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ECONOMIC COMMISSION FOR AFRICA

**First Executive Dialogue of Ministers
and Leaders in the Private Sector
on Science and Technology
for Africa's Development**

Addis Ababa, Ethiopia

18 - 19 June 1998

REPORT

A. Attendance and Organisation of Work

1. The First Executive Dialogue of Ministers and Leaders in the Private Sector on Science and Technology for Africa's Development was held in the United Nations Conference Centre, Addis Ababa, Ethiopia from 18 to 19 June 1998. The meeting was formally opened by Mr K. Y. Amoako, the United Nations Under-Secretary-General and Executive Secretary of the United Nations Economic Commission for Africa (UNECA).

2. The meeting was attended by Ministers or their representatives from Ethiopia, Ghana, Tunisia, Uganda, South Africa, and Zambia. Ambassadors or embassy staff from Algeria, Angola, Cameroon, Kenya, Ghana, Madagascar, Côte d'Ivoire, Botswana, Burkina Faso, Burundi, Chad, Mali, Malawi, Guinea, Tunisia, Morocco, Zimbabwe, Senegal, Gabon, Egypt and the Democratic Republic of Congo also attended.

3. Leaders of the Private Sector from Ethiopia, Kenya and Tunisia also participated in the two-day Dialogue.

4. The Executive Secretary of CORAF who is also a member of the Science and Technology Advisory Board of the ECA attended the meeting as an observer.

B. Accounts of Proceedings

Opening address (Agenda item 1)

5. In his opening speech, the United Nations Under-Secretary-General and Executive Secretary of ECA, Mr K. Y. Amoako, welcomed all present to the First Executive Dialogue of Ministers and Leaders in the Private Sector on Science and Technology for Africa's Development. He noted that the participants present at the Dialogue signified their support and commitment to the science and technology strategy of the ECA. He reiterated that innovations are the engine of economic growth for all countries.

6. The Executive Secretary drew attention to two events that he said were worth noting. First, societies that have harnessed science and technology have reaped immense benefit and have been able to accomplish development feats that would otherwise have taken hundreds of years. He stated that while it took the US 47 years and the UK 58 years to double their per capita income, China and South Korea doubled theirs within a decade. He further said that while the ratio of income disparity in the 18th Century between the richest and the poorest countries was a mere 2:1, today this ratio is more than 100:1.

7. The second event that he highlighted is the advent of generic technologies, namely, Information and Communication Technologies, Biotechnology and Genetic Engineering and new materials. He stated that while information technologies are significantly changing the way we do business and the way we order our lives and societies, the other new generic technologies have also altered, markedly, the nature of competition among nations, the structure of employment, and the character of manufacturing and trade. He stated that the comparative advantage of poor countries such as commodity production is being replaced by a rapidly-changing technological revolution in the context of unprecedented globalization and the shrinking of distances.

8. Mr K. Y. Amoako said that it was in response to these phenomenal changes that the African Conference of Ministers at its twenty-second meeting held in May 1996 assigned to the Commission a number of challenging tasks for the promotion of science and technology in the region. He added that the Commission was mandated to:

- foster subregional cooperation and integration in science and technology by formulating subregional policies on the basis of members' competitive advantage;
- provide policy advice to member States on the legislative framework for implementing science and technology;
- enhance entrepreneurial capacity building in science and technology use;
- design and implement subregional science and technology projects; and
- provide resource mobilization assistance to member States for science and technology related activities.

9. He said that it was in this context that the Commission embarked on the critical appraisal of its past efforts to develop a new strategy to meet Africa's science and technology challenge in the twenty-first century. He then enumerated some of the initiatives that the Commission had taken including: the Meeting of an Ad-hoc Group of Experts which led to the establishment of an Advisory Board on Science and Technology for Africa's Development; the launching of the ECA's Science and Technology Network (ESTNET); and the work on the preparation of compendia of best practices in the application of science and technology to food security and sustainable development, as well as related research by member States.

10. Mr K. Y. Amoako said that the Executive Dialogue avails the Commission of two important opportunities: the first was the opportunity to discuss how best to proceed in the light of the Commission's declared objectives and review with ministers some of the current issues on science and technology development as they affect member States; the second, according to him, was the opportunity for exchange of views with private sector participants who represent important agents in the new development paradigm of trade liberalization, globalization and a technology-driven development process. He said that the Commission was seeking the insights and guidance of participants on:

- the recent changes in ECA's science and technology strategy;
- the impact of social and economic policies on science and technology; and
- the impact of national policies on technology development by the private sector.

11. Mr K. Y. Amoako commended the commitment of participants to the ideals of science and technology-driven development in breaking the negative synergies that exist between low agricultural productivity, high growth of population and environmental degradation. He then expressed his confidence in their contribution and thanked them for their support to the work of the Commission.

the private sector, since these are the agents that are expected to drive social and economic development in Africa. He informed participants that science and technology activities were coordinated by the Ugandan National Council for Science and Technology headed by an Executive Secretary. Council membership was drawn from eminent scientists and prominent industrialists. He said that the Council supervised the various research and development organizations in the country and guided the direction of their activities. He highlighted some of the achievements of the National System of Innovation in Uganda which included: the development of Clonal coffee which is ready for harvesting within eighteen months of planting; improved crop varieties through biotechnology; and important contributions from the informal sector. He then highlighted some of the problems that were experienced in Uganda. These included: the non-development of many inventions which prevented commercialization; high dependence on donor funding as a result of lack of own funds for science and technology; and the isolation of research and development from industry. He appealed to participants to seek solutions to the funding issue in particular.

