Nuclear Ecosystem and Safety Culture Self-Assessment at a Regulatory Body

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Presentation flow

- Role of Nuclear in Balancing the Planet Earth
- What have we Learned From Nuclear Accidents?
- Future of Nuclear Safety; Need for a Change in Approach

  New Approach to Nuclear Safety Culture (Safety Culture II)

  Leadership attributes for the Nuclear Safety Culture (Safety Culture II)
- Review of IAEA Safety Documents
- Safety Culture Self Assessment at Regulator
- Conclusions

Green Nuclear Energy

Balancing the Planet Earth Ecosystem

Plants, Animals, Humans, Air, Water, Soil, are parts of Earth Ecosystem

NPP 12.3 % provides of the world Electricity

Avoids 2.5 Billion metric tones of CO2/year

We have to think and feel together to Protect Planet Earth Ecosystem

One Mind One Soul

What have we Learned From Nuclear Accidents?

1979 three Mils Island, USA

We also learned the influence of human factors on nuclear safety?

1986 Chernobyl, USSR

we also learned about influence of organizational and cultural factors influence on nuclear safety

2011 Fukushima , Japan

We are learning about safety culture II influence on nuclear safety

Have we learned and changed our way of doing things?

Future of Nuclear Safety: Need for a Change in Approach

Was TEPCO at the wrong place at the wrong time?

What if tsunami was in other country, how would they done it?

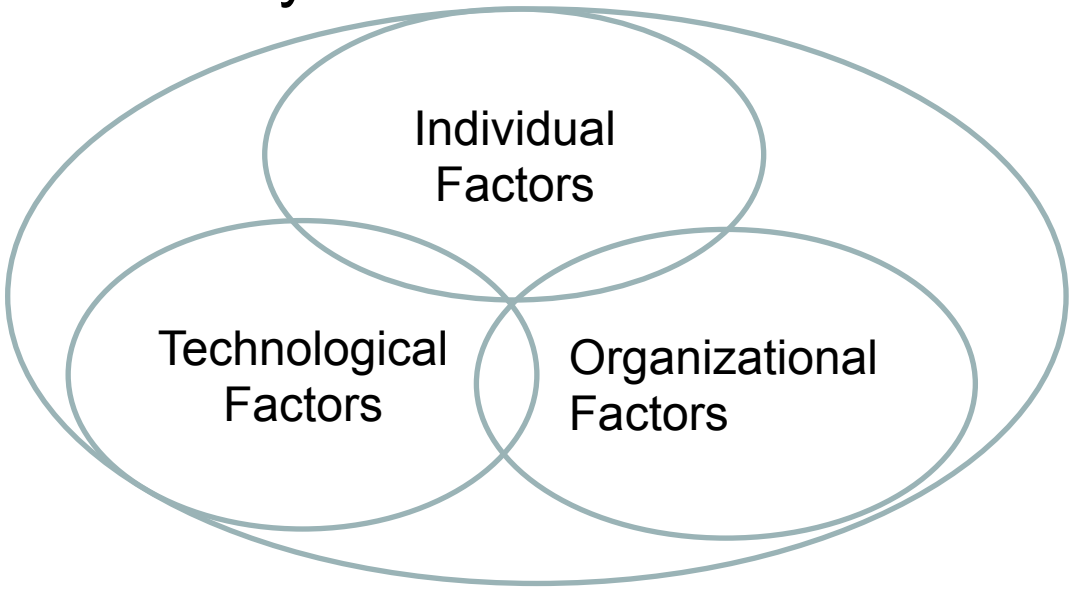
Is our understanding changed towards safety culture?

Have we changed our basic assumptions and feelings towards safety culture ?

Transformation is change of heart (and mind)

Systemic view of the Organization

The future of nuclear safety and clean energy rest on our commitment and understanding that human behaviours, technology systems, organizational processes (ITO), are subsystems of one system.



New Approach: Nuclear Safety Culture is in the Interaction of Human, Organizational and Technical factors (ITO).

