No. 12
July 15, 1990

EAJ Information

講　演

1990年３月16日(金)・第20回談話サロン（関西経済連合会会議室）

講師・題目

Andrzej P. Wierzbicki：Current Situation in Poland and Scenarios of Future Developments (Extended Summary)

Reference Lecture "Towards Poland 2000 and Beyond"

日本工学アカデミー
THE ENGINEERING ACADEMY OF JAPAN

Current Situation in Poland and Scenarios of Future Developments

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The Committee of Future Studies of National Development "Poland 2000" at the Presidium of Polish Academy of Sciences was formed in 1969 and conducted many future studies and forecasts concentrating on particular issues such as education, or energy policy, or socio-political aspects of the development of Poland. In 1985-88 a major comprehensive future study of Polish development was conducted. This study was performed by the Committee composed of 70 specialists representing various fields of science, management and governmental organizations, but was also based on many contributions of various disciplinary Committees of P.Ac.Sc. The study covered such fields as sociology, culture, political sciences, demography, economics (including an assessment of current state of Polish economy, issues of economic reform, problems of economic structural change), scientific and research potential, problems of food and agriculture, energy policy, housing, spatial planning, ecology and environment, education, social security and social participation, general trends of international and global development and their impact on Polish situation, international trade and debts of Polish economy, etc.

Because of changing political situation, the findings of the study were not supposed to serve a particular government or political party, but were addressed to entire Polish society. This was possible because the Committee "Poland 2000", although it included representatives of various governmental organizations (such as Planning Commission or Statistical Bureau), was not responsible to the government but to the Academy of Sciences. The final report synthesized many thousands of pages of disciplinary reports into a comprehensive volume of ca. 700 pages and was published in February 1989—see [1]—during so called Round Table discussions in Poland; it was also used in these discussions.

When preparing such a multi-disciplinary report and, particularly, when studying future development scenarios, many methodological issues related to scenario development and assessment as well as to interdisciplinary synthesis had to be solved—see [2]. These problems

were overcome by developing a new method of future scenario generation, related to modern trends in aspiration-based decision support systems, see [3]. It should be mentioned that these trends are also related to some cooperation between Polish and Japanese researchers in this field, see [4], [5]. However, the interdisciplinary synthesis of results required in the work of the Committee "Poland 2000" took much research and discussions; over 4 years were needed to complete the study.

The study had to take into account historical and socio-political background of Poland that is rather specific. It includes old traditions of democracy and freedom of expressing divergent opinions, as well as strong individualism exemplified by historical contributions of Polish people to science and culture. Thus, after the II World War, Poland was never a fully totalitarian state, several political parties existed and political debates were often quite open. With this tradition, the martial law introduced in 1981 could not subdue political dissent and was actually aimed at preventing foreign intervention, not at a political dictatorship. Economic reforms towards introducing market economy mechanisms started already in 1982, but subsequent governments underestimated the difficulties of converting a centrally planned economy into a market economy.

A major step in the democratization of political situation in Poland occurred during 1989 and resulted in an essential change of power structure and a new broad coalition government led by Solidarity. This development represents a global trend that was predicted in its broad outline (not in its details and speed; but it was clear, for example, that the events in Poland will stimulate many changes in Eastern Europe). This trend is a part of global challenges of the transition towards new type of civilization and society—called variously post-industrial or "third wave" or information society, but actually referring to a new epoch of "informed reason", see [6]. In order to meet these challenges, any country must put more emphasis on freedom of thought and speech, of information exchange, on individualism combined with a new global perception of ethics and rationality. Even democratic and rich countries might need to stress stronger some specific aspects related to this global trend—as, for example, more global perception and more individualism in Japan or, on the other hand, better informed and more uniform levels of education in the U.S.A. Any country that does not meet these challenges decreases the chances of its people in future global competition.

Details of political developments, however, cannot and should not be predicted in future studies because of their short-term character. Economic aspects of development have more middle-term character, while in long term civilizational, educational and demographic aspects are decisive. This was taken into account when assessing the current state and future scenarios of development in Poland.

