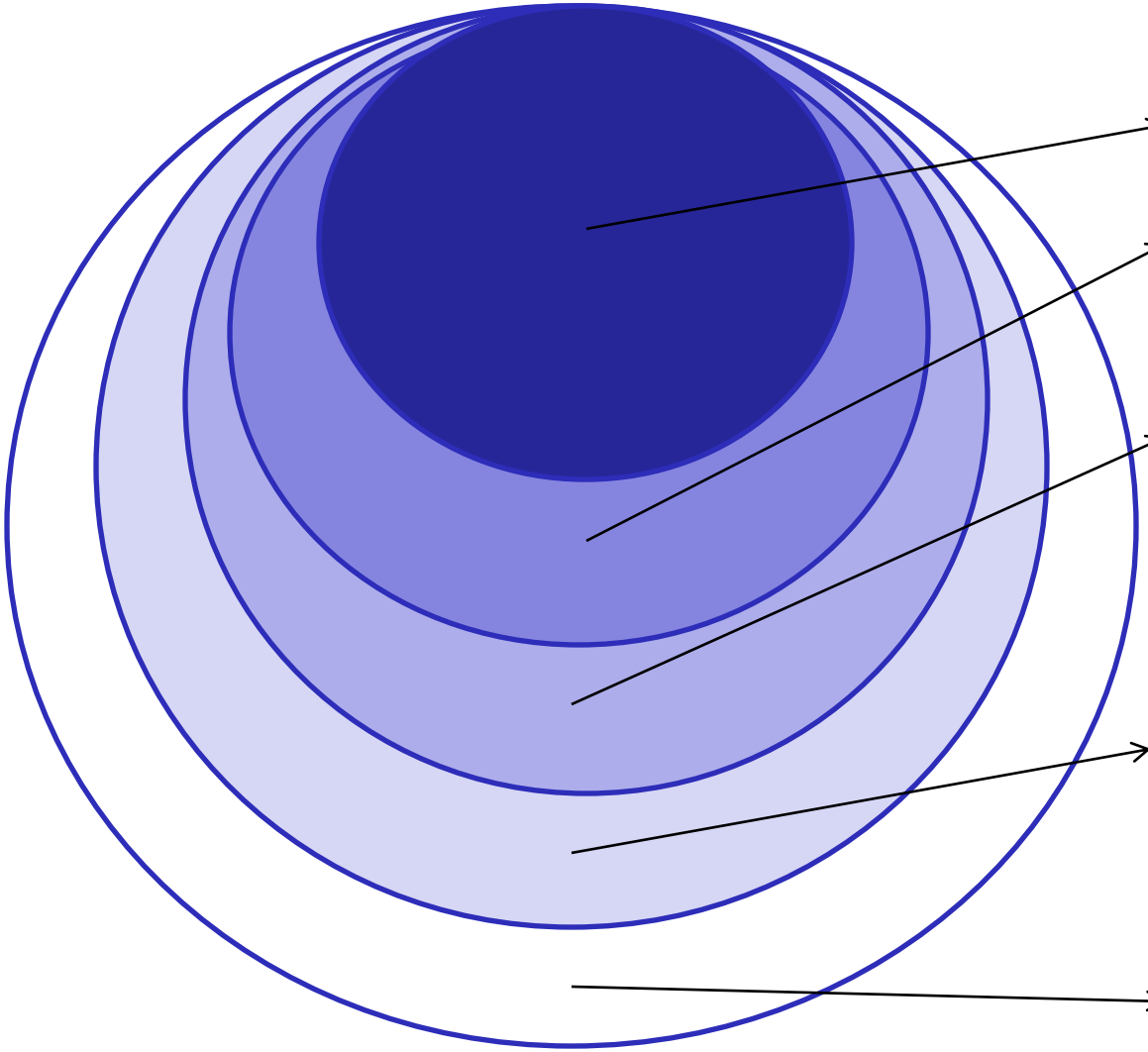
総合資源エネルギー調査会
原子力の自主的安全性向上
に関するWG　第4回会合
資料1

