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IDENTIFICATION OF RESEARCH AND DEVELOPMENT OPPORTUNITIES FOR TARGETED SECTORS

GENERAL FUND GOVERNANCE MODEL – R&D AND ICT

27 February 2008

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GENERAL FUND GOVERNANCE MODEL – R&D AND ICT

SUSTAINABLE ACHIEVEMENT OF
BUSINESS EXPANSION AND QUALITY (SABEQ)

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CONTENTS

OBJECTIVE.....	1
EXECUTIVE SUMMARY.....	1
SCIENTIFIC RESEARCH FUND	1
Size and Sources of Funds	3
Where the Fund Currently Resides	3
Governance Structure	3
Board of Directors	3
Audit Bureau	5
Fund Director & Deputy Director	6
Technical Committees.....	7
Finance, Grants, Awards and Agreements Offices.....	7
Public Relations/Communication	10
Fund Operations	11
Technical Projects.....	12
Proposal and Award Process.....	13
Phase I - Proposal Preparation and Submission	13
Phase II - Proposal Review and Processing	13
Phase III - Award Processing	15
Scientific Research Fund Summary	22
ICT VENTURE CAPITAL (VC) FUND	23
Fund Model.....	23
Fund Development and Structuring.....	23
Governance Structure	24
Fund Operations	24
FINANCIAL INTERMEDIATION	30
JORDANIAN ENVIRONMENTAL FUND.....	30
APPENDICES.....	31
Appendix A - Fund Governance	31
Appendix B - Supply-Pull/Demand-Push.....	31
Appendix C - Governance Structure.....	32
Appendix D - Fund Director & Deputy Director	32
Appendix E - Technical Committees - Detail	33
Appendix F - Finance, Grants, Awards and Agreements Offices.....	41
Appendix G - R&D Fund Technical Projects	41
Appendix H - Sector Priorities	42
Appendix I - Proposals	43
Appendix J - Proposal and Award Process	44
Appendix K - Proposal Preparation and Submission	44
Appendix L - Proposal Review and Processing	45
Appendix M - Award Processing	45
Appendix N - Financial Intermediation	46

OBJECTIVE

The objective of this assignment was to help develop governance structures and operational policies in accordance with internationally recognized best practices for three funds in Jordan: The Jordanian Scientific Research Fund, the [proposed] ICT Venture Capital Fund, and the [proposed] Jordanian Environmental Fund ([See Appendix A for diagram](#)).

EXECUTIVE SUMMARY

The purpose of this assignment was to develop the governance and operational structures of three proposed funds: the Jordanian R&D Fund, the Jordanian Environmental Fund and an Information and Communication Technology (ICT) Fund. Jordan is striving to develop mechanisms along with capital sources to aid Jordanian enterprises and public/private institutions in their growth and development. The three Funds discussed in this paper are key elements in this effort. The Scientific Research Fund will be a source of funding for scientists, researchers and entrepreneurs to take “ideas” and turn them into innovations – the main ingredients for wealth creation of not only companies, but countries as well. The Environmental Fund will provide needed capital to help solve critical environmental issues the country is facing such as its air water pollution. The ICT Venture Capital Fund will provide capital for young technology companies in a sector that holds the hopes of giving Jordan a competitive advantage in this global economy.

The following report along with the accompanying Mind Manager Maps detail the structures recommended by the Consultant.

These recommended governance structures and operational policies are based on internationally recognized best practices and on the Consultant’s personal experience in the development and operations of various private equity funds.

This consulting engagement with SABEQ was conducted in Amman, Jordan from 3 January 2008 to 19 February 2008. The Consultant met and worked with all the relevant stakeholders for each of the Funds and reviewed all relevant documentation that had been previously produced. SABEQ’s Laith Al-Qasem, Isam Mustafa, Kinan Jaradat and Mohammed Asfour were the primary points of contact among the various Funds’ stakeholders and were extremely helpful to the Consultant with their insights and facilitations.

Note on Mind Maps

This document should be used in conjunction with the collection of MindManager mind maps that the consultant created to give a two-dimensional, visual representation of the information provided herein. Moreover, the mind maps also contain links and information sources that have been used in the development of this report as well as useful information for those who wish to learn more about governance issues.

SCIENTIFIC RESEARCH FUND

Jordan is in its early stage of developing and encouraging a research and development “ethos” among Jordanian entrepreneurs, universities and research organizations - one that would promote collaboration between these groups that will ultimately lead to commercially viable discoveries that in turn would create greater wealth for the citizens of Jordan.

Creating this R&D culture is not easy. Jordan has not had the luxury of experiencing an industrial revolution that the developed economies of the world learned and benefited from. Jordan’s economy has historically been based on trade. With a trading economy, there is little to no need for research and development. According to Int@j, the information technology association of Jordan, the first true technology companies were just introduced into Jordan in the late 1980’s. Given this, Jordan has only had about two decades of limited experience in the

development of new technologies. So it is quite understandable that an R&D culture has not taken hold in Jordan as of yet.

In today's era of globalization and intense competition among countries, countries such as Jordan are earnestly striving to diversify their economies by finding new ways to create wealth. Part of this is for Jordan to develop its country's sources of ingenuity, creativity and innovation – which are all ingredients of “create something from nothing,” or wealth creation.

So, where does a country start in developing an R&D ethos? The Consultant believes that first; those stakeholders who aim is to develop this ethos must take a long-term approach. They should recognize that those countries with well-entrenched R&D cultures took many decades to get where they are today. Secondly, there must be a two-pronged approach; call it if you will a demand-push/supply-pull approach (see [Appendix B - Supply-Pull/Demand-Push](#)).

1. Demand-push (or bottom-up) approach would imply stimulating a demand for R&D within private enterprises. Most enterprises, especially in the highly competitive world of the technology sector, naturally understand the need for R&D. They know they have to innovate if they not only want to be competitive and profitable; they have to innovate if they want to survive. However, for nascent enterprises, they may need guidance given their lack of experience with the R&D function that is needed for innovation. This assistance might be provided by organizations and/or advisors that can take companies by the proverbial hand and guide them to the research sources (e.g. research funding sources, university research centers, private research institutions, et. al.).
2. Supply-pull (or top-down) approach would imply that the government would supply not only funding for research and development, but also create a viable and credible research infrastructure (e.g. research institutions within and outside of Jordan's universities) that would attract private enterprise to engage in research activities with those institutions. There is currently not a strong supply-pull by existing research institutions in Jordan and funding needs to be provided to develop “magnet” research facilities that would create a strong “magnetic” pull.

The Jordanian government recognizes the need for a supply-pull approach and is the impetus for the development of the Jordanian R&D Fund.

After holding discussions with the key stakeholders of the Jordanian R&D fund (the “Fund”) and reviewing relevant documentation, it became clear that the aim of the fund was to emulate the governance structure and operational policies of the National Science Foundation of the United States (“NSF” - www.nsf.gov). In addition to studying the structures and policies of the NSF, the Consultant also studied the following similar foundations/fund that represented best practices:

- Philippine Council for Advanced Science and Technology Research and Development (PCASTRD) of Department of Science and Technology (DOST) (www.pcastrd.dost.gov.ph/). On their web site, the PCASTRD indicates several research and development funding successes, which offer examples of what the Fund could potentially imitate and realize. It should be noted that this organization appears to be modeled on NSF practices.
- Pakistan's National ICT R&D Fund (www.ictrdf.org.pk/about.htm).
- Incite - Catalyst for Euro-Indo IT research (www.inciteproject.org).
- Science Foundation of Ireland (www.sfi.ie/home/index.asp).
- Scottish Funding Council (www.sfc.ac.uk).

NOTE: The consultant wishes to credit the National Science Foundation (NSF) of the United States, as well as other similar foundations of Ireland, Scotland, Pakistan and the Philippines.

Most of the governance and operation policies suggested in this report are modeled on NSF practices.

SIZE AND SOURCES OF FUNDS

At present, the only source of funding for the R&D Fund is the 1% of profits of all publicly traded companies. The Fund at present has been accumulating funds though the fund has not yet become operational. It has been indicated to the Consultant by the Secretary General of MoHE that there is approximately 5 million JD in the account to be allocated to the Fund. The Secretary General has indicated that the Fund would like to raise additional capital. Potential sources of this additional capital could be from international donors/multilateral organizations and from local and international private Foundations.

WHERE THE FUND CURRENTLY RESIDES

The existing Fund presently resides under the auspices of the Ministry of Higher Education & Scientific Research (MoHE), currently governed by the Chairman, H.E. Professor Omar Shdeifat, Minister of Higher Education & Scientific Research (MoHE) and the Deputy Chairman, H.E. Professor Turki Obeidat, Secretary General of the Ministry of Higher Education & Scientific Research (MoHE). Professor Turki and his staff have accomplished a considerable amount of work in creating the by-laws and regulations of the Fund. The following governance structures and operational policies are merely recommendations based on internationally recognized best-practices (based primarily on the NSF model) to enhance the work already accomplished by the MoHE. It is recommended that the MoHE review these best-practices and determine which practices would be best suited as ancillary or complementary methods to guide the Fund in its governance and operations.

GOVERNANCE STRUCTURE

The Scientific Research Fund's (the "Fund") leadership has two major components (see [Appendix C – Governance Structure](#) for diagram):

1. A director who oversees the Fund's staff and management.
2. A 10-member Board of distinguished individuals who are leaders in their respective fields of scientific expertise.

Board of Directors

The Scientific Research Fund Board of Directors (the "Board") shall jointly work with the Director to pursue the goals and functions of the R&D Fund. This includes the duty to facilitate the pursuit of national policies for the promotion of research and education in science and engineering.

The Board shall have two primary mandates:

1. The Board shall establish and oversee the policies of the Fund inline with the applicable national priorities set forth by the Government of Jordan. The Board has the responsibility to:
 - identify issues that are critical to the Fund's future;
 - analyze and approve the Fund's overall strategy and direction;
 - analyze and approve the Fund's annual budget;
 - approves new programs and major awards;
 - ensure a balance between initiatives and core programs.

2. The Board is to serve as an independent body of advisors to the Jordanian Parliament on broad national policy issues related to science and engineering research and education.

COMPOSITION OF THE BOARD

The Board shall be made up of 10 Members that shall be appointed by the prime minister and confirmed by the Parliament. The Fund director shall be an ex officio Member. Members shall serve six-year terms; one-third of the board is appointed every two years. Board Members shall be drawn from industry and universities, and represent a variety of science and engineering disciplines and geographic areas. They are selected for their preeminence in research, education or public service.

Nominating Board Members

The Board shall be responsible for assembling and transmitting to the Parliament recommendations for appointment of new Board Members from the various scientific, engineering, and educational organizations and societies. In its review of candidates, the Board applies the statutory eligibility requirements (see below) and looks at demographics, balance among professional fields, active researchers, teachers and administrators, and industrial representation.

Statutory Eligibility Requirements for Board Members

The Board should be composed of broadly experienced individuals of distinguished achievement and representative of a broad range of disciplinary interests. It should also draw attention to the need for equitable representation of individuals from underrepresented groups.

The persons nominated for appointment as members of the Board shall be:

1. eminent in the fields of the basic, medical, or social sciences, engineering, agriculture, education, research management or public affairs;
2. selected solely on the basis of established records of distinguished service; and,
3. shall be so selected as to provide representation of the views of scientific and engineering leaders in all areas of Jordan.

In making nominations, Parliament shall give due consideration to equitable representation of scientists and engineers who are women or who represent minority groups. Parliament shall be requested, in the making of nominations of persons for appointment as members, to give due consideration to any recommendations for nomination which may be submitted to them by Jordan's research, science, technology, engineering and education societies, centers and organizations to include universities and other educational institutions.

The term of office of each member of the Board shall be six years; except that any member appointed to fill a vacancy occurring prior to the expiration of the term for which his/her predecessor was appointed should be appointed for the remainder of such term. Any person, other than the Director, who has been a member of the Board for twelve consecutive years, shall thereafter be ineligible for appointment during the two- year period following the expiration of such twelfth year.

Nomination and Appointment Process

The nomination and appointment process could take 12 to 18 months. Key steps include:

1. the Board's review of nominations and recommendations to Parliament,
2. evaluation of potential nominees,
3. nomination by Parliament,
4. consideration and approval of nominees,
5. appointment, and
6. the swearing in at an open meeting of the Board.

Format for Nominations

A nomination packet shall be submitted. This packet must include:

1. a nominating letter,
2. a biosketch of the candidate, and
3. the candidate's curriculum vitae without publications.

Confidentiality, Privacy & Transparency

The information supplied on the application/nomination materials will be used in connection with the selection of qualified applicants and may be disclosed to qualified reviewers and staff assistants and to other government agencies as part of the review process. All efforts will be made to ensure that the nomination and appointment process is completely transparent. Biographical and background information from publicly available sources may be used for this purpose. Submission of the information is voluntary; however, failure to provide full and complete information may reduce the possibility of recommendation for appointment.

ACTIONS OF THE BOARD

The Board shall meet six times a year to establish the overall policies of the fund and to ensure that the Fund is managed in accordance with the policies set. It shall review and approve major Fund awards and new programs. It shall also initiate and conduct studies and report on a broad range of policy topics -- on its own initiative or Parliament requests, which would include performance measurements. The Fund shall also publish occasional policy papers or statements on issues of importance to Jordanian field of science and engineering.

