

National Knowledge Commission (NKC) of India: An Overview

Members

Mr. Sam Pitroda : Chairman

Dr. P.M.Bhargava : Vice Chairman

Dr. Pratap Bhanu Mehta

Dr. André Béteille

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About NKC

The 21st Century has been acknowledged worldwide as the 'Knowledge Century'. Every nation now finds itself operating in an increasingly competitive and globalised international environment where the information infrastructure, research and innovation systems, education and lifelong learning, and regulatory frameworks are crucial variables.

In the next few decades India will probably have the largest set of young people in the world. Given this demographic advantage over the countries of the West and even China, we are optimally positioned, in the words of our Prime Minister, to **"leapfrog in the race for social and economic development"** by establishing a knowledge-oriented paradigm of development.

It is with this broad task in mind that the National Knowledge Commission (NKC) was established on 13th June 2005 and given a timeframe of three years from 2nd October 2005 to 2nd October 2008 to achieve its objectives.

Terms of Reference

As per Government Notification of 13th June 2005, the following are the Terms of Reference of the National Knowledge Commission (NKC).

- Build excellence in the educational system to meet the knowledge challenges of the 21st century and increase India's competitive advantage in fields of knowledge.
- Promote creation of knowledge in S&T laboratories.
- Improve the management of institutions engaged in intellectual property rights.
- Promote knowledge applications in agriculture and industry.
- Promote the use of knowledge capabilities in making government an effective, transparent and accountable service provider to the citizen and promote widespread sharing of knowledge to maximize public benefit.

Objectives

The overall task before the National Knowledge Commission is to take steps that will give India the 'knowledge edge' in the coming decades, i.e. to ensure that our country becomes a leader in the creation, application and dissemination of knowledge.

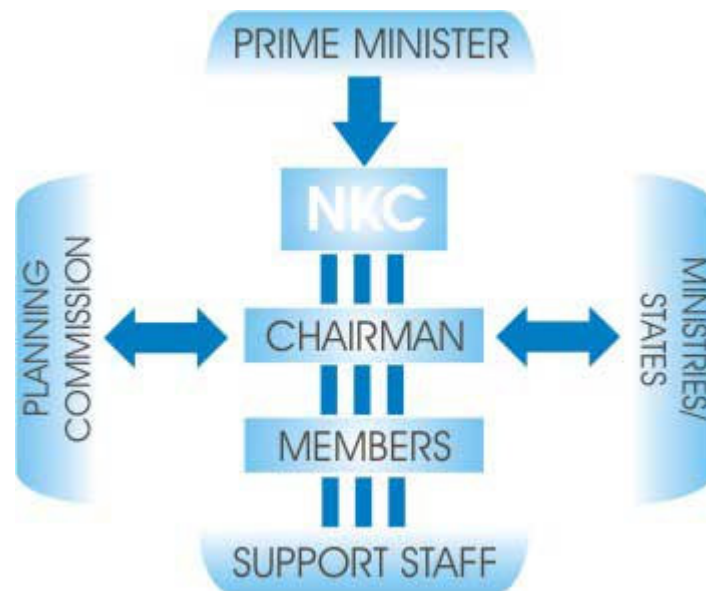
Creation of new knowledge principally depends on strengthening the education system, promoting domestic research and innovation in laboratories as well as at the grassroots level, and tapping foreign sources of knowledge through more open trading regimes, foreign investment and technology licensing.

Application of knowledge will primarily target the sectors of health, agriculture, government and industry. This involves diverse priorities like using traditional knowledge in agriculture,

encouraging innovation in industry and agriculture, and building a strong e-governance framework for public services.

Dissemination of knowledge focuses on ensuring universal elementary education, especially for girls and other traditionally disadvantaged groups; creating a culture of lifelong learning, especially for skilled workers; taking steps to boost literacy levels; and using Information and Communication Technology (ICT) to enhance standards in education and widely disseminate easily accessible knowledge that is useful to the public.

Organisation



The National Knowledge Commission consists of eight **Members**, including the **Chairman**. All Members perform their duties on a part-time basis and do not claim any remuneration for the same.

The Members are assisted in their duties by a **Technical Support Staff**, which consists of a maximum of 10 young professionals from premier educational institutions, hired on contract basis.

A small number of officials may be seconded to the NKC by the Government for administrative coordination as **Officers on Special Duty**. The Commission is also free to co-opt **Experts** to assist in the management of its tasks.

For the purposes of oversight, a **National Steering Group** for the NKC has been created under the Chairmanship of the Prime Minister. This group includes the Ministers of Human Resource Development, Agriculture, Commerce and Industry, and Communication and Information Technology, the Deputy Chairman of the Planning Commission, and the Minister of State for Science and Technology.

The Planning Commission is the nodal agency for the NKC for planning and budgeting purposes as well as for handling Parliament related responses.

The methodology of the NKC is to form **Working Groups** within each of its focus areas and make concrete proposals for reform directly to the Prime Minister through a series of **White Papers**.

This task involves working in close collaboration with Central and State governments, professionals, academics, scientists, regulatory bodies, national think-tanks, industry representatives, civil society organisations etc.

Focus Areas

Access to Knowledge

Access is one of the most fundamental issues in a knowledge society. Even if universities, research institutions and laboratories produce large amounts of knowledge, it will be of little use until the majority of the population actually possesses adequate means to acquire, absorb and communicate this knowledge.

Knowledge Concepts

Advances in knowledge and its applications are products of human endeavours; therefore it is of utmost importance that we nurture the skills and intellectual capacities of our largely youthful population in order to build a strong base of human capital that can transform India into a strong knowledge economy.

Knowledge Creation

Although India has the option of borrowing or buying new knowledge from abroad, it is important to create self-sufficiency by promoting indigenous research, especially in Science & Technology. S&T has the ability to accelerate the processes of other parallel knowledge objectives, leading to economic growth and security.

Knowledge Application

The creation of knowledge cannot be directionless. To derive maximum benefits from our intellectual assets, we must apply knowledge in fields like agriculture, industry, health, education etc. where productivity can be enhanced. Knowledge application is both a goal in itself and a facilitator of progress in these important sectors.

Knowledge Services

Investment in knowledge services will produce large-scale benefits for the common man. Technology has the potential to make government services and functioning more accountable, transparent and efficient. E-governance can change the way in which the citizens of India perceive and interact with the government.

Access

“If you have knowledge, let others light their candles in it.” - Margaret Fuller

The concept of access to knowledge is made up of four components.

- First and foremost, individuals must possess the ability to receive and comprehend knowledge.
- Second, means must exist for individuals who have the ability to receive and comprehend knowledge to readily obtain it.
- Third, accurate knowledge of the state and its activities should be made available to the general public.
- Lastly, and most importantly, access is about increasing the reach and opportunities of individuals or groups excluded from mainstream knowledge systems.

Against this backdrop the following issues need to be considered.

- **Adult Literacy:** Approximately 250 million adults in India are illiterate. The target is to achieve functional literacy among at least 90% of the population in the quickest time possible.
- **Delivery**
 - Existing public libraries need to be rejuvenated and new libraries established as centres of excellence in academic resources.
 - Information networks and a culture of information-sharing are required in sectors like education, health, agriculture, business, R&D, food distribution, disaster management, security, etc.
- **Public Information**

- National web-based portals need to be established as one-stop comprehensive sources of information on issues like water, sanitation, health, education, housing, nutrition, employment, etc.
- Technology and the Internet also have an important role in making the recently legislated Right to Information Act more effective in its implementation.
- **Affirmative Action:** A cogent government policy on eliminating discrimination and widening access in education and employment is required. So far efforts in this direction have been fragmented, compelling the judiciary to step in and make decisions that do not always sit well with government policy and public opinion.

Concepts

“Education is not the filling of a pail, but the lighting of a fire.” - William B. Yeats

Knowledge concepts are organised, distributed and transmitted through the education system. Education is a potent force for any developing state. It encourages individuals to

- Think independently
- Make better-informed decisions
- Keep abreast of important issues and trends at the local and national level
- Question existing socio-economic arrangements in a manner that leads to innovation, change and development.

A good education system relies largely on a complex interface of human resources, pedagogical methods, curricula, infrastructure and academic standards. These are all important variables, at every level and in every field of education.

The NKC is in particular concerned with the following aspects of Indian education.

