Unleashing Creative and frugal innovation potential in society

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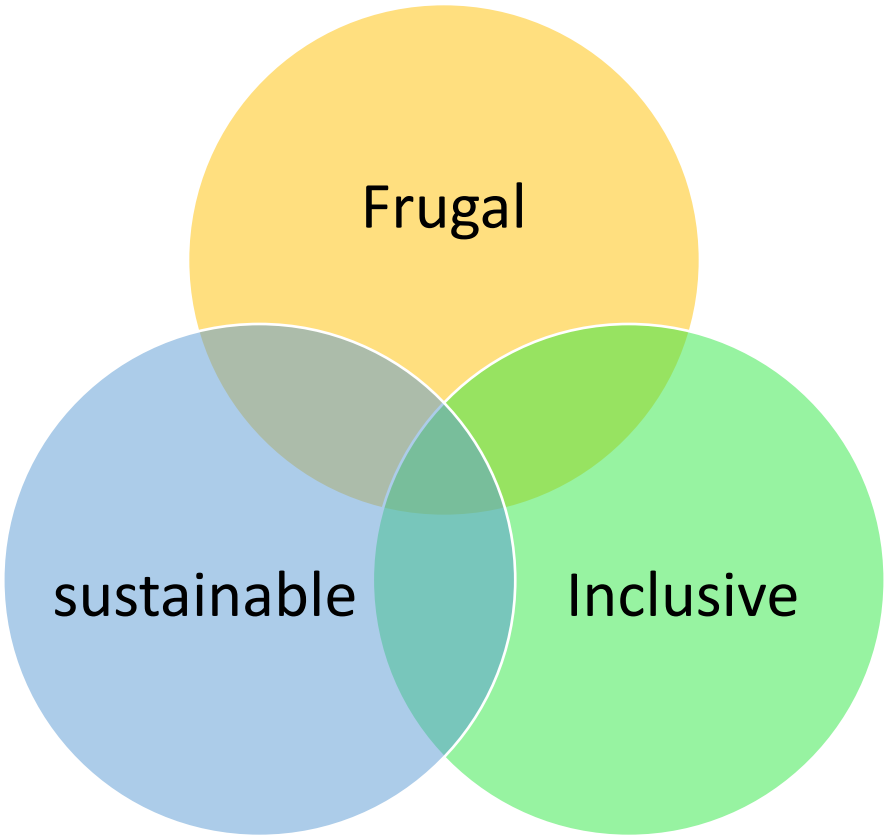
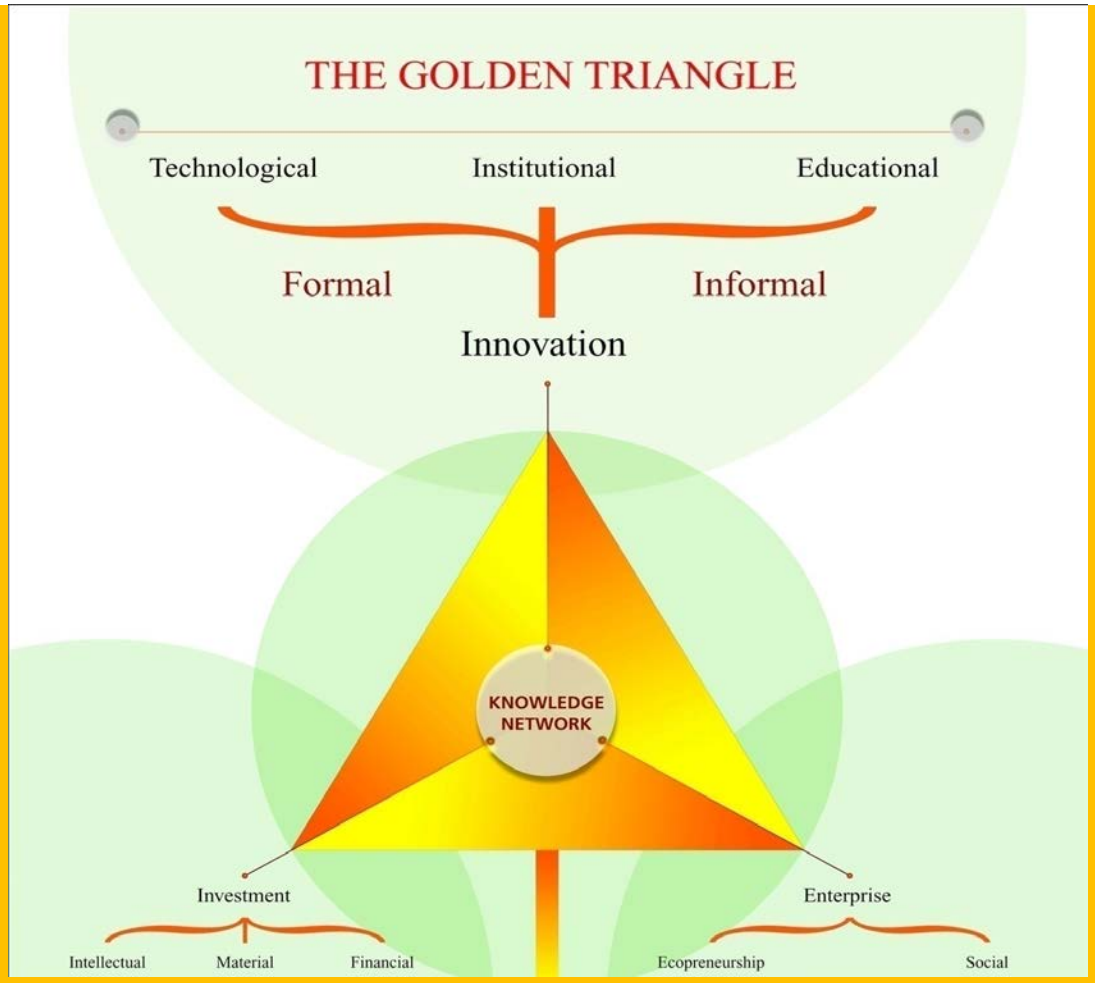
Fertilizing Imagination

Can tail wag the dog:

Can large corporations and other organizations learn from frugal grassroots and children innovators?

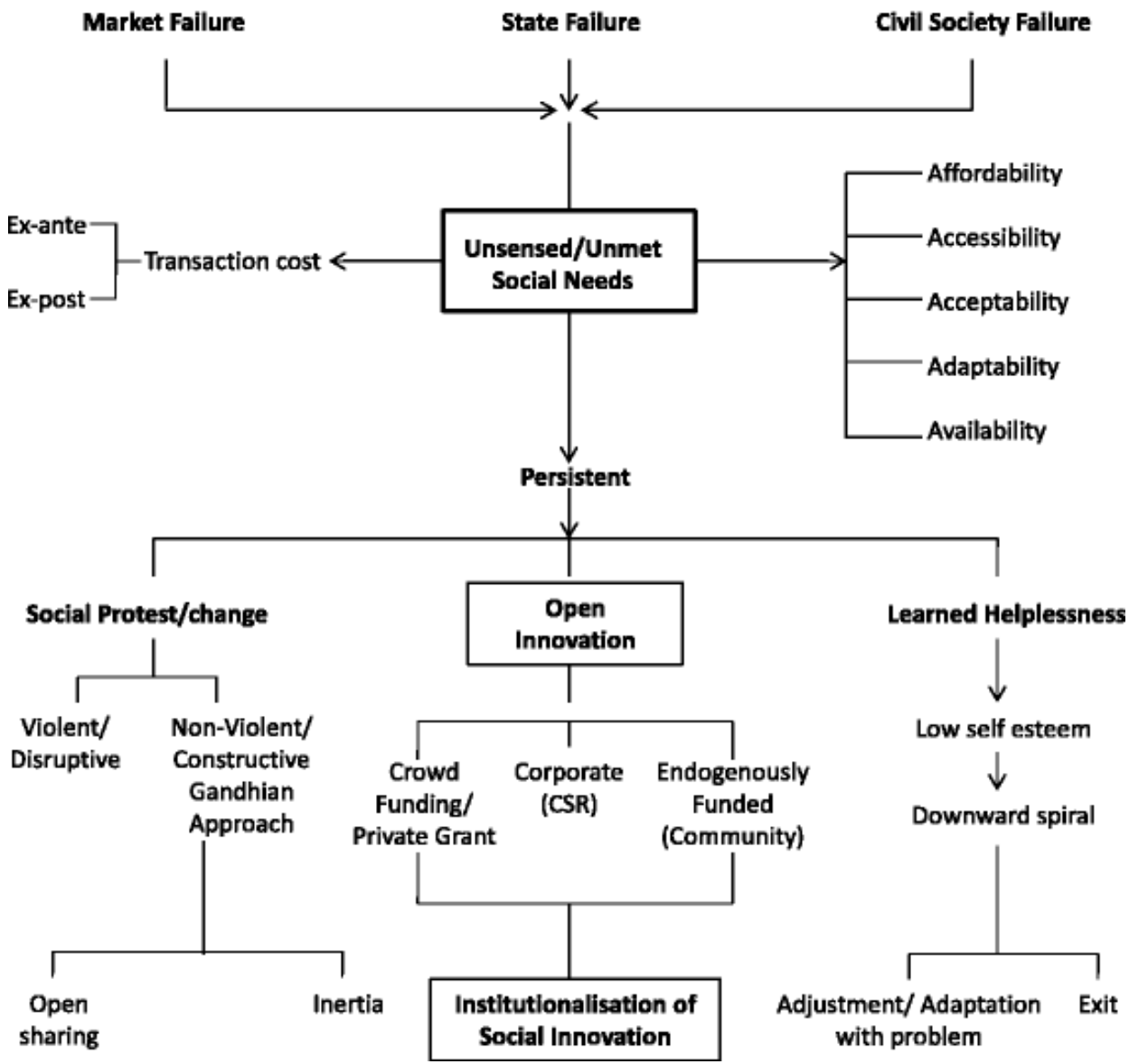
Towards Our common frugal future:


Frugal
sustainable
Inclusive



Gujarat Grassroots Innovations Augmentation Network (GIAN)

Emergence of social Innovation




Can context
change the
content?

Empathy (*samvedana*) is the key

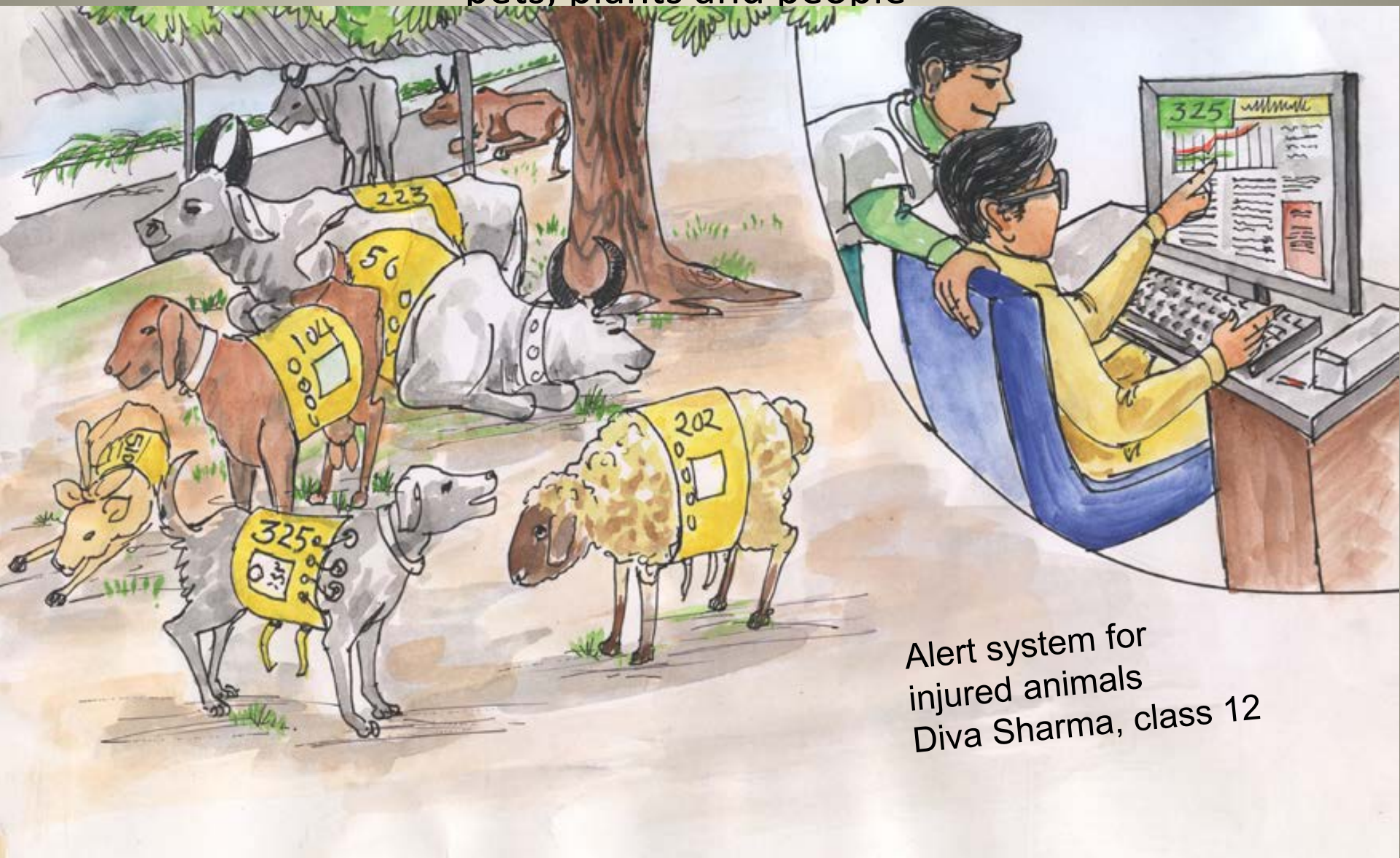
Sowing the seeds of *samevdana (samevdana is with in, empathy is for others)*
Sam=equal
Vedana=pain

When we feel pains of others as intensely as they feel, it does not remain their pain, it becomes our pain
Srijansheelta creativity borne out of samavedana is empathetic innovation

Let us explore the unexplored or underexplored potential of empathetic frugal innovations

Internet of Things (IOT) to Internet of things, **thoughts, feelings and being:**

pets, plants and people



Alert system for
injured animals
Diva Sharma, class 12

Learning from a curious child

Posture correcting chair/Sensor

Kulsoom Rizvi, 5, Muzaffarnagar , UP & Tarun Anand, 10, Hardoi, & UP Sunvi Agarwal, 10, Gurgaon, Haryana

If a person is sitting on the chair in a wrong posture, an alarm will start ringing and not stop until the person corrects the posture. Else, a camera in computer device or TV screen will sense posture and cover the display with a message, “sit properly before u can work”

Low cost Braille printer

Santosh Singh & Khushwant Rai, 12, Jalandhar, Punjab

Braille printer exists in the market but at a price range that an ordinary man cannot afford. For this they have extended the functionalities of dot matrix printer with some modification to make economical printer which cost around Rs 10000/- against the market price of about a lakh.

Inclusive Innovation

Modified walker with adjustable legs

Shalini Kumari, then Class eight
Bihar

Shalini's grandfather used a walker to assist him while he walked But she noticed that he could only use the walker comfortably while walking on a level surface. Shalini came up with the idea of the modified walker with adjustable legs. She has also thought of including a folding seat so that the user can rest for a while when required and fitted a horn and a light to it as well. NIF licensed this technology to a company recently
Nifindia.org

Frugality has to manifest

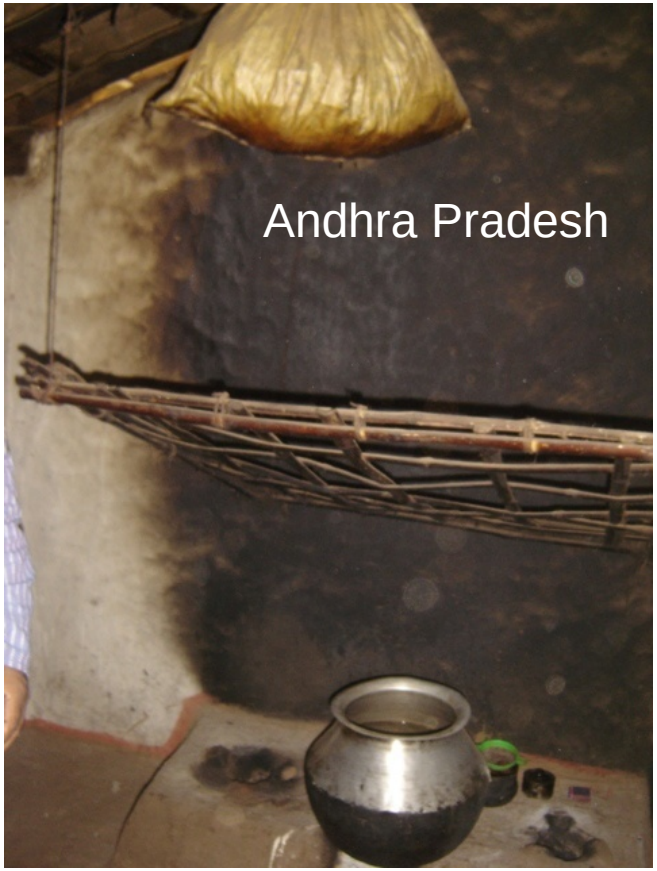
in three dimensions

Form

Feature

Function

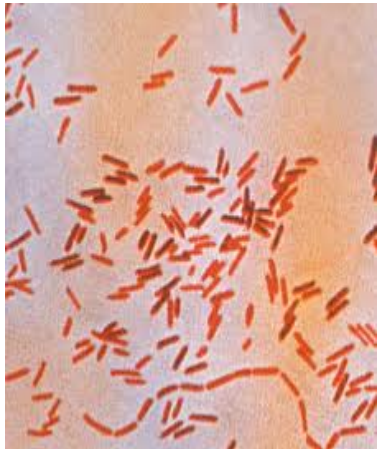
DHRUV: GANDHINAGAR,
A REFRIGERATOR WHICH GIVES MORE FOR LESS



Energy – new heuristics

Do we harvest it efficiently?
Can our mothers from the North East and Southern India teach us some thing new?

