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Expert Group Meeting on International
Co-operation on Petrochemicals

Vienna, Austria, 19 - 21 September 1984

REPORT* (Co-operation
on petrochemicals).

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INTRODUCTION

1. On the recommendation of the Second Consultation on the Petrochemical industry, UNIDO convened the first Expert Group Meeting on International Co-operation in this sector, held in Vienna Austria, from 19-21 September 1984.
2. The studies conducted by UNIDO's secretariat on the development of the petrochemical industry since the Second Consultation meeting in 1981 has indicated that a continued growth in demand on petrochemical products is expected in developing countries which present an obvious opportunity for the growth of the industry. This poses great possibilities for global co-operation in petrochemicals whether between developed and developing countries or among developing countries. Two studies were presented by the UNIDO secretariat to the September meeting on international co-operation; one on the restructuring process in the industry and the expected growth in demand and the second on aspects of global co-operation in the industry. The participants were requested to study matters concerned with co-operation at national and corporate levels.

1. CONCLUSIONS AND RECOMMENDATIONS

3. The Expert Group Meeting felt that further work on the following topics could be considered to further international co-operation in the petrochemical industry.
 - (a) The need for updated information may include:
 - i. the establishment of a data bank on available services;
 - ii. annual publication of world supply and demand and the special involvement of chemical associations in this exercise;
 - iii. the identification of market potentials at country, regional and global level;
 - iv. a directory of capabilities existing in developing countries.
 - (b) To increase the awareness of developed and developing countries of global opportunities opened in petrochemicals in order to optimize the use of global resources, through:
 - i. the organization of meetings to facilitate contacts and exchange ideas and experiences;
 - ii. to ascertain commonality of interest and willingness to co-operate;
 - iii. the provision of technical assistance services, and
 - iv. realistic project formulation taking into account global implications.

(c) To impress upon new producers the need for sound and realistic project planning and implementation including alternative approaches to integrated petrochemical complexes.

(d) To investigate relevant techno-legal aspects and longer term arrangements, in particular new forms of collaboration and novel instruments for its attainment.

4. Participants strongly indicated their willingness to collaborate in the North-South co-operation dialogue. To that end and as one possibility, more frequent contacts were proposed and agreed upon.

11. ORGANIZATION OF THE MEETING

5. The first Expert Group Meeting on International Co-operation on Petrochemicals, organized by the United Nations Industrial Development Organization (UNIDO), was convened in Vienna, Austria, from 19-21 September 1984. The list of participants is presented in Annex A.

6. The meeting was opened and chaired by the Chief of the Chemical Industries Group, Negotiations Branch, Division of Policy Co-ordination, UNIDO. He suggested that discussion on co-operation should focus on:

- (a) Areas of co-operation
- (b) Needs to be covered
- (c) Contributions to be given
- (d) Difficulties to be envisaged

both at company and at national/international levels.

7. The following agenda was considered by the meeting:

- (a) Opportunities opened by the global restructuring of the petrochemical industry
- (b) Bases for promoting international co-operation
- (c) Action required to prepare and implement schemes of co-operation.

8. In order to facilitate its discussion the meeting agreed to consider the promotion of international co-operation in the petrochemical industry on two levels, names company level and national/international level.

A. CO-OPERATION AT COMPANY LEVEL

9. Discussion at company level was focussed on main areas of co-operation in marketing, technical and corporative co-operation.

Marketing of petrochemicals

10. It was stated that some co-operation forms in developed countries depend overwhelmingly on company to company co-operation and as such does not compare to co-operation in developing countries where the government is greatly involved. The example of pipeline grids in developed countries was quoted for this purpose.

11. Profit motive in such co-operation arrangements was considered as the driving force for any arrangements in this area. Government involvement to manage such a co-operation was seen as crucial but also sometimes problematic in developing countries.

12. Considerable pressure or restructuring of the petrochemical industry in developed countries is being exerted. On the other hand increased production in some developing countries at lower production and operational costs would support acceptable product price levels. Co-operation between partners, who have market and those who have competitive raw materials is viable. A proper mechanism is needed to contribute to the continued development of the industry in developing countries which has come almost to a halt in recent time.

13. Commodities rather than performance petrochemical products were suggested for co-operation in order to take benefit of easy, large scale shipments of products produced in large scale plants whereas customer service oriented products should be done by local producers making optimum use wherever possible of complementarity in production.

