value of the Global 1000 firms The richest companies in the sector were: Enel (US$ 42,216 mil.), E.ON (US$ 35,640 mil.), Tokyo Electric Power (US$ 27,316 mil.), Southern Co. (US$ 22,460 mil.) and National Grid TranscCo (US$ 20,040 mil.).

The sectoral analysis clearly shows the occurrence and consequences of globalization of the economy. Apart from a continuous increase of the market value and the increase in sales by the Global 1000 companies, a strong concentration of size and differentiation of companies within a sector is obvious. In this respect, the following assessment draws on the Pareto's principle, i.e., identification of the nature/type of feature distribution for 20% of the biggest corporations (according to their market value) within each sector. The data obtained is presented in Table 2. It confirms the proposition that the degree of concentration within the sectors is significant. The sectors can be divided into three groups according to the degree of the concentration:

a) - in the S-25 sector, the 20% group of the biggest companies reported a loss of -US$ 11,042 mil.
b) Approximate value since it considers the total sum of sales revenue of only 12 institutions from the group of the biggest organizations in this sector which posted appropriate data on sales
c) - in the S-45 sector a 20% group of the biggest companies posted positive financial results (US$ 2,225 mil.), but the whole sector posted a loss of -US$ 15,716 mil.

Sector of the world economy	Number of the 20% group of companies with biggest value	Share of the 20 % group of companies in total:			
		Market value of the sector firms	Net sales value of the sector	Financial results of the sector	Value of sector assets
1.S-10: Energy	10	73.7	79.0	78.8	71.8
2. S-15: Materials	12	46.4	32.8	53.4	38.6
3. S-20: Industrials	23	58.1	56.0	60.7	68.4
4. S-25: Consumer/ Discretionary	32	53.4	37.3	a)	75.6
5. S-30: Consumer Staples	16	62.3	55.5	70.7	56.3
6. S-35: Health care	16	58.3	47.3	77.2	54.8
7. S-40: Financial institutions	48	59.8	47.2 b)	70.7	57.7
8. S-45: IT sector	22	68.1	81.3	c)	66.7
9. S-50: Telecommunications services	9	57.4	62.7	d)	43.3
10. S-55: Utilities	12	40.9	47.2	46.6	48.5
Total: 1000 firms	200	59.4	46.0 e)	64.8	55.5

Table 2. Degree of concentration in the world economy sectors based on the results of the analysis of the Global 1000

d) - both the 20% group of firms and the whole S-50 sector posted losses (- US$ 16,952 and - US$ 17,364 mil., respectively.)
e) -Approximate data - see note in b).
Source: see Table 1.

The first one is characterized by a 20:70 ratio, which means that the group of 20% of corporations represents approximately 70% of the market value of all the firms in the sector appearing on the Global 1000. This situation is visible in the sectors: "Energy" (S-10) - 73.7% and "Information Technology" (S-45) - 68.1%.

The second group of sectors can be described by a ratio of 20:60. It consists of sectors: "Production and distribution of food, tobacco, beverages, household and personal products" (S-30) - 62.3%, "Financial institutions" (S-40) - 59.8%, "Health care" (S-35) - 58.3%, "Industrials" (S-20) - 58.1%, "Telecommunications services" (S-50) - 57.4% and "Consumer/ Discretionary" (S-25) - 53.7%.

The third group includes the sectors in which the ratio is question equals 20:50, namely sectors: "Materials" (S-15) - 46.4% and "Utilities" (S-55) - 40.9%.

For the majority of the transnational corporations listed in the Global 1000, the degree of concentration can be described with a 20:60 ratio. This means that the 200 most valuable world companies represent 59.4% of the accumulated market value, 46.0% of

sales, 64.8% of financial results, and 55.5% of the asset value of the 1000 firms covered by the Global 1000 ranking.

Conclusion

Summing up the above reflections one can conclude that the results of the analysis are significant. By presenting the degree of concentration in the sectors, these results dramatically depict the shape of the world economy, the globalization processes, and the processes of market competition on the global level. The Global 1000 ranking proves the real role of the 1000 biggest corporations in the world economy. The total value of sales revenue of these companies constituted approximately 32% of the gross world product, and within this group, more than 50% of sales were realized by the 20% of corporations with the biggest capacity. This is the real scale of globalization of the modern world economy and this is the position held by the 200 biggest transnational corporations. This scale is summarized by an apt, if somewhat simplified, remark by the Corporate Europe Observatory that the modern world, in particular, separate sectors of its economic system, are becoming "one concern" to a larger and larger degree ("Die Welt – ein einziger Konzern"(Balanyá 2001)). The results presented can, at least partially, contribute towards verifying G.S. Yip's proposition, specifically, that the nature of globalization is not so much expressed in the answer to the question whether markets and sectors are global, but mainly what is the real degree of globalization of a particular sector and what influence it exerts on the strategies of companies functioning in "the international and global class."

