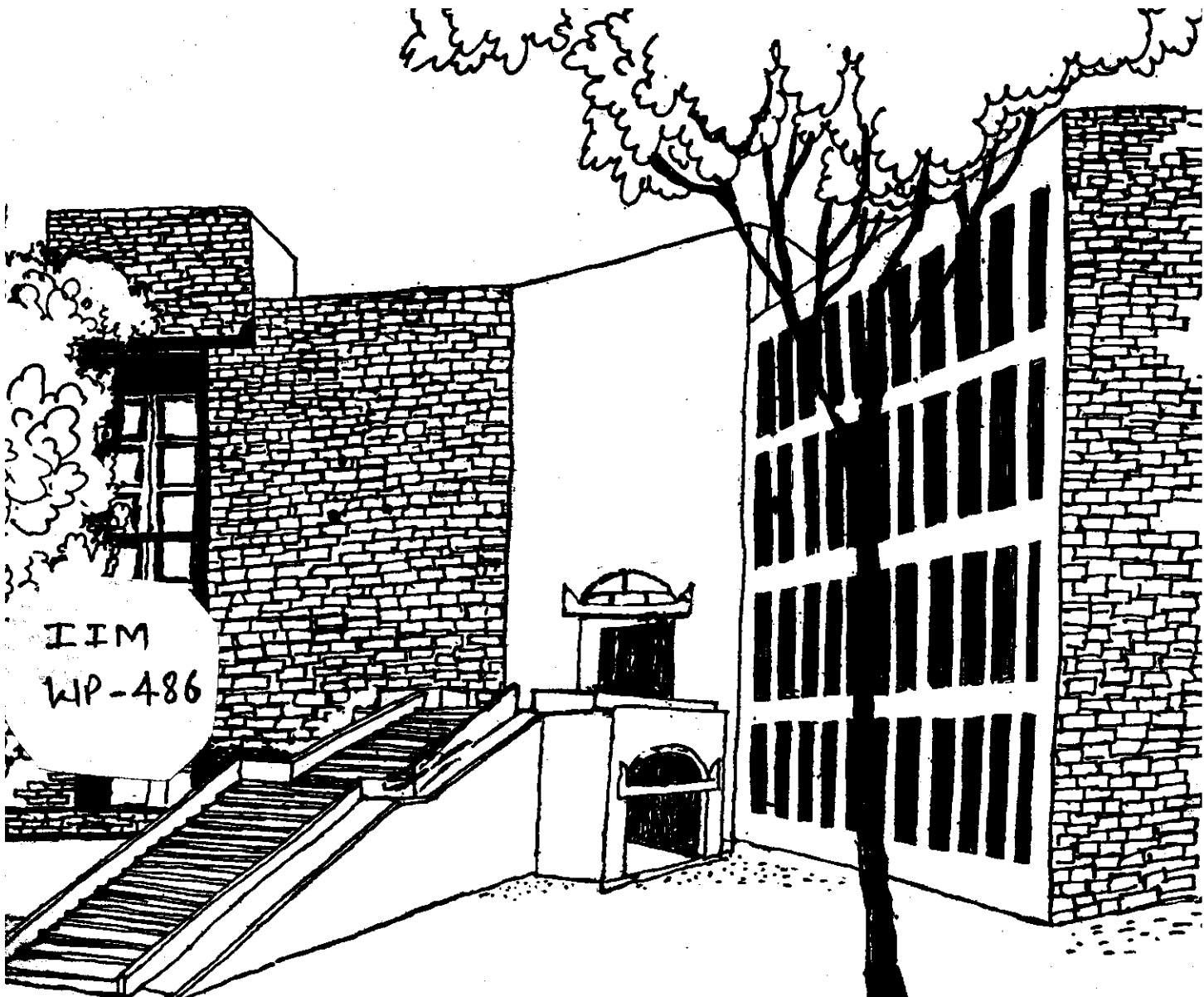




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# Working Paper



DESIGN OF AN ORGANIZATION STRUCTURE  
FOR OCEAN DEVELOPMENT

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Abstract

DESIGN OF AN ORGANISATION STRUCTURE FOR OCEAN  
DEVELOPMENT\*

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The development of ocean resources has become a major strategic programme for India. The vastness, complexity and uncertainty of the ocean environment necessitate a co-ordinated, and responsive organisation structure. This paper outlines the design considerations and proposes an organisational structure within the Government of India, to achieve its main objectives in ocean development. Firstly, an analysis of tasks, roles and linkages in ocean development is attempted. Various approaches to organisation design like contingency theory, cultural analysis, stakeholder analysis, matrix organisation and organisational learning are reviewed in the context of the tasks ahead in ocean development. It is argued that the design of the structure should be seen in multiple ways and structure is much more than an objective set of relationships and formal location of authority. Such a processual view of the structure enables us to look at its design as a part of ocean development rather than an "objective stage" prior to its implementation. Consistent with the nature of advanced technology, the turbulent

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environment and an assessment of the alternatives in organisation structure within Government of India, an organisational structure at the top management level and programmes is designed. The structure is based on an analysis of environmental conditions and task requirements as well as perceptions of and consensus among stakeholders. The design is informed by a larger contextual understanding of India's strategic vision and her political economy.

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## 1. Background.

The Oceans, probably, constitute the last frontier of mankind. India has a strategic interest in the oceans. With the recent enactment of the Maritime Zones Act (1976), India has extended limited sovereignty for resource exploitation and regulation to nearly two million sq. kms. in the form of the Exclusive Economic Zone (EEZ). This area is nearly two thirds of India's landmass and contains very rich living and non-living resources. Oceans, in this sense, provide another historic opportunity for India in its economic development efforts. Major marine technologies for the recovery and utilisation of ocean resources are likely to become feasible and viable in the next 20 years. The scramble for ocean resources has already started. The inconclusiveness of the debates of the United Nations Law of the Seas Conference reflects the basic inequity of the international economic order. The oceans might well be a source of major conflict among the nations in the eighties and nineties. In the EEZ, India has the opportunity to develop and exploit the resources and to emerge as a Third World leader in ocean development. Within India, the major strategic question of developing ocean resources for the benefit of the masses is yet to be resolved. The vastness, complexity and uncertainty of the ocean environment necessitate a coordinated, centralised and highly sophisticated development response. (Government of India, 1982). Such an intervention necessarily implies benefit to some groups and not to others. The political

economy of ocean development is likely to be as problematic within India as it is among nations.