- **Literacy:** There are roughly 100 million illiterate children in India. Special initiatives and outreach programmes are required to bring these children into the mainstream.
- **Elementary Education:** High levels of financial and institutional commitment are required to ensure basic infrastructure in schools, bolster teaching quality and improve academic standards.
- **Secondary Education:** Secondary Education needs to be recognised as a crucial intermediary step between Elementary and Higher Education. Innovative strategies are required to make secondary school education less strenuous and more appealing to students.
- **Higher Education:** Funding, regulatory frameworks, curricula, private sector participation, academic standards and research are all issues that require urgent attention and sincere resolution with a long term view in mind.
- **Professional Education:** To consolidate and extend India’s growing international presence in IT, medicine, law, engineering, etc., professional education needs to be supported creatively and its quality constantly checked and upgraded.
- **Vocational Education:** Technicians and other skilled workers and craftsmen form the backbone of manufacturing and infrastructure development. A larger and much more dynamic system of vocational education is required to train and equip them in greater numbers.
- **Distance Education:** While formal education is useful for building human capital, not all individuals are able to participate in it. Enough resources must be invested to ensure that distance education is developed as a viable alternative to formal education.
- **Continuous Learning:** It is important for today’s workforce to keep up with the rapid pace of technological progress. A culture of lifelong learning needs to be encouraged for all jobs, especially in the public sector.
- **Language:** Language is an important issue not just of knowledge concepts but also of access and application. Translations from and into local languages will ensure that

knowledge is uniformly available in society and local knowledge is made available for use and analysis.

Creation

“Discovery consists of seeing what everybody has seen and thinking what nobody else has thought.” - Jonathan Swift

A nation can develop in two ways – either it learns to use existing resources better, or it discovers new resources. Both activities involve a significant amount of knowledge creation by way of research and innovation, primarily in the field of Science & Technology (S&T).

Innovation is a product of research and an essential ingredient of progress in S&T. However, in relative terms, India lags behind the West and developing countries like Brazil and China in this respect.

The above considerations suggest that measures need to be taken to make India a leader in S&T in the coming years. For this it will be important to:

- **Promote research** in institutions of higher education in order to bring them at par with national research institutes and laboratories. A cross-pollination of theory and practice, wherein equal emphasis is placed on research and teaching, is essential for progress.
- **Link research** in public institutions with industry requirements to foster a symbiotic relationship whereby research is more disciplined and focused on deliverables, and the private sector benefits from lower costs in R&D.
- **Diversify the funding** sources of research institutions and universities. Allowing private investment (both domestic and foreign) or public-private partnerships in R&D would bring in more resources while easing the financial pressure on the government.
- **Augment** the R&D infrastructure. Geographical consolidation of S&T laboratories and other research institutions would provide them with benefits of agglomeration and also facilitate knowledge exchanges between public institutions.
- **Promote innovation** through the National Innovation Foundation, by encouraging entrepreneurship at the local and national levels, and encouraging inter-disciplinary studies in S&T in order to encourage new approaches and methodologies.
- **Strengthen the IPR regime.** New knowledge cannot be fully exploited by its creator unless there is a strong enough regime that protects Intellectual Property Rights. This will also earn the confidence of global leaders in S&T who will be more willing to cooperate and licence or share their technologies with India.

Application

“If you give me rice, I’ll eat today; if you teach me how to grow rice, I’ll eat every day.” - Mahatma Gandhi

Knowledge can be productively applied to promote technological change and facilitate the reliable and regular flow of information. This requires significant investment in goal-oriented Research and Development and R&D along with access models that can simplify market transactions and other processes within an industry.

Recent non-public initiatives in the fields of education, communication and agriculture have further demonstrated that knowledge can be very effectively applied for the betterment of the rural poor.

The NKC has identified some areas where knowledge application will produce significant benefits.

- **Education:** The prospect of using technology and the Internet to spread education and literacy is an exciting one. Initiatives like e-learning can play a vital role in increasing enrolment in education and also enhance quality by complementing classroom teaching.

- **Agriculture:** The relative decline in agricultural productivity since Independence can be reversed by promoting agricultural research that is in line with the needs of farmers. Information on new technologies and techniques, prices, distribution channels, weather, water, power and livestock management can greatly enhance the incomes of farmers and make the sector a source of prosperity rather than poverty.
- **Rural and SMEs:** There is tremendous potential in technology to facilitate skill development, process improvement, market access, quality control and access to credit and insurance in this sector. In this manner, it will be possible to raise rural incomes, facilitate competition and link rural and urban markets in an unprecedented manner.
- **Traditional Knowledge:** The rapid advance of technology and levels of information-sharing are increasingly prone to crowding out traditional knowledge. It is therefore desirable to document, standardise, validate, disseminate and utilise traditional knowledge from all over the country, especially in the fields of agriculture, health and arts and culture.

Services

“Knowledge will forever govern ignorance; and a people who mean to be their own governors must arm themselves with the power which knowledge gives.” - James Madison

The use of knowledge services, more popularly known as e-governance, has the potential to simplify many different points at which citizens interact with the state. Traditionally these points of interaction have been vulnerable to unscrupulous activities and rent-seeking.

They have also created a culture of fear in the people, who often find themselves completely at the mercy of frontline government officials while trying to access public services.

Technology provides us with an opportunity to eliminate these unsavoury elements of our democracy and its bureaucracy, and to ensure accountability, transparency and efficiency in government services.

The Benefits of e-Governance consist of

- Reducing the cost and improving the reach and quality of public services.
- Reducing transaction costs and transaction times.
- Empowering citizens and increasing transparency of government functioning.
- Re-engineering of processes that results in greater efficiency and productivity.

A prominent recent example of good e-governance has been the introduction of the online reservation system of the Indian Railways. Similarly, the creation of portals on water resources, power, agriculture, business, etc. can provide the public with information that is useful and readily accessible.

Immediate Concerns

E-governance strategies need to be deployed to standardise public records like land titles, driving licences, voter identification, birth certificates etc. It is entirely possible today to envisage the simplification of at least ten public services or processes through e-governance.

On the whole, therefore, knowledge services provide India with the opportunity to simplify, standardise and streamline public services and institutions. In conjunction with other enabling opportunities like the Right to Information Act, e-governance promises to usher in a new era of accountability and transparency in government functioning.

Reference:

National Knowledge Commission. <http://www.knowledgecommission.org/>

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NATIONAL KNOWLEDGE INDEX – INDIA

(Introductory Note)

**Prepared by
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For

**The National Knowledge Commission
Government of India**

Introduction:

The National Knowledge Index is an attempt to measure India's performance as a knowledge economy and to provide decision support for growth and government policy making. The index is a support tool and by product of the national knowledge commission and should facilitate the establishment of actionable goals and national growth policies. The index should help identify variables that will help create an environment favorable to innovation and knowledge diffusion. The index will include economic indicators such as identified by the World Bank KAM methodology, plus knowledge competitiveness indicators, knowledge creation and diffusion, national knowledge culture, national and regional skills assessment, Education and innovation networks, etc.

When we wish to examine the internal and external process that takes place in a country, we survey its economic indicators. The question that arises is - do these indicators provide a full and accurate assessment of the country's assets and do they provide an indication of its potential for future growth? This is the question we are addressing within the framework of India's Knowledge Index. A Knowledge Index comprises the knowledge, wisdom, capability and expertise that provide the nation with a competitive advantage and is used to assess the national knowledge assets. This paper describes the index and the standardized measures that can be used to evaluate the national knowledge assets, the countries competitive capabilities and core competencies for the next decade.

The National Knowledge Index (NKI) refers to a performance monitor that measures current performance and future progress on key knowledge parameters. The NKI can also be used to benchmark against other developed nations and competitor countries like China, Israel, Romania and the developed world. The NKI works as:

- Indicator/Metrics of National Knowledge Performance
- Indicator of current performance
- Provides parameters for comparison with benchmarking countries
- Measure of performance improvement across time lines
- Metrics to monitor and improve knowledge management in governance
- Indicator which provides transparency to both Indian citizens as well as potential external investors and work as a tool for marketing India's competitive advantages to Foreign Direct Investment and international economic agencies.

The National Knowledge Commission based on the objectives and agenda of the commission will decide the key knowledge areas. The NKI should potentially meet the following objectives of the NKC:

- Highlight the challenges and opportunities presented by the future knowledge society
- Understand and monitor India's performance in its evolution as a knowledge society, both nationally and internationally

The NKI will include primary national metrics like GDP and other economic indicators plus the national knowledge production function. The NKI will follow a balanced score card approach and present measures of competitive advantage. It will also act as an internal monitor for continuous improvement and knowledge development. The different variables that maybe included in the monitor are described in the next sections. The project is an attempt to create a comprehensive actionable metrics for policy making in India. The attempt is to provide the essential knowledge economics indicators (as designed by the world bank) and to further enhance

them with cultural measures and criticality assessments that will help make them actionable in the Indian context.