Initial Statements by Ministers/Private Sector Leaders (Agenda item 2)

(b) Statement by the Honourable Commissioner for Science and Technology in Ethiopia, Mr Asrat Bulbula

13. The Honourable Commissioner commended the ECA for organising the Executive Dialogue and briefly recounted what the Ethiopian Government was doing to promote science and technology in the country. He told participants that Ethiopia was promoting agriculture-led industrialization through a clearly documented national science and technology policy, which had been put in place since 1993. He drew attention to the fact that the official policy was to allocate 1.5% GDP to science and technology activities. He said that in implementing this policy, the Government of Ethiopia set up a Science and Technology Commission which was charged with all science and technology activities. He drew attention to the priority sectors for the science and technology activities of Ethiopia which are: agriculture, natural resources, industrial development, transportation and communication, new and emerging technologies, and related research councils. He stated that the Ethiopian Government had also set up a National Computer Information Centre, a National Research and Maintenance Centre, as well as the Institutional Framework for Protecting Intellectual Property Rights as a basis for the inflow of Direct Foreign Investment (DFI). He said that the country was also promoting access to existing patents and encouraging professional associations which according to him numbered about 50 at that time. Other incentives provided for the promotion of science and technology included: award schemes for technological breakthroughs; special schemes to encourage bright researchers; networking of higher institutions for science and technology research; and the rationalization of research to avoid duplication. He then recalled that the Ethiopian Science and Technology Commission had participated in many science and technology initiatives of the ECA in the past, and suggested that the ECA would make a greater impact in the region if it harmonized the various priorities of member States and encouraged them to take a longer-run view of science and technology by investing in basic science as a compliment to the focus on applied science.

(c) Remarks of His Excellency, Mr Hamid Zaouche, Ambassador Extraordinary and Plenipotentiary of Tunisia in Addis Ababa speaking on behalf of Honourable Minister, Mr Mongi Safra, Secrétaire d'Etat auprès du Premier Ministre chargé de la Recherche Scientifique et de la Technologie

14. His Excellency apologised for the inability of his country's Minister of Science and Technology to attend the dialogue in person and that the remarks that he read were those of the Minister.

15. The Minister thanked the ECA, and particularly, the Executive Secretary for the initiative of organising the Executive Dialogue of Ministers and the private sector. He said the meeting proved the ECA's firm commitment to resolutely direct attention to the real problems facing Africa, adding that science and technology were at the core of economic growth, social, cultural and industrial developments of modern nations. He commended the ECA for the three issues chosen for the dialogue process since these were the burning issues of our times. He assured participants that Tunisia was fully committed to the ideals of the initiative, namely that there can not be meaningful and rapid progress without the integration of science and technology in social and economic planning. He enumerated some of Tunisia's innovations which included the creation of a secretariat of State of Scientific Research, and Technology in 1991; allocation of 1% of state budget or 0.4% of GDP to scientific research; launching of national research programmes involving many laboratories in various fields such as agriculture, health, environment, energy, computer science, telecommunications etc.; networking of research institutions; provision of various financial incentives to increase Research and Development Institutions (RDI) - Industry Linkages, etc. He concluded that although much had been done, he was convinced that much more could still be done to harness science and technology for development. He was convinced that the current dialogue would make a substantial contribution.

(d) **A presentation to the First Executive Dialogue of Ministers and Leaders in the Private Sector on Science and Technology for Africa's Development by Dr Farouk Brimah, Deputy Minister of Environment, Science and Technology**

16. The Honourable Minister thanked the ECA for the initiative and apologized for his inability to arrive for the dialogue on time. He reiterated Ghana Government's conviction that science and technology was the key to present day development. Accordingly, his Government was sparing no effort to improve science and technology infrastructure and build institutional capacity, in an attempt to make science and technology the cornerstone of national development. He, however, drew attention to the many problems that were hindering his country's technological progress. These were the challenges of globalization to Ghana's competitiveness on the world market; the challenges of the new information and technology age; the formulation of national science and technology policy to address the requirements of Ghana's Vision 2020; the problem of institutional linkages between the public sector science and technology institutions and the private sector; and the enhancement of agricultural productivity and its linkage with agro-processing and marketing. He concluded by expressing the hope that appropriate solutions would be found to these problems by the participants at the dialogue.

(e) **Statement by Zambia on the occasion of the First Executive Dialogue of Ministers and Leaders in the Private Sector on Science and Technology for Africa's Development read by His Excellency, Mr Simataa Akapelwa, Ambassador Extraordinary and Plenipotentiary of Zambia**

17. His Excellency, the Ambassador gave the apology of the Zambian Minister of Science, Technology and Vocational Training (MSTVT) for his inability to be personally present and thanked ECA for initiating the dialogue. He explained that the statement was originally intended to be read by the Minister.

18. In the speech, the Minister informed the meeting that the Government of the Republic of Zambia had successfully developed a National Policy on Science and Technology which had been enacted into an Act N° 26 of the Laws of Zambia. He stated that the Act had two broad objectives: (a) to ensure the entrenchment of science and technology as part of the culture of the productive sector; and (b) to ensure the production of a wide range of quality goods and services. He further stated that

the objectives were being pursued through three programmes: (a) scientific and technological rationalization; (b) science and technology promotion; and (c) scientific and technological database creation. He enumerated the various activities that were being carried out within each of the programmes including science and technology conferences; science and technology capacity assessment; and science and technology public awareness building.

(f) **Statement by the Chargé d'Affaires of the South African Embassy in Addis Ababa on the Science and Technology Policy of South Africa**

19. His Excellency informed participants that science and technology was a priority area of cooperation in South Africa's relation with the rest of Africa. He recalled that his Government made a voluntary contribution of US\$25,000.00 to the ECA specifically for science and technology development in Africa, and had, a few months earlier participated in a science and technology forum in Cairo at which South African and Egyptian scientists deliberated on areas of cooperation. He stated that the science and technology policy of South Africa was people centred, and briefly traced the evolution of science and technology in his country. Some of the highlights of the Government's efforts included the publishing of a Green Paper on science and technology followed by wide debate and the issuing of a subsequent White Paper; the signing of a number of bilateral science and technology agreements with several countries namely the UK, USA, Russia, the EU, Germany, Italy, France, the Netherlands, among others; the creation of eight statutory bodies to oversee the implementation of the science and technology policy; and research in other areas by the private sector, which was responsible for about 54% of all research and development spending in the country.

(g) **Statement by Mr Naresh Mehta, Managing Director of Power Technics Limited, Nairobi (Kenya)**

20. Mr Mehta thanked the ECA organizing the Executive Dialogue and for inviting the private sector to participate. He then gave a brief resume of his company. He told participants that Power Technics started in 1982 with a capital base of US\$500.00 from which it grew to its present size with a turnover of over US\$10 million employing about 180 people of whom 15 are engineers. He said his company was a high tech manufacturer of: high voltage switchgear; power and distribution transformers; low voltage switchboards; feeder pillars; circuit breakers; voltage stabilisers; lighting fittings; computer networking cabinets etc. He stated his company's commitment to continuous innovation to maintain competitiveness. He related his company's efforts to promote such a continuous innovation through dynamic technology acquisition and barter trading to secure training of its local work force at very low cost to the company. He asserted that competitiveness could only be ensured through continuous training. He further suggested that the private sector could be aided in this challenge of global competition if incentives could be given by the member States through relieving financial constraints, reducing the burden of engineering and technical training, and the provision of basic infrastructure. In particular, he suggested a cost sharing system whereby Governments and industry shared the salaries of fresh engineering graduates for the first three years of graduation in order to provide practical experience which had constrained their employment at present. He felt that the constraint arising from inadequate infrastructural facilities was the most critical bottleneck that affected technological development and the competitiveness of African industry.