リスク・ガバナンスの欠陥
Deficits of Risk Governance

第4回　原子力の自主的安全性向上に関わるWG
2013年10月7日　@経済産業省

谷口武俊
taniguchi@pp.u-tokyo.ac.jp

リスク・ガバナンスに影響を及ぼす背景要因



核となるリスクガバナンス・プロセス

組織的能力
- アセット
- スキル
- 能力

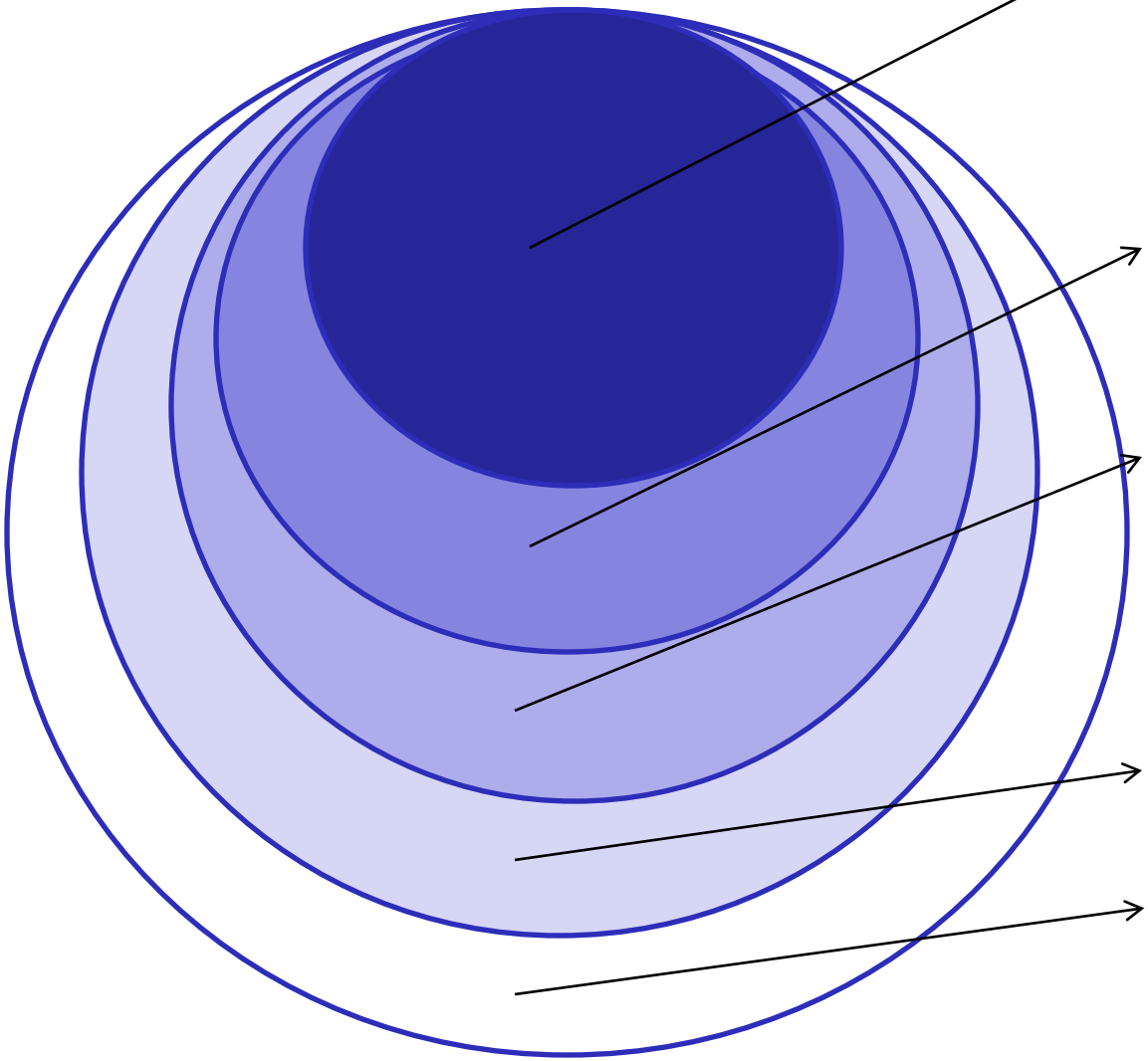
アクター・ネットワーク
- 政治家
- 規制当局
- 産業界／企業
- NGO／NPO
- メディア
- 一般市民

社会的風土
- 規制当局／体制への信頼
- 科学専門家に対する認知
- 市民社会の成熟度

政治的、規制的文化
- 規制スタイル

IRGC, 2007

Different dimensions of context affecting the risk governance process



IRGC (2007)

Core risk governance process
- pre-assessment
- risk appraisal
- evaluation: tolerability/acceptability judgment
- risk management
- communication

