



SCIENTISTS AND SCIENTIFIC ADMINISTRATORS : CHALLENGES IN BRIDGING THE TWO CULTURES



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CSIR

- Origins , History and Evolution
- Mission and Functions
- Structure and Governance
- Character and competence
- The Changing Context : The Future CSIR

Clear thinking about the history, nature and direction and development of an organization is imperative. The past lives on in most institutions, influencing attitudes and judgements in a manner which is deeply hidden. Successfully managing change depends on getting these issues in the open



The three phases

- The infrastructure build up phase (1947-60)
- The assessment and reorientation phase (1960-80)
- The accountability and performance phase (1980-90)
- The economic liberalization and market orientation phase (1990 -)
- ***Science and Technology policy statements***
- Science policy resolution 1958
- Technology policy statement 1983
- **Science and technology policy 2003**
 - Reforms in academic scientific systems
 - Measures to increase public private partnership in R&D
 - Importance of Intellectual Property as an instrument of wealth creation

SCIENCE AND TECHNOLOGY IN INDIA : A CHRONOLOGY



•Council of Scientific and Industrial Research	1945
•National Chemical Laboratory	1950
•The Atomic Energy Act	1948
•Bhabha Atomic Research Center	1957
•First IIT at Kharagpur	1954
•All India Institute of Medical Sciences	1957
•First Agricultural Research University at Pantnagar	1960
•Indian Space Research Organization	1969
•Launch of First Sounding Rocket	1963
•Department of Science and Technology	1971
•First Atomic Device Detonation (Pokharan)	1974
•First Indian Satellite, Aryabhata	1975
•Department of Ocean Development	1981
•National TV Network	1982



COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH (CSIR)



Mission

**To provide scientific
industrial research
& development that
maximizes the
economic,
environmental &
societal benefits for
the people**



CSIR MISSION STATEMENT

CSIR hopes to achieve this mission through clear technology focus

- **Technology for economic growth**
 - **Partner Indian industry enabling it to emerge as a significant global player**
 - **Assist the nation in deriving enhanced and sustainable value from Indigenous resources**
- **Technology for human welfare**
 - **Provide S&T based solutions to mitigate the vulnerability and improve the quality of life, especially, for the weaker and disadvantaged sections of the society**



S&T VISION FOR CSIR

- **Encourage excellence in core areas**
- **Nurture new disciplines of research**
- **Advance cross-functional collaborations**
- **Define and execute a few large mission mode program that will energise the organization and demonstrate its collective strength**




COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH (CSIR)


farmers and rural fo

SWARAJ

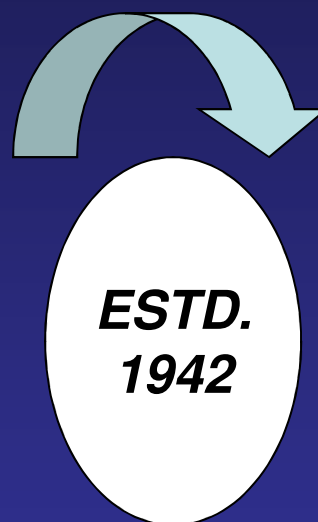
India's first indigenous tractor



Independent India had to fill its granaries to feed its millions. Green revolution was on the way, but needed a lot of men and machines for agriculture. CSIR entered at this stage with SWARAJ, a 20 hp tractor. Punjab Tractor Limited, a PSU, began manufacturing and selling the tractors in 1974. Mechanized agriculture was ushered in. Today nearly 1,00,000 tractors are tilling the Indian soil. CSIR's latest contribution to Indian



CSIR - responds to the slogan "Jai K



Aerospace
Life and Plant Sciences
Chemical Sciences
Drugs & Pharmaceuticals
Material Science
Leather Science
Engineering Sciences
Food Science
Earth , Ocean & Physical Sciences....

