Mitigation and Adaptation Studies

Class 7: Wicked Problems

Contents:

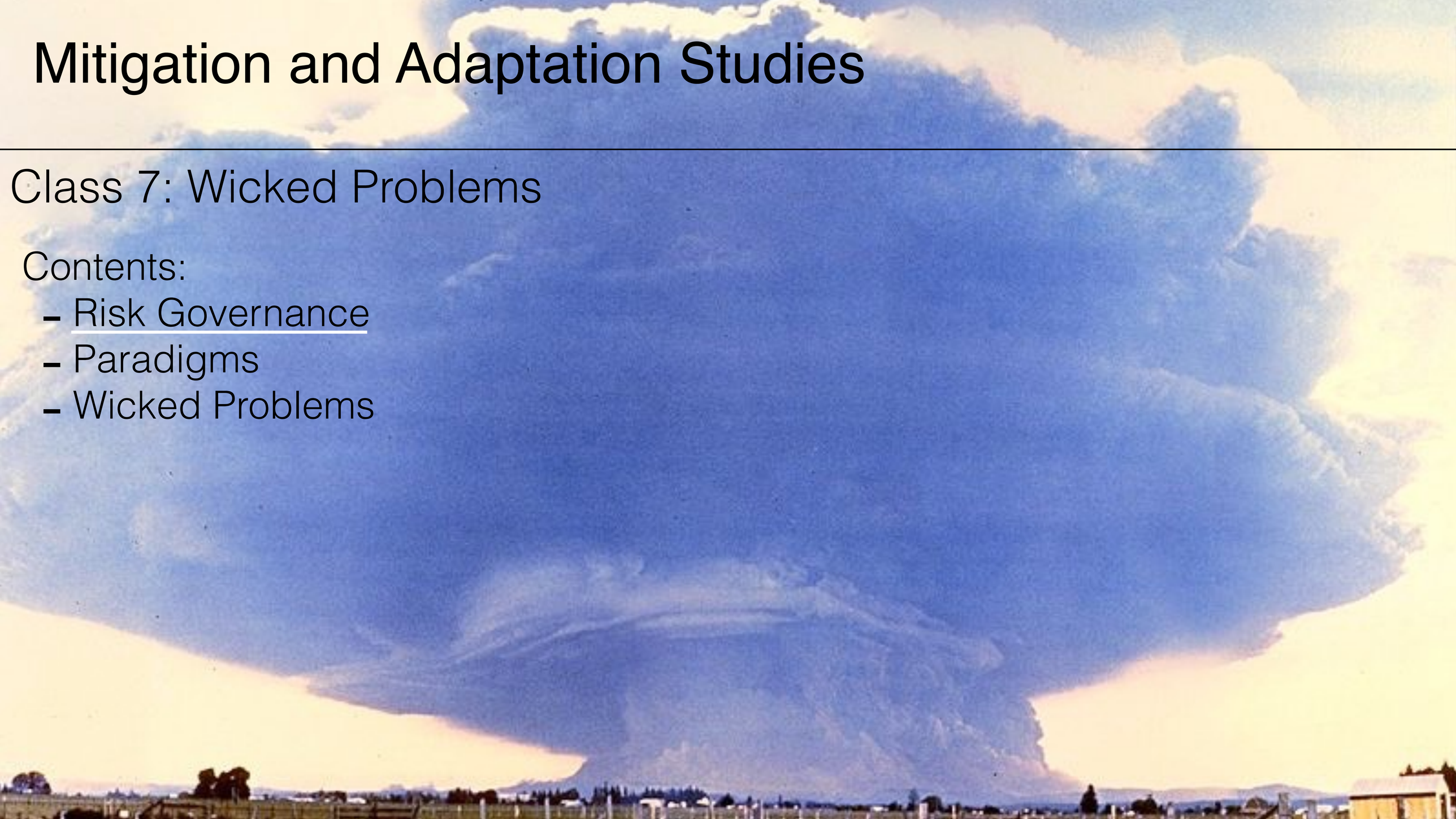
- Risk Governance
- Paradigms
- Wicked Problems

Mitigation and Adaptation Studies

Class 7: Wicked Problems

Contents:

- Risk Governance
- Paradigms
- Wicked Problems



Risk Governance

Societal goal: disaster **risk** reduction or **governance**

Risk Governance

Societal goal: disaster **risk** reduction or **governance**

- Reducing disasters caused by hazards is a goal and a necessity to improve sustainability of human communities.
- Disaster Risk Governance (DRG) requires a thorough understanding of:
  - the hazards that can occur,
  - the probability of them occurring, and
  - the processes that can lead to disastrous impacts on human and non-human communities.

Risk Governance

Societal goal: disaster **risk** reduction or **governance**

- Reducing disasters caused by hazards is a goal and a necessity to improve sustainability of human communities.
- Disaster Risk Governance (DRG) requires a thorough understanding of:
  - the hazards that can occur,
  - the probability of them occurring, and
  - the processes that can lead to disastrous impacts on human and non-human communities.

Natural or anthropogenic?

Risk Governance

Societal goal: disaster **risk** reduction or **governance**

- Reducing disasters caused by hazards is a goal and a necessity to improve sustainability of human communities.
- Disaster Risk Governance (DRG) requires a thorough understanding of:
  - the hazards that can occur,
  - the probability of them occurring, and
  - the processes that can lead to disastrous impacts on human and non-human communities.

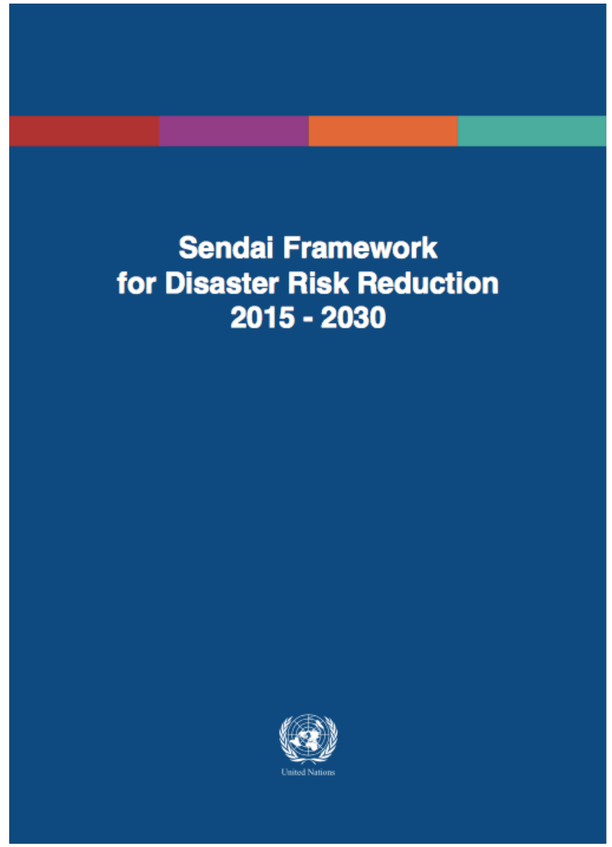
Natural or anthropogenic?

- The distinction between natural and anthropogenic hazards, risks, and disaster is somewhat arbitrary.
- It would work if humans were in a spaceship and Earth was free of humans.
- Humanity is:
  - an integral part of the Earth's life-support system (ELSS)
  - is modifying the ELSS at a very significant level leads
- Many hazards that seem to be "natural" but are actually to some extent caused or amplified by humans.

Risk Governance

Societal goal: disaster **risk** reduction or **governance**

- Reducing disasters caused by hazards is a goal and a necessity to improve sustainability of human communities.
- Disaster Risk Governance (DRG) requires a thorough understanding of:
  - the hazards that can occur,
  - the probability of them occurring, and
  - the processes that can lead to disastrous impacts on human and non-human communities.



Natural or anthropogenic?

- The distinction between natural and anthropogenic hazards, risks, and disaster is somewhat arbitrary.
- It would work if humans were in a spaceship and Earth was free of humans.
- Humanity is:
  - an integral part of the Earth's life-support system (ELSS)
  - is modifying the ELSS at a very significant level leads
- Many hazards that seem to be "natural" but are actually to some extent caused or amplified by humans.

Risk Governance

UNISDR
The United Nations Office for Disaster Risk Reduction

www.preventionweb.net/go/sfdrr
www.unisdr.org
isdr@un.org

Chart of the Sendai Framework for Disaster Risk Reduction
2015-2030

Scope and purpose

The present framework will apply to the risk of small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters, caused by natural or manmade hazards as well as related environmental, technological and biological hazards and risks. It aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors.

Expected outcome

The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries

Goal

Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience

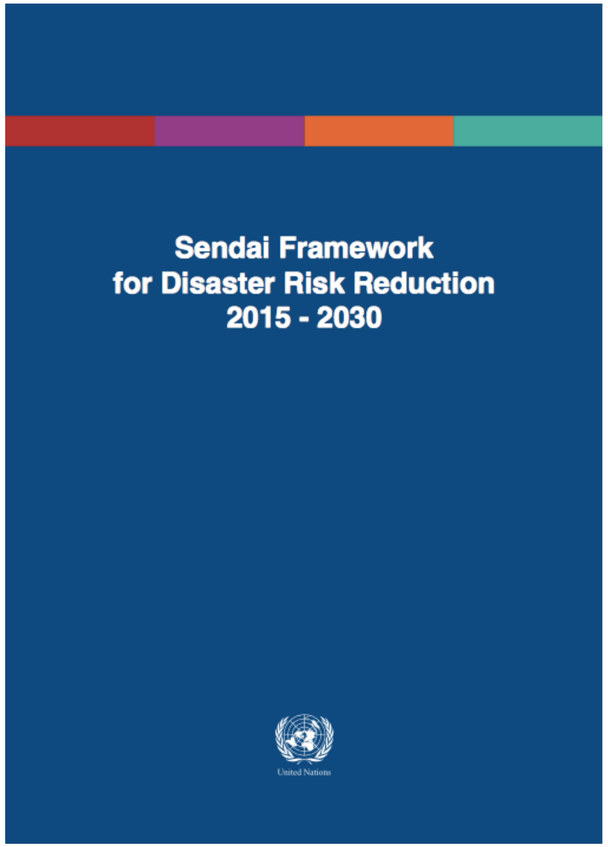
Targets

Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020-2030 compared to 2005-2015	Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020-2030 compared to 2005-2015	Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030	Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030	Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020	Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of this framework by 2030	Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030

Priorities for Action

11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnera situations

Priority 1	Priority 2	Priority 3	Priority 4
Understanding disaster risk	Strengthening disaster risk governance to manage disaster risk	Investing in disaster risk reduction for resilience	Enhancing disaster preparedness for effective response, and to «Build Back Better» in recovery, rehabilitation and reconstruction



Risk Governance

Risk Governance

SDG 11: Sustainable Cities and Communities

11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations

Risk Governance

Definition:
Risk is the potential for consequences where something of value is at stake and where the outcome is uncertain”

Risk Governance

Definition:
Risk is the potential for consequences where something of value is at stake and where the outcome is uncertain”

Risk assessments can lead to decisions to mitigate or adapt in order to reduce risk.

Risk Governance

Definition:
Risk is the potential for consequences where something of value is at stake and where the outcome is uncertain”

Risk assessments can lead to decisions to mitigate or adapt in order to reduce risk.

How can Risk be measured?

Risk Governance

Definition:
Risk is the potential for consequences where something of value is at stake and where the outcome is uncertain”

Risk assessments can lead to decisions to mitigate or adapt in order to reduce risk.

How can Risk be measured?

Insurance:
Risk (in $) = Hazard Probability * Vulnerability * Exposed Assets

Risk Governance

Definition:
Risk is the potential for consequences where something of value is at stake and where the outcome is uncertain”

Risk assessments can lead to decisions to mitigate or adapt in order to reduce risk.

How can Risk be measured?

Insurance:
Risk (in $) = Hazard Probability * Vulnerability * Exposed Assets

Engineering:
Risk = Event rate * vulnerability * consequences

Risk Governance

Definition:
Risk is the potential for consequences where something of value is at stake and where the outcome is uncertain”

Risk assessments can lead to decisions to mitigate or adapt in order to reduce risk.

How can Risk be measured?

Insurance:
Risk (in $) = Hazard Probability * Vulnerability * Exposed Assets

Engineering:
Risk = Event rate * vulnerability * consequences

Exposure:
- infrastructure
- services
- people
- ecosystems
- species

Risk Governance

Definition:
Risk is the potential for consequences where something of value is at stake and where the outcome is uncertain”

Risk assessments can lead to decisions to mitigate or adapt in order to reduce risk.

How can Risk be measured?

Insurance:
Risk (in $) = Hazard Probability * Vulnerability * Exposed Assets

Engineering:
Risk = Event rate * vulnerability * consequences

Risk Governance

Definition:
Risk is the potential for consequences where something of value is at stake and where the outcome is uncertain”

Risk assessments can lead to decisions to mitigate or adapt in order to reduce risk.

How can Risk be measured?

Insurance:
Risk (in $) = Hazard Probability * Vulnerability * Exposed Assets

Engineering:
Risk = Event rate * vulnerability * consequences

Hazard:
- natural or anthropogenic?
- probability density function

Vulnerability:
- system property
- independent of hazard occurrence

Exposure:
- infrastructure
- services
- people
- ecosystems
- species

Definition:

A hazard is a change of the system state that can lead to system degradation and/or a reduction of the system's capability to function.

Definition:

A hazard is a change of the system state that can lead to system degradation and/or a reduction of the system's capability to function.

A hazard can impact the sustainability of the system.

Definition:
A hazard is a change of the system state that can lead to system degradation and/or a reduction of the system's capability to function.

A hazard can impact the sustainability of the system.

A hazard can be:
- a short event (e.g., an earthquake),
- a longer process (e.g., extinction), or
- a slow trend (e.g., sea level rise, climate change).

Different origins for hazards

We distinguish:

- extraterrestrial hazards: asteroids, bolides, radiation events, and solar storms
- geo(logical) hazards: those that arise mainly from processes in the solid earth;
- hydro-meteorological hazards: those that are associated with processes in the coupled hydrosphere-atmosphere system;
- biological hazards: pandemics, rodents, insects, algal-blooms, extinction;
- chemical hazards: changes in major flows of the ELSS leading to changes in the composition of atmosphere, ocean, soil, water (including pollution, acid rain, ocean acidification, change of greenhouse gases);
- technological hazards: accidents, mal-function, AI, nano-technology;
- social hazards: involuntary migration, unrest, racism, genocide, wars, imperialism, failed governance
- economic hazards: depressions, bubbles, speculations, peak-oil, etc.

Definition:

Vulnerability is the (systemic) inability of a system to withstand the effects of a hostile environment.

Definition:

Vulnerability is the (systemic) inability of a system to withstand the effects of a hostile environment.

Infrastructure: e.g., shaking, water damage, fire, aging, …
Services: e.g., operational, management, access to resources, …
Individuals: e.g., sickness, injuries, economy, …
Communities: e.g., lack of social capital, economic instabilities, …

Definition:

Vulnerability is the (systemic) inability of a system to withstand the effects of a hostile environment.

Infrastructure: e.g., shaking, water damage, fire, aging, …
Services: e.g., operational, management, access to resources, …
Individuals: e.g., sickness, injuries, economy, …
Communities: e.g., lack of social capital, economic instabilities, …

Social vulnerability:

- the extent to which a community could be affected by stress, change or a hazard.
- depends on the individual and community levels of access to resources to prepare for, cope with and recover from disasters.
- a large number of factors may contribute to social vulnerability including, but not limited to, gender, race, socioeconomic status, age, language, and access to information.

Definition:

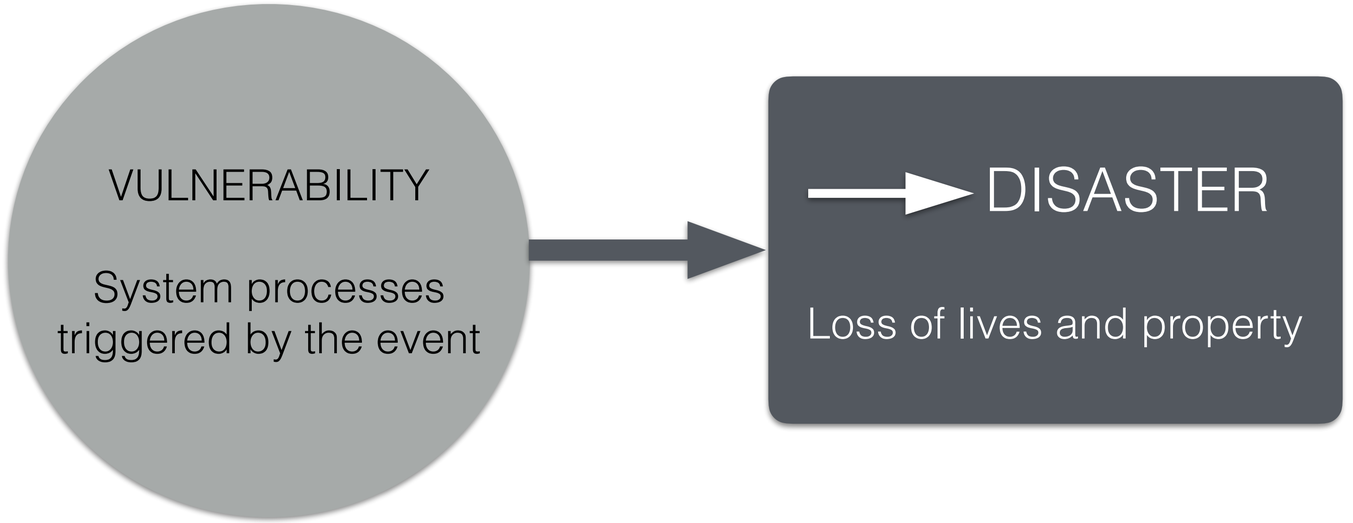
A disaster is the loss of lives and property; often as the result of a hazardous event.