Audit Bureau

The Audit Bureau has the authority and responsibility to conduct audits, inspections, and investigations involving any R&D Fund proposal, award, program, function, system, or operation.

The Audit Bureau shall be responsible for:

- promoting economy, efficiency, and effectiveness in the administration of R&D Fund programs and operations;
- preventing and detecting fraud, waste, abuse, and mismanagement in R&D programs and operations;
- commenting on legislation and regulations that affect the R&D Fund;
- preventing, detecting, and handling cases involving research misconduct; and
- issuing Semiannual Reports to the Parliament that describes the Audit Bureau's activities with the R&D Fund.

With respect to the fulfillment of these responsibilities, the Audit Bureau shall have statutory authority to subpoena or otherwise obtain all records, files, reports, documents, or materials needed to conduct audits, inspections, and investigations. The Audit Bureau shall be independent and may not be prevented from carrying out any audit, inspection, or investigation or issuing any report.

Additional Duties of the Audit Bureau (per Jordanian law) (Source: Government of Jordan -

<http://images.jordan.gov.jo/wps/wcm/connect/eGov/Government+Ministries+&+Entities/Audit+Bureau/General+Information/>):

- a. Monitoring the entries of the state, its expenditure, the methods of spending, the accounts related to deposits advances, loans, settlements and warehouses/storage.
- b. Offering consultancy to the institutions subjected to monitoring in the fields of accountancy.
- c. Monitoring public finances in order to ensure that it is spent in a legal and effective way.
- d. Ensuring the application of environmental legislation that is in force, in coordination with the competent parties.
- e. Ensuring that the administrative decisions and procedures adopted by the institutions subjected to monitoring are in accordance with the legislation in force.
- f. Presenting a yearly report for each financial year to the Parliament, including the opinion and remarks of the Audit Bureau, as well as the infractions and the accountability for such infractions, at the beginning of each term of parliament or whenever required by the Parliament.

Fund Director & Deputy Director

([see Appendix D](#))

Governance

The Office of the Director houses the Fund's top leadership, and oversees all Fund activities from the development of policy priorities to the establishment of administrative and management guidelines, including long-range planning.

Selection

The R&D Fund Director (the "Director") shall be appointed by Parliament. The Fund's statutory authority shall establish a six-year term for the Director.

Duties & Responsibilities

The Director will oversee the Fund's staff and management. He/she is responsible for:

- a. Project creation and administration
- b. Merit review of proposed projects and programs
- c. Planning and budgeting
- d. Day-to-day operations

Technical Committees

The following are the recommended six Technical Committees of the Fund. Each is described in detail in [Appendix E](#).

1. Biological Sciences (BIO)
2. Information and Communication Technology (ICT)
3. Engineering Sciences (ENG)
4. Geo and Environmental Sciences (GEO & ENV)
5. Social Sciences (SOSCI)
6. Agricultural Sciences (AGSCI)

Finance, Grants, Awards and Agreements Offices

Primary mandates of this office ([see Appendix F](#) for diagram) are to review business, financial, and policy implications of proposals and to make awards after Awards Office Approves proposal.

The sub-offices are:

1. Budget Office

The Budget Office, located within the Finance, Grants, Awards and Agreements Offices, is responsible for the development, analysis, and execution of the Fund's annual budget to the MoHE and Parliament. This responsibility encompasses budget formulation and development, implementation and management of appropriate budget operations and control processes through development of operating plans and special analyses, assisting the development of long-range plans for the Foundation, and assisting the chief financial officer in the resource management of the Fund.

The two key areas of responsibility for this office are:

- a. Budget Operation & Systems
- b. Program Analysis

2. Acquisition & Cooperation

Primary mandate of this office is to provide comprehensive acquisition and cooperative agreement award leadership.

This office is responsible for solicitation, negotiation, award and administration of Fund contracts and of cooperative agreements for the Fund's research facilities, and major centers' programs. It is also responsible for overseeing NSF procurement systems, contracts policy, processes and guidance.

3. Financial Management

The Financial Management Office is responsible for the financial policy and financial management of the Fund. This office is responsible for the Fund's financial reporting, grantee business office relationships, payment of vendors and staff reimbursement for travel expenses. The goal of this office is to provide accurate, courteous and efficient financial service to the Fund and its grantees.

The Financial Management Office is composed of three distinct branches:

- Accounting Operations
- Cash Management
- Financial Systems

These branches provide financial services to the Fund's staff, grantees, and vendors.

a. Accounting Operations

This office:

- Prepares financial reports to meet internal and external reporting requirements
- Reconciles and maintains general ledger accounts and balances
- Manages accounts receivable
- Classifies and records all cash receipts
- Manages all accounting aspects of reimbursable agreements for the Fund
- Processes fellowship payments
- Processes intergovernmental payments and collections
- Reconciles and manages all intergovernmental transactions

b. Cash Management

Duties:

- Manages the Fund's grant payment and financial reporting processes
- Administers the Fund's web site (automated) financial functions
- Reconciles grantee payment and expenditure reporting processes to the Fund's award system and the Fund's financial accounting system, and
- Maintains all assigned organizational grant accounts

- Processes payments for purchase orders, contracts, training and interagency agreements
- Processes receiving reports associated with purchase orders
- Processes vouchers for the Fund's staff travel, panelist reimbursements advisory, committee reimbursements, and invitational travel vouchers

c. Financial Systems

Duties:

The Financial Systems Office is responsible for financial systems operations, maintenance, training, customer service, user support, and ensuring the financial systems function in accordance with applicable laws, regulations and requirements. In addition, this office is responsible for providing services in the following areas:

- Establishes and maintains the financial code structure of the Fund including changes related to reorganizations within the agency
- Produces ad hoc reports for this office's staff and for other Fund staff as deemed appropriate
- Monitors the financial accounting system and other financial feeder systems data that interface directly to the system for accuracy, efficiency, security and reporting compliance
- Maintains the financial accounting system users manual
- Maintains liaison with the Audit Bureau, the government treasury, and other agencies on matters involving financial systems
- Maintains liaison with the Information Systems Office within the Fund for financial systems' modifications, development and testing
- Maintains liaison with the Administrative Managers on matters involving access to the financial accounting system and selected systems

4. Grants and Agreements

Grants and Agreements Office mandate:

The Grants and Agreements Office supports the issuance of Fund assistance awards and other agreements by providing business, financial, and award administration assistance from pre-award through closeout.

This office:

- provides direct support to the Fund's programs and activities as well as to the Fund's overall administration;
- is service and customer oriented and provides business and administrative assistance to meet the needs of the Fund's internal and external stakeholders;
- emphasizes teamwork and staff involvement in all areas;

- continues to develop the technical and professional competence of our staff and recognizes their achievements and contributions;
- analyzes and evaluates from a financial and administrative perspective to identify and resolve any potential concerns;
- facilitates conformance with applicable Fund and Governmental award requirements through outreach and communication with program staff and the grantee community;
- applies the skills and knowledge of its staff in a timely and professional manner; and
- continuously evaluates and seeks improvement of the business processes used to administer and manage grants and agreements, including effective innovation and implementation of electronic technology.
- develops, implements and issues proposal and award policy for the programs of the Scientific Research Fund.

5. Award Support

The Award Support function is:

- To ensure that the Fund makes awards on a "prudent" basis and that the Fund is fulfilling its fiduciary duty to all its stakeholders.
- To provide innovative and exemplary Public Service, including financial and administrative assistance to implement these business models, processes and practices to recipients of the Fund's awards and throughout all of the Offices of the Fund.
- To ensure that innovative and best business practices are used in managing the Fund's activities in accordance with the Fund's and the Nation's goals.
- To set an example of efficiency, honesty, transparency and efficacy for all recipients of funding and all stakeholders.

In addition, this office will:

- Aid in setting Policy
- Aid in developing Monitoring and Evaluation Systems and in the Monitoring and Evaluation process
- Perform cost analysis
- Audit and measure performance

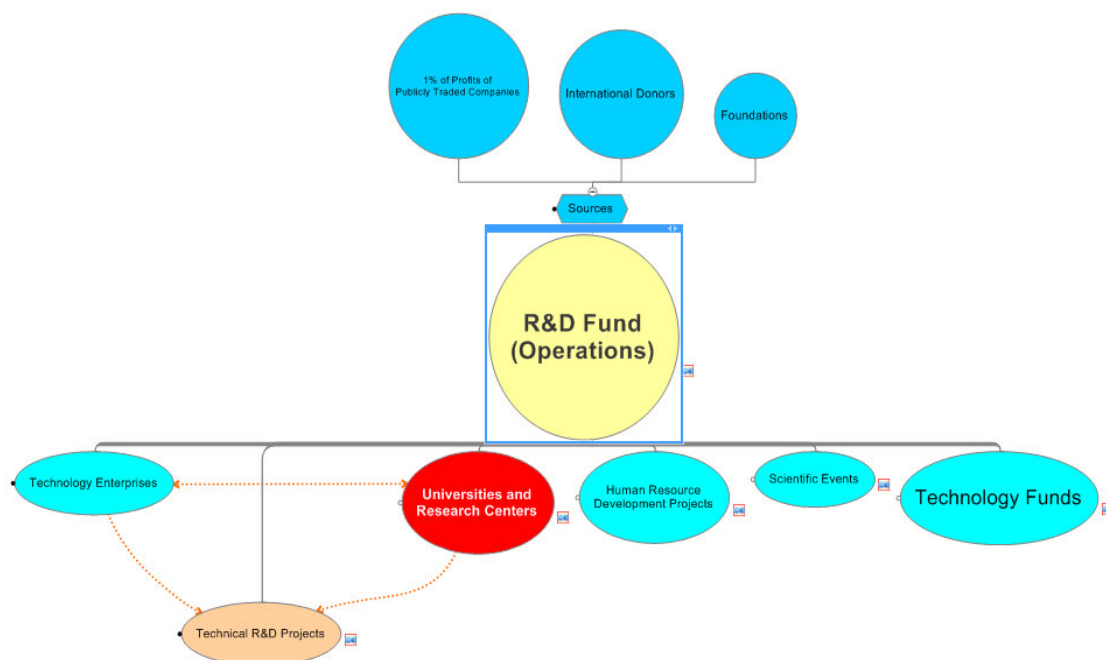
Public Relations/Communication

This office will develop and execute public relations plan to publicize the fund and build awareness of its programs. This office will play a major role in creating the supply-pull that is required to get private enterprise engaged in innovative research and development. They will also play an important role in working with private enterprises to encourage their use of research funding opportunities and research capacities available in Jordan.

FUND OPERATIONS

Below is the basic model of the operations of the Fund. The top ovals indicate the Sources of funds. As mentioned earlier, at present, the only source of funding for the Scientific Research Fund is the 1% of profits of all publicly traded companies. The Fund at present has been accumulating funds though the fund has not yet become operational. It has been indicated to the Consultant by the Secretary General of MoHE that there is approximately 5 million JD in the account to be allocated to the Fund. The Secretary General has indicated that the Fund would like to raise additional capital. Potential sources of this additional capital could be from international donors/multilateral organizations and from international private Foundations. However, as with any “first fund,” it will likely be a challenge to attract additional funding until an encouraging track record of this Fund has been established.

The bottom ovals indicate the Uses of funds. While the priority of the Fund is to provide funding for private enterprise’s research endeavors in order to foster innovation that could lead to economic growth (both for the enterprise and for the country as a whole), funding will need to be provided to help build Jordanian research capacities at universities and other research centers. A certain portion of the fund will be allocated as well to the development of Jordan’s Human Capital (via scholarships, research grants, etc.) and a portion of the Fund will be used to fund specific Scientific Events and Activities (e.g. intellectual property rights support, conferences, research incentives support, Faculty for Factory Programs, etc.).



Technical Projects

The focus of this section is on the Fund's Technical Projects, beginning with the Fund's National / Sector Priorities and finishing with the Proposal and Award Process and Monitoring Project Performance ([see Appendix G](#) for diagram).

1. Sector Priorities

Below are the Fund's National / Sector Priorities, each of which is consistent with the Objectives of the Fund ([see Appendix H](#) for detailed Sector Priorities diagram):

- Energy
- Water
- Environment
- Technology Applications
- Humanities, Social and Educational Studies
- Innovative Subjects of National Interest

2. Large Scale, Small & Medium Scale Research Projects

It is recommended that proposed research areas be divided between large scale and small & medium scale project to help in the balanced allocation of funds. Large-scale projects would likely include those sectors/areas of research deemed most important and pressing to Jordan. The Fund should determine the delineation between the scales based on best practices adjusted for conditions in Jordan.

3. Networking of Universities and Research Centers

It is recommended that the Fund allocate funding for not only developing the country's research capacities and infrastructure, it should also provide funding for the networking of Jordan's university research centers and other research centers, both private and public. In addition to this, funds should be provided to aid in the establishment of networks and collaboration with universities outside of Jordan.