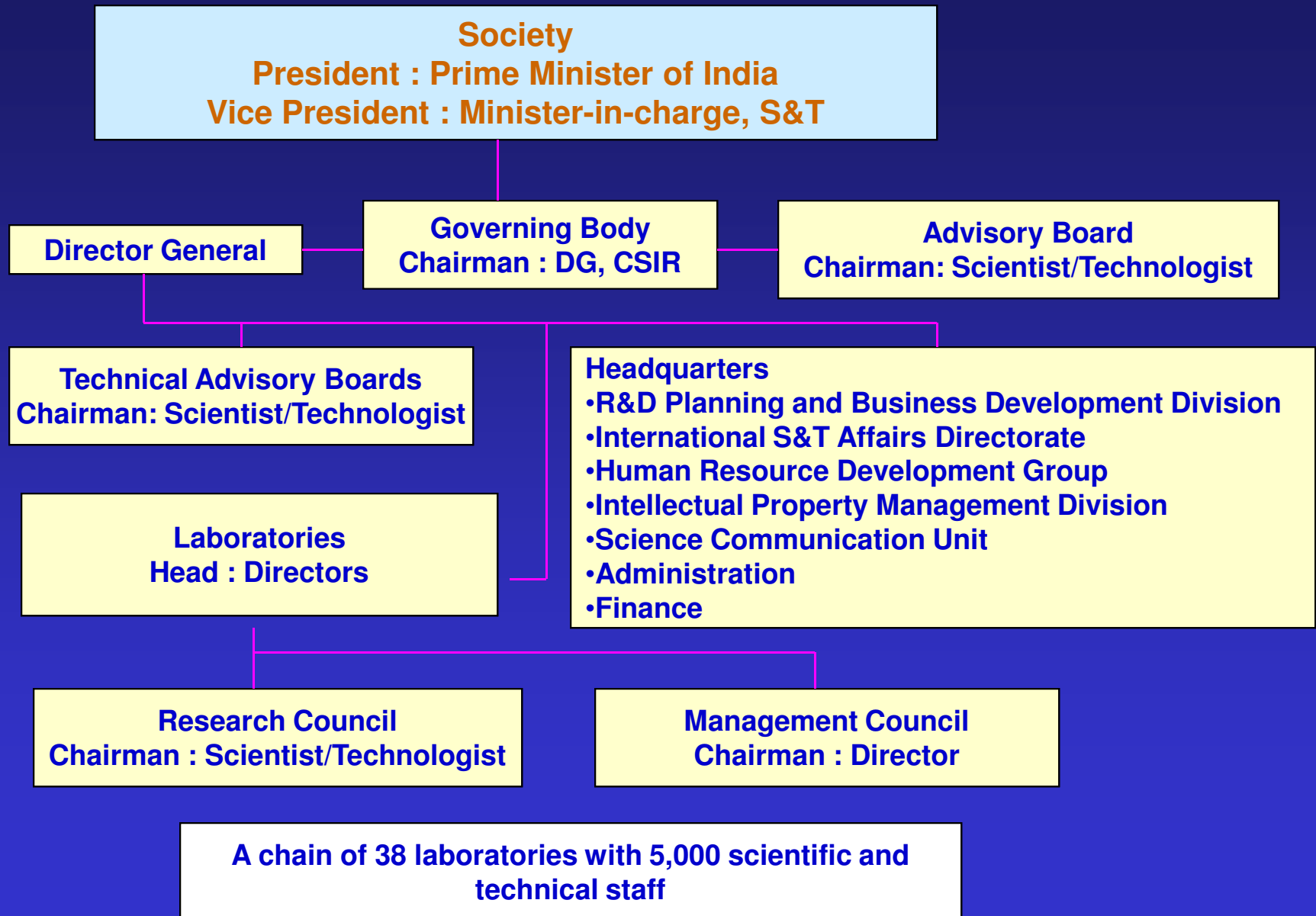
Multi-disciplinary multi-location chain of 37 research laboratories
Largest chain of publicly funded laboratories
Total staff strength of 18000 ; scientific and technical staff : 13000



