

Risky or beneficial? Exploring perceptions of nuclear energy over time in a cross-country perspective

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01. Social sciences in HoNESt: key concepts

Understanding mechanisms for societal engagement and public perceptions

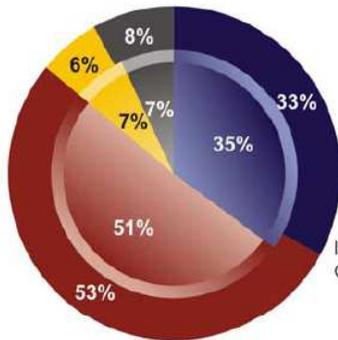
- Societal engagement
 - Activities of actors seeking to support or oppose nuclear power
- Public perception
 - How social actors perceive and evaluate nuclear energy
- This presentation: focus on public perception



What do we know?

Whole EU level

Question: QA1. When you think about nuclear power, what first comes to mind?



Special Eurobarometer 324
European Commission

Inner pie EB72.2 Sept.-Oct.2009
Outer pie EB66.2 Oct.-Nov.2006

- The benefits of nuclear power as an energy source outweigh the risks it poses
- The risks of nuclear power as an energy source outweigh its benefits
- Neither (SPONTANEOUS)
- Don't know

Opinions on the future use of nuclear energy: Eurobarometer data on the perception of nuclear energy 1982 – 2009 in %

	Positive							Neutral							Negative						
	Worthwhile to develop ('82 – '96) In favour ('06) Increased ('09)							No particular interest ('82) No particular advantage ('84; '89) Neither develop nor abandon ('91; '96) Balanced views ('06) Maintained the same ('09)							Unacceptable risk ('82 – '96) Opposed ('06) Reduced ('09)						
	'82	'84	'89	'91	'96	'06	'09	'82	'84	'89	'91	'96	'06	'09	'82	'84	'89	'91	'96	'06	'09
BG	-	-	-	-	-	-	26	-	-	-	-	-	-	42	-	-	-	-	-	-	10
FI	-	-	-	-	33	29	24	-	-	-	-	32	49	51	-	-	-	-	31	21	23
DE	37	45	30	23	12	20	7	14	8	5	25	44	34	37	27	30	49	44	33	43	52
ES	-	-	18	18	14	14	5	-	-	6	22	40	35	33	-	-	47	40	20	37	49
SE	-	-	-	-	24	41	23	-	-	-	-	30	38	34	-	-	-	-	39	20	35
UK	39	41	35	35	27	19	27	17	13	9	26	35	47	39	37	37	44	31	28	27	25
FR	51	55	42	25	19	21	12	4	4	4	51	31	44	45	30	30	48	18	44	33	37
NL	34	37	29	21	17	17	26	6	7	6	45	39	43	35	48	47	58	29	40	37	31
IT	34	41	20	29	16	21	20	5	6	5	24	47	31	35	42	43	66	33	20	35	27
DK	25	22	21	13	15	10	20	9	10	7	35	61	23	32	50	48	64	46	21	65	42
EL	15	17	15	10	6	6	5	6	3	3	26	68	21	29	49	70	60	53	18	73	65
PT	-	-	7	13	9	12	7	-	-	17	16	53	34	25	-	-	43	38	20	39	37
AT	-	-	-	-	4	4	4	-	-	-	-	70	14	27	-	-	-	-	21	80	66
LT	-	-	-	-	-	37	13	-	-	-	-	-	27	46	-	-	-	-	-	25	17
HU	-	-	-	-	-	34	27	-	-	-	-	-	42	49	-	-	-	-	-	20	20



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02. Sample

HoNESt data: 20 historical 'Short Country Reports' (SCRs) consisting of same structure:



1. Historical context (narrative)
2. Showcase
3. Events (5)
4. Facts and Figures

Focus on:

- Actors
- Themes and arguments
- Engagement
- Time periods

Country sample for in-depth analysis:

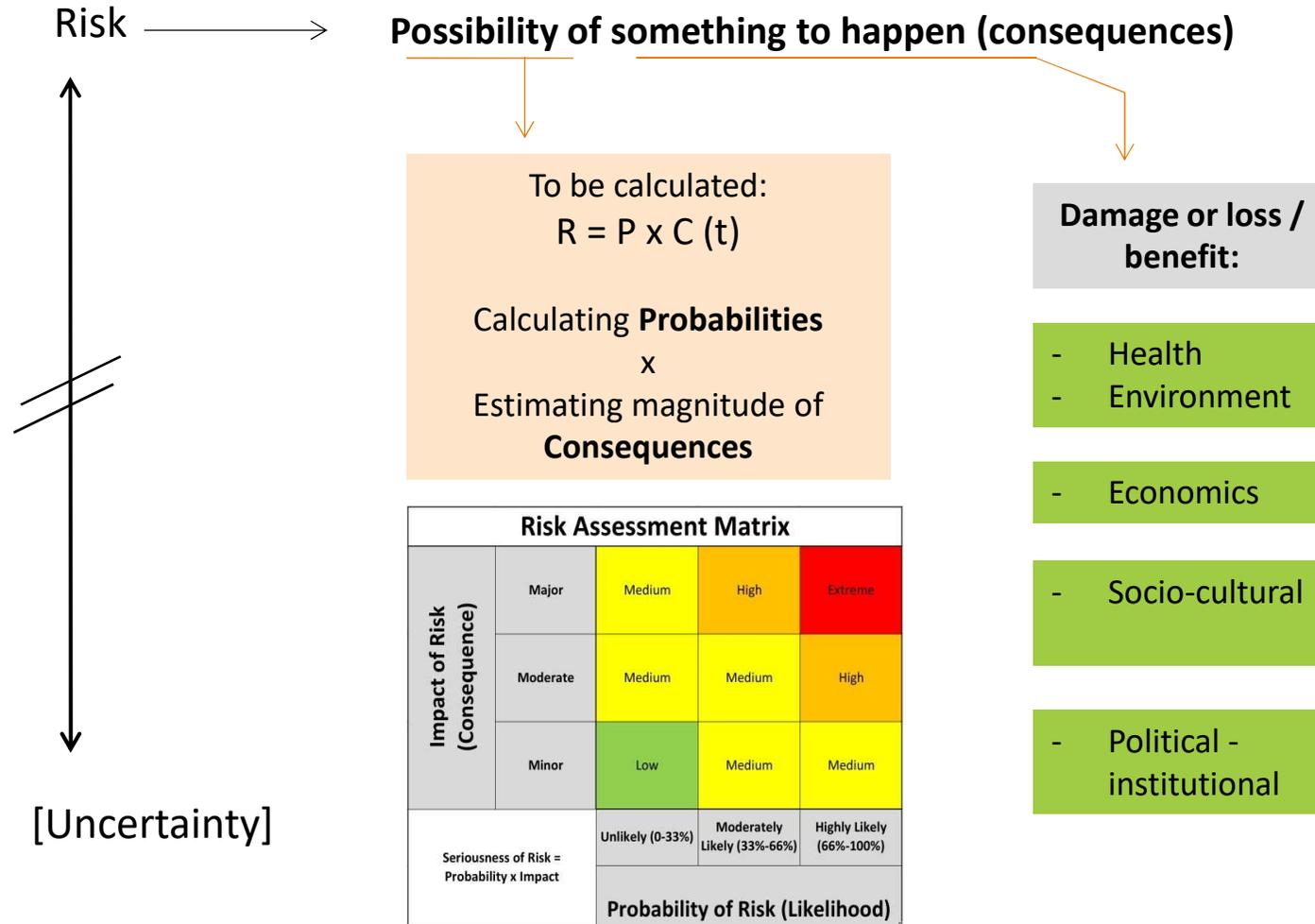
Country	Region	Political System
Bulgaria	East Europe	Soviet regime + Democracy
Finland	Scandinavia	Democracy
F.R. Germany	Central Europe	Democracy
Spain	Mediterranean Europe	Dictatorship + Democracy
Sweden	Scandinavia	Democracy
Ukraine	East Europe	Soviet regime + Democracy
United Kingdom	West Europe	Democracy
USA	North America	Democracy