14. Although local markets have absorbed a large share of the production from new petrochemical centers in developing countries some share of the production had to be exported to other markets. Since trade flows between countries were essential to maintain orderly markets, trade barriers were considered as harmful to the development of the industry. Several cases were presented to this effect.

15. Plant services were felt as being most important for successful operations on continuous basis. Special attention to market development was also considered as essential to sustain development and continuous operation. Government regulations and policies in developing countries thought to have the most crucial impact on the development of the industry.

16. Governments role in feedstocks was seen important in most countries to provide a general framework in which companies can operate. Co-operation in basic petrochemical products was felt to be easier except in aromatics where product balance might cause difficulties. Balance problems could also emerge in other basic products particularly when more ethane is used in crackers.

17. Although a number of new co-operation forms like swaps, long term sales arrangements were introduced during this decade in the area of co-operation in the products, it was felt however that their use is limited. Saturation of the markets leading to lower price levels was not seen as being convincing to increase demand in developed countries.

18. The particular requirements in marketing of petrochemicals are described in table 1 taking into account envisaged contributions and difficulties.

Technical co-operation

19. Except for some infra-structural problems such as electrical power and water problems, the operations of petrochemical complexes in developing countries have been a great success. Thus the flows of good experiences between developed and developing countries could be beneficial to both although the benefit to developing countries might be greater.

20. Foreign currency limitations have lead to maintenance problems in some developing countries. It was thought that centralized warehouses, standardization, assistance to local producers, creation of producers' clubs etc could reduce stocks of maintenance items considerably. An example was given where stocks were reduced by two-thirds.

21. Technical services could be an important item of co-operation where developed countries' long experiences could be of immense value. It was also stated that due to layoffs in developed countries many experts would be available to offer their services to developing countries. These experts could be used for training in developing countries. Other possibilities include outside maintenance companies, special services companies, extended education abroad, consulting services, etc. Some developing countries with rich experience in the field, extending in some cases over 30 years, are well situated to offer these services internationally.

Technology

22. The transfer of the latest technological developments to developing countries was felt to be most important and should be reflected in contractual arrangements with the proper safeguards to lowering their cost. In this regard information flows were regarded as crucial. Several sources where such information was available were quoted.
23. Some developing countries noted that their experiences in training were often negative leading to situations where they were forced to hire outside operators due to difficulties in getting proper technical services. The importance of strong technical background was felt crucial to successful and safe operations.
24. Some developing countries have been able to create their own technology and make them internationally available whereby some examples were given. Although in the field of research and development it was felt that a large vacuum still exists in developing countries. The need for research and development is expected to greatly increase in the future particularly in the field of product applications because of severe environmental conditions in most developing countries. Examples of co-operation in this area were given.
25. Equipment manufacturing infrastructure in some developing countries was reported to be high offering good opportunity of co-operation. Close contacts with equipment manufacturers were emphasized.
26. Plant safety was found to be another important area of co-operation whereby feedback in the form of built-in safety measures should primarily be used. Different forms for safety information flows were recommended like information exchange, short plant visits, demonstrations, international conferences of institutions, associations and alike. Proper attitude, safety schemes and management action with safety audits were highly recommended.
27. Environmental control with low emissions, safe standards, appropriate engineering measures and references were found increasingly important in developing countries taking due account of toxicological problems. Examples quoted from industrialized countries show that retrofitting costs to comply with environmental protection regulation could compel the shutdown of some plants.
28. Practical requirements, contributions, obstacles and conclusion on this topic are given in table 1.

Corporative co-operation

29. Concerning joint ventures different views were expressed of their usefulness and purpose. It was stated that the interests of the parties often change over time. A number of other factors including government legislation, ownership dilution, financing questions etc. might change bringing in substantial risks as compared to other arrangements. However, all these aspects vary from region to region. Thus multinationals and larger companies tend to have limited number of joint ventures. It was suggested that 50/50 shareholding offer the best chances to collaboration with equal responsibilities.

30. Smaller countries tended to have more optimistic views even for minority shareholding joint ventures. Many developing countries felt that joint ventures were successful and dynamic business development instrument. Also joint venture conditions had been improving recently in many developing countries.

31. It was found that many possibilities exist in these arrangements enabling new bases to emerge depending upon the short-term or long-term expectations of the partners for their co-operation.

