

Policy Analytics

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Computational Decision Making and Data Sciences

Outline

- 1 Motivations, Facts and Claims
- 2 Policy Making
- 3 Analytics
- 4 Policy Analytics

What do we observe?

- 1 Increasing demand for supporting the design, implementation and assessment of public policies.
- 2 Specific demand for innovative design for innovative policies.
- 3 Too much information of unknown quality and meaningfulness.
- 4 New Public Management and Evidence Based Policy Making failed to become a sufficient legitimate paradigm both in theory and in practice.
- 5 Focus on Governance of the whole **Policy Cycle**

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Do numbers provide evidence?

alternatives	g_1	g_2
h	2000	500
a	160	435
b	400	370
c	640	305
d	880	240
e	1120	175
f	1360	110
g	1600	45

Table: Weighted sum

Do numbers provide evidence?

alternatives	g_1	g_2	g_1^n	g_2^n
h	2000	500	100.00	100.00
a	160	435	8.00	87.00
b	400	370	20.00	74.00
c	640	305	32.00	61.00
d	880	240	44.00	48.00
e	1120	175	56.00	35.00
f	1360	110	68.00	22.00
g	1600	45	80.00	9.00

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alternatives	g_1	g_2	g_1^n	g_2^n	Score	Rank
h	2000	500	100.00	100.00	100.0	1
a	160	435	8.00	87.00	47.5	2
b	400	370	20.00	74.00	47.0	3
c	640	305	32.00	61.00	46.5	4
d	880	240	44.00	48.00	46.0	5
e	1120	175	56.00	35.00	45.5	6
f	1360	110	68.00	22.00	45.0	7
g	1600	45	80.00	9.00	44.5	8

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alternatives	g_1	g_2	g_1^n	g_2^n	Score	Rank
h	2000	700	100.00	100.00		
a	160	435	8.00	62.14		
b	400	370	20.00	52.86		
c	640	305	32.00	43.57		
d	880	240	44.00	34.29		
e	1120	175	56.00	25.00		
f	1360	110	68.00	15.71		
g	1600	45	80.00	6.43		

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h	2000	700	100.00	100.00	100.0	1
a	160	435	8.00	62.14	35.07	8
b	400	370	20.00	52.86	36.43	7
c	640	305	32.00	43.57	37.79	6
d	880	240	44.00	34.29	39.14	5
e	1120	175	56.00	25.00	40.50	4
f	1360	110	68.00	15.71	41.86	3
g	1600	45	80.00	6.43	43.21	2

Table: Weighted sum

Do numbers provide evidence?

alternatives	g_1	g_2	g_1^n	g_2^n	Score	Rank
h	2000	700	100.00	100.00	100.0	1
a	165	450	8.25	64.29	36.27	8
b	400	370	20.00	52.86	36.43	7
c	640	305	32.00	43.57	37.79	6
d	880	240	44.00	34.29	39.14	5
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J.-Ch. Billaut, D. Bouyssou, Ph. Vincke, "Should you believe the Shanghai index?"
Scientometrics, vol. 84, 237 - 263, 2010.

The Air Quality index

pollutant	CO ₂	SO ₂	O ₃	dust
t_1	3	5	8	6

The Air Quality index

pollutant	CO ₂	SO ₂	O ₃	dust
t_1	3	5	8	6
t_2	1	1	8	1

The Air Quality index

pollutant	CO ₂	SO ₂	O ₃	dust
t_1	3	5	8	6
t_2	1	1	8	1
t_3	7	7	7	7

The Air Quality index

pollutant	CO ₂	SO ₂	O ₃	dust
t_1	3	5	8	6
t_2	1	1	8	1
t_3	7	7	7	7

For the ATMO index t_3 is better than t_2 .

If this index serves as an alert this is fine.

If this index serves to assess a policy this is counterintuitive.

Is majority a reason to make a decision?

- Which majority?
- Is majority sufficient?
- How majorities are constructed?
- Innovation comes from minorities.

Scientific problems

- Is Policy Making special from a decision aiding perspective?
- Does helping policy makers have something special?
- Can we use formal models in helping policy makers?
- If yes, which, how and for what purpose?

What is policy and policy making?

Public Policies

A public policy is a public agreement allocating public resources to a portfolio of actions aiming at achieving a number of objectives settled by the public decision maker. Such agreement generates multiple including or excluding meanings for the subjects of the policy.

Policy Cycle

Policy making, as we rationalise it, is a cycle starting from setting the agenda until assessing the consequences of implementing it.

Our concern is to support the whole cycle!