Systemic view: 'ITO'

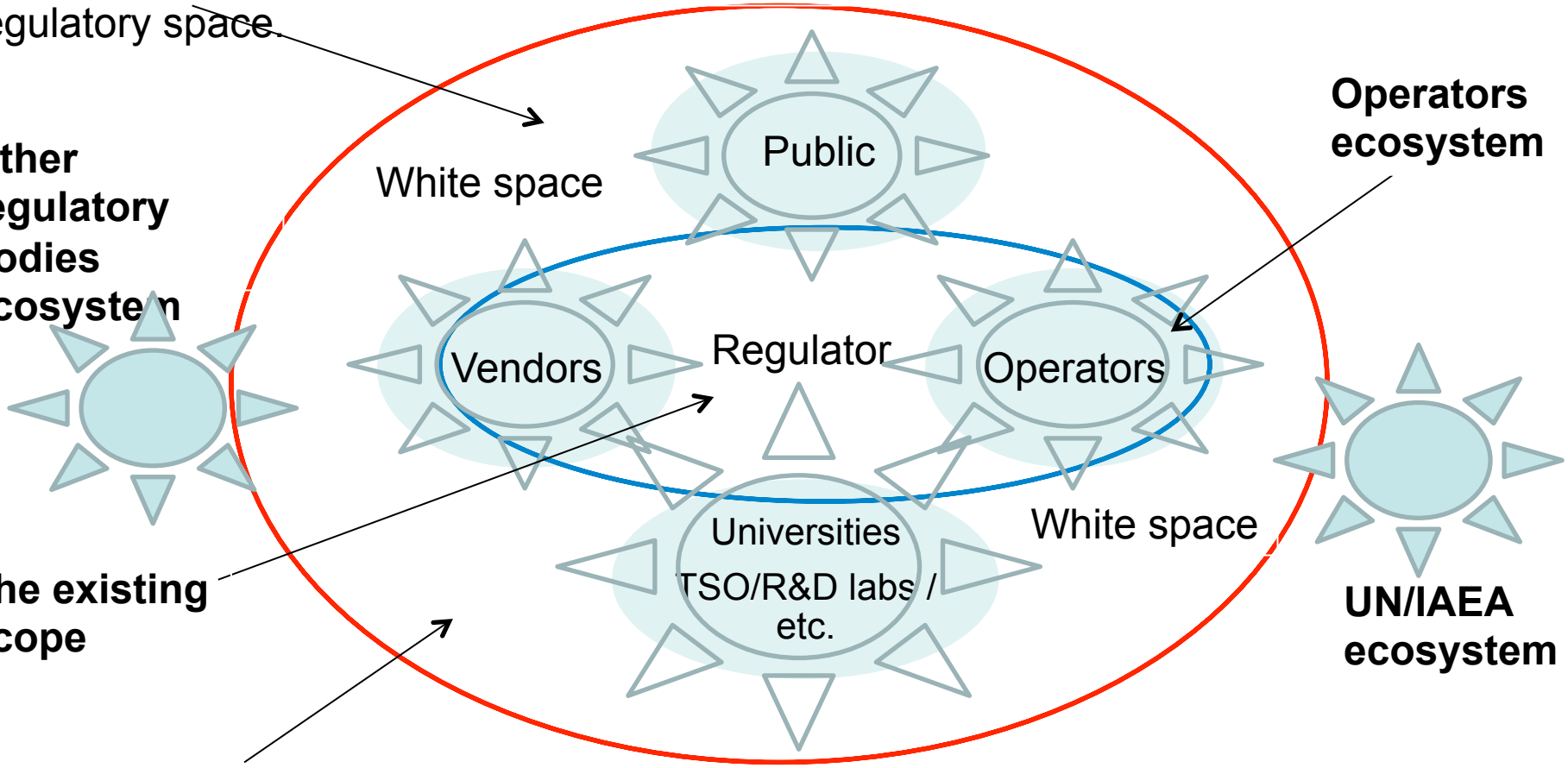
- Refers to the interaction between **I**ndividuals, **T**echnology, and the **O**rganization
- A systemic safety perspective that embraces.
  - HF - Factors which influence individuals` capability to perform safely
  - HFE - Engineering in which factors that could influence human performance are taken into account
  - OF- Factors which influence the organization to operate safely; the organizational infrastructure for individuals to safely operate the technology
  - TE - Factors which influence the technology to operate safely

