



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

20600

Distr.
LIMITED

ITPD.3(SPEC.)
22 April 1994

ORIGINAL: ENGLISH

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Global Preparatory Meeting
for the First Consultation
on Consulting Engineering Services

Geneva, Switzerland, 20-22 June 1994

STRATEGIES AND POLICIES
FOR THE DEVELOPMENT
OF CONSULTING ENGINEERING SERVICES IN
DEVELOPING COUNTRIES

Discussion paper*

Prepared by
the UNIDO Secretariat

* This document has not been edited.

V.94-22889

CONTENTS

	<u>Page</u>
I. INTRODUCTION.....	3
II. THE IMPORTANCE AND ROLE OF CONSULTING ENGINEERING SERVICES IN NATIONAL ECONOMIES.....	4
III. CONSULTING ENGINEERING IN DEVELOPING COUNTRIES: FACTORS BEHIND THE LOW PARTICIPATION IN THE DOMESTIC MARKET AND MAIN REASONS FOR DEVELOPMENT AND GROWTH.....	5
IV. THE NEED FOR INTERNATIONAL CO-OPERATION.....	9
V. FINAL CONSIDERATIONS AND CONCLUSIONS.....	10

1. INTRODUCTION

1. The strategic significance of the Consulting Engineering Services (CES) as an enabling factor for industrialization and economic development is being increasingly recognized. In industrialized countries the consulting engineering services have become the main support for reaching and/or maintaining productivity, efficiency and competitiveness. They have embodied most of the knowledge and skills related to the industrial and business disciplines.

2. The market for engineering consulting services is a multi-billion dollar market which is dominated by large firms based in industrialized countries. Even for a single investment project the range of services required is often very broad encompassing knowledge of, and expertise in, engineering, economics, finance and specialized technology. The larger multidisciplinary firms have a clear advantage.

3. In the developing countries, the main actors are still foreign firms. They play a critical role in shaping development through the provision of feasibility studies, studies on choice of technology, procurement, establishment of operating standards, preparation of tender documents, constructing of financial packages and many other specialized activities. There is, however, an emerging group of engineering consulting firms in certain countries in the developing world, particularly in the Far East and in the larger Latin American countries. These firms are competitive in that they are able to export their services to other developing countries and can succeed in their domestic market on the basis of fair and open competition with international firms.

4. Although the situation may vary from country to country it is generally admitted that for the majority of developing countries, the consulting engineering profession is relatively new. It is mainly characterized by a lack of experience in many aspects of the consulting activities including management and professional expertise. This experience is necessary for finding and implementing the best solution for a successful investment project. Indeed, an increased participation of developing countries in the consulting engineering market will enable them to improve their technical capabilities and management skills and contribute to their development and growth

5. The purpose of this paper is to give a brief analysis of the state of the art of the consulting engineering services in developing countries and to attempt to identify the main constraints inhibiting the local development of the profession as a whole and propose some solutions - without prejudice to the outcome of the meeting. Section II stresses the role of the consulting profession in the domestic economy and points out the importance of its development. Section III deals with the current situation of and the major problems confronting the profession and highlight the requisite conditions for its proper development and growth. Section IV emphasizes the need for international cooperation for capacity building in this area, and section V contains some final considerations and conclusions.

6. It is hoped that this paper will stimulate a dialogue among the experts participating in the Global Preparatory Meeting that will assist UNIDO in the selection of priority issues for further elaboration and consideration at the Consultation Meeting on the subject which is tentatively scheduled to be held in October 1994.

II. THE IMPORTANCE AND ROLE OF CONSULTING ENGINEERING SERVICES IN NATIONAL ECONOMIES

7. Consulting engineering services play a crucial role in the industrial development of developing countries. They are the means by which project concepts are translated into industrial plants through successive application of intellectual inputs. Although they account for less than 10 per cent of investment costs, they none the less determine the efficiency and long-term viability of investment projects. The purpose of such services is to provide in each case the most effective solution for the realization of high productivity manufacturing facilities; the choice of technology and its adaptation - in the context of the specific economic and social environment of the country - are critical components of the solution. Consulting engineering services are thus the determinant of the efficient and effective transfer and development of technology.