The Knowledge Paradigm: Variables

The National Knowledge Index –India should measure the following aspects of a knowledge economy:

- 1) ***Overall performance of the economy***: Includes GDP per capita, GDP growth, human development index, poverty index, unemployment rate, employment in industry/service, value added in industry, value added in agriculture, income distribution, etc.
- 2) ***The economic regime***: includes trade as % of GDP, government budget as % of GDP, tariff and non tariff barriers, intellectual property protection (IPR) and patents, soundness of banks, exports as % of GDP, interest rate spread, high technology exports, trade surplus, annual growth in export, export concentration index, export growth from world demand, etc.
- 3) ***Governance***: Regulatory quality, political stability, government effectiveness, etc. In addition, this variable also includes *services provided by the administration*.
- 4) ***The Innovation system***: FDI as % of GDP, royalty and license fee payment, science and engineering enrolment ratio, researchers in R&D (per million population), total expenditure towards R&D (% of GDP), scientific and technical journal articles published, private sector R&D spending, availability of venture capital funding, number of start-up's, culture towards start-up failure, communities and networks of practice, collaboration between industry and universities, patent gifts, number patents granted, new products developed, ratio between patents granted and new products produced and marketed, *applications by industry* and innovations in science and technology labs.
- 5) ***Human capital***: Human Capital refers to the combined knowledge, skill, innovativeness and ability of the nation's individuals to meet the tasks at hand, including values, culture and philosophy. It is measured in terms of education and training, work, culture and health. Measures include average education, adult literacy rate, literacy rate, number of tertiary schools per capita, % of primary teachers with required qualifications, number of tertiary students per capita, cumulative tertiary grades per capita, organizational training and development per capita, training and development participation rates, % of GDP spent on education, population at various age groups, quality of education, English language skills, process capabilities and certifications, standardization bodies, life expectancy, etc.

Culture is a sub variable that has high impact on the effectiveness and success of any policy. It has to be measured separately and understood in order to design workable solutions. Culture is synonymous with knowledge shared by a social group and used to interpret the world around them. When the knowledge is changed it results in a change in the way an experience is interpreted and behavior is generated. Cultural impact includes critical mass of managerial/governmental support (budgetary allocations), sharing behavior, reuse behavior, attitudes towards globalization, perception of failure, etc.

Skills and competencies are another important aspect of human capital and the long-term performance of India as a knowledge economy. It is, therefore, of vital importance that

the current available skills and competencies of the Indian population be understood, the future needs determined, the gaps analyzed and investments channeled to areas of greatest returns. Some difficult to acquire skills could include managerial skills, project management, science and technology, engineering for manufacturing, etc.

- 6) **ICT and Infrastructure:** This refers to cooperation and the flow of knowledge required structural intellectual assets, i.e. information systems, hardware, software, databases, laboratories, an organizational / national infrastructure and a management focus that can sustain and amplify the output of human capital. It includes computer literacy rates, digital storage per capita, volumes of books in libraries per capita, transportation statistics, availability and extent of software usage, fixed lines and mobile phones (per 1000 people), telephone average cost of local call (USD average for 3 minutes), Phone Faults (Number per 100 lines), Waiting Time for a Line (Years), personal computers (per 1000 people), internet users (per 1000 people), paved roads (% of total), Electric Power System Losses (% of total power output), airports and international flights, Research and Innovation networks, data intensive grids, etc.
- 7) **Identifying and prioritizing current knowledge and core competencies:** we study the nations core competencies and create knowledge maps, which help in prioritizing and decision-making. The knowledge parameters¹ are an internal monitor and indicator for growth. The maps also act as an alarm on knowledge areas that India is on the verge of losing competitive advantage.

The current state of national knowledge assets such as agriculture, science and technology, traditional knowledge, art and culture, natural resources management, disaster management, etc, are identified and defined, in order to:

- Create a useful overview and common vision of (what we know about)
- A structure for classifying knowledge in order to better manage it. Provide for better knowledge transfer technologies.
- To identifying priority knowledge areas
- Identify the importance of each knowledge area for the country
- Identify the level of mastery in each area

Knowledge areas are identified and measured on the basis of their *importance* and *performance*. A reasonable indication of which knowledge areas are priority can be obtained by looking at the gap between Importance and Performance. Matrix is broken in three parts, technologies, process and products. This matrix along with the skills and competencies analysis determines the nation's core competencies. The criticality of the knowledge to the nation's market competitiveness is determined by the following questions? How formalized is the knowledge? What is the ease of transfer? Its spread and availability? What is the pace of its obsolescence, what is its reach? Who is the target (the citizens of the country, the international investors, etc) and a criticality assessment tool. Critical knowledge domains are those that are difficult to transfer and rare to find experts in. Those areas will need more immediate action by the NKC and the respective ministries.

The ICT and infrastructure metrics and the governance metrics tell us the state of support processes that will affect national performance in a knowledge economy. ICT

¹ Kannan, 2001 and 2005.

diffusion and work place organization are important determinants of total factor productivity. These measures will help drive policy and investment decisions. Improving the lot of the most skill deficient in society is dependent upon a much wider range of policies that are designed to combat social exclusion. Skills, whilst important, are only part of the policy mixture necessary to create a more prosperous and socially inclusive nation. Measures of culture help us determine and overcome the resistance to change. Measures of innovation are metrics of performance and provide guidelines for determining the future course of policy.

- 8) ***Knowledge Competitiveness Index***: This index is a comprehensive measure of the global competitiveness of different regional clusters within India. The metrics are reused to analyze regional competitiveness and are determined by four key components: human capital components, Economic capital (financial capital or equity inputs), Innovation (knowledge capital – R&D and patents), and knowledge sustainability (human capital availability and knowledge transfer to meet long term production needs, investments in higher education and ICT diffusion).

Conclusion

The National Knowledge Index (NKI) will provide the reader an integrated and balanced picture of the core competencies, key success factors and hidden assets. The Index attempts to highlight India's competitive edge in the international market, creating a national profile that offers a great potential for international investments and a great partner for global business and worldwide collaboration. The index will also facilitate decision-making and actionable implementations. The index will be based on the KAM methodology designed by the World Bank but incorporate variables that are specific to the Indian context and operational variables that will drive change. It will thus consist of knowledge economic variables plus knowledge management and human capital management components, encompassing culture, process and technology. The NKI will consist of: (a) an international competitive index comprising of human capital, market capital, process capital, (b) an internal audit and benchmark of India's knowledge capital comprising of core competencies and knowledge maps, knowledge prioritization and criticality assessment and a knowledge process maturity monitor and (c) a metrics to measure the knowledge and innovation projects launched by the National Knowledge Commission. The NKI will facilitate the design, development and monitoring of policies, processes and projects that will enable the nation's capacity and ability to create new ideas, thoughts, processes and products, and to translate these into economic wealth.

NATIONAL KNOWLEDGE COMMISSION

AGENDA FOR DISCUSSION

AUGUST 4TH 2005

PM's OPENING BRIEF TO NKC ON AUGUST 2ND

- Strengthen knowledge base of India
- Convert knowledge into human capabilities
- High potential but severe challenges
- Demographic advantages
- Funding gap/attract global investment
- India to become global R&D destination
- Improve governance
- Improve public libraries and think-tanks
- Bold recommendations to improve mathematics, science and liberal arts

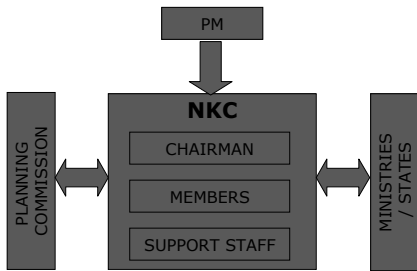
NKC MEMBERS

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- Deepak Nayyar
- Ashok Ganguly
- Jayati Ghosh
- Andre Beteille
- Pratap Bhanu Mehta

TERMS OF REFERENCE

- Build excellence in the educational system to meet the knowledge challenges of the 21st century and increase India's competitive advantage in fields of knowledge
- Promote creation of knowledge in S&T laboratories
- Improve the management of institutions engaged in intellectual property rights
- Promote knowledge applications in agriculture and industry
- Promote the use of knowledge capabilities in making government an effective, transparent and accountable service provider to the citizen and promote widespread sharing of knowledge to maximize public benefit

ORGANIZATION



OVERSIGHT MECHANISM

- A national steering group for the NKC headed by the PM, includes Ministers of
 - Agriculture
 - HRD
 - S&T
 - Commerce
 - IT
 - Planning

RESPONSIBILITIES

- Members
 - Consultations
 - Working group leadership
 - Expert identification
 - New ideas and initiatives
 - Specific area focus
 - Action items and deliverables
 - Overall coordination/communication

METHODOLOGY

- Highlight the challenges and opportunities presented by the future knowledge society
- Understand and monitor India's performance in its evolution as knowledge society, both nationally and internationally
- Identify areas of cooperation and collaboration between education, S&T, business, eGovernance, judiciary, etc.
- Recommend organizational and institutional changes, and create new institutions
- Establish NKC working groups to provide expert advice on specific areas and public policy issues