Sources: IAEA SCAS- RB

New Approach to Nuclear Safety

Regulate the White Space to shape the Nuclear Safety

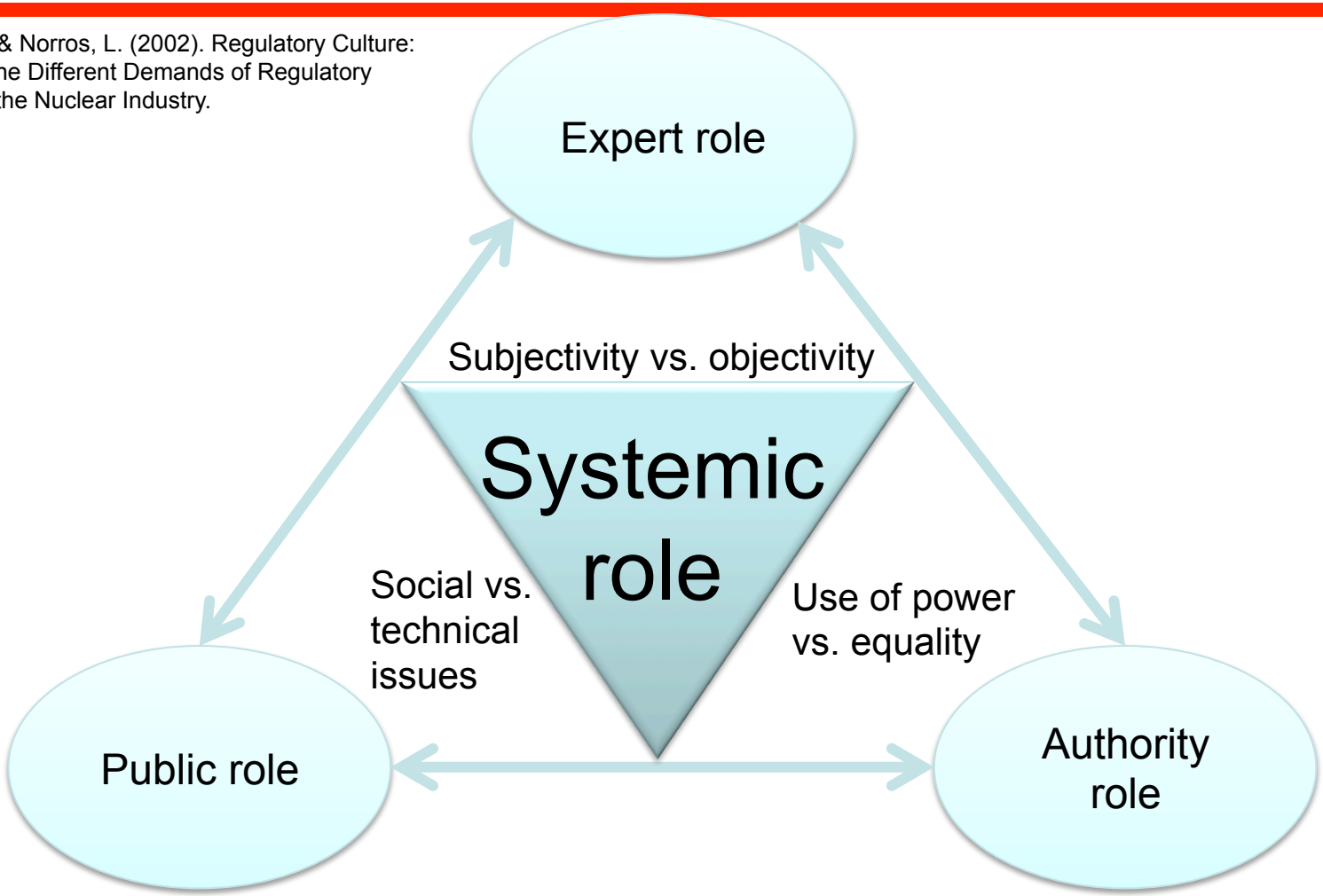
Ecosystem view is an opportunity for regulator to achieve the mission of nuclear safety culture within the national nuclear program. White space is the area beyond existing regulatory space.