India has had a fairly long maritime history. Presently, Indian involvement in the oceans is fairly high. For example, fisheries, offshore oil exploration and shipping are very significant. There are many agencies both in the public and private sectors that are involved in the use of ocean resources. The major ocean resources are (i) fisheries, (ii) minerals, (iii) oil and gas, (iv) energy (ocean thermal, wave, tidal etc.) and (v) marine space for transportation and national security. In each of these, the potential far exceeds the present resource use and it is truly a new frontier with possibilities and problems. The Government of India, considering the strategic importance and the need for orderly and harmonious use of oceans has set up the Department of Ocean Development to play a nodal role for developing policies for co-ordination, security, regulation and development of the oceans. This is probably the first developmental agency that the Government has created with a spatially integrated mandate of such an order of magnitude. This paper outlines the design considerations and proposes an organisation structure within the Government of India, to achieve its main objectives in ocean development. While doing this, we realize that organisation structure is one among several variables to determine programme effectiveness. The paper is based on discussions with



senior officials, review of relevant documents and our own understanding of different organisations. The arguments are developed in the following sections:

- (i) Analysis of tasks, roles and linkages in ocean development
- (ii) Approaches to organisation design, which will examine some conceptual issues
- (iii) Organisational issues in ocean development
- (iv) Assessment of a few major alternative structures
- (v) Development of organisational structure and finally,
- (vi) Intervention strategies for implementing the design.

## II. Tasks, Roles and Linkages in Ocean Development

The tasks facing the ocean development programme in the next ten years are really major. These tasks can be described as follows:

(a) The Oceans Profile prepared by the Department through extensive consultations and meetings in different parts of India outlines the major thrusts that India needs to undertake, to bring about orderly ocean development. Priorities and strategies however are yet to be identified in the form of a strategic plan for ocean development. This process is under way. There are several existing agencies in oil and gas exploration, fisheries, shipping etc, which have their own mandates and derive funds directly from their own Ministries. The new Department of Ocean Development is unlikely to have overall control or funding authority over any of these agencies. Therefore, it was not intended that the Department should evolve into a monolithic, large organisation encompassing all ocean related activities. The new structure is likely to have persuasive, catalytic and coordinating tasks in relation to these various agencies. Hence, one of the primary tasks facing this new structure would be to build strong institutional linkages within an integrated, long range ocean development plan.

(b) There is considerable consensus that the new organisation for ocean development should not attempt to build a large manpower

directly on its rolls. Rather, it should work through existing institutions by funding new programmes, entering into contracts for specific tasks and joint/co-financing of projects. For very specific situations, where a new ocean programme would not fit into the mandate or capability of any existing institution (e.g. ocean mining) or when short term, urgent, co-ordinated action is required (e.g. Antarctica mission), the Department needs to create a new agency to implement that particular programme.

The production of polymetallic nodules is one such area where a new agency may have to be created. With India gaining "pioneer" status in ocean mining through United Nations, there is an urgency to establish a comprehensive project for polymetallic nodules. This project will become an important "executive" arm of the ocean development programme. It provides interesting possibilities for designing innovative structures for interorganisational collaboration. Its three stages, viz., (i) Exploration/Survey-Assessment, (ii) Mining and Transport and (iii) Processing and Marketing pose real challenges to bring together expertise and skills in various institutions. National Institute of Oceanography, Geological Survey of India, National Geophysical Research Institute and Indian Bureau of Mines might be involved in the Exploration-assessment stage. For mining and transport, Engineers India Ltd. and others may be necessary. For processing and marketing, Hindustan Zinc Ltd. and Hindustan Copper Ltd. may be required. In addition, foreign collaboration

and technology may be needed in any of these stages. Comprehensive planning and monitoring of the operations and linkages will be needed.

(c) In the foreseeable future (i.e. ten years), development of technology and its commercialisation are likely to be of major importance. For example, building deep-sea structures, ocean mining, underwater technology, instrumentation and control and vehicle design are some of the areas where technology has to be developed and commercialised. It will be the task of the new organisation to develop these technologies directly through funding, through setting up new centres or through linkages with other scientific and technical institutions in the country. If some of these technologies are to be imported, then, they need to be absorbed and adapted.

Connected with this task of technology development are the two important tasks of Ocean Science Development and Ocean Resource Assessment. Our basic knowledge about the ecology, climate and biology of oceans, physical and chemical oceanography and the history of ocean environment is inadequate. Hence, considerable work needs to be done by basic, long range research on oceans. Similarly, (living and non-living) resource mapping and assessment in the vast area of EEZ and outside are likely to prove very important. Vastly increased efforts in surveys, exploration and analysis need to be launched to gain this knowledge. A variety of mechanisms such as grants-in-aid, research contracts, post-graduate fellowships in existing institutions as well as developing new centres can be used to build this knowledge base.

(d) Qualified and skilled manpower for ocean development in India is extremely scarce. Except in a few academic/research institutions and a few industries, there is hardly any high quality manpower with skills to operate in the ocean environment. Development of such human resources through training courses, continuing education programme, development of centres of excellence in ocean science and technology and sponsored research, is critical. Without extensive and intensive development of human resources, it would be impossible to undertake an ambitious programme of ocean development. The history of atomic energy and space programmes in India points to the need for high priority for this task.

(e) Rebuilding a maritime tradition and ocean consciousness in India will be a major long range task facing the programme. Setting up an ocean information centre which is both a clearing house for all ocean related programmes as well as management decision support facility will be a high priority task. Dissemination of ocean related information through books, reports, films, publicity measures, seminars/workshops as well as through formal and non-formal education will be an important task for this centre, to achieve the objective.