32. Concerning the risk it was found that petrochemical companies are short of risk capital compared to oil companies thus being unable to take these risks except occasionally. However developing countries differ greatly in this respect. Mutual attraction should be sustained in most cases where long-term risk balancing is concerned.

33. Risk question was found extremely difficult and a vacuum existed in developing countries to this respect which require the development of appropriate insurance schemes.

34. Joint ventures were also regarded as optimistic co-operation forms between developing and developed countries provided proper policies and actions are taken. Requirements and conditions are discussed in table 1.

B. CO-OPERATION AT NATIONAL/INTERNATIONAL LEVEL

Government policies

35. Government policies regarding incentives, guarantees, protection, stability, continuity, financing terms, aid etc. were considered in detail and several examples from developing and developed countries were given.

36. Stability and attractive incentives, reasonable tariffs, stable policies were stressed as being crucial factors for sustaining economically viable joint ventures in developing countries.

37. Information flow was unanimously found as an important basis for co-operation between North-South where UNIDO's role could and should be crucial.

38. To implement this target a meeting was proposed between contributors to the data bank with representatives from chemical associations, multinationals and other companies holding data-banks and willing to contribute. Table 1 represents an overall view of the items discussed.

International co-operation

39. Information about factors such as supply and demand, capacities, export, import, available forms of co-operation, technology, etc. in the form of data banks was found to be important as basis for information flows and co-operation between North and South where UNIDO role could and should be crucial.

40. UNIDO organized meetings and conferences which would help to achieve the goals sensitize both North and South to optimize resources and to draw up realistic programmes for helping developing countries in their industrial development. An overall view of this topic is presented in table 1.

41. Exchange of experiences was felt greatly needed in achieving those targets and avoiding the creation of non-viable projects.

42. Continuous market research was stressed to be of utmost importance through co-operation so as to depict obstacles and to improve market condition through market development and industrial linkages.

LIST OF PARTICIPANTS

Algeria

Mr. Mohamed Meziane
Chargé d'Etudes + de Synthèse
Ministère de l'Energie, l'Industries Chimiques + Pétrochimique
80, Ahmed Chermoul
Alger

Brazil

Mr. Marcus Tulio Roberto Sampaio de Melo
Vice President
Petrobras Química S.A. - Petroquisa
Rua Buenos Aires 40
Rio de Janeiro

Mr. Jose Figuerido Paschoal, Jr.
Director
Petrobras Química S.A. - Petroquisa
Rua Buenos Aires 40
Rio de Janeiro

Finland

Mr. Jorma Puolanne
Manager, Chemical Business Development
Neste OY
Keilaniement.1
02150 Espoo 15

India

Mr. Surgit Singh Sachdeva
Executive Director
Oil Industry Development Board
Petrochemical Complex in U.P.
Ashoka Estate, 10th Floor
24 Barakhamba Road
New Delhi 110 001

Italy

Mr. Carlo Trabucchi
Strategic Co-ordination Manager
Montedison SpA
Via Taramelli 26
20100 Milan

Kuwait

Mr. Adan Yousif Al-Meer
Deputy Managing Director for Administration and Production
Petrochemical Industries Company, KSC
P.O. Box 9116
Ahmadi
Kuwait

Mr. Ahmad Ali Al-Duaij
Data Processing Manager
Petrochemical Industries Company, KSC
P.O. Box 9116
Ahmadi
Kuwait

Mexico

Mr. Fernando Mitre Lopez
Gerente, Planeacion Industrial
Instituto Mexicano del Petroleo
Eje Central Lazaro Cardenas No.152
07730 Mexico D.F.

Norway

Mr. Arne Brantsaeter
Deputy Director
Dyno Industries A.S.
Tollbugt 22
P.O. Box 779
Sentrum
Oslo 1

United Kingdom

Mr. Gordon Davey Wilson
Division Licensing Manager
Plastics and Petrochemicals Division
Imperial Chemical Industries Limited
P.O. Box 6
Welwyn Garden City

ORGANIZATION

OPEC

Mr. Marcelo Maldonado
Officer on Downstream Operations
Organization of Petroleum Exporting Countries (OPEC)
Obere Donaustrasse 93
1020 Vienna

APIA

Mr. Juan Tampier
APIA
6 Norte 241, DP 62-E
Cruces del Mar
Chile

OBSERVER

Mr. D. Subramaniam
International Legal Counsel
P.O. Box 10
1173 Vienna

Annex B

LIST OF DOCUMENTS

World Changes in the Structure of the Petrochemical Industry 1980-1983

State of the Petrochemical Industry and Aspects of South/South
and North/South co-operation.