4. Proposal Process - Going from "Idea" to "Project" to "Completion"

a. Solicited and Unsolicited Proposals

It is recommended that the Fund will have Solicited and Unsolicited Proposals. Solicited Proposals would be for those research projects that the Fund believes are of an urgent nature where immediate attention to a specific problem is needed. These Solicited Proposals should be tendered on the Fund's web site. Unsolicited Proposals, the Consultant believes, should be accepted on a rolling basis. The current regulations permit Unsolicited Proposals on biannual (two-cycle) basis. The challenge this could pose is on proposals that are rejected in pre-screening and need refinement for resubmission. The timing of resubmission and the subsequent re-review, may not fit within the established cycle (it may mean the applicant needs to wait for the next cycle for re-reviewing). Secondly, the cycle is currently timed to the university school cycle. This would imply that submissions would need to be made when school is just starting. This may not be realistic due to the time needed for the research idea formulation and for the time needed in preparing the grant proposal.

b. Grant Proposal Guide

The Grant Proposal Guide will be an all-encompassing rulebook for all grant proposal writers. This guide should be provided via the Fund's web site.

Proposal and Award Process

Courtesy: National Science Foundation ([see Appendix I](#) and [Appendix J](#) for diagrams).

Phase I - Proposal Preparation and Submission

(see [Appendix K](#) for diagram)

1. Opportunity Announced - All funding opportunities will be announced on the R&D Fund web site.
 - a. Mechanisms Used to Generate Proposals
 - i. Program Descriptions
 - ii. Program Announcements
 - iii. Program Solicitations
 - b. Unsolicited Proposals
 - i. Unsolicited proposals to specific R&D Fund programs should be allowed at any time.
2. Proposal Submitted
 - a. Using Grant Proposal Guide (GPG)
 - i. The GPG will be THE source for guidance on preparing and submitting a proposal to the R&D Fund.
 - ii. The GPG details formatting and submission requirements.
 - b. Submissions made Online
3. Proposal Received
 - a. Proposals are received by the Scientific Research Fund's Proposal Processing Unit - from the online submissions.
 - b. Proposals are then assigned to the appropriate program for acknowledgement.
 - c. Proposals are initially screened to determine if they meet the Fund's Criteria and requirements
 - i. If they **Pass**, then
 - The Proposal is put forward for review.
 - ii. If they Fail, then
 - The Proposal is returned with comments on why it failed and instructions on how the Proposal may be resubmitted. A proposal may be returned without review if it does not meet the R&D Fund's proposal preparation requirements, such as page limitations, formatting instructions, and electronic submission, as specified in the GPG or program solicitation.
 - iii. The Grant Proposal Guide will identify all of the reasons for which a proposal may be returned without review.

Phase II - Proposal Review and Processing

(see [Appendix L](#) for diagram)

4. Reviewers Selected

- a. Reviewers are selected based on their specific and/or broad knowledge of:
 - i. The science and engineering fields;
 - ii. Their broad knowledge of the infrastructure of the science and engineering enterprise, and its educational activities.
- b. Strive for diverse representation within the review group.
- c. Sources of reviewers:
 - i. Can be found from:
 - 1. The Program Officer's knowledge of the research area
 - 2. References listed in the proposal
 - 3. Professional society programs or associations
 - 4. Internet/database searches of science and engineering journal articles related to the proposal
 - 5. Reviewer recommendations included in proposal or sent by email
 - ii. Proposers can suggest persons they believe are especially well qualified to review the proposal, as well as identify persons they would prefer not review the proposal.

5. Peer Review

- a. Merit Review
 - i. Merit review is a critical component of the R&D Fund's decision-making process for funding research and education projects.
 - ii. Through use of rigorous, competitive merit review, the Fund will maintain high standards of excellence and accountability. It will enable investments in projects that couple the best ideas from the most capable researchers and educators, with the advancement of discovery and learning and the enrichment of the science and engineering resources.
 - iii. Each reviewer will be asked to address only those that are relevant to the proposal and for which he/she is qualified to make judgments.
 - iv. Macro Criteria for Evaluation (some may not be relevant)
 - 1. **Criterion 1**: How does the proposed activity address Jordan's national challenges or help improve its competitiveness?
 - 2. **Criterion 2**: What is the intellectual merit of the proposed activity?
 - a. How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields?
 - b. How well qualified is the proposer (individual or team) to conduct the project?
 - c. What is the quality of prior work?

- d. To what extent does the proposed activity suggest and explore creative and original concepts?
 - e. How well conceived and organized is the proposed activity?
 - f. Is there sufficient access to resources?
- 3. **Criterion 3:** What are the broader impacts of the proposed activity?
 - a. How well does the activity advance discovery and understanding while promoting teaching, training, and learning?
 - b. How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?
 - c. To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships?
 - d. Will the results be disseminated broadly to enhance scientific and technological understanding?
 - e. What may be the benefits of the proposed activity to society (within Jordan and internationally)?
- v. Scientific Review
- vi. Technical Review
- vii. Programmatic Review
- b. Some proposals may have additional review criteria.
- c. External reviewers' analyses and evaluation of the proposal provide information to the Program Officer in making a recommendation regarding the proposal.
- 6. Program Officer Recommendation
 - a. After scientific, technical and programmatic review, the Program Officer shall recommend to the Fund Director whether the proposal should be recommended for an award or declined for funding.
 - b. The review and consideration process could take up to six months or more. Large or particularly complex proposals may require additional review and processing time.
- 7. Fund Director Review
 - a. If the decision is made to decline the award, the organization is notified and review information shall be made available on the Fund's web site. If the decision is to award, the recommendation is submitted to a Grants & Agreements Office.

Phase III - Award Processing

(see [Appendix M](#) for diagram)

- 8. Business Review
 - a. The Grants and Agreements Officer In the Grants & Agreements Office conducts a review of:
 - i. The business (if applicable)

- ii. Financial aspects
 - b. Any policy implications
9. Award Finalized
- a. The award will be comprised of:
 - i. An award notice/contract
 - ii. A budget
 - iii. The proposal
 - iv. Applicable R&D Fund conditions
 - v. Any other documents or aspects required by the agreement.
 - b. Funds are disbursed
10. Research Project Starts

Monitoring Project Performance

- 1. Monitoring Performance
 - a. Grantee Responsibilities
 - i. A grantee has full responsibility for the conduct of the project or activity supported under an R&D Fund grant and for the results achieved. The grantee should monitor the performance of the project to assure adherence to performance goals, time schedules or other requirements as appropriate to the project or the terms of the grant. In order to carry out these responsibilities, each grantee organization shall agree to comply with the applicable Governmental requirements for grants and to the prudent management of all expenditures and actions affecting the grant.

Documentation for each expenditure or action affecting the grant shall reflect appropriate organizational reviews or approvals, which should be made in advance of the action. Organizational reviews are intended to help assure that expenditures are allowable, necessary and reasonable for the conduct of the project, and that the proposed action:

 - 1. is consistent with grant terms and conditions;
 - 2. is consistent with the Fund's and grantee's policies;
 - 3. represents effective utilization of resources; and
 - 4. does not constitute a change in objective or scope.
 - ii. Notwithstanding these responsibilities, the Fund continues to encourage communication between the Fund program officers and the grantee on the progress of projects supported by the Fund as well as on project changes.
 - iii. The Fund, through authorized representatives, has the right, at all reasonable times, to make site visits to review project accomplishments, grantee management control systems and administration and management of the grant and to provide technical assistance as may be required. If any site visit is made by the Fund on the premises of the grantee, the grantee shall provide all reasonable facilities and assistance for the safety and convenience of the Fund representatives.

- b. Grantee Notifications to the Fund and Requests for the Fund Approval
 - i. The following is a list of grantee notifications to and requests for approval from the Fund. This list is not all-inclusive, but it shows the most common areas where specific notifications and requests for approval are called for:
 - 1. Type of Grantee Notification
 - a. Grantee Approved No-Cost Extension
 - b. Significant Changes in Methods/Procedures
 - c. Significant Changes/Delays or Events of Unusual Interest
 - d. Short-Term Absence of the Grantee or members of its staff
 - e. Amount of Government funds is expected to exceed the grant by more than 2,500JD or 5%
 - f. Conflicts of Interest that cannot be satisfactorily managed reduced or eliminated
 - 2. Type of Grantee Request:
 - a. First Fund Approved No-Cost Extension
 - b. Second Fund Approved No-Cost Extension
 - c. Request for Supplemental Support
 - d. Change in Objective or Scope
 - e. Long-Term Absence of the Grantee or members of its staff
 - f. Change in Person-Months Devoted to Project
 - g. Changes of the Grantee's staff (e.g. withdrawal, transfers or substitutions of staff)
 - h. Reallocation of Funds Budgeted for Grantee
 - i. Additional Trainee Support Costs
 - j. Rearrangements/Alterations in excess of 2,500JD
 - k. Adjustments to cost sharing commitments
 - ii. Notifications should be submitted electronically
- 2. Changes in Project Direction or Management
 - a. Changes in Objectives, Scope or Methodology
 - i. Changes in Objectives or Scope

Neither the phenomena under study nor the objectives of the project stated in the proposal or agreed modifications thereto should be changed without prior the Fund approval. Such changes should be proposed to the cognizant Fund Program Officer by the Grantee. If approved by the Fund, the Grants and Agreements Officer will amend the grant in writing and attach it in an annex.
 - ii. Changes in Methodology

The Fund intends to encourage the Grantee to feel free to pursue interesting and important leads that may arise during the conduct of a

research project or to adopt an alternative approach, which appears to be a more promising means of achieving the objectives of the project. However, significant changes in methods or procedures should be reported to the appropriate Fund Officer.

iii. Significant Changes, Delays or Events of Unusual Interest

1. In the event there are problems, delays or adverse conditions that will materially affect the ability to attain the objectives of the project or to meet such time schedules as may have been proposed, appropriate grantee officials should notify the Fund Program Officer.
2. The Fund should be informed of any events of unusual interest that occur during the course of the project. Reports, communications or photographs should be submitted via the interim report capability electronically on the Fund's web site.

b. Changes in the Principal Investigator (PI) or time devoted to the Project

i. Background

The Fund's decision to support or not to support a proposed project is based to a considerable extent upon its evaluation of the Grantee's knowledge of the field of study and his/her capabilities to conduct the project in an efficient and productive manner. This is reflected in the Fund's criteria for the selection of projects for funding (see Phase I section). There will be a named PI from the Grantee that shall be continuously responsible for the conduct of the project and be closely involved with the effort.

ii. Basic Requirements

If the PI plans to, or becomes aware that he/she will: (i) devote substantially less effort to the project than anticipated in the approved proposal; (ii) sever his/her connection with the grantee organization; or (iii) otherwise relinquish active direction of the project, he/she shall advise the appropriate official at the grantee organization, who shall initiate action appropriate to the situation under the guidelines that follow.

c. Short-Term Absence of PI

If the PI will be absent from the project for short periods of up to three months, he/she shall notify appropriate officials of the grantee organization. The grantee shall then notify the Fund Program Officer of arrangements for conduct of the project during the PI temporary absence.

d. Long-Term Absence of PI

- i. In the event the PI will be away from the project for a period greater than three months (e.g. sabbatical leave) but intends to return, arrangements for oversight of the project shall be sent electronically to the Fund for approval. This information must be provided at least 30 days before departure or as soon as practicable after the prospective absence is known. The Fund Program Officer will provide written approval to the grantee if the arrangements are satisfactory, but no formal amendment to the grant will be made.
- ii. If the arrangements are not satisfactory to the Fund, the grant may be terminated. If the PI's temporary activities might constitute a conflict of

interest (e.g., working for a Federal agency), a substitute PI shall be appointed.

e. Change in time devoted to the Project

If the PI will devote substantially less time to the project than anticipated in the proposal, (defined as a reduction of 25% or more in time) he/she should consult with appropriate officials of the grantee organization and with the Fund Program Officer. If either determines that the reduction of effort will substantially impair the successful execution of the project, the Program Officer will consult the Fund Grants and Agreements Officer. The Fund Grants and Agreements Officer may:

- i. request the grantee to nominate a replacement PI acceptable to the Fund Program Officer;
- ii. initiate termination procedures; or
- iii. negotiate an appropriate modification to the grant.

f. Withdrawal of PI

In the event the PI severs his/her connection with the grantee organization or otherwise relinquishes active direction of the project, the grantee, or equivalent, must notify the Fund Program Officer via the Notification and Request module via the Fund's web site, and either:

- i. initiate transfer of the grant;
- ii. nominate a substitute; or
- iii. initiate grant closeout procedures through submission of final reports.

g. Substitute PI

In the event the grantee desires to continue the project with a substitute PI, the appropriate officials at the grantee organization must advise the Fund Program Officer of the substitute PI's name, qualifications, and current and pending support for research from all sources. If approved by the Fund, the Grants Officer will amend the grant. If not approved, the Fund may take steps to suspend or terminate the grant.

h. Disposition of a Grant When a PI Transfers from One Organization to Another Organization

- i. Policy. When a PI plans to leave an organization during the course of a grant, the organization has the prerogative to nominate a substitute PI or request that the grant be terminated and closed out. In those cases where the PI's original and new organizations agree, the Fund will facilitate a transfer of the grant and the assignment of remaining uncommitted funds to the PI's new organization.
- ii. Procedures. When a PI plans to leave an organization during the course of a grant, the PI, or equivalent, shall notify the Fund Program Office. If the project is to continue with the original organization, the Fund Program Officer should advise the grantee to nominate a substitute PI. If the project is to be continued at the PI's new organization, and if the Fund and both organizations agree, formal notification of the impending transfer can be electronically initiated by either the PI or the PI's organization. A financial position report must be posted to the Fund's financial accounting system prior to submitting the PI transfer. The amount transferred has to be equal to or less than the uncommitted balance.