CSIR AS A NATIONAL ASSET

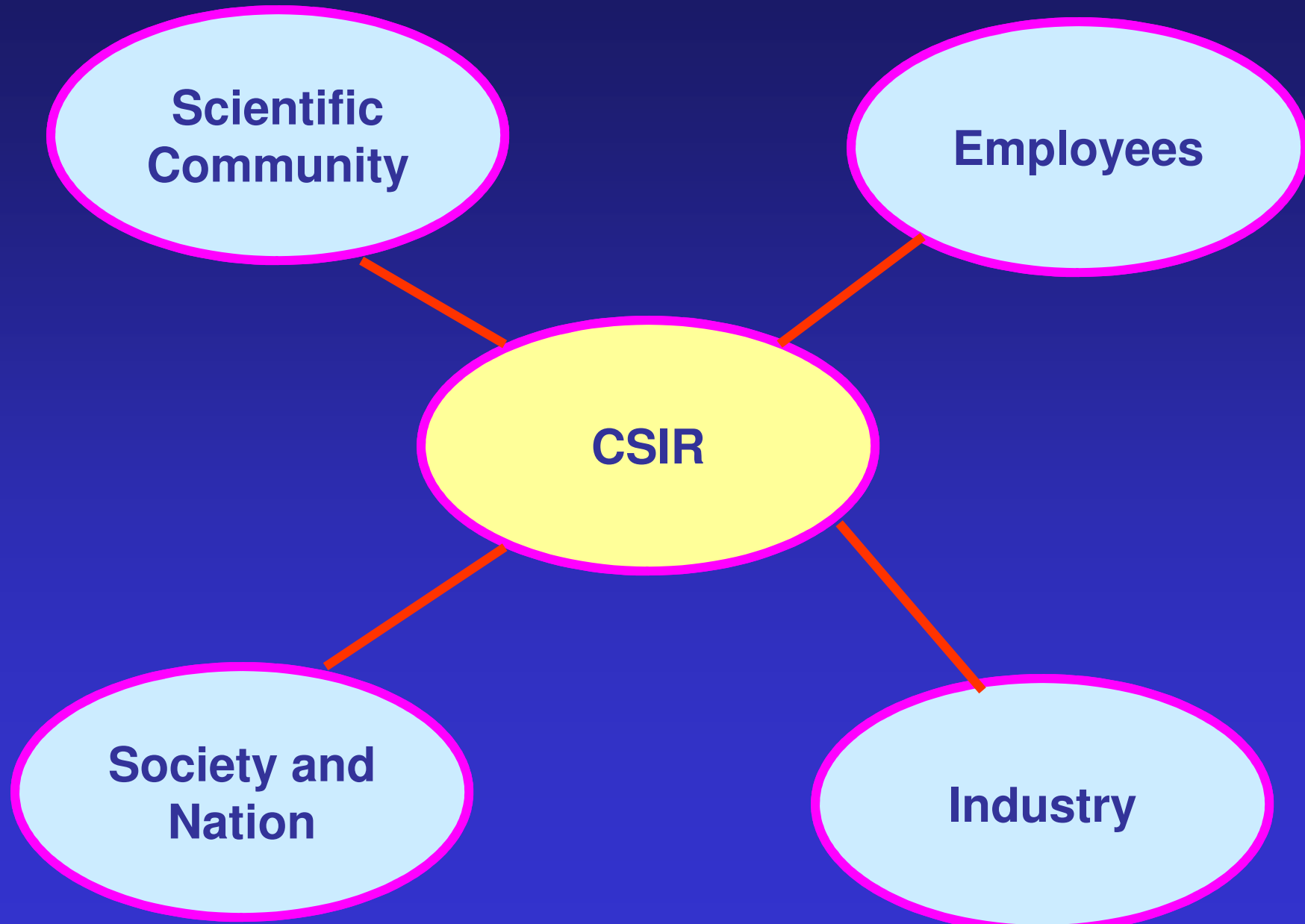
- **Largest concentration of inter-disciplinary talent in S&T**
- **Finest infrastructure for S&T in India : Land , buildings, research facilities, demonstration facilities etc**
- **Long tradition of scholarship and leadership in science and technology and has nurtured some of our most distinguished scientists and engineers**
- **A great generator of human resources in S&T ; A significant percentage of India's S&T manpower must have been beneficiary of a CSIR-JRF or SRF !**
- **Generous public funding for R&D; most scientists do not need to write proposals and compete for funding**
- **Systems and procedures in CSIR are not too overpowering although scope exists for further simplifications**
- **In spite of many weaknesses, CSIR is still a good place to work, providing great freedom to scientists to express themselves in S&T**

ORGANIZATIONAL STRUCTURE COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH





CSIR's STAKEHOLDERS





STAKEHOLDER EXPECTATIONS FROM CSIR

EXPECTATIONS

OUTCOMES

INDUSTRY

**Create new engines of
Growth in economy**

- New products and processes
- Creation of new business
- Create and exploit IP

**Support existing engines
of growth in economy**

- Improve existing products
and processes
- Provide high quality
analytical support

**Build and sustain
strategies for innovation ;
provide S&T manpower**

- Specialized training and
continuing education
- Strategic planning
- HRD (Ph.D. & post M.Sc.
Research training)



COMMITMENT TO STAKEHOLDERS

Stakeholders	Goals of NCL important to stakeholders	Anticipated outcome
Society and the nation	<ul style="list-style-type: none">• Provide R & D solutions to fulfill the critical needs of the society, namely energy, food, water, health care and environment• Contribute to policy issues related to S & T planning and industry road maps• Create sustainable Resource Centres to address long term S & T needs of the country• Contribute to building a culture of scientific enquiry and the pursuit of technological solutions to the nation's problem	<ul style="list-style-type: none">• Appropriate technological solutions with focus on delivery to the customer• Participation in national level committees, think tanks etc.• Creation of Resosource Centres of national importance• Popular articles and publications

COMMITMENT TO STAKEHOLDERS



Stakeholders	Goals of NCL important to stakeholders	Anticipated outcome
Scientific Community	<ul style="list-style-type: none">• Carry out cutting edge research and contribute to the scientific understanding of problems• Contribute to the culture of knowledge sharing and dissemination• Contribute to the various global systems that form the basis of the global scientific enterprise	<ul style="list-style-type: none">• New knowledge and new methods to add to the body of scientific knowledge• Scientific publications, books etc.• Organization of and participation in conferences; Talks and lectures• Membership in scientific bodies and committees



COMMITMENT TO STAKEHOLDERS

Stakeholders	Goals of NCL important to stakeholders	Anticipated outcome
Employees	<ul style="list-style-type: none">• Create an ambience and environment where both individual and team creativity is encouraged and nurtured• Empower scientists in decision making in areas relevant to their work• Involve the scientific staff in all aspects of management of the laboratory (participatory management)• Create a culture of responsiveness to the needs of the scientists amongst S&T support staff	<ul style="list-style-type: none">• Highest level of individual professional achievement• Highest levels of personal satisfaction• Employee loyalty



