

"LAW OF THE SEA CONVENTION - THE EMERGENCE OF A NEW LEGAL MECHANISM FOR THE TRANSFER OF TECHNOLOGY TO DEVELOPING COUNTRIES."

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Introduction

(i) Brief Survey of Transfer of Technology issues in International Negotiations

The transfer of technology from the industrialized developed countries to the developing countries, is perceived as a major factor in achieving the development objectives of the Third World. The UNCTAD Report, "An International Code of Conduct on Transfer of Technology" (1) referring to the objectives of the developing countries, states that the task of the Code is, "to restructure existing relationships between suppliers and recipients of technology, so as to facilitate the Third World's access to the accumulated promise of mankind's scientific and technological achievements."

The desire to restructure the existing legal relationship between the suppliers and recipients of technology has been motivated by an awareness on the part of the developing countries, of their technological dependance on the industrialized countries, a dependence, further accentuated under the existing legal mechanisms for the transfer of technology.

The existing legal mechanisms for the transfer of technology are usually in the form of direct foreign investments, joint ventures and licensing agreements. These mechanisms, particularly the licensing agreements, contain restrictive conditions for example, restrictions on research and development, restrictions on use of personnel and adaptation, restrictions on exports, price-fixing and exclusive sales or representation agreements and a host of similar constraints, which on the one hand, accelerate the high cost of technology to the developing countries and on the other, increase the technological dependance of these countries, thereby prejudicing their efforts to achieve an indigenous technological capability.

Surendra J. Patel, in his paper "The New International Economic Order and the technological transformation of the Third World",⁽²⁾ draws an interesting analogy between the leasing of land under feudal conditions and the transfer of technology under the existing legal mechanisms.

"...Then landlords owned the land which was cultivated by serfs, share-croppers or tenants-at will. These cultivators did not enjoy fixity

(1) U.N.Doc.TD/B/C.6/ACI/2/Suppl.1/Rev.1,3(1975).

(2) Surendra J. Patel, "The New International Economic Order and the technological transformation of the third world - A paper presented at the workshop on the NUSC-Hague Academy of International Law - *See Academie De Droit International*, 1980-
pg. 221, at. 225.

of tenure, ... or in general invest labour and resources in the improvement of land from which they would be entitled to benefit. No wonder, a complete restructuring of the legal fabric of land relationships in Europe had to precede the modernization of both the techniques of the agricultural production and the management of farms ... There is a parallel between leasing of land under feudal conditions and technology transfer now. Technology is generally leased, not sold. The agreements for the transfer of technology contain several restrictive practices ..."

Underlining the need to liberalize these restrictive conditions which govern the unequal relationship of the "landlords" and "tenants" of the present day "technological feudal order" the developing countries have launched several important initiatives, directed towards the re-structuring of the existing legal mechanisms governing the transfer of technology. These efforts of the developing countries, must necessarily be viewed in the wider perspective of their efforts to restructure the entire North-South relationship.

As far back as 1961, General Assembly Resolution 1713 (XVI) of 19 December 1961,(3) called for "a study of the effects of patents on the economy of under-developed countries." The Resolution also requested, inter-alia, an analysis of the patent legislation in least developed countries in the light of economic development objectives. In 1964, the Secretary-General of the U. N. in his report "The Role of Patents in the transfer of technology to developing countries"(4) underlined the need to counter the difficulties experienced by developing countries, in gaining access to appropriate technologies.

An important landmark in the initiatives of the developing countries was the UNCTAD III Conference, held in Santiago, Chile, in 1972, which endorsed the work of the UNCTAD and of the Inter-Governmental Group on Transfer of Technology. The Conference called on developed market economy countries to improve the means of access to technology by the developing countries as well as the terms and conditions under which the technology could be obtained.

The culmination of these initiatives was reached with the inclusion, in the Declaration on the Establishment of a New International Economic Order, NIEO at the Sixth Special Session of the UNGA in 1974, one of the principles on which the NIEO should be founded was:

"giving to the developing countries access to the achievements of modern science and technology and promoting the transfer of technology and the creation of indigenous technology for the benefit of the developing countries in forms and in accordance with procedures which are suited to their economies,"(5)

(3) U.N. Doc. TD/B/AC.1/12 (1974).

(4) U.N. Doc. E 3961 (1964).

(5) Resolution 3201 (S - VI) General Assembly, Official Records, Sixth Special Session, Suppl.No.1.(A/9559) Paragraph 4(p).

The Programme of Action on the establishment of a New International Economic Order, elaborated the measures required for an effective transfer of technology to developing countries.(6)

These measures lay emphasis, inter-alia, on the need to adapt technology to the varying stages of development in the developing countries and on the creation of suitable indigenous technology within these countries. The Programme of Action called for the formulation of an International Code of Conduct for the Transfer of Technology and to adapt Commercial practices governing transfer of technology to the requirements of the developing countries.

The initiatives of the developing countries for better terms in respect of transfer of technology for its social and economic development, received further impetus, with the adoption, at the Twenty Ninth Session of the UNGA, in December 1974, of the Charter of Economic Rights and Duties of States.(7) Article 13 of the Charter relating to transfer of technology, refers to the following:

"...In particular, all states should facilitate the access of developing countries to the achievements of modern science and technology, the transfer of technology and the creation of indigenous technology for the benefit of the developing countries in forms and in accordance with procedures which are suited to their economies and their needs."

A direct consequence of these initiatives, was the convening by the UNGA in 1977, of an international conference under the auspices of UNCTAD, to formulate a code of conduct for the transfer of technology.

Negotiations at the UNCTAD over the past several years reveal that, although agreement has been reached in several areas, major differences still exist, between the developed and developing countries on several fundamental issues with regard to the code. The key outstanding issue concerns the determination of "restrictive business practices" to be prohibited by the code. The Group of 77 and the developed countries have presented separate drafts on the proposed code. The Group of 77 draft lists some forty items to be categorized as "restrictive business practices." (RBPs)(8) This has not met with the approval of the developed countries.

In order to achieve a satisfactory compromise, the developing countries have shown at the UNCTAD negotiations, a sense of compromise and flexibility and have been willing to accept the code, even without its legally binding character, as a code of voluntary guidelines, provided the developed countries were prepared to accept some of the outstanding fundamental issues such as the definition of RBPs. However, these efforts of the developing countries have not been matched by a similar response on the part of the developed countries.

The Paris Convention of 1883 governs patents, trade-marks and other industrial property. The provisions of this Convention still apply to the technology transfers of the present day and is weighted towards the protection of the rights of the owners of technology.

(6) Resolution 3202 (S - VI) General Assembly, Official Records, Sixth Special Session Suppl.No.1.(A/9559).

(7) A/RES/3281 (XXIX).

(8) U.N. Doc.TD/CODE TOT/13 - 12 May 1981.

The UNCTAD Report on "The International Patent System as an Instrument of Policy for National Development"⁽⁹⁾ states that the Convention represents "a reverse system of preferences" granted to foreign patent holders in the markets of developing countries.