Regulator is responsible and accountable for nuclear ecosystem

Regulatory Roles: Systemic

Reiman, T. & Norros, L. (2002). Regulatory Culture: Balancing the Different Demands of Regulatory Practice in the Nuclear Industry.



New Approach to Nuclear Safety

The Mission of Nuclear Safety Culture

Nuclear regulator is the creator and shaper of nuclear safety culture within the ecosystem. Regulator can protect it or disregard its nuclear ecosystem. To protect the nuclear ecosystem system the regulatory body must have strong safety
culture, and the mission to built and improve nuclear safety culture within its nuclear ecosystem.

Q. What will be the cost of not having a clear nuclear safety culture mission for the ecosystem and within the regulatory body?

Leadership Attributes for the Nuclear Safety Culture

Most important attribute is self reflection attitude always seek time for soul searching why and what are we doing? How it is connected with safety culture (SC)?

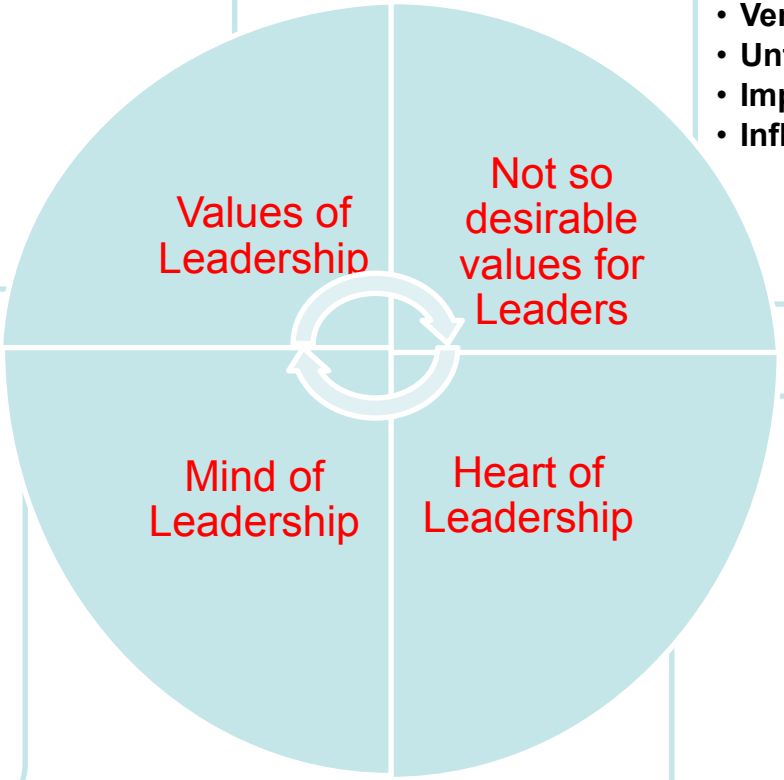
Self Reflection

What is the purpose of my organization? (Systemic view)
What and why I enjoy my job? (connecting to core values and believes)
How my organization is linked with other organizations? (Systemic view)
What is my organization SC mission and what is my SC mission? (mission and purpose)
What are the correct ways of doing things and what needs to be changed? Why (Systemic view)
What are (my) ours assumptions on SC? How these assumptions have created our understanding about SC? What should be our assumptions and why? (shared space)
How and what choices will influence nuclear ecosystem? (Systemic view)