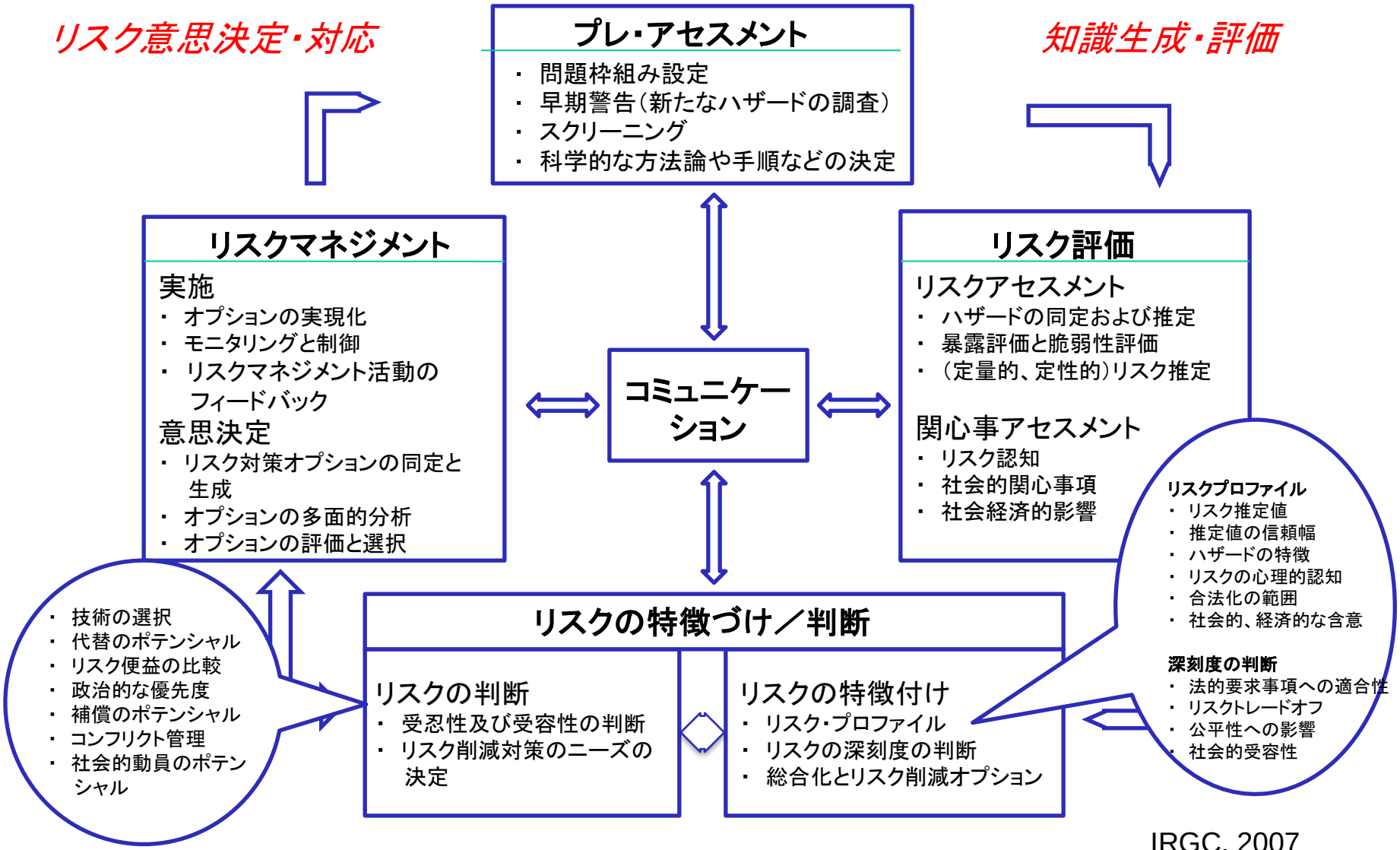
Organizational capacity
- assets
- skills
- capabilities

Actor network
- politicians
- regulators
- industry/business
- NGOs
- media
- public at large