International Co-operation in Petrochemicals

Table 1

Requirements	Contributions	Difficulties
<u>A. Company level</u>		
<u>1. Commercial</u>		
a) Marketing	Orderly marketing utilizing different arrangements should enable smooth flow of products to customers using the strengths of attractive product prices from low cost producers. Profitability should be crucial factor and driving force in marketing efforts.	Depending on region, these vary from purely company to company arrangements to government participation in different forms. Complementarity in production is key tool in progressive and successful co-operation utilizing the strengths of production elsewhere supplemented by one's own capabilities.
b) Marketing services	Market services are available to limited extent in developing countries whereas developed countries have accumulated abundant services for customers' applications and other needs. Often the requirements in developing countries are much harder compared with those in similar applications in developed countries.	Efforts to support the build-up of tailor-made service facilities and appropriate training should be undertaken also by the technology holders. Marketing services are needed at all levels but especially so at downstream processing industries level. An inhouse team backed up by laboratory and a man running customers' needs is a necessity.
c) Market development	Potentialities in advantageously positioned developing countries could and should be utilized in international markets through trade-offs in products vs. raw materials or other swaps in different product patterns.	Long-term arrangements, like joint ventures, co-operation arrangements, government to government or company to company arrangements could prove to be suitable tools.

Lack of awareness of the world situation leads to overcapacity/overproduction. Stiff barriers inhibit marketing of petrochemicals.

Social obligations are often difficult to overcome in restructuring process. Unawareness of opportunities through co-operation still persists.

Profits pose less interest in government arrangements though considered important.

Lack of awareness and initiatives prelude gaining momentum in many necessary situations.

Lack of information of suitable partners and hindrances like legal, duties, barriers, etc. substantially limit genuine possibilities.

	Requirements	Contributions	Difficulties
	Gradual and sustained growth of the market could support marketing sharing at companies level.	Concentration on a limited number of products and developing their marketing taking due consideration of the dominant role of the market place itself and its regional needs.	Unawareness of the complexity of the market factors, false expectations, different culture, government policies, etc. sometimes inhibit successful co-operation.
	Orderly supply of products is a necessity for successful development.	Co-operation and information on mutual interests keep market in needed equilibrium.	Building of overcapacities leading to oversupply situations disturb delicately achieved market balance.
d) Market information	Comprehensive information of market development is a prerequisite to a balanced, continuous market development and to successful plant investment.	Co-operation between companies and appropriate associations will provide most of the information needed.	Future co-operation in this field remains very difficult and in most cases unsolved. Difficulties might be envisaged in the compilation of such kind of confidential information.
2. Feedstocks			
a) Raw material	Utilization of advantageously priced feedstocks to sustain the profitability of the petrochemical industry is very important. These include flared gas, gas liquids, heavy petroleum fractions and also new renewable feedstocks.	Government contribution is essential. Arrangements may include bilateral arrangements, counter-trade, barter and other direct or indirect forms of co-operation. Also companies are more involved in direct arrangements.	Present situation of relatively wide abundance of feedstocks will limit possibilities of co-operation in the near term. Shortage of hard currency is a major constraint for many countries or companies to undertake co-operation.
b) Basic petrochemicals	Due to the fluctuation in feedstock availability in some basic petrochemicals, certain amount of restructuring will be needed to sustain balances in the market place in most basic petrochemicals.	Least-cost producers having access to advantageous feedstocks can provide regional and global supplies at competitive prices.	Due to overcapacities there is little room for co-operation in basics in most cases except in propylene.

Requirements	Contributions	Difficulties
c) Intermediates	Restructuring is also necessary in intermediates, with due account of the newcomers in the downstream industry.	Production from world-scale plants should be utilized with different forms of co-operation at different levels. Some co-operation is possible even in oversupply products in very absorbing markets. Co-operation within the industry regarding capacity build-up at government level is needed.
d) End-petrochemicals	Restructuring due to overcapacities in main end-petrochemicals makes the petrochemical industry healthier and more competitive. Co-operation in the build-up of global capacities is crucial for the successful and profitable operations, utilization of latest technologies should be the focus of special attention and co-operation in developing countries.	An increase in co-operation is foreseen due to the emergence of new producers in developing countries and due to new polymer producers in other developed countries. Production from new producers will enable healthy development of the polymer industry posing greater opportunities at different levels both at government and at company level. Contributions in services as well as in applications are very much needed.
		The captive use of aromatic basics inhibits co-operation in these products leading to balance problems. Shortage of capital is a major constraint in the establishment of the basic petrochemical industries in developing countries. Lack of adequate infrastructure inhibits development. Capital shortages will preclude many smaller countries from starting polymer production. The differing needs and fast development in applications sets limitations for the industry in developing countries.