The current state of Polish economy is characterized by:

—the necessity of a substantial increase of the share of exports in forming gross national product of Poland (currently ca. 20 %) in order to ease the pressure of international debts (ca. 40 billion dollars, actually not very much, but too high when compared with the volume of foreign trade);

—an old and inadequate structure of the economy with the dominance of traditional heavy industry (steel mills, shipyards, heavy chemistry, etc.), mining (coal, copper, sulphur, etc.) and with inadequate infrastruc-

ture (such as badly underdeveloped telephone network);
—a relatively well educated and rather inexpensive labor pool which could be much more productive given better management and equipment (recent economic policy results in growing unemployment that is still rather small—less than 1 %—but actually larger due to hidden unemployment);
—a fast changing organization of the economy with the formation of new economic structures and markets due to the transition from centrally planned to market economy;
—a large unutilized productive potential (buildings, organizational structures, labor force) due to this transition;
—rather high inflationary pressures related to this transition, in particular due to a specific phenomenon of oligopoly of socially owned enterprises (inflation 70 % per month at the end of 1989, decreasing in last months);
—new economic policy of current government of opening the economy, encouraging exports and foreign investments in Poland, introducing exchangeability of Polish currency (zloty) and counteracting inflation.

Based on the assessment of the current state (a year ago, all but the last element of the assessment were clearly visible) and on possible long-term trends in civilizational and demographic developments, three possible scenarios of long term-developments in Poland have been analyzed. All scenarios assume that the global trend towards democratization is stable. Today we can confirm this assumption or put it even stronger: it is practically certain that Poland will become a market economy with stable and interesting environment for foreign investment, as an essential part of European common market and its link to the U.S.S.R. There is no doubt today that the process of democratization of Poland is irreversible; various political and economic developments can only influence its speed and character. On the other hand, current international developments (the process of reunification of Germany) increase, on one side, the interest of Western Europe in creating an economic counterbalance by including Poland in the common market, and, on the other side, strengthen the common interests of Poland and the U.S.S.R. in creating a political counterbalance.

The analyzed scenarios were as follows:
—A. The scenario of priority for energy and resources concern corresponds to the continuation of the traditional pattern of development in Poland characterized by the domination of traditional heavy industry and mining. It would lead, however, to an environmental and energy crisis at the turn of centuries. After the political changes in Poland in 1989, such a continuation is not very probable.
—B. The scenario of priority of basic needs corresponds to shorter-term market responses equilibrating shortages in housing, food and agriculture and redressing environmental damages that resulted from extensive mining and heavy industry development. Such a scenario is very probable when introducing market economy mechanisms and is much better than the first scenario, but its long-term civilizational effects are not the best.
—C. The scenario of priority of civilizational progress assumes concentrating on some critical, long-term issues such as opening Polish economy and society to world markets and other global influences, a deep restructuring of industry and economy accelerating the growth of high technology industries and other science-

intensive branches of national economy, an equilibration of consumer markets achieved through modernizing the structure of supply and demand, a deep and long-range reform of Polish educational system combined with an intensification of implementing scientific results in industry and economy. While most difficult to achieve, this scenario gives the best chances for long-term development.

With the aim of increasing the chances of scenario C, there is a clear interest from Polish side to intensify Japanese-Polish business, industrial and scientific relations. From Japanese side, there might be interest in opportunities created by the change in economic structure and markets in Poland (unutilized productive potential in buildings and well educated, inexpensive labor could be supplemented by investments in management and equipment to obtain high productivity and international market penetration in central or eastern Europe and western parts of U.S.S.R.).

But a long-term intensification of Japanese-Polish cooperation must rely on the stability of long-term common interests and mutual complementarity. There exist premises for such complementarity which should be recognized and strengthened through an open-minded, future oriented vision and action. There are various similarities and differences in historical and cultural traditions of both countries that can strengthen mutual interests and complementarity. For example, while the changes in Poland necessitate the organization of schools of management and business administration oriented towards market economy, there are various styles of such schools; Poland could learn much from Japanese style of business management.