Herbal remedy for Typhoid Fever

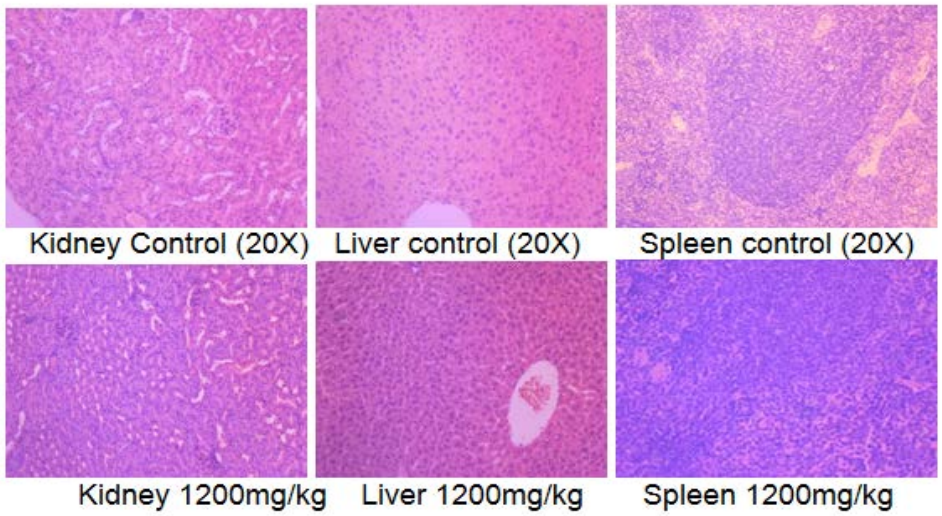


- Typhoid is one of the most common worldwide bacterial diseases transmitted by ingestion of food and water, contaminated with *Salmonella typhi.* Poor sanitation conditions promote the occurrence and re-occurrence of typhoid
- Symptoms of typhoid includes frequent fever and gastric problems.
- Typhoid fever persist for three weeks to a month, which may be fatal if not treated.
- Treatment of typhoid includes various chemical drugs such as ampicillin, chloramphenicol, amoxicillin, ciprofloxacin etc
- Resistance of causal organism towards these commonly used drugs is one of the major concern worldwide. Typhoid resistance to these drugs are known as Multi Drug Resistant Typhoid (MDR-Typhoid)

Herbal Formulation for Typhoid:

- Extract and fractions obtained from *Shorea robusta* was evaluated against causal organism of typhoid and all of them showed good control in *in vitro* conditions.

- Toxicity of the above was also tested in in vivo conditions in Swiss albino mice at different dose and it was found non-toxic even at the oral dose of 1200mg/kg.

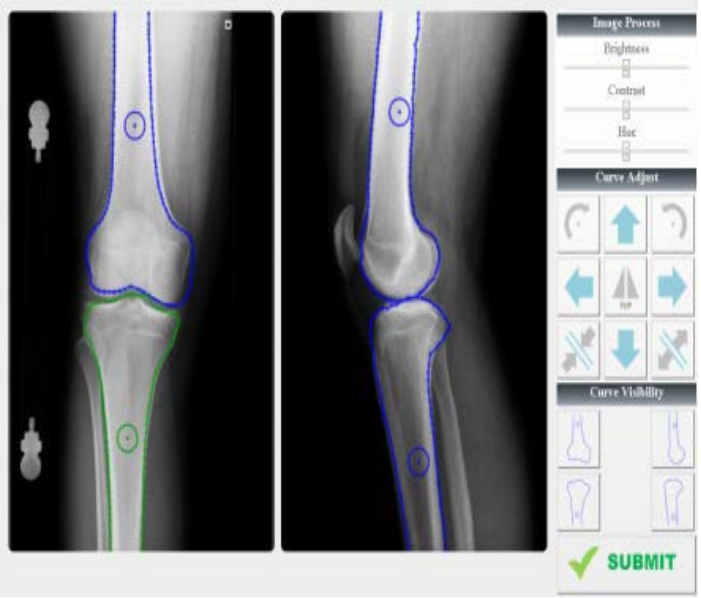


Dr. Arvind Vishnu Bhave factor of sixty

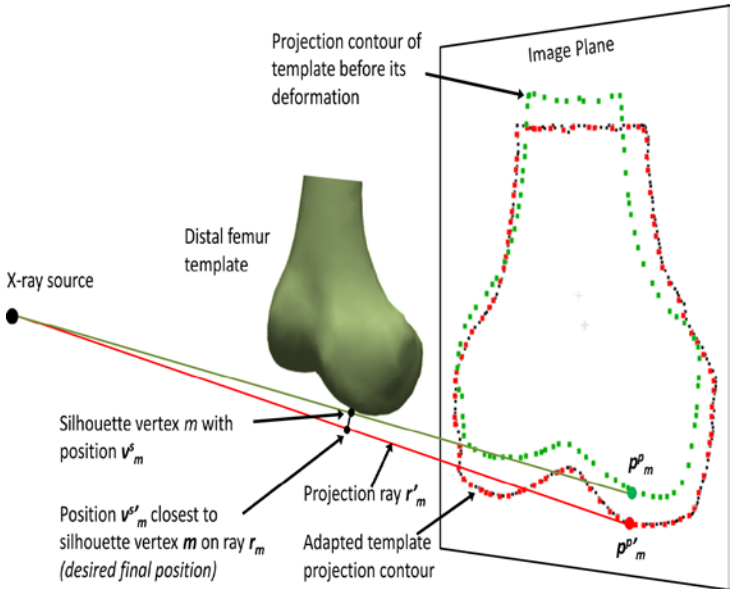
- Pune
- MBBS/MS (Ortho), IPTM, FellowhipSpicial Injuries Centre, Fellowship
- Device developed to carry out 'vertebroplasty' - a stitch less surgery done under local anesthesia to treat vertebral fractures reducing the risk cost and hospital stay for patients.

X-Ray to 3D

Vikas Dhruwdas Karade, Mumbai, Maharas



This innovation is a software/algorithm, which can generate 3D model of bone shapes from a 2D X-ray image. It is an alternative to the conventional method of building 3D models from CT scans which has 200 times more radiation than normal 2D X-ray. The application involves 3D surgery planning, implant design, surgery training etc. The algorithm has been tested with simulated as well as real X-ray images of knee joint bones, using MATLAB based codes. The results show acceptable accuracy and reconstruction time is within a minute. This novel method will reduce the health risks like cancer due to CT scan radiation and also bring down the cost and time significantly.



Rightbiotic: The Fastest Antibiotic Finder-detecting urinary tract infections in four hours

Replicates The Basic Tenets Of Clinical Microbiology, Namely 1) Growth Of Bacteria In A Specialized Medium And 2) Measuring The Inhibition Of Growth Of Bacteria In The Presence Of An Antibiotic. Detection Is Based On Chromogenic Endpoints Which Are Measured Using A Set Of Optical Sensors. The Output Is Analyzed Using Lab-developed Algorithm Based Software Which Reports The Sensitivity Of The Pathogen To The Panel Of Antibiotics Tested. The Results Of Ast Using The New Test Are Available In 3 Hours As Compared To 48-72 Hours Taken For Conventional Culture Results (based On Kirby-baeur Disc Method).