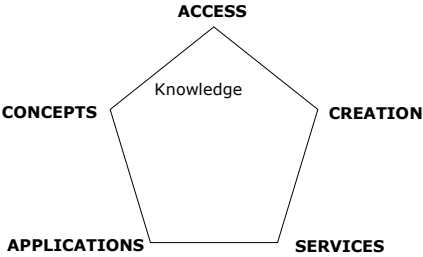
CONSULTATIONS

- Government
 - Central
 - State
- Professionals
 - Academics
 - Vice Chancellors & Principals
 - Scientists
 - Social Scientists
 - Regulatory Bodies
 - Major National Think-tanks
 - Industry
 - NGOs
 - Multilateral Agencies
- Regional / National Consultations

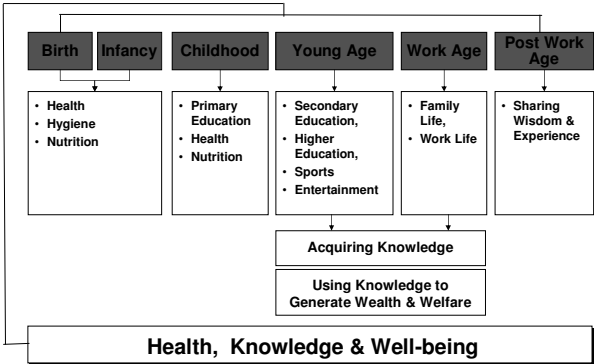
STRATEGY

- Capitalize on government commitment
 - Leadership support
 - Policy environment
 - Resource provision
 - Reconciliation of interests
 - Growth, equity and universality
 - Long term commitment
- Partnership with NGO, private sector and public sector
- Resource mobilization
- Use technology

KNOWLEDGE PENTAGON



KNOWLEDGE LIFECYCLE



KNOWLEDGE PROCESS

- Generation of new knowledge
- Dissemination of knowledge on a continuous basis
- Utilization of knowledge
 - Health-care
 - Agriculture
 - Government
 - Industries
 - Traditional knowledge

NKC FRAMEWORK

- Public policy
- Regulation impact
- Budgets and funds
- Process re-design
- Institutions
- Owners / Champions
- Incentives / Disincentives
- Extending reach to people
- Mission mode

LINKAGES & SYNERGIES

Knowledge to Create Wealth & Equity

- Teaching and research
- Intra-Institutional
- Inter-Institutional
 - Within domains
 - Different domains
- Industry and R&D
- Institutions to Citizen
 - Innovation
 - Production
 - Entrepreneurship
 - Venture Capital
 - Agriculture
- Knowledge for civil society

ACCESS

Increase Reach & Opportunities

- Literacy
- Affirmative action
- Knowledge delivery
 - Libraries
 - Networks
- Resources
 - Individuals
 - Institutions
- Right to information

NETWORK EXAMPLES

- Education
- Health
- Agriculture
- Business
- R&D Labs
- Libraries
- Food Distribution
- Art & Culture
- Traditional Knowledge
- Security
- Government
- Disaster Management

NATIONAL WEB PORTALS

- National Knowledge Commission
- Water
- Sanitation
- Health
- Education
- Housing
- Nutrition
- Employment

EDUCATION

- Literacy
- Primary
- Secondary
- Vocational
- University
- Professional
- Research
- Continuous Learning
- Distance Learning
- Language

S&T

- Innovations
- Entrepreneurship
- IPRs and regulatory regimes
- Venture capital
- Trans and inter-disciplinarity

- India to become global destination for R&D

S&T

- Creation of new institutions, such as
 - National Science Foundation
 - National Social Science Foundation
 - Center for Disease Control
- Modernization of existing institutions
 - Bureau of Indian Standards
 - Public Health Systems
 - Government Data Collection

AGRICULTURE

- Information and knowledge flow to farmers
 - Inputs
 - Technologies
 - Output prices and channels
 - Weather
 - Water
 - Power
 - Livestock
- Extension services for the above
- Information flow from farmers to markets
- Supply chains

AGRICULTURE

- New sources of earning
- Relate research to needs of farmers
 - Dry-land cultivation
 - Changing climate
- Value addition through development of new technologies
- Financial services for farmers
 - Credit
 - Insurance
- Storage and transport

RURAL & SMEs

- Skill development
- Technologies
- Market access
- Inputs
- Access to credit

- Remove knowledge disparities

TRADITIONAL KNOWLEDGE

- Documentation, standardization, validation, dissemination and utilization in
 - Agriculture
 - Medical and health care
 - Art and culture
- Contemporary relevance

eGOVERNANCE

- For what?
 - Reduce cost and improve reach and quality of public services
 - Reduce transaction costs and transaction time
 - Increase transparency of government functioning and empower citizens
 - Reengineer processes to increase efficiency and productivity

eGOVERNANCE

- How?
 - Organization
 - Standards
 - People
 - Land / Property
 - Money flows
 - Transactions
 - Forms and functions
 - Process, procedure and organizational change identified at central, state and local government levels
 - Re-scaling and re-configuring existing resources
 - Supportive training

eGOVERNANCE

- Where?
 - 20 Processes that affect average citizens, e.g.
 - Below Poverty Line (BPL) Card
 - Ration Card
 - Birth and Death Certificates
 - Pension
 - Land Records
 - Passports
 - Voter ID Cards
 - eLegal
 - eHealth
 - eLearning

eGOVERNANCE

- Integration of citizen identification
 - Ration Cards (FCS)
 - BPL Cards (State)
 - Passports (MEA)
 - PAN# (IT)
 - MAPIN (SEBI)
 - Voter IDs (EC)
 - NSSF (RGI)
 - Drivers License (State)
 - Birth Certificates

ILLUSTRATIVE EXAMPLES

<u>TOPIC</u>	<u>ACTION ITEMS</u>	<u>OUTCOME</u>	<u>MEASURE</u>	<u>TIME-LINE</u>	<u>GOVERNMENT</u>
• AGRICULTURE / Extension	• Personnel, training and resources	• Improved channels for knowledge	• Farmer feedback	• 3 Yrs	• Agriculture
• EDUCATION / Primary	• Include teaching English as a language for all	• Enlarged opportunities for all	• Increase in number of English speaking young people	• 10 Yrs	• Education
• eGOVERNANCE / Ration Card	• Standardize and open access	• Security and entitlement for citizens	• Feedback	• 5 Yrs	• Civil Supplies

ILLUSTRATIVE EXAMPLES

<u>TOPIC</u>	<u>ACTION ITEMS</u>	<u>OUTCOME</u>	<u>MEASURE</u>	<u>TIME-LINE</u>	<u>GOVERNMENT</u>
▪ eGOVERNANCE / Integration of Citizen Identification	▪ Harmonization and coordination	▪ Convenience, equity and access for citizens	▪ Cost reduction	▪ 10 Yrs	▪ Various
▪ S&T / Innovation	▪ Create conducive milieu and provide incentives and recognition	▪ Innovative products and services	▪ Increase opportunities	▪ 3 Yrs	▪ S&T
▪ TRADITIONAL KNOWLEDGE	▪ From documentation to utilization	▪ Economic opportunity	▪ Growth	▪ 3 Yrs	▪ Various

ACTIONS - GENERAL

- Motivate, mobilize, support and encourage existing and new knowledge initiatives at various levels in the country
- Help build knowledge infrastructure and institutions
- Focus on knowledge for
 - Individual advancement
 - National development
 - Security
- Use knowledge to leverage new economic opportunities from globalization

ACTIONS - GENERAL

- Link knowledge initiatives to expedite the process of meeting basic human needs
- Encourage innovations and entrepreneurship at all levels
- Use knowledge to fuel growth in agriculture, manufacturing and services
- Restructure existing institutions to respond to knowledge needs of tomorrow
- Create new institutions to respond to the needs of tomorrow

ACTIONS - GENERAL

- Empower people and institutions to participate in the knowledge economy
- Encourage knowledge sharing forums and discussion groups in schools, colleges, libraries, R&D institutions, youth groups, etc.
- Institute district, state, and central awards to recognize people for
 - Innovations
 - Entrepreneurship
 - Education
 - Health

PHASE 1

- Access
 - Knowledge delivery
 - Libraries
 - Networks
- Education
 - Primary
 - Secondary
 - University
- S&T
 - Creation of new institutions
 - Modernization of existing institutions

PHASE 1

- eGovernance
 - 10 to 20 Processes that affect average citizens
- Agriculture
 - Information and knowledge flow to farmers
 - Relate research to needs of farmers
- Rural & SME
 - Skill development
 - Technologies
- Traditional Knowledge
 - Documentation to Utilization