The request shall include a:

1. brief summary of progress to date;
2. description of work yet to be accomplished;
3. completed transfer request, including total estimated disbursements to date. The original organization is responsible for including in the total estimated disbursements, any anticipated costs yet to be incurred against the original grant.
4. detailed line item budget for the transfer amount and any outstanding continuing grant increments.

The original organization concurs with the transfer of the award by electronically forwarding the request to the new organization. The new organization completes the request by providing a detailed budget for the transfer amount agreed to by both organizations.

3. Contracting or Transferring the Project Effort

- a. Excluding the procurement of items such as commercially available supplies, materials, equipment or general support services allowable under the grant, no significant part of the research or substantive effort under a Fund grant may be contracted or otherwise transferred to another organization without prior Fund authorization. The intent to enter into such arrangements should be disclosed in the proposal submission.
- b. If it becomes necessary to contract or otherwise transfer a significant part of the research or substantive effort after a grant has been made, the grantee shall submit, at a minimum:
 - i. a clear description of the work to be performed;
 - ii. the basis for selection of the subawardee (except for collaborative/joint arrangements); and
 - iii. a separate budget for each sub award.

The request should be submitted electronically, and the Fund authorization will be indicated by an amendment to the grant signed by the Grants and Agreements Officer. The Fund grant conditions will identify which articles relate to subawardees.

4. Technical Reporting Requirements

The Fund requires technical project reports for all assistance awards. Information from these reports is used in annual reports to Parliament to demonstrate the Fund's performance. These reports also provide the Fund program officers and administrative offices with information on the progress of supported projects and the way these funds are used. Information in these reports may be made available to the public.

Technical reports should be submitted via the Fund's Project Reporting section of its web site.

a. Annual Project Reports

- i. Unless otherwise specified in the grant, annual project reports shall be submitted at least 90 days prior to the end of the current budget period. In the case of continuing grants, failure to submit timely reports may delay processing of funding increments.

- ii. Annual project reports will generally not be required for fellowship awards/scholarships. Specific reporting requirements for fellowships are established in the program solicitation and award conditions.
- iii. For multi-year standard grants, PIs are required to submit an annual report at least 90 days prior to the end of each 12-month period. In the case of cooperative agreements, the annual report is required before the Fund approves any future funding increments.
- iv. Continuing grants also require annual reports at least 90 days prior to the end of each 12-month period. For continuing grants that have a duration of 18 months or more per increment, two annual reports are required. A report must be submitted for the first 12 months of the project, and then another report for the remaining months of the increment. Continuing grants, which include an initial increment of 24 months, will require an annual report at the end of each 12-month period.

b. Final Project Report

Within 90 days following expiration of the grant, a final project report must be submitted electronically via the Fund's web site. In addition, the grantee also shall provide to the cognizant Fund Program Officer, within 90 days following the expiration of the grant any unique reports or other end items specified in the award, including any reporting requirements set forth in any of the Fund brochure, guide, solicitation, etc., referenced in the award as being directly related to either the award or the administration of the award.

Final project reports are normally not required for institutional graduate research fellowships. However, final project reporting requirements for individual fellowships are established in the program solicitation.

c. Final Technical Information Items

As soon as they are available after completion of the project, the following technical items shall be submitted for the Fund program management use:

- i. abstracts of theses;
- ii. publication citations and reprints of articles;
- iii. data on scientific collaborations;
- iv. information on inventions;
- v. technical description of the project and results;
- vi. other materials either required in the grant or considered to be useful to the Fund; and
- vii. Universal Resource Locator (URL) numbers of electronic publications generated by the project.

d. Compliance with Technical Reporting Requirements

PIs must submit final technical reports within the time period specified. Failure to provide these reports on a timely basis will delay the Fund review and processing of pending proposals for all identified PIs on a given award.

e. Grant Closeout

Grant closeout is the process by which the Fund determines that all applicable administrative actions and all required work of the grant have been completed.

Grants will be financially closed based on final costs reported one full quarter after the expiration of the grant. Grants are administratively closed after receipt of the Final Project Report and after determination that any other administrative requirements in the grant have been met. In the event a final audit has not been performed prior to the closeout of the grant, the Fund reserves the right to recover appropriate amounts after fully considering the recommendations on disallowed costs resulting from the final audit.

5. Records Retention and Audit

- a. records, supporting documents, statistical records and other records pertinent to a grant will be retained by the grantee for a period of three years from submission of the Final Project Report, except that:
 - i. records related to audits, appeals, litigation or the settlement of claims arising out of the performance of the project will be retained until such audits, appeals, litigation or claims have been disposed of; and
 - ii. records related to projects subject to special program income provisions will be retained for three years beyond the end of the award period.
- b. Unless court action or audit proceedings have been initiated, the grantee may substitute microfilm copies of original records.
- c. The Fund Director and the Office of the Auditor of Jordan, or any of their duly authorized representatives, shall have access to any pertinent books, documents, papers and records, of the grantee organization (and of the performing organization, if different) to make audits, examinations, excerpts and transcripts. Furthermore, any negotiated contract in excess of the small purchase threshold made by the grantee shall include a provision to the effect that the grantee, the Fund, the Office of the Auditor of Jordan or any of their duly authorized representatives, shall have access to pertinent records for similar purposes.
- d. In order to avoid duplicate record keeping, the Fund may make special arrangements with grantees to retain any records, which are needed for joint use. The Fund may request transfer to its custody of records not needed by the grantee when it determines that the records possess long-term retention value. When the records are transferred to or maintained by the Fund, the three-year retention requirement is not applicable to the grantee. In the rare event that these provisions are exercised, the Fund will negotiate a mutually agreeable arrangement with the grantee regarding reimbursement of costs.

SCIENTIFIC RESEARCH FUND SUMMARY

The Scientific Research Fund concept can play an integral role in aiding Jordan in its development and encouragement of a research and development “ethos” among Jordanian entrepreneurs, universities and research organizations. The development of this R&D culture could prove to be vital in stimulating innovation that would lead to the creation of intellectual property rights, commercially viable enterprises that take innovations to the market and most importantly, wealth creation for the country of Jordan.

Creating this R&D culture will take time and this should be well understood by the stakeholders of the Scientific Research Fund. The development of this Fund should not be rushed, for if all the relevant structures, policies and people are not properly placed and operations not properly executed, the Fund could experience long-lasting set backs.

The Consultant believes that the two-pronged approach (demand-push or bottom-up and supply-pull or top-down approaches) are needed for this Fund to create a symbiotic relationship among private enterprises and the public sector in relation to research and development.

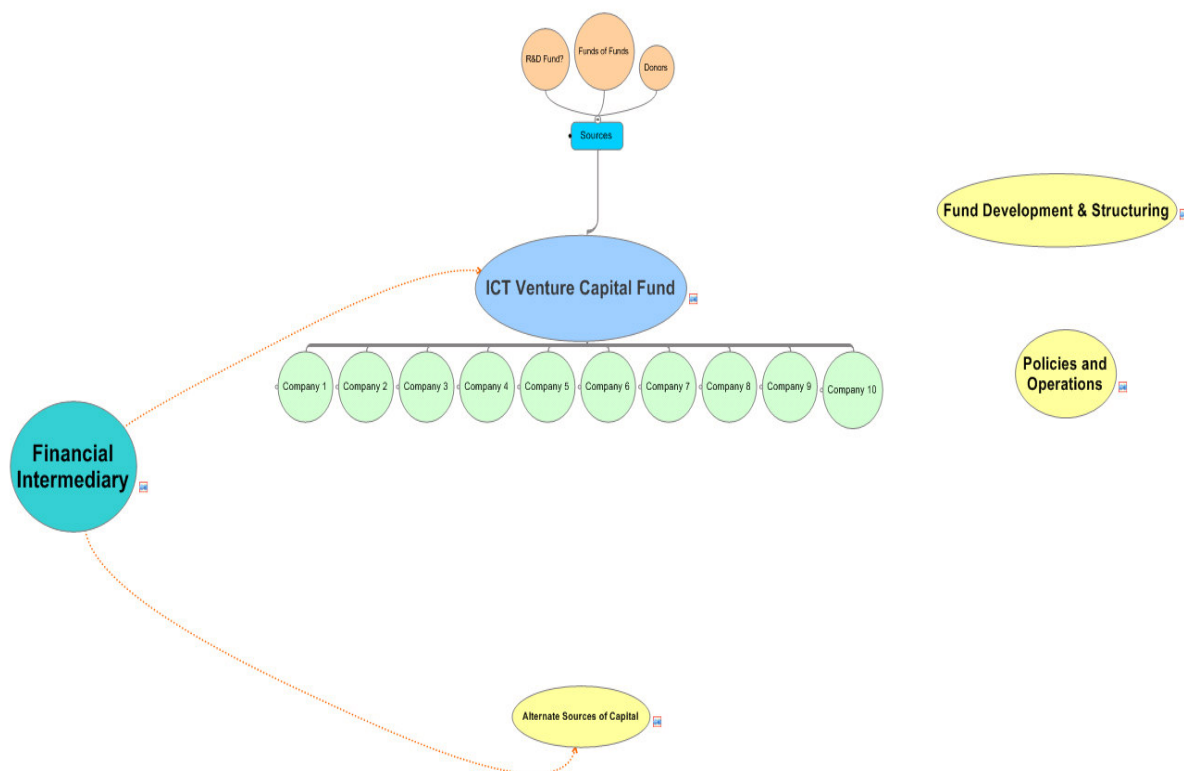
The government of Jordan should be applauded for embarking on this journey.

ICT VENTURE CAPITAL (VC) FUND

It is recommended that this fund be structured and operated as a pure-play VC fund that seeks out investment opportunities that offer a significant expected return commensurate with the risk taken. ICT companies in Jordan would of course have access to the Scientific Research Fund's grant sources but purely for R&D. The VC Fund would provide an alternative source of capital to promising ICT companies.

FUND MODEL

The model below indicates sources and uses of funds (with a hypothetical 10-company portfolio). Later in this section will be an explanation of the ICT Fund governance structure, the ICT Fund Development and Policies and Operations.



FUND DEVELOPMENT AND STRUCTURING

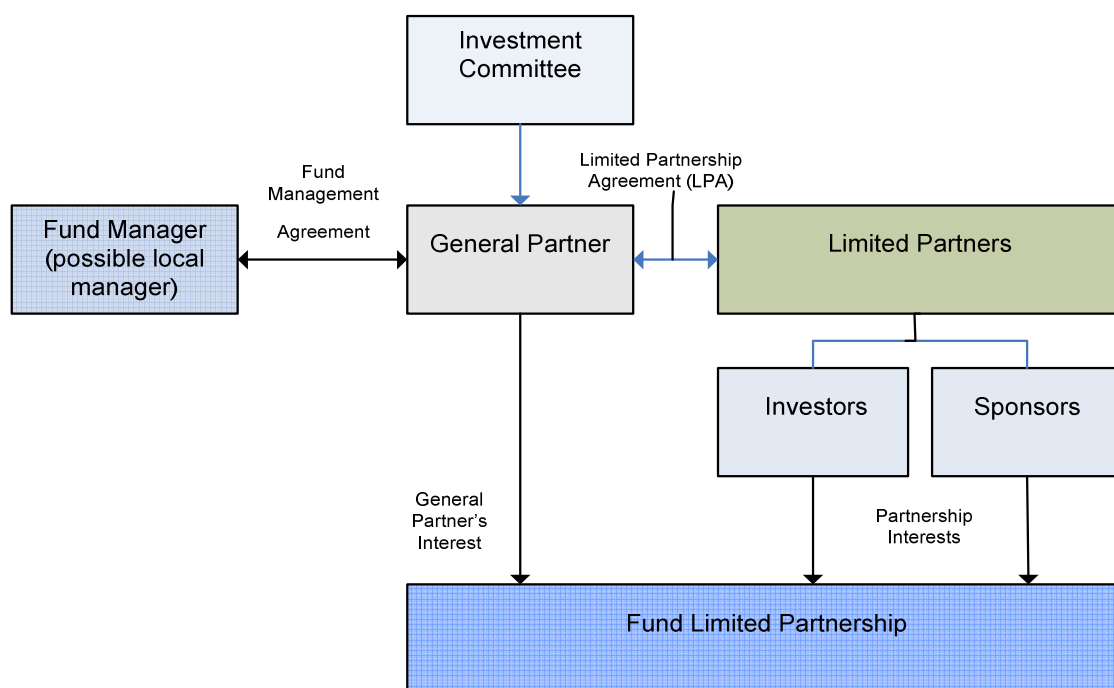
The following are the primary steps in founding a new venture capital fund:

1. Determine Capital Need
2. Determine Objectives
3. Determine Type of Fund

4. Develop Preliminary Information Memorandum (PIM)
5. Raise Funds
6. Finalize Shareholders' Agreement
7. Close Fund
8. Fund Startup
9. Fund Operations

Governance Structure

The recommended structure for the ICT Fund would be a limited partnership as described in the model below. The Jordanian government should consider being a fund-of-funds where it would become a Limited Partner (LP) and would leave the management of the Fund up to the General Partner (GP). This of course assumes that there would be an interested General Partner. One possibility is to have one of the local venture capital or private equity firms manage the Fund as a "Fund Manager" if not a GP.