COMMITMENT TO STAKEHOLDERS

Stakeholders	Goals of NCL important to stakeholders	Anticipated outcome
Employees	<ul style="list-style-type: none">• Establish high standards of personal ethics, honesty and transparency in interpersonal relationship• Create systems and procedures conducive to the creative work of the scientist• Shun bureaucracy and reduce drudgery• Create channels of open communication amongst all personnel• Contribute to the welfare and happiness of the employees• Provide appropriate incentive and reward systems	



PUBLIC, PRIVATE, SOCIAL AND STRATEGIC GOODS

- **Private goods and services** : These are defined as goods and services where the consumption of that goods or service is rivalrous and exclusion feasible (for example, development of a process technology for a client under contract research mode)
- **Public goods and services** : These are defined as goods and services where the consumption of that goods or service is non-rivalrous and exclusion of others is infeasible (for example, generic knowledge published in books, scholarly journals etc.)

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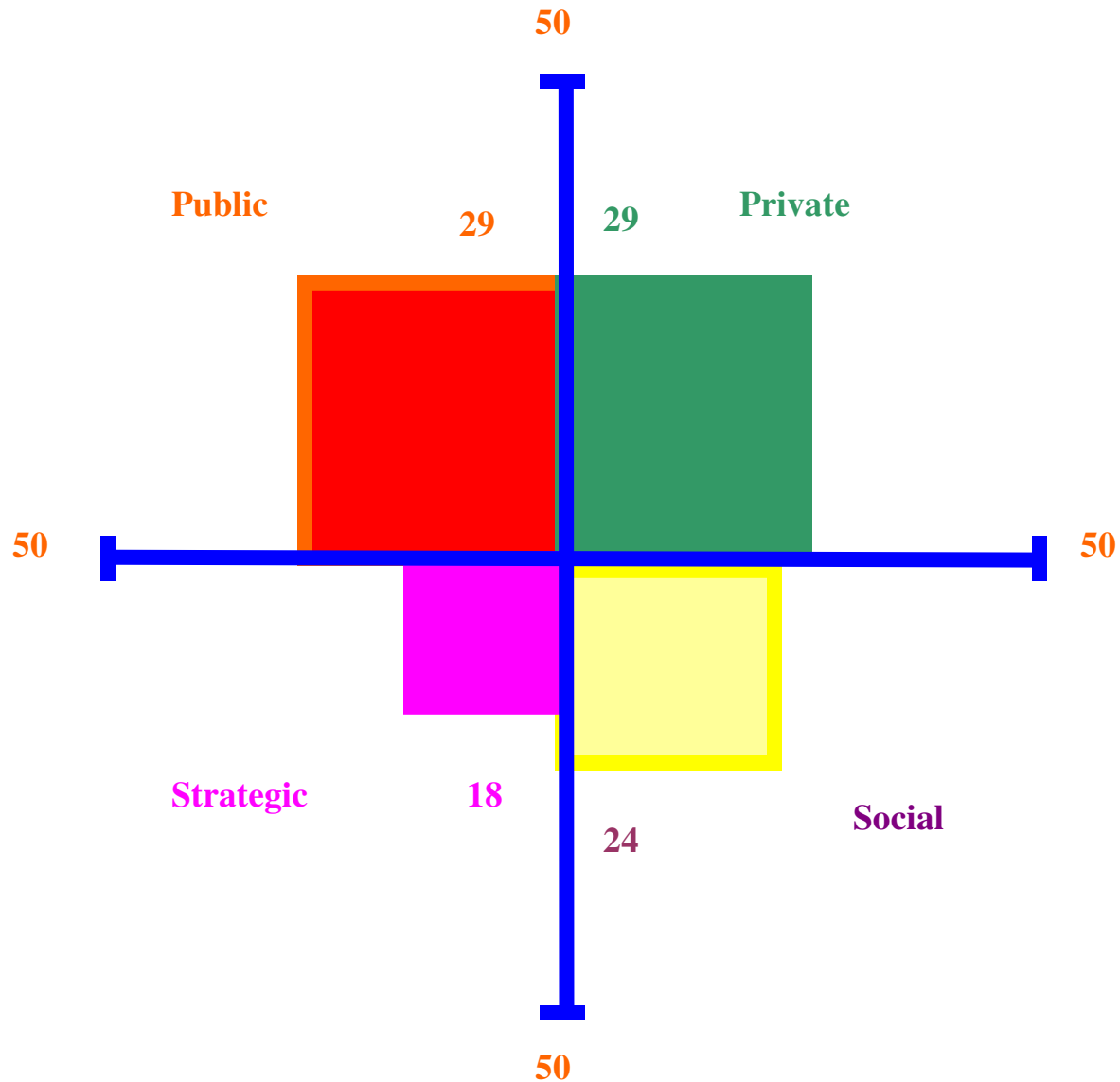
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PUBLIC, PRIVATE, SOCIAL AND STRATEGIC GOODS