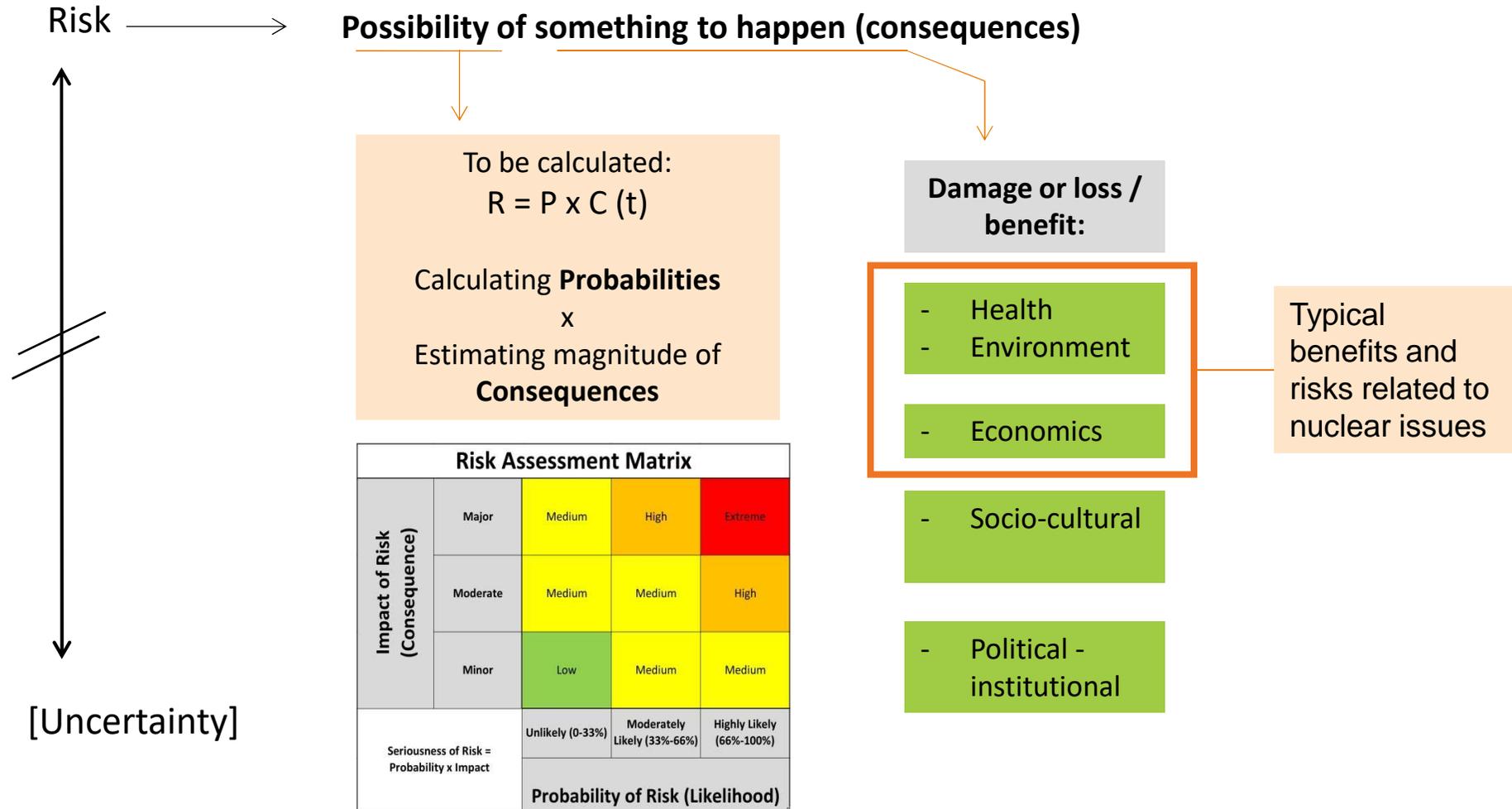
Three main historical phases:

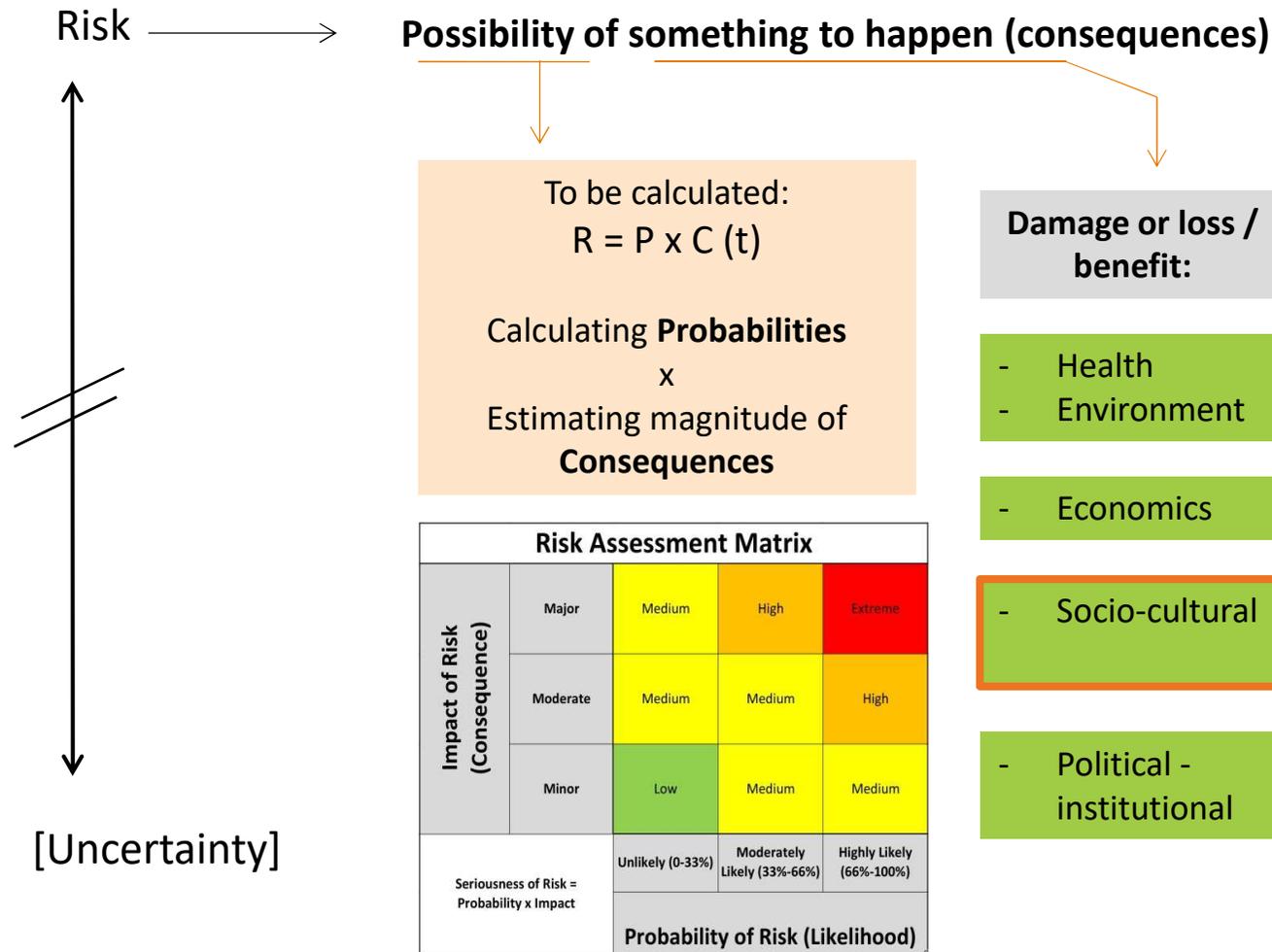
- **Phase 1: 1950 – 1970**
Atoms for Peace, first phase of nuclear energy development.
- **Phase 2: 1970 – 1990**
Public mobilization; TMI and Chernobyl accidents impacted public opinion.
- **Phase 3: 1990 – 2015**
Drop of the Iron Curtain, globalization, climate change, peak-oil, Fukushima accident.