Discussions have been initiated within the UNCTAD and WIPO to balance the monopolistic rights of patent holders with an obligation on their part to respond to the broader interests of developing countries, by facilitating the use of patents and by restricting abusive practices in licensing agreements.

These issues, as in the code of conduct negotiations, have proved to be the key areas of fundamental difference between the developed and developing countries, retarding the substantive progress of the negotiations.

(ii) **Preliminary initiatives in the United Nations, leading to the convening of UNCLOS III.**

The tremendous technological developments that took place in the post-war era, with regard to the exploitation of ocean resources, prompted a parallel initiative by the developing countries which underlined on the one hand, their awareness of the vital importance of ocean resources for their economic development, and on the other, an appreciation of the need to have access to marine technology, science and skills, in order to effectively utilize and develop these resources.

The forum for this parallel initiative was once again the General Assembly of the United Nations. UNGA Resolution 2172(XXI) of 6 December 1966 on Resources of the Sea requested the Secretary-General of the U.N. to undertake, "a comprehensive survey of activities in marine science technology, including that relating to mineral resources development." Pursuant to this resolution, a report on "marine science and technology, survey and proposals"⁽¹⁰⁾ was prepared by the Secretary-General.

A series of similar resolutions were adopted in the U.N. in the succeeding years, which clearly demonstrated the concern of the developing countries in the acquisition of marine scientific knowledge and technology for the effective utilization and development of the ocean resources.

These preliminary efforts culminated in the adoption in the United Nations of Resolution 2749(XXV) of 17 December 1970 on the Declaration of Principles Governing the Sea-bed, Ocean Floor and the Sub-soil thereof beyond the limits of National Jurisdiction. The Declaration, adopted unanimously, incorporated the historic "common heritage" principle propounded for the first time in 1967, by Ambassador Arvind Pardo of Malta. In Article 9, it is declared that:

(9) U.N.Doc.TD/B/C.6/AC.2/3(1974).

(10) U.N.Doc.E/4487.

"... The regime, inter-alia, provides for the orderly and safe development and rational management of the area and its resources and for expanding opportunities in the use thereof and ensure the equitable sharing by States the benefits derived therefrom, taking into particular consideration the interests and needs of the developing countries, ..." (11)

The "equitable sharing" of ocean resources, the "expanding opportunities" in the use of such resources, necessarily pre-suppose the access to technology. Transfer of technology issues had therefore surfaced even in the early stages of Sea-bed Committee deliberations.

Delegates of developing countries stressed the need for "... a new determined effort ... to devise a more just and human system for sharing the World's resources and pooling knowledge and technology", the need to "Compensate for the existing technological imbalance and meet the interests of the developing countries." Paul Engo of Cameroon, Chairman of the First Sub-Committee referred to the "need to bridge the gap between the developed and the developing countries". (12)

The question of access to technology by developing countries for the equitable sharing of the ocean resources, had thus assumed major significance in the context of the Law of the Sea negotiations and background papers on the transfer of marine technology had been prepared by the Secretariat. The Conference had on its agenda, the item "development and transfer of technology" and the Third Committee of the Conference was assigned the task of formulating draft articles on this item. The ground had thus been prepared for UNCLOS III to consider all aspects of transfer of technology with reference to the equitable sharing of ocean resources.

The inconclusive nature of the UNCTAD and WIPO negotiations on transfer of technology, brought into sharper focus and introduced a greater sense of relevance to the UNCLOS III negotiations in the formulation of a new legal mechanism for the transfer of technology to developing countries.

II

(i) Definition of Marine technology.

According to the United Nations Report, "Description of some types of marine technology and possible methods for their transfer," (13) the term "technology" usually consisting of five important elements, namely, (a) hardware, (b) operating procedures, (c) maintenance procedures, (d) operating and maintenance skills and (e) management capacity. The term "marine technology" has generally been understood to mean "the body of knowledge and hardware needed for using ocean space and for surveying and developing marine resources."

(11) Article 29 of the Charter of Economic Rights and Duties of states incorporates the principles contained in Resolution 2749(KXV).

(12) Sub-Committee, Sea-bed Committee.
A/AC.138/SC.1/SE.5/ 20 July 1971, P.5;
A/AC.138/SE.52, 18 March 1971, P.82.

Also see R. P. Anand, *Legal Regime of the Sea-bed and the Developing countries*, 1976, Ch 6; "Interests of the Developing countries and Developing Law of the Sea-bed".

(13) U.N. Doc.A/CONF.62/C3/L22 of 27 February 1973.

In other words, the term "technology" is a comprehensive concept embodying both the elements of a "body of knowledge" and "hardware". These two elements are interwoven into the concept and does not as a general rule, require treatment in isolation.

The definition of the term "technology" in the LOS Convention, takes into account the comprehensive nature of the term. Article 5(8) of Annex III states:

"... technology means the specialized equipment and technical know-how, including manuals, designs, operating instructions, training and technical advice and assistance necessary to assemble, maintain and operate a viable system and the legal right to use these items for that purpose on a non-exclusive basis."

Although the concept is thus a comprehensive one, embodying within itself the dual elements of "knowledge" and "hardware", in actual practice the tendency has been to treat these as distinct elements. Even the LOS Convention refers to the dual notions of "transfer" and "advancement" of technology. Perhaps, the rationale for such treatment is a need to emphasise the importance of building up the technological capacity of the developing countries.

This distinction between "hardware" and "knowledge" underlines the need for the existence of certain pre-conditions within a country in order to make the access to technology a meaningful one. It pre-supposes the existence of a national technology frame-work with an emphasis on a rapid process of technological education and knowledge to ensure the existence of qualified manpower resources within the country.

Article 144 relating to activities in the International Sea-bed Area introduces the dual notions of "transfer" and "advancement of technology". Sub-paragraph(a) of this Article, deals with the issue of transfer and technology, *per se*, to the Enterprise and the developing countries. It requires the Authority and States parties to initiate and promote transfer of technology programmes for the Enterprise and developing countries with regard to activities in the area. The Authority and States parties are required under sub-paragraph (b) to initiate and promote "measures directed towards the advancement of the technology" of the Enterprise and the domestic technology of developing states. Such measures will provide opportunities to personnel from the Enterprise and from developing countries for training in marine science and technology.

This dual approach is further reflected in Part XV of the Convention on the "Development and Transfer of Marine Technology" relating to activities in the general marine environment. Articles 266, 268 and 269 stress the development of the technological knowledge and skills, particularly of the developing countries. Article 268 stresses the importance of the acquisition of technological knowledge and skills and refers, inter-alia, to the "acquisition evaluation and dissemination of marine technological knowledge ..." and "the development of human resources through training and education of nationals of developing states ..."

These provisions underline the vital need for the developing countries to acquire a technological capacity with regard to a wide range of activities in the general marine environment.

