MANCHESTER 1824

The University of Manchester

Towards a Taxonomy of Science and Innovation Policy Instruments

Open Evaluation 2016
Vienna, Austria 24 - 25 November 2016

Abdullah Gök, Yanchao Li, ***Paul Cunningham****, Jakob Edler, Philippe Laredo*

Outline

- Introduction
- Classification of Policy and Policy Instruments
- Classification of Science and Innovation Policy Instruments
- Our Taxonomy
- Benefits/Pitfalls/Remedies

Introduction

- Classification as an indicator of the maturity of scientific field/discipline
- "policy" is increasingly becoming a central object of analysis in science and innovation studies, while no comprehensive and rigorous classification of science and innovation policies (SIP) instruments exists
- Object of classification: SIP instruments
- Our objective:
  - to formulate a comprehensive taxonomy of SIP instruments
  - to illustrate its usefulness

Classification: Typology

- Classification- one of the main processes of social science (and other disciplines): ordering entities into groups or classes on the basis of similarity (Bailey 1994) – 'simplifying complexity'
- Typology:
  - Classification of entities driven by conceptual or qualitative understanding - inherently subjective
  - Lowi's (1972) policy typology: to provide explanations and predictions of political patterns for any given policy "the basis for classification reveals the hidden meanings and significance of the phenomenon, suggesting what the important hypotheses ought to be concerned with"
  - Subsequent adjustments to Lowi typology (e.g. Kellow, 1988; Miller, 1990; Anderson, 1997)
  - Criticism:
    - inherently flawed process as it is often based on personal judgement and thus subjective (Smith, 2002)
    - subjective theoretical constructs exerting political positions and influences (Stone, 2002)

Classification: Taxonomy

- Taxonomy:
  - classification of empirical entities
  - more complex, often in a hierarchical and mutually exclusive way
  - less subjective – (but not cf. sciences)
  - can take into account a broad set of policy issues and seek to empirically divide them into categories on the basis of generally accepted characteristics rather than look for policy groups based on researchers' estimation (Smith 2002)
  - deconstructing the fruitcake and ordering the ingredients by their properties

Classification: Unit of Analysis

- Policies versus instruments/measures/programmes
- 'policies' often treated as non-separable units, while in practice they are multidimensional, involving objectives, target groups, as well as concrete tools used to address those objectives and target groups
- Policy:
  - a statement of intent driven by certain objectives rather than a tangible entity that is empirically observable
  - practically: a particular 'programme' or collection of 'programmes' underpinned by a common strategy
- Policy instrument/measures/programmes:
  - "myriad techniques at the disposal of governments to implement their public policy objectives" (Howlett, 1991)
  - one aspect of translating public policies into tangible actions and outcomes – the practical implementation of political intent
  - generic tools ('levers') employed to fulfil the intentions outlined in policies
  - Instruments live in a political context: a condensed form of knowledge about social control and ways of exercising it (Edler, Gök, Cunningham and Shapira, 2016).

Classification of SIP instruments

- Alic (2002): taxonomy of technology policy instruments
  1. direct government funding of R&D
  2. direct or indirect support for commercialisation and production, and indirect support for development
  3. support of learning
  - No insight into the linkage between instrumentation and what specific policy problems can be addressed through an intervention logic
- EU policy instruments
  - Rothwell and Dodgson (1992): changing focus of policy instrumentation towards increasing coordination between instruments
  - Lundvall and Borrás (2005): based on object of intervention
    - science policy instruments, technology policy instruments and innovation policy instruments
  - Rodriguez and Montalvo (2007): economic policy > industrial

Classification of SIP instruments

- Borras and Edquist (2013): regulations (obligatory), economic transfers (incentives), and soft instruments (complementary)
- Edler and Georghiou (2007): demand-supply dichotomy and then modalities. *Edler, Gök, Cunningham and Shapira (2016)* broadly followed this.
- Long history of EC attempts:
  - 1993 Action Plan for Europe: fostering innovation culture; establishing conducive framework conditions; and gearing research to innovation
  - INNO-Policy TrendChart and ERAWATCH: based on political/thematic priorities (>50 categories)
  - EC (2013): based on the 'innovation system element and policy objective' to be addressed
  - hard to justify the mutual exclusiveness and conceptual consistency of those priorities

Classification of SIP instruments

- Issues with the current classifications:
  - too rigid or too *ad hoc* to serve as generic tools to facilitate research and practice
  - often based on political priorities
  - serve different objectives
    - to provide conceptual background for a particular discussion (Rodriguez and Montalvo (2007), Edler and Georghiou (2007), Borras and Edquist (2013)),
    - to divide literature to meaningful chunks to be able to synthesise (Edler et al., 2016 - Nesta),
    - to monitor political priorities (EC initiatives).
  - often single dimension (with conflated attributes)
  - very long lists (thus reduced conceptual clarity and mutual exclusiveness)