(h) Statement by Mr Adane Gudina, Executive Secretary of the Ethiopian Chamber of Commerce

21. Mr Adane Gudina gave a short historical background on the development of science and technology in Ethiopia. He said that such a development occurred over three distinct periods, namely; 1960-1975 when very little attention was paid to technological development; 1975-1991 which were the years of communism and a command economy with most productive enterprises nationalised; and 1991 to the present during which there had been a gradual return to private enterprise. He recalled that the command economy experience was unsuccessful and drew attention to some of the efforts being made to help private sector development. He felt that African countries could promote technological development if more attention was paid to the development of appropriate technologies for small and medium enterprise, and to the development of technical human resources. He suggested that ECA could aid this process by networking the science and technology efforts of its member countries.

(i) Statement by Mr Berhane Mewa, President of the Ethiopian Private Industry Association

22. Mr Berhane Mewa drew attention to the fact that the Ethiopian private sector was still in its infancy. He said that initially this private sector was preoccupied with survival, but currently the focus is on competitiveness and productivity. He felt that Africa had a unique advantage in "eco-products" and that these should be the focus of their science and technology efforts. He recounted some success stories from Ethiopia, which included: the development of water drilling equipment capable of reaching 100 meters in depth; complete coffee manufacturing factories that were indigenously designed; and the production of rubber and plastic products using local machinery and equipment. He challenged participants to seek innovative ways by which ECA could help the private sector improve and grow.

(j) Statement by Mrs Margaret Nyandong, Commercial Attache of the Embassy of the Republic of Kenya in Ethiopia

23. Mrs Nyandong enumerated various efforts that the Government of Kenya was making in the area of science and technology. She said that Kenya was committed to the promotion of science and technology in view of its objective to become a newly industrialized country by the year 2020, and appealed to the ECA to assist her country in achieving its goal. In her enumeration, she mentioned Kenya's acquisition of technology through: indigenous research, direct foreign investment and patents; utilization of programmes developed by UNIDO and donor organisations; utilization of the services of the Kenya Bureau of Standards; pursuit of transfer and adoption of environmentally sound technologies; improvement of the country's infrastructure to facilitate technology transfer; and active support to the activities of the Kenya Industrial Research Institute. She also disclosed the Government's intention to set up a National Industrial Development Council to coordinate activities between the Government and the private sector.

(k) Statement by Mr Douglas B. McNeal, Regional Environment Office, US Embassy in Addis Ababa

24. He thanked the ECA for inviting him to participate as an observer in the First Executive Dialogue and explained that his desire to be part of the dialogue derived from his new assignment which covered 12 African countries in Eastern and Southern Africa. He said that his focus was on science and technology and that he will be looking forward to working in collaboration with the ECA.

Presentation of First Issue Paper: Research Institutions - Industry Relations within the National System of Innovation" (Agenda item 3)

25. The presenter briefly highlighted the various sections of the paper and raised and answered some questions which were not touched in the paper. In particular, the presenter wondered what roles could be played by ECA, African governments, trade associations, the Research and Development Institutions (RDI) in strengthening industry - collaboration. It was suggested that the ECA should, among other actions, (a) continue to sensitize African governments about the need to integrate Science and Technology policy into economic policy, and (b) take steps to promote the stimulation of technological innovation by disseminating some African success stories.

26. It was suggested that African governments should provide a favourable policy environment and take actions to support innovations. In particular, they should set up centres for engineering designs and manufacture to promote the development of indigenous capacity in these areas; organise institutionalized fora for regular dialogue and consultation among RDIs, government and industry to find ways and means to (a) assist entrepreneurs in specific identified niches; (b) develop industry - RDI collaboration in growth areas such as electronics, micro-processors, solar energy, information technology, material science and training in related skills; (c) utilize some of their procurement policies to promote RDI-industry linkages; and ((d) consider establishing Technology Clearing Houses to stimulate the demand side of the national economy for products of local RDIs which may have limited markets.

27. Some African success stories were also highlighted to show how such linkages had been forged in the past. The University of Science and Technology (Kumasi, Ghana) Technology consultancy Centre (TCC) ran a campus-based as well as an industrial estate based operation which resulted in the production of glue from local materials and the production of broader looms for Kente weaving respectively. An operation focused on small scale manufacturing of ceramics; foundry products for SMEs and training of technicians was carried out at the Industrial estate-based operation.

28. During the dialogue process participants drew on the experiences of their countries to enrich discussions. The intervention from the private sector participant from Tunisia highlighted the problems that his economy faced, and how these were addressed. He said that at independence, the country lacked critical technical skills; it had a rapid rate of population growth; agricultural production was stagnating; and only 60% of domestic consumption of meat was produced locally. He stated that the government pursued agricultural development through measures to increase cereal production which included: the identification of partners; targeted research; seed multiplication and distribution to farmers, and reliance on private sector initiatives. In particular, the covering of production deficit in meat was attained through private sector-research institution/networks that supported research, technology, feeds, and choice of species. He said that these results were attained because Agriculture had the highest priority for the country, and suggested that Africa should put this sector on the top of its priority list since development begins with food security. He added that the agricultural sector in Tunisia introduced the use of value analysis into the production system to identify and train the critical skills that were required.

29. Addressing the issues of isolation of research from industry, a participant drew attention to the need to identify the strategic industries Africa should engage in; the need to set food security as the highest priority in attaining competitiveness; the need to gear African research and development to adding value to the primary products that Africa produce; and the need to make the strategic goal of Research and Development (R&D) that of developing competitive advantage.

30. Several participants drew attention to the need to exploit the great potential of biotechnology in

It was felt that agriculture included many activities and could be the basis of Africa's long-term competitiveness. Other issues raised were those of irrigation and the fact that African agriculture is prone to droughts and floods.