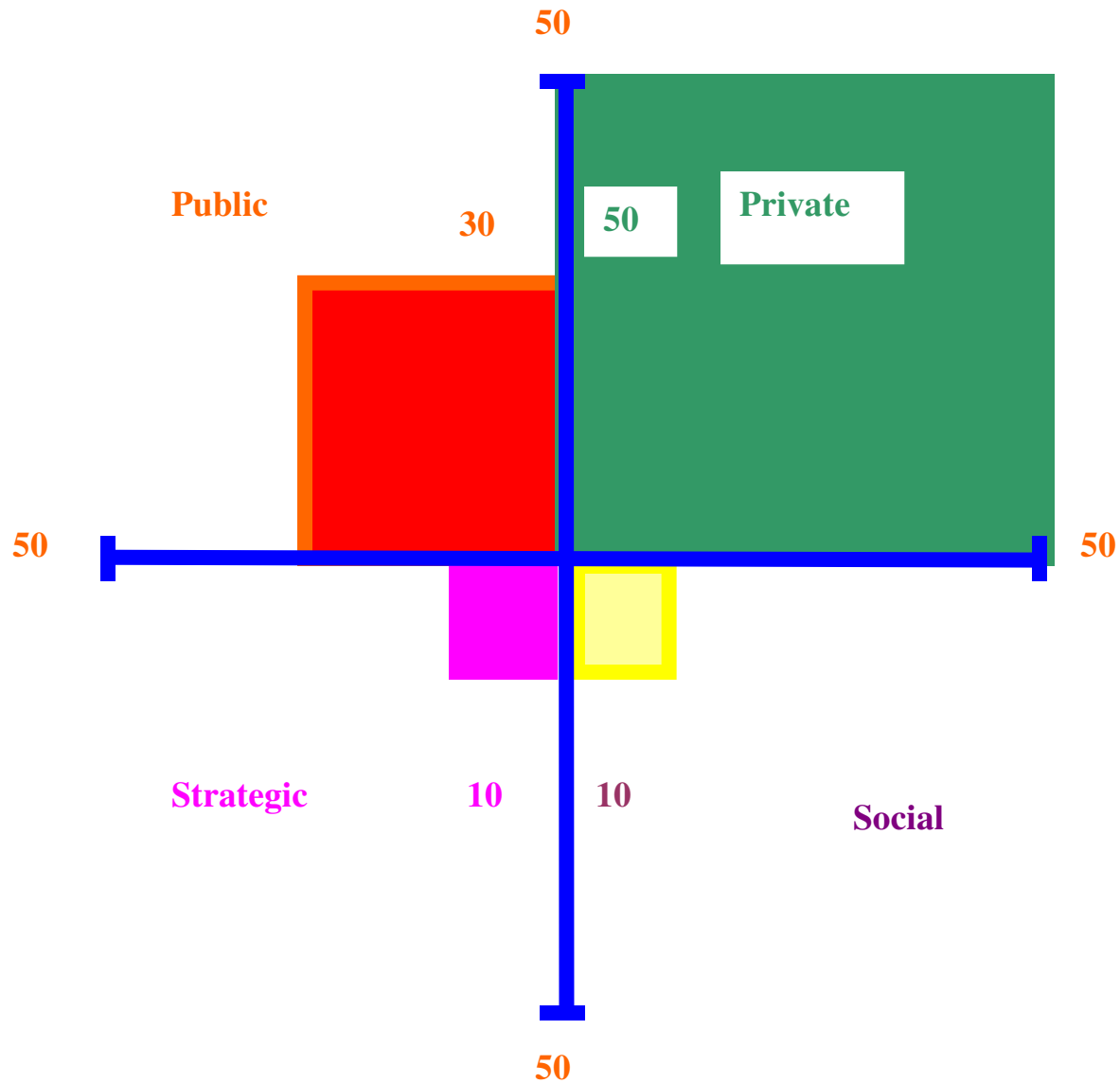
- **Social goods** : These are defined as those goods and services that a society prefers to provide to the community (for example, creating science awareness among students, development of technologies for using local resource endowments to improve welfare of the disadvantaged)
- **Strategic goods, services and technology options**: These are defined as goods and services to meet national security need or other national needs / obligations for which no solution is available or accessible elsewhere. As also, goods and services developed in order to meet independence of indigenous industries from critical foreign supplies. Other examples are : Pre-competitive technology development aimed at breaking into unchartered technology domains or achieving leadership in selected technology domains or enhancing national prestige and standing

THE CSIR SYSTEM : MAPPING THE STAKEHOLDER FOCUS (Para 7.2 of KC Report)