(f) For the promotion of many activities connected with ocean development and to ensure backward and forward linkages, financing is likely to be a major task. Resource mobilisation for ocean development is likely to face a number of constraints within the overall development planning context in the country. The ocean

development programme through its financing mechanism will also be called upon to use financing as a leverage to get some of its programmes undertaken by different agencies. Some of these programmes will need to be tested by market effectiveness through criteria such as efficiency, accountability or mission orientation. Others may be characterised by high risk, strategic or security orientation or uncertainty of outcome. These types would need different kinds of financial arrangements. Hence, there is a need to develop a financial strategy as a part of the strategic planning exercise. In addition to relying on budgetary appropriation, the ocean development programme may generate its own funds through internal operations. Government financial procedures do not now permit the use of internally generated funds, as all revenues go into the central pool. Some innovative financing mechanism may have to be designed.

Consistent with these tasks, the following roles can be identified in ocean development.

(a) The Promotional role will involve the following:

- Infrastructure development  
(Industry, R & D, Educational Programmes)
- Technology Development
- Institution building (new centres, institutions)
- Financial support and catalytic action
- Human resources development
- Information collection and dissemination

(b) Planning and Co-ordination roles will involve

Policy formulation  
 Strategic Planning and Management: Technological  
 Forecasting and Assessment  
 Monitoring Performance  
 Conflict resolution among competing uses  
 Interorganisational linkages  
 Resource mobilisation: Financing Strategy (Internal,  
 Government, Institutional loans)  
 Impact Assessment and Evaluation  
 Programme and Policy Review.

(c) The Regulatory role will involve

Multiple use regulation  
 Zoning  
 Regulation of specific types of uses oceans  
 International Treaty obligations, multilateral/bilateral  
 collaboration  
 New legislation and rules enforcement  
 Environmental Protection  
 Licencing, Imports, Foreign collaboration

These roles have both short and long range dimensions. For example, institution building in the short run may involve the creation of programme structures to meet the 1990 goals. In the long run, it may imply development of educational or research centres or general infrastructure development. Similarly, conflict resolution in the short term might require an inter-departmental committee. In the long run, it may be achieved by information flow, enactments, mutual agreements or joint development of long range plans and review processes.

The roles are not always mutually exclusive. For example, regulation can aid promotion under certain circumstances. In others, regulation may dominate and constrain promotion. Hence, role clarity and role management are important processes.

Linkages among agencies involved in the ocean can be of many kinds. The ocean development programme will have to strengthen these linkages (both horizontally and vertically) in relation to the strategic plan. An illustrative list of these agencies appear in Appendix 1. The linkages among these agencies can be based on:

- (a) Technology (same physical structure, same transportation means for multiple purposes)
- (b) Spatial, regional focus (same region for operation by multiple users)
- (c) Administration and planning (same approval or review procedures)
- (d) Programme management (same management structure)
- (e) Political (identity of interests of different groups)

These linkages based on common features (such as technology etc.) need to be strengthened through consultative and joint planning/review processes. Linkages can also be established with land based development programmes and policies. For example, National Water policy (discharges, allocation of use, transportation), National Food Policy (Land vs. Ocean food, price support) and Urban Planning for coastal cities such as Bombay or Madras, will have tremendous implications for ocean development. Linkages with those agencies and groups, then, need to be consciously strengthened.



Given these tasks, roles and linkages it will be useful to review some concepts in organisation design, to help in the analysis of structural issues.

### III. Approaches to Organisation Design

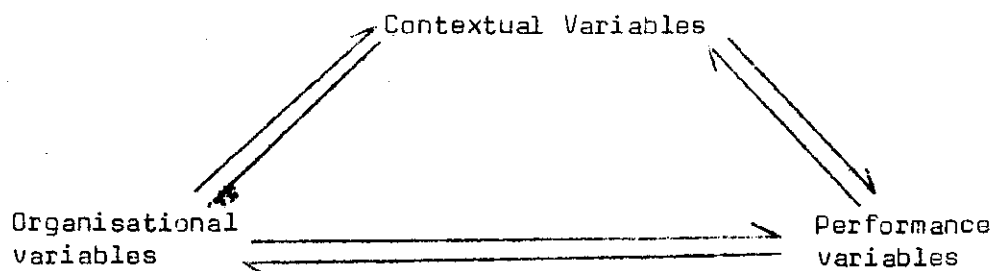
A new programme like ocean development has certain needs determined by environmental, technological and historical factors. Some basic choices have already been made. For example, ocean development will be the primary responsibility of Government through a planning process rather than being left to the market forces. Thus, the programme's linkages with the bureaucratic-administrative set up will be fairly strong. This study takes such basic features as given and will attempt to develop a structure that is appropriate to the tasks in ocean development.

There is an extensive body of knowledge on organisation structure. What we will attempt to do here is to briefly review some relevant concepts and explore their significance for ocean development. The first concept that is relevant is the framework which argues that an appropriate match between organisation, technology, environment market, and strategy is necessary for effective performance (Khandwalla, 1977). The adaptiveness of a structure is determined by its ability to change appropriately so that a match is accomplished in a situation where these factors are changing at different rates.

The nature and relationship of contextual, organisational and performance variables are outlined in Figure-1. As one can observe, these three types of variables mutually cause and constrain each

Figure-1

Contingent Variables in Organisational  
Design



Contextual  
variables

ownership and  
control

size

charter

technology

location

interdependence

goals

Organisational  
variables

specialisation/  
differentiation

standardization of  
procedures

roles

rules

formalisation

centralisation

configuration

Performance  
variables

economic viability

growth and expansion

adaptability

innovation

organisational  
culture

accountability

other. In designing a structure for ocean development, these variables have to be identified and their relationships explored.

Organisations have also been viewed from a cultural perspective. Organisations thus, are seen as consisting of multiple, often conflicting, "cultures" (Benson, 1977). The organisational reality is, in this view, socially sustained and socially changed. This view is clearly opposite to the unitary collective image of the organisation as a homogenous, functioning whole. Such a managerial view, typified by an organisation chart, job descriptions etc., is not "reality" but how top management sees it or thinks it should be. The different groups in an organisation have differing cultures and they attach different meanings to organisational phenomena. For example, in ocean development, scientific, administrative, diplomatic, commercial and military "cultures" are likely to be relevant. Hence, the need for multiple perspectives in organisational analysis.