(ii) **Nature of Marine technology.**

The activities in the general marine environment, such as fisheries and the production of petroleum and natural gas from off-shore areas, involve the employment of existing technology. Even with regard to such existing technology the developing countries have encountered considerable difficulties since such technology is under the ownership and control of the multinational corporations. Under the existing arrangements for the transfer of technology, restrictive conditions are imposed which prevent the acquisition of knowledge and the adaptation of this technology to suit the needs of the developing countries. The initiatives of the developing countries within the UNCTAD for Codes of Conduct on the transfer of technology as well as on transnational corporations, has been the inevitable outcome of the experience of the developing countries with regard to the transfer of existing technology under present conditions.

In contrast to the traditional areas of marine activities, the new areas of ocean resource exploitation, namely, deep sea-bed mining, is dependant upon "technological innovations".

The United Nations Report "Description of some types of marine technology and possible methods for their transfer" published in 1975, states:⁽¹⁴⁾

"In contrast to shallow water mining ... mining operations on the deep sea-bed will require large scale and capital intensive technological innovations. Technology for extended activity at depths greater than 5000 meters is still under development."

However, the position with regard to deep sea-bed technology has undergone considerable change, since the publication of this U.N. Report in 1975. In an Article published in 1980,⁽¹⁵⁾ Conrad G. Welling, a Senior Vice-President of Ocean Minerals Company, California, states that the first stage of initial technology development, started 17 years ago, is essentially complete now and what is left is "to refine the technology and scale-up the basic system to obtain operational reliability and production data."

The following description from Welling's article provides a realistic picture of the nature of the innovative marine technology that will be used in deep sea-bed mining operations.

(14) *Supra* n. (13).

(15) Conrad G. Welling, "The Ocean's waiting mineral resources"; *Stockton's Port Soundings*; August 1980, pg.6.

Note: The Ocean Minerals Company is one of the four Consortia identified in Secretariat Publication "Sea-Bed Mineral Resource Development. Recent activities of the international Consortia" (Doc.ST/ESA/107 and add.1.) and would thus become a pioneer investor under Resolution II of the Conference.

"The mining system uses a much heavier and larger pipe than used in the oil industry. In addition, it employs a bottom, self-propelled mining vehicle, completely remote controlled, that crawls on the ocean bottom and picks up nodules. Through a flexible conduit, the bottom crawler sends nodules up to an intermediate "pumping station" suspended in the water a few hundred feet above the bottom crawler. The pumping station then sends the nodules up a three-mile pipe string to the "mining ship" at the surface..."

The well-known multinational Consortia, who are the principal actor in this field of innovative marine technology for deep sea-bed mining, are believed to have spent over 400 million dollars on the development of this technology.

The position of the developed countries and that of the multinational Consortia, on the transfer of this innovative marine technology to developing countries are reflected by the views of Welling, that this technology cannot be meaningfully transferred until it has been fully developed and used commercially for a few years. According to this view, the developing countries must bide their time, until technology is ripe for transfer.

III

(i)

"Transfer and Development of marine technology with regard to activities in the general marine environment - A formative legal mechanism."

Part XIV of the Convention provides a mechanism for the transfer of marine technology, with regard to all activities in the general marine environment. The provisions of this part are drafted in very general terms and represents a legal mechanism for transfer of technology in a formative stage of development.

The principal mechanisms provided for in the Convention, in this regard, are, International Cooperation among states and international organisations and the establishment of National and Regional Marine Scientific and Technological Centres.

The formative nature of the legal mechanism provided for in this part of the Convention, is well illustrated in Article 266(3), which reads:

"States shall endeavour to foster favourable economic and legal conditions for the transfer of marine technology."

The legal conditions for the transfer of marine technology are thus left to states who are only required to "endeavour to foster" such conditions. The basic legal obligation is thus drafted in very general terms and lacks the stringent conditions, which characterise the transfer of technology mechanism provided in the Convention with regard to activities in the deep sea-bed.

Article 270 of the Convention dealing with ways and means of achieving international cooperation, provides a more specific basis for the transfer and development of marine technology. The fundamental basis for such transfer and development will be "existing bilateral regional or multilateral programmes" and also "expanded and new programmes."

Despite the formative nature of the mechanism provided for in this part of the Convention, these Provisions represent a modest degree of development, in that it provides a minimum framework for technology transfer.

While Article 270 thus provides for existing bilateral, regional or multi-lateral programmes and also expanded and new programmes, as the means through which international cooperation for the transfer and development of marine technology could be achieved, Article 271 provides an institutional element in achieving this cooperation.

This Article deals with "the establishment of generally accepted guidelines, criteria and standards for the transfer of marine technology". In the absence of a central institutional authority, this is again left to the initiative of states. In promoting the establishment of such guidelines, criteria and standards, however, states could take measures, either directly or on a bilateral basis, either through existing or new programmes referred to in the preceding Article or within the framework of International Organizations. This Article read with Article 270, therefore introduces a certain institutional element, to an otherwise formative legal mechanism for the transfer and development of marine technology.

The institutional element introduced in the preceding Articles, is further developed by the provisions of the Convention on Cooperation among International Organizations. The formative legal mechanism is somewhat strengthened by utilising existing institutional structures such as the United Nations System, for the transfer and development of marine technology.

Among the "competent international organisations" whose scope of activities will have a bearing on the marine environment, are the Inter-governmental Maritime Organization (IMO), United Nations Environment Programme (UNEP), Food and Agriculture Organization (FAO), particularly the Committee on Fisheries (COFI) and the Intergovernmental Oceanographic Commission (IOC).

Article 278 of the Convention imposes a general obligation for cooperation among international organizations. This must be viewed in the light of Resolution V of the Conference, sponsored by the Group of 77.⁽¹⁶⁾ The Resolution declared that the maximum use of the new opportunities for economic and social development offered by the Convention would be facilitated through action aimed at strengthening national capabilities in marine science, technology and ocean services, particularly in the developing countries. The Resolution recommended assistance to the developing countries in the preparation and implementation of their marine science, technology and ocean service development programmes. In this context the Resolution recognised the special role of competent international organizations envisaged by the Convention and recommended that "all competent international organizations within the U.N. system expand programmes within their respective fields of competence" for assistance to developing countries.

(16) A/CONF.62/L.127 - Adopted by the Conference at the 182nd Meeting of the Plenary on 30th April 1982. (Annex VI of Final Act).

The role of International Organizations under the Convention would therefore require, that they first coordinate their activities within the system in order to perform an active participatory role in the transfer and development of marine technology to the developing countries. Articles 272 and 278 of the Convention stresses the need to coordinate the activities of competent International Organizations in the transfer and development of marine technology.

As recommended in Resolution V, the special role of competent International Organizations would require a re-structuring and a broad-basing of their present scope of activities.