Political & regulatory culture
- different regulatory styles

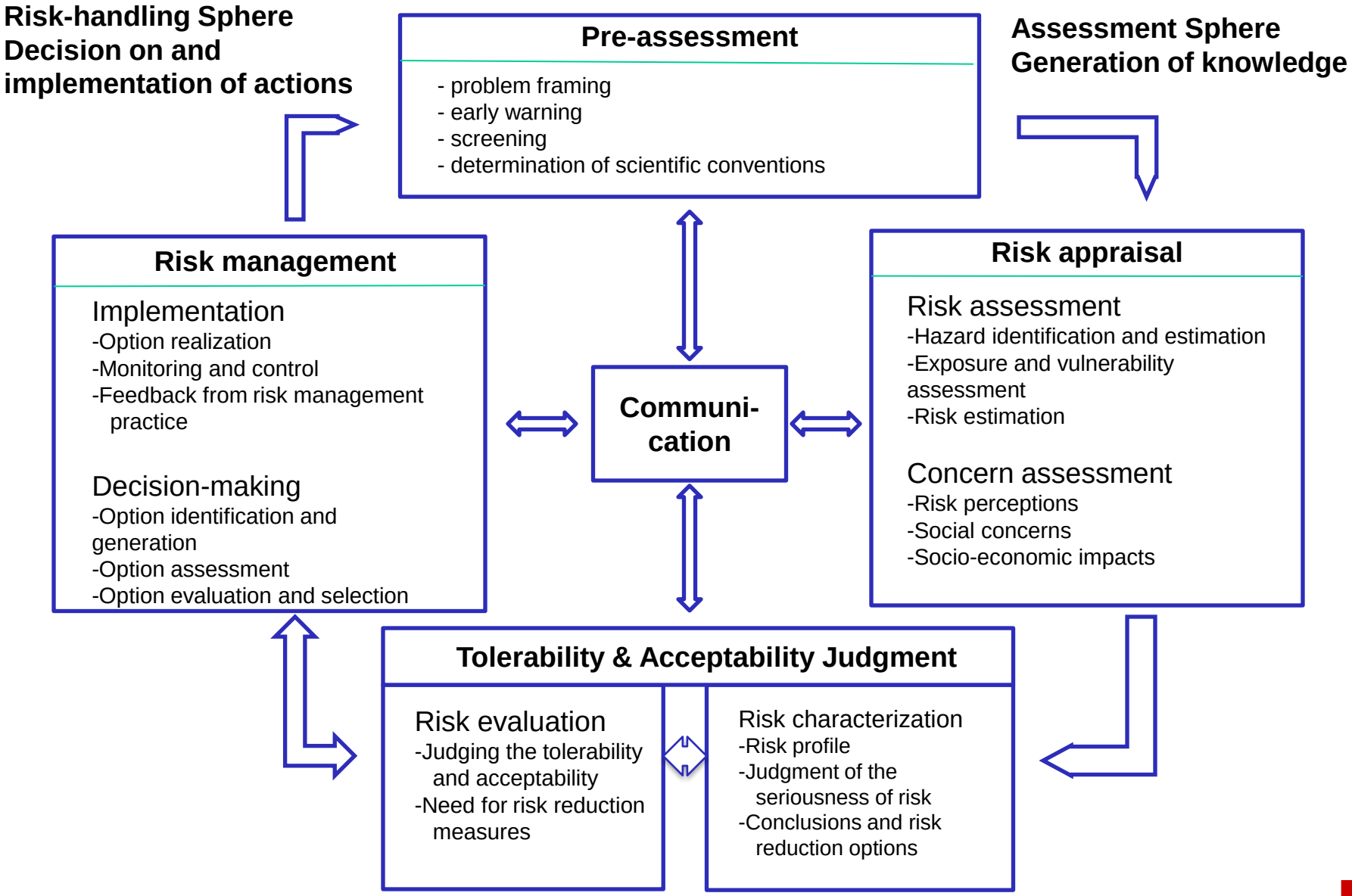
Social climate
- trust in regulatory institutions
- perceived authority of science
- degree of civil society involvement
- risk culture

リスク・ガバナンスの枠組み（核の部分）



IRGC, 2007

Risk Governance Framework



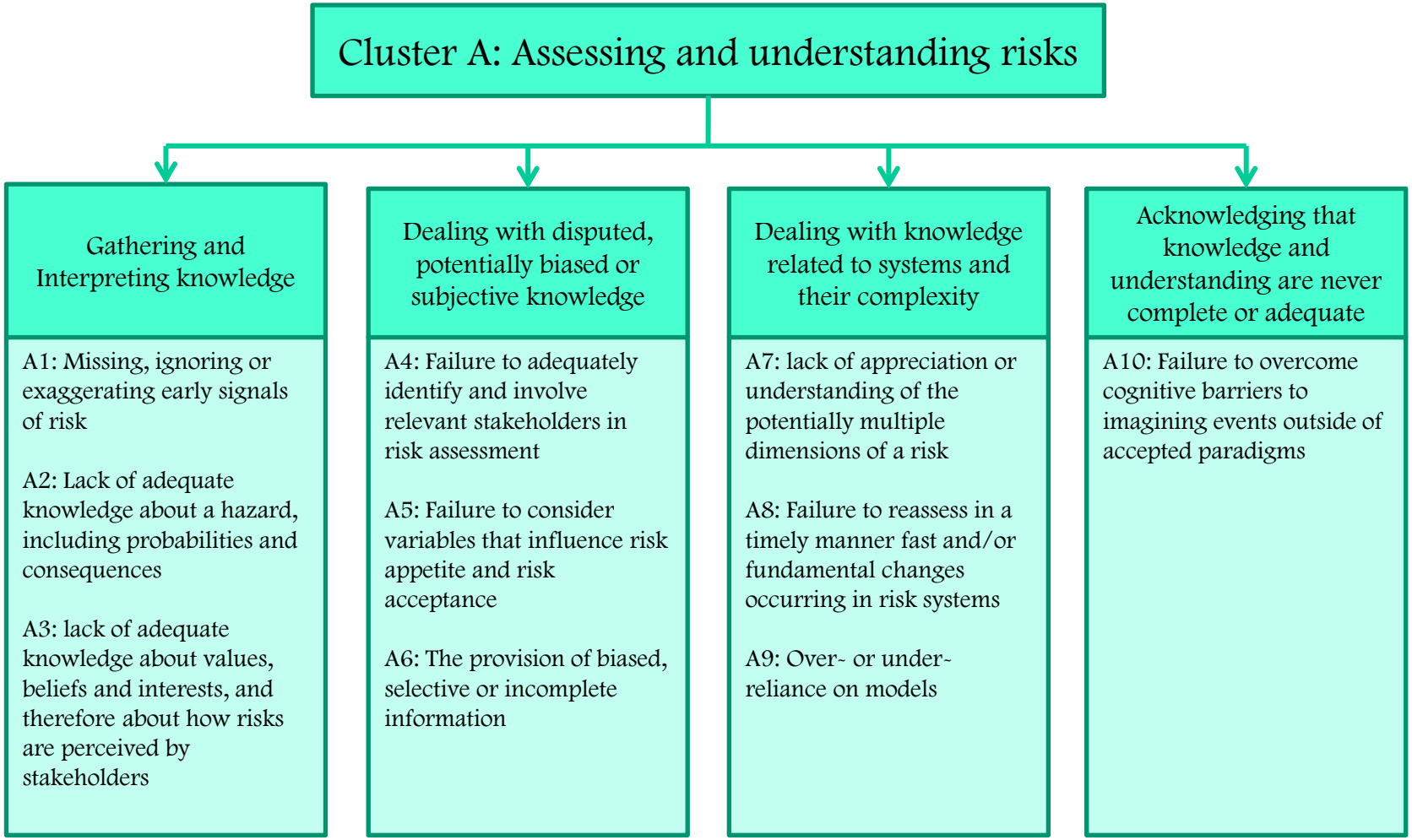
Risk Governance Framework: Assessment Sphere