Definition:

A disaster is the loss of lives and property; often as the result of a hazardous event.

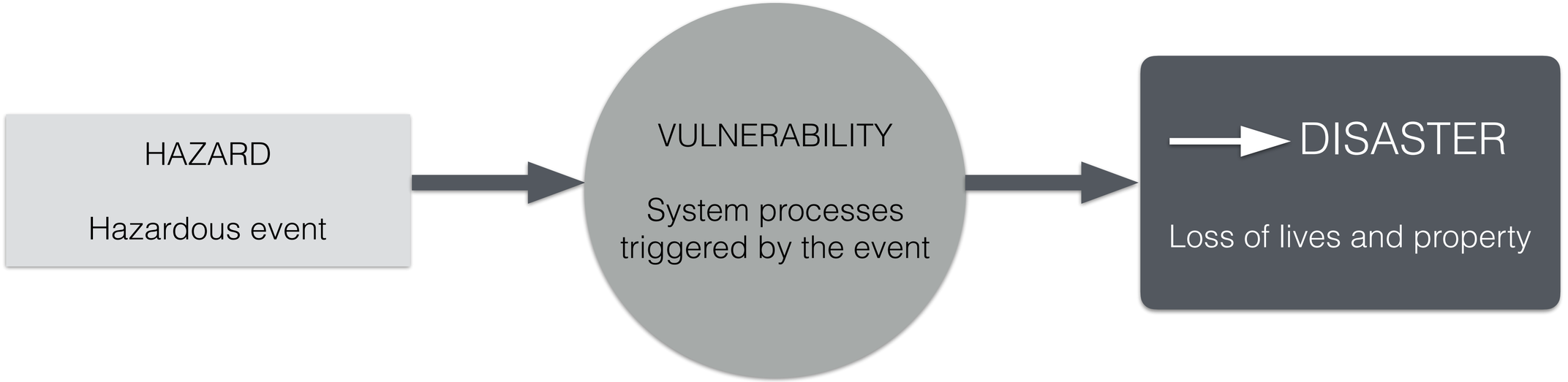
Definition:

A disaster is the loss of lives and property; often as the result of a hazardous event.



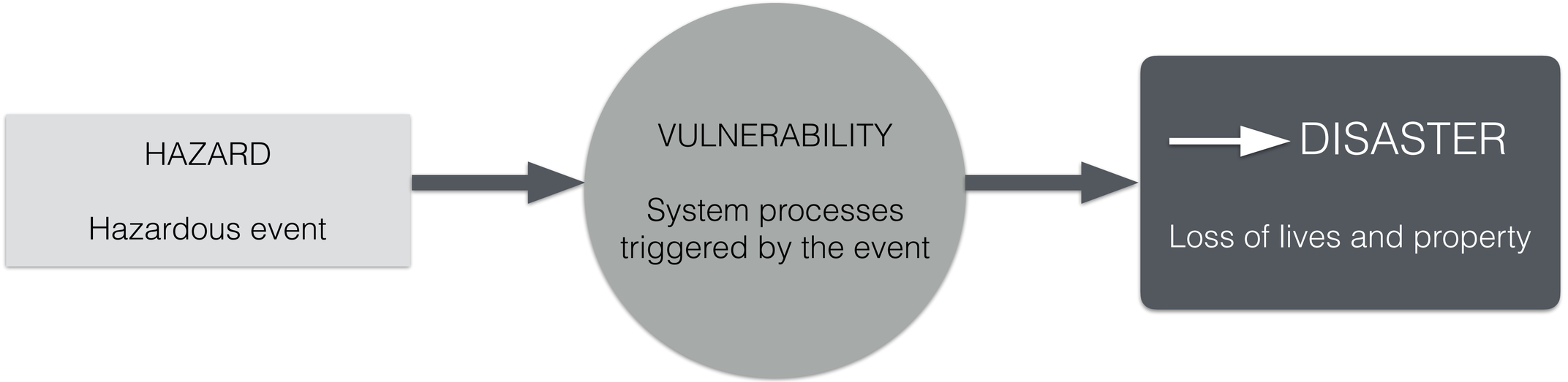
Definition:

A disaster is the loss of lives and property; often as the result of a hazardous event.



Definition:

A disaster is the loss of lives and property; often as the result of a hazardous event.



Concerning the extent of disaster, we follow Plag et al. (2015) and classify large event as:

- **Extinction Level Events** are so devastating that more than a quarter of all life on Earth is killed and major species extinction takes place.
- **Global Catastrophes** are events in which more than a quarter of the world's human population dies and that place civilisation at serious risk.
- **Global Disasters** are global scale events in which a few percent of the population dies.
- **Major Disasters** are those exceeding $100 billion in damage and/or causing more than 10,000 fatalities.

Risk Governance

Key Points:

- Risk is a useful concept that utilizes the “Probability Density Function” (PDF) of a hazard.
- Hazards and disasters are linked through system processes.
- Human decisions are informed by (disaster) risk assessments.
- Disaster Risk Governance aims to balance risks and benefits.
- Risk perception and awareness are social constructs.
- Media play an important role in shaping the social construct of risk.

Risk Governance

Key Points:

- Risk is a useful concept that utilizes the “Probability Density Function” (PDF) of a hazard.
- Hazards and disasters are linked through system processes.
- Human decisions are informed by (disaster) risk assessments.
- Disaster Risk Governance aims to balance risks and benefits.
- Risk perception and awareness are social constructs.
- Media play an important role in shaping the social construct of risk.

Measuring risk:

Risk (in $) = Hazard Probability * Vulnerability * Exposed Assets

Risk Governance

Key Points:

- Risk is a useful concept that utilizes the “Probability Density Function” (PDF) of a hazard.
- Hazards and disasters are linked through system processes.
- Human decisions are informed by (disaster) risk assessments.
- Disaster Risk Governance aims to balance risks and benefits.
- Risk perception and awareness are social constructs.
- Media play an important role in shaping the social construct of risk.

Measuring risk:

Risk (in $) = Hazard Probability * Vulnerability * Exposed Assets

Exposure:
- land use planning can reduce exposure

Risk Governance

Key Points:

- Risk is a useful concept that utilizes the “Probability Density Function” (PDF) of a hazard.
- Hazards and disasters are linked through system processes.
- Human decisions are informed by (disaster) risk assessments.
- Disaster Risk Governance aims to balance risks and benefits.
- Risk perception and awareness are social constructs.
- Media play an important role in shaping the social construct of risk.

Measuring risk:

Risk (in $) = Hazard Probability * Vulnerability * Exposed Assets

Vulnerability:
- for most systems, vulnerability can be reduced occurrence

Exposure:
- land use planning can reduce exposure

Risk Governance

Key Points:

- Risk is a useful concept that utilizes the “Probability Density Function” (PDF) of a hazard.
- Hazards and disasters are linked through system processes.
- Human decisions are informed by (disaster) risk assessments.
- Disaster Risk Governance aims to balance risks and benefits.
- Risk perception and awareness are social constructs.
- Media play an important role in shaping the social construct of risk.

Measuring risk:

Risk (in $) = Hazard Probability * Vulnerability * Exposed Assets

Hazard:
- natural hazards are difficult to mitigate

Vulnerability:
- for most systems, vulnerability can be reduced occurrence

Exposure:
- land use planning can reduce exposure

Probability Density Function

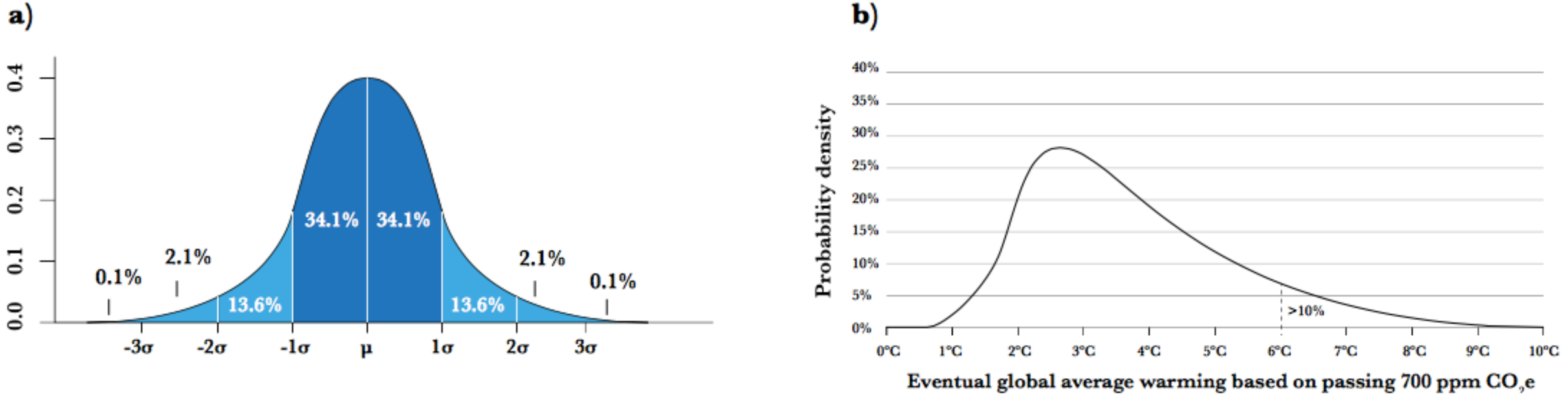
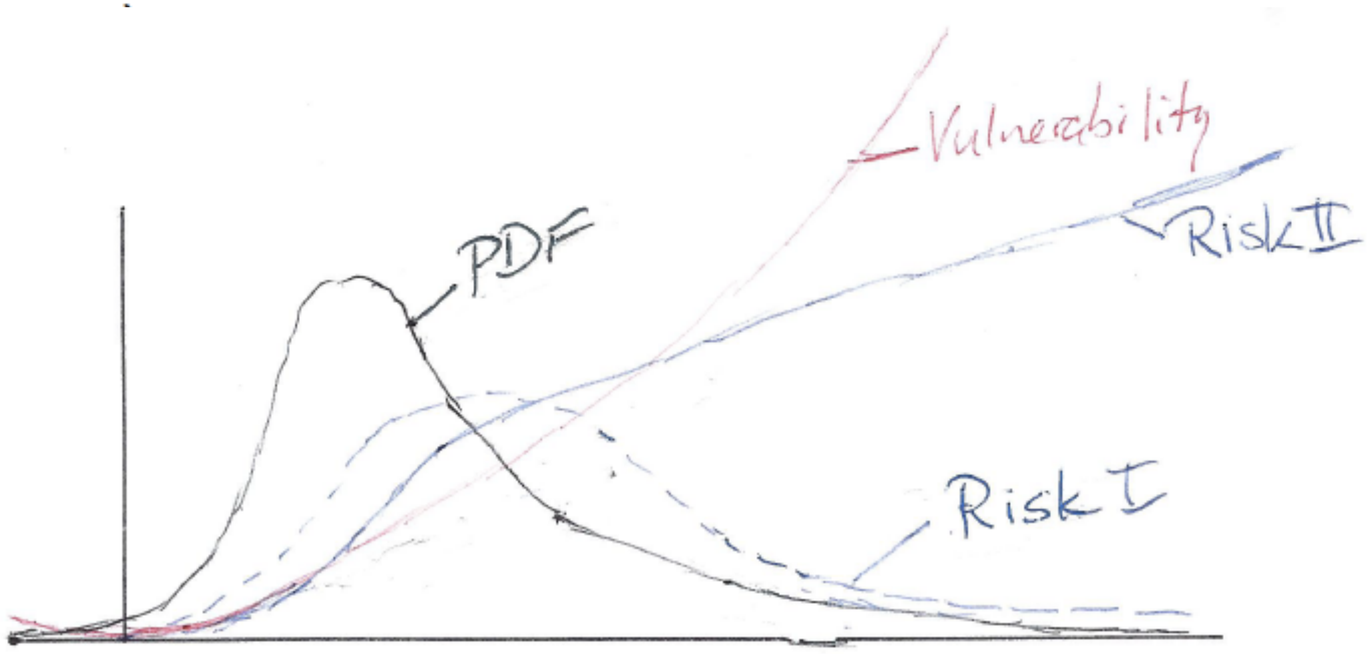
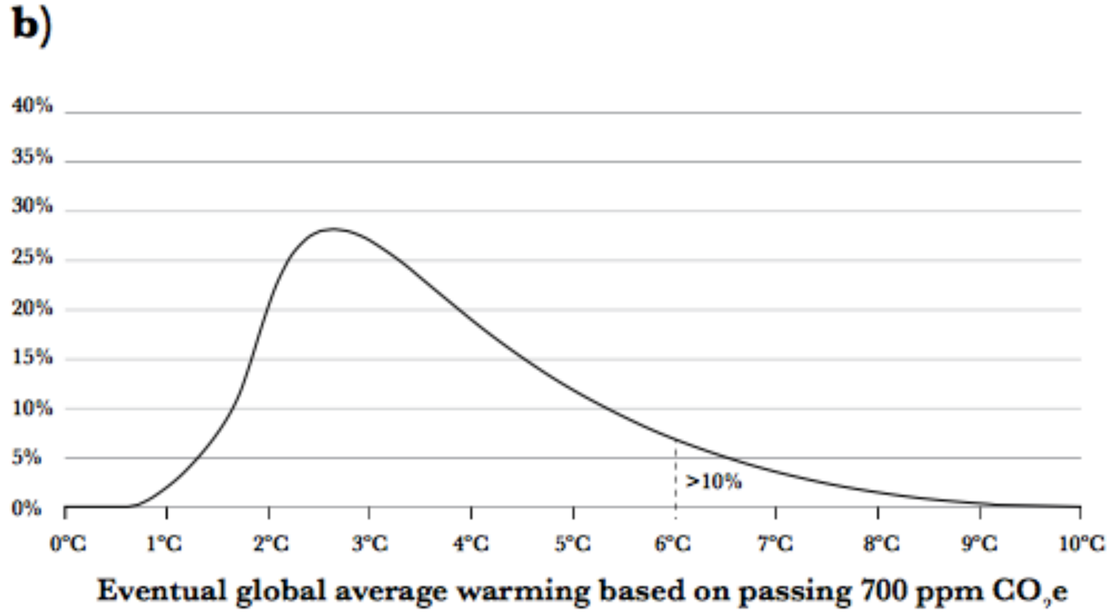


Figure 1: Normal and "fat tail" probability distributions. (a) Normal probability distribution, and (b) an estimate of the likelihood of warming due to a doubling of greenhouse gas concentrations exhibiting a "fat tail" distribution (Credit: Wagner & Weitzman 2015, *Climate Shock: The Economic Consequences of a Hotter Planet).*