Already studies have been undertaken by various Organizations within the United Nations System, on the effects of the new legal regime created by the Convention, on their traditional technical cooperation functions. A study prepared by the Secretary-General of the United Nations "on the future functions of the Secretary-General under the draft Convention and on the needs of countries, especially developing countries, for information, advice and assistance under the new legal regime"⁽¹⁷⁾ underlines "... the fundamental importance of relating the substantive activities provided for in the Convention to the overall economic and social development efforts of developing countries and to the activities of the United Nations System in support of these efforts

Under the provisions of Article 272, on Coordination of International Programmes, states are required to ensure that in the field of transfer of marine technology, competent International Organizations, coordinate their activities, including, "any regional or global programmes" taking into account, inter-alia, the needs and interests of developing countries.

Among the significant regional programmes by International Organizations, is the Regional Seas Programme undertaken in different regions by UNEP in collaboration with regional organizations and Governments of the states of the region. The study of the Secretary-General on the Needs of Developing Countries, cites by way of illustration several programmes of relatively new and important global and inter-regional projects which have been developed by International Organizations within the U. N. System, as a consequence of the evolution of the New Law of the Sea. These include, the FAO Programme on the Exclusive Economic Zone, IOC Programmes to enhance the marine scientific capabilities of developing states and the UNESCO/ECA project for marine scientific and technological development in Africa.

An illustration of an initiative directed towards the formulation of a regional programme, within a regional Inter-governmental Organization, is the proposal of Sri Lanka, placed before the Twenty-Second Session of the Asian-African Legal Consultative Committee held in Colombo in May 1981, on "Economic, Scientific and Technical Cooperation in the use of the

(17) A/CONF.62/L.76 - P.46.

Indian Ocean".⁽¹⁸⁾ This proposal is to the effect that "The Asian-African Legal Consultative Committee should carry out a study of the ways and means of promoting economic, scientific and technical cooperation, for mutual benefit among Asian and African States, in the exploration, exploitation and the rational use of the **Indian Ocean** and its resources." The proposal stressed that the institutional framework contemplated for such regional cooperation should be of a consultative character and should work in close collaboration with existing regional and global institutions such as FAO, IMO, IOC, UNEP (Regional Seas Programme) and ESCAP.

The Co-ordination of such regional programmes for technical collaboration would fall within the province of Article 272 and would assume considerable importance in the transfer and development of marine technology to developing countries, in a regional context.

Thus the Law of the Sea Convention had already, even during its negotiating phase, made a considerable impact on the policies, plans and programmes of International Organizations. On the one hand it has had the effect of broadening the scope of activities of Organizations within the U. N. System and on the other it has generated important regional initiatives within the framework of regional Organizations. The Co-ordination of these activities, taking into account the needs and interests of developing countries, as required by Article 272 would be an essential pre-requisite, if these initiatives are to be meaningful to the overall social and economic development efforts of developing countries.

On the means for ensuring this all important element of Co-ordination of International Programmes, for transfer of marine technology, an interesting view has been expressed by a foremost writer on the Law of the Sea, Elizabeth Mann Borgese. Referring to the necessity for an "effective integrative machinery" of competent International Organizations, Borgese suggests "a joint assembly where problems of ocean policy and management can be debated in a comprehensive, trans-sectoral manner."⁽¹⁹⁾

(ii) Transfer and Development of Technology with reference to the Protection and Preservation of the Marine Environment and Marine Scientific Research.

The concept of international cooperation and its relevant principles, embraces technology transfer with regard to all activities in the general marine environment. These principles are therefore incorporated in Part XII of the Convention dealing with the protection and preservation of the marine environment, as well as in Part XIII on Marine Scientific Research.

Article 200, envisages international cooperation "for the purpose of promoting studies, undertaking programmes of scientific research and encouraging the exchange of information and data ..." Article 201 requires international cooperation, for the establishment of "appropriate scientific criteria for the formulation and elaboration of rules, standards and recommended practices and procedures" for the protection and preservation of the marine environment.

(18) Proposal of Sri Lanka pursuant to Article 1(b) of the Statute of the Asian-African Legal Consultative Committee, dated 29 May 1981; see Proceedings of Twenty-Second Session of the Asian-African Legal Consultative Committee, Colombo, 1981.

(19) Borgese, "Law of the Sea: The Next Phase" *Third World Quarterly*; Vol.4, No.4, Oct. 1982, p.717.

Article 202 deals with the provision of scientific and technical assistance to developing countries and re-emphasises the aspect of "advancement" of technology. The assistance contemplated under this Article, includes the training of scientific and technical personnel of developing countries, as well as facilitating their participation in relevant international programmes. The technological assistance to developing countries for the protection and preservation of their marine environment includes assistance with respect to major incidents which may cause serious pollution.

International Organizations are further required, under Article 203, to grant developing states preferential treatment in the allocation of appropriate funds and technical assistance.

In the field of marine scientific research, too, the mechanism of international cooperation is designed to promote the transfer and development of marine technology and here again the means to achieve such cooperation is through the framework of bilateral and multilateral agreements.

Articles 242 and 243 require the promotion of international cooperation and the creation of favourable conditions for the conduct of marine scientific research and the integration of efforts of scientists, through the framework of bilateral and multilateral agreements.

Article 244 requires international cooperation in respect of the publication and dissemination of information on proposed major programmes and knowledge resulting from marine scientific research, and for this purpose international cooperation is required to "promote the flow of scientific data and information and the transfer of knowledge resulting from marine scientific research, especially to developing states..."

The transfer of knowledge resulting from marine scientific research is further strengthened in Article 249, which requires as a pre-condition to the undertaking of marine scientific research in the exclusive economic zone or the continental shelf of a Coastal State, the participation of the Coastal State in the marine scientific research project as well as the dissemination to the Coastal State of the preliminary reports as well as all data and samples of the project.

Certain special characteristics, which are consistent with the formative stage of development of the mechanism under consideration emerge from these provisions relating to the transfer and development of marine technology in the general marine environment.

The foundation on which the notion of international cooperation rests is the concept of a duty to cooperate. The "duty to cooperate" has been in a gradual process of evolution as a legal norm through state practice, particularly in the context of U. N. initiatives.

Among the many Resolutions adopted within the U. N. which give clear expression to the concept of a duty to cooperate, are the Declaration on the International Development Strategy for the Second United Nations Development Decade and also the Declaration of principles governing the Sea-bed and the Ocean Floor and the Sub-soil thereof, beyond the limits of national jurisdiction.

Many Resolutions in the field of development assistance refer specifically to a "duty to cooperate" and States tend to follow such Resolutions through subsequent state practice, which eventually lead to the norm hardening into a customary rule of International Law.⁽²⁰⁾

The incorporation of the concept of international cooperation in the LOS Convention and the state practice that may develop in this regard, would further enhance the development of "the duty to cooperate" as a legal obligation.

The utilization of the existing bilateral and multilateral programmes and the existing organizational infrastructure of the U. N. System are also important characteristics of the regime under consideration. The recourse to existing arrangements and infrastructures has the advantage that they provide an existing and a time tested framework to build up the new mechanism. Further they would impose less financial burdens on member states than the creation of new superstructures.