- Knowledge generation
  - Needed to reduce complexity and uncertainty and to understand ambiguity
  - Needed to clarify the often confusing interactions between multiple sources of harm, what causes them to become risks, and their potential physical, social and economic consequences
  - Help to quantify the levels of risk to be experienced by different individuals and communities

- If knowledge exists but is not understood by decision-makers, stakeholders and the public, risk governance becomes highly vulnerable to error and unpredictability .

- Risk governance deficits emerge when the knowledge base is deficient or inadequate as the result of:
  - ✓ A lack of scientific evidence about the risk itself, or of the perceptions that individuals and organizations have of the risk;
  - ✓ Application of inappropriate methods, models or scenarios to derive this evidence;
  - ✓ Failure to understand or take account of available knowledge; and/or
  - ✓ Misuse of available knowledge, intentionally or unintentionally

Deficits Relating To Assessing And Understanding Risks



IRGC has identified the common deficits of risk governance that are defined as deficiencies (where elements are lacking) or failures (where actions are not taken or prove unsuccessful) in risk governance structures and processes.

リスク・ガバナンスの欠陥：リスクの評価と理解

1. リスクの早期シグナルの見落とし、無視、あるいは誇張。
2. さまざまな事象の確率とそれに伴う経済・健康・環境・社会影響を含むハザードについての十分な知識の欠如。（CFCs, EMF）
3. 価値観・信念・利害についての十分な知識の欠如、したがって利害関係者がどのようにリスクを認知するか、どのような懸念をもっているかについての知識も欠如。（GMO in Europe, Nuclear power & Wastes）
4. 情報入力の改善やリスク評価プロセスへの正当性付与のために、的を得た利害関係者を適切に見定め、リスク評価へ参加させることに失敗。（EMF, SARS in Toronto）
5. リスクに対する社会の受容性や受忍性についての評価に失敗。
6. 偏った、都合のいい、あるいは不完全な情報の提供。（BSE）
7. 相互連結したシステムはどのような挙動をしうるかについての理解の欠如、したがってリスクの多様な側面とその潜在的な結果についての評価に失敗。（Sub-prime）
8. （複雑系）システム内で起きている急速で（あるいは）根本的な変化を適時認識し再評価することに失敗。（Fishery depletion）
9. （複雑系）システムについての知識を生成、理解するためのモデルの不適切な利用（依存）。（Sub-prime）
10. 受容しているパラダイムの外側を想像することへの認知的障壁を乗り越えることに失敗。

IRGC, 2009

Governance Deficits：Assessing and Understanding Risks

1. **Detecting early warnings of risk**：missing, ignoring or exaggerating early signals of risk
2. **Factual knowledge about risks**： lack of adequate knowledge about a hazard, including the probabilities of various events and the associated economic, human health, environmental and societal consequences
3. **Perceptions of risk, including their determinants and consequences**：lack of adequate knowledge about values, beliefs and interests, and therefore about how risks are perceived by stakeholders
4. **Stakeholder involvement**：failure to adequately identify and involve relevant stakeholders in risk assessment in order to improve information input and confer legitimacy on the process
5. **Evaluating the acceptability of the risk**：failure to consider variable that influence risk acceptance and risk appetite
6. **Misrepresenting information about risk**：provision of biased, selective or incomplete information
7. **Understanding complex systems**：lack of appreciation or understanding of the potentially multiple dimensions of a risk and of how interconnected risk systems can entail complex and sometimes unforeseeable interactions
8. **Recognizing fundamental or rapid changes in systems**：failure to re-assess in a timely manner fast and/or fundamental changes occurring in risk systems
9. **The use of mathematical models**：an over- or under-reliance on models and/or a failure to recognize that models are simplified approximations of reality and thus can be fallible
10. **Assessing potential surprises**：failure to overcome cognitive barriers to imagining outside of accepted paradigms (“black swans”)

Deficit: Detecting early warnings of risk

- The basic problem is simple: **how do we look for something that we do not yet know about or fully understand?**
- A signal typically exists long before a risk comes to the attention of decision-makers or the public, especially in cases of very slow changes within a system.
- **False negatives** (no indication of a risk when one is actually present) and **false positives** (erroneous signals indicating something is present when it is not) in early warning systems are unfortunate realities.
- Advances in science and technology are both helpful and problematic. Creative innovations in warning systems may cause a reduction in the rates of both types of error. However, advances in warning systems may also permit the detection of minute perturbations that are not indicators of real risk.