Requirements

Contributions

Difficulties

3. Technical

(a) Plant operations

Successful plant operations necessitate that management consider a number of variables including costs, utilization rate, optimization of variable costs, equipment monitoring, catalyst, performance and continuous plant improvement. High utilization rates will be regarded as crucial.

Successful operations need a wide spectrum of experiences of a number of situations, working rules, materials, corrosion, safety, etc.

To achieve maximum output at minimum cost requires good training facilities, technical assistance and co-operation up to extra-regional visits transplanted into a right organization.

Exchange of experiences between developed and developing countries in both ways prove very useful.

Utility problems have caused sometimes frequent and long time stopages together with lack of appropriate equipment parts.

Unawareness of opportunities, cost minimization, imaginative optimism and secrecy requirements are somewhat hindering exchange of experiences.

(b) Maintenance
Spare parts

Appropriate policies should be chosen taking into account the services, quantities of parts vs. plant utility and needed safety precautions. Adequate continuous training efforts with preventive and predictive maintenance methods should create skilled maintenance personnel. Adequacy of spare part should be guaranteed by necessary supplies with minimum stocks.

Awareness of maintenance requirements needs special focusing in the capital tied-up/deliveries ability. In this context new inter-industry approaches and standardization is required in the delivery of spare parts from centralized warehouses on the spot or similar arrangements of extreme co-operation and local production. Training and output from developed countries with longer experience including preventive maintenance tools with non-destructive and turn-around testing methods, in countries lacking these experiences, could significantly support activities in this field in developing countries.

Unawareness of possibilities, lack of training and even lack of foreign exchange in the absence of adequate procedures have lead to problems on some occasions.

The heavy cost burdens involved in maintenance problems, lack of spare parts, etc. lead to loss of production and of customers and severely interfere with successful business development and need special measures and consideration.

Requirements

Contributions

Difficulties

(c) Technical services

For the production to be both cost-effective and in accordance with stipulated specifications continuous support of technical services/less available backup resources is absolutely necessary at high level including support activities in catalysts, equipments, additives, inhibitors, improvements in systems and processes, etc.

Limited resources force companies to endeavour to use more skilled, trained workers, technical services companies and consulting companies. Co-operation with developed countries would be useful since they have longer experience and good idle people at hands. Using long-term training abroad has proven useful in some cases. Examples of new forms of centralized services might prove usable.

Lack of skilled and experienced personnel is the most important single factor to meet inadequacies. Other problems concentrate on the availability of these people to producers in developing countries from developed countries.

(d) Training and manpower development

Need for comprehensive multiskills training with a variety of training tools, continuously programmed schemes, is mandatory to achieve full-scale benefits taking into account different plant parameters in extreme conditions, safety measures in operations as well as human safety.

Besides a variety of traditional training tools, like simulators, pilot plants, on the training etc., sending operators and engineers abroad for longer periods of time has been used. Training responsibility should include these arrangements well in advance. A number of ongoing specialized conferences provide dissemination of useful experiences for newcomers. Contractual arrangement play an important role in successful training input.

Secrecy questions pose ever increasing problems in training arrangements. Increasing loss of trained personnel inhibit its appropriate implementation in many ways like shortened local training courses or insufficiently tailored training schemes. Also some companies in developed countries have ceased to offer this type of services.

(e) Safety

Protection of people and assets is of crucial importance to successful operations in the petrochemical industry posing severe hazards in many forms. Highly skilled and motivated operators up to top management action is continuously needed to minimize losses through hazards.

Safety should be taken into account from the very beginning of the planning process of the plant. Design-phase (built-in safety) can best physically protect plant. Appropriate training schemes, checking lists, rules and attitudes of the operating personnel provide good background for safety planning including sharing international experiences through co-operation.

Short sighted attitudes often preclude successful safety-oriented operations. Savings and lack of time, auditing etc. lead to inefficient preparedness in safety questions.