NEXT STEPS

- Start consultations
- Invite ideas and inputs
- Formulate action plan for October

NATIONAL KNOWLEDGE COMMISSION

TERMS OF REFERENCE

- Build excellence in the educational system to meet the knowledge challenges of the 21st century and increase India's competitive advantage in fields of knowledge
- Promote creation of knowledge in S&T laboratories
- Improve the management of institutions engaged in intellectual property rights
- Promote knowledge applications in agriculture and industry
- Promote the use of knowledge capabilities in making government an effective, transparent and accountable service provider to the citizen and promote widespread sharing of knowledge to maximize public benefit

ACTIONS - GENERAL

- Motivate, mobilize, support and encourage existing and new knowledge initiatives at various levels in the country
- Help build knowledge infrastructure and institutions
- Focus on knowledge for
 - Individual advancement
 - National development
 - Security
- Use knowledge to leverage new economic opportunities from globalization

Scaling Excellence in Education and Research

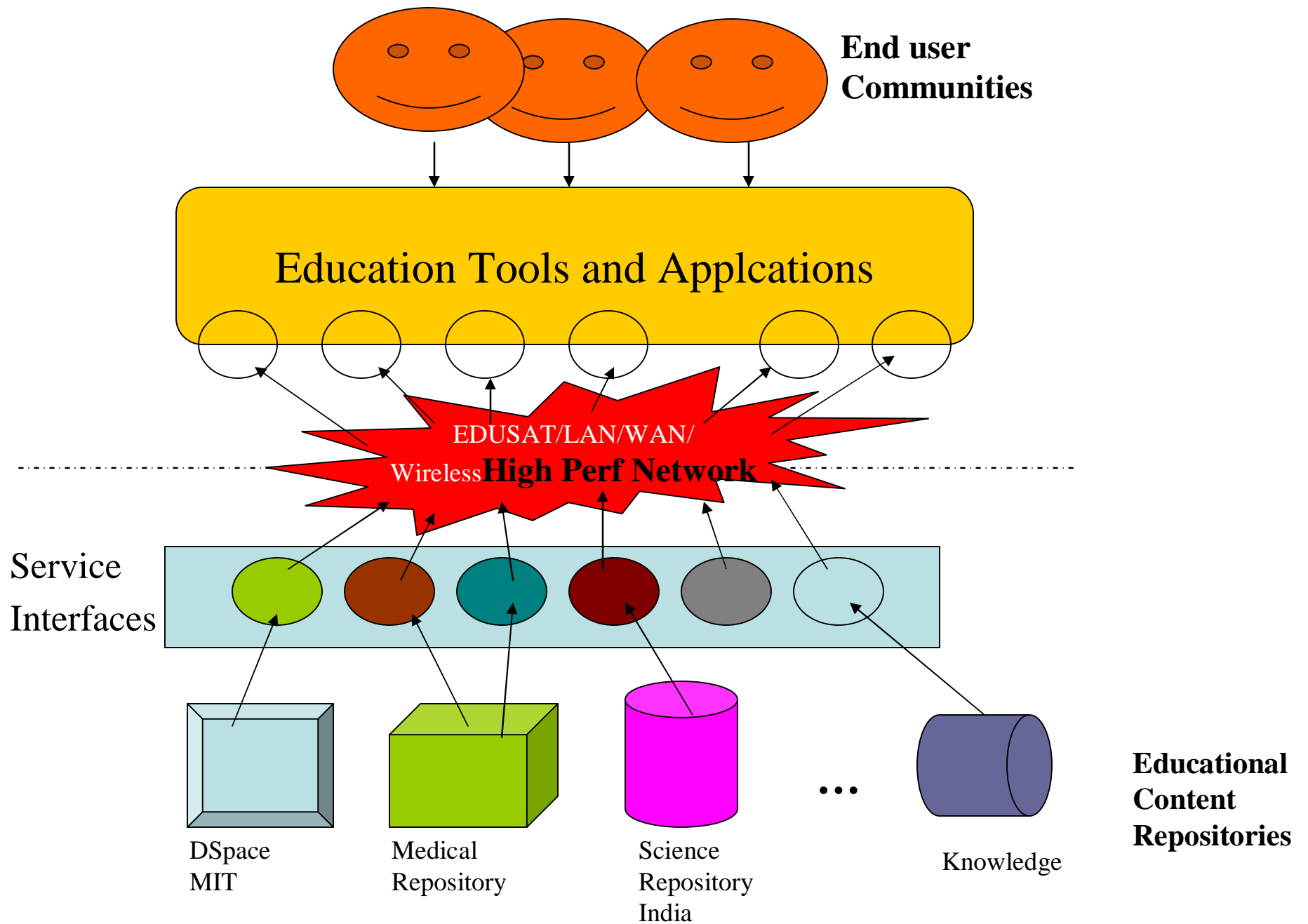
- Extensive Access to Quality Educational Resources
 - For faculty development
 - Direct education (formal and non-formal)
 - Meet hr (kw) needs in all sectors
- Quality Educational and Research Interactions
- Global Participation in Research and Education
 - Sharing
 - Benchmarking

Robust, High Performance Network is Central!

- **High performance networks** not only for advanced research but also **critical infrastructure for educational quality and access.**
- **Network developed and delivered Education will be the mainstream modality**
- Significant step forward in establishing India as a key participant in the Global Knowledge economy.

Opportunities

- Grids and Portals (Domain)
 - Research
 - Education
 - Knowledge Sectors
- iLab
 - Order-of-magnitude higher number of educationally meaningful laboratory experiments through the Internet based on hardware dispersed around the world
- Open Educational Resources
 - **OCW**: large pool of shared and open content (Rich-- visualization)
 - Mednet



Desired Outcome for Internet2

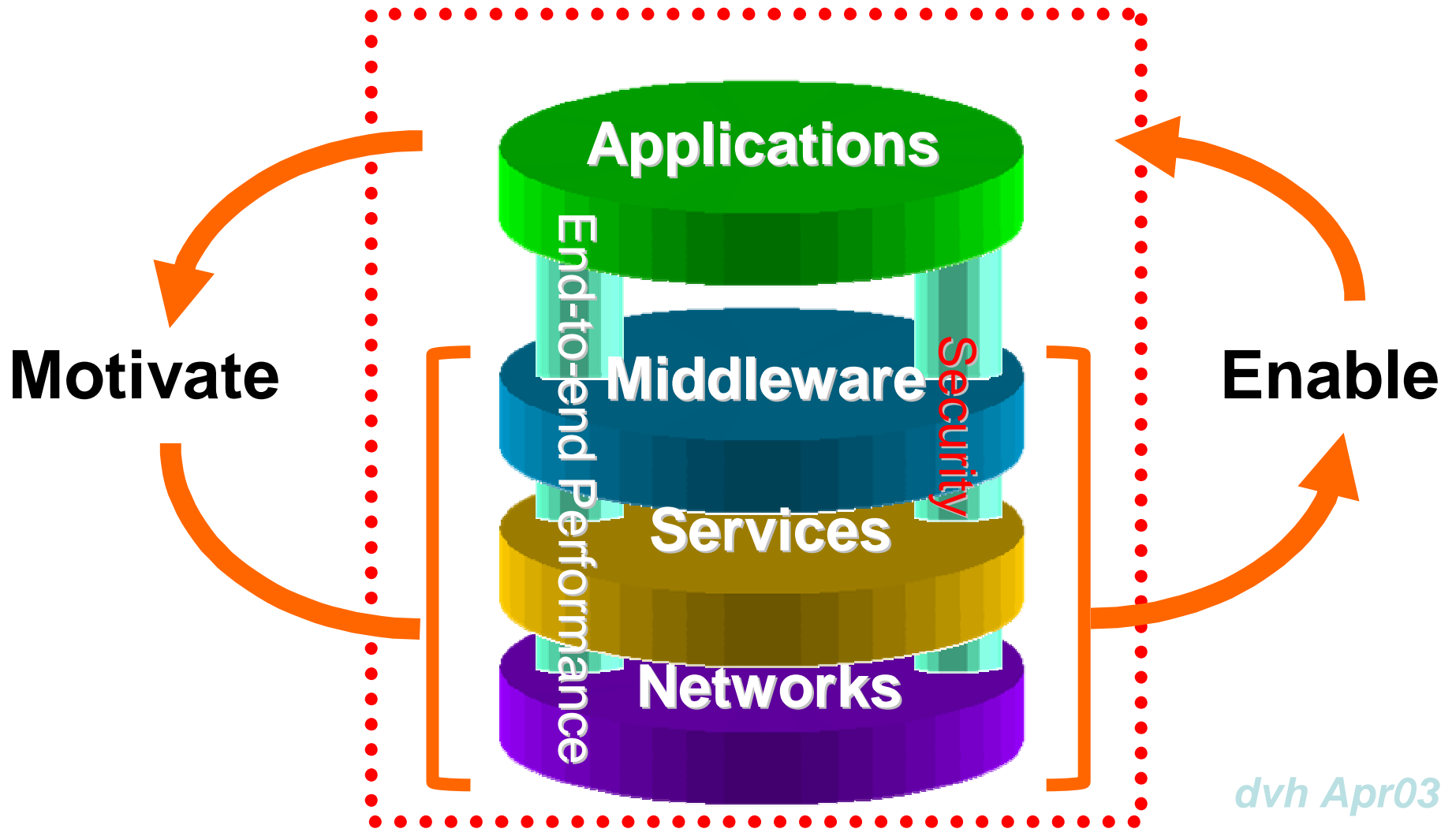
There is a multidimensional “balanced portfolio” of Internet2 Apps