Fund Operations

1. Investment process
 - a. Personnel
 - i. Team needed under the General Partner
 1. 1 Associate
 2. 2 Financial Analysts
 3. 1 Fund Accountant
 4. 1 Secretary/Personal Assistant

- b. Building database of potential investee candidates
 - i. Source list of highly qualified candidate companies
 - 1. Search codified industries by Standardized Industry Codes
 - 2. Utilize Chambers of Industry
 - 3. Lists of candidates from Inspectors
 - 4. Utilize Kompass.com or AME Info if they have listings in Jordan
- c. Deal Flow
 - i. Active search and deal sources
 - 1. Proactive searching and interviewing companies in targeted industries
 - 2. Bankers
 - 3. Lawyers
 - 4. Accountants
 - 5. Other Private Equity/Venture Capital Funds
 - 6. Financial Intermediaries (such as investment banks)
 - 7. Seminars/Networking events (e.g. Firsttuesday.com)
 - ii. Passive
 - 1. Advertising
 - 2. Well tagged web site (increase search hits)
 - 3. Listings in Capital Source & Environmental Directories
- d. Screening candidate companies
 - i. Screening Criteria
 - 1. Preliminary
 - 2. Management
 - a. Experience
 - i. Look for “depth and breadth” in management teams – those that have extensive experience not only in managing profitable businesses but extensive experience in the industry in which they operate.

Where private sector experience is lacking, mentorship could prove invaluable in enriching the depth of management teams here.
 - ii. Transparency and Trust

You want to see that management is transparent and honest. This is obviously subjective, but it is a serious issue for fund.

Some of the ways to mitigate the risks related to transparency and trust are by closely monitoring the portfolio company and dispersing funds on a monthly basis rather than in large tranches - however this may be difficult with the relatively large capital requirements for environmental related improvements.

iii. Synergy/Chemistry

It is important that the management of this fund feel they can work synergistically with the management team. It is important to feel like they can “get along” with the management team – have a good chemistry.

iv. Entrepreneurial Mentality and Strong Work Ethic

Look for entrepreneurial characteristics of the management team. You want to see innovation, creativity and freethinking.

v. Founder's (management's) ongoing commitment

It is very important that the founder/owner have a SUBSTANTIAL portion of their net worth invested in their company and that they are the majority owner of the company.

The fund manager wants to see that the founders' company is their “baby,” in which the vast majority of their time is devoted. Be leery of business owners that also own a myriad of other companies as is common in the Middle East.

A key reason why you want to see this commitment is that you do not want to give funding to a company that could be out of business in the near future.

Determinations as to the above cannot be made in just one, two or three meetings. In fact, making these assessments can take MANY months.

vi. Can be highly subjective

A fund's management experience is crucial in assessing the management of an investee candidate.

3. Large and growing market

- a. HIGH RETURN potential – Look for a strong growth story. It is important for management of investee candidates (“management”) to clearly describe their strategy for how they are going to capture a significant market opportunity and how that strategy translates into cash flows and thus value (wealth) creation. It is that management has intimate knowledge of their numbers (sales, gross margins, operating margins, net margins and cash flows). You want to see a clear picture of the investee candidate's free cash

flows over the next 5 years and the IRRs derived from such projections.

4. Potential for extraordinary return

- a. Required rate of return – This is one of the more difficult investor requirements to assess. The required rate of return is that return that an investor feels they need to be compensated for the level of risk they perceive they will take when making an investment. Typical private equity required rates of return in a developed economy are generally very high, ranging from 20% to 60% (annualized returns – realized at exit) - depending on the stage of the company and typical risk factors - again that's in a developed economy. It is important to keep in mind that a private equity investor has no security as a bank has in the form of collateral when giving a loan – plus an investor is not paid a set interest rate. In a developing economy such as Jordan, after accounting for the additional risks that are inherent in such an economy (country risk), such as legal risk, currency risk, political risk, sector risk, etc., these required rates of return become even higher. When a required rate of return is higher than say 60%, an investor generally views the likelihood of such a high return being realized as being so small that the investment cannot be made.

5. Planned exit (explicit) – Another mandatory requirement that must be met is the “HOW” you will realize your return. You only realize your return when you are able to sell your shares – “exiting.” A private equity investor, particularly in the developing markets, typically plans to be in any investment for a period of 3 to 5 years. An investor cannot and will not make an investment unless there is a clear plan for how they are going to exit the investment and realize their return.

- a. The most common exit strategies are: 1) Exiting via the public markets (IPO), 2) Exiting through a strategic or trade sale (selling to a corporation in a similar line of business), 3) Exiting by management buy-out (MBO) or share repurchase, 4) Exiting through another financial/institutional investor.
 - i. Public market exit - Jordan has a nascent yet possibly viable public market, which could be an exit opportunity for the Fund to utilize for potential portfolio companies.
 - ii. Strategic/trade sale - Strategic sales could also be a practicable means to exit. However, for a company to become an attractive target for a strategic investor, they must have reached a critical mass and have a significant market share of a substantial market in their industry.
 - iii. Management buyout (MBO) or share repurchase – This may be the most likely exit strategy for an investment in a Jordanian company. Typically an

MBO is executed with leverage (leveraged buyout or LBO) – whereby, ideally, the company has reached a sustainable level of cash flows that could support an injection of debt that is used to buy out the investor. The founders benefit by regaining control of their company and the debt (usually with long durations) is paid down with the company's cash flows at a cheaper cost of capital.

The challenge with this exit possibility is that you would have to see a clear plan presented by management for how the MBO would be executed. Few, if any, management teams/owners would be able to develop such a plan due to lack of experience and training and lack of mechanisms to accomplish the buyout. Finance training could help companies here develop the knowledge for developing such a plan.

It must be clearly understood that even if all other requirements are met, an investment into an investee candidate should never be made unless there is a clear and explicit exit strategy.

6. Well prepared documentation and financial statements

This is always a challenging requirement for companies in the developing markets to meet for most companies simply have not had the proper training in IAS and business planning.

There is an undoubted need for assistance in helping Jordanian companies to develop proper financial statements and business plans (which could be provided by an intermediation service).

These six criteria are the most important when screening investee candidates but they are not all-inclusive.

ii. Starting Point: Fundamental Analysis

1. Overview of firm and its strategies
2. Evaluate the structure of the industry
3. Evaluate firm's current economic position
 - a. Ratio analysis
4. Predict future course of firm
 - a. Projections
 - b. Capital Expenditure (Cap Ex) required
 - c. Free cash flows
 - d. Valuation
 - i. Cost of Capital determination
 - ii. Methods – there are several to use, however, in the emerging markets certain methods do not aid in determined a viable range of valuation (e.g. multiples using comparable companies).

Discounting cash flows is generally the starting point for determining intrinsic value.

$$V_{S,0} = \sum_{t=1}^T \frac{E_t(CF_{S,t})}{(1 + k_{S,t})^t} + \frac{E_t(TV_{S,T})}{(1 + k_{S,T})^T}$$

- e. Due diligence
 - i. Operational
 - ii. Financial
 - iii. Technical
 - 1. Will often have to rely on outside technical experts
- f. Decision making
- g. Commitment
 - i. Term Sheet Offer
- h. Disbursement
- i. Tracking and Monitoring
- j. Fund Accounting

These are the basic elements of the investment process of a typical venture capital fund. Experience counts for a great deal in operating a fund. Seasoned professionals will indicate that you can run fancy financial models all day long, however, without extensive experience in assessing management teams and analyzing potential market opportunities, it is easy to make bad investment choices.

FINANCIAL INTERMEDIATION

Financial intermediation (see [Appendix N](#) for diagram) is the functioning as a conduit between investors and entrepreneurs. An intermediary typically either represents a company seeking capital or represents an investor seeking investment opportunities. There is a great need for intermediation in Jordan. Few companies have the know-how for presenting themselves to the financial markets. Many Jordanian companies not only need help in “packaging” themselves for presentation to capital sources, but they need help in making themselves into investment opportunities. They need guidance in creating business strategies for capturing market opportunities and they need help in translating those strategies into growing and sustainable cash flows. They need help in financial management and operational management of their businesses as well as technical expertise. These areas of assistance can be serviced with the development of proper intermediation capacities.

Though intermediation can come in different forms, investment banks are the primary example of a financial intermediary. Investment banking can be performed by individuals or institutions which act as underwriters or agents for companies (and municipalities) raising capital or seeking to provide capital to merge with or to acquire another company. Many investment banks also maintain broker/dealer operations as well as maintain markets for previously issued securities. In Jordan, the most needed role they can play is in raising capital in the private equity markets and in offering advisory services to business owners and to investors. Investment bankers also typically provide corporate restructuring advisory services. Unlike commercial banks, they do not accept deposits from and do not provide loans to individuals or businesses. They focus mainly on functioning as a conduit between business owners and investors and in advising companies on business development.

Jordan has a few investment banks; however, their deal size requirement prohibits them from servicing smaller entrepreneurial companies. There have been investment banking boutiques that have appeared on the market, but even so, most look for companies that have capital needs of \$5 million or more and have revenues of at least \$1 million annually.

One of the greatest values investment bankers bring to the table is the relationships they have with capital sources. It is one thing to be able to help in developing businesses and properly packaging them for the market, but if they do not have the relationships with the capital sources in the market; they have no one to present to. An investment/merchant banker who indiscriminately sends out offering memorandums (“packages” or “books” – the selling documents) to the market, will meet with little, if any, success. These relationships, however, take time and money to develop, nurture and maintain. It is difficult for a young boutique to cover the cost of fees while working on deals; especially since it can take a year to 18 months to consummate a deal in Jordan).

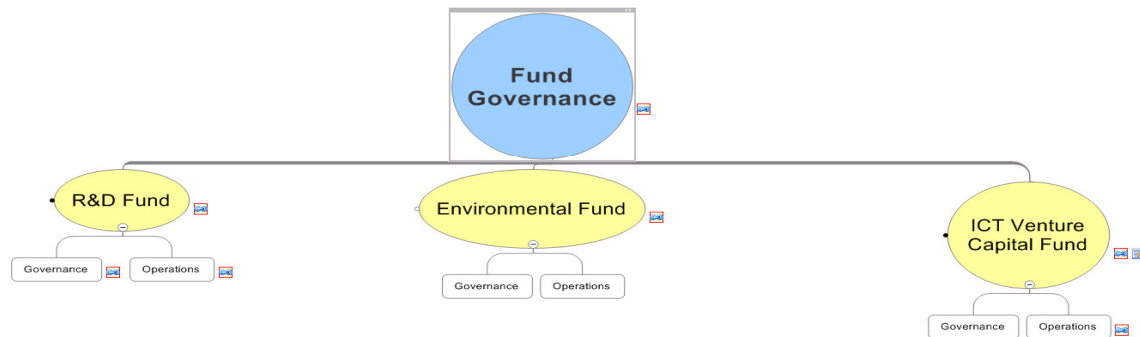
Financial intermediation services should be developed in Jordan to give young and growing entrepreneurial enterprises access to alternative sources of capital that they would normally not be able to access.

JORDANIAN ENVIRONMENTAL FUND

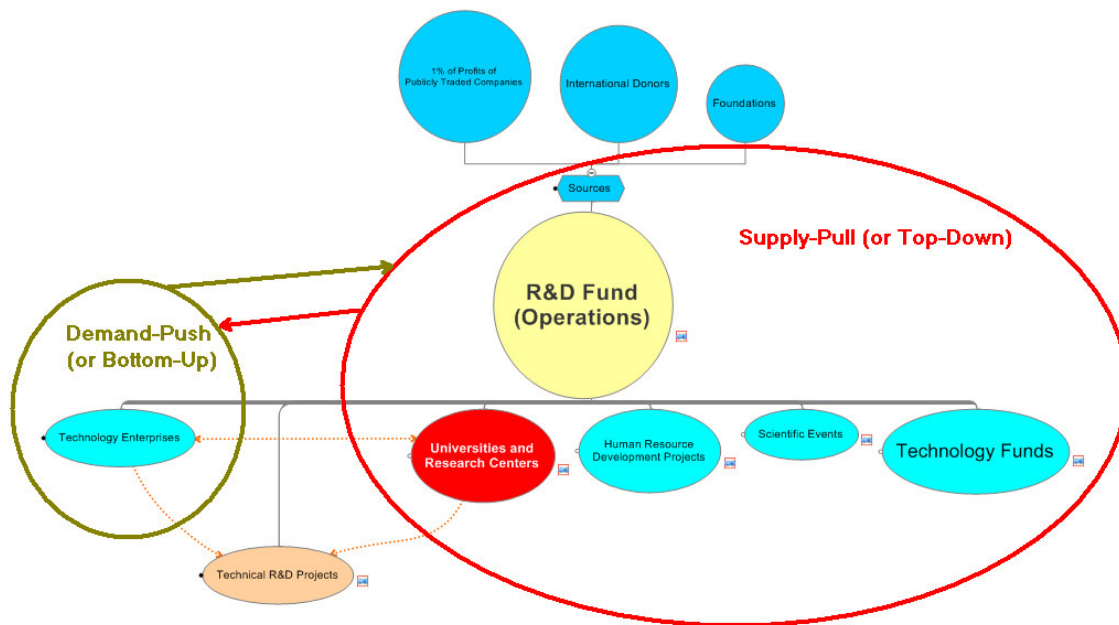
After reviewing relevant documentation regarding this fund, it was determined, that SABEQ’s team working on this fund had substantially completed the governance section which was very much in line with internationally recognized best practices. The Consultant provided “reality check” inputs on the governance and operational policies for this fund. There may be additional inputs that can be derived for this fund from the governance and operational policies that the Consultant has suggested for the R&D fund below. Notes, comments and inputs for the Environmental Fund are included in the accompanied mind maps.