On the other hand, the practical end of the cold war that we observe now opens quite new possibilities of cooperation in peaceful applications of high technology, such as software development for business, industry and administration. Poland has a strong tradition in mathematics and an education system that stresses individualism and excellence in sciences; thus, Polish software specialists are known for their quality in the world. A Japanese software firm with Polish subsidiary could thus develop excellent software at quite low cost. Many further examples of such possible joint ventures can be given.

The chances for successful and long-term stable business cooperation are thus rather high; the rapidly changing economic situation in Poland creates many opportunities for investments and joint ventures, if we approach them in a open-minded and future-oriented way and overcome prejudices that have accumulated through many years of the cold war. In order to help in such intensification of business and industrial cooperation, we need also more intense scientific and cultural cooperation, to which purpose I hope to devote my energy upon returning to Poland.

Selected references:

[1] Towards Modern Dimensions of Poland—Development Dilemmas on the Verge of XXI Century. Report of the Committee of Future Studies of National Development "Poland 2000" of P.Ac.Sc. Editors: Z.Kaczmarek, A.P. Wierzbicki. Ossolineum, Warsaw and Wroclaw, 1989.

[2] Wierzbicki, A.P. Towards Poland 2000 and beyond. Paper presented at the Sixth General Assembly of World Future Study Society, series Studies of XXI Century, Washington D.C., July 1989.

[3] Lewandowski, A., and A.P. Wierzbicki. Aspiration Based Decision Support System—Theory, Software and Applications. Springer Verlag, Berlin and Heidelberg, 1989.

[4] Sawaragi, Y. Towards a new systems approach.

JISR—IIASA Joint Workshop on New Advances in Decision Support Systems, Kyoto, April 1988.

[5] Seo, F., and M. Sakawa. Multiple Criteria Decision Analysis in Regional Planning: Concepts, Methods and Applications. D.Reidel Publishing Company, Dordrecht, 1988.

[6] Wierzbicki, A.P. The Role of Basic Concepts in Systems Theory, Multicriteria Decision Analysis and Game Theory at the Turn of a new Epoch of Informed Reason. Discussion Paper No. 280, Kyoto Institute of Economic Research, November 1989.

TOWARDS POLAND 2000 AND BEYOND

(Presented at the Sixth General Assembly of World Future Study Society, series Studies of XXI Century, Washington, D.C., July 1989.)

Summary

The paper summarizes the findings of a major study on scenarios of future national development of Poland to the year 2010 and beyond. The study was prepared in the years 1985-88 and covered aspects of demography, sociology, political sciences, economics (current conditions, reform of economic mechanisms, economic structural change), food and agriculture, energy policy, housing, spatial planning, ecology and environment, health, education and cultural development, and other issues. Full version of the report in Polish is ca. 700 pages. The study was organized along three scenarios of national development that are presented in the paper. The paper discusses also a methodological issue how to rationally develop and select future development scenarios. Beside a review of various approaches to scenario generation, a novel method of generating aspiration scenarios and elaborating corresponding realistic development scenarios is described; this method has been in the reported study.

1. Introduction.

The Committee "Poland 2000" was formed in 1969 and conducted many future development studies, concentrating or particular issues of development, such as education, energy policy, etc. In 1981-84, a major study on various aspects of Polish society at the turn of XX and XXI century was prepared (see references); it was felt, however, that there is a need for a comprehensive future study including a deeper analysis of various issues in economics, demography, environment, etc. In 1985-88 such a study was conducted in the Committee with participation of over 70 specialists from various fields under the chairmanship of Professor Z. Kaczmarek, while the author of this paper served as the scientific secretary and was responsible for methodological aspects of the study. Many other committees of P.Ac.Sc. and other professional institutions cooperated in the study. The final report "Towards Modern Dimensions of Poland —Development Dilemmas on the Verge of XXI Century" (see references), summarizes numerous specific studies in various fields—sociology, culture, political sciences, demography, economics (including the assessment of current state of economy, issues of reform of economic mechanisms and problems of economic structural change), scientific and research potential, food and agriculture, energy policy, housing, spatial planning, ecology and environment, education and cultural development, issues of social security and psychological issues of social participation, general trends of international and global development, their possible impacts on the development of Poland, issues of international debt, etc. Even the synthesized findings included in the final report required ca. 700 pages.