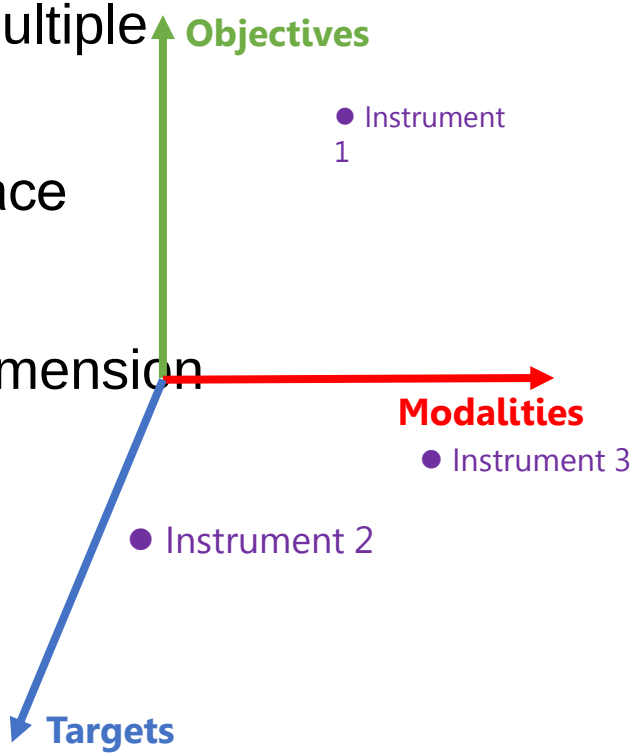
Our Taxonomy

- Three dimensions of SIP instruments
  - Objective (Why the support is provided): basic policy purpose/aim
  - Modality (How support is provided): operation and the means of delivery
  - Target (Recipient of the support): main beneficiaries or focus

- based on an empirical analysis of over 1,000 policy documents such as policy evaluation reports, policy reviews and academic articles which provide a discussion of policy instruments collected as part of the Compendium of Innovation Policy (*Edler, Gök, Cunningham and Shapira, 2016*)

Our Taxonomy

- multi-dimensional:
  - objective, modality, target
  - mutually exclusive (but can have multiple categories within a dimension)
  - coordinates in Euclidian 'policy' space
- multi-attribute:
  - instruments have more than one dimension
  - 1,200 possible coordinates
- Other basic information:
  - geographic (country)
  - national/regional



Dimensions: A. Objectives

A. Policy objectives (Why the support is provided)	A1. Enhancement of education and initial/further training
	A2. Facilitating personnel mobility
	A3. Internationalisation of (research, technology, development and innovation (RTDI) activities
	A4. Awareness raising and promotion of public acceptance
	A5. Strengthening/improving research management practices
	A6. Improving absorptive capabilities and capacity
	A7. Supporting collaborative interactions for the production of new knowledge and/or innovation (including project focused approaches, innovation vouchers, etc.)
	A8. Supporting broader (multiple) interactions (e.g. through clusters or networks)
	A9. Supporting the commercialisation of research (including support for the protection of IP)
	A10. Mobilising additional (non-public) financing for innovation (e.g. support of business angels, VCTs, equity schemes, etc.)
	A11. Stimulation of additional RTDI activity (e.g. increasing R&D expenditures)
	A12. Strengthening the quality of RTDI activities (promotion of excellence)
	A13. Creating new RTDI capacity (e.g. new organisations, start-ups, technology-based companies)
	A14. Generation or diffusion of innovation targeting the demand for innovation or the interaction between demand and supply…
	A15. To support priority setting (e.g. foresight exercise)
	A16. Supporting the participation and advancement of women or minority groups in R&I

Dimensions: B. Modalities

B. Modalities (How support is provided)	B1. Direct financial support: grants, loans, guarantees, contracts, etc.
	B2. Direct financial support: scholarships, fellowships, etc.
	B3. Direct financial support: (non-project specific) institutional block grants including large centres
	B4. Indirect financial support: tax & fiscal incentives (e.g. R&D credits)
	B5. Infrastructure support (e.g. provision of access to and construction/upgrading of research infrastructure)
	B6. Non-financial support (e.g. training ,coordination and advisory/information support/provision)
	B7. Prizes and awards (ex-ante inducement, ex-post performance recognition, etc.)
	B8. Indirect support/stimulation – norms, standards, regulations

Dimensions: C. Targets

C. Targets (Recipient of the support)	C1. Individuals (researcher, student, manager, entrepreneur, investor, etc.)
	C2. Higher Education Institutions (including sub-departments and institutions)
	C3. Research Organisations (including the spectrum from public (PROs) to private (RTOs))
	C4. Public organisations (governmental or quasi-governmental agencies, policy-making organisations – not directly involved in R&D)
	C5. Intermediaries (e.g. science parks, business incubators, technology parks, knowledge brokers, TTOs, etc.)
	C6. Firms (SMEs focused)
	C7. Firms (no size-specific focus)
	C8. Other funding organisations (NGOs, NPIs, Not-for-Profit, Charities.)
	C9. Specific industrial sector targeted
	C10. Specific S&T field targeted

Use and Usefulness

- Potential Uses:
  - Conceptual map of policy instruments
  - Framework for policy analysis
  - Practical schema for data (SIPER database)

- Practical Benefits
  - multi-dimensional vs single-dimensional
  - allows location/identification by single-attribute
  - mutually-exclusive vs mutually-inclusive
  - might serve for different purposes

Limitations and remedies

- Systematically reflects one way of making sense of policy and instrument complexity
- Might perpetuate a certain framing of thinking about instruments and policies; the illusion of no alternative
  - e.g. typology based on objectives, target groups and modalities ignores
    - policy logic of time ("journeys and stages")
    - responsibilities for policies / instruments
- Typologies need
  - an explicit explanation / rationale for choosing lead dimensions
  - clarity about consequences of choices (and omissions)
  - commentary on alternatives
  - flexibility

Benefits, pitfalls, remedies

- Delivers a definitive list of interventions to refer to, simplifying policy design, communication and comparison
- Could limit creativity in reasoning about interventions, or force simplification of understanding of instruments to fit categories
- Use of typology needs to
  - be accompanied by free spaces to think about intervention
  - allow for ambiguity and multiple categorisation
  - allow for contingency approach: designed for different purposes
  - permit hierarchies of aggregation and simplification
  - retain awareness of the purpose for their design/construction

Thank You!

http://www.research.mbs.ac.uk/innovation

Any questions?