Guide: dr Suman kapoor -*Shivani Gupta, Dv Padmavathi, Anuradha Pal- BITS Pilani, Hyderabad Campus*

Front View

Modified Two Wheeler Vehicle for specially-abled: Jignesh S. Shah

Four levels of learning

1) Artefactual - replication of similar design
2) Analogic - metaphor to inspire
3) Heuristic - models of thinking
4) Gestalt - configurational of factors

Gupta, 2012, Own compilation

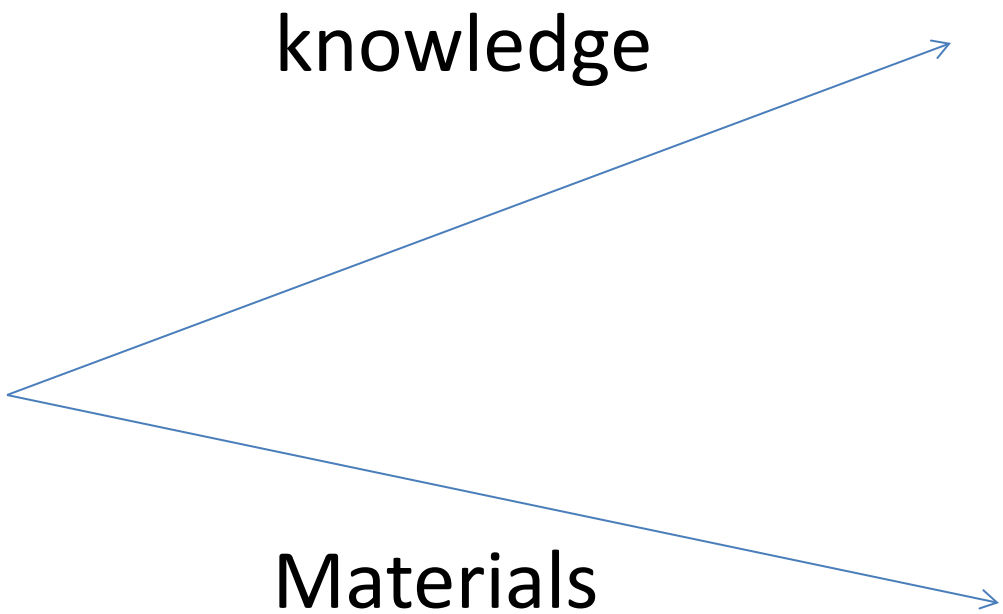
Learning platforms

connecting communities with corporations

Frugal
Flexible
Friendly
Elegant
But excluded
From the market

Why frugal innovation

a) Minimisation of materials, maximization of knowledge for any product/service is imperative



Frugality, why

b) Extreme **affordability** for **consumer** as well as **nature** is needed to expand market sustainably: '*frugal' plastic sachet is very costly*

c) Frugality implies **marrying minimalism with eco-sufficiency** (not just eco-efficiency)

d) Regardless of resource abundance/scarcity in an organization, frugality also implies **higher socioeconomic inclusion**

e) Whether resources become scarce or remain abundant in future, *frugality is the only sustainable solution, as a way of life, attitude towards nature, and future generation*

Information/Knowledge/Wisdom

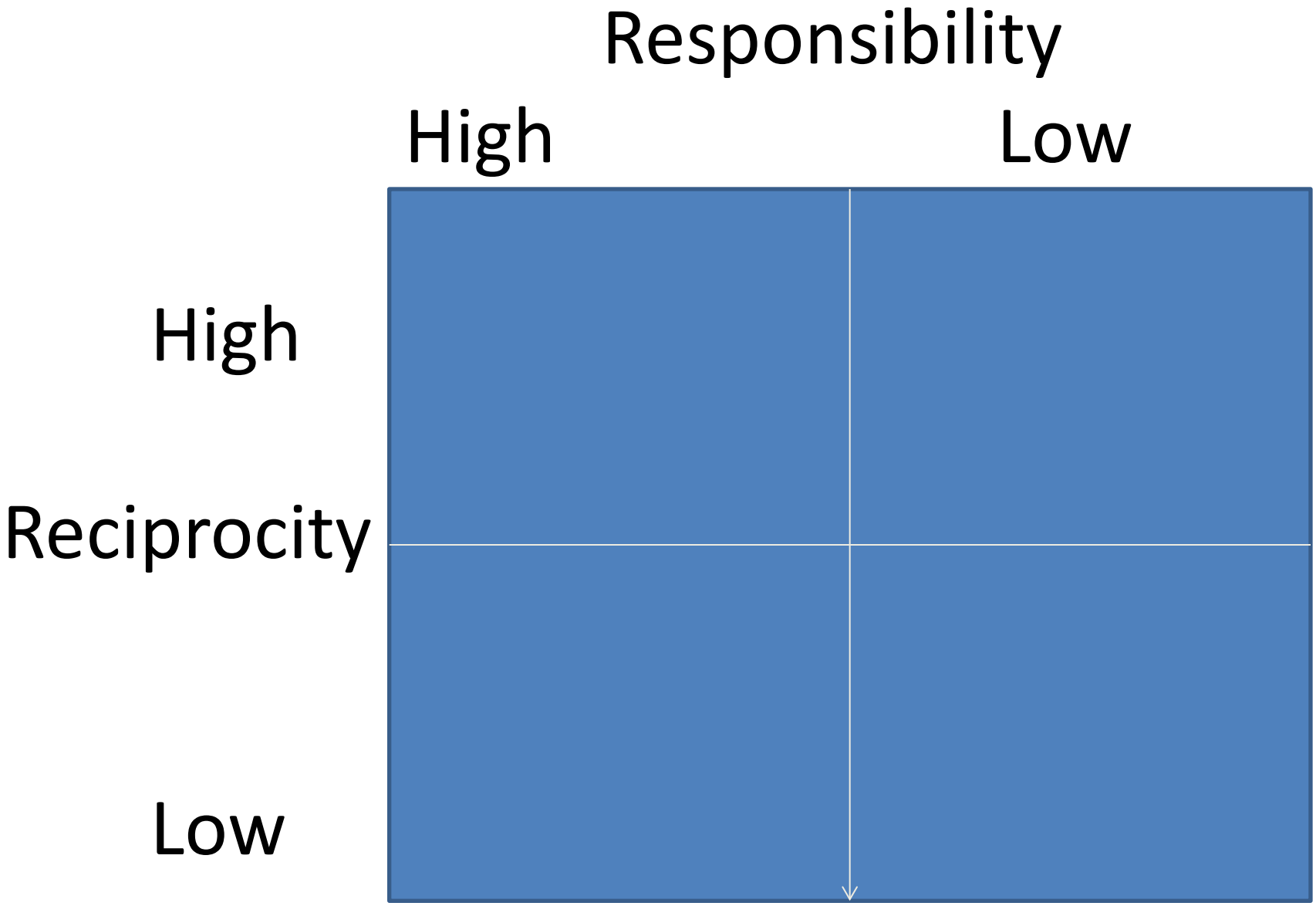
Innovation Playground

Dil bada dimaag bada

Inside out

	High	Low
High	DBDB hbn	Sponge P & G
Low	Pollinator Tesla	Ostrich Doomed

Outside in


Responsibility
High
Low
High
Reciprocity
Low

(i) High reciprocity and low responsibility

opens source database with user can add with no responsibility about veracity of quality, validity, applicability