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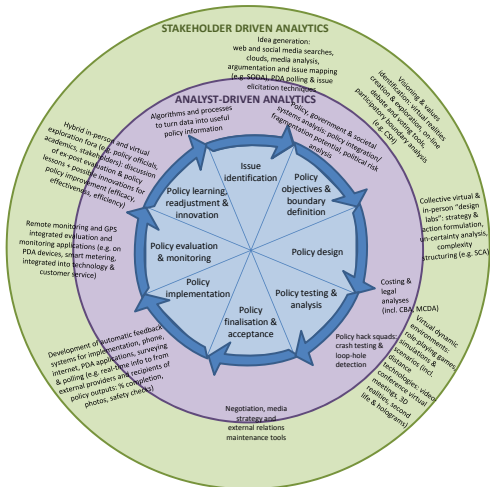
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Policy Cycle (credits to K. Daniell)



What is special in Policy Making?

- Long time horizon.
- Use of public resources.
- Participative decision making processes.
- Accountability and legitimation.
- Deliberation.

What do we have?

- Statistics.
- Performance indicators.
- Data mining.
- Knowledge extraction.
- Machine Learning.

Some questions

- Does the market correctly reveal society's values?
- If not, how do we learn about such values?
- Client's values/Society's values/Legitimated values
- How do we explain/justify/argue about values?

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Create meaningful knowledge

For whom?

The client, the analyst and the stakeholder(s).

Create meaningful knowledge

For whom?

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How?

Respecting measurement theory and elementary decision aiding principles.

Create meaningful knowledge

For whom?

The client, the analyst and the stakeholder(s).

How?

Respecting measurement theory and elementary decision aiding principles.

For what?

Being fair, transparent and coherent.

Create legitimate and legitimating knowledge

For whom?

The client, the stakeholder(s), the general public, respecting the norms.

Create legitimate and legitimating knowledge

For whom?

The client, the stakeholder(s), the general public, respecting the norms.

How?

Arguing and making reasons; establishing ownership.

Create legitimate and legitimating knowledge

For whom?

The client, the stakeholder(s), the general public, respecting the norms.

How?

Arguing and making reasons; establishing ownership.

For what?

Creating enduring convictions.

Create useful knowledge

For whom?

Useful for some decision process, for some stakeholder(s), for some purpose.

Create useful knowledge

For whom?

Useful for some decision process, for some stakeholder(s), for some purpose.

How?

Merging multiple sources including past experiences, hard and soft data, ground knowledge, but also culture, history.

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For what?

Innovative design of public policies.

Examples

- Go beyond the traditional dichotomy of conventional legislation between lawful and unlawful behaviour.
- Personalised taxation schemes taking into account subjective capabilities.
- Introducing self-governed agencies for natural resources management.
- Designing socially responsible algorithms

Comparison

Steps in the Policy Cycle
Issue Identification
Policy Objectives
Policy Design
Policy Testing
Policy Finalisation
Policy Implementation
Policy Monitoring & Evaluation
Policy Learning & Innovation

Table: The Role of Policy Analytics in the Policy Cycle

Comparison

Steps in the Policy Cycle	Business Analytics
Issue Identification	market segmentation
Policy Objectives	Data-driven definition
Policy Design	Single policy design
Policy Testing	Data-based testing (data mining, predictive analysis)
Policy Finalisation	Consensus
Policy Implementation	Assumed straightforward
Policy Monitoring & Evaluation	Evaluation conducted against a success criterion initially set
Policy Learning & Innovation	Feedback, data updates and reactive innovation

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Comparison

Steps in the Policy Cycle	Business Analytics	Policy Analytics
Issue Identification	market segmentation	clustering issues and citizens
Policy Objectives	Data-driven definition	Value-, cultural-stakeholder-driven definition
Policy Design	Single policy design	Scenario and value-driven design of alternative policies
Policy Testing	Data-based testing (data mining, predictive analysis)	revisable testing no benchmarks
Policy Finalisation	Consensus	Legitimation
Policy Implementation	Assumed straightforward	Process legitimation
Policy Monitoring & Evaluation	Evaluation conducted against a success criterion initially set	Explanations Justification Argumentation
Policy Learning & Innovation	Feedback, data updates and reactive innovation	Constructive learning proactive innovation

Table: The Role of Policy Analytics in the Policy Cycle

Conclusions

- **Using evidence is necessary, but not sufficient.**
- Decisions are in the values and not in the data.
- We need to expand analytics through a methodology geared to take into account the specificities of public policy making.
- Policy analytics should and can support innovative design of public policies.

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