APPENDICES

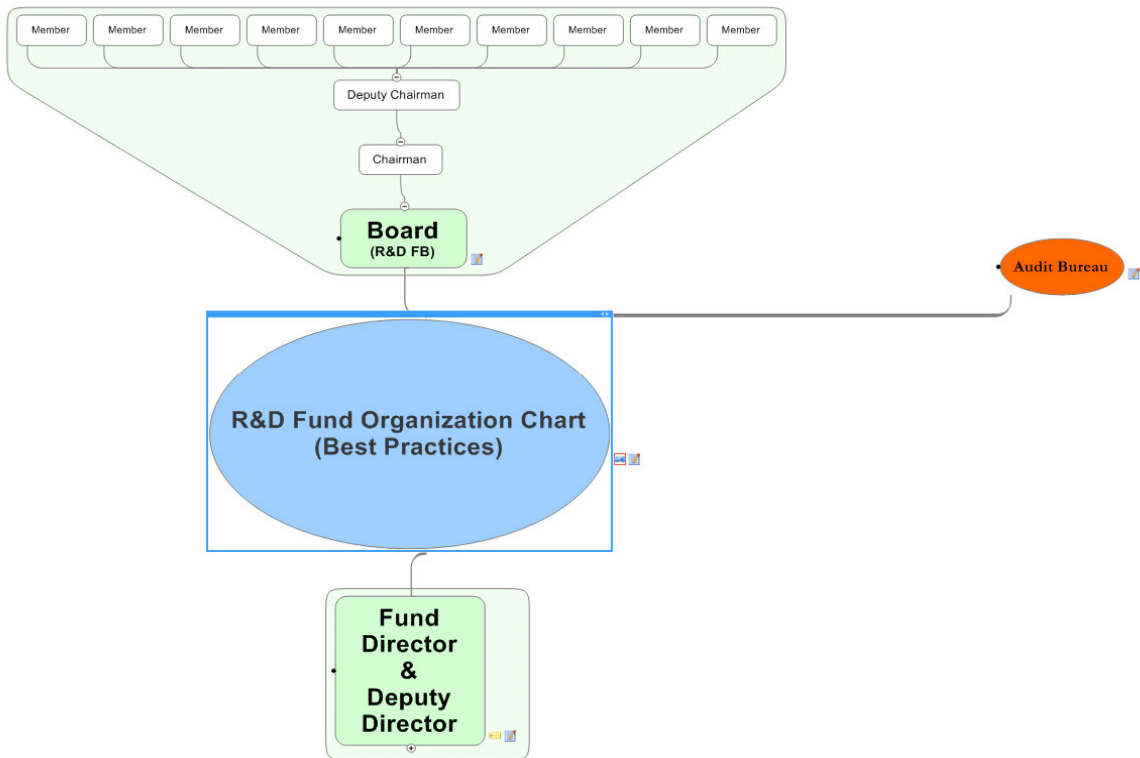
APPENDIX A - FUND GOVERNANCE



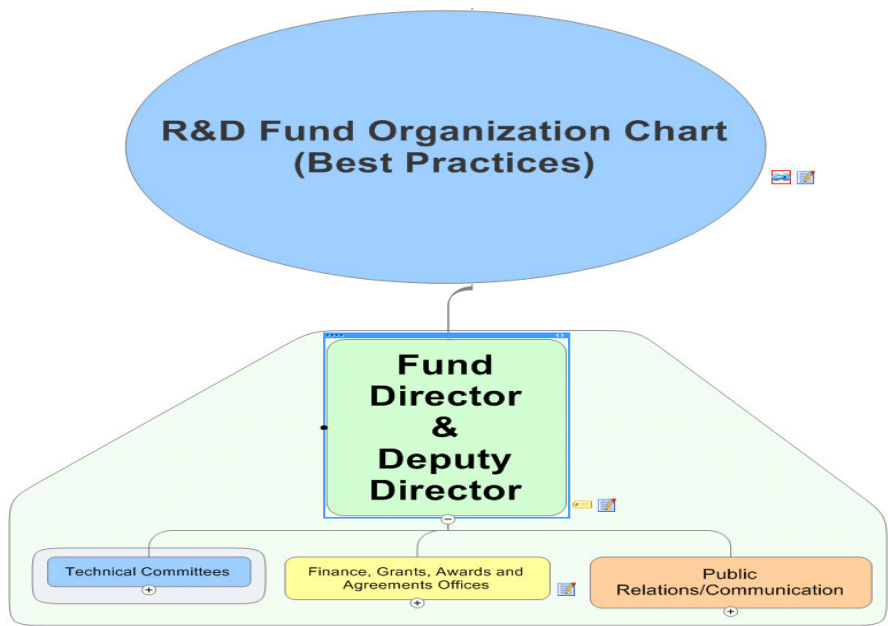
APPENDIX B - SUPPLY-PULL/DEMAND-PUSH



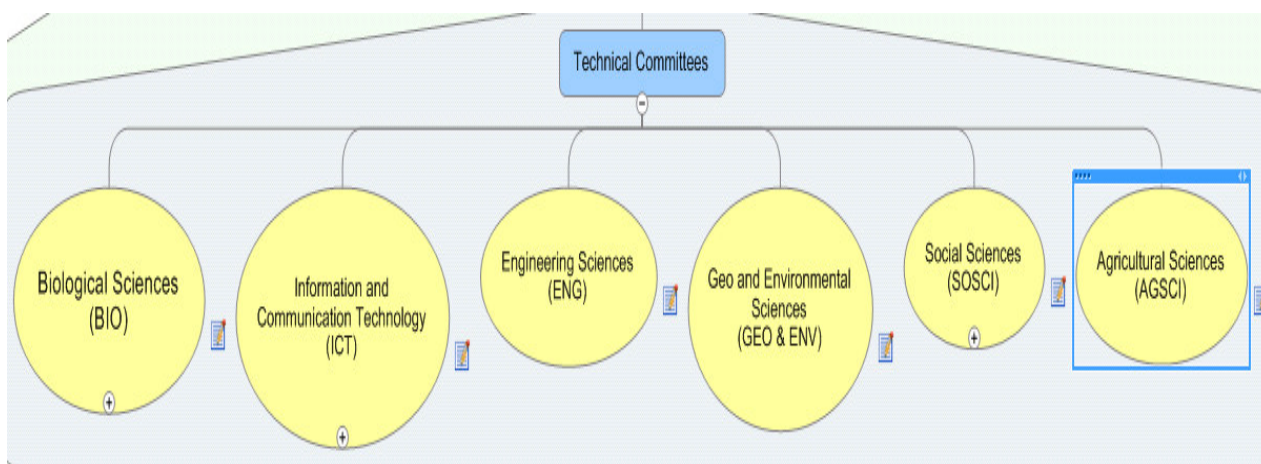
APPENDIX C - GOVERNANCE STRUCTURE



APPENDIX D - FUND DIRECTOR & DEPUTY DIRECTOR



APPENDIX E - TECHNICAL COMMITTEES - DETAIL



1. Biological Sciences (BIO)

The mission of the Directorate for Biological Sciences (BIO) is to enable discoveries for understanding life. BIO-supported research advances the frontiers of biological knowledge, increases our understanding of complex systems, and provides a theoretical basis for original research in many other scientific disciplines. The two subcommittees that fall under the BIO Committee shall be:

- a. Medical & Pharmaceutical Sciences
- b. Basic Sciences

Areas of Support

The Directorate for Biological Sciences provides support for research to advance understanding of the underlying principles and mechanisms governing life. Research studies range across progressively more complex systems and scales encompassing the structure and dynamics of biological molecules, cells, tissues, organs, organisms, populations, communities, and ecosystems up to and including the global biosphere. Comprehensive concepts that span and unify the diverse areas of biology include complexity, robustness, communication, resilience, adaptability and cooperation. Achieving a coherent understanding of the complex biological web of interactions that is life is a major challenge of the future. This challenge will require that knowledge about individual biological units, networks, sub-systems and systems be compiled and connected from the molecular to the global level and across scales of time and space. Integral to all activities across the directorate is a commitment to integrate research and education, to broaden participation, and to promote international partnerships.

BIO plays a major role in support of research resources for the biological sciences including living stock centers, biological field stations, computerized databases including sequence databases for plants and microorganisms. FUND/BIO is also the nation's principal supporter of fundamental academic research on plant biology, environmental biology and biodiversity. This Committee also supports varied activities that provide the infrastructure for contemporary research in biology. These broadly include instrumentation-related activities, research resources, and training opportunities.

This Committee supports fundamental research on the origins, functions, relationships, interactions, and evolutionary history of populations, species, communities, and ecosystems. It also supports research aimed at an integrative understanding of organisms as units of biological organization, with particular emphasis on systems-level approaches to the study of their development, function, behavior, and evolution. It will support research and related activities that contribute to a fundamental understanding of living systems at the molecular, sub cellular and cellular levels.

An important aim of this Committee is to support innovative interdisciplinary activities that emerge from advances in disciplinary research. It will possibly make investments that expand the frontiers of research by fostering creative partnerships to build links across disciplines, promoting synthesis, and enabling development of new conceptual frameworks.

The mandate of the BIO Committee is to support research and education in the biological sciences. This includes designing programs for the development of academic faculty as both educators and researchers. The mechanisms for such can include research participation grants for undergraduates, specific training programs, postdoctoral research fellowships; and doctoral dissertation improvement. The Biology Sciences mandate also includes the broadening of participation in biological sciences of underrepresented groups

Mandate for the Biological Sciences Advisory Committee

The Biological Sciences Advisory Committee advises on such issues as:

- How BIO's mission, programs, and goals can best serve the scientific community;
- Institutional administration and policy;
- How BIO can promote quality graduate and undergraduate education in the biological sciences;
- Priority investment areas in biological research; and
- Performance measurement of awards granted.

The BIO Committee should meet twice a year. Members should represent a cross section of biology with representatives from many different sub-disciplines within the field; a cross section of institutions including industry; and balanced representation of women and under- represented minorities.

2. Information and Communication Technology (ICT)

The Committee for ICT has five primary aims:

- To help Jordanian ICT researchers and enterprises to innovate and create Intellectual Property Rights (IPRs).
- To help Jordanian ICT researchers and enterprises develop viable commercial opportunities out of their innovations and their newly created IPRs.
- To enable Jordan to develop competitive advantages in computing, communications, and information science and engineering.
- To promote understanding of the principles and uses of advanced computing, communications and information systems in service to society.
- To contribute to universal, transparent and affordable participation in an information-based society.

To achieve these aims, the Committee for ICT shall support and initiate research in all areas of computer and information science and engineering, aid in the development of state-of-the-art national computing and information infrastructure for research and education in general, and contribute to the education and training of the next generation of computer and communication technology scientists and engineers.

The ICT Committee shall be organized into three sub-divisions:

- Information and software systems
- Computer and Networking systems
- Communication technology systems

Each subcommittee shall be responsible for managing their portfolio of grants and proposal competitions. While individual program managers may be designated as the point of contact for specific sub-disciplines, collaboration takes place within each Sub-Committee, each Committee, and between committees and the Administrative Offices (Grants, Finance, etc.).

ICT Advisory Committee

The ICT Advisory Committee is charged with supplementing the Fund's knowledge by providing up-to-date information on the state of the ICT field, changes that are taking place in the ICT field (both in and outside of Jordan) and aiding the Fund in developing policies in response to the ICT market conditions. Moreover, the ICT Advisory Committee shall provide advice on the impact of the Fund's policies, programs and procedures on the ICT arena in Jordan. The Committee also shall provide oversight on program management and performance; and provide advice to the Fund Director on special issues, forming ad hoc subcommittees to carry out needed studies as necessary.

- a. Information and software systems
- b. Computer and Networking systems
- c. Communication technology systems

3. Engineering Sciences (ENG)

The goal of the Engineering Sciences Committee is to promote the progress of engineering in Jordan and to increase Jordan's engineering capacity. The Fund's investments in engineering research and education is to help build and strengthen a national capacity for innovation that can lead over time to the creation of new Intellectual Property, new enterprises and ultimately wealth creation that improves the lives of all Jordanians.

Engineering Sciences Advisory Committee

The mandate of the Engineering Sciences Advisory Committee is to advise on such issues as:

- How the Engineering Science Committee's mandate, programs, and goals can best serve Jordan and its people;
- Institutional administration and policy;
- How the Committee can promote quality graduate and undergraduate education in engineering;
- Priority investment areas in engineering research; and
- Performance monitoring of awards issued.

The Committee shall meet twice a year. The Committee Director and other Committee participants shall represent a cross section of engineering, science, and education with representatives from many different sub-disciplines within the field; a cross section of institutions including industry; and balanced representation of women and under-represented minorities.