In order to provide for a necessary measurer of coherency of such multidisciplinary study, three basic scenarios of possible development

were prepared by a subcommittee of interdisciplinary experts, corrected and approved by discussions of entire Committee "Poland 2000" and served as a reference for various disciplinary contributions; finally, the scenarios were worked out in more detail and presented in the final report. While presenting shortly the findings of the report, this paper concentrates on the development scenarios: the methodological problems encountered when generating such scenarios, a novel way of overcoming such problems adopted in the study, major findings of the finally adopted development scenarios.

2. Methodological issues of scenario generation.

Many failures of simplistic forecasting based on the extrapolation of historical and current trends have shown the inadequacy of such an approach to future studies. Extrapolatory forecasting assumes (explicitly or implicitly) that the dynamic mechanism of development is known and does not change in time. While such assumption might be partly valid in some particular fields of study (for example, demography) it is never fully justified and cannot be used for future studies of comprehensive socio-economic and cultural development, particularly in times of deep structural change.

This has been accepted as methodological lesson in most modern approaches to future studies that usually concentrate on the generation and assessment of various development scenarios. However, the major methodological issue how to rationally develop and select future development scenarios is not resolved until now.

The most frequently applied approach is to develop such scenarios intuitively, through expert assessment. While decisions made by master experts in given fields, although mostly intuitive, nevertheless can be shown to have usually a very good quality (see e.g. Dreyfuss 1984), this does not necessarily apply to multidisciplinary assessment; for who is a master expert in issues of interdisciplinary development?

Another frequently applied, more rational approach is to generate (intuitively, by expert assessment) *conditioning scenarios* and to combine them as exogenous factors with partial knowledge of dynamic development mechanisms to obtain comprehensive *conditional development scenarios*, typically through computer simulation. Such an approach is justified in some specific fields, such as demographly or macroeconomics or energy policy—where more or less validated models of dynamic development mechanisms are known. It has been also applied in particular fields in the study of the Committee "Poland 2000".

However, both approaches were judged to be insufficient when it comes to generating scenarios of comprehensive social, economic and cultural development. Before presenting a novel approach adopted in the study, it is however necessary to discuss a basic philosophical issue: is a society a subject or object of its comprehensive development?

The author is aware that the philosophy of XX century has proposed various and divergent answers to this question—ranging from total indeterminism and negation of any historical laws to total historical determinism, diverging also in many other aspects of this question, such as the role of economic and technological "basis" versus social, political, cultural and intellectual "superstructure". However, when studying future development one cannot omit this question.

The study of the Committee "Poland 2000" was based upon that assumption that a society is after all an object of its comprehensive development, in a specific sense. Obviously, the state of technology, economy (the "material basis"), but also of social and political institutions is the accumulated result of a given history of development and cannot be easily changed. However, new historical lessons as well as possibilities created by science, inventions or international comparisons result in the formation of specific systems of aspirations in a society; we might consider these aspirations as perceptions of challenges facing this society. Through its political system, a society can choose a response to the challenges corresponding to predominant aspirations. This response is influencing the future state of technology, economy, social and political institutions (obviously, a part of the response might be also a change in the political system), a general state of its civilization. In this sense, a society can influence its future, is an object of its development—although it is also a subject to the historically inherited state of development, to various random influences and events outside its control.