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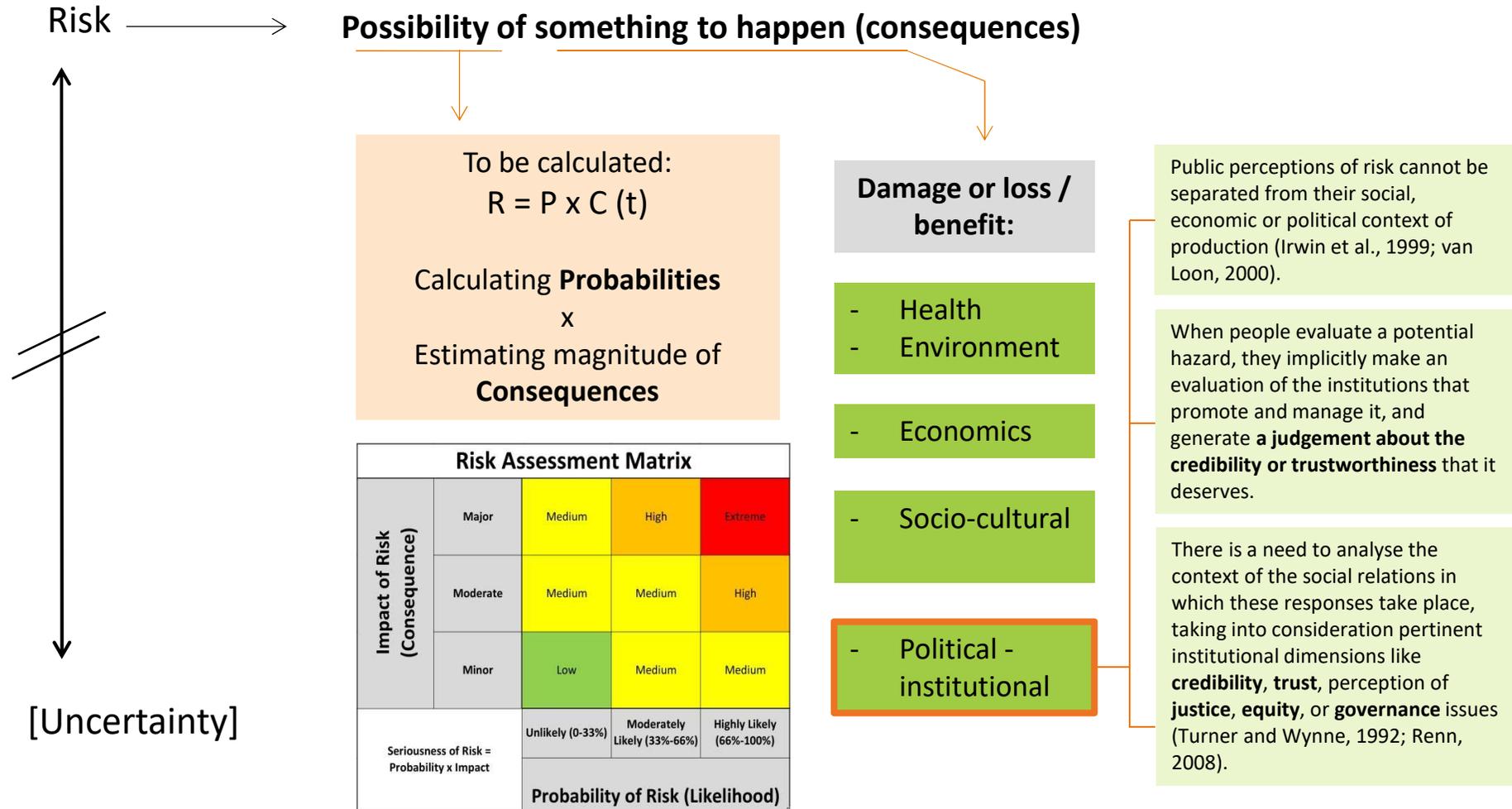