8. Consulting engineering services include techno-economic surveys leading to: opportunity and feasibility studies; advice on available technologies; identification and selection of appropriate technologies; preparation of tender documents and appraisal of bids; evaluation of technology; identification of plant and material suppliers; preparation of detailed plans for factory construction and installation of internal services; installation and commissioning of plant machinery and equipment; unpackaging of technology; and the provision of technical services for the proper operation and maintenance of plants to assure high productivity. All these activities are interlinked and require a multi-disciplinary approach, necessitating the services of technologists, engineers, economists, scientists, environmentalists and financing experts. Large consulting engineering firms are in a position to provide the full range of these services, including financial packaging. Smaller consulting engineering firms capture market niches through specialization in segments such as pre-investment studies or in-depth knowledge of specific subsectors. Environmental issues are of growing concern, and design of equipment to decrease pollution will command increased attention in the provision of consulting engineering services.

9. The economic and technical information for the appraisal of a project is provided in principle by the market. However, this economic and technical information contained in the equipment packages found on the market usually remains implicit and tacit. Complete assessment of the technology, its adaptation to local conditions and effective utilization, often require supplementary capabilities. Development of those capabilities may be too

costly for an individual investor. When in-house capabilities to appraise these various kind of information are not available, transfer of technology is confined to the acquisition of machinery and equipment, and/or of blueprints and instruction manuals. This gap is one of the explicative factors of most unsuccessful implementation of industrial projects in many developing countries. To reverse this situation, experienced and competent consulting firms should be brought in, at this point, to supplement that information and to ensure the best use of it according to the requirements of the project. Their wide range of services will enable them to interact with numerous technology suppliers and users and propose the most appropriate technological, organizational and economic solution to meet the investor's needs. Thus, they add the role of knowledge broker to their original role of designer and supplier of engineering services. Their role in the national economy is to collect, distill, and accumulate scientific information to be used in the study, design and implementation of investment projects.

III. CONSULTING ENGINEERING SERVICES IN DEVELOPING COUNTRIES: FACTORS BEHIND THE LOW PARTICIPATION IN THE DOMESTIC MARKET AND MAIN REASONS FOR DEVELOPMENT AND GROWTH

10. This chapter gives a brief overview of the state of the art of the Consulting Engineering Services (CES) in developing countries and tries to highlight some actions for promoting and strengthening the local consulting profession as a whole.

Supply and demand

11. By far the largest share of the demand from the developing countries for these services is met by international consulting firms. This share has displayed a downward trend in recent years, mainly because of declining investment in the developing countries but also because of increasing capacity for the provision of consulting engineering services domestically. A number of countries, notably in Latin America and East Asia, have developed a competitive edge in specific sectors and subsectors and have made some headway in exporting their services to other developing countries. Based on past capital investment and accumulated know-how, a number of these countries have used the construction industry as a point of entry into the consulting engineering sector. They have subsequently been able to diversify into industrial projects in the sectors in which they had a comparative advantage. However, the participation of the developing countries in the market for these services is still low. Several reasons have been advanced to explain this situation; one of them is lack of confidence in the capacities and capabilities of local consulting engineering services. This is the reason why in most developing countries, the public sector, which is by far the largest customer of consulting firms, tends to rely heavily on foreign suppliers of such services. From a short perspective, such reliance on foreign firms having the experience and the qualified human capital is often understandable, but in a long-term vision their building-up of domestic CES must be seen as a development resource.

12. As a matter of fact, the local CES suffer from a lack of an overall framework which is indispensable for the orderly development of the CES in most developing countries. Elements such as laws and regulations, policies and procedures required for fostering the promotion of local firms are common shortcomings.

13. With regard to the demand of consulting services, apart from financing institutions, private corporations, contractors etc., it is amply recognized that governments continue to remain the primary clients of the consulting engineering firms. Yet, despite their best intentions, governments have not been able to provide the promised support to domestic firms by allocating some share of the investment projects to them.

14. Furthermore, although there are some changes in the attitudes of governments in a few developing countries, most others continue to pursue their traditional policy of preference for foreign firms. If this trend continues to prevail in the future, the developing countries will be seriously handicapped in promoting a process of self-sustaining industrial and technological development. Moreover, macro-economic measures such as high import tariffs, rigid exchange regimes add to the problem of access to credit and the collateral dilemma make up major obstacles to the growth potential of the majority of domestic firms.