(ii) High reciprocity and high responsibility

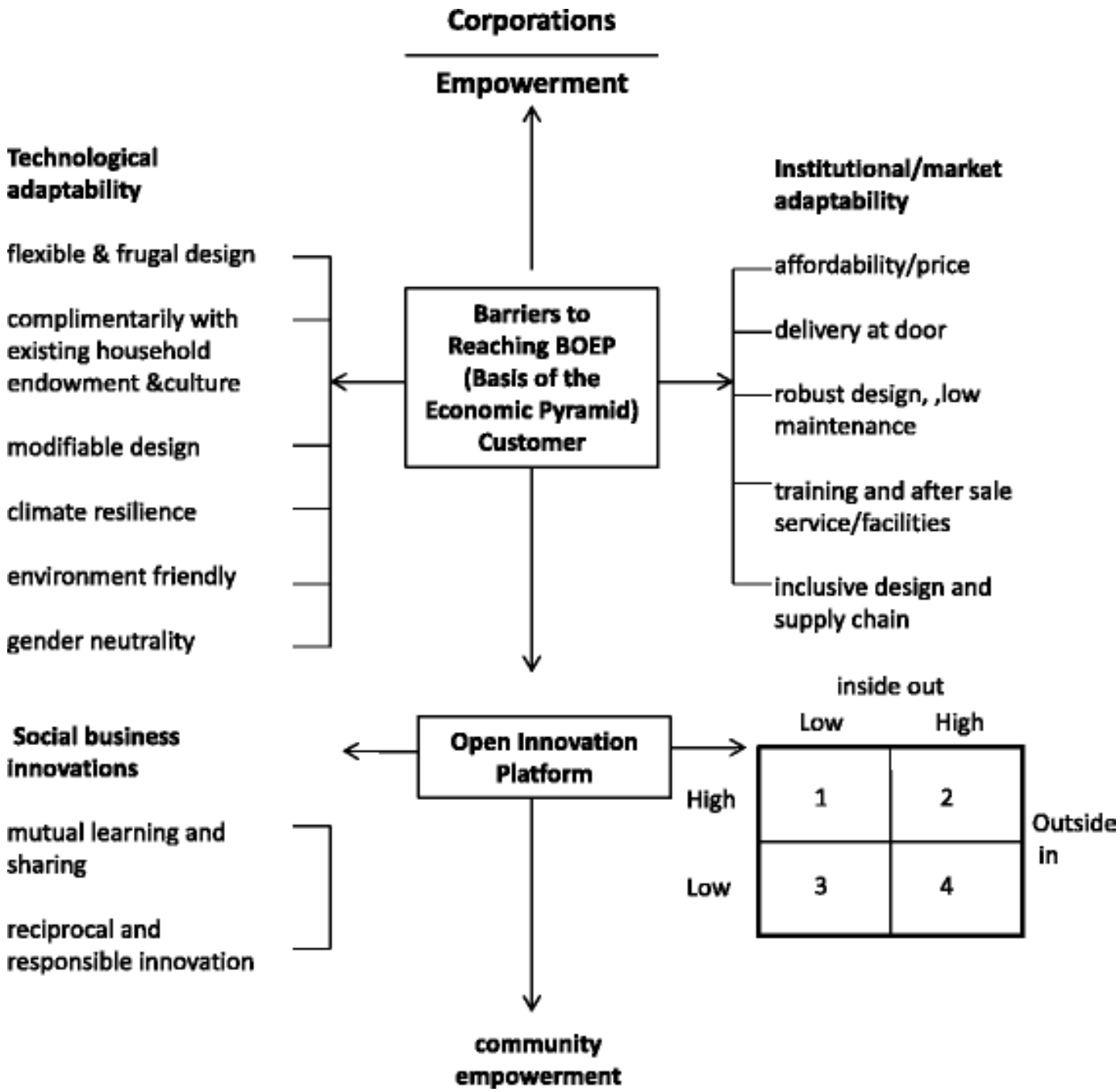
Company shares what it did with knowledge shares benefit, community shares its knowledge and helps in solving derivative problems, genuine co-creation , NIF, SRISYI, GIAN, Honey Bee network

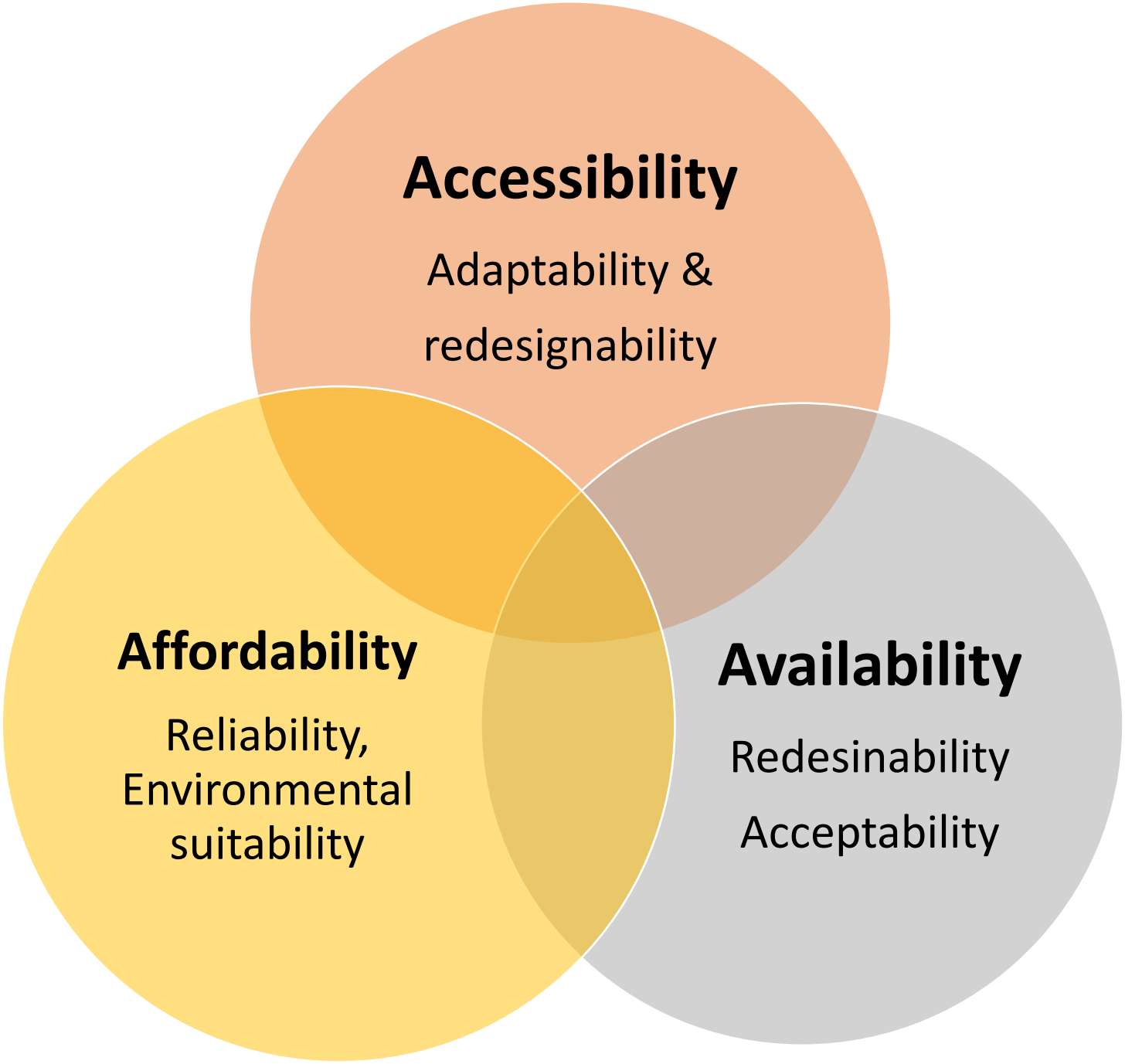
(iii) Low reciprocity and high responsibility,

On line learning platforms for mere exchange of information often without empirical validation in each case

(iv) Low reciprocity and low responsibility.

Crowdsourcing of ideas without reciprocity and responsibility


Corporations
Empowerment
Technological adaptability
flexible & frugal design
complimentarily with existing household endowment &culture
modifiable design
climate resilience
environment friendly
gender neutrality
Barriers to Reaching BOEP (Basis of the Economic Pyramid) Customer
Institutional/market adaptability
affordability/price
delivery at door
robust design, ,low maintenance
training and after sale service/facilities
inclusive design and supply chain
Social business innovations
mutual learning and sharing
reciprocal and responsible innovation
Open Innovation Platform
inside out
Low
High
High
Low
1
2
3
4
Outside in
community empowerment


Accessibility
Adaptability &
redesignability
Affordability
Reliability,
Environmental
suitability
Availability
Redesinability
Acceptability

How do we learn about frugality?