Risk Governance

Probability Density Function

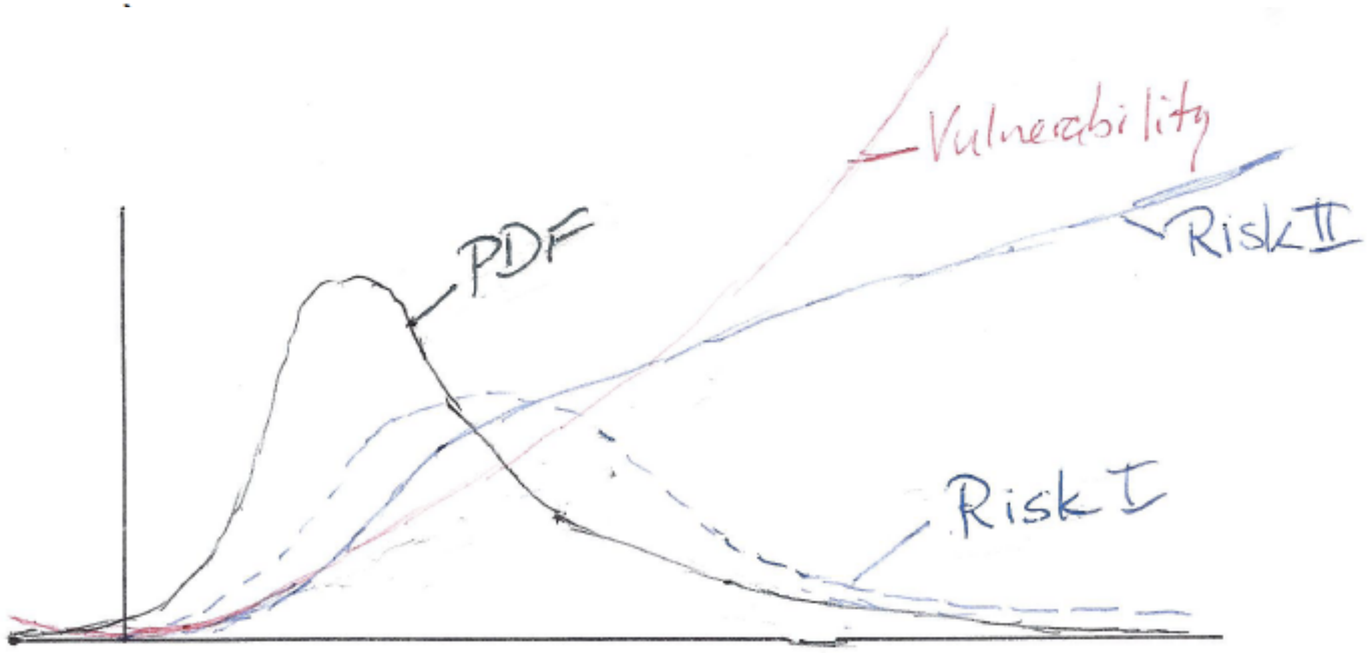


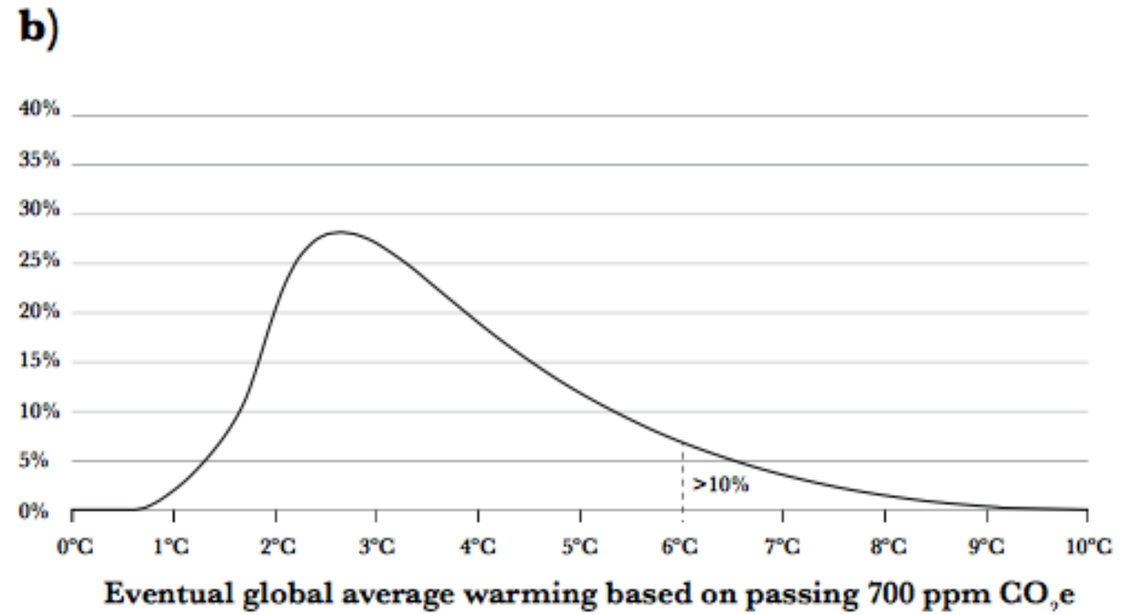


ution, and (b) an estimate of the likelihood of warming due to a doubling
r & Weitzman 2015, *Climate Shock: The Economic Consequences of a Hotter Planet).*

Risk Governance

Probability Density Function





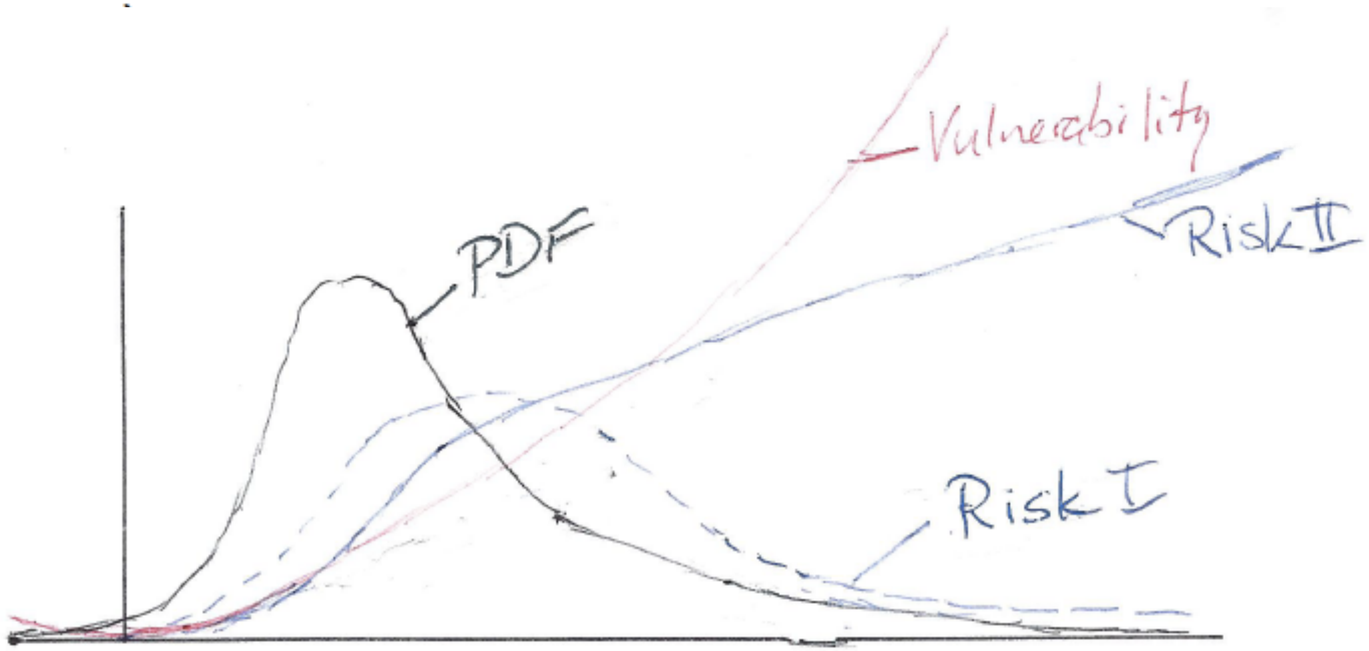
ution, and (b) an estimate of the likelihood of warming due to a doubling
r & Weitzman 2015, *Climate Shock: The Economic Consequences of a Hotter Planet).*

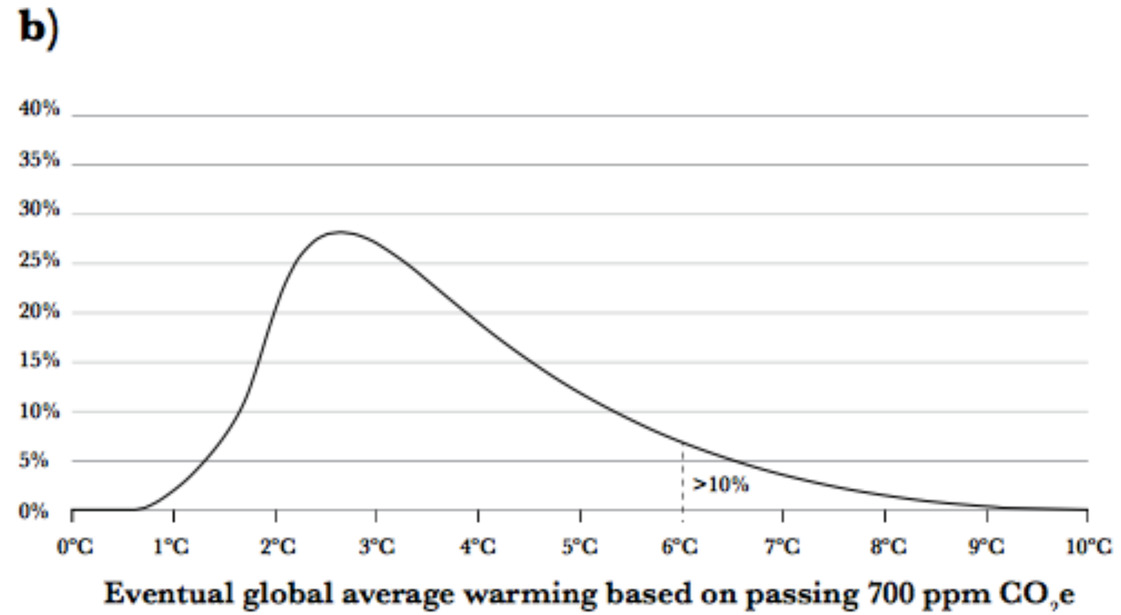
THINKING THE UNTHINKABLE

Successful risk governance requires thinking “outside the box” to avoid a failure of imagination, but this is a skill rarely found at the senior levels of government and global corporations. Spratt and Dunlop (2018)

Risk Governance

Probability Density Function





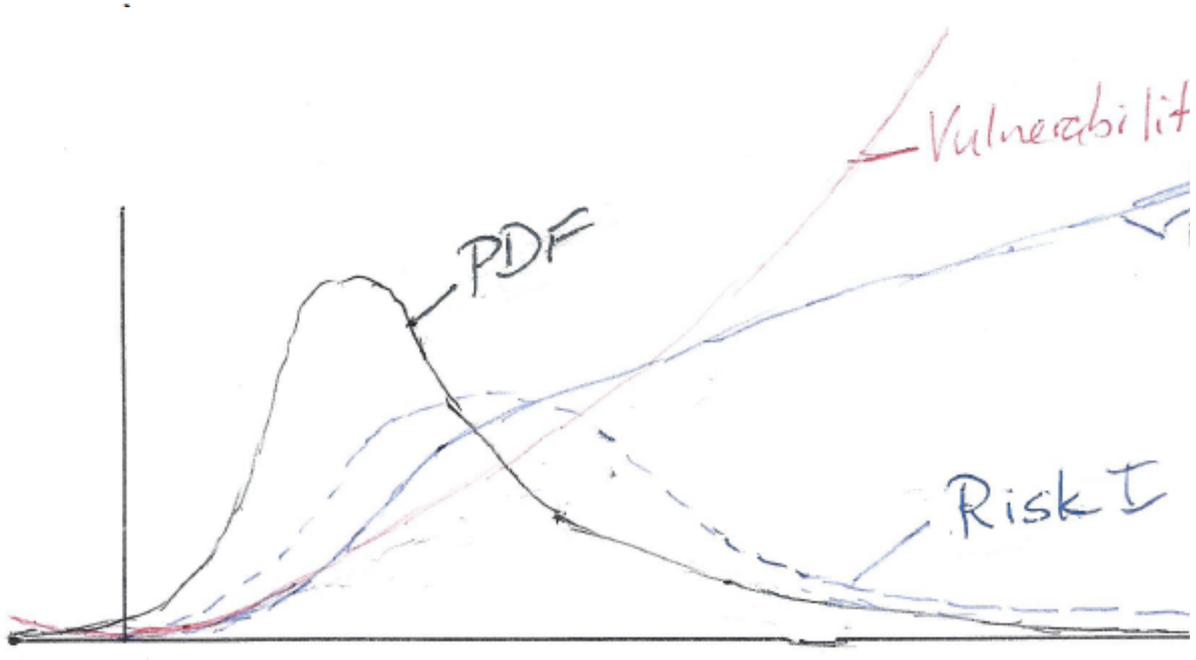
ution, and (b) an estimate of the likelihood of warming due to a doubling
r & Weitzman 2015, *Climate Shock: The Economic Consequences of a Hotter Planet).*

THINKING THE UNTHINKABLE

Successful risk governance requires thinking “outside the box” to avoid a failure of imagination, but this is a skill rarely found at the senior levels of government and global corporations. Spratt and Dunlop (2018)

THE UNDERESTIMATION OF RISK

Probability Density Function



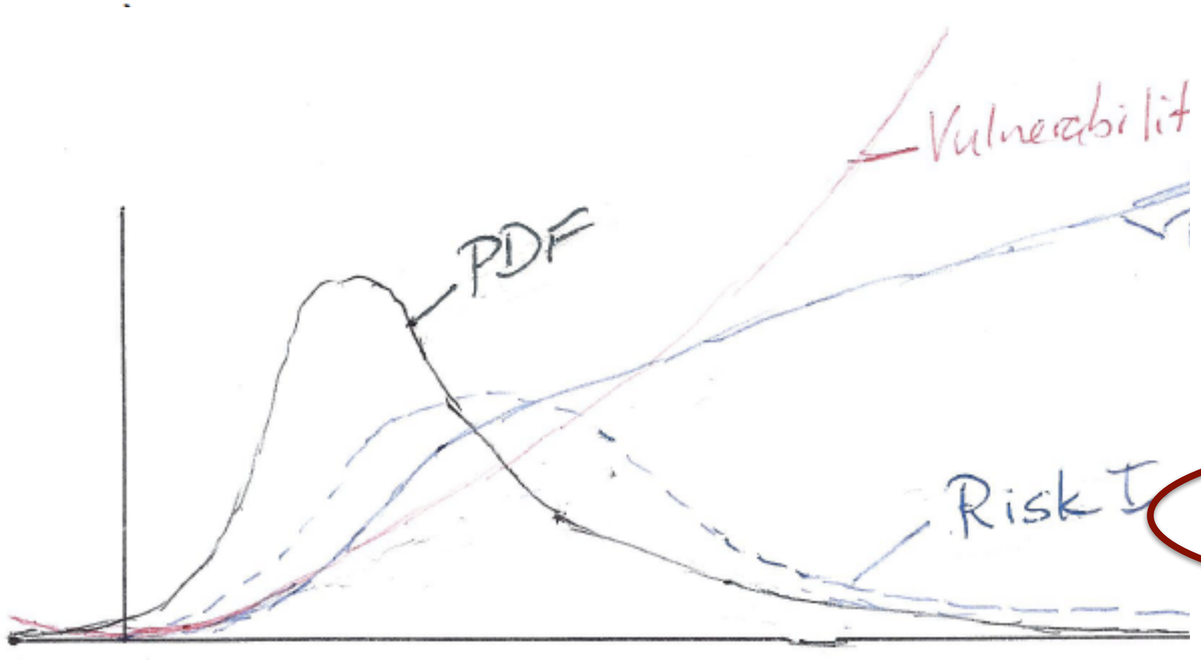
THINKING THE UNTHINKABLE
Successful risk governance requires thinki
imagination, but this is a skill rarely found a
corporations. Spratt and Dunlop (2018)

THE UNDERESTIMATION OF RISK

"When all the new knowledge that challenges the old is on the more worrying side, one worries about whether the asymmetry reflects some systematic bias… I have come to wonder whether the reason why most of the new knowledge confirms the established science or changes it for the worse is scholarly reticence."

Prof. Ross Garnaut, 2011

Probability Density Function



THINKING THE UNTHINKABLE
Successful risk governance requires thinki
imagination, but this is a skill rarely found a
corporations. Spratt and Dunlop (2018)

THE UNDERESTIMATION OF RISK

"When all the new knowledge that challenges the old is on the more worrying side, one worries about whether the asymmetry reflects some systematic bias… I have come to wonder whether the reason why most of the new knowledge confirms the established science or changes it for the worse is scholarly reticence."

