

Keynote Address

"Technology and the
Future of the World
Economy"

Dr. Klaus-Heinrich Standke

Director Office for Science
and Technology, United
Nations, New York, USA

Science and Technology is an issue which came on the agenda of world affairs very late. There are a number of reasons for this phenomenon. The economists are still struggling with the proper assessment of the role of science and technology in national growth. For policy decision makers in industry, "the R and D function is often regarded as a sort of luxury to be afforded only during profit making business cycles with little or no impact on the immediate future of the company. For politicians the role of science and technology is even more nebulous. The inevitable long lead-time that the application of science and technology calls for is far beyond their average tenure in office." Five years might well be necessary to incorporate an innovation in one of the regular products of the manufacturing industry. This time includes development, proving, making tools, consumer testing and manufacture. An industry that decides to enter a new type of manufacture altogether may well spend fifteen to twenty years before reaching the break-event point (1) . In international organizations scientific and technological matters live in the shadow of political affairs that make the front pages. In any event, it appears nationally as well as internationally that the politicians' estimate of how quickly any desired change can be brought about through the application of science and technology is too short, and unrealistic.

If the role of science and technology in society at large, and in the economy in particular, is already badly understood by those who are supposed to be well informed, it is hardly surprising that this picture is even less sharp in the eyes of the general public.

If this meeting here in La Hulpe had taken place 10 years ago, my task, to talk about "Technology and the Future of the World Economy," would have been easy one. One would have presented a thorough analysis of World Trade Flows coupled with projections of national and regional

targets. Formulated science policies, not to speak about science aim technology policies, are not more than ten years old even in the most industrialized countries. An examination of these national policies and plans for science and technology is, therefore, of little help if one aims to have new insights into the role of science and technology within the social and economic take-off processes of certain countries, For most industrialized western countries such a complex process is a bicentennial exercise. And yet, even the national science policies of industrialized countries covering the last 10 years show us very significant changes in emphasis : whereas in the early days of the last decade science and technology was regarded merely as an important but badly understood factor in economic growth, 10 years later new concepts of science policy developed, underlining the importance of "quality of life" versus the traditional unreflected pattern of "more growth". Only five years later, science and technology within developed countries

X has developed in a completely new dimension, namely what one could call "survival factor".

Almost all industrial technology of the world originates basically from Western Europe or, with the exception of Japan, from countries with inhabitants of primarily European origin. As 95 % of the world's R and D potential is even today concentrated in the same countries, it is unlikely that for the near future a major shift in the world's creative potential for technology can be expected in favour of the developing countries.

Why is this so ?

It appears that the European cultural climate consisting of a certain constellation of historical, religious behavioral patterns, combined with moderate climatic conditions, has favored scientific and technological development and its industrial exploitation. Having achieved this economic and technological lead, European countries have not only been able to trade their industrial products for unprocessed raw materials from Latin America, Asia and Africa but have also achieved, at a time, military supremacy that enabled them to dominate most of the rest of the world for practically two centuries. During the period of colonialism any scientific or technological take-off for the other countries was made practically impossible. This involuntary world, division of labour consisted of importing industrial products from the Western countries (with preference to the ruling colonial power) in return for supplies of national natural resources. There was practically no training of skills for local labour and any interest in science was likely to be concentrated on flora, fauna and geological surveys, with an eye to the location and development of exportable primary raw materials, as well as, to some extent, on medicine (5) .

The distinction between developed and developing countries among the nations of the world is an invention of modern times. What is meant by developed - is not a sort of idealistic human and cultural value target -but rather a materialistic concept of industrialization. Industrial

that enables production processes to be transformed. Looking at the world today, we find that the most decisive difference between what we call more and what we call less developed countries is that the former are able to apply modern knowledge to a larger extent than the latter. This is why the more developed countries are richer. It is therefore a major aim of the poorer countries to apply more of this knowledge to their various activities in order to reach higher economic levels (6) .

The problem of injustice in the development of the world is not new. It has been known for centuries. The modest attempts to tackle this problem that have been made have had humanitarian motives. But charity seems only to work if the period of distress "is likely to be short, * that is to say, when it is caused by flood or earthquake..." (7) .

Readjustments on a worldwide scale are not a matter of charity anymore, or of social sympathy, they are becoming a matter of world politics, or of power, if you like. Such readjustments in a relatively stable world situation would be difficult enough. In a period of rapidly increasing world population, however, no future projections but only a set of alternative scenarios seem to be possible. In other words, it becomes more and more evident that social and political problems will outdistance technical solutions.

The path for creating a worldwide political awareness was prepared almost 20 years ago, when the member states of the United Nations accepted the concept of a structured "Development Decade" in order to accelerate the development process. After the limited success of the First Development Decade covering the sixties, a second Decade was / proclaimed for the 1970^s and plans are in hand for a third.