Leadership for the Nuclear Safety Culture

- Trustworthiness and fairness
- Honesty and integrity
- Discipline and patience
- Self confidence
- Sense of purpose and mission
- Positive and Never giving up attitude
- Well mannered and respectful

- Self centered
- Vengeance
- Unfair
- Impolite (arrogance)
- Inflexibility to change



- Implementation of ideas
- Divergent thinking (details and big picture analysis)
- Transformation skills
- Teambuilding abilities
- Knowledge of the safety culture and expectations
- Sense of duty

- Decisiveness
- Will to sacrifice
- Dissatisfaction with the status-quo
- Will to lead
- Drive for change

It is not only the **presence** of positive values, heart and mind attributes are important but the **absence** of not so desirable values that are important for nuclear leadership.

What is not Nuclear Leadership ?

1. When leadership show only success and hide weakness and venerable sides.
2. When leadership creates hierarchy structure and power dynamics (no shared space).
3. When leadership is technology oriented, or rules and regulations oriented, or too much human oriented.
4. When leadership discourages difference of opinions and people stop showing disagreements.
5. When leadership compromises on safety culture and public trust.
6. When leadership is production oriented.

Review of IAEA Safety Documents

Document	Title
Safety Fundamentals No. SF-1	Fundamental Safety Principles
Safety Requirements No. GS-R-1	Government, Legal and Regulatory Framework for Safety
Safety Requirements No. GS-R-3	The Management System for Facilities and Activities
Safety Guide No. GS-G-3.1	Application of the Management System for Facilities and Activities
Safety Guide No. GS-G-3.5	The Management System for Nuclear Installations
Safety Guide No. SSG-16	Establishing the Safety Infrastructure for a Nuclear Power Programme
Safety Series No. 75-INSAG-4	Safety Culture
Safety Series No. 75-INSAG-15	Key Practical Issues in Strengthening Safety Culture
Safety Report Series No. 11	Developing Safety Culture in Nuclear Activities
Safety Report Series No. 42	Safety Culture in the Maintenance of Nuclear Power Plants
Safety Report Series:	Safety Culture during Pre-Operational Phases – Sept 2012
TECDOC 1321	Self-assessment of safety culture in nuclear installations

Review IAEA Safety Documents

IAEA has developed the safety fundamentals, requirements, guidelines, reports and TEC doc for operates and licensees point of views. (applicable for regulators)

However after several nuclear accidents we have learned that regulator was also not very effective in doing the safety culture assessment job at operators / nuclear organizations.

Q. Is there a need to bring regulator safety culture competence and know how to much higher level?

Q. If the regulator does not have the safety culture framework and has not done the safety culture self assessment how are they going to ensure safety culture at operators?

Safety Culture Self Assessment at Regulator: Case of PNRA

Safety Culture Self Assessment Journey

Why ?

1. Licensees were asking what/where is the regulator's safety culture framework?
2. Regulators/Inspector were asking what are the Attributes and characteristics for (our) regulator 's safety culture? Same as operators/NPP?
3. We know what is safety but how do we understand and observe safety culture at facilities/NPP?
4. Safety is the responsibility of licensees! (SF-1, p6)

Safety Culture Self Assessment at PNRA

What are the barriers for safety culture self assessment at regulator?

1. Don't have safety guide (like GS-G- 3.1/3.5) for safety culture self assessment for regulators
2. Regulators don't have skills and capabilities to do the safety culture self assessment. Engineering Mindset
3. What is safety culture for regulators?
4. Are we ready for SCSA training?
5. How can we **measure** CULTURE?

Safety Culture Self Assessment at PNRA

The objective of the project was to gain knowledge and guidance on how to continuously improve the regulatory body safety culture (SC) and reinforce the oversight licensees safety culture.

The project included expert support (from IAEA) in two main areas:

1) SC self-assessment, and safety culture oversight.
2) The development of training material, guidance documents, and training, coaching as well as international consultancy meetings.

Safety Culture Self Assessment at PNRA

Deliverables

1. Training and coaching on safety culture self-assessment
2. Training and coaching on safety culture oversight
3. Training material on safety culture self-assessment for regulatory authorities (IAEA)
4. Training material on safety culture oversight for inspectors (IAEA)

Safety Culture Self Assessment at PNRA

How it started?