31. Several questions were also raised. A member wondered why the "Dialogue" seemed to be dealing with minor issues, and suggested that attention be directed to big issues such as: (a) debt forgiveness and its effect on technological development; and (b) establishment of African own economic blocs. He also suggested that Africa's cultures needed a change to reflect the global issues affecting the continent.

Presentation of Second Issue: African Technological Development in the context of Globalization
(Agenda item 4)

32. The presenter highlighted the various characteristics of globalization and explained that trade liberalization represented one of the biggest challenges facing African countries in their technological development. He said that the Uruguay Round Agreement embodied several provisions, in this trend towards trade liberalization, which had important implications for Africa's technological development. He reviewed the main agreements which included those on industrial tariffs; Non-Tariff Barriers (NTBs); safeguards; subsidies and countervailing measures; agriculture; textiles and clothing; services; Trade Related Investment Measures (TRIMs); and Trade-Related Intellectual Property (TRIPs). He suggested that the expectation that the Uruguay Round Agreement (URA) agreements would lead to a freer flow of technology to developing countries was unlikely in view of many countervailing factors. He then suggested seven measures by which African countries could increase the impact of the URA for their technological development. These were (a) using the subsidy provisions to develop their human resource base; (b) investing heavily in social and physical infrastructure; (c) getting those who would benefit from the strict enforcement of the intellectual property provisions to pay for the legal and institutional infrastructure to enforce them; (d) creating industrial clusters that reflect niches of competitive advantage; (e) utilizing the millions of available free patents to access required technology; and (f) crafting innovative policies to woo direct foreign investment.

33. During the discussions, participants raised many issues. Among these were: (a) how were African countries going to expand their exports in face of the unlevelled playing field in the world market? (b) what were the implications of ignoring the "TRIPS" provisions for Africa? (c) what concrete measures could African countries follow to woo direct foreign investment? (d) what could Africa do about the heavy debt overhang which was preventing infrastructural investment? (e) concrete measures could African countries take to access available free patents? and (f) why should Africa be bothered that the developed countries are subsidizing their agriculture since Africa can not afford to subsidize and it helped food security if cheap subsidized imports were available? and why debates should be on food security instead of food self-sufficiency?

34. The presenter suggested that the expansion of exports was critical and difficult but was not impossible. He said it could be done by choosing niches in biotechnology; adding value to their basic raw materials; exploiting existing subregional trading blocs; and taking a long-run view of their competitive advantage. Regarding the suggestion that TRIPS be ignored, he said he was convinced that African countries should not spend their meagre resources enforcing TRIPS for the benefit of others. Rather they should let beneficiaries pay for the infrastructure since the promise of freer technology transfer through strict TRIPS enforcement was not borne out by the evidence. To woo more Direct Foreign Investment (DFI), the presenter suggested that special attention be paid to improvement of legal, social, political, and physical infrastructure. Without these, DFI would continue to elude Africa. He said that Africa needed

projects, users could be made to repay such debts. On the access to available patents, he suggested that efforts should be geared to screening and selecting relevant patents and disseminating these to prospective users through electronic and print media. He disagreed with the argument that Africa should not subsidize its agriculture but should enjoy the free ride of others' subsidy. He felt that every country that had made significant technological progress had preceded this with an agricultural revolution. He also felt that agriculture was still being subsidized, but the wrong things which did not affect productivity or efficiency were being subsidized e.g. purchase of expensive vehicles which are not used in the farms. He said it was possible for a country to have food self-sufficiency while sections of the society remained vulnerable and food insecure.

Presentation of the Third Issue: Information and Communication Technology in Support of Food Security and Sustainable Development (Agenda item 5)

35. The presenter called attention to the tremendous changes taking place as a result of the Information and Communication Technology (ICT) and emphasized the urgency of ensuring that Africa is not sidelined in the process. She then highlighted the role that ECA was playing to promote ICT which culminated in the endorsement, by the ECA Conference of Ministers, of the African Information Society Initiative (AISII). She explained that this was an action framework to build Africa's information and communication infrastructure. She then mentioned the challenges and opportunities of some priority areas such as job creation, health, education and research, culture, trade and commerce, tourism, food security, gender and development, and man-made crises and natural disasters. She emphasized the need for African leaders to rearrange their priorities to ensure that rural areas get the infrastructure that enables them to be part of ICT. She showed that if that was done, ICT would support science and technology development, and food security and sustainable development. She highlighted areas in which ICT could be beneficial to science and technology such as distance education: connecting educational institutions to national and international facilities, databases, libraries, research laboratories and computing facilities; reducing costs; promoting collaboration among educators and researchers; and extending continuing education to rural communities. With respect to food security, the presenter identified several areas in which ICT could make critical contribution. These included the establishment of information systems to monitor market performance and ICT networks for efficient marketing; development of systems dealing with the food chain; provision of equitable access to new techniques of agricultural production; and efficient distribution to reduce post-harvest losses. She listed several actions that could be taken to actualise these benefits. She said that capacity building, awareness raising and infrastructural development were prerequisites for enjoying the benefits.

36. During the dialogue process, several issues were raised. Participants wanted to know (a) if ECA had the capacity to cope with requests from member States for the development of their ICT infrastructure; (b) a participant wanted to know the extent to which electronic commerce was a reality; (c) to what extent could ECA go beyond awareness creation to begin to address the infrastructural constraints of ICT? and (d) participant wanted to know how ECA partnerships for ICT were forged. The presenter informed participants that since the range of ICT applications was wide, it was necessary for member States to define their objectives and prioritize these so as to apply their limited resources to targeted areas of highest need. She said that certain aspects of electronic commerce were a reality such as sales promotion; communication with customers; exchange of information; and the determination of investment opportunities. She said that actual transactions were still constrained by security issues of privacy and fraud. The presenter told participants that the AISII network was meant for information sharing; joint implementation of projects and the forging of partnerships. As to how partnerships were developed she named some of the partners of ECA in the ICT initiative and the means by which the partnerships were actualized. She recalled that a

participants and partners.