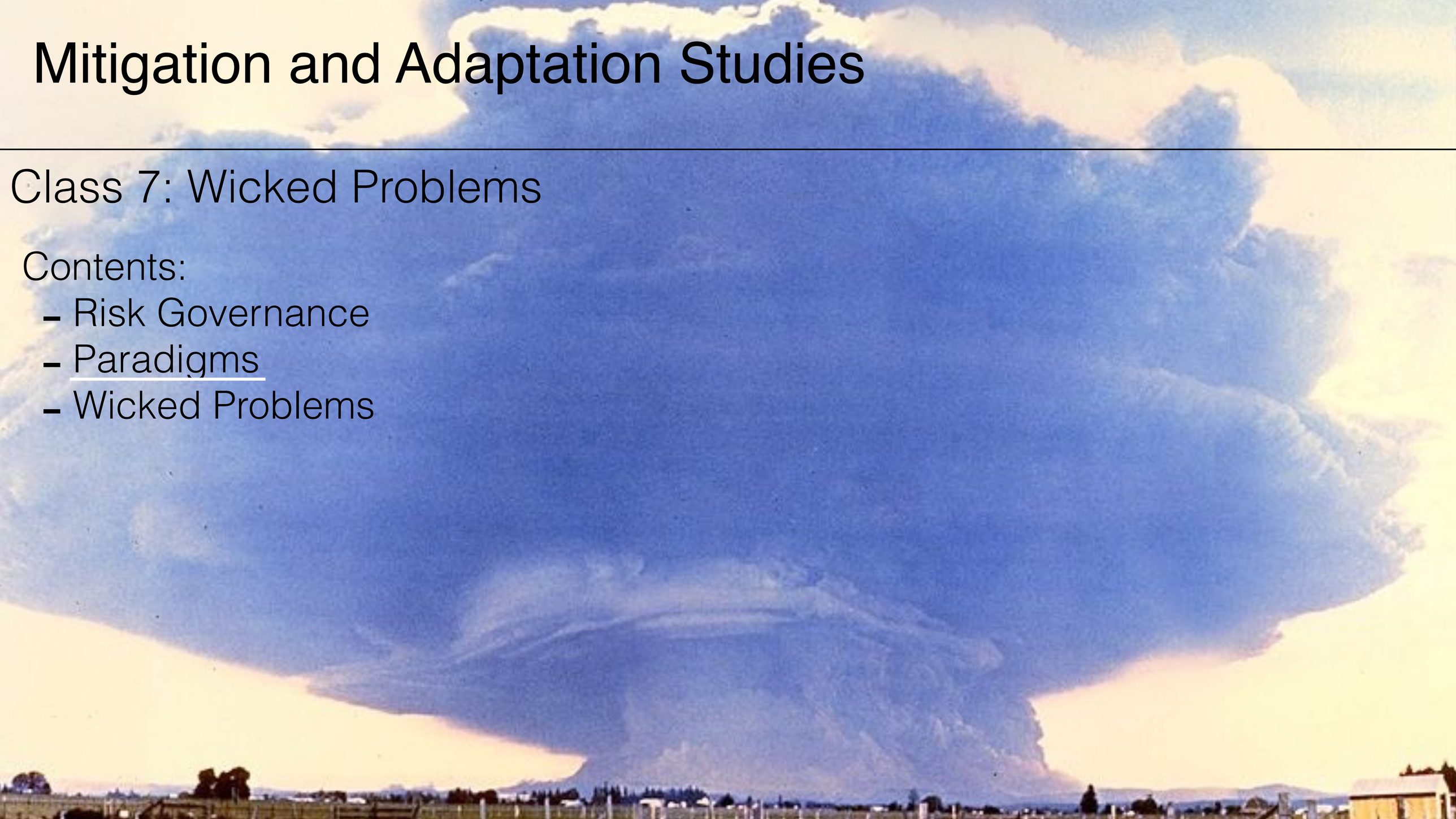
Prof. Ross Garnaut, 2011

Mitigation and Adaptation Studies

Class 7: Wicked Problems

Contents:

- Risk Governance
- Paradigms
- Wicked Problems



Paradigms

Paradigm:

- an inherited thought or idea;
- a cognitive framework shared by members of any discipline or group;
- a framework containing the basic assumptions, ways of thinking, and methodology that are commonly accepted by members of a (scientific) community.

Paradigms

Paradigm:

- an inherited thought or idea;
- a cognitive framework shared by members of any discipline or group;
- a framework containing the basic assumptions, ways of thinking, and methodology that are commonly accepted by members of a (scientific) community.

Paradigm shift:

- a fundamental change in the basic concepts and experimental practices of a scientific discipline (Kuhn, 1962);
- a fundamental change in the cognitive framework of a community;

Paradigms

Paradigm:

- an inherited thought or idea;
- a cognitive framework shared by members of any discipline or group;
- a framework containing the basic assumptions, ways of thinking, and methodology that are commonly accepted by members of a (scientific) community.

Paradigm shift:

- a fundamental change in the basic concepts and experimental practices of a scientific discipline (Kuhn, 1962);
- a fundamental change in the cognitive framework of a community;

Paradigm shifts:

- are the result of discrepancies between the scientific or cognitive framework and empirical evidence;
- can lead to adaptation.

Paradigms

Paradigm:

- an inherited thought or idea;
- a cognitive framework shared by members of any discipline or group;
- a framework containing the basic assumptions, ways of thinking, and methodology that are commonly accepted by members of a (scientific) community.

Paradigm shift:

- a fundamental change in the basic concepts and experimental practices of a scientific discipline (Kuhn, 1962);
- a fundamental change in the cognitive framework of a community;

Paradigm shifts:

- are the result of discrepancies between the scientific or cognitive framework and empirical evidence;
- can lead to adaptation.

Example Sea Level:

Current paradigm: sea level is stable, changes slowly in a linear mode; coast lines do not move horizontally (very much).

Empirical evidence: sea level rise is accelerating; there is a potential for rapid, non-linear sea level rise; coast lines may move rapidly

Mitigation and Adaptation Studies

Class 7: Wicked Problems

Contents:

- Risk Governance
- Paradigms
- Wicked Problems

Wicked Problems

A way to look at problems: Three types:

- Tame,
- Complex, and
- Wicked.

Wicked Problems

A way to look at problems: Three types:

- Tame,
- Complex, and
- Wicked.

The boundary between complex and wicked is not well defined.

Wicked Problems

A way to look at problems: Three types:

- Tame,
- Complex, and
- Wicked.

The boundary between complex and wicked is not well defined.

A Tame Problem:

- is well defined, a solution exist;
- can be solved in a linear fashion using straightforward, reductionist, repeatable, sequential techniques;
- is amenable to traditional project management approaches and introduces limited/known/manageable consequences and no unintended consequences.

Wicked Problems

A way to look at problems: Three types:

- Tame,
- Complex, and
- Wicked.

Wicked Problems

A way to look at problems: Three types:

- Tame,
- Complex, and
- Wicked.

A Complex Problem:

- tends to be non-linear, difficult to understand, but;
- the characteristics of the problem are mostly well understood;
- its solution can lead to other problems and unintended consequences;
- is not solvable by reductionist or sequential approaches;
- traditional analytic and project management techniques will fail.

Wicked Problems

A way to look at problems: Three types:

- Tame,
- Complex, and
- Wicked.

Wicked Problems

A way to look at problems: Three types:

- Tame,
- Complex, and
- Wicked.

A Wicked Problem: a problem that is difficult or impossible to solve because of

- incomplete or contradictory knowledge,
- a large the number of people and opinions involved,
- a large economic burden associated with solutions, and
- the interconnected nature of this problem with other problems.

Wicked Problems

A way to look at problems: Three types:

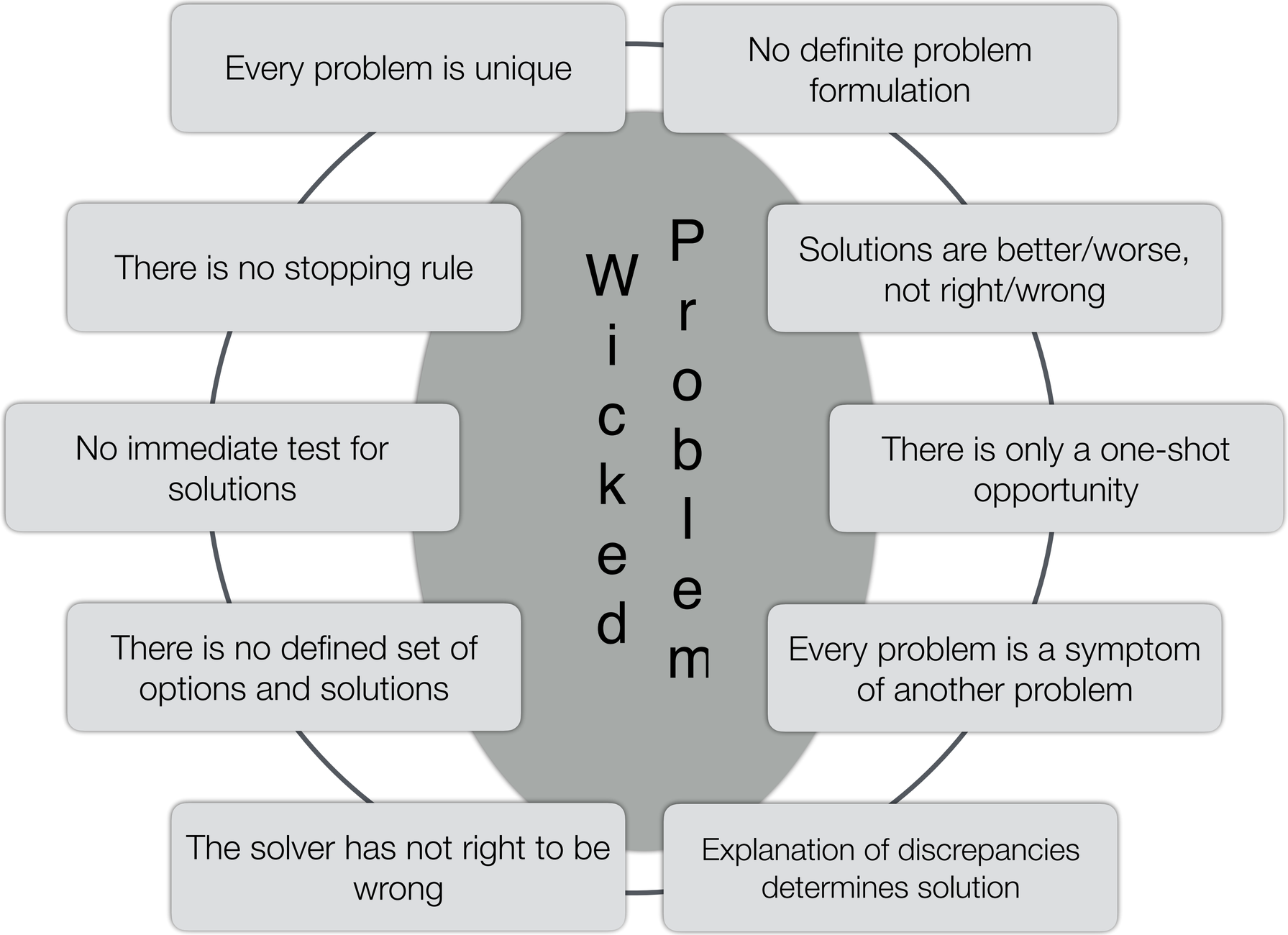
- Tame,
- Complex, and
- Wicked.

A Wicked Problem: a problem that is difficult or impossible to solve because of

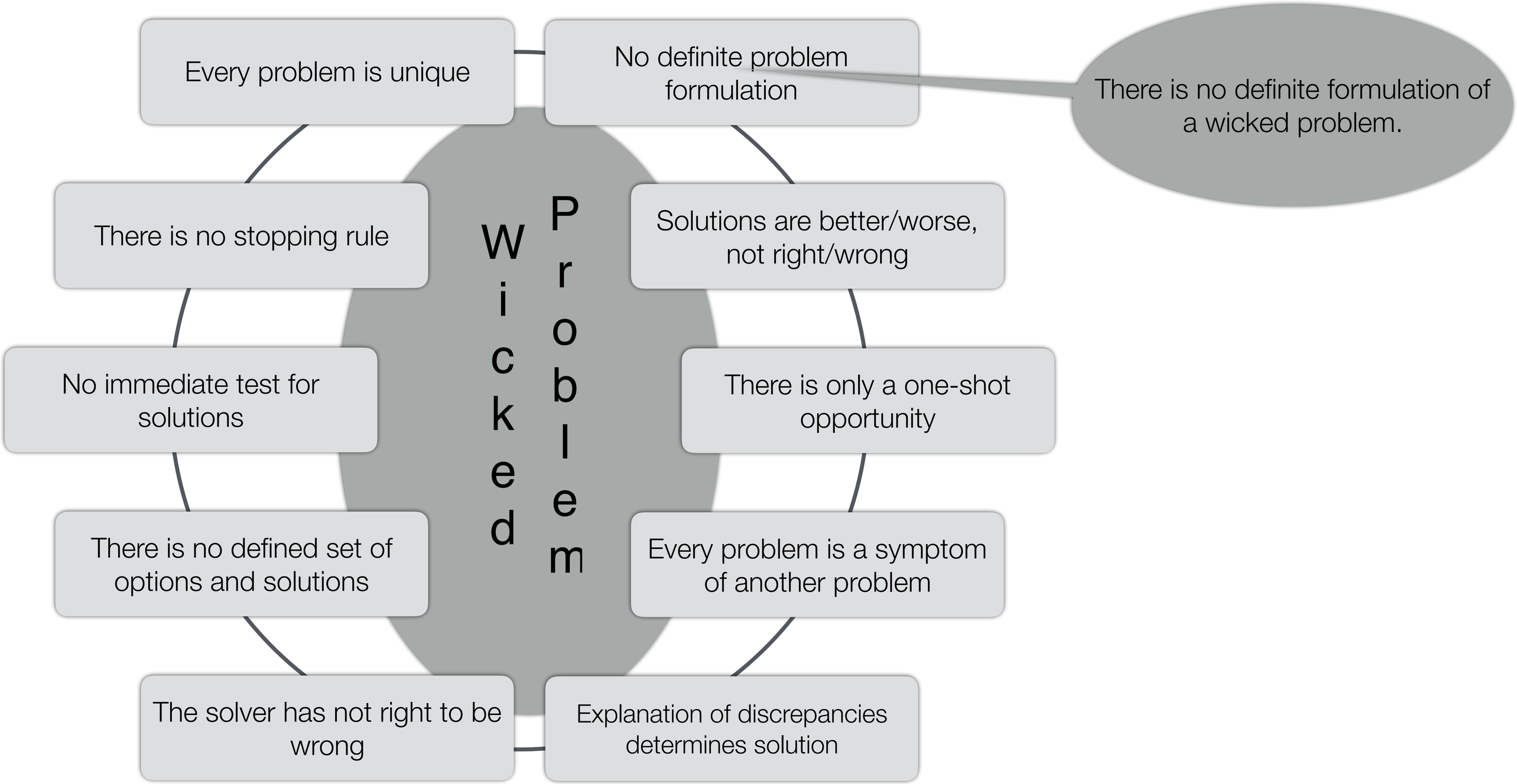
- incomplete or contradictory knowledge,
- a large the number of people and opinions involved,
- a large economic burden associated with solutions, and
- the interconnected nature of this problem with other problems.

Introduced by Rittel and Webber (1973) focusing on social planning.