- Nature has no waste and is very parsimonious
- Material resource constraint innovators often generate frugal solutions

- Organization facing immense challenges with limited material resources are forced to innovate frugal solutions such as Indian space programme
- Frugal supply chains will incentivise distributed design of frugal product and services

Policy induced affordability by consumer and nature

Subsidies, taxes, incentives, access to scarce resources, privilege to use certain features, functions, forms

Frugality through open innovation platforms

A) I share, don’t care, if you do or not - Tesla model

B) I share and hope you too

C) I share and require you to share, collaborate and share appropriately

D) I share and incorporate you in my enterprise as a share holder temporary or on an on going basis - south Italy auto sector - small firm network, garment sector India,

D) joint venture

E) cooperate in knowledge market And competition in product market - Lyon model

F) contractual crowd sourcing

G) collaborative open source problem solving

H) patent pool for industrial solutions or knowledge building blocks

I)

i) feedback at diff stages contingent on degree of openness at these stages

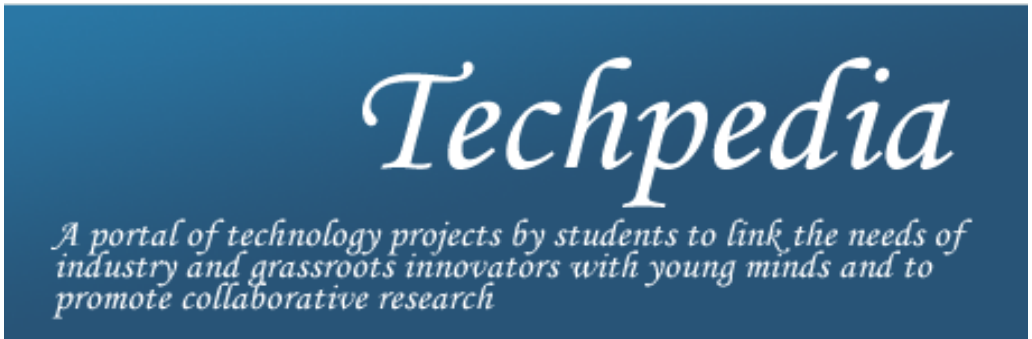
j) Crowd Testing by many people

k) Larger participation in distributed design development and delivery

l) Closed systems can also be frugal provided open learning among team, voluntary Material resource constraint and Anybody can ask question,

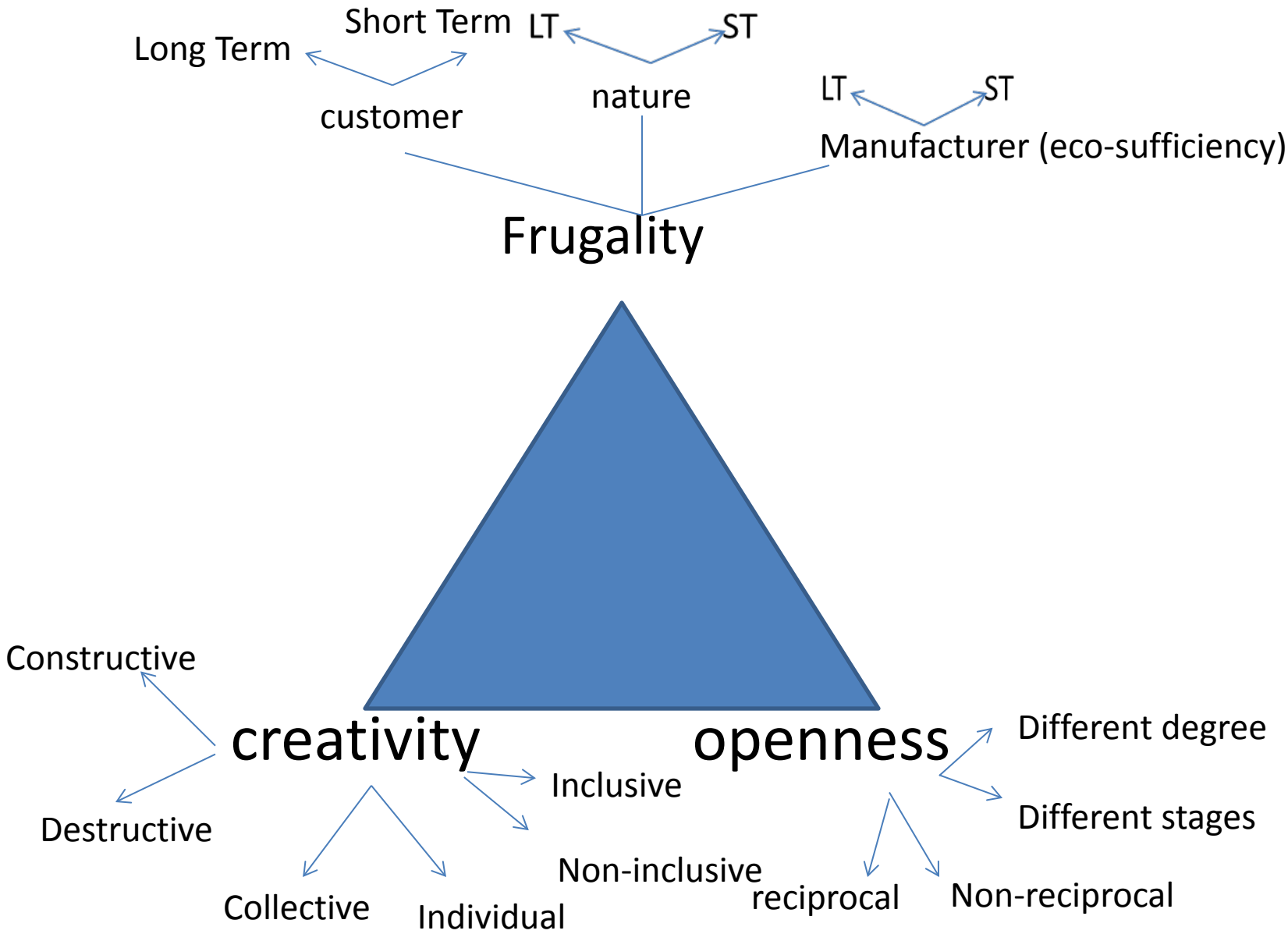
democracy spawns diversity and frugality of design

www.techpedia.in

- engaging with youth in the one of the youngest country:
- new initiative techpedia.in, (a portal by SRISTI (www.sristi.org) pooling 204,000 engineering projects by 700k students from over 600 institutions) etc.,
- 

a teacher of 2000 years

Just a DROP of water



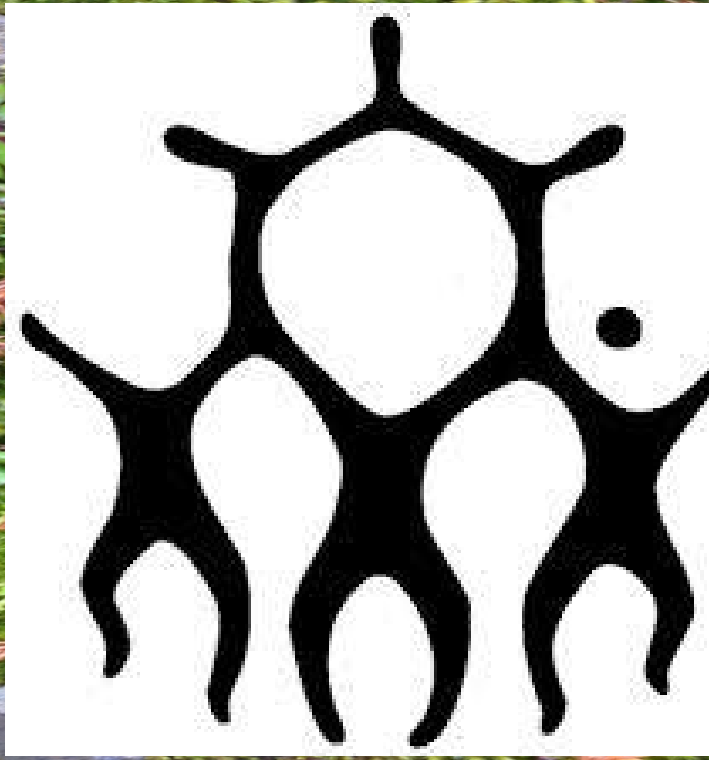
Source: anil gupta and dey, anmika, R, 2017, own compilation

Inclusive frugal innovations:

Overcome exclusion over 6S

space,

Sector, season, skill, social groups and structure of governance



Dimensions of Inclusion

- Spaces
- Sectors
- Seasons: stable to fluctuating
- Social segments
- Skills and knowledge
- Structure of governance