4. Geo and Environmental Sciences (GEO & ENV)

The Geo and Environmental Sciences Committee's mandate is to support research in the atmospheric, earth, and ocean sciences with a particular emphasis on the most pressing environmental challenges that Jordan is currently facing. The aim of supporting research in the geo-sciences is to advance scientific knowledge of Earth's environment, including resources such as water, energy, minerals, and biological diversity and to discover solutions for the preservation of the environment and of precious limited resources such as water. Research in this arena can also lead to advances in science's ability to predict natural phenomena of economic and human significance, such as climate changes, water shortages, weather, earthquakes, fish-stock fluctuations, et. al.

The Geo & Environmental Sciences Advisory Committee

This Committee shall:

- Provide advice, recommendations and oversight concerning support for the Fund's geo-sciences research and education portfolio.
- Be a point of contact with the scientific community to inform the Fund of the impact of its research support.
- Serve as a forum for consideration of geo-sciences and research initiatives.
- Advise the Fund on long-range plans and partnership opportunities.

- Perform oversight of program management, overall program balance, and other aspects of program performance (including performance of the fund recipients) for geo-science activities.

5. Social Sciences (SOSCI)

Other global research funding organizations, such as the National Science Foundation of the United States (“NSF”, for which the Jordanian R&D Fund emulates) have reported that public investment in science and engineering yield very high annual rates of return to society. Research activities supported by the NSF - fundamental research and education based at academic institutions - are generally viewed as among the most productive of all Federal investments.

The Social Sciences Committee supports the research that builds fundamental knowledge of human behavior, interaction, and social and economic systems, organizations and institutions. It does this through its Subcommittees of:

- Economic and Financial Sciences,
- Legal Studies,
- Behavioral Sciences, and
- Education.

International Collaboration

The Social Sciences Committee shall encourage collaboration between Jordanian scientists working on common research projects with scientists from other countries. One mechanism that has proven useful in other countries for pursuing collaborative research is through parallel review and parallel funding. Under this mechanism, a Jordanian collaborator submits a description of the work and a budget for the Jordanian activities to the Fund, while the partner submits a parallel or even identical proposal to his/her funding agency along with a budget for the collaborative activities. Under such circumstances, the Fund proposal would undergo the usual review process, as does the non-Jordanian R&D Fund proposal. This can be a win- win situation; because each funding source is getting more net research for their partial support of the overall project, (the whole is greater than the sum of its parts).

Social Sciences Advisory Committee

The Social Sciences Advisory Committee shall provide advice, recommendations, and oversight concerning support for research, education, and human resources development. The Committee shall review and advise on the impact of programs in the disciplines and fields encompassed by the Committee, provide oversight of overall program management and performance, and advise as to the over all impact of the Fund's policies on the Social Sciences scientific community.

a. Economic & Financial Sciences

The Economics and Financial Services Committee supports research designed to improve the understanding of the economic and financial processes and institutions of the Jordanian economy and of the world system of which it is a part. This Committees mandate is also to strengthen both

empirical and theoretical economic analysis as well as the methods for rigorous research on economic behavior. The Committee shall support research in almost every area of economics, including econometrics, economic history, environmental economics, finance, industrial organization, international economics, labor economics, macroeconomics, mathematical economics, and public finance.

This Committee shall encourage the submission of proposals from individual or multi-investigator research projects, doctoral dissertation improvement awards, conferences, workshops, symposia, experimental research, data collection and dissemination, computer equipment and other instrumentation, and research experience for undergraduates. The program places a high priority on interdisciplinary research. The Committee shall place a high priority on broadening participation and encourages proposals from junior faculty, women, and other underrepresented minorities.

This Committee shall also provide funds for suitable conferences and interdisciplinary research that strengthens links among economics and the other social and behavioral sciences as well as mathematics and statistics.

b. Legal Studies

The Legal Studies Sub-Committee shall support social scientific studies of law and law-like systems of rules, institutions, processes, and behaviors. These can include, but are not limited to, research designed to enhance the scientific understanding of the impact of law; human behavior and interactions as these relate to law; the dynamics of legal decision making; and the nature, sources, and consequences of variations and changes in legal institutions. The primary consideration is that the research shows promise of advancing a scientific understanding of law and legal process.

This Sub-Committee shall seek out diverse theoretical perspectives, methods and contexts for study. These perspectives could range from research on social control, crime causation, violence, victimization, legal and social change, patterns of discretion, procedural justice, compliance and deterrence to regulatory enforcement. This Sub-Committee shall consider funding for standard proposals, travel support requests that would result in developing the foundation for research, and proposals for improving doctoral dissertation research. This Sub-Committee shall also consider proposals that aid Jordan inter-connectivity with the rest of the world especially where Jordan's legal system would benefit from such inter-connectivity.

This Sub-Committee shall meet twice a year and should encourage the participation of other Committees of the Fund.

c. Behavioral Sciences

The Behavioral Sciences Committee shall support research to develop and advance scientific knowledge about humans in areas such as brain and behavior, language and culture, and geography and the environment.

This Committee shall consider funding opportunities in the following areas:

Anthropological Sciences

- Archaeology
- Cultural Anthropology
- Cultural Anthropology Scholars Awards
- Physical Anthropology

Geography and Environmental (Behavioral) Sciences

- Geography and Regional Science
- Psychological and Language Sciences
- Cognitive Neuroscience
- Developmental and Learning Sciences
- Documenting Endangered Languages
- Linguistics
- Perception, Action & Cognition
- Social Psychology

d. Education & Human Resources

The Education & Human Resources Committee mandate is to aid Jordan in achieving excellence in science, technology, engineering and mathematics education at all levels and in all settings (both formal and informal) in order to support the development of a diverse and well-prepared workforce of scientists, technicians, engineers, mathematicians and educators and a well-informed citizenry that have access to the ideas and tools of science and engineering. The purpose of these activities is to enhance the quality of life of all citizens and the health, prosperity, welfare and security of Jordan.

The goals of this Committee are:

- a. Prepare the next generation of science professionals, attract, and retain more Jordanians to science careers.
- b. Develop a robust research community that can conduct rigorous research and evaluation that will support excellence in science education and that integrates research and education.
- c. Increase the technological, scientific and quantitative literacy of all Jordanians so that they can exercise responsible citizenship and live productive lives in an increasingly technological society.

Capacity-Building Strategies

1. Identify effective ways to prepare and support teachers and faculty who can inspire and challenge students in the sciences.
2. Invest in research on learning, facilitating the translation of research into practice, and create supportive learning environments.
3. Ensure that the scientific community is broadly representative of the nation's individuals, geographic regions, types of institutions and scientific disciplines; and,

Education and Human Resources Advisory Committee

The Education and Human Resources Advisory Committee shall provide advice, guidance, recommendations, and oversight concerning the Fund's science and engineering programs. This includes effective and efficient strategies for assessing the condition of science, technology, engineering and mathematics education in Jordan, evaluating program results, achieving overall program balance, evaluating program results, and long-term strategic planning.

This Committee shall meet twice a year.

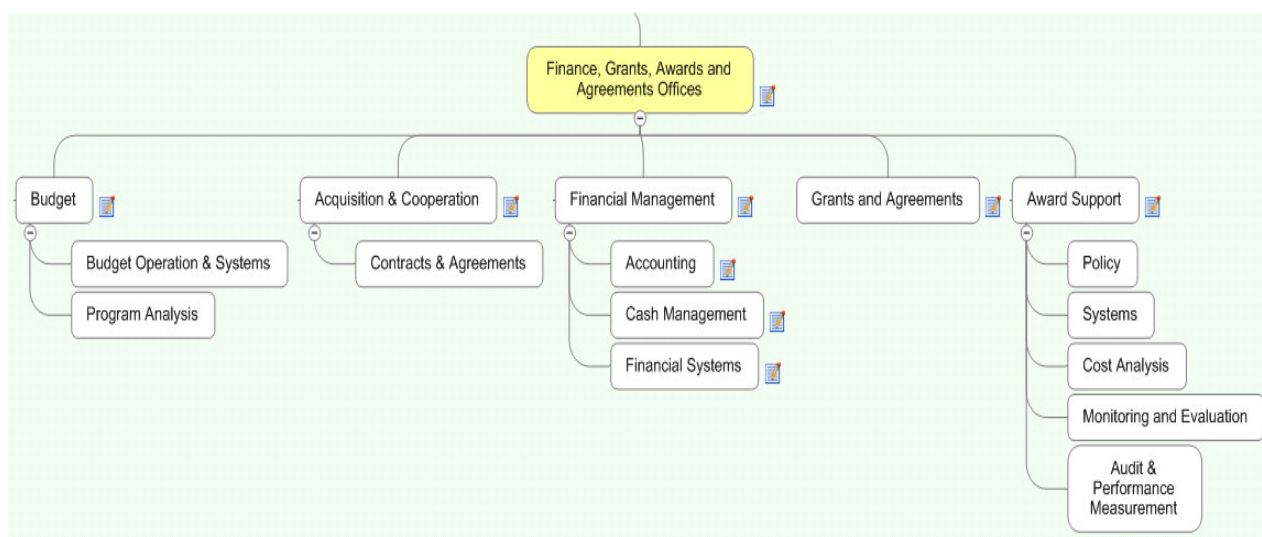
6. Agricultural Sciences (AGSCI)

The Committee of Agricultural Sciences supports research to develop and advance scientific knowledge and methods in agriculture.

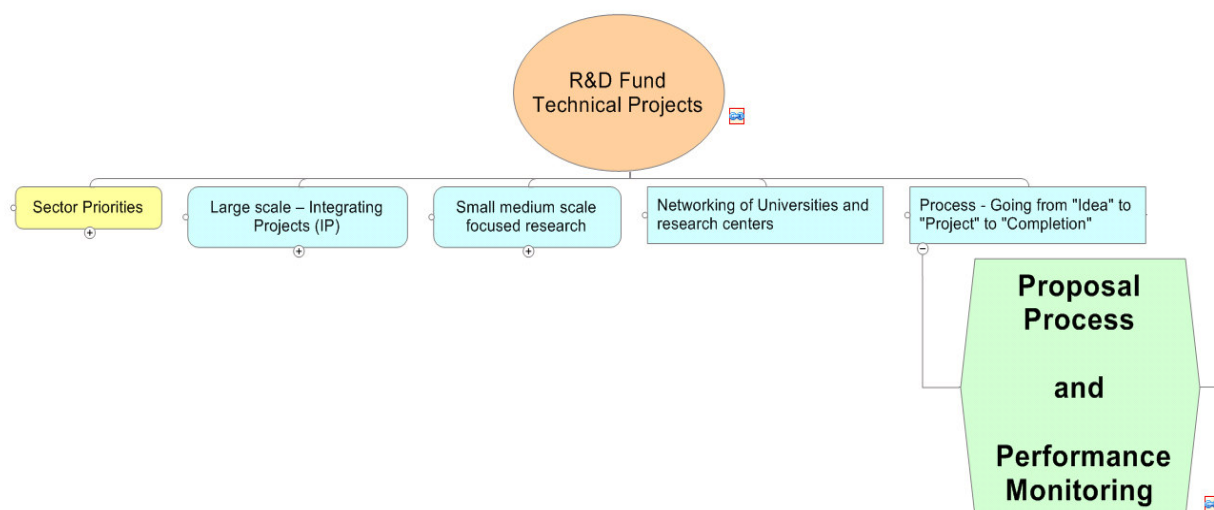
Agriculture Sciences Advisory Committee

The role of the Agriculture Sciences Advisory Committee is to provide advice, guidance, recommendations, and oversight concerning the Fund's agriculture science related programs. This includes effective and efficient strategies for assessing the condition of agriculture science and technology, agriculture education and training programs, evaluating program results, achieving overall program balance, and long-term strategic planning.