Issues for ECA's Consideration (Agenda item 6)

37. At the end of the First Executive Dialogue the following issues were identified for ECA consideration.

1. ECA should promote the provision of "real services" to small and medium enterprises for their technological development. These services include:
 - quality control and certification;
 - engineering design and manufacture;
 - the provision of supportive high technology services;
 - bulk procurement of inputs.
2. The funding of science and technology activities should be increased at the member country level; ECA should spearhead activities that can expand the funding base for science and technology:
 - Country science and technology foundations to which private individuals and organisations, and the Governments can contribute.
 - Special levies for science and technology.
 - Debt conversion to science and technology projects.
3. ECA should promote the networking of science and technology institutions, the compilation and dissemination of databases on research and development activities and the identification and encouragement of centres of excellence as a means of promoting subregional cooperation.
4. ECA should identify the science and technology priorities of members States and assist them to develop core competencies in areas of comparative advantage.
5. ECA should screen available free patents relevant to specific needs of member States (for example food storage, and processing and environmental conservation) and compile and disseminate a database of such patents.
6. ECA should encourage member States that do not have science and technology policies to develop them. In particular, technology policy should be effectively integrated into national development policies and programmes.
7. ECA should spearhead regional research on technology policies that have cross-country implications in the context of globalization. Examples of themes for such studies are:

- the innovative behaviour of research and development institutions in the context of current rationalization in Africa:
 - the study of technological dynamism in small, micro and medium enterprise clusters around Africa - causes of dynamism and methods of accelerating dynamism.
8. ECA should promote RDI - industry linkages with special reference to small and medium enterprises.

Adoption of the report

38. The draft report of the dialogue was considered by participants and a number of amendments were made. At the end of the discussions, adoption of the report was proposed by the Honourable Minister of State for Finance, Planning and Investment of Uganda. He was seconded by the Honourable Deputy Minister of Environment, Science and Technology of Ghana. Participants adopted the corrected report unanimously.

Closing

39. Closing remarks were made by the United Nations Under-Secretary-General and Executive Secretary of ECA. In his remarks, he reiterated the reason for organising the dialogue. It was for ECA to find a strategic niche where it will make a contribution rather than duplicate what other institutions were doing better. It was also to forge partnerships, sharpen its vision and build a framework for its operations, to better serve its member States. He thanked the Honourable Ministers, Private Sector and other participants and commended them for their commitment to the cause of African development.

40. The Chairman of the Advisory Board who moderated the dialogue process thanked the Executive Secretary for the opportunity offered to participants to dialogue and the initiative taken by ECA. The dialogue was officially closed at 7:15 p.m. on 19 June 1998.

Remarks of His Excellency, Mr Hamid Zaouche, Ambassador Extraordinary and Plenipotentiary of Tunisia in Addis Ababa

Messrs Ministers.

Mr Executive Secretary of the ECA.

Excellencies.

Ladies and Gentlemen.

Allow me at the outset, to express my deepest thanks to the Economic Commission for Africa and more particularly to Mr Amoako for his kind invitation and his timely initiative to organize this first Executive Dialogue on Science and Technology for Africa's Development.

The organisation of such a meeting proves, once again, the Economic Commission for Africa's firm commitment to resolutely direct its action to the real problems our continent is facing. Nothing is more crucial in this period of deep changes than the development of scientific research and technology control which is the core of industrial development of modern Nations and their social, economic and cultural growth.

The introductory lecture by Professor Paulina K. Makinwa-Adebusoye has allowed us to acquaint ourselves with the real problems and to make the pertinent analysis of:

- the relationship between industry and research institutions;
- the technological development in Africa within the context of globalization; and
- the information technology in support of food security and sustainable development.

These three items are priorities for the majority of the countries of our continent.

New perspectives available within the context of the globalization of markets and economies, make it imperative that we turn Science and Technology into a national priority, to which appropriate means should be evolved.

It is my pleasure to underline that on her part, Tunisia of the New Era, is firmly committed on this path, being aware that there can actually be no sustainable economic and social development without strong integration of scientific research in this process.

Allow me, in this connection, to state very briefly, some Tunisian innovations:

- the setting up in 1991 of a Secretariat of State of Scientific Research and Technology under the chairmanship of the Prime Minister's office;
- a yearly budget increase of around 15% devoted to research, since 1992. Today, it is around 1% of the State budget and 0.4% of GDP;
- the launching of mobilizing national programmes, with the participation of several laboratories in various fields, such as agriculture, health, environment, energy, computer science, telecommunications, etc.;

- development of research structures through the setting up of a number of institutions in new sectors such as physio-chemical analysis, tele-detection, biotechnology and nuclear energy;
- the setting up of an electronic network of research and technology, to facilitate scientific information and exchanges between researchers;
- the setting up of financial incentives to reinforce the relationship between research laboratories and enterprises; and
- the introduction of procedures for periodical evaluation of research activities.

Although a lot has been done, we are fully aware that a lot remains to be done in order to establish an innovative national system completely integrated and performing smoothly.

Despite the wide gap which still exists in the levels of development prevailing amongst our countries and peoples, we must strive to turn science and its results into binding factors between us.

In Tunisia, we strongly believe that we are capable of giving a different image of our continent and of proving that we are perfectly able to take full advantage of technological innovations so as to win the battle of economic and social development.

We are equally convinced that this first dialogue will allow us to lay the foundation of a real and effective collaboration with all concerned countries, thanks to durable and basic processes, such as human resources training, access to scientific and technical information, development of research infrastructures, the management of common projects of research and the realization of collective evaluations.

I wish, in conclusion, to once again thank the ECA for its welcome initiative to which Tunisia fully subscribes.

Thank you for your attention.

Presentation by Dr Farouk Brimah, Deputy Minister, Ghana Ministry of Environment, Science and Technology

Chairman,
Your Excellencies,
Honourable Ministers,
Distinguished Invited Guests,
Ladies and Gentlemen,

I bring to you warm greetings from Ghana.

I am Dr Farouk Brimah, a Deputy Minister of the Ghana Ministry of Environment, Science and Technology responsible for science and technology. I am a Member of Parliament and a Political Scientist.

Let me first of all on behalf of the Government of Ghana apologise for our late arrival to the Conference. In as much as we tried to be there on the opening day, we could not make it due to conflicting national assignment. Because of our national commitment to science and technology, the Government deemed it necessary for us to come. We are here this morning to participate in the final deliberation. Thank you.

Ghana is pleased to be associated with the First Executive Dialogue of Ministers and Leaders in the Private Sector on Science and Technology for Africa's Development.

Ghana, just like its sister African nations has fully endorsed the fact that science and technology is the key to present day national development. As such we have been trying hard to improve our science and technology infrastructure, build capacity in our science and technology institutions, etc. all in the name of making science and technology the cornerstone of our national development process. Despite these efforts, we are still encountering problems which I wish to share with you.