	Requirements	Contributions	Difficulties
Environmental aspects	Plant effluents should be considered carefully to meet the requirements of local standards, if any, taking into account toxicological problems. The specifications should include emission limits to be met in the performance tests.	Elaboration of comprehensive schemes for environmental protection taking into account measures like specialized consulting companies, licensors, international co-operation, conferences, retrofitting, etc.	Unawareness of dangerous properties, long-time impact of many petrochemicals, substantial cost of retrofitting and other measures, scarcity of location parameters etc. make it difficult to carry out preventive and successful pollution abatement measures.
Technology	Fast changing technology with striking recent process inventions in the petrochemical field sets high action-oriented demands for both old and newcomers in the industry to keep themselves abreast of the latest developments, improvements and innovations achieving the profitability vantage points offered by the inventors, contractors, licensors and other technology holders.	Contractual terms play vital role in the transfer process of technology taking into account the divergencies of the improvement of old technologies and new technologies. Different spheres of co-operation and collaboration like meetings, conferences, exchange of information and the like of the actual implementation of new technology and improvements would keep those participating cognizent of the developments and together with own efforts would produce strength and open up new possibilities. The achievement of strength prerequisites strong technical and analytical background. Because of long lead-times strenuous efforts are needed to bring up any new commercial process technologies.	All technology is not available to everybody in this field since some owners try to utilize it in the form of sold products. Secrecy requirements preclude sometimes the delivery of technology to some countries or geographical areas from the technology holders. Lack of resources inhibit the development of new process technologies or commercialization of inventions in a number of cases.

Requirements

Contributions

Difficulties

R&D efforts should be used in several ways including (a) new process development (b) technical backup operations (c) applied research in products applications (d) new equipment design and (e) environmental protection and safety in the petrochemical industry. The efforts should be geared to incorporate technological progress, to maintain high level of operations and continuously improve profitability, products quality and find out new products.

Gradually to establish R&D activities according to the policy and resources of the enterprise. Finding local, regional and international co-operation in working groups, universities etc. combined with own research efforts would greatly contribute to create successful results. Government incentives could play a very important role. Linkages to equipment manufacturers in implementing process, chemical and other innovations are most often crucial. Achievable goal could be as single as possible, using process design, equipment supply from local and/or international sources. Joint efforts in order to alleviate resource drain and to divide the risk burden are widely used and recommendable.

R&D undertakings require long gestation periods of time, often substantial resources, especially in the process design experienced and qualified laboratories to yield desired results. This demand leads into substantive infrastructure requirements. Co-operation due to secrecy and patent problems in joint efforts is difficult, but with diligent and hard work will be possible to overcome. Contractual arrangements in these cases lead to difficult negotiations.

4. Cooperative

Existing and/or new methods should be widely used in the implementation of petrochemical industries in developing countries, taking into account mutual benefits, shared risks, and other factors like government framework. The main goal being the equitable utilization of available resources like capital, raw materials, manpower, management, technology and markets for the continuous and balanced development of the petrochemical industry.

Co-operation in utilization of appropriate vantage cases through selective option of suitable tools like licensing, different types of joint ventures, equity participation, undertaking of management arrangements, trade arrangements of already operating or future plants and other similar short or long term arrangements can take a variety of forms depending on the case, country or region and the freedom of action and degree of commitment of the partners concerned. Principally, in this

A number of difficulties, such as disincentives, barriers and other restrictive measures would greatly inhibit successful joint venture. Unstability in appropriate geographical areas or countries would substantially limit or exclude co-operation possibilities. Mature markets in developed countries was seen as an inhibiting factor in some cases where competitive capacity already existed. Different risk possibilities

Requirements

Joint ventures present a special type of joint action. In that sense, close co-operation, mutuality of benefits, political stability or possible guarantees might, amongst other requirements, be needed in order to enhance the use of this long-term commitment in the petrochemical appraisal.

Contributions

process all contributions are important to one extent or another. One should also emphasize the role of government incentives, local tax exemptions, exchange rules of the central banks and other advantages which would allow the young venture to overcome its first difficult years. Facilitation of insurance arrangements on particular ventures would help to give guarantees against risks involved.

Petrochemical production means long-term commitments, thus being necessary for the countries which like to be involved to create stable political and economic conditions. Suitable government framework with incentives will attract partners including measures and provisions for risk management.