In the literature that deals with organisation-environment relationships, organisation structure is seen as an open system that has boundary exchanges with the environment. (French and Bell, 1980). It is both constraining and is constrained by the environmental forces. For example, if the technological environment of an organisation is relatively stable then the structure is likely to be more hierarchical. If the technology is fast changing, (e.g. oceans, electronics, space etc.) then the organisation structure will tend to be open, fluid and

more horizontal. Rules and procedures will be of much less importance and people may spend a lot of time continuously redefining their roles and in interacting with others. Thus, technology is an important variable of organisation structure and it provides limits to its design.

The legal environment of an organisation is a very important factor that influences organisation structure. The managerial view is that organisation is a means of control. The ownership of vast resources in the ocean, right now vests the State as "property". When the "property" becomes a resource that can be exploited, the legal power and control of the Government structure will vastly increase. Similarly, the distributional impact and ecological impacts of ocean resource development will be significant influences in determining the structure.

Work done on matrix organisational structures where inter-organisational collaboration is needed, indicate the need for multiple command systems, shared power/resources and a high degree of interdependence for task effectiveness (Davis and Lawrence, 1977). The dimensions of such a matrix structure may be programmatic goal categories (food, energy etc.), functional specialisation (finance, personnel etc.) and geographical focus. Matrix structures attempt to create balance of power between various dimensional elements so that each of them has a sense of control as well as a sense of interdependence. For them to work, tremendous flexibility and innovation

in accountability are needed. NASA's experience in putting the man on the moon is often cited as a successful experiment in matrix organisational structure. Recent technological advance (in communication and information processing) make such structures more viable. While there are pressures for organising by function, by region, or by sector, matrix structures have been able to integrate the various elements in spite of such pressures. This framework addresses problems of inter-organisational collaboration and co-ordination. Such a matrix structure might be relevant for a project like Polymetallic nodules, where different agencies will be involved or the technical secretariat at headquarters where multiple roles and skills are needed. Within government systems, formal matrix structures have not been widespread, even though co-ordination among specialised agencies is fairly common. Government agencies might well (like Moliere's gentleman who was surprised to find that he was speaking prose all his life) find that they have been "matrixing" all along.

Finally, organisational learning theory has made important contributions to the design of structures (Argyris and Schon, 1978). Structuring in such a perspective, is a reflection of organisational learning in response to environmental changes. In a system theoretic framework, organisational learning, looks at the structure as a self-regulating mechanism with feedback loops. The cycle of action-error detection-error correction provides the feedback for structuring and restructuring. If we view structuring as a cultural process,

this perspective emphasis shared meanings, norms and interaction. The organisational learning perspective also looks at structuring as a political process where there is an interplay of competing interest groups. These conflictual processes enable us to understand the distribution of power in the organisation and the way in which conflicts result in dominance, submission, compromise or stalemate in the structure.

The various perspectives we have reviewed emphasise that the design of the structure should be seen in multiple ways and structure is much more than an objective set of relationships and formal location of authority (as in an organisation chart). Such a processual view of structures enables us to look at their design as a part of the activity (in this case ocean development) rather than an "objective stage" prior to its implementation.

#### IV. Organisational issues in Ocean Development

An important design concept is that the structure is to be viewed as an evolving process in response to environmental needs rather than as a fixed entity, specifying roles, authority relationships and organisational hierarchy. The following issues relevant to the organisational design are outlined here.

If the programmes are mainly implemented through other agencies, then the top management's main focus will be on planning, resource mobilisation, coordination and institution building. Hence the size of the structure should be reasonably small. It should not develop into a large hierarchy. The structure should be horizontal and democratic. The personnel should be at a fairly high level. In addition to permanent manpower some may work for this group on secondment from other agencies like scientific laboratories, industry, universities and other government agencies.

The technical secretariat at headquarters should be compact and highly professional. Such a secretariat, in relation to the tasks and roles envisaged earlier, may ultimately have a strength of 25-30 officers. The secretariat can be organised along matrix lines where people have multiple roles and interdisciplinary skills. The dimensions of the matrix will be: (a) Sector (Shipping, Living resources, Non/living resources etc.), (b) Functions (International Relations, Legal, Human Resources Development, Administration, Finance, Procurement



and Contracts etc.) and (c) Programmes (Mining, Human Resources Development, Research Programmes, Special missions like Antartica expedition etc.). Such a secretariat needs to have a work oriented rather than a staff oriented culture. It will help the top management in policy formulation, implementation and monitoring. An effective model of this kind is the ISRO Technical Secretariat in Bangalore.

Connected with the nature of the secretariat is the location of the Headquarters. While there are some advantages in being in Delhi, we feel, based on the experience of many other scientific agencies, the secretariat and the top management should be located away from Delhi in a coastal city which has good transportation/communication and other infrastructure facilities. For many operational and "work-cultural" reasons, this may be a better choice. There can be a liaison/branch secretariat in Delhi. Again Department of Atomic Energy, and Department of Space are good examples in this regard.

Maintaining autonomy in finance and administrative functions is a vital necessity for the new programme. Its changing environment and complexity/sophistication in technology demand reasonably high orientation towards risk and uncertainty. Errors and failures should be expected to result from experimentation and serve as a source of institutional learning. If there is 100% success on all ocean development efforts, then probably, the organisation is not doing as well as it should be. A high degree of autonomy goes with a high

degree of public accountability. Hence, it is important for the leadership in this organisation to have a high risk orientation coupled with high accountability. Low risk orientation would imply a structure where responsibility is diffused among many agencies. For example, recruitment would then be done by UPSC, purchase will be done by DGS & D, expenditure will be approved by Ministry of Finance, etc. Organisational effectiveness will necessarily be low as procedures will take a long time and stifle innovations in ocean development. Therefore, experimentation, making errors and institutional learning need to become key characteristics in ocean development.