Problems and Concerns of Ghana in Science and Technology

1. Challenges of Globalization to Ghana's Competitiveness on the World Market

The lifting of trade barriers implies the unrestricted importation of foreign goods some of which are at prices far lower than local products. Technologies will be required to lower production costs as well as enhance product quality to global competitive levels. Indigenous capacities will have to be developed to meet International Standards Organization ISO 9000 (Production Systems) and ISO 14000 (Environmental Quality Standards) demanded by World Trade.

2. Challenges of new information and technology age

Information is now a powerful tool worldwide and those who have the right information and timely, have an edge over those who do not have it. The rapid access and dissemination of information by electronic means is a driving force for competitive production and access to markets. It also facilitates in-country rapid dissemination of information for informed decision making. The challenge is how to bring these new technologies (e-mail, internet, satellite communication, etc.) to the grassroots level in the present decentralized form of Government.

3. Formulation of Nation Science and Technology to address the Requirements of Ghana's Vision 2020

Ghana's Vision 2020 calls for the nation to become a medium income country where at least the per capita income is \$2,000.00 by the year 2020 and for science and technology to lead national development efforts. The private sector is to be the engine of growth. A vibrant science and technology policy to address science and technology capacity building and the creation of other enabling environment for a science-led development is a challenge to the country.

4. Problem of Institutional Linkages between Public Sector Science and Technology Institutions and the Private Sector

The key public sector institution for science and technology research in Ghana is the Council for Scientific and Industrial Research (CSIR) and to a lesser extent the Universities. As at 1996, the CSIR was by law requested to commercialize its research and development. To enable the CSIR cope with this paradigm shift, the Ghana Government has contracted a World Bank loan to assist in the restructuring of CSIR for delivery to the private sector.

The CSIR of Ghana is currently addressing this new requirement with the view to generate a minimum of 30% of its total annual budget through research and development commercialization. I am therefore pleased to note that this major initiative of the Government of Ghana is also a subject for our deliberations during this meeting.

5. Enhancement of Agricultural Productivity and its Linkage with the Agro-Processing and Marketing Sector

Ghana's agriculture is beset by annual fluctuations in response to the vagaries of the weather. Also the instability of the market due to alternating bumper harvest and drought situations have resulted in a net lowering of agricultural productivity. Technologies to maximize crop production with given inputs, post harvest and agro-processing technologies to enable the storage and stabilization of food supply are challenges facing the agricultural sector. Irrigation techniques in accord with growing farm income levels will be needed.

Chairman, it is my hope that technologies which will enhance productive capacity of our industrialists whilst ensuring food security and poverty alleviation will be addressed by this August body.

Thank you very much.

Statement by His Excellency, Mr Simataa Akapelwa, Ambassador Extraordinary and Plenipotentiary of Zambia on the occasion of the First Executive Dialogue of Ministers and Leaders in the Private Sector on Science and Technology for Africa's Development, 18 - 19 June 1998

National Programmes on Science and Technology

1. Introduction

The Government of the Republic of Zambia, through the Ministry of Science, Technology and Vocational Training (MSTVT), has successfully developed a National Policy on Science and Technology. This was done in order to improve coordination and funding of science and technology programmes and activities. The mission of the Policy is to promote and exploit science and technology as an instrument for developing an environmentally friendly indigenous technological capacity for sustainable socio-economic development in order to improve the quality of life in Zambia.

The policy was approved by Cabinet in 1995. Following the approval of the policy, the MSTVT

Science and Technology System. The Bill was passed by Parliament in October, 1997 and has since become an Act N° 26 of the Laws of Zambia. The MSTVT, through the Department of Science and Technology, has started the process of implementing the Science and Technology Policy by undertaking various programmes and activities.

2. Objectives of the programmes

The Department of Science and Technology has spelt out long term objectives which are to:

- ensure the entrenchment of science and technology as part of the culture of the productive sector; and
- ensure competitiveness in the production of a wide range of quality goods and services.

These objectives are being achieved through the following programmes:

- Scientific and technological rationalization;
- Science and technology promotion; and
- Scientific and technological database creation.

The activities that are being undertaken in these programmes are explained below:

3. Activities

3. 1. Creation of the Science and Technology Council (NSTC)

A number of autonomous Research and Development Institutes will be created during the process of rationalization of the Science and Technology System. The first institution that will be created very soon is the NSTC. This will be the coordinating body for all science and technology activities in Zambia. It will be an umbrella body under which all research and development institutes that will be created will fall. The next two institutes that will be formed within this year are the National Institute for Scientific and Industrial Research, (the current laboratories of the National Council for Scientific Research). The Science and Technology Institute for Soils and Crops (the current agricultural research branch of the Ministry of Agriculture Food and Fisheries). Statutory Instruments for the creation of these institutes have already been written. Other institutes are going to be created at a later stage when appropriate statutory instruments are written.

3. 2. Science and Technology Conferences

As part of the promotion of Science and Technology in Zambia, the Department of Science and Technology has included two national conferences on Science and Technology in the activities of 1997/98. The purpose of the Conferences is to promote interaction among stakeholders from Government, Industry, Education, Research and Non-Governmental Organisations (NGOs), so that they can review Zambia's performance in research and development since independence and recommend how research and development should be carried out so that the findings can be applied in the productive sector.

The First Conference was held in August, 1997 in Siavonga. The theme of the Conference was "The Role of Science and Technology in the Socio-Economic Development in Zambia." The participants came up with the following resolutions:

- Science and Technology should be allocated at least 5% of the GDP instead of the current 0.1%;
- Government should introduce measures that will promote the involvement of more women in the application of science and technology in various sectors of the economy;
- Existing research and development institutions should be encouraged to carry out research and development that is tailored to the needs of the small and medium scale entrepreneurs, as well as participating directly in entrepreneurship development. The economic scenario in Zambia is such that small and medium scale entrepreneurs are increasingly becoming the key players in the economy. Therefore, in order for them to be able to compete favourably in the global economy, they should be encouraged to apply appropriate science and technology in their production processes;
- Science and Technology Institutions should be more proactive and adopt a business like approach which should include the establishment of support institutions that would market research products.