15. Important factors in any entrepreneurial activity are the availability of a well qualified management and good organizational structure. Skilled, knowledgeable, qualified and experienced managers and trained staff well equipped to work according to well-set objectives and policies and programmes are a rarity.

16. At the level of the consulting engineering profession itself, the problems connected with the weak national associations and the lack of professional ethic and professionalism have an influence on the enhancement of a well-organized profession. Moreover, the close correlation between a country's economy and the growth of its domestic consulting profession, government policies and practices, donors, professional societies and associations also have a significant impact.

17. National government policies can play a crucial role in the development of national consulting engineering enterprises. On the supply side, more use has to be made of universities as well as of polytechnic and specialized institutions which should be encouraged to make their know-how available to local industry and fledgling engineering consulting firms. Training policies and programmes should aim at increasing the supply of electrical, mechanical, construction, and other engineers and technicians required in this field. Action should also be taken to train such engineers and technicians in project designing, planning and implementation, contract negotiation, and production management, in order to create a cadre of specialists who can provide the core for the creation or strengthening of national engineering services.

18. On the demand side, public investment could act as a spring-board for developing national capacity. Subsequently, build-up confidence could lead to increasing use of the services of local firms in projects funded (either multilaterally or bilaterally) by the public sector or by international and regional financial institutions. Government policies and incentives are the means by which demand could be increased and the parameters for competitiveness established. Organized in the private sector, national consulting enterprises are well placed to interact with private enterprises and demonstrate their ability to provide services in a timely and cost-effective manner, thereby promoting demand for such services. Yet, as mentioned above, demand for consulting assignment in a country reflects the level of industrialization and economic development reached, and the complexity of managerial and administrative problems faced by the private and public sectors. The need for efficiency and for meeting higher performance standards looms large among these factors.

19. In order to realize the potential for self-sustaining industrialization and economic development, a committed government should develop an effective strategy and programmes for addressing the profession's constraints and for enhancing the quality of its activities and efficiency as a whole.

20. The objective should be to improve the local consultants capacities and capabilities in domestic firms; to design and introduce effective policy measures in this area which would be grounded on action at government level as well as national consulting associations and federations, industrial associations, universities etc. The aim is to build up a productive and competitive capacity, and/or to overcome barriers to entry to domestic and, if possible, international markets.

21. To achieve these objectives, national governments together with concerned partners should develop/establish an overall framework for the promotion and development not only of the consulting engineering services but also for the profession as a whole.

22. The priority areas where actions are urgently required include:

- (a) The elaboration of policies, procedures and programmes to improve the quality of professional work and the efficiency of the profession;
- (b) Undertaking institutional reforms to initiate, support and implement the above policies, procedures and programmes effectively;
- (c) The development of a professional and favorable environment that supports local consulting engineering services to produce quality services and operate viable consulting companies.

23. In developing a coherent strategy to address the constraints on the profession national governments ought to consider the profession in all its facets, especially the following aspects:

- (a) The consulting engineering services profession requires flexibility, mobility, exposure to technological changes and speedy operational decisions. In this respect, procedures regarding technology acquisition and information, foreign exchange and the temporary employment of foreign experts should be simplified to allow local consulting firms to cooperate on a competitive basis.
- (b) The educational system should be reoriented to capitalize on know-how and skills development that are directly useful and applicable to meet the needs of the economy. This requires a permanent dialogue between universities and technical schools as well as employers which should lead to a genuine education-industry partnership.
- (c) Fiscal incentives and better access to finance are essential ingredients that can stimulate the development of the local consulting engineering firms. These incentives can take various forms such as tax-relief, reduced tariffs on import of key equipment, particularly those of informatics. Access to finance can be facilitated by modifying regulations with regard to collateral. Tying industrial project loans to the involvement of local consulting firms in project execution is an indirect way in which financial institutions can promote local firms. Access to finance could be improved by encouraging the establishment of special "banking windows" for producer services, and the credit worthiness of firms in the sector could be strengthened by a system of government guarantees.
- (d) To strengthen the credibility of the consulting engineering profession, there is a need to pass laws to regulate the membership. Such laws should be drawn up in consultation with national associations, and should contain provisions for these associations to participate in consulting engineering profession policy making.
- (e) Governments should consider integrating the development of local consulting engineering services in its economic planning, linking its development to that of human resources, of markets and the utilization of local inputs;
- (f) Domestic firms which qualify for long-term collaboration should have sufficient experience to contribute through their knowledge of local technology, codes, practices, materials, socio-economic and political conditions. This can only happen if they are allowed to be more involved in the execution of investment projects.