Thus a mechanism for the transfer and development of marine technology in the general marine environment, though in a formative stage of development, encompasses within itself, an existing institutional element. In this way, it draws upon the past experiences of the U. N. System, while at the same time, creating new challenges, which demand that these Organizations refashion and adjust their scope of activities, to meet the needs of the new regime created by the Convention. The experiences gained in the light of these challenges, could over the years, result in the new mechanism transforming itself into a formal mechanism.

(iii) **Role of National and Regional Marine Scientific and Technological Centres, in the Transfer and Development of marine technology to developing countries.**

Resolution V adopted by UNCLOS III on Development of National Marine Science, Technology and Ocean Service Infrastructures,⁽²¹⁾ states, in its preamble,

"Considering that national and regional marine scientific and technological centres would be the principal institutions through which States and, in particular, the developing countries, foster and conduct marine scientific research and receive and disseminate marine technology".

Thus National and Regional Centres, emerged through the UNCLOS III negotiating process, as the principal institutions for the transfer and development of marine technology with particular regard to the developing countries.

The emphasis by the developing countries on a regional approach to the transfer and development of marine technology, had developed over a period of time before it found clear expression in the LOS Convention.

(20) Dr. Wil D. Verwey, (1972) Economic Development, Peace and International Law - "The Recognition of 'Mankind' as a supreme legal value and the duty to cooperate for global welfare" - pp.273 - 281.

(21) *Supra* n(16).

The Report of *Pacem in Maribus*, held in Yaounde, Cameroon, in 1979 states:

"With regard to marine sciences and technology, participants suggested the institution of regional survey ships, under the authority of the regional mechanisms for marine science and management."⁽²²⁾

The relevance of national and regional technological centres, in the wider context of the international transfer of technology, is that they would provide an effective institutional mechanism at the national or regional level which could facilitate the adoption of international standards and criteria to suit the particular needs of a developing country or of a particular region.

Articles 275 - 277 of the Convention, once again, underline the formative nature of the mechanism relating to the general marine environment and has as its basis, the concept of International Cooperation, comprising both direct cooperation among states and through International Organizations. The objectives sought to be achieved under these provisions re-emphasise the notion of "advancement" of technology and lay stress on the acquisition of technological knowledge and skills. The establishment of national centres are "to stimulate and advance the conduct of marine scientific research by developing coastal states ..." International cooperation is required under Article 275(2) to "facilitate the establishment and strengthening of such national centres so as to provide for advanced training facilities and necessary equipment, skills and know-how ..."

Under Article 276, relating to the establishment of regional Centres, States are required in coordination with the competent International Organizations, the Authority and National Marine Scientific and Technological Research Institutions, to promote the establishment of Regional Marine Scientific and Technological Research Centres, particularly in developing countries, "in order to stimulate and advance the conduct of marine scientific research by developing states and foster the transfer of marine technology".

The functions of the Regional Centres, set out in Article 277, emphasise: the acquisition of technological knowledge and skills, inter-alia, through access to technological information.

The existing mechanisms for the dissemination of technological information, such as those established within the United Nations Industrial Development Organization (UNIDO), for example, Industrial and Technological Information Bank (INTIB) and the Technological Information Exchange System (TIES) are confined to a limited group of technology suppliers dominating the market and the available information, is in consequence, necessarily selective.

Article 277 of the Convention, provides a framework, through the establishment of a regional cooperative mechanism, for the collection and dissemination of technology information, particularly among the developing countries.

(22) *Ocean Yearbook - 1980 - Vol.2 - Pacem in Maribus* - (Ed. Burgess and Ginsburg) Pg. 419.

The LOS Convention provides only the broad framework for the establishment of National and Regional Centres, and States are required to take cooperative measures with other States, International Organizations and the Authority to facilitate the establishment of such Centres. At the national level, therefore, it is imperative that States adopt appropriate legislative measures to set up national centres, which co-ordinate all activities relating to the marine environment and vest in a central authority, broad competence in Ocean affairs, taking into account their interrelated character. The study prepared by the Secretary-General of the U. N.⁽²³⁾ draws attention to the fact that there is evidence of new initiatives to bring questions of Ocean research and development within the immediate compass of a central authority

One of the earliest examples of the setting up of such a central authority, even while the draft articles of the Convention were still in the process of formulation, was the establishment in Sri Lanka of the National Aquatic Resources Research and Development Agency (NARA)⁽²⁴⁾ as the "principal national institution charged with the responsibility of carrying out and co-ordinating research, development and management activities on the subject of aquatic resources."

The objects and functions of the Agency are "to ensure the application and utilization of scientific and technological expertise for the implementation of the national development programme on the subject of aquatic resources" and "to promote and conduct research activities directed towards the identification, assessment, management and development of aquatic resources..."

Among the particular fields identified for this purpose, are Oceanography, advisory and consultancy services on scientific technological and legal matters relating to the exploitation, management and development of aquatic resources and the collection, dissemination and publication of information and data useful for the development of aquatic resources.

The role of NARA, in planning the national use of marine resources and promoting their development under the new regime of the Oceans would be further enhanced by the provisions of the Convention, regarding the strengthening of existing national institutions and the wider mandate sought to be given to such institutions with regard to their collaboration with regional centres.

IV

- (i) **A developed legal mechanism for the transfer of technology to Developing Countries - Deep Sea-bed mining technology.**

The Convention provides a sophisticated legal mechanism consisting of contractual and other legal arrangements for the transfer of both recovery and processing technology, which is strengthened by an elaborate settlement of disputes procedure and different forms of sanctions, both legal and extra legal, to deal with violations of the legal obligations. These special

(23) *Supra* n.(17).

(24) National Aquatic Resources Research and Development Agency Act No.54 of 1981.

characteristics distinguish the developed legal mechanism relating to the transfer of deep sea-bed technology from the less developed and the formative mechanism for the technology transfer with regard to the general marine environment.

The principal instruments in the legal mechanism for the transfer of deep sea-bed technology, are the International Sea-bed Authority (hereinafter referred to as the Authority) and its operational arm, "the Enterprise."

Article 156 establishes the Authority. The Activities in the Area, will be organized, carried out and controlled by the Authority on behalf of mankind as a whole. All states parties to the Convention are, *ipso facto*, members of the Authority.

The principal organs of the Authority are, an Assembly, a Council and a Secretariat. An Economic Planning Commission and a Legal and Technical Commission will also be established as organs of the Council.

The Enterprise is the operational arm of the Authority, and the organ through which the Authority will carry out, activities in the Area, directly. The structure of the Enterprise comprises a Governing Board, composed of 15 members elected by the Assembly, a Director-General and the staff necessary for the exercise of its functions. Among the powers and functions of the Board, is the Power to authorise negotiations concerning the acquisition of technology.

Article 153 read with Article 8 of Annex III of the Convention, sets out the 'Parallel System' of exploration and exploitation of the deep sea-bed area. Under the Parallel System, activities in the area shall be carried out, on the one hand by the Enterprise and on the other, in association with the Authority, by states parties or state enterprises or natural or juridical persons which possess the nationality of state parties or are effectively controlled by them or their nationals, when these entities are sponsored by such States.