Deficit: Perceptions of risk

- Risk perceptions are not always constant.
- When perceptions are diffuse or tentative, they may be susceptible to substantial influence. Once perceptions have hardened, they can be quite difficult to modify, even with compelling evidence.
- Risk perceptions may also be influenced by factors related to personal experience, such as the amount (or distribution) of associated benefits, the likelihood of the risk affecting identifiable rather than anonymous victims, the familiarity of the risk source or the state of personal or scientific familiarity with the risk issue. These factors will also have an impact on **the acceptability of the risk**.
- Erroneous information about risk perceptions can mislead decision-makers as much as erroneous factual information about risks. In fact, inappropriate understanding of risk perceptions may exacerbate social mobilization and this may itself influence the acceptability of the risk.

Deficit: Recognizing fundamental or rapid changes in systems

- When risks emerge unexpectedly because of rapid changes in the fundamentals of political, technological, environmental or economic systems, risk assessment becomes far more difficult.
- New risks can emerge rapidly or they can be characterized by a creeping evolution where they are difficult to identify at an early stage, spread only gradually and have consequences that cannot be recognized until a much later.
- Fundamental change may not become obvious until a previously unknown threshold or “tipping point” is reached and the system disruptively jumps to another state.
- Failures to react to such fundamental changes can lead to disaster.

Deficit: Assessing potential surprises

- No one can reliably anticipate the future. This deficit, however, is not the failure to predict the unpredictable – which is, by definition, impossible – but the failure to break through embedded cognitive barriers to imagine events outside the boundaries of accepted paradigms.

- Risk assessors and decision-makers may not realize that rare events can happen, presumably because they have never happened before, or not for many decades.
  - Unexpected events of extreme impact (the so-called “black swans”) or paradigm shifts that undo long-established truths must be acknowledged.
  - Even if risk assessors are aware that such events and developments could occur, they may downplay them, ignore them or be helpless in considering how to take them into account.

- One should not assume that rare surprises are always bad. But regardless of whether surprises are good or bad, better information and preparedness for a world with surprises make organizations more resilient.

Risk Governance Framework: Management Sphere

- Both the public and private sectors play important roles in risk management although they have different objectives and perspectives. Each has separate responsibilities, but the effective management of many systemic risks requires cohesion between them.

- They are also prone to some similar deficiencies.
  - ✓ Pressures to address near-term concerns are prevalent in both sectors.
  - ✓ The scope for action of politicians may be shaped by electoral cycles, while corporate actors are constrained by pressure from shareholders to maximize profits and short-term shareholder value.
  - ✓ Even leaders of NGOs dedicated to long-term causes may focus on short-term publicity to bolster their visibility and acquire an edge in fundraising and political influence.

- A pervasive challenge in risk management is to bring some long-term perspective to bear on risks when the pressures to focus on near-term concerns are powerful. This is heavily influenced by an **organization's risk culture**.

リスク・カルチャア

- リスク･カルチャアとは、リスクへの対処に関する組織内の一連の信念や価値観や実践を指す。

- リスク･カルチャアの主要な点は、如何に包み隠さずリスクについて話できるか、それらの情報をコミュニティの間で共有できるか、である。

（参考）

セーフティ・カルチャア

- 何にも優先して、安全に係わる全ての事項に、その重要度に相応しい注意を払う個人ならびに組織の態度、気風.（IAEA）
- Safety culture is reflection of risk awareness. (SwissRe)

Risk Culture

- Risk culture refers to a set of beliefs, values and practices within an organization regarding how to assess, address and manage risks.

- A major aspect of risk culture is how openly risks can be addressed and information about them shared among a risk community.