A resolution passed at the 6th Special Session of the General Assembly in April 1974, which called for a new "International Economic Order", appeared to be politically more explosive than this moderate concept of non-compulsory target-setting for 10 years within Development Decades. Although there has been much debate about this new political concept in the last 2 and a half years, opinions still differ widely concerning the exact meaning of such a "new order". Is the newly proposed order a modification of the old order or an ordering of the disorder ? The New International Economic Order introduces, in essence two different but complementary approaches :

- A revision of the old organizational structures, leading to a more stable situation in which disagreements are resolved in conference
^ rather than in violent conflict'
- The acceptance of a system of values that would permit the improvement of the status of the poor.

Nations system, as well as the activities or privatizations -like the Club of Rome, the Aspen institute for Humanistic Studies, the Dag Hammarskjold Foundation and many others, including the initiatives of a few countries like Canada, the Netherlands and Sweden (and when I say countries I mean people like Trudeau, Strong, Pronk, and Palme) ' -have opened new horizons for making as a whole. At the same time they have shown the countries that have ruled the world up till now to what extent their own well-being is inter-linked with the fate of what was regarded for many centuries as "the rest of the world".

* The organizations of the governments of the world, namely the United Nations and its specialized agencies, have become, particularly in some developed countries, a popular target of criticism and a model example for inefficiency. It is difficult for the World Organization, without any real power and without adequate funds, to do more than its member States want it to do. What the United Nations has effectively done -particularly in the last five years - is to systematically build up world-wide political and social consciousness toward global problems. < There have been World Conferences on the Human Environment, on the Peaceful Applications of Atomic Energy Conference on Population, on food, on problems of Outer Space, on the law of the Sea, on Industrialization, on Employment, on the Role of Women in Society, on Human Settlement as well as Special Sessions of the General Assembly on Energy and on Natural Resources.

All these activities call, in essence, for a new World Development Philosophy, sector-by-sector, as well as for such across-the-board issues as environment or social development. Old issues that have for centuries been on the programmes of churches or political movements as: "Social Justice", "Equity", "Basic Human Needs" and "Human Dignity", have entered the political arena of the United Nations, as the platform of the economic, social and political democracy of all the states of the world.

If the call for a "New World Order" could be based entirely on voluntary humanitarian motivations, such a concept might come out of some elitist well-intentioned thinkers. But there are now more powerful arguments pushing in the direction of a so-called - "global fairness revolution". As listed in a recent Aspen Seminar report, "the new factors in world politics include rising expectations, Third World solidarity, sub nuclear turbulence, the spread of nuclear energy, a cautious bi-power detente, global stagflation, the monetary breakdown, the oil cartel, wide swings in commodity prices, the shredding of traditional international law, a shift of economic power to new actors, a new environmental awareness, and a widening gap between the richest and the poorest people in the world" (8). Numerous contributions for an intellectual conceptualization of a new world development strategy have been published in the last 2, or 3 years. After the 2nd report to the Club of Rome "Mankind at the Turning point" (9) , we note titles like "The Planetary Bargain" (10) ,

"Human Requirements, Supply levels and outer Bounds", "Try of World Order" (1 2), "Outer Limits and Human Needs" (1 3), "Catastrophe or New Society ? " (1 4) all coming from the same school of *i* thought. A few weeks ago, in October 1976, two new World models were presented independently from each other, both decorated with the name of a Nobel prize winner in Economics, i. e. "The Future of the World Economy" (1 5), commissioned by the United Nations and directed by Professor Wassily Leontief and "Reshaping the International Order" (1 6) commissioned by the Club of Rome and directed by Professor Jan Tinbergen. Both studies can be regarded as "optimistic" studies. Both feel that an accelerated development in developing regions in order to reduce substantially the inequalities existing between the world's regions, is feasible. Both studies foresee no absolute scarcity of food, energy, or natural resources in this century. Both call for not only financial and technology transfer from the outside but also for what one might call national and regional policies for self-reliance. In short, both represent, - not surprisingly, a professionally sound assessment of available data concerning the future of world development. The main conclusion of the Leontief study is "the principal limits to sustain economic growth and accelerated development are rather than physical political, social and institutional in character" (1 7). In order to create the necessary readiness for changes in attitudes among those who have influence on politics, social affairs and institutions, the Tinbergen study stresses "Any possibility to implement ideas of a new structure would, in democratic societies, necessitate the acceptance of such ideas by rather wide sectors of public opinion" (1 8).