Considerable buffer capacity and business flexibility is needed in the long-term joint venture commitment. Different forms of arrangements like complementarities in production, services, raw materials, running of the plants management, etc. can provide suitable conditions enhancing joint venture commitment.

Difficulties

mainly fear of loss of equity capital, where creditworthiness is low, prevents joint venture realisation.

Balancing of interest on the long-term might prove to be very difficult pending upon a variety of changes and other measures in the partners' business commitment including differences of their expectations. The same applies to political changes. Even some sudden minor changes in a tight business competition might lead to irreversible and irreconcilable business undertakings.

	Requirements	Contributions	Difficulties
<u>B. National/ International level</u>			
<u>1. Government policies</u>	<p>Government policies provide an important framework on international co-operation varying essentially from country to country and from region to region. Rules, regulations and specific laws, if any, have to be carefully evaluated according to planned co-operation programmes and projects. In most basic and intermediate petrochemical projects, at least in small and medium size developing countries, government is directly involved through government companies, umbrella arrangements, financing, licenses, etc. In the case of multinationals or independent companies, government involvement might be very little, if any, except in cases when aid is involved. Rules, laws etc. take a variety of forms including specific requirements to be met in order to get the permission to proceed with a project. The basic requirement is that the money invested must be paid back by the venture, whatever the conditions. Thus certain guarantees or pre-conditions are to be provided. In downstream operations normal private business-orientation is more commonly used, however, within the umbrella framework of particular country. Policies should support industrial development taking into account the needs and resources, balance of the country and the region. In this context linkages to other industries do play a crucial role.</p>	<p>Government contribution is applied through stable and/or changing legislation, like laws pertaining to joint ventures, investments, taxation, etc. An important role in this context is played by incentives, exemptions, tariff structure, exchange controls, capital repatriation rules, patents, trademark, property, royalty and other relevant legislation. Stability of the umbrella system created by legislation is of crucial importance for business evaluation, so are other favourable parameters which indicate project profitability. Regional co-operation would greatly help in harmonizing the different rules and laws customerizing the business community in a certain area. Package arrangements, especially for financing to alleviate shortages would greatly enhance investment alacrity. Since the market might, at the beginning, be too competitive for an industry in its infancy certain protective measures are often needed.</p>	<p>The main difficulty, most obviously lies in the establishment of equitable and attractive umbrella system including incentives, flexible enough, and stable conditions for the long-term arrangements like joint ventures. At incipient stages the new complexes require often protection whereby there is a tendency to exaggerate the needed measures. Ensurance of smooth production continuity in cyclical market conditions which currently prevail might be difficult. Generally speaking, companies might experience many kinds of difficulties in huge number of variables involved, but to alleviate fears, this seldomly occurs in practice.</p>

Requirements	Contributions	Difficulties
<p>2. <u>International co-operation</u></p>	<p>In this very difficult task all contribution is needed. UNIDO's role would be seen to gather information, keep up-to-date data bases and data bank, provide information through meetings and conferences for guidance.</p> <p>Petrochemical associations, by providing regional and country data would greatly help this work and also avoid additional work from each countries. Tools which would be available after laborious work on different long-term arrangements in different aspects are urgently needed in the education process for equitable negotiations and approval.</p>	<p>Envisaged difficulties lie mainly in the adjustment process needed occasionally in the cyclicalities of the world economy and its impact on petrochemical demand. A number of other worries like financing difficulties, trade barriers, availability of technology, inadequacy of training etc. might from time to time worsen, in some geographical areas, smooth development of the petrochemical industry. The shortsightedness to see the importance of hurdles in linked industries can also be seen as a major threat for successful development.</p>
<p>Huge tasks facing the world petrochemical industry necessitate amongst other things, close co-operation, good information systems with updated data bases, cross-sectoral co-ordination of activities, balanced supply and demand and capacities, availability of know-how, technology and services, adequate financing facilities, to name the most important ones, at global, regional and national levels. This could be best achieved by elaborating package-type systems applied regionally. Long-term arrangements would also play a crucial role in enabling companies to use clear formulas of operation in trade and specific models for construction of plants for different demands in contractual arrangements.</p>		
<p>Education of both developing countries and developed countries to increase their awareness of global possibilities in petrochemicals, also education of new producers, in this context, would greatly help in harmonizing the global petrochemical operations in the utilization of available resources in a right, sensible and realistic way.</p>		