NCL : STAKEHOLDER FOCUS





CHARACTER AND COMPETENCE

Competence

Capability, efficiency, having sufficient skills to accomplish a defined goal

Character

The combination of attributes that define the nature of an organization



CSIR : CHARACTER AND COMPETENCE

Character

- **Collection of 37 laboratories with its own mission and stakeholder focus**
- **Loosely federal structure with high degree of functional autonomy**
- **Recent attempts to network diverse competence of the individual laboratories towards larger national goals have met with mixed success. To some degree, the very character of CSIR laboratories mitigates around top driven ordering of priorities or focus within CSIR**
- **However, this unique character of CSIR laboratories has its advantages in terms of nurturing high quality science, greater intellectual and operational freedom as well as encouraging strong leadership at the laboratory level**



CSIR : CHARACTER AND COMPETENCE

- There is a need for greater focus on converting knowledge into wealth; new public-private partnership models, encouraging knowledge driven entrepreneurship, promoting a climate conducive to greater risk taking in R&D and greater innovation in fulfilling societal and strategic mission
- R&D intensity in several manufacturing sectors is outpacing CSIR. CSIR will need to move up the value chain to be relevant to industry in the years to come
- India will continue to be challenged by several societal problems. CSIR will be called upon to deliver solutions to these problems which, by their very nature, need to have high impact and visibility

Substantial transformation of “competence” will be necessary, for CSIR to meet the emerging challenges in the R&D / S&T landscape, both, within India and globally



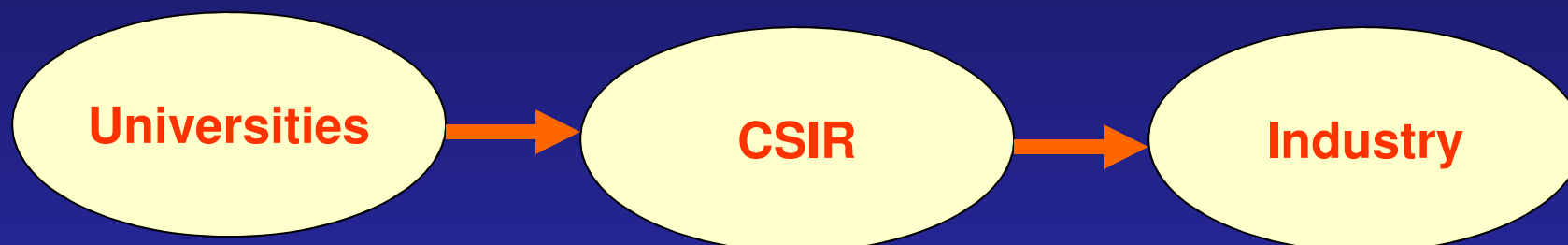
WHAT BUSINESS WE ARE IN?

- Our business is to perform research and provide knowledge based services to fulfill stakeholder expectations
- These functions are , to differing degrees, performed by industry, laboratories and universities

So how do we differentiate ourselves?



WHERE DOES CSIR FIT IN?



- PI driven fundamental research
- Problems tend to be narrowly defined
- Education is the primary goal
- Teaching and mentoring is a core activity of faculty

- Team driven multi-disciplinary research
- Problems need to be large and difficult
- Larger degree of application focus
- Long term needs of industry and society
- Education is an associate goal

- Team driven multi-disciplinary research
- Objectives business driven
- Focus – short and medium term



WHY DO WE NEED CSIR

- Leadership roles depend upon who we are and what we are trying to accomplish
- If there is ambiguity in role of CSIR , there is bound to be incoherence in leadership

One of the key responsibilities of leadership in CSIR and the laboratory is to articulate why we exist and who will miss us if we do not exist