The structure, then should have a large measure of operational autonomy. As we emphasised earlier, the physiology (culture of the organisation) is more important than the anatomy (structure). From our study of the existing scientific organisations we would like to recommend the following, operationalising the concept of autonomy. The formal mechanism (cabinet resolution, enactment, government order, whatever) setting up the new programme should ensure (a) Movement towards performance oriented, budgetary control from expenditure control, (b) Delegation of maximum financial powers, (c) Power to reappropriate funds within broad categories, (d) Flexibility and powers for creation of posts, recruitment, purchase, contracts, etc. and freedom from normal government rules and procedures of UPSC, DGS and D, CPWD and Ministry of Finance. Such delegation is already operational in

Department of Space, CSIR etc. All decisions (beyond the delegation) that require the clearance/approval of Ministry of Finance should go directly to a Secretary in that Ministry for decision and not to a lower functionary. These measures are suggested in the hope that such autonomy will confer the new organisation with sufficient flexibility and dynamism. Precedents exist within Government for such delegation. However, we are also aware that within the financial and administrative structure of Government of India total autonomy is neither feasible nor desirable. Beyond a certain measure, flexibility in rules will not ensure effectiveness in performance, either.

The political economy of ocean development and its distributive impacts within the country is of strategic importance in the new organisation's mission. The experience of high technology programmes in this country largely has been of marginal importance to the poor. Many of these programmes have created organisations characterised by professionalisation, elitism and irrelevance to the masses. The environmental imperative of ocean development might push the new organisation in the same direction. Strategic choice of programmes and their implementation can contain this trend and make ocean development more meaningful. One can address this question only partially through structural innovations. Maintaining a high profile of public accountability and participation of as wide a variety of stakeholders as possible would be important. While a number of stakeholders are fairly well organised, there are others who are not. Hence, it is

very important that the new organisation protect the interests of unorganised and semiorganised groups such as coastal fisherman whose livelihoods are at stake and ecological groups concerned about sustainability of operations in the ocean environment. A stakeholder analysis has been attempted here (Mitroff and Emsbroff, 1979). Table-1 portrays the different types of stakeholders and their particular strategic focus as far as ocean development is concerned, their preferred ocean programmes and their needs for structural orientation in ocean development. The Table clearly shows that the perspectives are quite divergent and it is important that the design recognises this conflict in perspectives and attempt a synthesis. This is based on a worldview that problems in ocean development are not simply technical but involve social conflicts. The conflicting perspectives should not be brushed away or compromised in a superficial manner but should be used productively to explore through dialogue, the underlying values, assumptions and goals. Such a dialogue can then create a richer synthesis for development.

Coordination among a variety of programmes, over which the Department of Ocean Development does not have full control implies the need for coordinating structures and a system of sharing information. Hence, the new structure should contain a strong capability in management information systems that provide information about what is happening in the ocean environment on an integrated and holistic basis. Such a comprehensive information system can be invaluable for strategic planning and development of complementary programmes.

TABLE 1

Ocean Development: Stakeholder Analysis

<u>Stakeholders</u>	<u>Strategic Focus</u>	<u>Preferred Prog.</u>	<u>Needed Org. Structure</u>
1. Scientists/ Technologists	Knowledge Building	Research Projects; Training & Education	R & D Orgs.; Training Institutes
2. Administrators	Coordination; Long term development	Institution building; Inte- grative Progress	Board/Commission and Department
3. Corporate (Public & Private) sector	Expansion and Diversification	Building capacity; new Commercial projects	Funding agency
4. Related Government agencies (oil and gas; fisheries; minerals, etc.)	Protection of own interests. Problem solving orientation	Own Departmental/ Agency Programmes	Inter-departmental Committee/task force for coordination
5. Coastguard	Enforcement	Legislation and regulations	Fewer agencies/
6. Politicians	Short-term performance; image building; Espousing interests; Building a political base	"Frontier" technology; Internationally visible programmes	Board/Council directly accountable

A planning function of this nature can serve as another co-ordinating mechanism which will integrate the diverse aspects in different programmes, and highlight their cross-impacts, cumulative, long range implications, and impact networks as well as systematic effects. Again there is positive experience from other government agencies like the Department of Electronics which has a strong Information, Planning and Analysis group. Such a strong planning function should be an integral part of the proposed structure.

## V. Alternatives in Structure

Within the Government of India, a number of different organisational structures have emerged over the last 150 years. These alternatives vary widely in form, autonomy, accountability and effectiveness. Each one has had its origins in a particular historical context and in perceptions of the leadership about environment and technological forces. Some of these forms are set out in Table-2.

In all these organisations, government and the public have considerable stake. They are exclusively financed by public expenditure and have monopolistic control over their respective functions. They are in one sense (except perhaps some public enterprises) regulated monopolies. The big differences among them is in terms of the relative autonomy which they enjoy from the usual checks and balances prevalent in Government operations and decision making. Let us now review the structural alternatives.

Departmental undertakings usually have fairly stable technological and task requirements and tend to have a strong bureaucratic structures. Their autonomy is very limited and they are usually treated as "subordinate" offices. Major decision making would have to be done by higher offices, probably in the Departments or Ministries. This form clearly is unsuitable for top management in ocean development.

The first organisation that got the maximum amount of autonomy was the Railway Board. The constitution of the Railway Board empowers

TABLE 2Organisational Forms

<u>Form</u>	<u>Organisation</u>
1. Departmental undertaking	Government Printing Press
2. Board	Railway Board, P & T, Oil Industry Development Board
3. Commission	Atomic Energy Commission, Electronics Commission, Commission on Additional Sources of Energy, Space Commission
4. Authority	Central Electricity Authority International Airports Authority
5. Autonomous Organisation/ Registered Society	CSIR, IITs
6. Public sector enterprises	Indian Oil, Steel Authority of India Ltd., Engineers India Ltd.



it to have complete financial and administrative autonomy. In fact the Railway finances also are separated from general finances, giving it a certain sense of stability free from the vagaries of budgetary appropriations. Structurally, Railways are the most autonomous among many programmes. The Railways have a single mission of transportation and have far flung operations throughout the country. Over time, the structurally granted autonomy was eroded and the Railway administration appears to have become more departmentalised. The case of Railways provides ample proof that structural designs do not provide everlasting guarantees for effectiveness. However, many of the features of the Railway Board which have developed over the last 75 years have relevance to ocean development.