1. It was initiated from lower and middle level managers not from the top level. Chief regulator fully supported it but it is still owned by lower and middle level managers. Change beings from the bottom.

2. Culture change program started with small project, from safety culture self assessment workshop and not organization wide cultural change project. Small is beautiful.

Safety Culture Self Assessment

Questions were raised during reflection phase.

1. Why regulator needs safety culture?
2. What are the safety culture attributes for regulators?
3. What and how IAEA will help self assessment?
4. Will top management act on self assessment findings or not?
5. Which regulatory organization has done SCSA?
6. Where is the report?
7. Where is the methodology to do SCSA?
8. Does national culture/ organizational culture / personal habits influence safety culture? What?

Senior Manager's feedback on the IAEA Safety Culture Self-Assessment Course

Place: PNRA, Islamabad, Pakistan **Dates:** 24-26 April 2013 **Number of participants:** 25

	Disapp-ointing	Good		Excellent		AVERAGE score
Score	1	2	3	4	5	
Overall Workshop Evaluation						
Content and length of workshop		2	5	12	1	3.6
Clarity of presentations				14	6	4.3
Response to questions				10	10	4.5
Quality of material (slides/handouts)			1	9	10	4.5
Importance and usefulness of the topic		1	2	9	7	4.2
Learning experience			3	8	9	4.3
Exchange of information			3	12	5	4.1
Open/respectful atmosphere				10	10	4.5
Balance presentations/dialogues			1	11	8	4.4
Overall impression of workshop			1	10	9	4.4
Personal level of engagement and commitment			1	8	11	4.5
TOTAL AVERAGE score						**4.2 out of 5**
Evaluation of Course Leaders						
Knowledgeable?				7	12	4.6
Able to teach effectively?				7	12	4.6
Approachable?				6	12	4.7
Willing to flex teaching methods to meet learner needs?				9	9	4.5
TOTAL AVERAGE score						**4.6 out of 5**

The contents and the calibre of the lectures were extraordinarily high. I could not find any weaknesses except that it should be a four day workshop for senior management.

Engaging and highly interactive, knowledgeable and experienced lecturers, open atmosphere evolved by the resource persons.

The lecturers were very open to dialogue ideas and were practicing what they said regarding shared space and communication. I feel the workshop should have had a few more hours, or another day, to really mesh.