* Obviously, both reports make certain assumptions and leave by necessity some important questions unanswered :

- Can we realistically assume today, or within the near future, that citizens of industrialized countries will develop a feeling of global solidarity with their less privileged fellow citizens in a far distant part of the world ?
- Is mankind ready to accept the concept of "basic human needs" of all people in the world even if this could mean a reduced standard of living for him personally ?
- Are Governments in developed countries ready to accept a moderate but higher than economically necessary unemployment rate for their own population in order to create jobs in other parts of the world ? The 1L0 predicts a figure of 1 billion people unemployed by the year 2000,
- Can a voluntary reduction of consumption of energy and raw materials be expected from today's generation in favour of future generations ?

the crucial Limiting

Economy will depend on our readiness, or unreadiness to change our development strategy as a whole. One can predict, without being a prophet, that the world of tomorrow will not be shaped around the occidental way of life. Politically, the dream of Western nations after World War II to introduce democracy as an ideal form of government for all countries of the world through the United Nations has remained a dream. Economically, the high standards of living that many industrialized countries enjoy thanks to the successful application of Science and Technology have very often endangered the quality of life of the individual and have not necessarily guaranteed him human happiness. From the ecological point of view, only academic model builders can seriously believe that planet earth possesses sufficient natural resources to guarantee all 4, 6, 8 or 10 billion people the same per capita consumption that, say, the average US citizenship has today.

The role of Science and Technology in the World Economy of the future will be different from the one we knew in the past and know in the present. "It has to be brought home to all governments and the peoples of the world that the earth on which we live is finite. This is, conceptually distinctly different from human experience of the past - on which are based all our present structures of nations and (governments, of trade and commerce, of property rights, of production and growth, of international co-operation and world order. It is the application of science and technology in the relatively recent past that has brought about the explosive growth of population - through the miracles of modern medicine ; the enormous increase in productive capacity with depletion of resources particularly in the context of a consumer-oriented society ; of processes of production which have led to the degradation of the environment. Science and technology have also made the world a small place through the miracles of telecommunications and transportation and given rise to a rising tide of expectations based on the standards and forms of living characteristics of the most affluent parts of the globe. Population increase, resource depletion and environmental degradation will soon get to the point where the finite earth will constitute a limiting factor. Well before we get to that point there is need for wise decisions, for radical action, for creation of new structures in human relationships, and for generating and sustaining value systems consistent with the finite earth concept ; where the quality of life can be developed and preserved. There are, no doubt, many problems that need national solutions ; and many that need sectoral or discipline-based solutions. But there is urgent need to recognize the existence of global problems that cut across sectors and nations, and demand unified global thinking" (19). The United Nations is preparing for a new World Conference on the Application of Science and

Technology to Development in 1979. This Conference can be regarded as a sort of culmination of all previous sector-oriented World Conferences. It will be preceded in 1977 by national gatherings of each participating member state with the aim of reassessing in both developed and developing countries the role of Science and Technology in national development

in order to better prepare for the arrival of the magic year 2000. In 1978 there will be regional conferences, continent by continent, which will spell out priority areas for future research on both national and regional scales. In preparing this World Conference the United Nations, jointly with all specialized agencies belonging to the United Nations systems seeking the active cooperation of the science and technology communities of the world. "It is to be hoped that the United Nations Conference on Science and Technology/ in 1979 will bring to the fore the need for new inspired solutions to these fundamental questions that cannot be swept under the carpet ; for if we do not deal with these correctly at this stage, these problems will explode in the face of mankind when time will not be in our favour" (20).

I am confident that three years from now, that is to say after the United Nations World Conference on Science and Technology for Development, all of us shall be able to deal with the topic of this morning's presentation less philosophically than I was able to do but more concretely and with an orientation toward action.

- (1) Arrol, W. J. : "Proposal for an "Industrial Policy Institute", March 1976 (manuscript).
- (2) "A new ecumenical vision of the Future" in : Anticipation, No. 19 , November 1974, p. 5.
- (3) The Club of Rome, "Halte a la croissance ? ", Paris 1972.
- (4) OECD, "Science, economic growth and government policy", Paris 1963.
- (5) Ranis, G. : "Science : A resource for Humankind", manuscript, National Academy of Science, October 1976 , p. 3.
- (6) Kristensen, T. : "Development in rich and poor countries", London, 1974.
- (7) Piree, N. W. : "Implementing the possibilities" in : Science Journal, London Lay 1968 , p. 101 . t
- (8) United Nations, "The Future of the World Economy", New York 1976
W. Leontief and Peter Petri, p. 48.
- (9) The Club of Rome : "Mankind at the turning point", New York 1974.
- (10) Aspen Institute for Humanistic studies, 1975
"The Planetary BargainT .
- (11) Aspen. Institute for Humanistic Studies, 1975
"A Framework for Thinking about the Planetary Bargain".
- (12) Cleveland, H. : "The Third Try at World Order", Philadelphia, October 1976.
- (13) "Outer limi^taand Human needs", Dag Hammarskjold Foundation, Uppsala 1976.

- (14) "Catastrophe or new Society ? A Latin American world model",
 - (15) IDRC, Ottawa 1976.
 - (16) *Ibid.* (8), p.48.
 - (17) "Reshaping the International Order", Club of Rome, New York 19
 - (18) *Ibid.* (8), p. 48.
 - (19) "Reviewing the International Order (RIO), p. 7.
 - (20) Proposals for the preparatory committee of the conference on guidelines for the preparation of national papers, Advisory Committee on the application of Science and Technology to Development, E/AC.52/XXII/CRP.11/Rev.3/Add.2.
- Ibid.* (19).