This dynamical feedback loop between the material "basis" and sociocultural "superstructure" can be observed in history. Until the end of XX century with its globalization of informational systems, basic cultural paradigms of societies have been changing slowly: according to anthropologists, such cultural paradigms are stable at least for three-four human generations, say, for 75-100 years. Assuming such delay time in changing basic cultural paradigms and the dynamic feedback process described above, one can deduce—see Wierzbicki, 1984, 1988—a long cultural or civilizational cycle or wave of the period of four delay times, that is 300-400 years. Such theory corresponds well to (at least European) historical records, where we can distinguish three long cultural waves: that of Late Middle Ages, starting around 1000, that of Renaissance, starting around 1350-1400 and that of Enlightenment starting around 1700-1750 (all more specific cultural periods, such as Baroque or Romanticism or Positivism, being only specific parts of these long cultural waves). Economic or even demographical records also support the hypothesis of such long waves. Each long wave starts with a formation of a new cultural platform of basic values that influences the technological and economic basis giving it new development impulses; in the middle of each wave, social tensions created by the development result in form of sociopolitical protest (respectively in each wave mentioned above Franciscanism, Reformation, socialist and communist movements) that influence the second part of the wave and prepare the way—through a dispute with the existing cultural platform—to a formation of a new platform of basic values. The end of each wave is characterized by a decline of old basic values, by exaggerated ideological tensions and a search for a new platform of values.

When seen from this perspective, we might be living now at the end of the long cultural wave of Enlightenment and searching for a new platform for the coming wave—that might be called the wave of Informed Reason—the information technology and the perception of fragility of human civilization and environment on Earth being the most important determinants of this coming wave. The new platform of basic values that is being formed now must include global responsibility in seeking a way of preserving Earth for mankind, as well as cultural and ideological tolerance, permitting each society to respond to the chal-

lenges of coming informational age according to its own cultural tradition.

If we accept the answer that a society can influence its future development by forming systems of aspirations and responding to challenges, a novel approach to rational generation and selection of development scenarios can be proposed. This approach is analogous to an aspiration-led method of multiobjective optimization (see Lewandowski and Wierzbicki, 1989): if we had a mathematical model of development dynamics, we could select by this method such development paths that are multiobjectively (Pareto) optimal and correspond best to specific aspiration scenarios determined exogenously. Although we do not have precise models of comprehensive development of a society, we can stil apply the same methodological idea: first discuss and select by expert assessment what might be possible scenarios of aspiration changes in a given society, then apply all available knowledge (be it in form of formalized models in specific development fields, or only in form of expert opinions) to determine what would be realistic development paths if the society responds to challenges specified by selected aspiration scenarios. Obviously, the selection of *aspiration scenarios* in this approach remains intuitive, expert choice; but the determination of the corresponding development paths or *aspiration-led development scenarios* is as much rational as possible based both on formalized and non-formalized knowledge.

In an interdisciplinary study, this approach provides also for a higher level of coherency of partial, disciplinary studies, although it might require a few additional iterations: the selected aspiration scenarios and the corresponding aspiration-led development scenarios must be several times discussed and enriched in details in an interdisciplinary committee, while they are used as guiding information for the work of disciplinary subcommittees. Such an approach has been applied in the latest study of the Committee "Poland 2000".

A basic difficulty that arises in this approach—but also in other approaches—to elaborate future comprehensive development scenarios is related to the fact that various disciplines can have different time-horizons of reasonable forecasts. For example, political issues can be forecasted often only for a few years, macroeconomic issues—usually for not more than a decade or two, demographic issues—usually even for several decades.

In order to resolve this difficulty, the study of the Committee "Poland 2000" included rather short-range political forecasts and concentrated more on macroeconomic, ecological and other forecasts that can be made for one or two decades (to the year 2000 or 2010)—focused on issues that would face Polish society no matter what particular government is elected—as well as included demographical forecasts extended even to the year 2030. Obviously, one could argue that changes in political systems do affect the macroeconomic development; but if we consider these changes as a part of society response to perceived challenges, only their general direction and not their specific details is important. Similarly, one could argue that demographic development depends on economic conditions and cannot be forecasted further than the economy; but we know well that demographic dynamics is much slower and better known than economic dynamics, and thus can be forecasted for longer periods and with better accuracy.

3. Basic scenarios of national development of Poland towards the year 2000 and beyond.

Three possible scenarios of aspiration changes in Polish society were judged to be of basic importance:

A. *The scenario of priority for energy and resources concern*

This corresponds to a firmly established although slowly changing system of aspirations in Polish society in which hard work on exploiting natural resources of Poland—for example, coal or copper—is a fundamental value. While perceiving new challenges, the system of aspiration tries to respond to them by concentrating on old values.