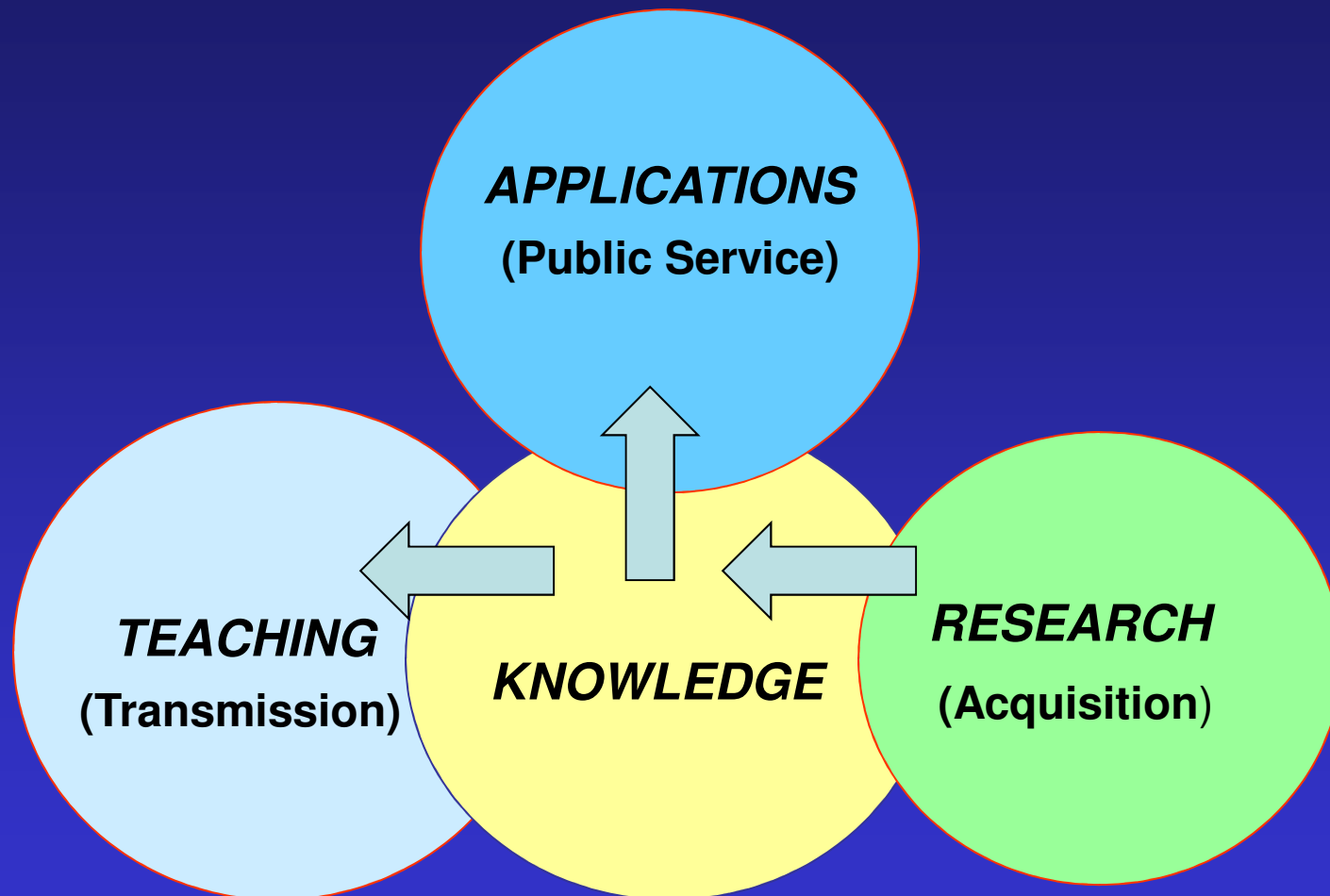
CSIR'S FUTURE VISION

- **Crossing Intellectual Barriers**
 - *Use the best global bench marks*
- **Serving National Agenda**
 - *Relate to the national agenda*
- **Innovating for Industrial Competitiveness**
 - *Participate in the global knowledge economy*
- **Redressing National Shortfalls**
 - *Remain socially relevant*

***TO CREATE AN INSTITUTION WITH ENDURING VALUES OF
EXCELLENCE DEVOTED TO ACQUISITION, TRANSMISSION AND
APPLICATION OF KNOWLEDGE***



COMPONENTS OF A KNOWLEDGE INSTITUTION





CSIR

- Innovation Organizations : new Models
- Organizational Challenges
- Change Management in Public Organizations



CSIR : CHANGING CONTEXT

- **India and the world is experiencing immense cultural, social, political and organizational transformations, creating in its wake, both challenges and opportunities**
- **Organizations have history and carry, both old baggage as well as future aspirations of existing and new employees. Leadership has to respond to both**
- **For any organization to create new history, it needs to renew , re-anchor , design and recalibrate, both, its objectives and processes with the present realities and future expectations**
- **When this realignment occurs, new choices and new directions emerge**



CSIR : IN THE MIDST OF A TRANSFORMATION

- India and the world is experiencing and encountering immense economic, cultural, social, political and organizational transformations creating , in its wake, both challenges and opportunities
- Organizations have history and carry, both, baggage and future aspirations of existing and new employees. Leadership has to respond to both
- For any organization to create new history, it needs to review itself, re-anchor itself, design and recalibrate, both its objectives and processes with the present realities and future expectations
- When this realignment occurs, new choices and new directions emerge

CSIR IS IN THE THROES OF A MAJOR TRANSFORMATION ; THESE CHANGES WILL PROFOUNDLY AFFECT THE WAY WE WORK IN CSIR



MAJOR FORCES INFLUENCING GLOBAL ECONOMY

- **Shift from information to knowledge**
- **Shift from hierarchies to networks**
- **Local/national to transnational**
- **Competitive to collaborative strategy**



EMERGING MODELS OF INNOVATIVE ORGANIZATIONS

- From hierarchal or linear to distributed networks
- Fluid network of many interacting parts, with many nodes, but no singular leader

Leadership will need skills to create partnership, govern loose networks and lead by influence rather than control and command



THE STARFISH ORGANIZATION

(The Starfish and the Spider : The Unstoppable Power of Leaderless Organizations by O. Brafman and R.A.Bckstrom