Inclusive Innovation

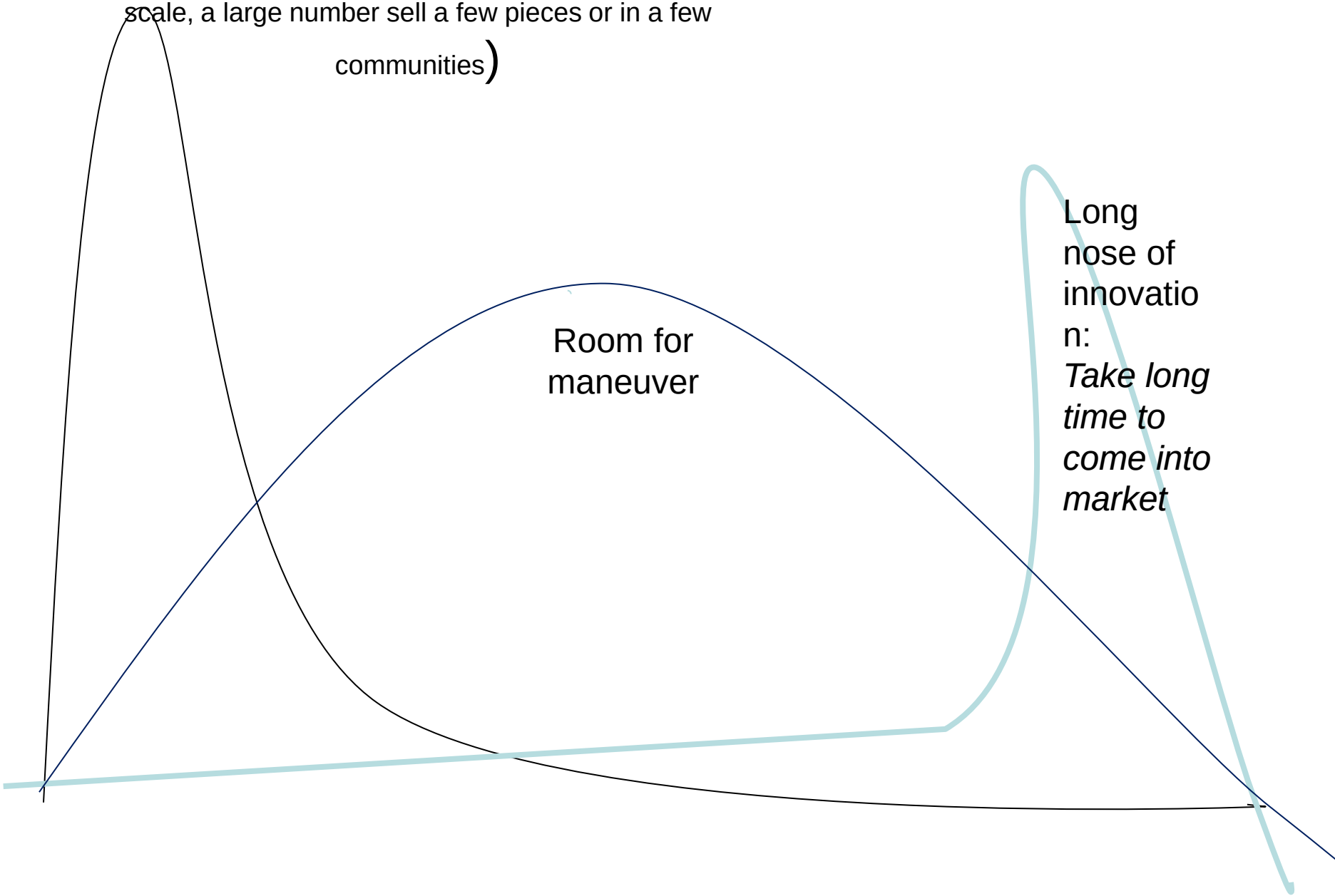

Meghalaya
Technology is like
words,
institutions are
like grammar
and culture is like
thesaurus
Three pillars of
sustainability

Autopoeisis

Model of Frugal Innovation

Self correcting, self design, self managed processes of empathetic innovations

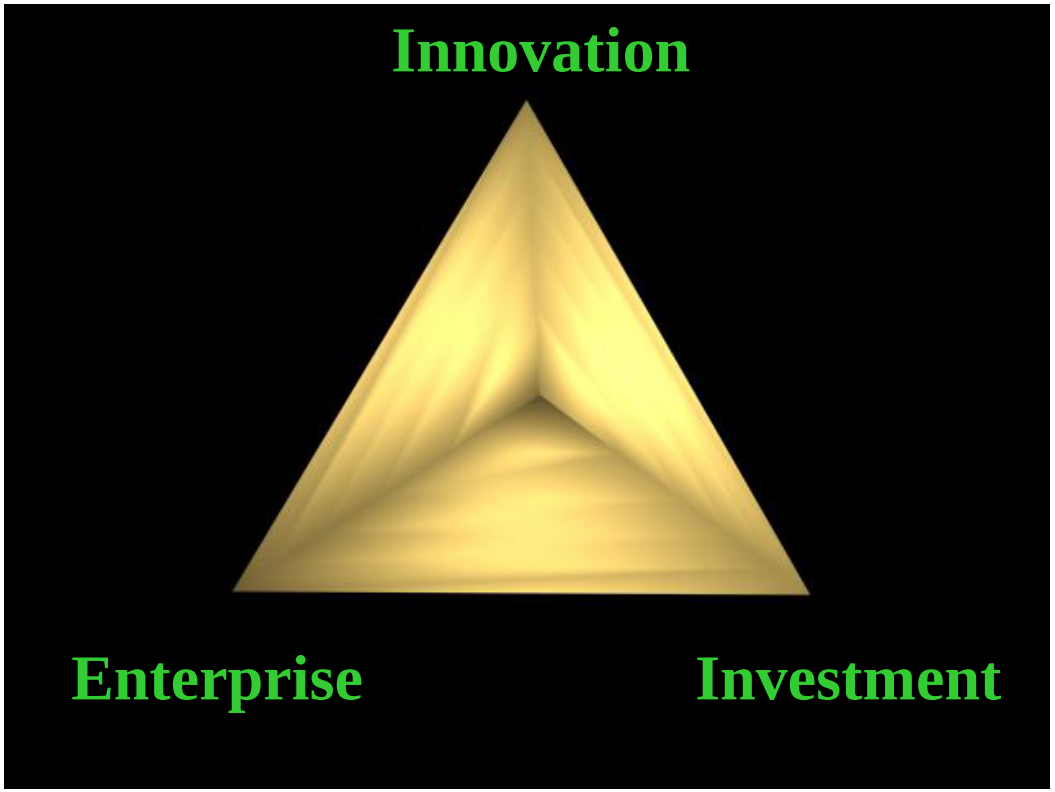
Long tail of innovation (only a few achieve scale, a large number sell a few pieces or in a few communities)



GOLDEN TRIANGLE for rewarding CREATIVITY

Leadership is to take note of *ex ante* and *ex poste* transaction costs and deal with them upfront,

If not these are transferred to the weaker partner

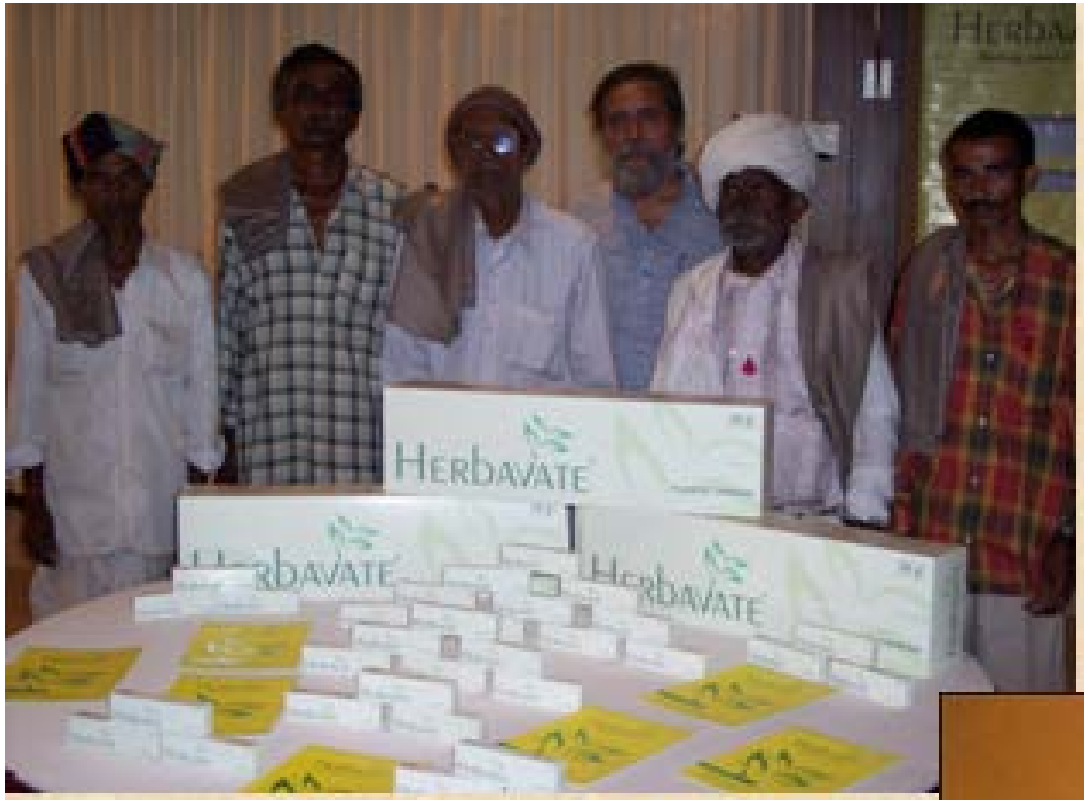


Mind to market:
the case of herbavate

Herbvate: a skin ointment

- It is based on the knowledge of seven innovators from six districts Sabarkanth, Panchmahal, Dang, Mahsana, Patan and Bhavnagar of Gujarat. Herbavate exhibits remarkable properties against eczema and variety of inflammatory and infectious skin conditions.