- Impacting both broad and narrow user communities through both
 - Cross-cutting initiatives with broad applicability
 - Rich Collaboration, Digital Libraries, Enhanced Teaching & Learning, Reusable Application Toolkits
 - All disciplines addressed with specific or general applications
 - Health sciences, Arts & Humanities, Social Sciences, Engineering, High Energy Physics, Space/Ocean/Earth Sciences, Languages
- Representing all stages of maturity along the applications lifecycle, from demo all the way to full production in their target community -- with some reaching standardization and productization
- Using and challenging diverse characteristics all layers of the advanced Cyberinfrastructure in different ways
- Involving different kinds of partnerships
 - Industry, international, organizations, governmental agencies...

Internet2 Applications Priorities

- Advance a vision for applications that motivate and, in turn, are enabled by cyberinfrastructure
- Promote large scale adoption of common applications
- Address the critical needs of research subcommunities
- Maintain openness to innovation at the edge
- Address strategic priorities for educational access and quality

Internet2- System View

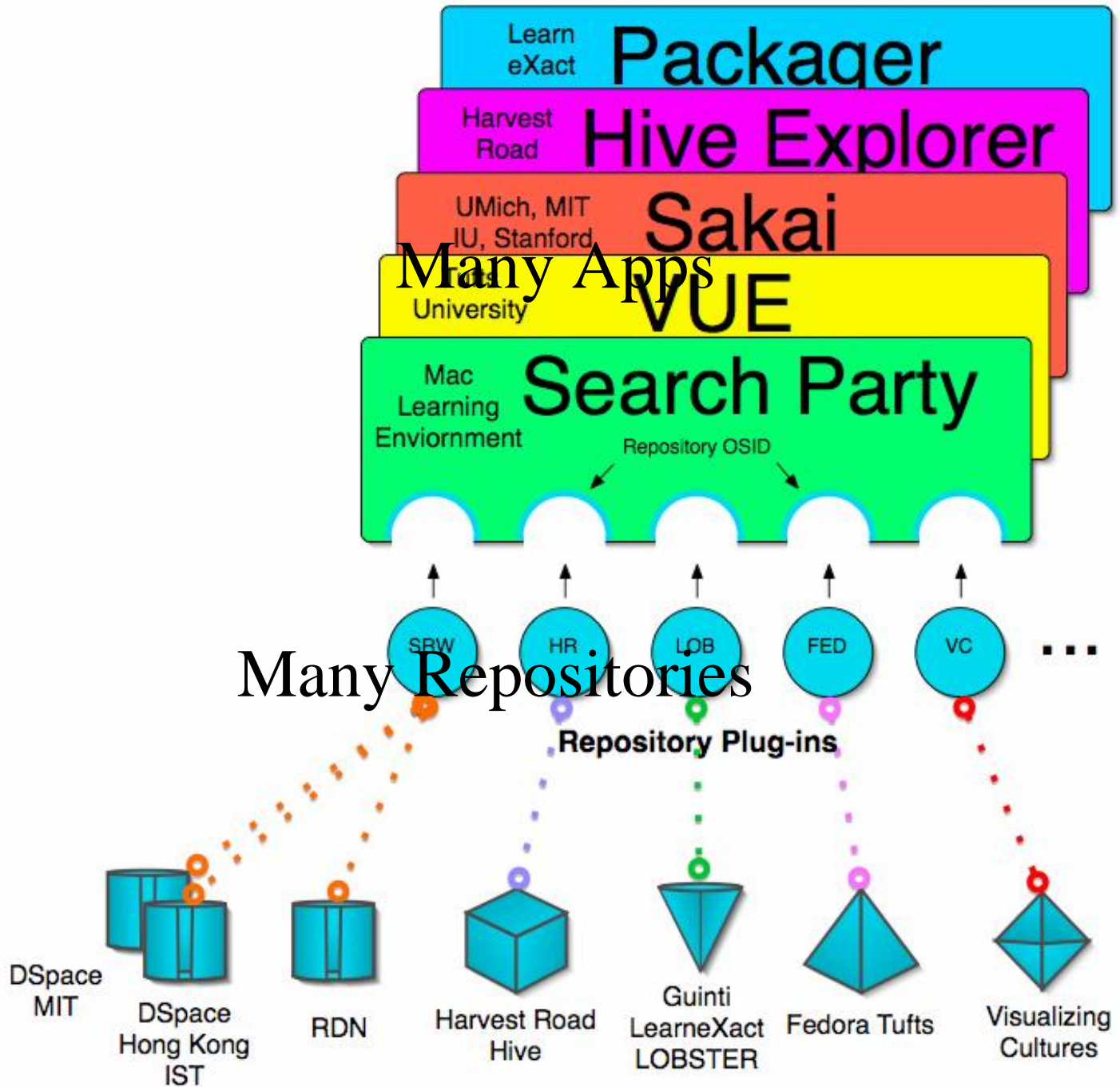


Vision for Internet2 Applications

Internet2 Applications are recognized as key enablers of strategic improvement in higher education's missions of research, teaching & learning and public service

Educational Value Proposition

- Quality Content
- Proximities
 - First Hand; Learner-Teacher; Research-Teaching
- Choice
 - time, location, modality
- Highly Interactive Experiences
 - Experience; Project based; Collaborative
- Transformations in Form
 - Traditional → Virtual
- Transformations in Function
 - Knowing → Affecting and Changing
- **A pedagogy of abundance**
 - **Connected; Continuous; Community**
- **Sustainable Ecology of Educational and Research Opportunity**