Different social groups can develop different perceptions of risk depending on their adherence to certain **social values, beliefs and cultural standards** (Otway and Fischbein, 1976; Otway and von Winterfeldt, 1982, 1992).

Some factors can influence individual risk responses, such as **unwillingness** to be exposed, **familiarity** with the risk, the **controllability** of the consequences, the **deferred appearance** or not of damage in time or space, etc. (Fischhoff et al., 1978; Vlek and Stallen, 1980, Slovic, 1993, 2000).

The cultural theory research explains how concerns or fears about a risk can lead to indirect consequences (either intentionally or not) of contributing to the cohesion of a social group and generation of **social identity**. Risk could play a role in the maintenance of a certain social order (Douglas and Wildavsky, 1982).





Analytical dimensions

- Health
- Environment
- Economics
- Socio-cultural
- Political - institutional

Our theoretical assumption

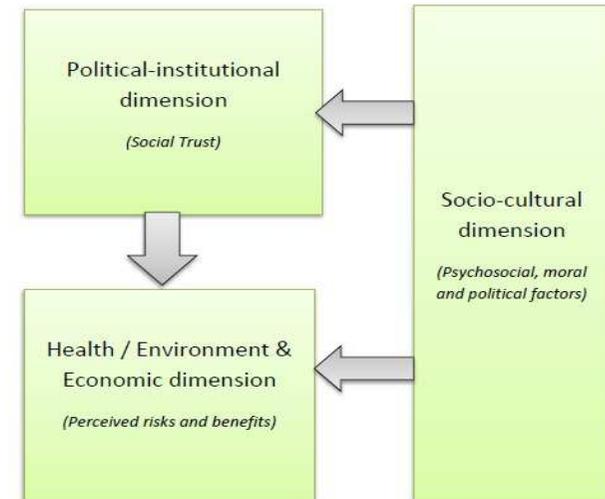


Disparities between different actors' views are grounded on the existence of different perceptions regarding the type of 'consequences' at stake.

We do not only distinguish between *proponents* or *opponents* of nuclear energy, but are also able to identify the specific **dimensions** that underlie actors' support or rejection of nuclear technologies.

Recent theoretical developments (focus on nuclear issues)

Whitfield, Rosa, Dan & Dietz 2009; Visschers & Siegrist 2013; Huang, et al. 2013; Tsujikawa, et al. 2016; Lidskog & Sundqvist, 2004; Kinsella, et al. 2015; Corner, et al. 2011; Siegrist & Visschers 2013; Whitfield, Rosa, Dan & Dietz 2009; Siegrist, Cvetkovich & Roth 2000; ; Poortinga and Pidgeon 2003; etc., etc.



1. The degree of public acceptance of nuclear energy is mainly related to the perception of certain types of **benefits** and **risks**.
2. The perception of risks and benefits is strongly influenced by the degree of **trust** that people have in the institutions and companies promoting, running and regulating nuclear power plants.
3. At the same time, both benefit/risk perceptions and social trust are influenced by a set of antecedent variables including **affective** feelings, **psychosocial** factors, **values** or **beliefs** and **ideological** and political orientations (e.g. pro-environmental ideological orientation).



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03. Results

What have we found in the SCRs?