B. *The scenario of priority of basic needs*—such as eliminating shortages on food and housing markets as well as most severe sources of industrial pollution. This system of aspiration developed during the economic and social crisis starting with 1980 in Poland and concentrates on eliminating current difficulties.

C. *The scenario of priority of civilizational progress*, responding to the global challenges regarding the transition towards an information age. This system of aspiration—represented mostly by the youth or some professionals—is oriented towards the future and creating new values.

These aspiration scenarios were elaborated in more detail—in their psychological or social aspects—and discussed by the Committee. Disciplinary subcommittees supplied then specific knowledge that through discussions in the Commitee was synthesized into three corresponding scenarios of possible development of Poland.

A. The first scenario corresponds to the continuation of the traditional pattern of development in Poland which is characterized by the domination of traditional heavy industry and mining. Large social groups and trained working force are professionally and emotionally prepared for the continuation of this development pattern. However, this pattern is extensive in energy—and resources—as well as requires large capital investments for its continuation. Poland is still rich in natural resources, but the costs of their mining rises very fast. Available forecasts of world prices for raw products of Polish heavy and mining industry are not advantageous, hence prospects of export intensification in this field are also bad.

The continuation of such development pattern might lead to a socioeconomic crisis on the verge of XXI century. The mechanism of such a crisis, though complex, would be related mostly to two basic components. One of them is possible energy crisis. The structure of primal energy sources in Poland relies heavily on coal that is used rather inefficiently by heavy industry and electric power stations. In this situations, a concentration on producing more energy leads to a known paradoxical viscious cycle of energy-extensive growth: faster than energy production grows the energy demand of heavy industry whose products are in turn required by mining and electric power production. Another of these components is environmental crisis. In many regions of Poland, ecological dangers resulting from heavy industrial waste and, in particular, acid rain caused by burning coal are already very high and close to catastrophical levels. The capital investments required for environmental protection grow rapidly. Total capital investments necessary for further development of heavy industry, mining, energy production and environmental protection would leave then no reserve for restructuring the economy and industrial production, no possibility for

increasing supply of consumption goods and for expanding exports necessary for opening-up of Polish economy to world markets.

B. The second scenario—that of priority of basic needs—assumes therefore an energy policy focused on energy conservation and a diversification of the structure of primal energy sources. The potential of agriculture in Poland is sufficient to satisfy food demand; however, food processing industry is underdeveloped and requires intensive modernization. A source of particular concern are housing shortages, particularly among younger people that have often to wait over ten years until they can obtain own housing. This necessitates heavy capital outlays in the industry of building materials and components as well as in the building and construction industry. Another priority are fast growing outlays in environmental protection, since ecological dangers become visibly detrimental to the health of population in some Polish regions.

A path of development responding to these needs and aspirations would be no doubt better than in the first scenario, but it would still have severe limitations. The rise of living standards and changes in the consumption structure would be only slight and quantitative, not qualitative. The concentration on redressing worst cases on environmental damage without deep structural changes on Polish industry and economy would be not quite efficient. The attempts to increase supply of food and housing, without addressing deep causes of these shortages, would be costly and not quite effective. The priority for bettering the provision of basic needs would engage most investments of Polish scociety leaving few reserves for the development of modern industries and the expansion of exports necessary for opening Polish economy and decreasing its international debts.

C. The third development scenario—that of priority of civilizational progress—assumes addressing deep causes of various critical issues by concentrating on:

1. A deep restructuring of Polish industry and economy, an acceleration of the growth of high technology industries and other science-intensive branches of national economy as well as modernization of its more traditional branches. High technology or science-intensive industries participate now only in ca. 2% of industrial output (and in 7% of exports). Their intensification and an increased application of their products in other branches in Polish economy are necessary for energy conservation, environmental pollution control and export expansion.
2. An opening of Polish economy and society to world markets and other global influences. The share of exports in national income, now ca. 14%, should be almost doubled in the year 2000 in order to achieve relatively open economy and to deal successfully with the burden of international debts. A stronger influence of international markets on Polish economy is desirable to increase its competitiveness, speed up restructuring processes, counteract monopolistic tendencies of many enterprises that become visible during the economic reforms since 1980. This goal is complementary with the intensification of high technology and science intensive branches of Polish economy since the necesary, fast growth of exports (ca. 8% yearly) depends on and can at the same time help in restructuring the economy.
3. An equilibration of basic consumer markets, achieved not only through intensification of food production, food processing, building industry and through intensifying the impact of market machanisms in food and housing markets, but also through changing and modernizing the structure of consumer goods

supply, including a higher supply of durable and high technology consumer goods. The necessary economic policy consists both in intensifying and promoting market mechanisms in all cases where they are restricted by regulation or monopolistic tendencies as well as in promoting selectively consumer goods supply towards market equilibration. The outcomes of economic reform until now did not achieve market equilibrium and resulted in high inflation instead; the sources of this inflation are not only classical—such as international debts, large budget deficit related to subsidizing inefficient publicly owned enterprises—but also rather specific—resulting from the fact that the degree of concentration of Polish industry is rather high and that a publicly owned, self-governing enterprise of monopolistic market position increases the prices of its products and the salaries of its staff faster than a privately owned monopolistic enterprise. A necessary process of introducing capital markets and changing the historically established interpretation of public ownership in industry will be long and fifficult and might create various social tensions; to speed up this process, an opening of the Polish economy is a strongly complementary goal.

4. A deep and long-range reform of Polish educational system combined with an intensification of implementing scientific results in industry and economy. In the years 1950-80, the Polish educational system was strongly developed and the level of education and professional qualifications in Polish society is still a considerable asset that is not fully utilized. However, the educational system is in regress since 1980; the percentage of population in given age finishing high school stabilized at ca. 43% and attending colleges and universities decreased to ca. 14%. To meet the challenges of XXI century, it is necessary to develop the educational system not only quantitatively, but also to change it qualitatively and structurally, increase and modernize training and education both in high technology and science-intensive fields as well as in management and business administration. Similarly, many results of Polish scientific development were not implemented in industry or economy because of monopolistic phenomena; thus, the educational and scientific goals have strongly complementary character to the goals or restructuring, opening and increasing market competitiveness in the economy.

The third development scenario includes also many other important issues. For example, such a scenario could become reality only if the political development of Polish society would continue towards openess and democracy; but it is an obvious (though popular) mistake to assume that political changes alone would resolve a deep structural and socioeconomic crisis that has components as well of local, specifically Polish, as of global character, related to the challenges of global transition towards information age. Therefore, the third scenario can be realized only through wise socioeconomic policy of a government strongly supported by a wide social perception of the necessity of meeting these challenges.

The third scenario can result, because of the respective feedbacks of many complementary factors, in a much faster increase of national income, consumption and quality of life in Poland than the previously described two scenarios. However, it is most difficult and hence least probable scenario; until now, we observe development along the first or a mixture of the first and second scenarios.

4. Policy conclusions in specific fields.

The study of the Committee "Poland 2000", beside a detailed elaboration of the development scenarios, contains also an analysis of present and predicted state of development in many specific fields along with policy conclusions. Because of limitations of this paper, only some examples of such conclusions can be presented here.

The demographic predicitions for Poland were quite detailed and long-ranged. In the year 2000 Polish population will probably be around 40 million, preserving a higher growth rate (ca. 44 million predicted for 2030) than most other European countries. A high wave (ca. 30% increase) of young people will enter Polish universities and labor markets in the years 1995-2000. Governmental policy should prepare an increased number of places at universities, employment and housing opportunities; otherwise, we might count with mass emigration of young people. In parallel with this, the percentage of old people in the population will steadily grow, generating problems related to health care and social insurance.

The health of Polish society causes also some concern, particularly in regions of increased environmental hazards. While fairly long, the average life of men in Poland (66.8 years) slightly declined recently, and the average life of women (75.1 years) ceased to grow. Particular danger for Polish population results from so called civilizational illnesses (heart and brain strokes, etc.). An increased social awareness of the necessity of changing life and nourishment styles together with intensified health care and profilactory measures are necessary to counteract these dangers.