The Atomic Energy Commission and the other Commissions that are modelled after it are major organisational innovations in government. The commission structure for high technology programmes has become the norm after the experience of Atomic Energy Commission. In a Commission, decisions could be taken quickly and programme managers have considerable power to decide on all policy questions. Recruitment, purchases and finance approvals were all possible within the Commission structure. The Railways Board innovation of having a Member for Finance as the representative of the Finance Ministry within the Board itself continues in the Atomic Energy Commission. But while the Railway Board has a full time Financial Commissioner, the Atomic Energy Commission and the other commissions have only a part-time member for finance who is also a

Secretary in the Ministry of Finance. This ensured even more autonomy for the Commissions from the procedural requirements of financial approval. Coupled with strong leadership (e.g. Homi Bhabha and Vikram Sarabhai), the Commissions often enjoy very high degree of autonomy and have proven that for promotion of new technologies they are eminently suitable as organisational structures. Whenever unique organisational missions are involved (particularly developmental, non-commercial and non-regulatory activities), the Commission form has worked fairly well. For regulation and coordination of other organisations the Commission form has not been very successful. The Commission coupled with a Department (for example, the Atomic Energy Commission and the Department of Atomic Energy) have tended to erode the cohesive top management role of the Commission. Over time, the Departmental secretariats have tended to become more powerful. Moreover, having all members except chairman on a part-time basis, has not resulted in a strong top management and policy team. As the ocean development programme is a multi-mission activity and relies heavily on coordination and regulation the Commission form alone may not be fully effective. But elements in it that relate to autonomy and satisfy the criteria for organisational design which have been outlined earlier, will be relevant for ocean development.

The structure of an Authority gives it limited powers and works relatively well in regulatory agencies or in very limited programmatic agencies. The Central Electricity Authority experience has not been

very satisfactory, particularly in coordination and promotion. This model, we feel, is not very appropriate for joban development.

Conceptually, Registered Societies like CSIR have the maximum autonomy, because they are structurally independent from government. Unfortunately, due to the conditions imposed by the Government of India and socialisation/acclimatisation through recruitment of deputationists from government organisations as well as massive, wholesale application of government rules and procedures, CSIR has become indistinguishable from a government agency. Recently this has been perceived as a major problem and some administrative reforms and new incentives have been introduced. However, ambiguity about roles, relative isolation and failure to see interdependence and linkages have been major factors for contributing to the relative ineffectiveness of CSIR.

The alternative of public sector enterprise which confers an independent legal status as well as relative autonomy was considered. While for purely commercial organisations this might be a suitable alternative, for promotion, regulation and coordination, this form has been found unacceptable to Government.

## VI. An Organisation for Ocean Development

Considering the various alternatives and the criteria developed earlier about structures we suggest the following structure for ocean development which synthesises elements from the various forms we had examined. The proposed structure has three tiers: (i) Cabinet Committee, (ii) Committee of secretaries and (iii) An Ocean Development Commission. The three tiers represent different levels of policy making control and management. The structure is developed in two phases in an evolutionary manner, consistent with the tasks ahead and organisational needs.

The first tier of the structure for ocean development will be the appropriate Cabinet committee (Economic Affairs, political Affairs, Science and Technology etc.). Such a committee will be the highest policy making body to resolve the interministerial conflicts, to decide on broad policy questions like resource allocation etc. The Committee will be headed by the Prime Minister who is also the Minister for Ocean Development. This Committee will provide at the highest level, political support and visibility which are critically needed during the nascent stages of ocean development. The Prime Minister's support will also be critical and needs to be expressed in visible ways in protecting and nurturing this new programme. Jawaharlal Nehru's nurturing of the Atomic Energy Programme in the initial years and KD Malaviya's strong support for the Oil and Natural Gas Commission in the initial years are historic parallels. While this may demand considerable allocation

of time in the Prime Minister's busy schedule, it is needed and she needs to give such support in the immediate future, till the programme builds some traditions and matures.

At the second tier, the Cabinet Committee will be supported by an interdepartmental Committee of Secretaries somewhat along the lines of the Scientific Advisory Committee to the Cabinet. Again the focus of this Committee will be on a coordination, interdepartmental conflict resolution and approval and support of major policy measures. This Committee will be serviced by Cabinet Secretariat.

At the third tier an Ocean Development Commission (ODC) needs to be constituted. This Commission will be the top executive policy making and management authority for all the ocean development programmes. The Commission can be set up by a resolution of the Government of India (similar to the resolution on Atomic Energy Commission or Space Commission). The Commission should have the powers of the Government of India, both administrative and financial in the area of ocean development, within the limits of budget provisions approved by Parliament. Its main functions will be: (a) policy formulation, (b) coordination and (c) implementation of programmes in ocean development. It should have autonomy as provided in the Railway Board/AEC structure.

This Commission structure should be developed in two phases. In the first phase lasting about three years several systems have to be established and personnel recruited. During this phase, a

more compact structure with clear political support is needed. During the next phase of stability, consolidation and expansion a somewhat more operational, management oriented structure is needed. What we have suggested in two phases, takes into account these differing needs.

The Commission should have full time and part-time members. The Commission in the first three years (Phase-I) should be chaired by the Minister of State for Ocean Development. This will be desirable as it would give necessary political support and inter-ministerial credibility/status, to the Commission. For the first three years, the Commission structure is shown in Figure-2.

The priority tasks in this phase (Human Resource Development, Polymetallic Nodules Project, Research Programmes, Exploration, Technology Development, Ocean Information Centre, etc.) will be primarily shared between the Executive Vice Chairman and the Member for Development.

After three years, this structure will be reviewed comprehensively and based on the feedback, can be redesigned. What we foresees now is the design (Figure-3) during Phase-II. While this evolution is to be planned for, interim developments will necessarily influence what will happen eventually.