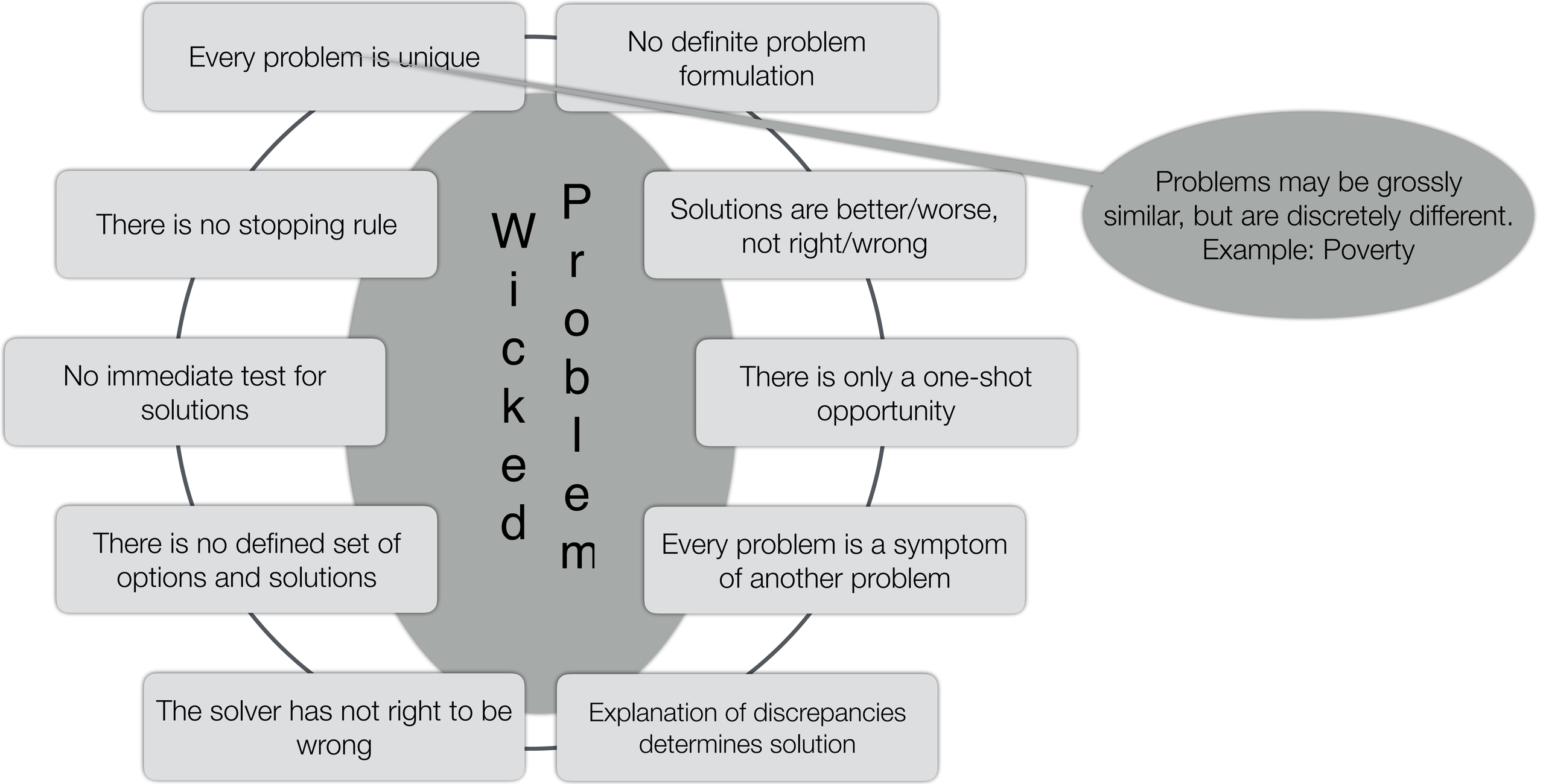
Wicked Problems



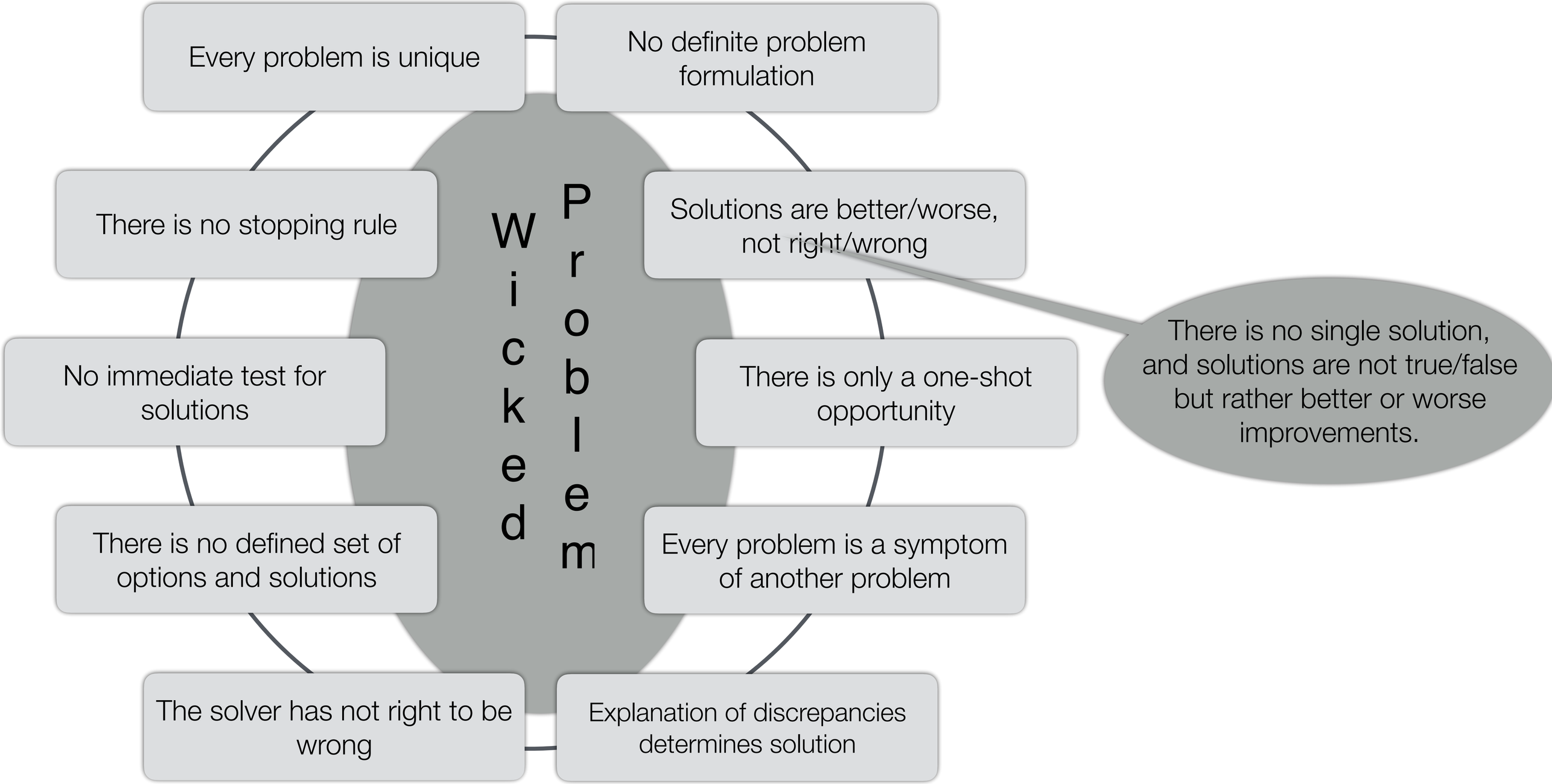
Wicked Problems



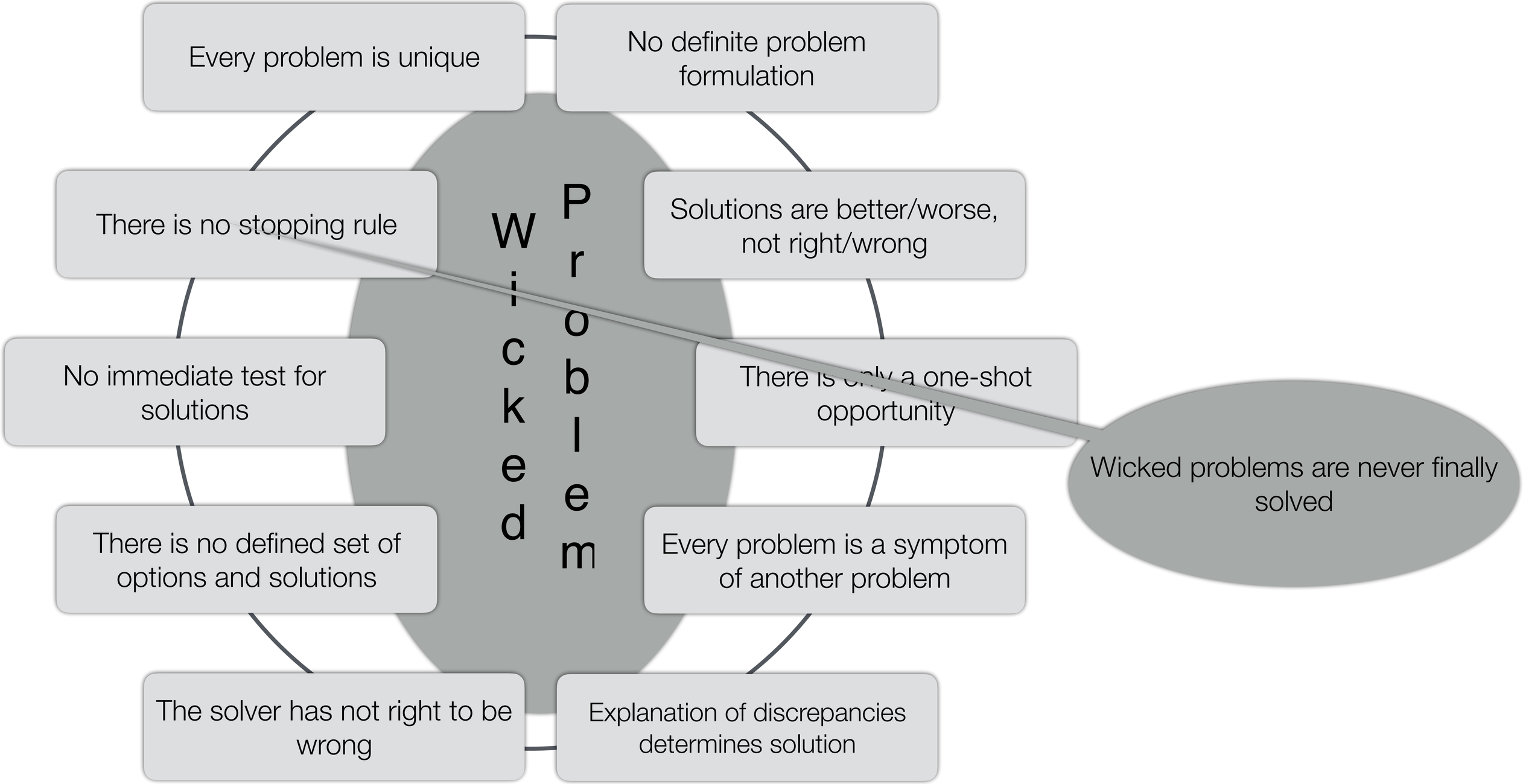
Wicked Problems



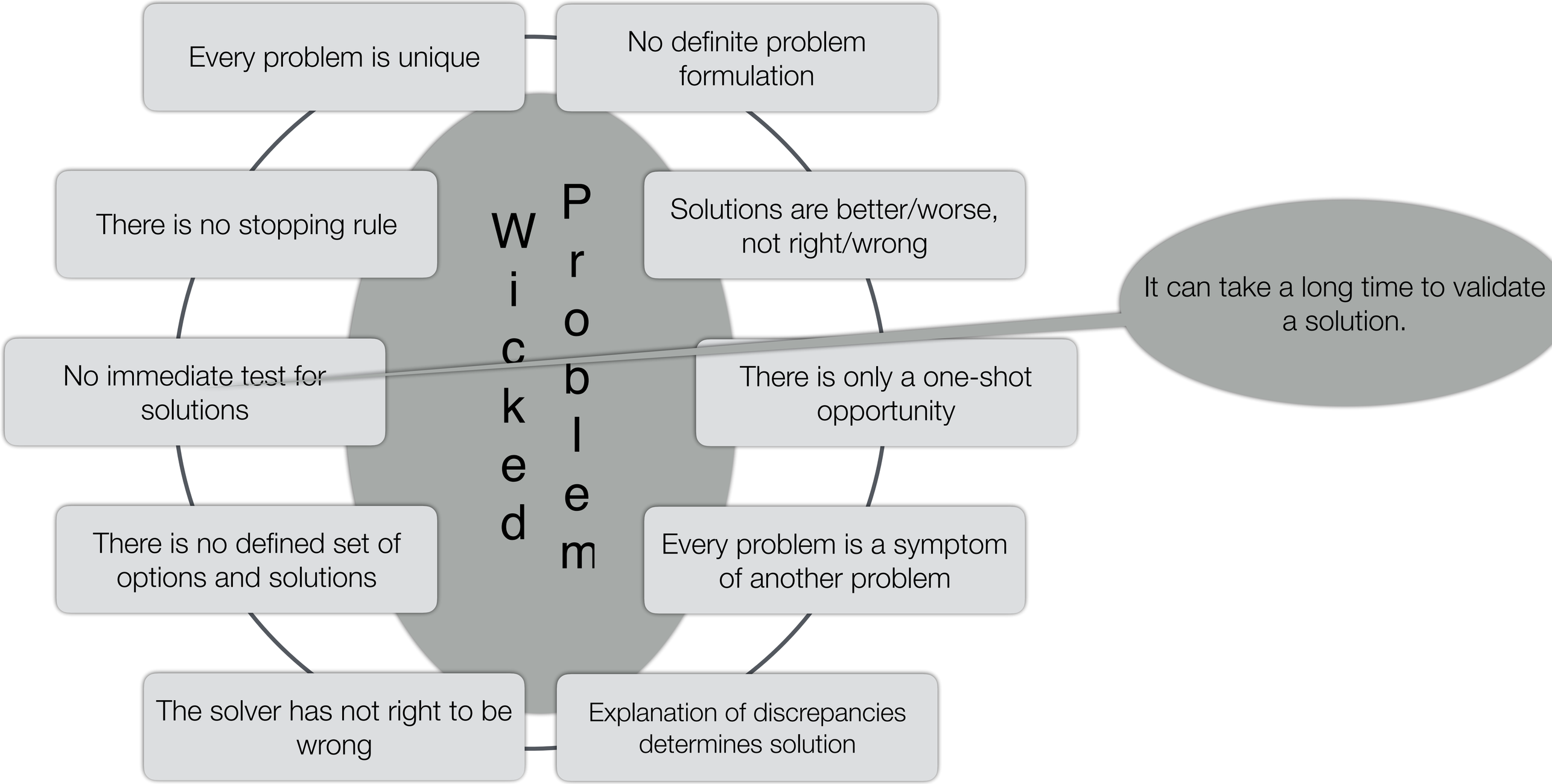
Wicked Problems



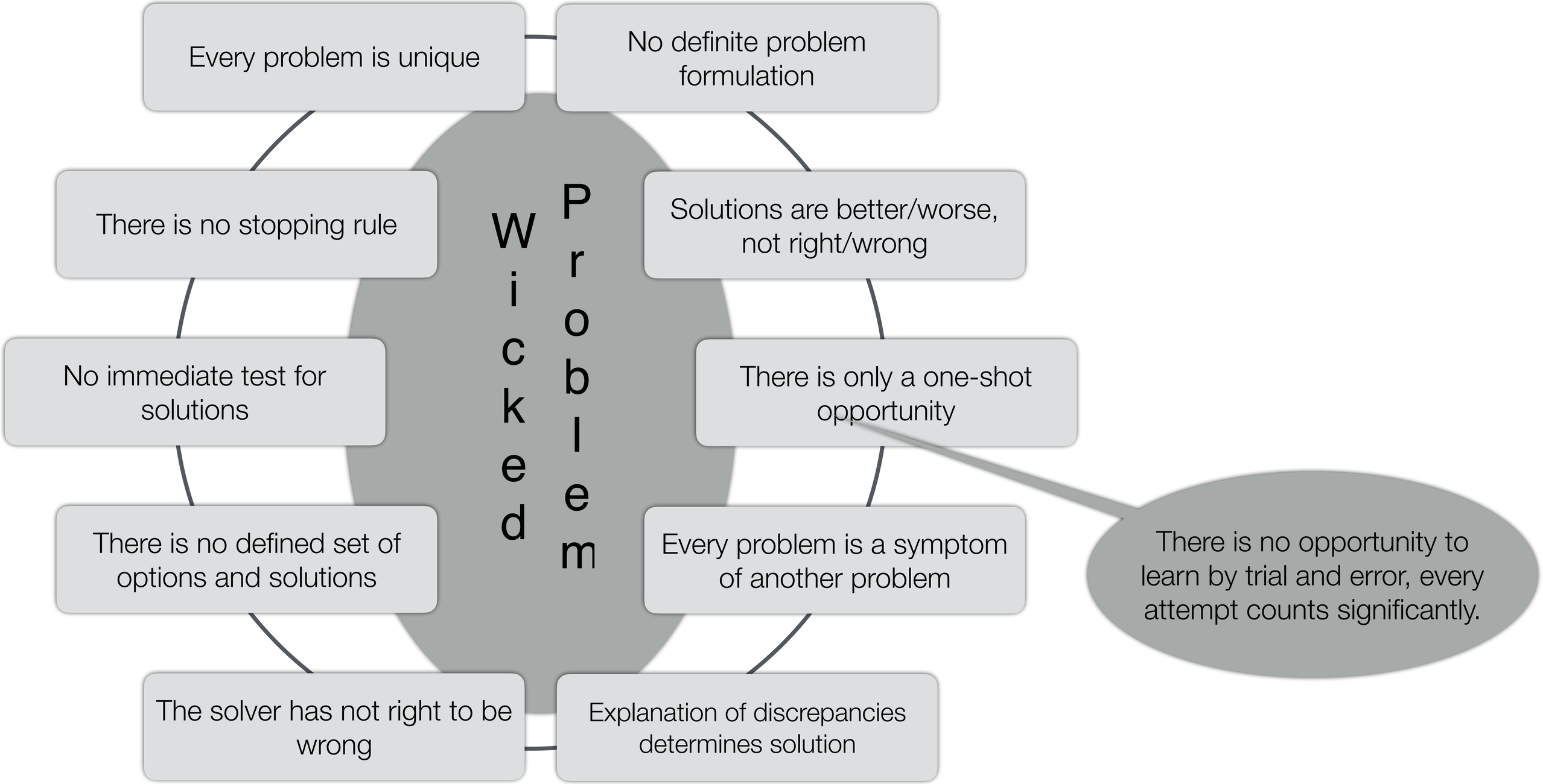
Wicked Problems



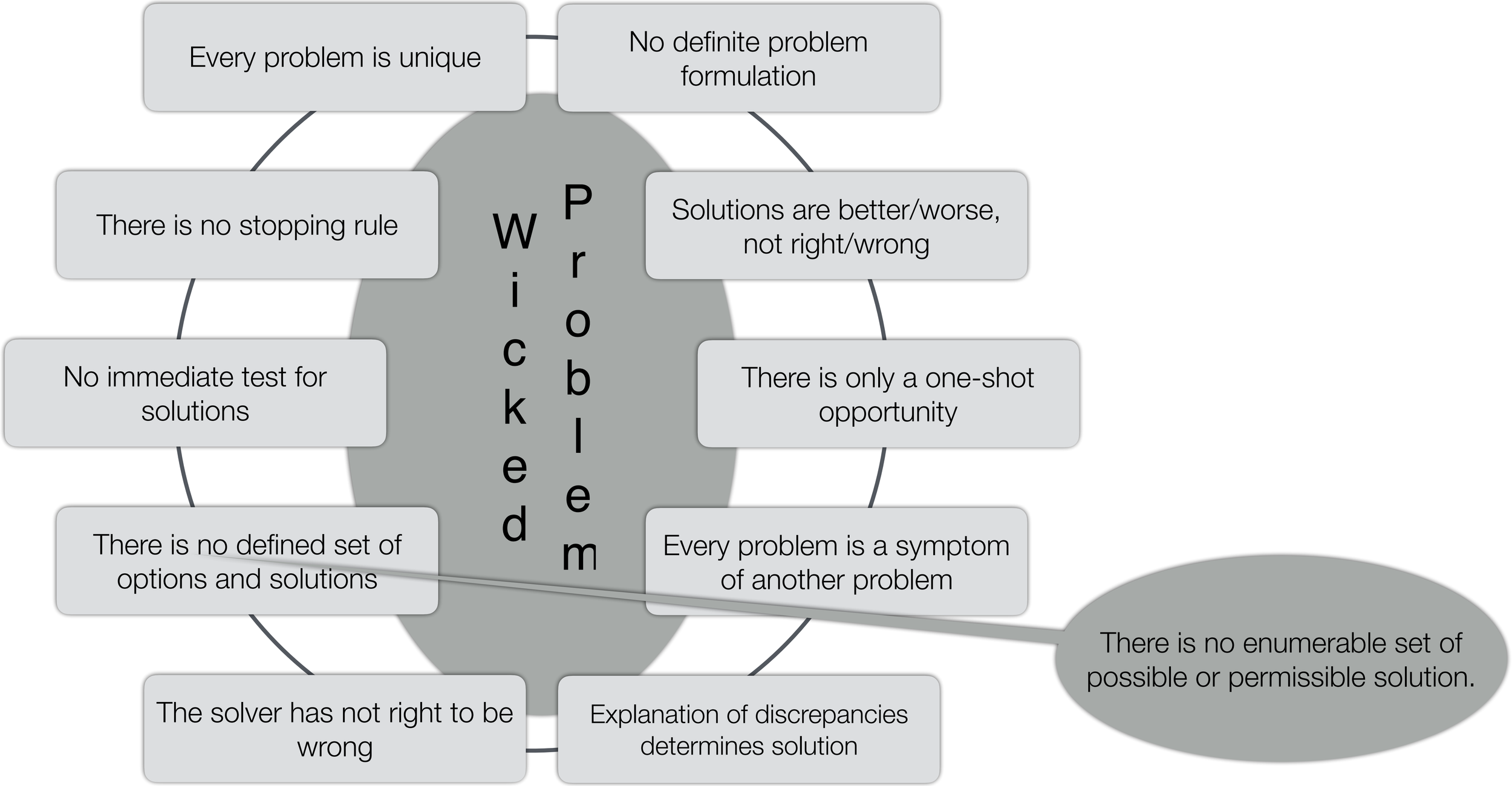
Wicked Problems



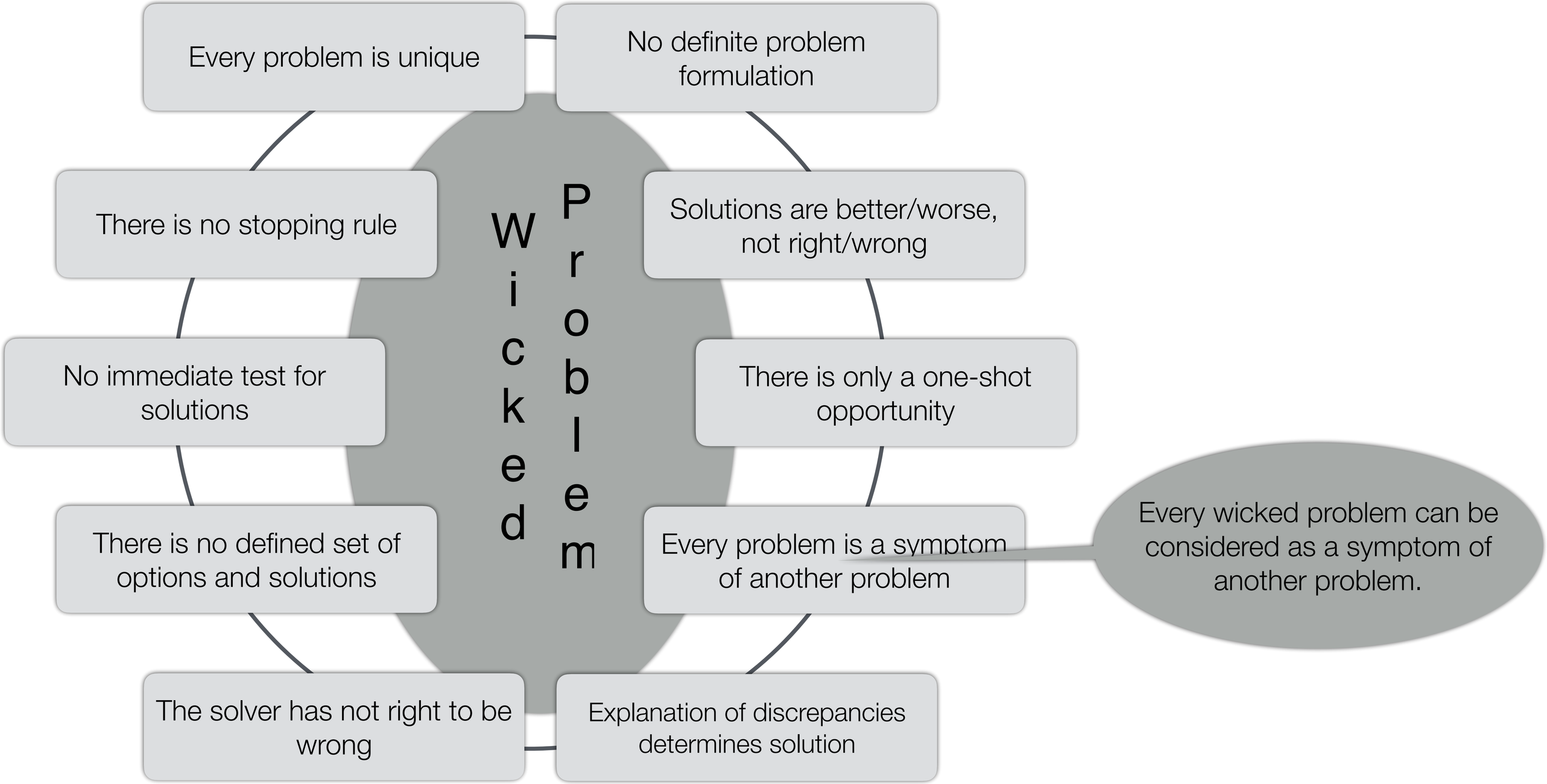
Wicked Problems



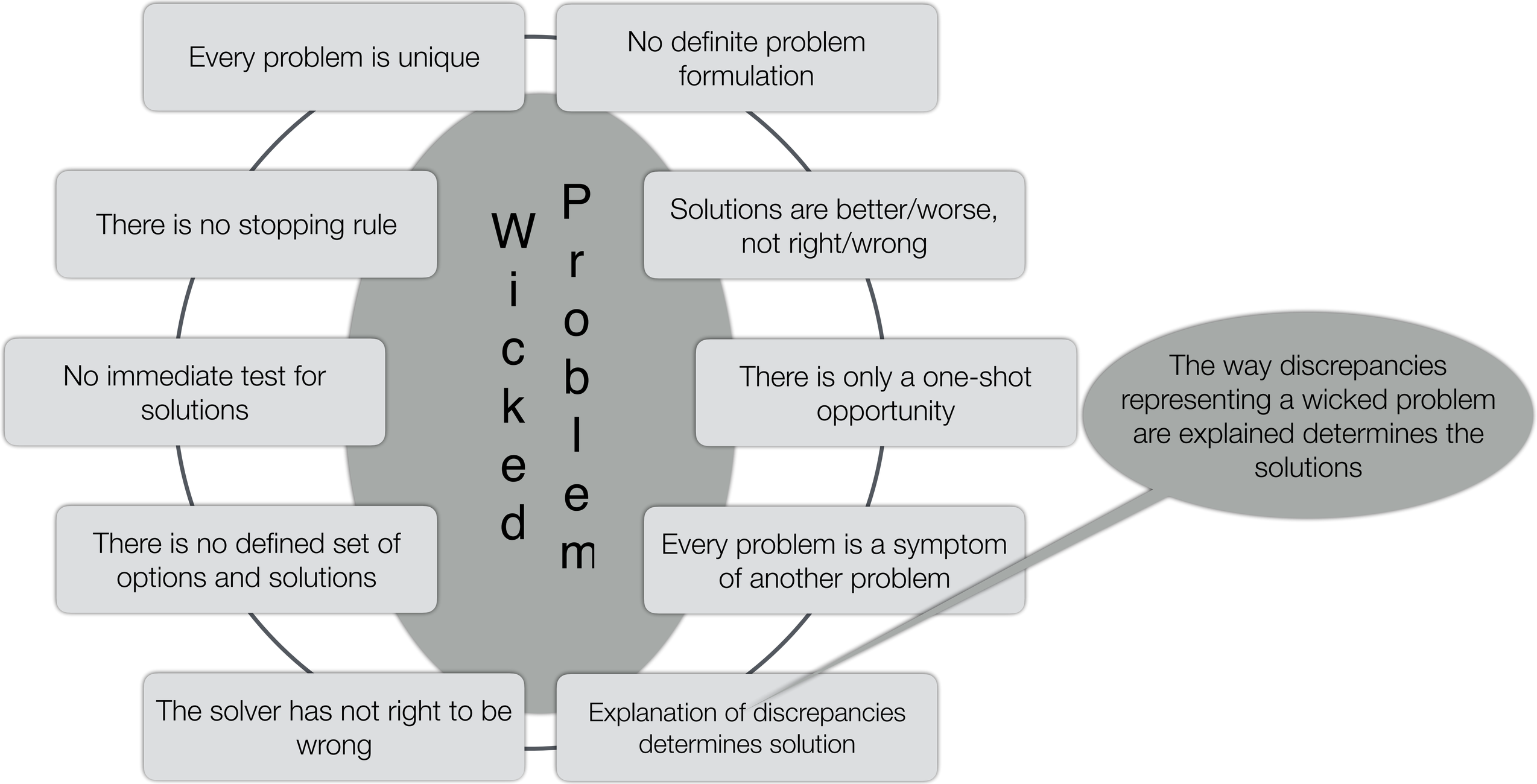
Wicked Problems



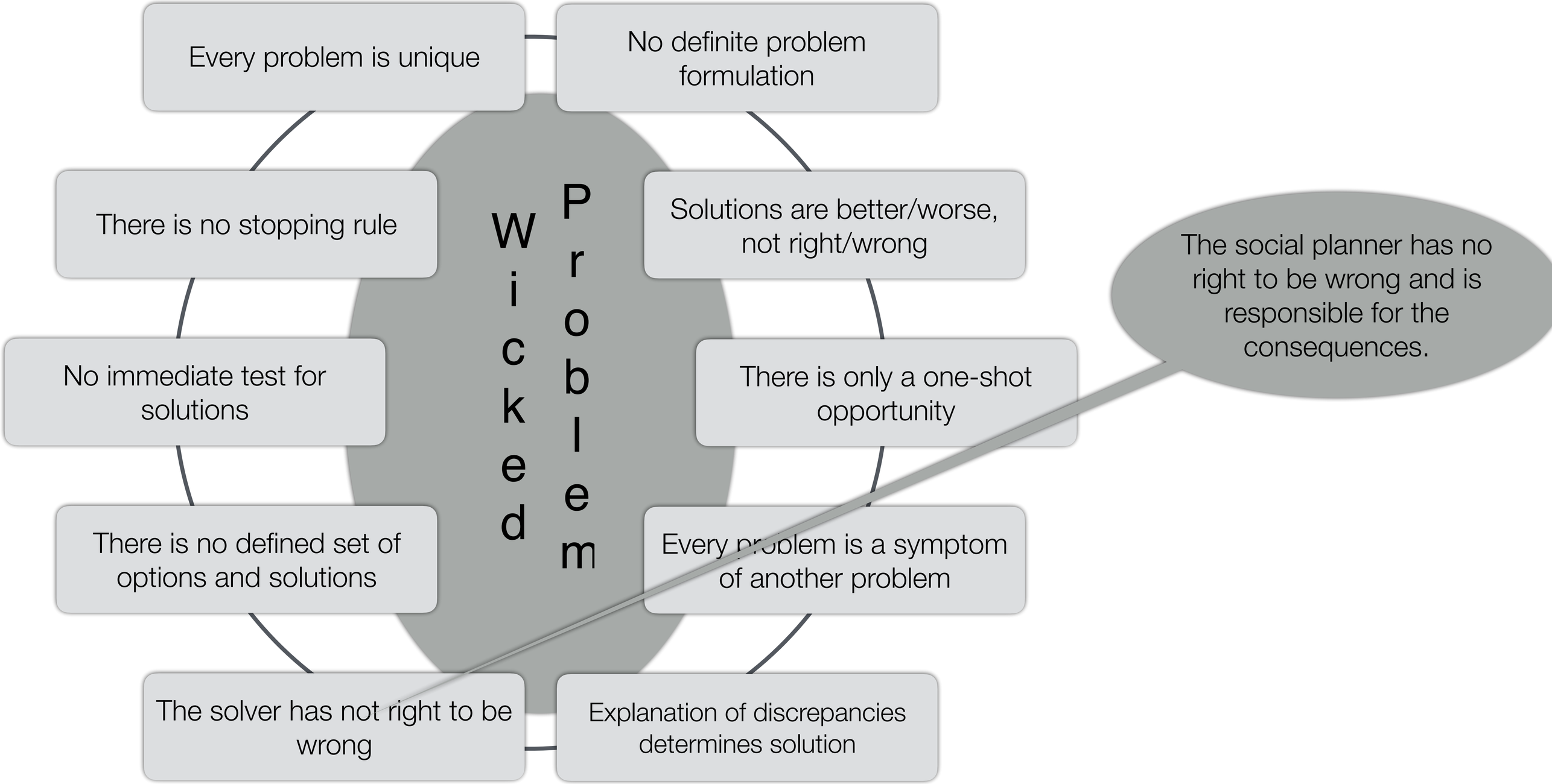
Wicked Problems



Wicked Problems



Wicked Problems



Wicked Problems

Original Characterization by Rittel and Webber (1973) focusing on social planning:

1. There is no definitive formulation of a wicked problem.
2. Wicked problems have no stopping rule.
3. Solutions to wicked problems are not true-or-false, but better or worse.
4. There is no immediate and no ultimate test of a solution to a wicked problem.
5. Every solution to a wicked problem is a "one-shot operation"; because there is no opportunity to learn by trial and error, every attempt counts significantly.
6. Wicked problems do not have an enumerable (or an exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan.
7. Every wicked problem is essentially unique.
8. Every wicked problem can be considered to be a symptom of another problem.
9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution.
10. The social planner has no right to be wrong (i.e., planners are liable for the consequences of the actions they generate).

Wicked Problems

Generalized characterization:

1. The solution depends on how the problem is framed and vice versa (i.e., the problem definition depends on the solution)
2. Social agents have radically different world views and different frames for understanding the problem.
3. The constraints that the problem is subject to and the resources needed to solve it change over time.
4. The problem is never solved definitively.

Wicked Problems

Levin et al. (2012): **Super wicked problems** have the following additional characteristics:

1. Time is running out.
2. No central authority.
3. Those seeking to solve the problem are also causing it.
4. Policies discount the future irrationally.

Wicked Problems

Levin et al. (2012): **Super wicked problems** have the following additional characteristics:

1. Time is running out.
2. No central authority.
3. Those seeking to solve the problem are also causing it.
4. Policies discount the future irrationally.