Under the Provisions of Article 8, each application, other than those submitted by the Enterprise, should cover a total area sufficiently large and of sufficient estimated commercial value to allow two mining operations. The Authority shall designate one part to be reserved solely for the conduct of activities by the Authority through the Enterprise or in association with developing States. The area so designated shall become a "Reserved Area".

Approval may be given to a Contractor with regard to a plan of work for the other Part, the non-reserved area, provided that the Contractors satisfy the criteria set out under Article 153. Among these are the criteria that these States or private entities meet the requirements of Part XI of the Convention and also the requirements of Annex III on the basic conditions of prospecting, exploration and exploitation.

These requirements of Part XI and Annex III, form the Cornerstones of the developed legal mechanism relating to deep sea-bed technology transfer.

In Part XI, Article 144 deals with cooperation between the Authority and states parties in the promotion of Programmes for the transfer of technology

to the Enterprise and to developing countries with regard to activities in the Area and also the promotion of measures directed towards the advancement of the technology of the Enterprise and the domestic technology of developing countries. Specific reference is made in Article 144.2(b), to the providing of opportunities "to personnel from the Enterprise and from developing states for training in marine science and technology and for their full participation in activities in the Area".

It is a feature of the developed legal mechanism with regard to deep sea-bed technology, that the obligations under Article 144 are not restricted to the field of International Cooperation. These obligations are reinforced by the basic conditions of prospecting, exploration and exploitation set out in Annex III.

Article 2 of Annex III stipulates that prospecting in the Area shall be conducted only after the Authority has received a satisfactory written undertaking that the proposed prospector will comply with the Convention and the relevant rules, regulations and procedures of the Authority, concerning inter-alia, co-operation in the training programmes referred to in Articles 143 and 144.

The written undertakings given by a proposed prospector, would assume a mandatory character in the light of the different forms of legal as well as the extra-legal sanctions that are provided with regard to the activities in the deep sea-bed and the elaborate procedures for the settlement of disputes.

Activities in the Area will be carried out in accordance with a formal written plan of work, approved by the Council, after review by the Legal and Technical Commission. Upon such approval, every plan of work, presented by states parties and other entities referred to in Article 153, (except those presented by the Enterprise) will take the form of a contract concluded between the Authority and the applicant.

Applicants, other than the Enterprise, in order to qualify to engage in activities in the Area are required to satisfy, inter-alia, "qualification standards" set forth in the rules, regulations and procedures of the Authority. The qualification standards require, that every applicant, **without exception**, shall undertake as part of his application, to comply with the provisions on the transfer of technology.

Article 5 of Annex III sets forth the provisions on transfer of technology and transforms the undertakings of the applicant into mandatory contractual obligations.

When submitting a plan of work, every applicant is required to make available to the Authority, a general description of the equipment and also the methods to be used in carrying out activities in the Area. This obligation on the applicant covers all relevant non-proprietary information about the characteristics of such technology and information as to where such technology is available. Whenever a substantial technological change or innovation is introduced, the Authority is to be informed of revisions in the description and information already made available.

Article 5(3) deals with the different forms of contractual obligations to be undertaken by a Contractor. Where it concerns technology which the Contractor is legally entitled to transfer, he is obliged to make available such technology to the Enterprise "on fair and reasonable commercial terms and conditions". The means for such transfer would be through licenses or "other appropriate arrangements", to be negotiated between the contractor and the Enterprise. This obligation on the contractor, is however subject to the important proviso, that it can only be invoked "if the Enterprise finds that it is unable to obtain the same or equally efficient and useful technology on the open market on fair and reasonable commercial terms and conditions,"

The negotiating difficulties at UNCLOS III primarily concerned the transfer of third party owned technology. With regard to the treatment of third party owned technology, the Contractor is required to obtain a written assurance from the owner of such technology, that the owner will, whenever the Authority so requests, make that technology available to the Enterprise. The means for such transfer will again be through licence or "other appropriate arrangements" and on "fair and reasonable commercial terms and conditions". If the Contractor fails to obtain this written assurance, he is precluded from using this technology in carrying out the activities in the Area. The objections of the Industrialized countries arose from the fact that the Contractor would have no means of ensuring the compliance of a third party with such an obligation. Further difficulties could arise where the owner of technology is no longer in business or has stopped production of a particular type of technology.

In respect of third party technology, the Contractor is further obliged, to acquire from the owner by means of an enforceable contract, the legal right to transfer such technology to the Enterprise. This obligation again applies only to technology, not generally available in the open market. In determining whether all feasible measures have been taken by the Contractor to acquire such a right, the closeness of the corporate relationship, where such relationship exists, between the Contractor and the third party owner and the degree of control or influence of the Contractor over the third party owner will be a relevant factor. In cases where the Contractor does in fact exercise such effective control the failure to acquire the legal right will have a bearing on subsequent applications for approval of a plan of work. This provision reflects the concern of the developing countries that the transfer of technology provisions could be nullified by a Contractor by taking refuge behind a "veil" of corporate personality and makes it possible to "pierce the corporate veil" to determine whether the owner of technology is in reality a third party or not.

The Contractor is further required to facilitate the acquisition of third party technology by the Enterprise from the owner, if the Enterprise decides to negotiate directly with the owner of the technology. The transfer will again be effected through licence or other appropriate arrangements.

Thus the developed legal mechanism, in which the Authority and the Enterprise play key roles, derives its basis, from mandatory contractual obligations for the transfer of technology and functions within a sphere of specific legal rights and duties. The misgivings of the Western industrialized countries to the transfer of technology provisions, flow from their perception

of technology as a concept concomitant with monopolistic ownership. The industrialized countries therefore, attach fundamental importance to the need to ensure that technology must, at any cost, be protected against any form of expropriation.

In the view of the present writer, an interpretation of Article 5 of Annex III, as giving rise to expropriation measures, is not justified. Whether it be technology that the contractor is legally entitled to transfer or third party owned technology, the transfers are to be effected through "licence or other appropriate arrangements" and "on fair and reasonable terms and conditions." The question whether the terms are fair and reasonable is not a matter left to domestic laws and regulations, but is made subject to arbitration under the Convention. The provisions of Article 5, furthermore, reflect a substantial compromise which emerged at the UNCLOS negotiations. The Group of 77 position as reflected in the successive negotiating texts, was that the transfer of technology obligation should be a condition precedent to the awarding of a contract. Present Article 5, however, is formulated as a legal obligation which can be enforced through the dispute settlement and penalty provisions after a contract has been awarded. This was essentially a concession to meet the concerns of the developed countries.

While it must be conceded that the provisions relating to the transfer of third party owned technology may require further clarification, a task well within the functions of the Preparatory Commission, it should not be overlooked that the obligation to transfer third party technology arises, only when it is "not generally available on the market". It is likely that, at least the initial technology would generally be available in the open market. In any event this is also a matter which would be subject to the arbitration procedure.