Under the responsibility of full time members (who will be ex-officio Secretaries to Government), Programmes (funding, public sector corporations, Departmental undertakings, Centres etc.) will

Figure - 2

Ocean Development Commission

Phase-I

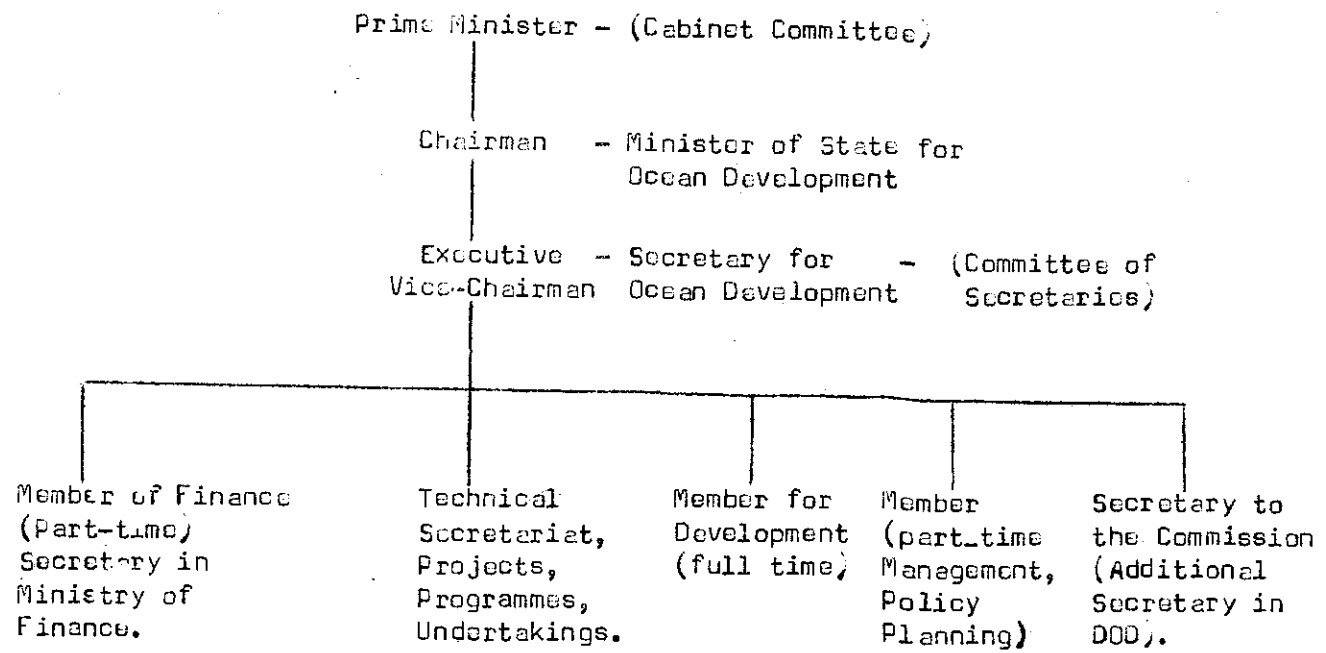
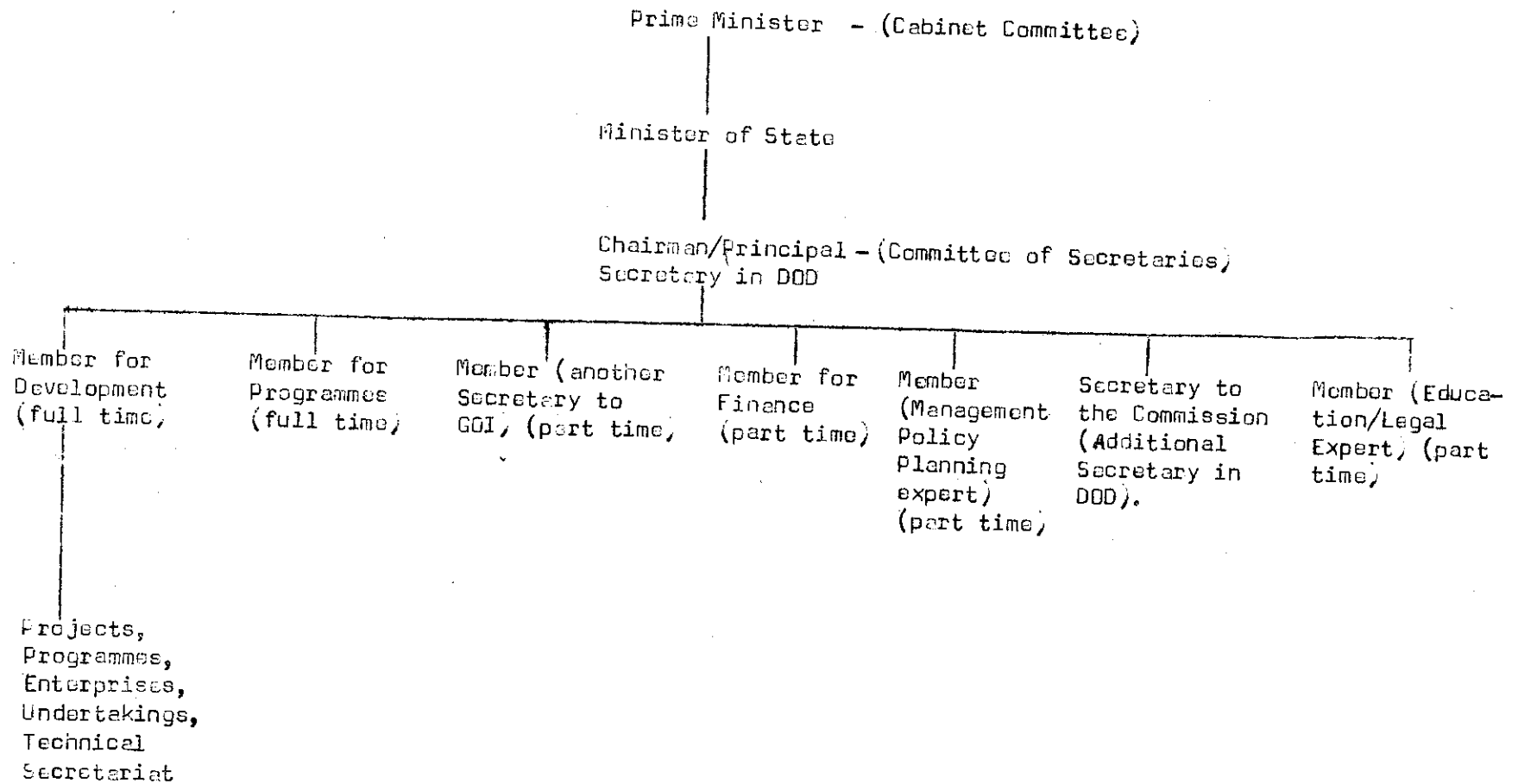


Figure - 3

Ocean Development CommissionPhase II



operate with appropriate horizontal Coordination Committees/Boards of management. Decentralisation of authority will be very specific and fairly high for projects/programmes/enterprises with corresponding accountability for performance. Different units may have differential autonomy, depending on the tasks to be performed.