These resolutions were submitted to the MSTVT for action. The Ministry is addressing these issues, some of them in consultation with other line Ministries. The second conference is being held in Livingstone, 16 - 20 June 1998. The theme of the Conference is "Focusing Scientific Research and Technological Development on priority areas; and identifying Incentives for the Development and Application of Science and Technology in Zambia." Two of the objectives of the Conference are to:

- determine incentives for promoting private investment in science and technology; and
- determine incentives for technology providers and technology use.

It has been realised that one of the contributing factors to the poor performance of the productive sector is the general lack of research and development in their operations. However, the establishment of research and development sections, particularly in small scale enterprise, their operations can be very costly. Therefore, there is need for small scale enterprise to enter into partnership with research and development institutions so that the latter can carry out research on behalf of the former on contract basis. Another issue to be dealt with at the Conference is the identification of priority to provide the required technologies for their development and enhancement of production.

3. 3. Science and Technology Capacity Assessment

This activity is being undertaken in order to assess the capacity of Science and Technology in Zambia. In this context, capacity includes human resource, infrastructure, and processes and methodologies that are employed in various scientific and technological activities.

There is need to know the capacity in the Science and Technology System in order to establish the

in stages. The first stage is to assess the capacity within the research and development institutions and then move to industry and educational institutions.

3. 4. Science and Technology Public Awareness

The purpose of this activity is to promote science and technology by enlightening the public on the role of science and technology in socio-economic development, and hence cultivate a scientific and technological culture in Zambia in the context of science and technology, the public includes policy making authorities and the politicians.

Awareness campaign is being done through radio and television interviews, panel discussions, and play acting. Science and technology slogans have been printed on T-shirts and caps which are being sold to the public.

Statement by Dr S. Shaw, Charge d'Affaires of the South African Embassy in Addis Ababa on the Science and Technology Policy in South Africa

Science and Technology is a priority area of cooperation in South Africa's relations with other African countries. We have just made a voluntary contribution of US\$25,000.00 to the UNECA specifically for science and technology development in Africa. Just a few months ago a science and technology forum took place in Cairo at which South African and Egyptian scientists deliberated on science and technology cooperation. In South Africa, the present calendar year has been declared the Year of Science and Technology in order to publicise the role of science and technology in the development process.

Science and technology policy was first articulated by President Mandela in May 1994 when he linked it to human dignity and to the creation of a people-centred society. Other cornerstones of the policy are innovation, a performance-driven culture, improving quality of life and enhancing economic competitiveness.

Research and development has regrettably decreased from over 1% of GDP in the eighties to around 0.7% at present. Interestingly, the private sector contributes 54%.

In January 1996, the Government published a Green Paper on science and technology, inviting citizens to participate in the paper as a discussion document. Using these inputs a White Paper was published later in 1996 and copies will be made available to participants.

A number of international science and technology cooperation agreements have also been signed in the past few years. Countries include UK, USA, Russia, EU, Germany, Italy, France, Netherlands, Flanders, Israel and Croatia.

Eight statutory bodies oversee the implementation of national science and technology policy. These are Agricultural Research Council, Council for Scientific and Industrial Research Foundation for Research Development, Mineral Technology Council, Human Sciences Research Council, Medical Research Council, Council for Geoscience, South African Bureau of Standards.

Apart from these statutory bodies, there is research in other areas such as the antarctic, energy,

metallurgical areas and in industrial and information technology.

Presentation by Mr Naresh S. Mehta, Managing Director, Power Technics, Nairobi, Kenya

Introduction and historical background

Power Technics Ltd. was incorporated in Kenya in the year 1982. The directors who are also shareholders of the company are qualified engineers in the field of electrical engineering and mechanical engineering.

The initial capital of the company was US\$500 with present capital at US\$100.000.

The company has achieved a growth over last fifteen years with turnover exceeding 10 million dollars out of which 2 million is from exports.

The company employs 160 people with qualified technicians and engineers. The company after incorporation in 1982 went through a transition when the directors decided to venture into local manufacturing of electrical switchgear products incorporating components from principles it represented in the region.

Technology planning and acquisitions

In the next millennium, sustainable competitive advantage will come much more from process technology and re-engineering and much less of new product technology. There is some hope for African countries to catch up with developed countries.

Because the business environment is changing at an unprecedented speed. Corporations must continually re-invent train and stay competitive.

With effective training and technology planning organizations have a powerful instrument to enhance enterprise competitiveness.

It is important to identify the critical technological needs and analyze their strengths in enhancing the growth of the enterprise.

In our experience the market demand laid the foundation for our technical needs and plan for technology acquisition.

While many companies were embracing the old technology for manufacturing, our company decided to acquire the best available technology machine using CNC (Computer Numerical Controls) technology. This was done with machines used in developed countries.

Difficulties were encountered in procurement of the technology especially importing such machines in Africa.

Many companies in Europe declined to quote or answer the enquiry from Africa, at such demand for "CNC" machines was new and unheard off from Africa. The machine manufacturers were afraid of

We demonstrated our will to maintain the stock of spares and undertake training in France. Also the bank were not willing to finance such technology due to high technology and inability to dispose such asset in case the company failed to perform. With collateral and high interest rate our company managed to negotiate loan and purchased first set of CNC machines in 1990.

Today the company has ordered 3rd set of such machines and now the suppliers are more than willing to deal with our company due to past track record and ability to service the loan.

One can negotiate long credit terms and use EIB, (European Investment Bank) for such purchases.

The machines have helped to change the destiny of our company and drive it towards export market in the region.

Competitive product for regional/global market

With industrial production and trade liberalization new demands have emerged for the products to be competitive and compliance to international quality standards.

Competitiveness is increasingly dependent on the technological level in each sector of the economy and manufacturing process for the particular products.

With rapid pace of industrialization for African countries, time is running out and many countries will fall behind due to various constraints in the path to industrialization.

There are basic requirements like, road, electricity, water and telephones, which brings a conducive environment for investment.

Infrastructure is a basic requirement for any successful industrial venture. An enterprise can invest in the new technologies at par with developed countries and produced goods with very high productivity.

The cost of poor infrastructure in transporting the finished product and receiving raw materials in time constitutes an added cost on the final product.

This would make companies uncompetitive against international competition.

The pace of industrialization will depend not in the ability of enterprise to acquire new technology but on the infrastructure.

Towards industrialization Visions of 2020

We recently celebrated another small passing from one year into another. Goodbye 1997 and Hello 1998.