On another controversial issue, the developed countries took the view that the obligation to transfer technology, applies only to the actual recovery activities in the Area, and therefore only to recovery technology and not to processing technology.

This was on the basis that, after the nodules were recovered from the deep sea-bed, the processing procedure was an activity which came within the jurisdiction of the territorial state, since the processing plant would be located within that jurisdiction. The developing countries however, were of the view that such a restricted interpretation of the term "activities in the Area", would defeat the viability of the Enterprise, and would prevent its effective participation in the activities in the Area.

The Convention now reflects the developing country position and Article 170 stipulates that the "Enterprise shall be the organ of the Authority which shall carry out activities in the Area directly... as well as the transporting, processing and marketing of minerals recovered from the Area". The transfer of technology provisions of the Convention therefore applies both to recovery as well as processing technology.

The Convention envisages a different, legal mechanism (as distinct from the contractual mechanism, discussed so far) to apply to a situation where the Enterprise is unable to obtain appropriate technology, particularly processing technology, to enable it to commence in a timely manner the

recovery and processing of minerals. The legal mechanism envisaged here is a **consultative procedure**, where the Council or the Assembly may convene a group of states parties, composed of those which are engaged in activities in the Area, those which have sponsored private entities and other states parties having access to such technology. The obligation under this Consultative arrangement is to consult together and take effective measures to ensure that the technology is made available to the Enterprise on fair and reasonable commercial terms and conditions. Each state party is required to take "all feasible measures" to this end within its own legal system.

The mandatory transfer of deep sea-bed technology is also to apply direct to the developing countries. The Contractual obligations prescribed in Article 5(a), (b), (c) and (d) are extended to apply for the benefit of a developing state or group of developing states, subject to the safeguard that activities, under the contract sought by the developing countries, would not involve transfer of technology to a third state. This obligation will apply only to a contractor who has not been requested to transfer technology by the Enterprise or had already transferred technology to the Enterprise.

This provision known as the "Brazilian Clause" reflects the position of the more developed of the developing countries, such as Brazil, who at the UNCLOS III negotiations were anxious to ensure a direct transfer of technology to developing countries, to meet their aspirations of full and effective participation in deep sea-bed mining.

From the point of view of the developed legal mechanism for the transfer of deep sea-bed technology, its importance lies in the fact that the "Brazilian Clause" preserves the mandatory nature of the contractual obligation for the transfer of technology to the developing countries. In a broader context, the "Brazilian Clause" had a significant ideological dimension. It established the important principle that developing countries would have a direct right of access to technology, a principle that would have far-reaching implications on the on-going UNCTAD negotiations on the code of conduct for transfer of technology.

Apart from the contractual obligation between a contractor and the Authority for the transfer of technology, the developed legal mechanism contemplates other legal arrangements.

The question of the mandatory form of joint venture arrangements between contractors and the Authority or the Enterprise was considered by the Conference but met with opposition from both the developed and developing countries. Consequently the Convention now provides for optional joint venture arrangements, with a view to stimulating, inter-alia the transfer to technology to developing countries. Thus the Enterprise may decide to exploit the reserved areas in joint ventures "with the interested state or entity. When considering such joint ventures, the Enterprise is required to offer developing countries and their nationals "the opportunity of effective participation".

Apart from the primary contract for the exploration and exploitation of the deep sea-bed between the contractor and the Authority, joint arrangements in the form of joint ventures or production sharing as well as any other

from of joint arrangements may be entered into between the contractor and the Authority and the operations will be carried out through the Enterprise. The legal arrangements contemplated are optional in nature, and contractors entering into such joint arrangement may receive financial incentives. Among the objectives to guide the Authority, in adopting rules, regulations and procedures concerning the financial terms of a contract, is the providing of incentives for contractors to undertake joint arrangements with the Enterprise, and developing countries, to stimulate the transfer of technology and to train the personnel of the Authority and developing countries.

It would also be appropriate in this context to consider the relevance of Resolution II of the Conference, "Governing Preparatory Investment in Pioneer Activities Relating to Polymetallic Nodules"⁽²⁵⁾ in the context of transfer of technology. (hereinafter referred to as the PIP Resolution).

The PIP Resolution recognises and grants priority in the consideration of applications for the exploration and exploitation of activities in the deep sea-bed, to the so called "pioneer investors". The Pioneer investors are certain states and international consortia referred to in the resolution who have already expended considerable expenditure (an amount equivalent to at least US \$ 30 million) with regard to the development of marine scientific research and technology, among other pioneer activities. The justification for the adoption of this resolution was the belief that the according of priority to such pioneer activities, would encourage the development of deep sea-bed technology.

According to the priority that the Resolution confers on a pioneer investor, such investor could, within six months of the entry into force of the Convention, apply to the Authority for approval of a plan of work, for exploration and exploitation of the deep sea-bed. The plan of work, however must conform to all the requirements of Annex III on the basic conditions of prospecting exploration and exploitation, including "the undertakings concerning the transfer of technology". Therefore the mandatory transfer of technology provisions vis-a-vis the Enterprise and the developing countries will apply to a Pioneer investor. This obligation finds unambiguous expression in the Resolution when it requires that every Pioneer investor shall "undertake, before the entry into force of the Convention, to perform the obligations prescribed in the Convention relating to transfer of technology."

The significance of the PIP Resolution, therefore, in the context of the developed legal mechanisms for the transfer of deep sea-bed technology is that on the one hand it preserves the mandatory contractual obligation of the Contractor regarding transfer of technology and on the other it is designed to ensure that, at the time of the entry into force of the Convention the Enterprise will become a viable entity which is able to carry out activities in the Area, in such a manner as to keep pace with states and other entities.

A developed legal mechanism of this nature, requires the backing up of an effective system of legal sanctions, in order to make the mandatory obligation to transfer technology a meaningful one from the legal standpoint. Thus the settlement of disputes procedure and the types of legal and extra-legal sanctions provided in the Convention assumes major importance.

(25) Draft Final Act of the Third United Nations Conference on the Law of the Sea: A/CONF.62/121 of 21 October 1982.

(ii) **Settlement of Disputes Procedure and forms of Sanctions - a strengthening factor.**

The requirement of the mandatory transfer of technology, assumes the form of an obligation to be enforced **after** a contract has been awarded to an applicant. Therefore it requires a well developed settlement of disputes procedure as well as effective sanctions, to strengthen this legal mechanism. Article 5(4) of Annex III, requires that disputes concerning contractual undertakings for the transfer of technology shall be subject to compulsory settlement in accordance with Part XI of the Convention.

Section 5 of Part XI provides for the establishment as well as the jurisdiction of the Sea-bed Disputes Chamber (SBDC) of the International Tribunal for the Law of the Sea. The jurisdiction of the SBDC applies to disputes with respect to activities in the Area.