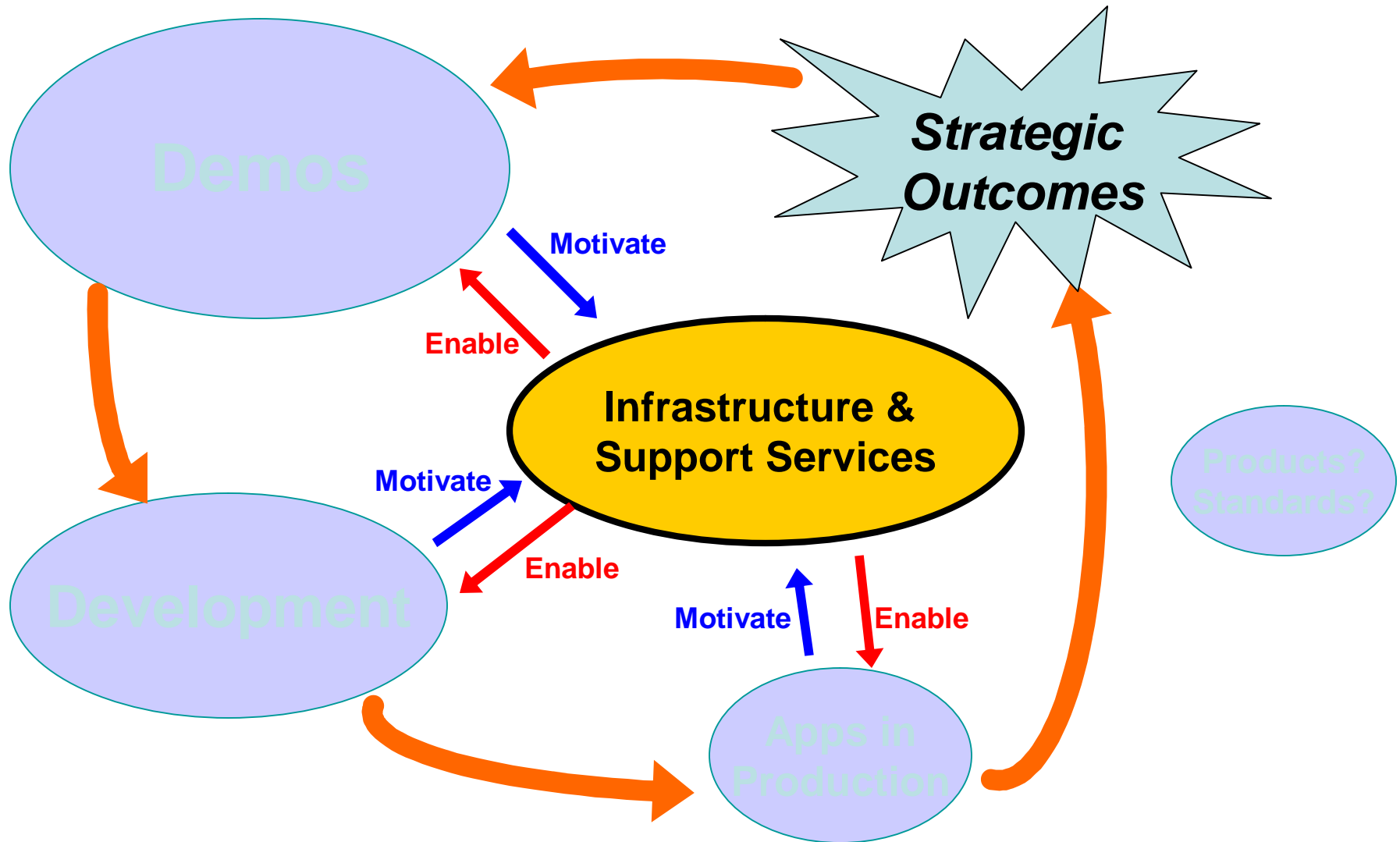


- Endgame:
- Position in Global Know Economy
- Raise the Ceiling to Raise the Floor
- Peering in performance
- End-End Value

- Value Proposition:

- What will it take:
 - Socializing the value proposition

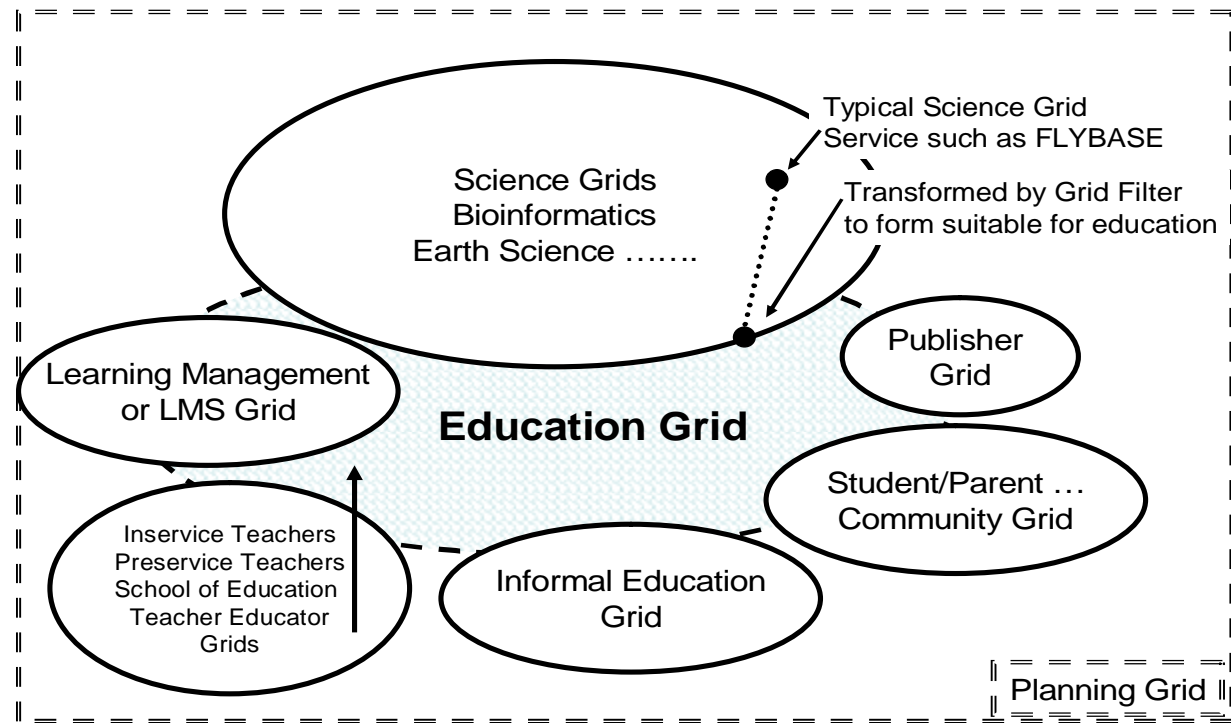
Advanced Apps Lifecycle V.02



Components of I2 Applications Strategy

- Vision
 - Must be a vision for entire Internet2 Applications “enterprise”
- Outcomes
 - Assessable outcomes that advance the vision
- Action plan
 - Requires full engagement of the full I2 community to achieve the outcomes that advance the vision
 - Integration with Internet2-wide planning and resource management
 - Involvement of all Internet2 components: members, management, staff, partners, councils, working groups...
 - Ongoing monitoring, feedback and updates

"field of dreams" a grid of grids:



iLabs at MIT



Flagpole (*Civil Eng.*,
deployed 2000, inactive)



Polymer crystallization
(*Chem. E.*, *deployed 2003*)



Shake table (*Civil Eng.*, *to be deployed early 2004*)



Microelectronics device characterization
(*EECS*, *deployed 1998*)



Heat exchanger (*Chem. E.*, *deployed 2001*)

Open Content

The logo for MIT OpenCourseWare, featuring the text "MIT OPEN COURSEWARE" in a bold, sans-serif font. "MIT" is in black, "OPEN" is in red, and "COURSEWARE" is in black. Below this, "MASSACHUSETTS INSTITUTE OF TECHNOLOGY" is written in a smaller, red, sans-serif font.

MIT OPEN COURSEWARE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

- **Concept: Make the basic teaching materials for 2,000 MIT subjects available on the Web to teachers and learners everywhere free of charge.**
- **MIT has committed to OCW as a permanent, sustainable activity**

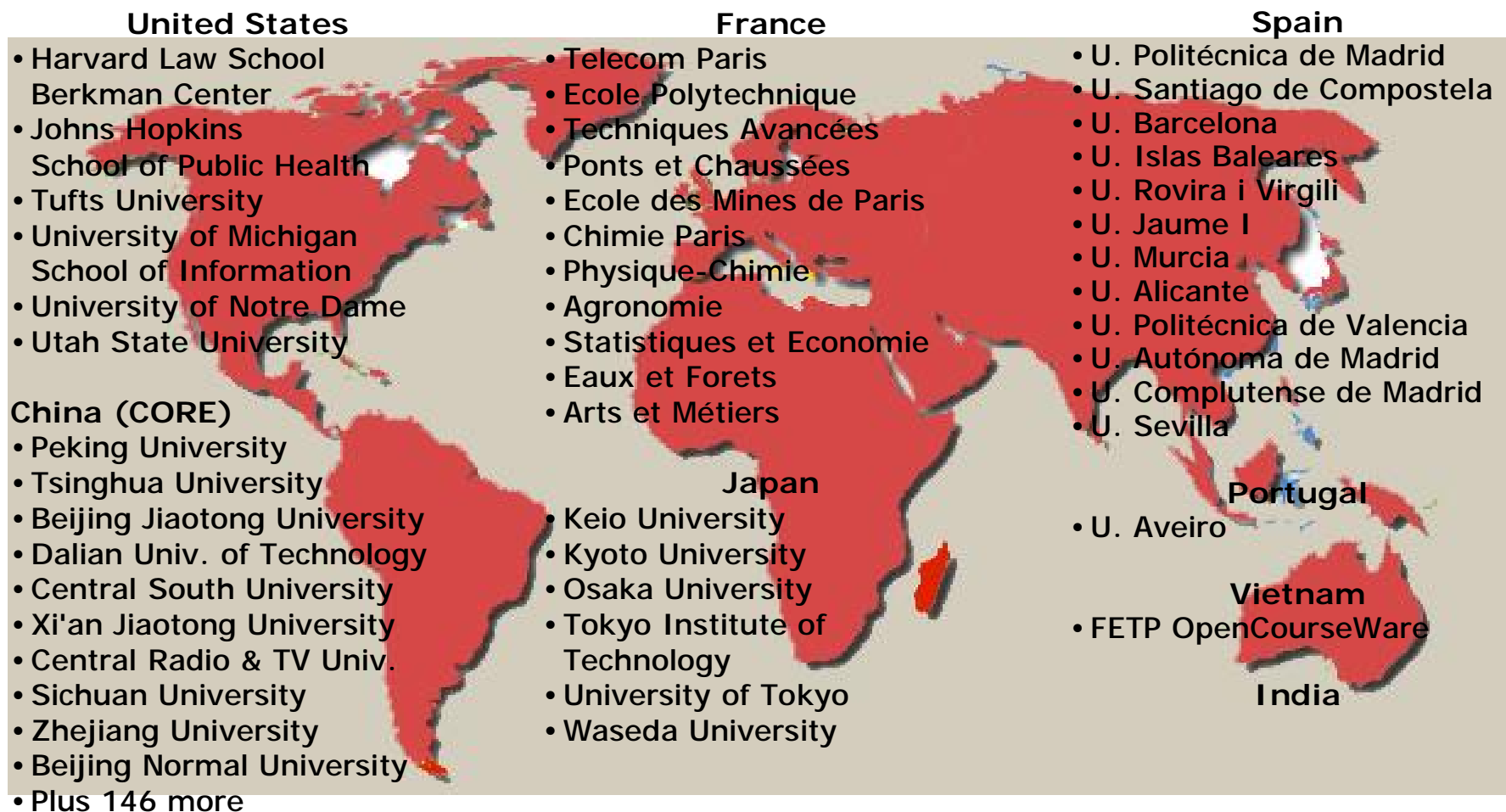
Access Data: Countries with most hits in October 2005 (*outside of U.S.*)