- The items that define a wicked problem relate to the problem itself.
- The items that define a super wicked problem relate to the agent trying to solve it.
- Unsustainability, leaving the “safe operating space,” climate change, extinction, all are super wicked problem

Wicked Problems

Levin et al. (2012): **Super wicked problems** have the following additional characteristics:

1. Time is running out.
2. No central authority.
3. Those seeking to solve the problem are also causing it.
4. Policies discount the future irrationally.

The system is on a trajectory towards an undesirable/dangerous future

- The items that define a wicked problem relate to the problem itself.
- The items that define a super wicked problem relate to the agent trying to solve it.
- Unsustainability, leaving the “safe operating space,” climate change, extinction, all are super wicked problem

Wicked Problems

Levin et al. (2012): **Super wicked problems** have the following additional characteristics:

1. Time is running out.
2. No central authority.
3. Those seeking to solve the problem are also causing it.
4. Policies discount the future irrationally.

No individual or group has the authority to implement interventions

- The items that define a wicked problem relate to the problem itself.
- The items that define a super wicked problem relate to the agent trying to solve it.
- Unsustainability, leaving the “safe operating space,” climate change, extinction, all are super wicked problem

Wicked Problems

Levin et al. (2012): **Super wicked problems** have the following additi

1. Time is running out.
2. No central authority.
3. Those seeking to solve the problem are also causing it.
4. Policies discount the future irrationally.

The solution is attempted from within the system.
The social agents working on a solution are part of the system

- The items that define a wicked problem relate to the problem itself.
- The items that define a super wicked problem relate to the agent trying to solve it.
- Unsustainability, leaving the “safe operating space,” climate change, extinction, all are super wicked problem

Wicked Problems

Levin et al. (2012): **Super wicked problems** have the following additional

1. Time is running out.
2. No central authority.
3. Those seeking to solve the problem are also causing it.
4. Policies discount the future irrationally.

Present needs and benefits have a much higher value than the needs and benefits in the future.