- *"The norms of behavior for individuals and groups within an organization that determine the collective ability to identify, understand, openly discuss, and act on the organization's current and future risks."*

  -Levy, Lamarre, & Twining 2010

Ten Metrics of Organizational Risk Culture (Banks 2012)

1. Leadership tone regarding risk
2. Governance processes relating to risk
3. Transparency on risk strategy, appetite, and exposures
4. Resources devoted to risk management
5. Technical risk skills
6. Decision making processes, timelines and success
7. Business and risk management relationship
8. Communications frequency and clarity
9. Incentive mechanisms related to risk-taking
10. Risk-related surprises

Deficits Relating To Managing Risks

Cluster B: Managing risks

Preparing and deciding on risk management strategies and policies

B2: failure to design risk management strategies that adequately balance alternatives

B3: failure to consider a reasonable range of risk management options

B4: inappropriate balancing of benefits and costs in an efficient and equitable manner

B6: Failure to anticipate, monitor and react to the outcomes of risk management decisions

B7: Inability to reconcile the time frame of the risk with those of decision-making and incentive schemes

B8: Failure to balance transparency and confidentiality

Formulating responses, resolving conflicts and deciding to act

B1: Failure of managers to respond to early signals that a risk is emerging

B11: lack of understanding of the complex nature of commons problems and of adequate management tools

B12: Inappropriate management of conflicts of interests, beliefs, values and ideologies

B13: Insufficient flexibility in the face of unexpected risk situations

Developing organizational capacities for responding and monitoring

B5: Failure to muster the necessary will and resources to implement risk management policies and decisions

B9: Failure to build or maintain an adequate organizational capacity to manage risk

B10: failure of the multiple departments or organizations responsible for a risk's management to act cohesively

リスク・ガバナンスの欠陥：リスクの管理(1)

1. リスク評価者がリスクが顕在化しつつあることを早期のシグナルから特定したとき、リスク管理者がそれに対応し行動することに失敗。（Asbestos, Sub-prime）
2. 代替策のバランスを十分にとったリスク管理戦略の設計に失敗。
3. 合理的で利用可能なあらゆるリスク管理オプションの検討に失敗。
4. コストと便益が効率的かつ公平な方法でバランスがとられていないと不適切なリスク管理となる。（EMF）
5. リスク管理の政策と決定を実施するために必要な意志と資源を集めることに失敗。
6. ネガティブな副作用のある場合のリスク管理決定の結果を予測し監視し対応することに失敗。
7. 意思決定及びインセンティブ・スキームの時間フレーム（可視的で短期的視点）とリスク問題の時間フレーム（長期的視点）を調整する能力がないこと。（Asbestos, EMF）

IRGC, 2009

Governance Deficits: Managing Risks

1. **Responding to early warnings** : failure of managers to respond and take action when risk assessors have determined from early signals that a risk is emerging
2. **Designing effective risk management strategies** : failure to design risk management strategies that adequately balance alternatives
3. **Considering a reasonable range of risk management options** : failure to consider a reasonable range of risk management options (and their negative or positive consequences) in order to meet set objectives
4. **Designing efficient and equitable risk management policies** : inappropriate risk management occurs when benefits and costs are not balanced in an efficient and equitable manner
5. **Implementing and enforcing risk management policies** : failure to muster the necessary will and resources to implement risk management policies and decisions
6. **Anticipating side-effects of risk management** : failure to anticipate, monitor and react to the outcomes of a risk management decision in the case of negative side effects
7. **Reconciling time horizons** : an inability to reconcile the time frame of the risk with the time frames of decision-making and incentive schemes

リスク・ガバナンス上の問題点：リスクの管理(2)

8. 意思決定において必要な、（利害関係者の信頼醸成につながる）透明性と（セキュリティ確保とイノベーションに対するインセンティブ維持のための）機密性、のバランスをとることに失敗。（Enron）
9. リスク管理のための十分な組織的能力を構築あるいは維持することに失敗。（Katrina, SARS in Toronto）
10. 複数の部署あるいは組織が責任をもち結束してリスク管理にあたることに失敗。（BSE, Katrina, SARS）
11. 共有地問題の複雑な性質についての理解不足、その結果として、それらの対処に求められる特定のリスク管理ツールの欠如。（CFCs, Fishery depletion）
12. 対立は交渉の余地があるかもしれないし、収拾がつかないかもしれない。リスク管理者がこの状況を見分ける能力に欠けている。（GMO in Europe）
13. 予期せぬリスク状況に直面して柔軟性に欠ける。

Governance Deficits: Managing Risks

8. **Balancing transparency and confidentiality** : failure to balance two of the necessary requirements of decision-making: transparency, which can foster stakeholder trust, and confidentiality, which can protect security and maintain incentives for innovation
9. **Organizational capacity** : failure to build or maintain an adequate organizational capacity to manage risk
10. **Dealing with dispersed responsibilities**: failure of the multiple departments or organizations responsible for a risk's management to act cohesively
11. **Dealing with commons problems and externalities** : a lack of understanding of the complex nature of commons problems and consequently also of the specific risk management tools required to address them
12. **Managing conflicts of interests and ideologies** : a conflict may be negotiable or irreconcilable, and risk managers must have the capacity to distinguish between the two
13. **Acting in the face of the unexpected** : insufficient flexibility in the face of unexpected risk situations

Deficit: Reconciling time horizons

- Business and politics are often dominated by short-term considerations. Yet risk issues have a variety of time profiles.
  - ✓ Some become apparent only after a long period of time (e.g., chronic disease after a certain latency period), some strike suddenly with various degrees of warning (natural disasters), some start slowly but may escalate rapidly in epidemic fashion (e.g., AIDS) and some are so persistent that they breed neglect due to familiarity (e.g., alcohol abuse).