1. Health and Environment dimension

- 1.1. Human health concerns
- 1.2. Safety concerns
- 1.3. Environmental issues

2. Economic dimension

- 2.1. Job creation
- 2.2. Industrial progress and new business
- 2.3. Security of energy supply
- 2.4. Consumer economics
- 2.5. Resource requirements
- 2.6. Economic losses due to nuclear incidents

3. Political-institutional dimension

- 3.1. Trust and confidence in institutions
- 3.2. Governance issues
 - Political strategies
 - National energy dependence

4. Socio-cultural dimension

- 4.1. Subjective attributes of risk
- 4.2. Social networks and identities
 - Scientific national pride
 - Land use / territorial identities
 - Socio-political identities
- 4.3. Cultural values, traditions and lifestyles
(military imagery included)



Perceived **benefits** of nuclear energy over time

	1950-1970	1970-1990	1990-2015
Health		Healthy (US) Useful medical applications (FI)	
Safety		Safest (FI, UK) Safest standards (ES) Safest technology (SE) Safe energy (DE)	Safest (SE [2], UKR) Safest technology (FI)
Environment	Positive environmental impacts (SE)	Positive environmental effects (ES) Clean energy (DE) Sustainability (SE)	Climate change challenges (FI, UK [3]) Radiation natural phenomenon (ES, FI)
Economics	Energy supply (FI) Inexpensive electricity (FI) Jobs (FI) Jobs (high quality) (FI) Investments (business) (US) Socio-economic development (DE, FI)	Energy supply (ES) Inexpensive electricity (SE) Jobs (ES) Investments (business) (SE) Socio-economic development (ES [2])	Jobs (FI, SE) Economic viability (UKR) Investments (business) (US) Socio-economic development (ES)

References to the **health benefits** were mainly argued during the 1970-1990 period.

In the first two phases (1950-1970 and 1970-1990), some actors talked about **positive environmental impacts** of nuclear energy production, such as temperature increases that could be beneficial for certain ecosystems, and the fact that nuclear technologies would pollute less than other industries. Since the 1990s, discussion has increasingly addressed the benefits of nuclear energy in the fight against climate change.

Job creation is presented as the major economic benefit to people affected by nuclear energy infrastructures. Business actors and regulators assumed that economic advantages would outweigh any possible doubts that people might have because of the expected risks.

Source: own depicting. Illustrative examples, not exhaustive.

Legend: BG: Bulgaria; DE: Germany; ES: Spain; FI: Finland; SE: Sweden; UK: United Kingdom; UKR: Ukraine; US: United States of America; figures in []: number of times a factor appears in the SCR



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Perceived risks of nuclear energy over time

	1950-1970	1970-1990	1990-2015
Health	Accident (US) Radiation (UK)	Health (BG) Damage to health (UKR [2]) Accident (SE, US) Radiation (ES [2], UKR [2]) Stress, anxieties (BG) Fears and anxieties (SE) Pessimistic view (DE)	Accident (FI)
Safety	Safety culture (FI) Safety (SE)	Safety (BG [2], DE, ES, US) Emergency (BG)	Technical safety (BG) Safety conditions (BG) Safety (UKR, US)
Environment	Pollution (FI)	Environmental dangers (SE) Environmental concerns (UK, UKR)	Environmental concerns (UK) Environmental impacts (US) Non-carbon-free (FI) Poor sustainability (FI [2])
Economics	High cost (DE, ES; US) Financial damage (UK)	High cost (BG, DE [2], ES [3]; SE [2]; US [2]) Economic uncertainties (ES) Economic compensations (UKR [2])	High cost (ES, FI [3], UK, UKR, US)

Most health and environment concerns related to nuclear energy were reported from the period 1970-1990. This tends to coincide with the period of greater social mobilization against nuclear projects around the world.

In some cases (UK, FI) affected people seemed to agree with a 'reluctant acceptance' of nuclear energy because it could help in coping with low-carbon energy and climate change challenges.

The cost of nuclear energy projects has been an argument used by many actors as a justification for reluctance in investing in these projects, for cancelling on-going projects, but also for continuing with a project once it had been initiated (in this case to avoid potentially greater economic losses from cancellation of already invested projects).