- (g) National governments should be encouraged to ensure that a significant amount of the consulting engineering market be given to national consultants to allow them to develop their firms and train their personnel to improve their technical and managerial skills to acquire the necessary experience and expertise needed to be competitive by providing good quality services thereby avoiding low price biddings.

IV. THE NEED FOR INTERNATIONAL COOPERATION

24. The proposed Consultation on Consulting Engineering Services mentioned earlier in para. 6 would have a significant potential for international cooperation (North-South, South-South, and possibly also North-East-South). The trend in the developed countries appears to be towards the provision of integrated services from conception to operation, covering technological, managerial and financial packages. Segments of these services could be provided by firms in developing countries through sub-contracting.

25. At the same time there are perceived movements in some developing countries towards the provision of more complex services in particular subsectors and industrial areas. Consulting engineering services in the majority of developing countries are still at an embryonic stage, however. A vast potential therefore exists for South-South cooperation. The strengthening and development of national capability in consulting engineering services would enhance such a process and foster the transfer and development of technology that is more appropriate to the needs of the developing countries. This would help create a favourable environment for the attraction of foreign investment and other forms of international cooperation.

26. Due to the rapid development of technology, a broad range of technological solutions is frequently possible. Investors encounter difficulties in the choice of technology from the large selection of technological alternatives available. This is especially true in the case of small and medium-size enterprises, as became apparent in the Consultation on Small and Medium-Scale Enterprises held in 1989. The development of domestic consulting engineering capability could give much-needed impetus to small-scale industries. There are also other industries, notably agro-industries, building materials and construction where there is a strong potential for developing national capability through various forms of cooperation. The need for building up consulting engineering capability in the developing countries has been underlined in past Consultations, particularly in those relating to the iron and steel and petrochemical sectors.

V. FINAL CONSIDERATIONS AND CONCLUSIONS

27. The previous sections have attempted to discuss some of the issues related to the development of consulting engineering firms in developing countries, their current capabilities and potential for growth, as well as the right environment and the constraints inhibiting their promotion and development. In this respect, the UNIDO Secretariat proposes that issues for the First Consultation on Consulting Engineering Services be selected from the following:

- (a) How best the domestic consulting engineering services should be established and promoted for the new comers to the profession, and how to strengthen the existing ones in order to foster their broader and deeper participation in their domestic market and, when ever possible, in international ones?
- (b) The ongoing industrial rehabilitation and restructuring in many developing countries, and former centrally-planned economies will create many business opportunities particularly in regard to small projects. Such a trend is already observable in the promotional and technical co-operation activities of UNIDO. Developing countries therefore ought to undertake urgent measures to develop national consulting engineering services not only to participate effectively and profitably in emerging markets, but also to assure that the costs of providing such services do not rise as a result of supply constraints. In this context, what policy and institutional support would be required from governments and local business community for the domestic development and growth of consulting engineering services?
- (c) The need to improve the local consultants capacities and capabilities will add to their competitive advantage in such area as the socio-psychological management of investment programmes and projects. Therefore, how and to what extent national governments can encourage and/or strengthen collaboration particularly between foreign and domestic firms? This collaboration can be established in different ways. The aim is to increase market access and provide learning opportunities to local consultants. And for foreign firms, there are definitely cost advantages and easy access to local information. Such arrangements may include: joint-ventures, project-specific partnerships, subcontracting, etc. Cooperation among local firms also needs to be encouraged, although the risk of sharing scarce technical information limits such cooperation.

28. It can thus be safely concluded that the road to the establishment and successful operation of the local consulting firms is arduous but not impassable. As discussed above, in most developing countries, and especially in the least developed ones, lack of experience, expertise, and reliability represent the points of fragility in the development of the consulting profession. What is really needed is an effective strategy and programmes for restructuring the profession, matched with a genuine commitment on the part of national governments to integrate the consulting profession with the overall structural change underway in their respective countries. However, the success of these programmes depends, to some extent, on efforts to build up autonomous professional organizations - or to strengthen the existing ones - to defend the common interest of their members, to promote a code of ethics, educate the new comers to adopt a professional approach in a changing business environment to achieve the objective of the consulting engineering services playing an important role in the national economy.