- Being small gives competitive advantage
- Communities of networks creates better value of human resources
- Creativity thrives in chaos; order and structure squelch creativity
- Knowledge is spread throughout the organization; the best knowledge is at the fringe of the organization
- The spirit of sharing thrives; everyone wants to be a contributor
- In a starfish organization, people will do what they will do; the role of management is to connect people and ideas

If you cut off a spider's head, it dies; but if you cut off a starfish's leg, it grows a new one .Traditional top down organizations are like spiders



RESEARCH AND DEVELOPMENT

- R&D, by its very nature, is an activity that is aimed at generating new knowledge, testing hypothesis about how matter in the physical or chemical world act and react, and in general, providing answers to observations in nature and in systems in that part of our life to which they pertain.
- The uncertainties of outcome of research, the difficulties in measuring the impact of research and the differences in the expectations , values , attitudes and motivation of scientists from those of other employees are some of the distinguishing features of this profession
- R&D institutes are rather peculiar places – professionally questioning and argumentative communities where every one has an opinion; and issues tend to generate heat in inverse proportion to their importance



SCIENTISTS: EXPECTATIONS, VALUES ATTITUDES AND MOTIVATION

- **Scientists, in general , are oriented towards things, not people, possess poor social skills, are comfortable with things that they can measure and control, are introverted and show diminished loyalty to employers**
- **Scientists generally shirk administrative responsibilities, are critical of administration and have a pathological aversion to bureaucracy. Bureaucracy (noun) is defined as any system of administration in which matters are hindered by excessive adherence to minor rules and procedures**
- **Their psychological needs are focused on achievement, peer recognitions, professional growth, freedom to choose a problem to work on and a hassle free environment**
- **Scientists like to innovate, are not afraid to take risks and are challenged by the new**
- **Scientists are averse to hierarchy, are good communicators and can collaborate if they find value in team work.**



ORGANIZATIONAL TRANSFORMATION: THE CHALLENGES

- The Purpose : Organizational goals; why do we exist ?
Who will miss us if we do not exist ?
- The Incentives : Bureaucracy gives powerful incentives to follow rules; status quo brings steady rewards; innovation can only bring trouble; employees are paid the same irrespective of what they produce



ORGANIZATIONAL TRANSFORMATION: THE CHALLENGES

- Accountability : Whom are you accountable? Are you accountable for following rules are accomplishing results ?
- Control : Bureaucratic systems tend to be hierarchical; power is concentrates at the top; Government employees respond to orders rather than to the needs of the customer



ORGANIZATIONAL TRANSFORMATION: THE CHALLENGES

- Culture : Values, norms, attitudes , expectations of employees; Bureaucratic systems use detailed specifications – functional units, procedural rules, job descriptions to mold what employees do; employees trend to become reactive, fearful of taking initiatives and create a culture of fear, blame and defensiveness



CSIR ADMINISTRATION : THE FUTRE VISION

- Whom do I work for ?
- Who is my customer?
- Doing things right vs doing the right things
- Process vs results
- Silo vs matrix
- Team vs individual
- Action vs consequence
- Wheels vs motion
- Taking a stand vs reaching a consensus



CHANGE MANAGEMENT IN GOVERNMENT

- **The operative rules and procedures in government are less flexible**
- **In government penalties of failure are always greater than rewards for exceptional performance**
- **All actions in government are conducted in a ‘fishbowl’ and almost every initiative is bound to meet with someone’s disapproval**
- **Span of leadership is generally short leading to discontinuity**
- **In government positions of leadership are not necessarily chosen based on qualities of leadership. More often these appointments are based on individuals command of policies, contribution to science or political connections**



CHANGE MANAGEMENT IN GOVERNMENT

- Most employees generally feel estranged from a government organization's strategy and mission. Employees have poor understanding of how their individual or collective efforts affect the organization's performance. As they lose sight of the overall mission they come to care only about those things that they can directly control, like protecting their own turf
- Employees often stay in the organization for a long time, typically much longer than the leaders. This is both a liability and an asset
- Key tasks of a leader : Formulate a vision; be aware of present realities; develop a broad base of support internally; set a clear path; respect the complexity of what you are attempting; hold people accountable for both results and commitment to the change effort
- Bureaucrats respect barriers; leaders have to find ways to go around barriers

Be a leader , not a bureaucrat



CSIR : ORGANIZATIONAL CHALLENGES

- **Shift the focus from inputs and outputs to outcomes**
- **Promote cross functional interactions; Foster virtual teams with common goals cutting across divisional boundaries; Spread the word that teams win, not individuals**
- **Learn from failures and successes; understand the past, redesign the future**
- **Attract and encourage great people to achieve**
- **Generate greater value out of existing assets**
- **Create greater focus on the stake holder**
- **Build infrastructure for high quality research**
- **Create a performance driven and result oriented organization**
- **Maximize the use of IT in everyday functions of the Laboratory to improve the comfort levels of the scientists**
- **Promote organizational learning through community building and communication**

A man who dies without enemies is a man who has changed nothing and most probably contributed to little in his life time

***Walter Murdoch
(1874-1970)***



THANK YOU