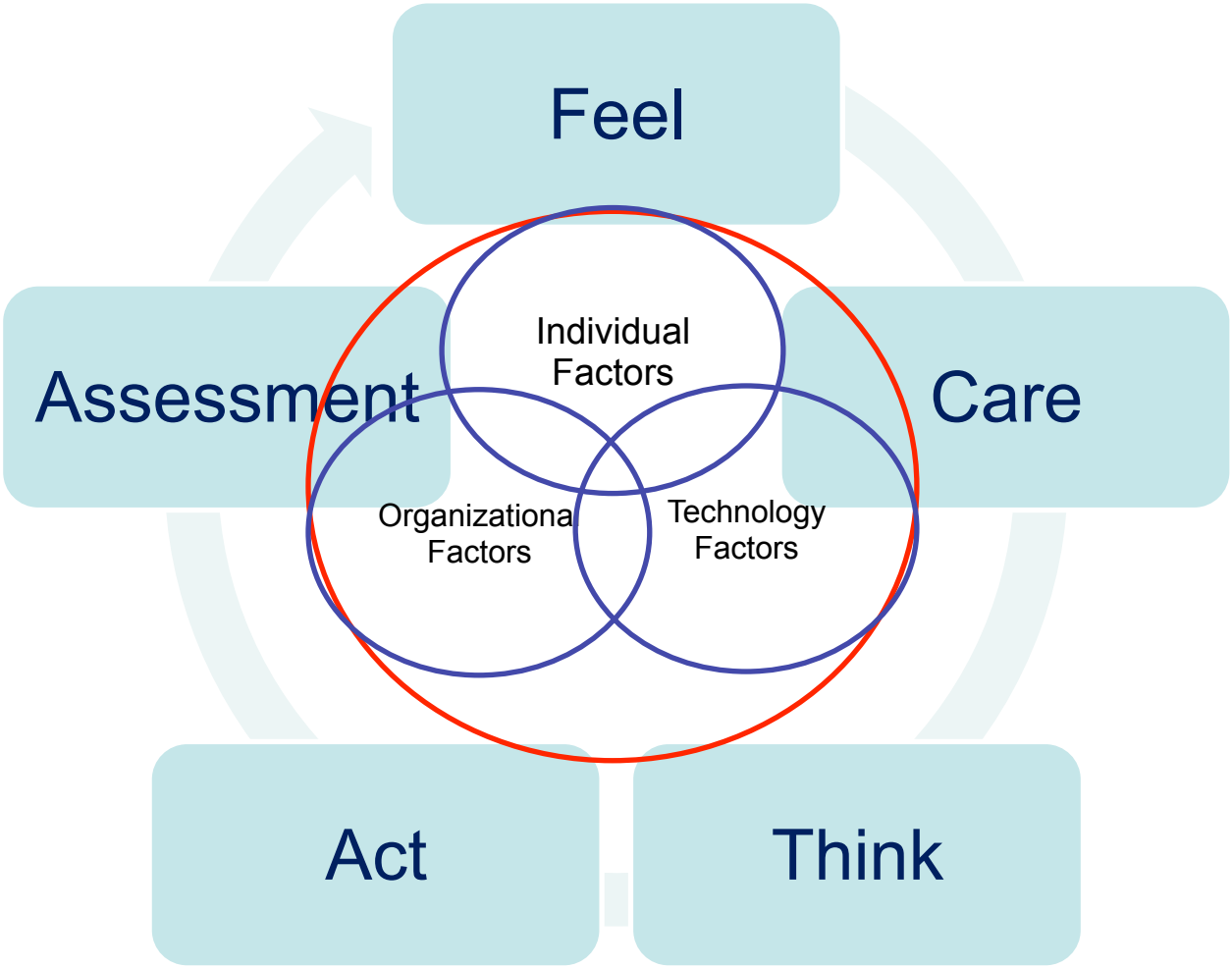
The workshop came at the right time since we have initiated some serious work related to sa ety culture assessment and improvement. The presentations, discussions and information sharing were excellent and I now feel change in the way of thinking and behaving.

	No answer	Not at all	Somewhat	Fairly well	Thoroughly
Design and Conduct of the Workshop					
Was the Workshop based on the needs of your organization?			6%	50%	44%
Were your individual expectations and needs met by the Workshop?	6%		6%	39%	50%
Was the information that you received before the Workshop sufficient for you to prepare for it?			22%	33%	44%
Do you consider that the appropriate balance was achieved between lectures, discussions, laboratory exercises, and site visits (if any)?			6%	33%	61%
Did the learning-by-doing approach help you to understand new concepts and learn more easily?				33%	67%
Percentage of respondents	**1%**	**0%**	**8%**	**38%**	**53%**

Conclusions

1. Regulator is responsible and accountable for the nuclear ecosystem.
2. Safety culture at regulatory body will determine the safety culture within the nuclear ecosystem and nuclear organizations.
3. Start small project with the big mission in heart. SCSA is a best way for developing team culture in organization.
4. Understand organizational culture before safety culture.
5. There is a need for SCSA guidelines for regulatory body.
6. Be ready for surprises and blind spots during the SCSA.
7. We have to transform our feelings towards safety culture, mind

New Approach: Systemic View of Safety Culture



Conclusions

SCSA provided a Systemic **view of individual behaviors, and organizational factors relationships and influence on nuclear safety culture within the nuclear regulatory organization.**

Future of Nuclear safety is in the Safety Culture II and when your heart and mind, are together for safety culture.

Thank You

And

Shukria