Country		Web Hits
1	China	2,517,286
2	India	1,754,562
3	Canada	1,120,502
4	United Kingdom	958,607
5	South Korea	744,989
6	Taiwan	696,804
7	Brazil	664,815
8	Germany	528,135
9	Turkey	527,048
10	Japan	510,896

Country		Web Hits
11	Italy	491,548
12	Australia	480,520
13	France	441,503
14	Vietnam	422,667
15	Iran	379,500
16	Spain	347,462
17	Portugal	316,773
18	Mexico	307,735
19	Sweden	278,841
20	Singapore	244,598

OCW Movement — Other opencoursewares

Emerging “opencoursewares”



The image features a world map with several countries highlighted in red. Text boxes are placed over these highlighted areas, listing various open courseware (OCW) providers. The countries and their respective providers are: United States, France, Spain, China (CORE), Japan, Portugal, Vietnam, and India.

Country	Open Courseware Providers
United States	<ul style="list-style-type: none">• Harvard Law School Berkman Center• Johns Hopkins School of Public Health• Tufts University• University of Michigan School of Information• University of Notre Dame• Utah State University
France	<ul style="list-style-type: none">• Telecom Paris• Ecole Polytechnique• Techniques Avancées• Ponts et Chaussées• Ecole des Mines de Paris• Chimie Paris• Physique-Chimie• Agronomie• Statistiques et Economie• Eaux et Forets• Arts et Métiers
Spain	<ul style="list-style-type: none">• U. Politécnica de Madrid• U. Santiago de Compostela• U. Barcelona• U. Islas Baleares• U. Rovira i Virgili• U. Jaume I• U. Murcia• U. Alicante• U. Politécnica de Valencia• U. Autónoma de Madrid• U. Complutense de Madrid• U. Sevilla
China (CORE)	<ul style="list-style-type: none">• Peking University• Tsinghua University• Beijing Jiaotong University• Dalian Univ. of Technology• Central South University• Xi'an Jiaotong University• Central Radio & TV Univ.• Sichuan University• Zhejiang University• Beijing Normal University• Plus 146 more
Japan	<ul style="list-style-type: none">• Keio University• Kyoto University• Osaka University• Tokyo Institute of Technology• University of Tokyo• Waseda University
Portugal	<ul style="list-style-type: none">• U. Aveiro
Vietnam	<ul style="list-style-type: none">• FETP OpenCourseWare
India	

**Prime Minister Manmohan Singh's speech at the launch of the NKC
2nd August 2005, New Delhi**

“I am truly delighted that we are formally launching the Knowledge Commission today. I am grateful to each one of the distinguished persons, who have agreed to be the members of this Commission and I assure you that you will have the fullest possible support from myself as well as our Government. Shri Arjun Singh ji, the Hon'ble Minister for Human Resource Development, very much wanted to be here but he is little indisposed and he is not able to attend but I can assure you on his behalf, on my behalf and on behalf of our Government that we will work whole- heartedly with you to ensure that your work proceeds as you would like it to proceed. And it goes without saying that we are eagerly looking forward to your suggestions on how we can strengthen the knowledge base of our country.

It is now commonplace to say that the 21st Century will be the “Knowledge Century”. What exactly do we mean when we say this? I believe that this proposition implies that it is not military power or economic power that will in fact determine a nation's place in the world now in the making, but its “brainpower”. Brainpower should of course be reflected in a country's economic competitiveness as well as military prowess. More importantly it should be reflected in, what Amartya Sen has called, “human capabilities”. Human capability is a function of the well being of people and the investment we make in human capital formation. The ability of a nation to make best use of its brainpower will shape its place in the world in the present century.

If capability created by knowledge is the foundation upon which our future is to be built then we must ask ourselves whether we are adequately equipped and prepared for the future. The paradox about India is that the answer to that question cannot be unambiguous. In many ways we have the potential to make the best use of the opportunities that lie ahead of us. However, in many other ways we also have an enormous task ahead of us in being able to realise this vast latent potential of our country.

The enormity of this task is all the more due to the demographic transition underway now in our country. In the next few decades India will probably have the world's largest set of young people. Even as other countries begin to age, India will remain a country of young people. That I believe is potentially our great advantage. All demographers tell me that if the proportion of working population to total population increases, that should be reflected in a sharp increase in the country's savings rate. And if we can find productive job opportunities for our working population, that of course would give us a big opportunity to leapfrog in the race for social and economic development and our growth rates should go up and we are today, I think placed in the situation where China and other countries of South East Asia face the phenomenon of ageing population and we are an exception to this rule. And therefore, it might be our opportunity to leapfrog in the race for social and economic development. As I said, these youth can be an asset only if we invest in their capabilities. A knowledge-driven generation will be an asset. Denied this investment, it will become a social and economic liability. Hence, we must invest in building the knowledge base of our coming generations.

The task ahead is at many levels – from primary schools to higher education and research institutions of national excellence. At all levels, there is a need to improve both access and excellence. There are, of course, fiscal and administrative challenges to be tackled and there are intellectual and leadership issues to be addressed. We must address them boldly.

At the bottom of “knowledge pyramid” the challenge is one of improving access to the primary education. At the top of the “pyramid” there is need to make our institutions of high education and research world class. There is a genuine funds constraint in the public sector that is being neutralized only in part by the private sector. Together, the public and private sectors are not able to cope with the demand for higher and professional education. However, there is an additional problem at the top of the pyramid, namely, that of quality. Our Universities and centers of excellence are falling behind the best in the world both in terms of human capital and in terms of physical infrastructure.

India has, today, more than 250 Universities and many more Research and Development units and professional colleges and institutions. We have the world’s largest chain of publicly funded R&D institutions. On an average, more than 350,000 engineers and 5,000 Ph.D. scholars graduate from our Universities and Colleges every year. With such a vast pool of qualified, English-speaking scientific and technological manpower, India must have the ambition to become a large base of research and development activity. We should be able to attract global investment into R&D activity at home. I do think we should put in place the required legal and physical infrastructure that can attract more foreign investment in R&D activity in India. The Knowledge Commission must come forward with creative ideas to promote the ‘knowledge base’ of our economy and to exploit the vast latent potential that lies. We must leverage it to make India truly the ‘Knowledge Engine’ of the world.

Going beyond universities, colleges and schools there are other elements of a “knowledge economy”. Public libraries are an extremely important element of the foundation of a knowledge economy. Think Tanks and specialised institutions are equally important, especially in facilitating informed policy-making. I would also like you to suggest ways in which the Central and State Governments can improve rules and regulations and the capacity of policymaking institutions that deal with knowledge institutions. Be it the University Grants Commission or other institutions dealing with certification and regulation of academic institutions and programmes.

Finally, I would like the Knowledge Commission to come forward with bold proposals aimed at improving excellence in research and teaching, especially in the frontier areas of mathematics, science and technology. India cannot afford to lag behind the rest of the world. The leaders of our national movement were resolutely committed to excellence and to making India a powerhouse of intellectual endeavour. It was this vision that informed Pandit Jawaharlal Nehru’s perspective when he created institutions of higher learning and excellence that have since stood the Nation in such good stead. The time has come for us to create a second wave of institution building and of excellence in the field

of education, research and capability building in India so that we are better prepared for the 21st Century.

These are my expectations from you and as I said in the very beginning that our Government will work very closely with you so that your work achieves the goals that you have set for yourself.

I wish your endeavour all success.”