- The items that define a wicked problem relate to the problem itself.
- The items that define a super wicked problem relate to the agent trying to solve it.
- Unsustainability, leaving the “safe operating space,” climate change, extinction, all are super wicked problem

Wicked Problems

Levin et al. (2012): **Super wicked problems** have the following additional

1. Time is running out.
2. No central authority.
3. Those seeking to solve the problem are also causing it.
4. Policies discount the future irrationally.

Present needs and benefits have a much higher value than the needs and benefits in the future.

- The items that define a wicked problem relate to the problem itself.
- The items that define a super wicked problem relate to the agent trying to solve it.
- Unsustainability, leaving the “safe operating space,” climate change, extinction, all are super wicked problem

Resolution requires to “restraining the presents to liberate the future” (Richard, 2009).

Wicked Problems

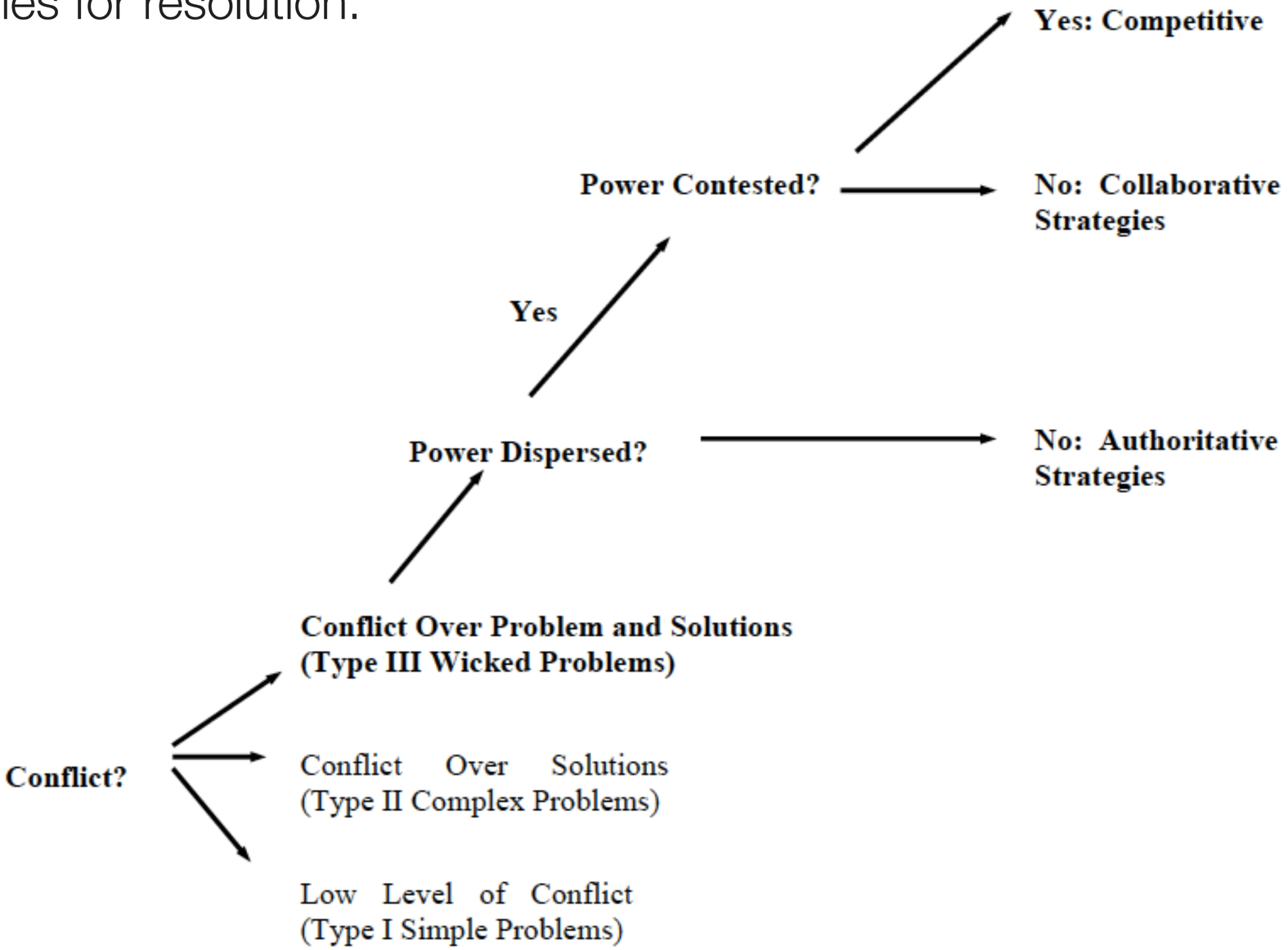
Examples

- Global Climate Change — super wicked
- Involuntary migration — super wicked
- Natural Hazards
- Global Change — super wicked
- Social injustice
- Data security — super wicked
- Conservation — super wicked
- Pandemics
- Healthcare
- Inequality
- Nuclear — super wicked

Wicked Problems

Roberts, 2000: Three strategies for resolution:

- **Authoritative**
- **Competitive**
- **Collaborative**

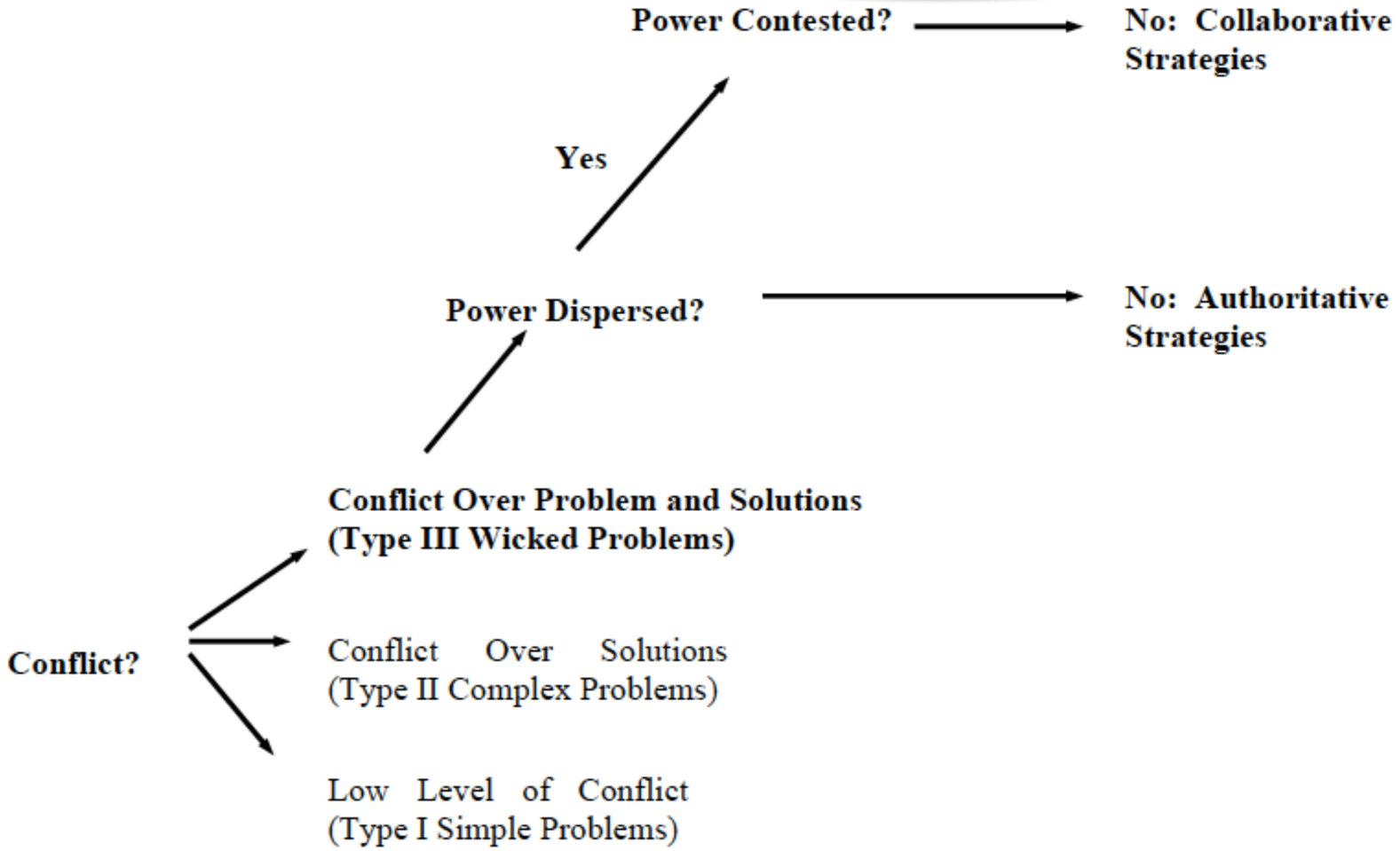


Wicked Problems

Roberts, 2000: Three strategies for resolution:

- **Authoritative**
- **Competitive**
- **Collaborative**

Seek to tame wicked problems by vesting the responsibility for solving the problems in the hands of a few people.



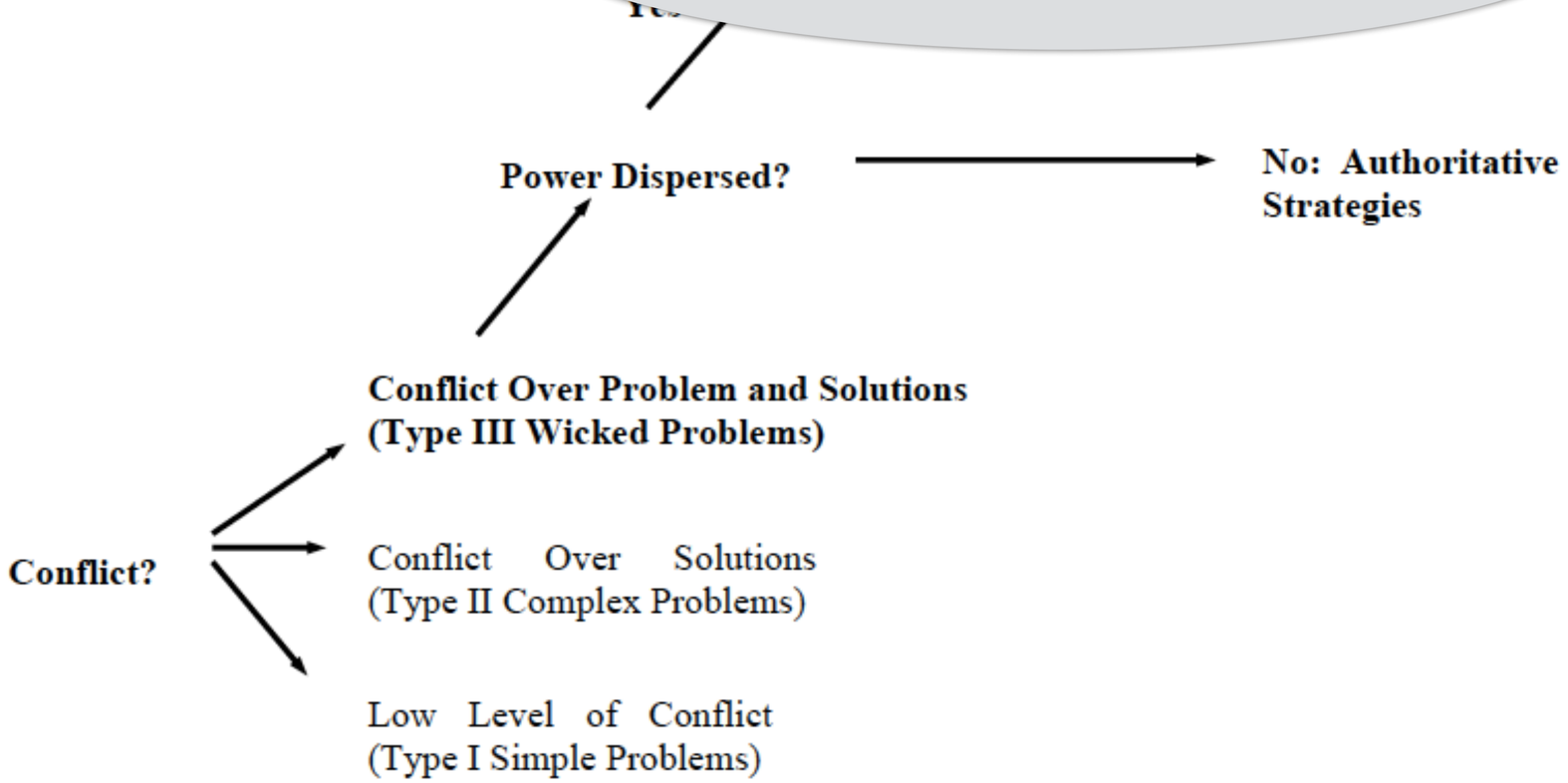
Wicked Problems

Roberts, 2000: Three strategies for resolution:

- **Authoritative**
- **Competitive**
- **Collaborative**

Seek to tame wicked problems by vesting the responsibility for solving the problems in the hands of a few people.

Reduces problem complexity, as many competing points of view are eliminated at the start.



Wicked Problems

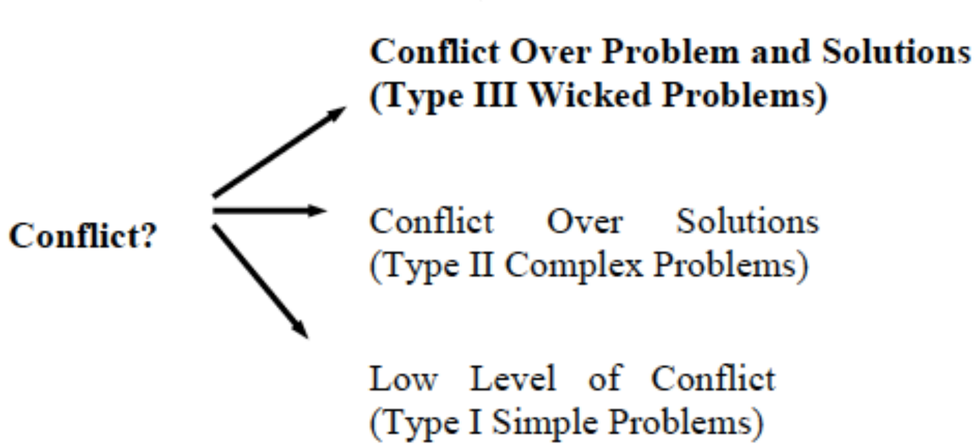
Roberts, 2000: Three strategies for resolution:

- **Authoritative**
- **Competitive**
- **Collaborative**

Seek to tame wicked problems by vesting the responsibility for solving the problems in the hands of a few people.

Reduces problem complexity, as many competing points of view are eliminated at the start.

Disadvantage: authorities and experts charged with solving the problem may not have an appreciation of all the perspectives needed to tackle the problem.

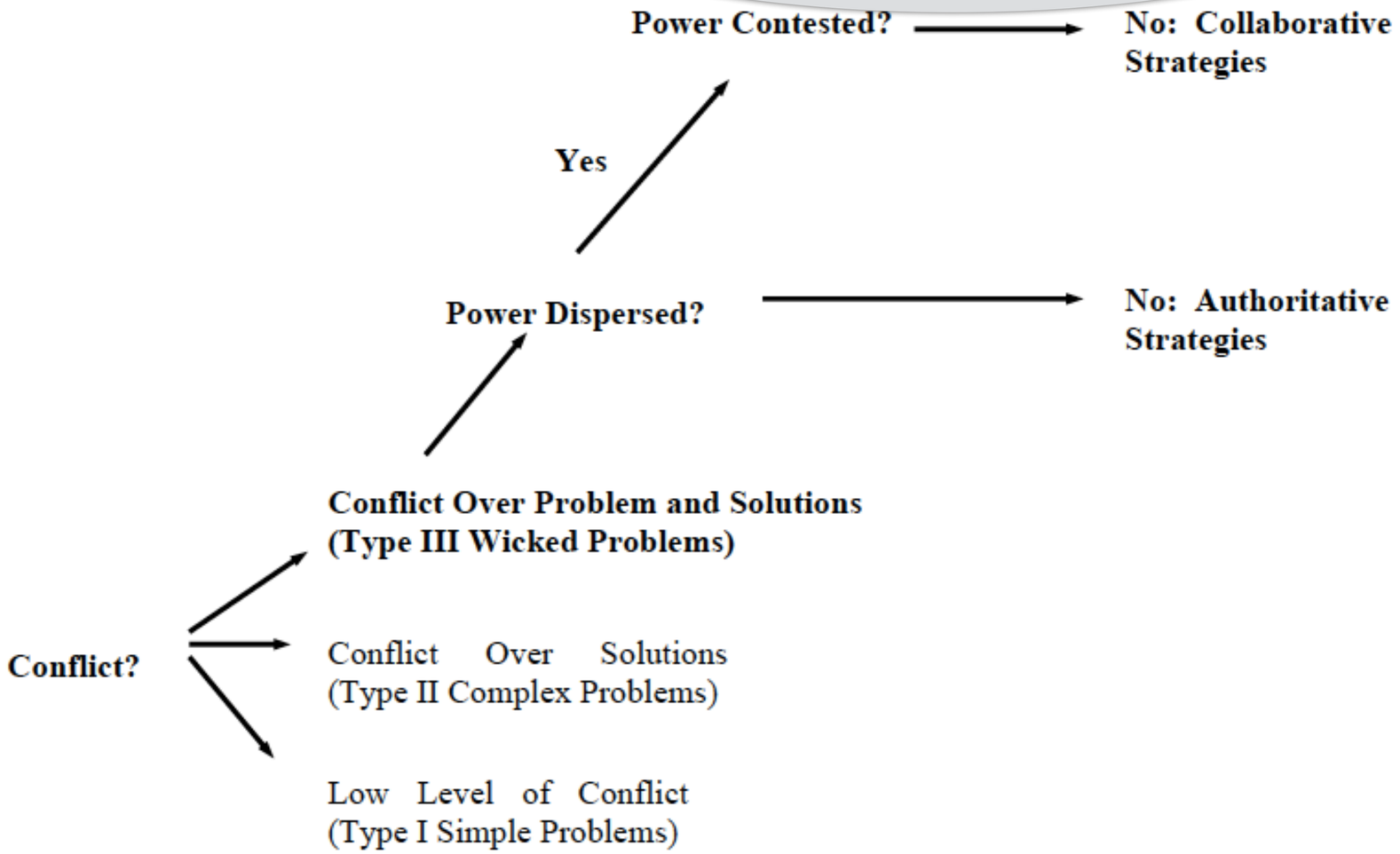


Wicked Problems

Roberts, 2000: Three strategies for resolution:

- **Authoritative**
- **Competitive**
- **Collaborative**

Attempt to solve wicked problems by pitting opposing points of view against each other, requiring parties that hold these views to come up with their preferred solutions.