All disputes between states parties, concerning the interpretation or application of Part XI relating to the Area as well as Annex III relating to the basic conditions of prospecting, exploration and exploitation, in instances where the parties agree, will be referred to a special chamber of the International Tribunal for the Law of the Sea. Where there is no agreement between the parties, the dispute will be referred to an ad hoc chamber of the Sea-bed Dispute Chamber or to the plenary of the chamber itself. Therefore questions of interpretation or application of the transfer of technology provisions in the Convention, as between states parties, will be referred to one of the above fora, depending on whether there was agreement between the parties as to the choice of a forum.

Disputes between parties to a contract on the interpretation or application of a relevant Contract or a plan of work will be submitted, either to the SBDC or to binding Commercial Arbitration, under UNCITRAL rules, in the absence of other provision. Disputes as to the terms of transfer of technology itself, is also subject to a system of binding Commercial arbitration.

Disputes as to whether the transfer of technology offers, made by a contractor are within the range of "fair and reasonable Commercial terms" envisaged in Article 5, may, at the request of either party, be submitted to binding commercial arbitration, in accordance with UNCITRAL Arbitration Rules, or other rules prescribed by the Authority.

The legal sanctions which enforce the mandatory transfer of technology obligations are contained in Article 18 of Annex III. The sanctions which flow, in the case of violations of transfer of technology undertakings are primarily suspension or termination of the contract, or monetary penalties.

The sanction of suspension or termination of a Contractor's rights will be applied only where, in spite of warnings by the Authority, the Contractor has conducted his activities, in such a way as to result in "serious, persistent and wilful violations of the fundamental terms of the contract, Part XI and the rules, regulations and procedures of the Authority", or if the Contractor has failed to comply with a final binding decision of the dispute settlement body applicable to him.

Where the activities of the Contractor do not amount to "serious, persistent and wilful violations" the Authority may impose monetary penalties "proportionate to the seriousness of the violation".

Further, in regard to disputes, as to whether offers for transfer of technology made by a Contractor, are within the range of "fair and reasonable commercial terms and conditions" the Contractor will be given 45 days to revise his offer to conform to such conditions before the Authority takes action either to terminate or suspend the contract or impose monetary penalties.

While these legal sanctions certainly strengthen the mandatory obligations to transfer technology, the developed legal mechanism also relies on a form of extra-legal sanctions as a further means of reinforcement of the contractual obligation.

In the case of third party owned technology, which requires the Contractor to obtain a written assurance from the owner, it has already been observed that the failure to obtain such written assurance would result in a prohibition on the Contractor to use such technology in carrying out activities in the Area. In instances where the Contractor is required to acquire from the owner, the legal right to transfer technology to the Enterprise, and where the Contractor exercises effective control over the owner, the failure to acquire such right, will be a relevant factor with regard to the Contractor's future applications for sea-bed mining.

These amount, in effect, to a system of black listing, where contractors do not comply with their contractual obligations for the mandatory transfer of technology. The legal as well as the extra-legal sanctions provided in the Convention, together with the elaborate dispute settlement mechanism, strengthens the developed legal regime for transfer of deep sea-bed technology.

V

A concluding Assessment

A paradox of the UNCLOS III negotiations was the emergence of an elaborate and a developed legal mechanism with regard to the transfer of deep sea-bed technology while the legal mechanism for the transfer of technology relating to activities of the general marine environment which would have brought about more practical and immediate benefits to the developing countries, took a less developed and a formative nature.

A question arises as to the rationale behind this dual approach of the developing countries. The transfer of technology with regard to the activities in the deep sea-bed had ideological implications beyond UNCLOS III negotiations. It reflected the fundamental principles of the NIEO regarding the spreading of scientific knowledge and technology, in a completely new sphere of activity. This prompted the developing countries to adopt a strong unified bargaining position on the transfer of deep sea-bed technology issue. At the practical economic level, the developing countries viewed their full and effective participation in the activities of the deep sea-bed as a vital factor in accelerating their process of development. It had far-reaching implications, *vis-a-vis*, exploitation of new resources, scientific research, training of personnel

and the development of indigenous skills in general. Ocean mining technology belongs to the "Third Industrial Revolution". "If developing countries fail to join this revolution on the ground floor ... the development gap will widen to the point at which 20 years from now it may become unbridgeable." (26)

The developed legal mechanism is not however, completely free of certain obscurities. The Provisions relating to the mandatory transfer of third party technology, while reflecting a genuine concern of the developing countries against possible measures to defeat the objectives of the Convention, however requires clarity and further elaboration. Objective criteria must be established to determine what are "feasible measures" to obtain such technology. Similar difficulties could be envisaged in determining the technology "not generally available on the open market". With regard to the obligation to disclose technological information, difficulties could well arise, both with regard to the means available and the criteria to be used in determining whether "a substantial technological change or innovation" has been introduced. All these issues require determination through well-defined, objective criteria.

The Preparatory Commission established pursuant to Resolution I of the Conference could perform a salutary function in clarifying these "grey areas" of the Convention relating to technology transfer. Para 8 of the Resolution calls for the establishment of a Special Commission for the Enterprise and to entrust to it the functions referred in para 12 of Resolution II relating to preparatory investment. These functions include, inter-alia, the function of arranging technology transfer to the Enterprise. The Preparatory Commission is thus required to ensure that every registered pioneer investor shall undertake before the entry into force of the Convention, to perform the obligation prescribed in the Convention on technology transfer. In formulating the rules, regulations and procedures for such transfer, the Preparatory Commission should be mindful of its task in clarifying these issues which have become the subject of strong reservations on the part of the developed countries.

The developed countries must also, on the other hand, demonstrate a greater sense of accommodation with regard to transfer of technology to developing countries. The undertaking given by the developed countries, represented by the now famous "Kissinger Proposals" of 1975, both with regard to financing of and the transfer of technology to the Enterprise, in order to make it a viable entity, formed the very foundation on which a parallel system was accepted at the Conference. This undertaking, guaranteed that if the industrialized countries and private entities were given equal access to the Area, the Enterprise will be provided with the funds, technology and expertise necessary to enable it to keep pace with States and other entities with respect to activities in the Area. If the Enterprise is now required to wait until technology is "ripe for transfer" while developed States and private companies go ahead with such activities, it would tantamount to a serious reversal of this fundamental undertaking and prejudice the participatory process of the developing countries in the international sea-bed area.

(26) *Supra*, p(19).

There are certain proposals before the Preparatory Commission which have the objective of promoting collective efforts towards research and development of sea-bed technology.

A proposal by Austria presented before the Special Commission II, at the Second Session of the Preparatory Commission held in March 1984 suggests joint venture partnerships which shall, *inter-alia*, undertake research and development in mining technology transport and processing and to organise training programmes and establish a technology bank.(27)

The consideration by the Preparatory Commission of such proposals in a spirit of constructive cooperation and compromise will make a positive impact and help to transform the legal mechanism for transfer of deep sea-bed technology into a practical and a realistic mechanism which would serve the technological needs of both the Enterprise and the Developing countries.

(27) LOS/PCM/SCN(II)L/II.