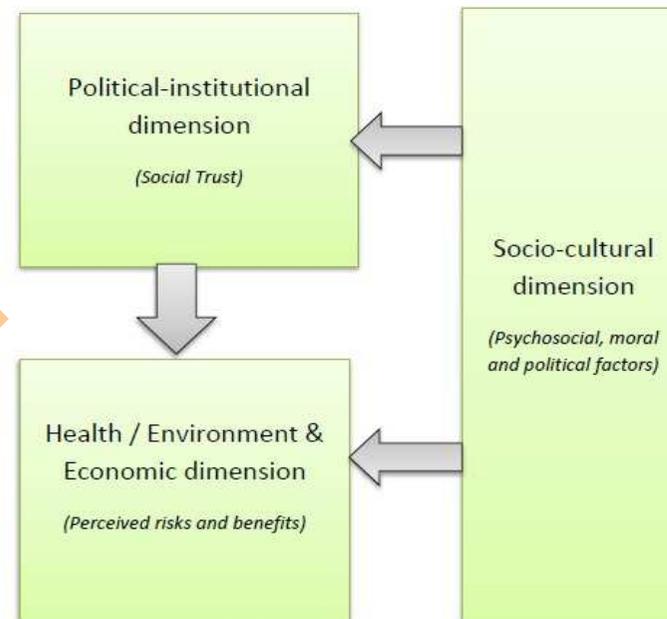
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The **perceived risks and benefits** are very **similar** in **ALL** the countries sampled.



Therefore we need to understand how **people perceive** their relationships with institutions (trust and the **political-institutional dimensions**), as well as what kind of **socio-cultural factors** are part of the context in which the nuclear technology is perceived.

But the social and institutional responses are very **different**.



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Trying to find patterns inside the SCR data...

Factors underlying public perceptions of risks and benefits of nuclear energy		BG	UKR	FI	DE	ES	SE	UK	US
Political-institutional factors	Low institutional trustworthiness	II (2)	II	III(+)	II	II (3)	II	I II (+) III	I (2) II (4) III
	Political strategies	II	III(2)	II III	II	II III	I		
	Dependency of/on other countries	III (2)	I III	I II					III(2)
Socio-cultural factors	Conflicts of values (ideology, etc.)	III (2)	I II	I (2) II	II (2)	II (2)	I II	I (2)	I
	National scientific pride	II (2)	I	I (2)		III	I II	I (2)	I II
	Territorial identity conflicts			I	I (2)	II (3) III	II		I
	Subjective attributes of risk			I (2)	I (2)	III(3)	III	I	

Source: own depiction based on the in-depth analysis of the SCRs. Each line means that that factor or activity has been mentioned in the respective SCR, sometimes more than once (numbers in brackets) over the different historical periods (I= 1950-1970; II= 1970-1990; III= 1990-2015)

Legend: BG = Bulgaria; UKR = Ukraine; FI = Finland; DE = Germany; ES = Spain; SE = Sweden; UK = United Kingdom; US = United States of America



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Our analysis of this complex set of factors reveals that the countries investigated are to be clustered into **three** main groups:

a) Countries where nuclear energy plays a key role in national independence. This independence has conditioned both public opinion and management spheres and has led to a situation where the perceived benefits (in terms of national independence, pride, etc.) are higher than the perceived risks.

Bulgaria, Ukraine, and to some extent Finland, are part of this group.

b) Countries where the nuclear issue was **instrumentally** used for **political** and electoral purposes, and where the behaviour of some institutions (promoters and/or public authorities) was perceived as low trustworthy.

Germany, Spain, and to some extent Sweden, belong to this group.

c) Countries with strong national scientific (and military) **pride**, which has influenced the public perception of risks and benefits, as well as the trust in institutions (regulators and public authorities). They have some public conflicting **values** related to the use of nuclear weapons and the risk of war, more than to the use of civil nuclear technology.

The UK and the USA share this group.



Thank you!

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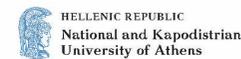
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