- Risk managers, as they grapple with risk issues, must encourage time horizons for risk management action that are aligned with the nature of the risk and its consequences, even though those perspectives may not be natural or appealing to politicians or business leaders.

- The most spreading deficit is a tendency to ignore long-term risks and costs relative to the day to day needs that seem to be urgent.

- A related tendency is to look for simple “quick fixes” to complicated, long-term challenges that may require fundamental changes in public attitudes, behaviors and institutions (e.g., sustainability and climate change).

Deficit: Balancing transparency and confidentiality

- An excessive focus on confidentiality may reduce trust in risk management and in decision-makers by raising suspicion that the shield of confidentiality is being used as a power lever (e.g., by government and/or industry) to advance or protect particular interests without adequate justification.

- Excessive transparency may not respect the need to protect legitimate interests (e.g., the privacy interests of individual citizens).

- The general trend in public and corporate governance, however, is towards more release of data, more transparent reporting and fuller accountability, while maintaining some confidentiality under compelling circumstances.

UK Government "Principles of Managing Risks to the Public"

- The UK government has addressed the problem of balancing transparency and confidentiality by issuing "Principles of Managing Risks to the Public", which includes the promise to give an "appropriate" answer to the public in all situations:

Government will make available its assessments of risks that affect the public, how it has reached its decisions, and how it will handle the risk. […]

When information has to be kept private, or where the approach departs from existing practice, it will explain why. Where facts are uncertain or unknown, government will seek to make clear what the gaps in its knowledge are and, where relevant, what is being done to address them. It will be open about where it has made mistakes, and what it is doing to rectify them. [HM Treasury, 2005]

Illustrations of Risk Governance Deficits

- Asbestos アスベスト
  Delayed and inadequate action to deal with the health risks of asbestos is a symptom of a *failure to respond to early warnings* and of the difficult challenge of *reconciling time horizons* when the costs of damages (compensation) will only be payable in the far-off future;
- Bovine Spongiform Encephalopathy (BSE, or "mad cow disease") 牛海綿状脳症
  The UK governmental assurances that British beef was safe to eat seriously downplayed the scientific uncertainties regarding transmissibility of BSE to humans. This *intentional misrepresentation of knowledge* resulted partly from conflicting risk policy objectives, as well as *dispersed responsibility between organizations;*
- Chlorofluorocarbons (CFCs) クロロフルオロカーボン
  The degrading effects of CFCs on stratospheric ozone were not observed until more than forty years after their widespread use began. This is an example of a *failure to anticipate side-effects*. However, the Montreal Protocol is a good example of a successful institutional and industrial solution to a risk: a model of reference for *how to deal with commons problems and externalities;*

- Electromagnetic fields (EMF) 電磁界
  Factual knowledge about risks is, in the case of EMF, not straightforward. Scientific uncertainties regarding potential health risks create difficulties for risk governance and make *stakeholder involvement, designing efficient and equitable risk management policies*, and *reconciling time horizons* complicated questions to address;
- The collapse of Enron エンロン破綻
  Enron's incredibly complex and opaque accounting and auditing practices contributed to the severity and surprise of its collapse and constitute an example of an inadequate *balancing between transparency [openness] and confidentiality* in corporate risk governance;
- Fisheries depletion 漁場枯渇
  Fisheries, as services provided by ecosystems, are common property resources. Their depletion indicates failures of risk governance in *dealing with a commons problem* and, in some cases, also failures related to *recognizing fundamental and rapid changes in risk systems* and/or *designing effective risk management strategies;*
- Genetically modified crops in Europe 欧州における遺伝子組み換え作物
  The difficulty of *acknowledging different perceptions of risk* (and the values and interests underlying them) led European governments to adopt regulations that potentially refrain innovation and international trade and fail to deal with *conflicts of interests and ideologies;*

- Hurricane Katrina ハリケーン・カトリーナ
  The inadequate response to the hurricane's devastation and the crisis generated within the US Administration were largely a result of failures of *organizational capacity*, problems with *dispersed responsibilities* and difficulties in *acting in the face of the unexpected;*
- Nuclear power generation and management of nuclear waste 原子力発電所と放射性廃棄物管理
  Governance experience in this domain has demonstrated how important *acknowledging different perceptions of risk* can be, but also how this must be balanced with consideration of *issues of cost-efficiency and equity;*
- The sub-prime crisis サブプライム危機
  This crisis demonstrated how difficult it can be to *act upon early warning signals, to understand the dynamics of complex systems* (including scale, scope and properties), and how *the use of mathematical models* has limitations.
- The Toronto case of Severe Acute Respiratory Syndrome (SARS) 重症急性呼吸器症候群 トロントの事例
  This outbreak of SARS in Toronto revealed weak *organizational capacity*, disorganization stemming largely from *dispersed responsibilities* between responders, and showed how problems can be multiplied if there is a lack of key *stakeholder involvement*.