We are now closer to celebrating a new century and a new millennium. What will life be in the year 2010, 2020 or 2030? We all must be thrilled at the prospect of living in the new Century!

For a preview, we must look at past, say 100 years back. Compare life in 1998 with the World in 1898! - incidently, the year my Grandfather set foot on this soil and today we are fourth generation looking ahead to next millennium.

While there were a few automobiles on road and no electricity in major parts of the World and most of the work tasks were done by muscle power, our World has since changed to what we see today. Every country targets vision and sets in motion the wheels of economy which will drive it through the next millennium. What have we done in Kenya?

Kenya has embarked on the road to industrialization by the year 2020.

Industry is a basic instrument for both economic modernization and sustainable long lasting development. While industrialization is increasingly market-driven government and indeed the World community continue to have a decisive role in furthering sustainable industrial development.

Universally, there is a compelling demand to speed up industrialization, especially when agriculture tends to dominate the national economy.

Business requires a conducive climate in which to flourish, but something has to be done to overcome market weakness such as in the field of environment or funding small industrial enterprises and training.

We all have a role to play in training our new and upcoming graduate engineers. Power Technics is an active participant in this drive and trains engineers and technicians, who are either absorbed by the company or the industrial sector.

Statement by Mr Margaret Nyandong, Commercial Attache of the Kenyan Embassy in Addis Ababa

Kenya is committed to the promotion of science and technology in view of its objective to become a newly industrializing country by the year 2020. An objective which the ECA should assist Kenya in achieving through technical assistance.

Kenya acquires technology through indigenous research and development, direct foreign investment and patents accessed from the Kenya Industrial Property Office.

In acquiring technology, Kenya aims at creating employment, achieving competitiveness in international markets and adopting appropriate technologies suitable to domestic conditions.

Kenya utilises programmes developed by the United Nations Industrial Development Organisation (UNIDO) and donor organisations meant to promote technological transfer.

The country further utilises the services of the Kenya Bureau of standards for standard development, testing and quality control.

Kenya is a proponent of the transfer and adoption of environmentally sound technologies. Currently the law on environment does address itself to liability for the victims of pollution and other environmental damage. Every technology imported or developed locally must be environmentally sensitive

In an effort to access technology, the Kenyan Government is committed to improving infrastructure. The Kenya Industrial Research Institute (KIRDI) for instance has a leather testing facility and an engineering development and service centre which carries out design and production of engineering tools, jigs and fixtures. KIRDI has also conducted research on improving the quality of coffee processing.

As indicated in the current development plan, Government aims at establishing the National Industrial Development Council which will be a collaborative effort between Government and the private sector aimed at addressing emerging needs and challenges to industrial development. The NIDC will also provide strategic information to enterprises on markets and new technologies and the nature of competitiveness. The organisation will undertake specialised programmes to encourage healthy competition and hold national awards for quality production and export achievements.

Kenya's private sector is committed to producing quality products and undertaking quality production in the face of globalisation. The Government encourages the promotion of SMEs for job-creation; SME's are funded by organisations such as the Small Enterprise Finance Company.

Statement made by Mr Adane Gudina, Acting Secretary General of the Ethiopian Chamber of Commerce

Excellencies, Ladies and Gentlemen

Our historical memory tells us that, Ethiopia was the Centre for ancient civilization. However, it did not bring the country into continuous development due to the fact that, the country kept itself almost isolated from the rest of the world in relation to development.

Towards the end of 1960's and early 1970's, there were discernible economic signs which showed the country was moving out of economic backwardness to modest economic progress. Agricultural exports were booming. Industrial production was expanding. As a whole private sector was becoming more and more vibrant and dynamic than ever before.

With the fall of the then government, there came the 1975 nationalization of the private capital. The private sector not only lost its property, but almost lost its spirit, zeal, dynamism and vision - for 17 solid years, the private sector went into forced hibernation. During this period, the experiences gained in domestic and international business was lost. Private investment and trade was not allowed in many economic activities and curtailed in others to only inefficient public investments.

The community learned business in battle fields of practical business and commerce without developing its business management capacity building. It lost world trade trends and development.

The 1991 change of government was not only change of government; it was also a change of economic and political philosophy. As the business community totally forgot almost all export/import trade practices, it wrongly thought that free market means a free ride to a free lunch. The business community did not realize that free market means cut-throat competition which requires vigilance, and being equipped with the latest business knowledge and practices, as the world is getting into a small globe.

Excellencies, Ladies and Gentlemen,

From the aforementioned descriptions, the past Government policies had great negative impact in acquiring technological developments into the country. The "Derg" regime with its socialistic move was not successful by any standard, even from the socialist block criteria, as the economy was only catering civil war.

The current government policy towards economic development is geared towards technologies acquiring labour, rather than those which are highly technology demanding, as the nation has more than 85% of the population in the rural part of the country who are mostly unemployed and under-employed. Hence, the economic policy favours the small and medium scale enterprises. As a result, a lot of entrepreneurs and enterprises are mushrooming nowadays in unbelievable degree.

On the other hand, users of technologies in the production and service giving industries in this country are either ignorant or not aware about the degradation they cause to the environment. Most industries in Ethiopia do not even have plants that treat industrial wastes, although the government proclaims environmental protection a priority; when there is no national environmental action plan to be put into action.

Excellencies, Ladies and Gentlemen,

To summarise, entrepreneurship development in Ethiopia is still in its infant stage although it started to play the major role in the economy. Development of world standard competitive entrepreneurs has to be the driving force for Ethiopian economic policy. Similarly, the use of appropriate technology that hires large amount of labour in the foreseeable future has to be the focal point. That is, SME's have to be the present Ethiopian economy developer's choice. Moreover, the entrepreneurs need more access to credit facilities to acquire science and technology to be competitive.

As there is lack of skilled man power in the economy, it requires a great deal of work in the development of human resource.

The Ethiopian government and the Chamber have geared their efforts towards the realization of these phenomena. And the Ethiopia Chamber of Commerce is taking some strides to train entrepreneurs.

The Ethiopian Science and Technology Commission has started financing scientific researches that have goals towards SME's development and sustainable economic growth which we acknowledge full hearted. Finally, I would like to say, that, the scientific community has to seek common cause with the general public to a much greater extent in order to achieve a multiplier effect from the wider adoption of more sustainable technologies by creating networking throughout Africa. Without a competitive technological development, African economy will be lagging behind the world.

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