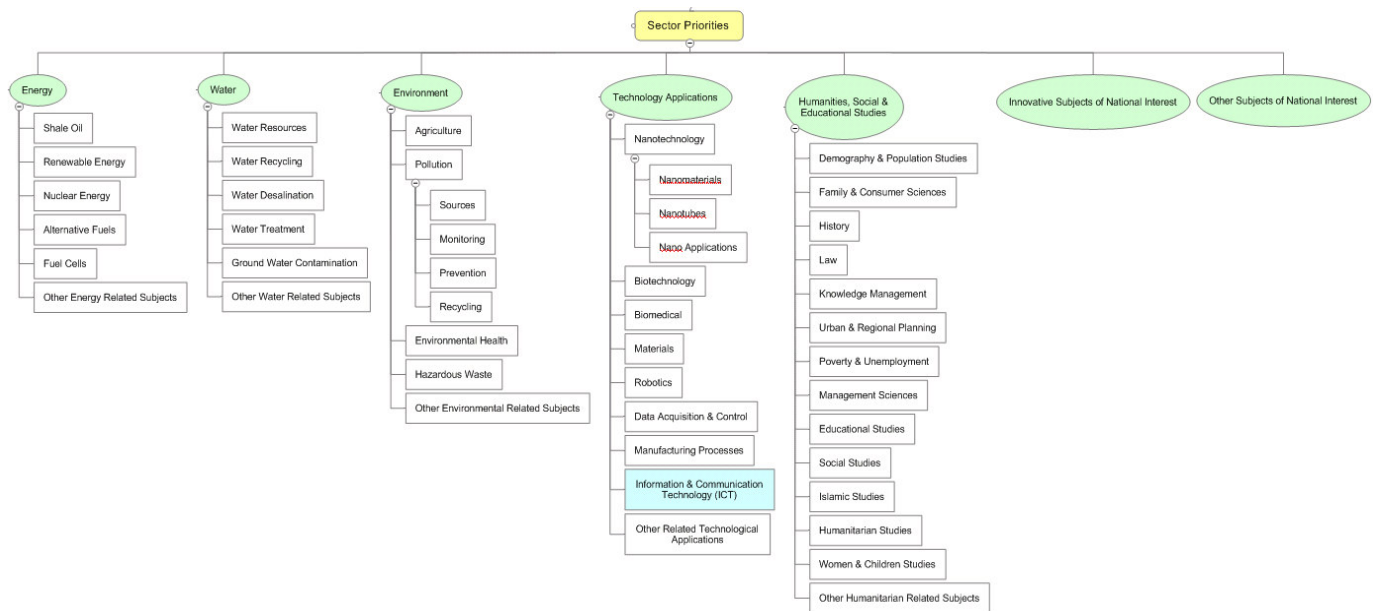
APPENDIX F - FINANCE, GRANTS, AWARDS AND AGREEMENTS OFFICES



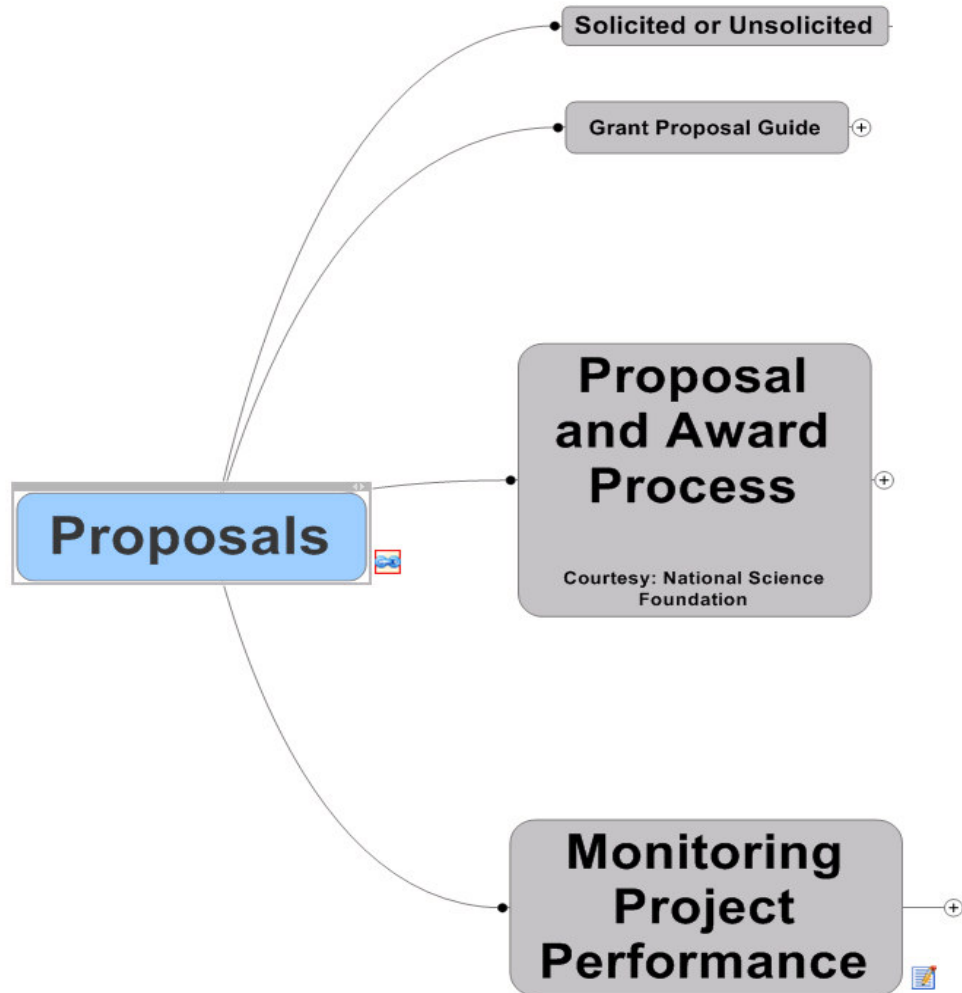
APPENDIX G - R&D FUND TECHNICAL PROJECTS



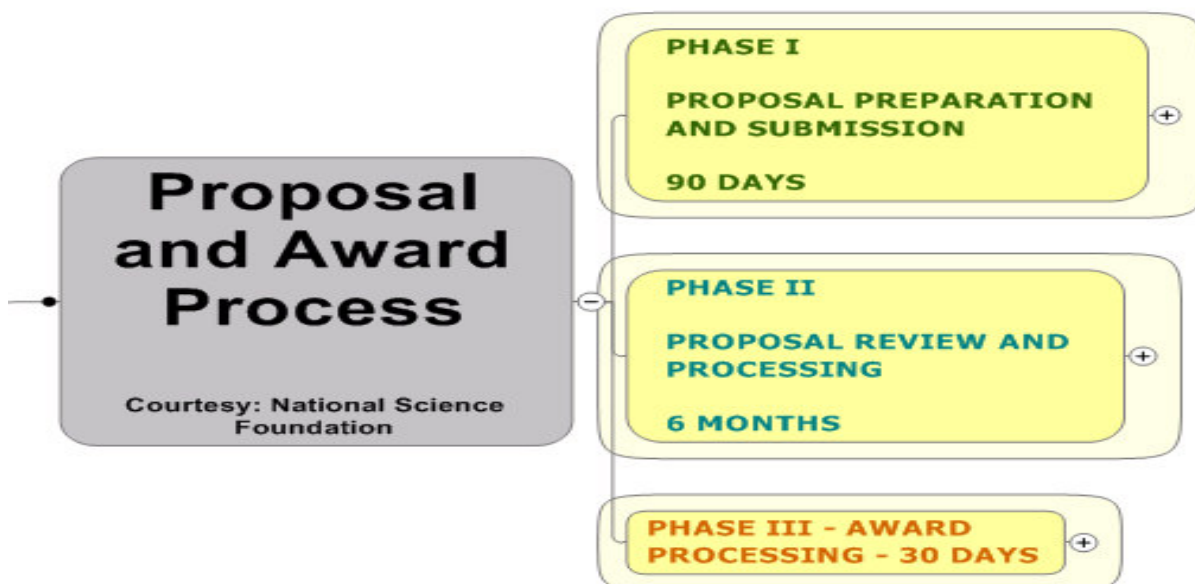
APPENDIX H - SECTOR PRIORITIES



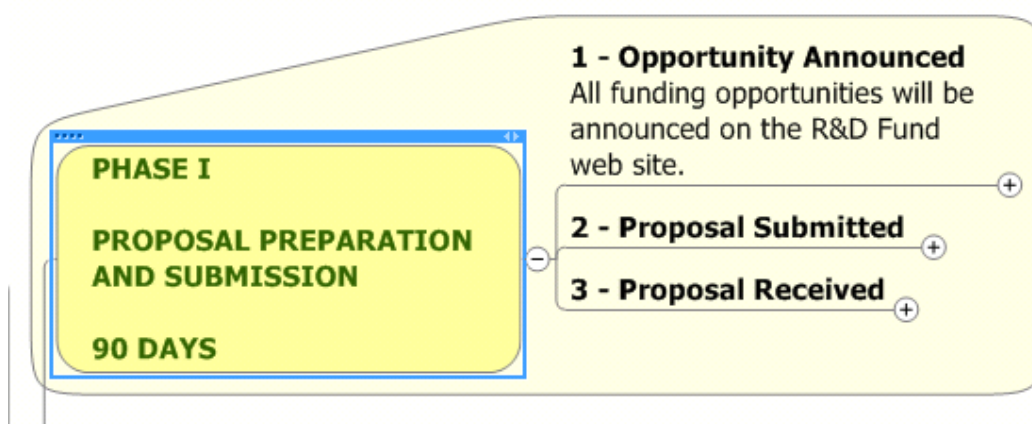
APPENDIX I - PROPOSALS



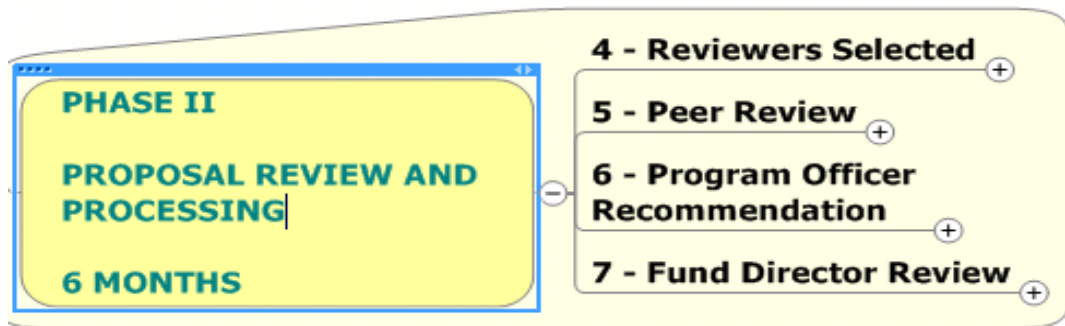
APPENDIX J - PROPOSAL AND AWARD PROCESS



APPENDIX K - PROPOSAL PREPARATION AND SUBMISSION



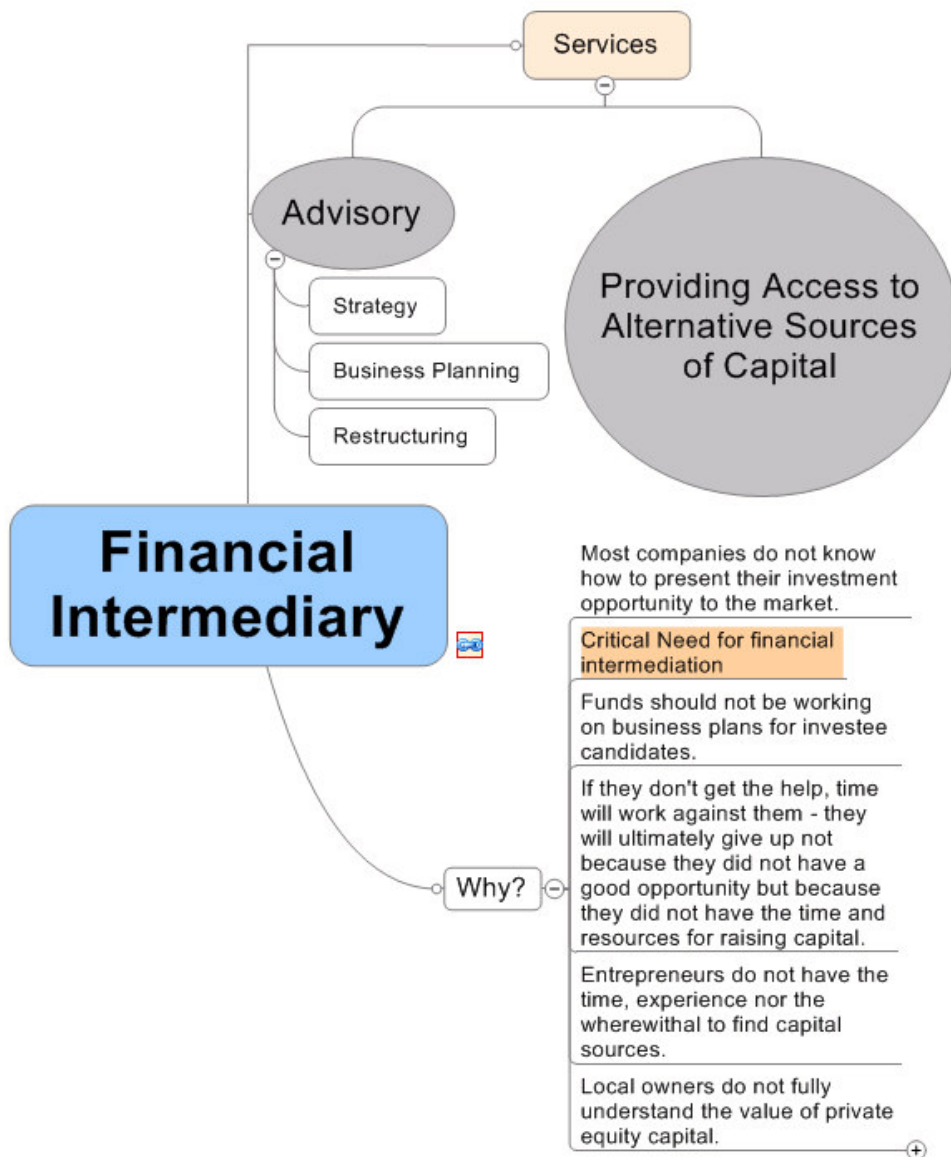
APPENDIX L - PROPOSAL REVIEW AND PROCESSING



APPENDIX M - AWARD PROCESSING



APPENDIX N - FINANCIAL INTERMEDIATION



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