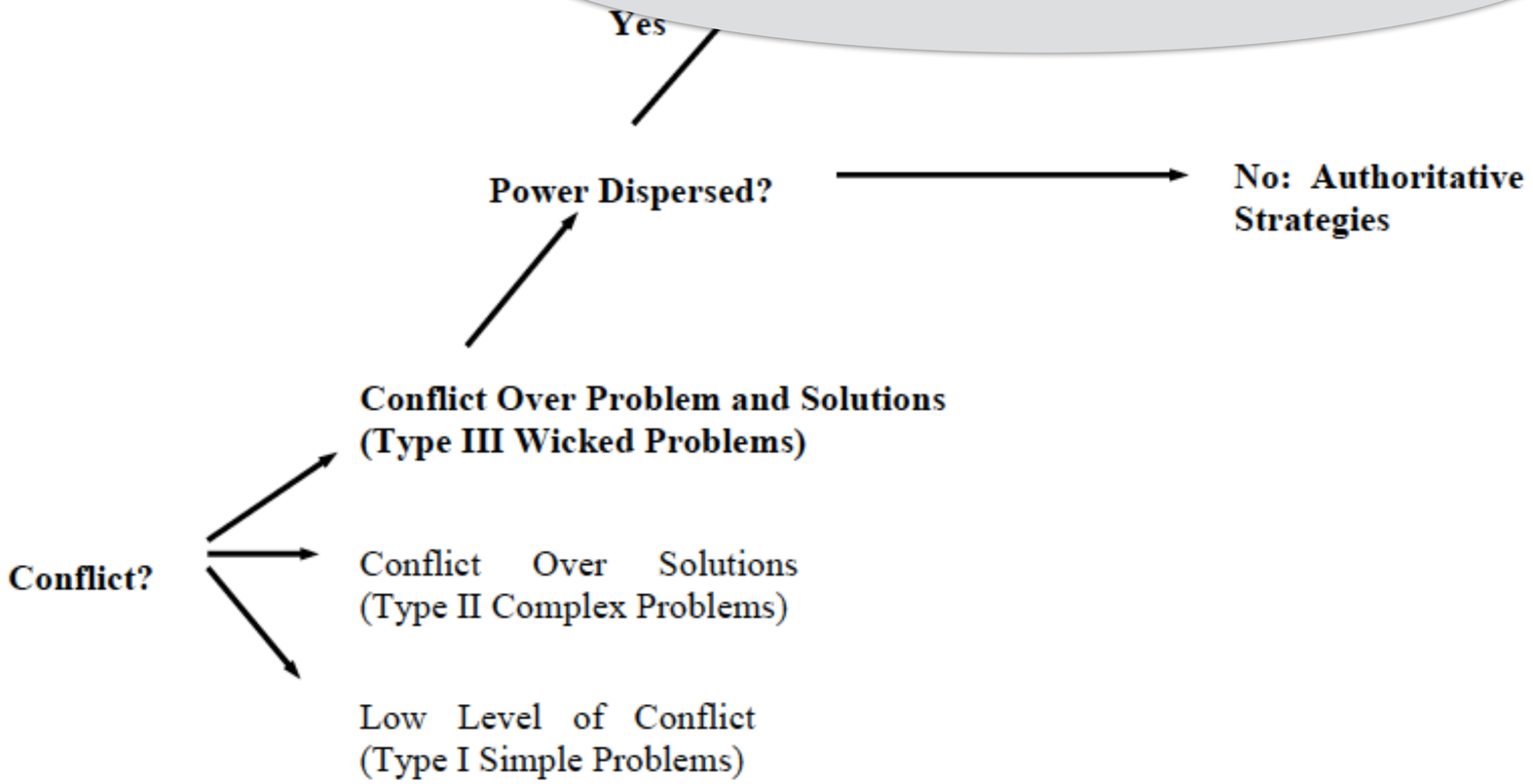
Wicked Problems

Roberts, 2000: Three strategies for resolution:

- **Authoritative**
- **Competitive**
- **Collaborative**

Attempt to solve wicked problems by pitting opposing points of view against each other, requiring parties that hold these views to come up with their preferred solutions.

Advantage: different solutions can be weighed up against each other and the best one chosen.



Wicked Problems

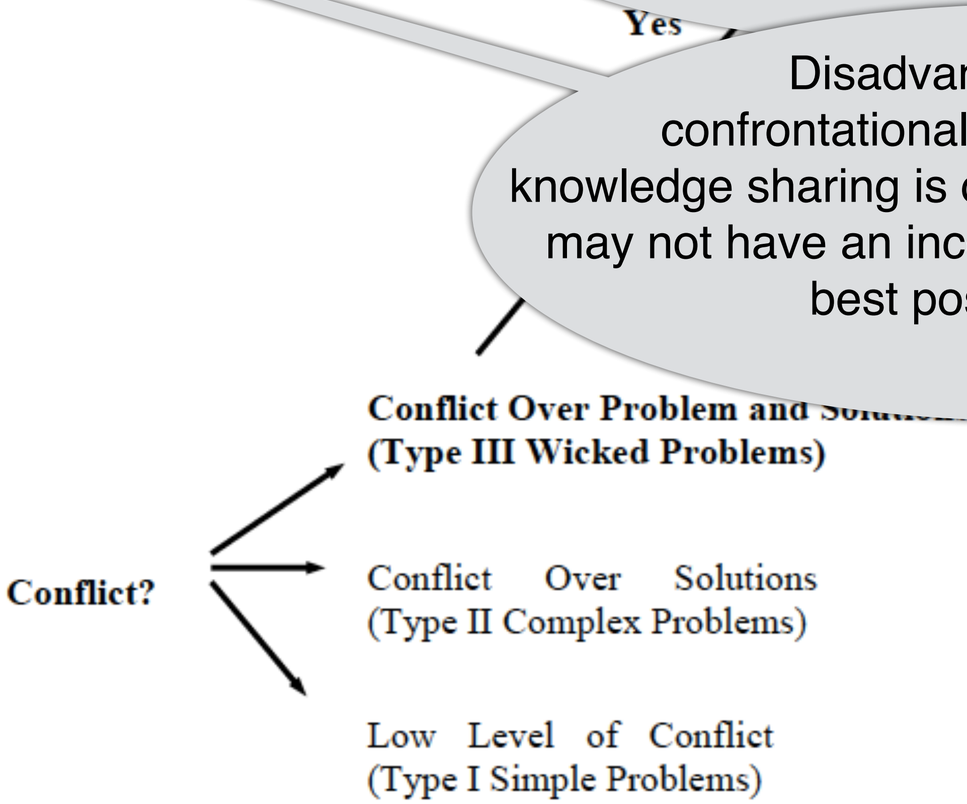
Roberts, 2000: Three strategies for resolution:

- **Authoritative**
- **Competitive**
- **Collaborative**

Attempt to solve wicked problems by pitting opposing points of view against each other, requiring parties that hold these views to come up with their preferred solutions.

Advantage: different solutions can be weighed up against each other and the best one chosen.

Disadvantage: creates a confrontational environment in which knowledge sharing is discouraged. Parties involved may not have an incentive to come up with their best possible solution.

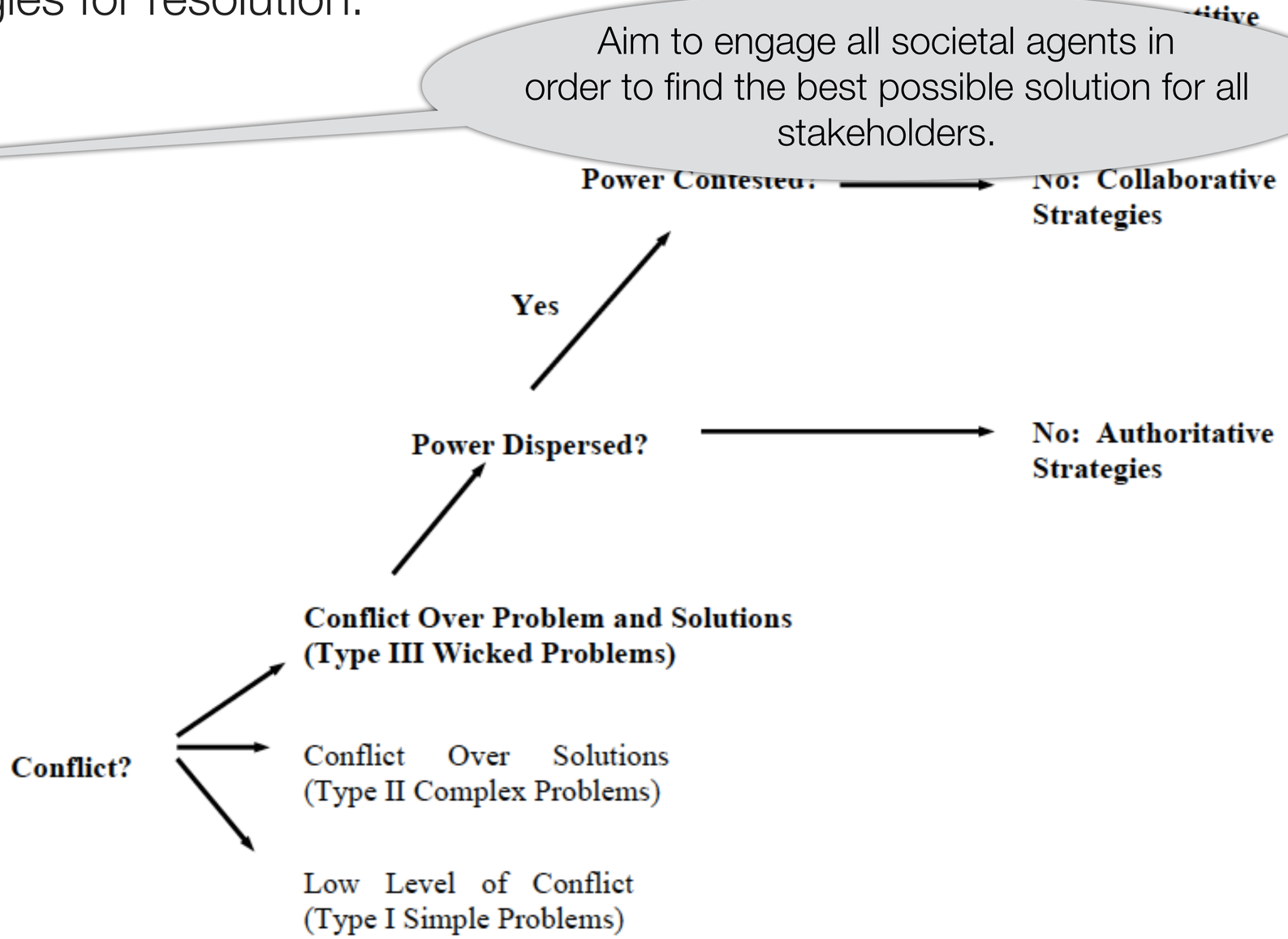


Wicked Problems

Roberts, 2000: Three strategies for resolution:

- **Authoritative**
- **Competitive**
- **Collaborative**

Aim to engage all societal agents in order to find the best possible solution for all stakeholders.



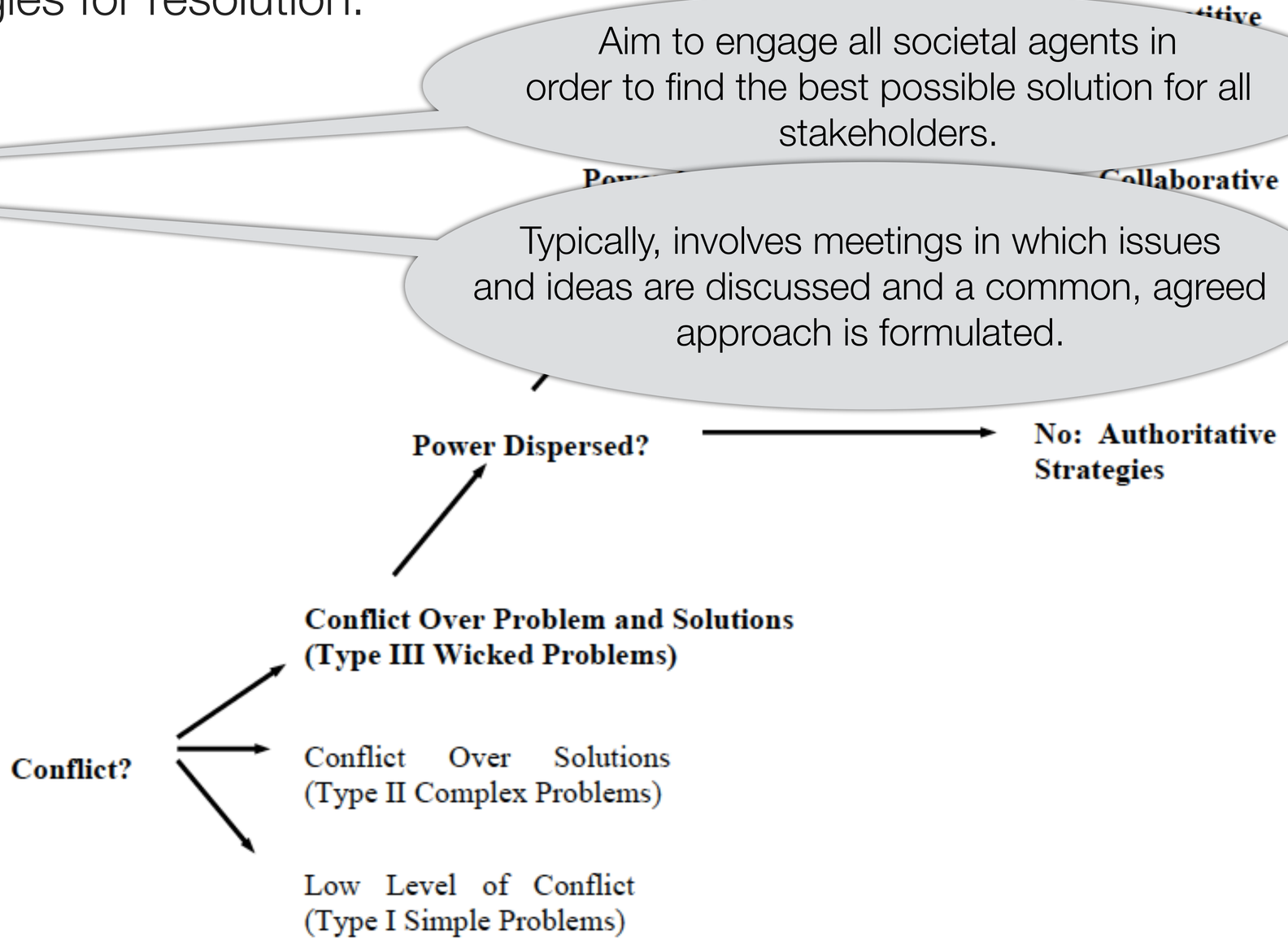
Wicked Problems

Roberts, 2000: Three strategies for resolution:

- **Authoritative**
- **Competitive**
- **Collaborative**

Aim to engage all societal agents in order to find the best possible solution for all stakeholders.

Typically, involves meetings in which issues and ideas are discussed and a common, agreed approach is formulated.



Wicked Problems

Roberts, 2000: Three strategies for resolution:

- **Authoritative**
- **Competitive**
- **Collaborative**

Aim to engage all societal agents in order to find the best possible solution for all stakeholders.

Typically, involves meetings in which issues and ideas are discussed and a common, agreed approach is formulated.