While in the first phase, the Commission will have five members, in the second phase it will have seven members. During the second phase, the Minister of State may discontinue being the Chairman (the parallel is again that of ONGC, as the Commission would have been well established. He will, however, continue to give policy guidance and leadership to the ODC.

The Department of Ocean Development will be the administrative secretariat of the Commission and should remain fairly small (four or five secretariat officers). Great care should be taken not to expand the Department nor entrust it with powers so that it becomes another layer in the decision making process. Contrary to conventional norms of the Government of India the Ocean Development Commission should function as the top management body as well as the Ministry. The ODC will hire appropriate personnel (managers, technical officers and advisors) at appropriate levels to help in its functions. The Additional Secretary in the Department should function as Secretary to the Commission. Programmes in Ocean Development should be set up relatively independent and autonomous units of the ODC. The functions of the Commission members during Phase-II can be stated as follows:

1. Chairman

Long Range Planning  
 Technology Forecasting/Assessment  
 Public policy development  
 Interface with the other Government Department  
 Coordination with Ministry of Finance, Planning Commission  
 and Cabinet Secretariat

Ocean Information Centre  
 Human resources development  
 Planning and analysis group  
 Evaluation of programmes  
 Administration/personnel  
 Regulation and legislation  
 Publications and public relations

2. Member for Development

Research and Development Programmes/Funding  
 Experimental Demonstration facilities  
 Relations with Research and Educational Institutions  
 Ocean Science and Technology Development  
 Institution building  
 International collaboration and transfer of technology  
 Choice of technology  
 Resource assessment and surveys  
 Environmental quality

3. Member for Programmes

Planning and formulation of Application programme  
 Projects, Undertakings and Commercial Enterprises  
 Development of new centres  
 Implementation of programmes  
 Monitoring programme performance

4. Member for Finance

Resource mobilisation/allocation  
 Financial approval and financial advice  
 Financial function for Management control  
 Accounting and Audit Systems.

The other three part-time members will participate actively  
 in the Commission meetings (meetings which should be frequent; say

six times a year) and will bring their experience and knowledge, perspective to the Commission's decisions. They will also constitute a Committee on policy and management audit, which should review the programmes and policies for ocean development from time to time and report to the Prime Minister through ODC.

The choice of personnel to be the member of the Commission in both phase-I and II is an extremely critical one and in fact will determine the effectiveness of ocean development programmes for decades to come. It is very important to get members who have complementary skills and experience, a strategic vision and who can function together as a top management team. The members should represent diversity of backgrounds in science and technology, administration, planning, social sciences, law, education etc. in addition to sectoral specialisations such as energy, food and minerals. The members must be truly interdisciplinary and broad in their individual capacity and not be specialists alone.

## VII. A Strategy for Implementation of the Design

The design is proposed with a clear understanding that structure is an important but only one determinant among others that influence effectiveness and performance of ocean development programmes. The implementation strategy proposed here is based on the notion that the structure needs to evolve organically over a period of time and should be based on institutional learning and active participation of stakeholders. As discussed earlier, the design must be institutionalised through practice. Presently it is only a guideline for beginning work. The following steps are suggested for implementation.

(a) Based on the Ocean Profile and identified priorities during this decade, the Prime Minister should make a major policy statement/ release a White paper on Ocean Development. This statement will form the basis for a Strategic Management Plan as well as the context for setting up the structure\*.

(b) A workshop/meeting needs to be organised by the Department of Ocean Development. The workshop participants will be the key stakeholders in ocean development from various government departments and outside. The objectives of the meeting are:

- (i) Mutual clarification of roles and tasks among agencies;
- (ii) Shared understanding/consensus on the future of ocean development, interdependence and differentiation among different agencies.

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\* An Ocean Policy Statement has now been made by the Prime Minister in the Parliament.

(c) The design of a structure should be a part of larger exercise of developing a strategic management and long range planning capability in the Ocean Development Commission. The development of a design implementation plan and a strategic management framework needs to begin immediately. Such a systematic plan for strategic management alone can lead to institution building in ocean development.

In conclusion, design of a structure is a creative exercise, (Vickers, 1973). It is based on environmental conditions and task requirements as well as the perceptions of and consensus among stakeholders. The design should be informed by a larger contextual understanding of India's strategic vision and her political economy. This paper is prepared as a document to contribute to such an understanding.

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Research, Technology, Education

CSIR: National Institute of Oceanography/Other Research Institutions  
 Department of Science and Technology  
 Naval Oceanographic Laboratory  
 Meteorological Department  
 Naval Hydrographer  
 Mapping/Survey Organisations  
 Biological Sciences Surveys  
 Indian Institute of Technology  
 College/Institutes in Technical areas.

Policy, Planning and Research Allocation

Ministry of Finance  
 Planning Commission  
 Cabinet Secretariat  
 Prime Minister's Secretariat  
 Ministry of External Affairs

Industry

Engineers India Ltd.  
 Mazagon Docks Ltd.  
 Bharat Heavy Plates and Vessels Ltd.  
 Engineering and Metallurgical Industry  
 Engineering-Consultancy and Design firms

Regulation

Department of Environment  
 Customs authorities  
 International Law/External Affairs

International

UNESCO/IOC  
 IMCO  
 UN-DETC  
 Collaborating institutions such as  
 Scripps, Bedford, Woods Hole, etc.