The educational level of Polish society, though high enough to meet present needs of economy, was judged to be inadequate qualitatively to prepare for future challenges. The Committee "Poland 2000" cooperated with a special committee of experts for educational reform in preparing a very detailed and deep report on scenarios and perspectives of such a reform (the report is being finished now).

The quality of human potential of Poland—which was judged one of decisive long-range development factors—was also examined in the study of the Committee "Poland 2000" in many other dimensions; sociological, cultural, political, psychological, scientific development, etc. Another broad field of study were various economic factors.

The state of Polish economy can be characterized by overconcentration and outdated structure of industry; by diversified agrarian structure with predomination of small farms and underdeveloped food processing industry; by ongoing economic reform that started to introduce market mechanisms but not fully implemented them yet and resulted in high inflation and deep market disequilibria; by growing environmental dangers from traditional industry; by high energy and material consumption combined with low productivity of labor; by high international debts, particularly when compared with yearly exports volume.

In this bleak picture, however, one can find many unutilized reserves and opportunities for growth. Polish industry has large unutilized potential, particularly in industrial buildings and qualified labor force; new investments are necessary but must be concentrated in machinery for modernization of traditional industries, in high technology branches, in food processing. There is a room for the creation of many small enterprises, particularly when located in small towns and helping in "small industrialization of agriculture": this might

help in increasing the average size of farms and the efficiency of Polish agriculture.

The low efficiency in labor only in a small part can be attributed to the lack of motivation and labor morale; more important causes are shortages of industrial supply and resulting breaks of work, inadequate mechanization and automatization of many industrial operations, and the outdated structure of economy with low participation of higher technology industries—that are characterized by a high labor efficiency themselves and help to increase labor efficiency in more traditional industries.

Poland has obviously no chances in entering many fields of high technology production independently from foreign capital and technology transfer. However, these are several high technology fields where there are accumulated expertise and prepared qualified labor force. These are, for example, telecommunication; specialized measurements and automatization; software engineering (this is a particular feature of Polish tradition in good mathematical education); pharmaceutics and medical high technology divices. Without substantially increasing the output of Polish high technology industries, there is little chance of raising exports to the level necessary for opening Polish economy and meeting the burden of international debts. The question of international indebtedness and necessary policies for export expansion was analyzed in detail and in several additional scenarios in the study of the Committee "Poland 2000".

Although concentrating on long-range problems, the study addressed also some current economic difficulties and issues of current economic reform. To these belong: the issue of self-government of publicly owned enterprises—which is desirable from sociopolitic reasons and might help in modernizing the structure of industrial ownership, but must be accompanied by cutting state subsidies, by antimonopolistic measures and opening economy to world markets; the related issue of combating inflation, while inflationary pressures might for a long time yet act on Polish economy; the issue of supply stimulation for consumer goods and market equilibration in Poland, etc.

The study addressed also in depth such long-term problems, as energy policy with several additional scenarios; the state of natural environment and regional planning issues in Poland; long-term agricultural potential and policies; the state of building and construction industry, the reasons of housing shortages and necessary policy changes; and many other subjects.

5. Concluding remarks.

The study of the Committee "Poland 2000" was not designed to produce a plan, nor even a program of socio-enonomic and civilizational development of Poland. Based on a detailed assessment of current state and barriers of development and prepared with help of a novel methodology, three development scenarios presented in the study are aimed at increasing the awareness of broader parts of Polish society: what challenges and development dilemmas have long-term significance, what responses are necessary now and in the future. The Committee would prefer the third scenario; but the final choice belongs to Polish people, who in conditions of democratization of political institutions can influence through their parliamentary representation the government and can contribute by diversified actions to the choice of development path.

This might be the significance of the study

for Polish society; internationally, we hope that the novel methodology of constructing and selecting development scenarios might be helpful to similar efforts in other countries.

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1990年7月15日

編集
発行 日本工学アカデミー

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