Communities: The innovators of Herbavate: 1. Amratbhai Shankarbhai Rawal, Mehsana Gujarat. 2. Kunjubhai Kakadiyabhai Bhoya, Dang Gujarat 3. Pujabhai Dabhi, Sabarkantha, Gujarat 4. Karshanbhai Parmar, Sabarkantha Gujarat 5. Laxmanbhai Pagi, Panchmahal, Gujarat 6. Lilabhai Rawal, Patan Gujarat 7. Lakhabhai Becharbhai Khatana, Bhavnagar Gujarat



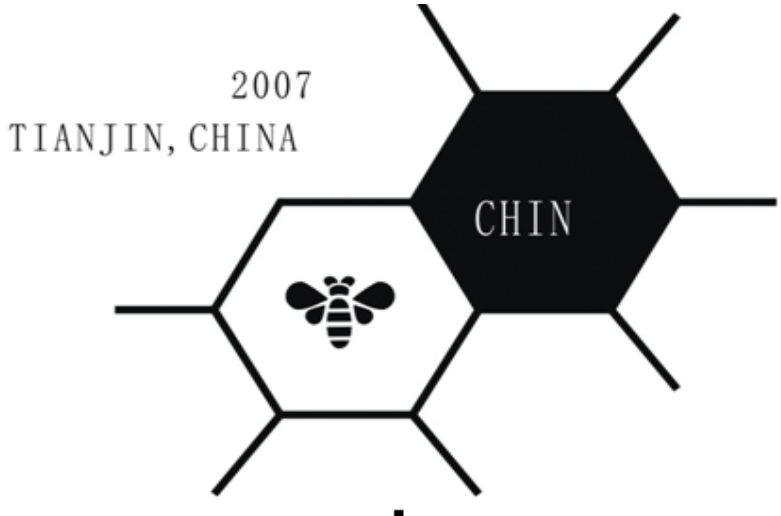
HERBAVATE

Herbal medicine for patients suffering with dermatitis and psoriasis

g2G

grassroots to global

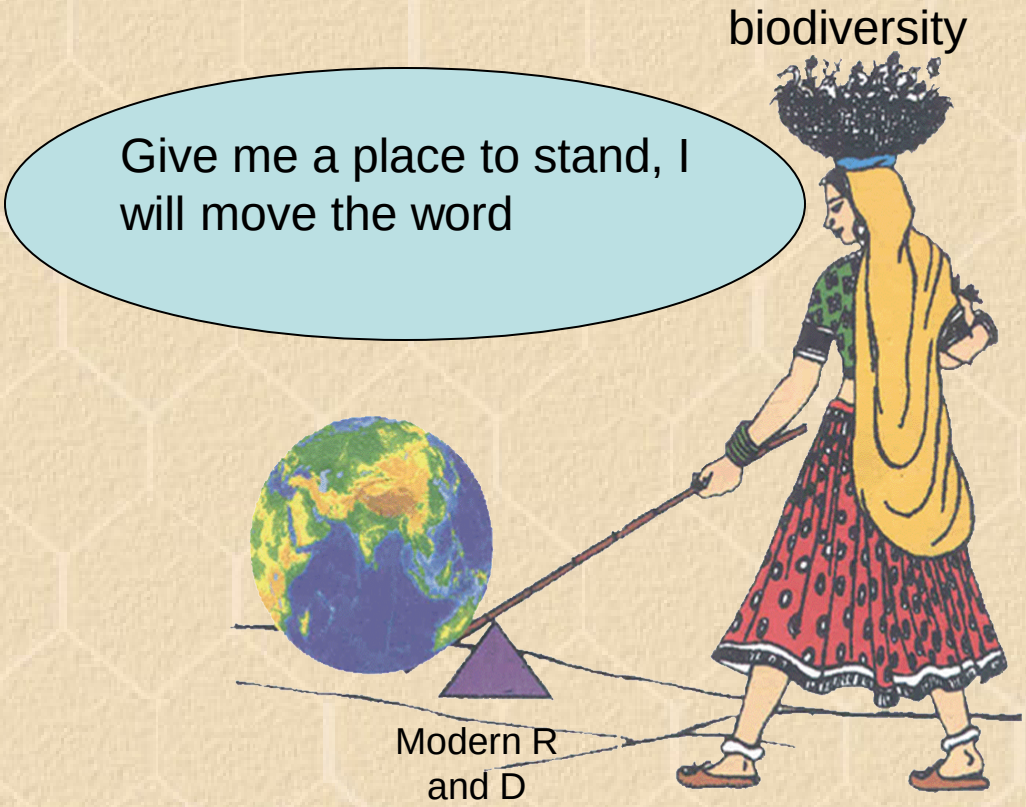
Global GIAN – Building Global Value Chain for augmentation of Green Grassroots Innovations



Sales made

1. Coconut tree climber- USA (Florida, Massachussets, California, Hawaii etc.) Australia, Maldives, Sri Lanka, Brazil, Mexico, West Indies
2. Pomegranate deseeder-Turkey, USA
3. Garlic peeling machine-Pakistan
4. Arecanut husker- Singapore
5. Milking machine-Phillipines, **Uganda, Ethiopia**
6. Resin grading machine-Peru
7. Cassava peeling machine-**kenya**
8. Herbal growth promoters-Ghana

Product enquiries:		
Sl no.	**Innovation/product**	**Countires**
1	Coconut/palm tree climbing device	USA, United Kingdom, Vietnam, Australia, Sri Lanka, Mexico, Iran, West Indies
2	Entech oil expeller	USA, United Kingdom, Australia, Phillipines, Canada, Kenya, Colombia, S. Africa, Switzerland, Poland, Indonesia, Belgium
3	Garlic peeling machine	Slovenia, USA, Turkey, Peru, Singapore, Iran , Venezuela, Pakistan
4	Pomegranate deseeding machine	USA, Australia, Turkey, Venezuela, Hongkong, Israel, Netherlands, Thailand, UAE, Iran, United Kingdom
5	Cassava peeling machine	Congo, USA, Benin, Nigeria, Kenya, UAE, Uganda
6	Aaruni tilting cart	Uganda
7	Coconut defibring machine	China
8	Coconut dehusker	Mexico, New Zealand, USA, Philippines, Bangladesh
9	Lemon cutting machine	S. Africa
10	Milking machine	Bangladesh, Uganda, Ecuador
11	Palm leaf mat weaving machine	Fiji
12	Rain Gun (Chandraprabha)	Sudan
13	Tea making machine	Bangladesh,
14	Tile making machine	Bangladesh, Kenya, Rwanda, Ghana, Zambia
15	Trench digging machine	Pakistan
16	Zero head water turbine	Egypt
17	Arecanut dehusking machine	Chile



SRISTI (*Society for Research and Initiatives for Sustainable Technologies and Institutions, 1993*) is a developmental voluntary organization, set up to strengthen the Honey Bee Network of grassroots innovators engaged in conserving biodiversity and developing sustainable solutions to local problems.

http://www.sristi.org *Note on SRISTI*

Mining the minds of masses

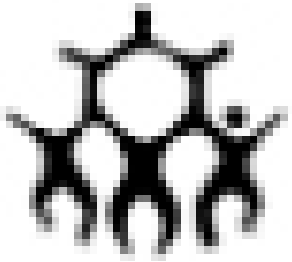
- NIF has mobilized more than 200,000 ideas, innovation, and traditional knowledge practices, of course not all unique, from over 550 districts of India. Patents have been filed for more than 800 grassroots innovations and outstanding tk practices in India and USA; much more are in public domain

Be
A
Bee!!

Search, spread, celebrate, sense unmet social needs :
Honey Bee Network innovation hubs

How did it happen:

The journey…..



Honey bee network , informal global social movement, started in 1987-88,

SOCIETY FOR RESEARCH AND INITIATIVES FOR SUSTAINABLE TECHNOLOGIES AND INSTITUTIONS (www.**SRISTI.org**) info@sristi.org

GRASSROOTS INNOVATION AUGMENTATION NETWORK (www**GIAN.org)**

NATIONAL INNOVATION FOUNDATION (www.**NIFindia.org**) info@nifindia.org

Anilg@sristi.org

Creativity counts
Knowledge matters
Innovations transform
Incentives inspire
Collaborations sustain

(not just individual, but also collective, not just material, but also non-material)

Join the Honey Bee Network!
For rewarding indigenous creativity and innovation
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anilgb@gmail.com