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1. This question constitutes the main area of consideration of the principal work on the forms of corporate presence in international and global markets, i.e., a monograph by G.S. Yip (Yip 2004).
2. Globalization issues constitute a substantial and growing area of interest for the fields of economics and management. For the nature of globalization refer to, among others,: (Krystek 2002) and (Stonehouse 2001).
3. Grupa Lizbońska, Granice konkurencji, Poltext, Warszawa 1996, p. 50.
4. (Grupa Lizbońska 1996, 48) The work contains a deep analysis of the basic competition mechanisms from the perspective of the global market.
5. For a broader and more detailed consideration of the conditions and consequences of globalization see: (Globalizacja 2002), (Zorska 2002), (Marketing globalny i jego strategie 2002).
6. V. Cibaková, G. Bartáková refer to this thesis in (Marketing mana•ment 2003, 5-24), while analyzing trends in the development of marketing management in corporations in a new market environment marked by globalization processes.
7. This term refers to a subtitle of (Koźmiński 1999).
8. Yip, Strategia..., op. cit., p. 28.
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12. G. S. Yip, Strategia..., op. cit., p. 38-39.
13. A broad selection of internationalization indicators can be found in (Hünerberg 1994: 30-32).
14. (Global 1000 2003, 8: 62-82).
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Derivative Securities in Risk Management for Capital Market Investments

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An investor who has selected a security to invest (a stock) can enhance the profile of her position by forming a portfolio combining the stock with some derivative securities, whose underlying security is the chosen stock. We analyse this position from the point of view of risk-return dilemma. The classical portfolio theory takes the standard deviation of the rate of return as a measure of risk. Given some level of the expected rate of return the investor chooses a portfolio minimizing the standard deviation.

Other approach, which we follow, is based on specifying the level of risk (standard deviation) and choosing a portfolio with such a risk and best available expected rate of return. From this point of view the investments in

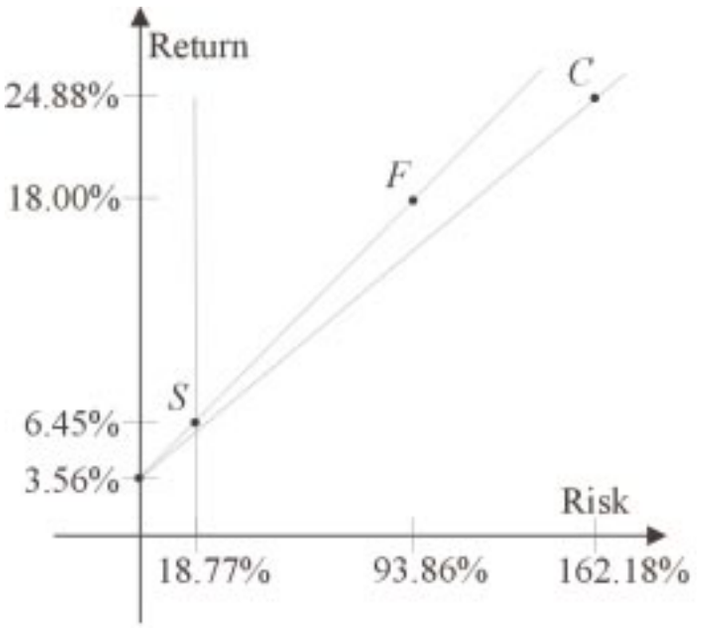
- the stock,
- a suitable portfolio of long forward position and risk free asset
- a suitable portfolio of call option and risk free asset

have similar characteristics as an example in the table below shows (where forward contract is assumed to include some initial deposit). This analysis requires computing the rate of return and the standard deviation of the rate of return, which is performed in the full version of the paper.

An example in discussed, where the stock selected has 6.45% expected rate of return and 18.77% standard deviation of the rate of return (the stock is modeled within the Black-Scholes framework)

The figure below shows the ingredients of the portfolios considered: stock (S), forward with deposit (F) and call option (C). The straight lines show all possible portfolios obtain from these ingredients combined with the risk free asset (risk free rate assumed at 3.56%). Having chosen the standard deviation at 18.77% we select the vertical line and the portfolios in question are found at the intersections.

If the investments are examined bearing in mind the Value at Risk as a risk measure (the level of loss at a given probability) these investments differ substantially. Portfolios including derivative securities turn out to be much safer than the investment in stock only. The first portfolio is based on the forward contract where a deposit equal to 20% of the value of the underlying stock (the weight of such a forward position in forward-risk-free portfolio is



20%). The second portfolio is built of call option with strike price equal to the current stock price, (the weights of call options being 11.57%). Such portfolios have the same standard deviation of the rate of return as the stock (18.77%).

investment	expected return	VaR(5%)	VaR(1%)
stock	6,45%	21,21	28,72
portfolio forward – risk – free	6,45%	18,18	25,69
portfolio call – risk – free	6,03%	10,19	10,19

The example shows that the combination of call and risk-free asset has a great advantage of considerable reduction of Value at Risk while maintaining the expected rate of return at a level similar to the stock itself.

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