DEPARTMENT OF SCIENCE, TECHNOLOGY, ENGINEERING AND PUBLIC POLICY

Looking Beyond Policy Design: The Organisation of Innovation Policy

Irina Brass, University College London

Lecturer in Regulation, Innovation and Public Policy

i.brass@ucl.ac.uk

@InaBrass

27 June 2019

T13P08 – The Design and Organisation of Innovation Policy

ICPP4 MONTRÉAL2019

Overview

- ✓ **Panel vision, ambition** & research question(s)
- ✓ **State of play:** systems of innovation, policy mixes & … innovation bureaucracies
- ✓ Policy instruments, **regulatory instruments**, **regulatory regimes** and organizational structures
- ✓ **Two brief examples:** IoT & ATMPs

Research Question

How do governments **organise** their innovation policy, beyond its initial design?

Innovation Policy

INNOVATION POLICY	
Problem-oriented	Innovation policy responds to “systemic problems”, “policy problems” or just problems (Edquist 2011)
Invention-oriented	Innovation policy focused on R&D at the invention phase, leaving exploitation & diffusion to the market (Edler & Fagerberg 2017)
Mission-oriented	Innovation policy focuses on specific societal challenges (non-technological) that define the political agenda and cut across industrial sectors (domains). The focus is not only on the R&D phase, but the entire innovation cycle (Mazzucato 2013, Kattel and Mazzucato 2018)

Edquist, C., 2011. **Design of innovation policy through diagnostic analysis: identification of systemic problems (or failures).** Industrial and Corporate Change 20, 1725–1753. https://doi.org/10.1093/icc/dtr060
Edler, J., Fagerberg, J., 2017. **Innovation policy: what, why, and how**. Oxford Review of Economic Policy 33, 2–23. https://doi.org/10.1093/oxrep/grx001
Kattel, R., Mazzucato, M., 2018. **Mission-oriented innovation policy and dynamic capabilities in the public sector**. Ind Corp Change 27, 787–801. https://doi.org/10.1093/icc/dty032

Systems of Innovation (SI)

Box 7.1 Systems of innovation: main terms used

Innovations = product innovations as well as process innovations. Product innovations are new—or better—material goods as well as new intangible services. Process innovations are new ways of producing goods and services. They may be technological or organizational.

SI = system of innovation = the determinants of innovation processes = all important economic, social, political, organizational, institutional, and other factors that influence the development, diffusion, and use of innovations.

Constituents of SIs = *components* + *relations* among the components.

Main components in SIs = organizations and institutions.

Organizations = formal structures that are consciously created and have an explicit purpose. They are players or actors.

Institutions = sets of common habits, norms, routines, established practices, rules, or laws that regulate the relations and interactions between individuals, groups, and organizations. They are the rules of the game.

An SI has a *function*, i.e. it is performing or achieving something. The *main function* in SIs is to pursue innovation processes, i.e. to develop, diffuse and use innovations.

Activities in SIs are those factors that influence the development, diffusion, and use of innovations. The activities in SIs are the same as the determinants of the main function.

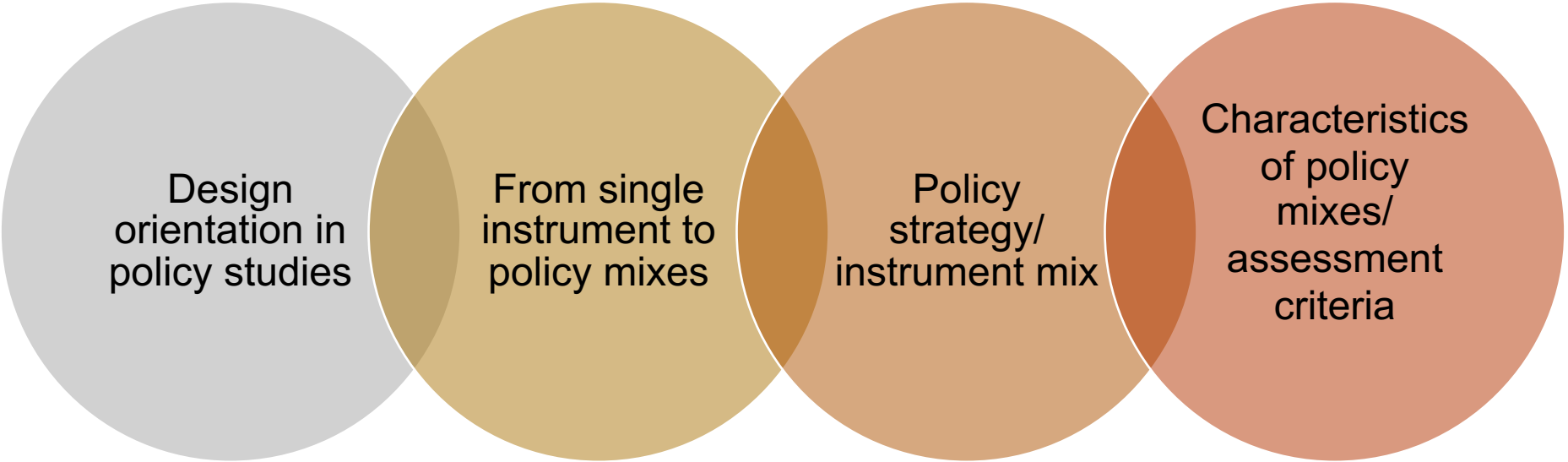
Edquist, C., 2006. **Systems of Innovation: Perspectives and Challenges**. The Oxford Handbook of Innovation.
https://doi.org/10.1093/oxfordhb/9780199286805.003.0007

Table 1. Taxonomy of Functions of Innovation Bureaucracies

Function	*Socio-economic policy goals, relation to innovation*	*Examples of organizational configurations*
Management of strategic resources	Ensure wider returns from key assets; up/downstream skill and technology development	Trading companies, state owned companies
Long-term investment	Ensure financing of future technologies and skills, upgrading of existing ones; infrastructure and public works development.	Central banks steering private finance, development banks, public venture funds
Furthering knowledge frontier	Ensure research into basic scientific questions, enable next generation of technologies	Research funding agencies; public universities
Deepening technology base	Ensure widening of applied R&D, lowering risks of diversification, upgrading	Developmental and innovation agencies; IPR offices; experimental technology and policy/public service labs
Generating demand for new products and services	Generate market power for new technologies, innovations deemed socio-politically important	Procurement of innovations, public R&D laboratories; regulatory bodies (in health, environment, energy)
Diffusion of new skills, technology	Ensure wider benefits from technological advances and innovations	Industry associations, competition authorities

Karo, E., Kattel, R., 2015. **Innovation Bureaucracy: Does the organization of government matter when promoting innovation?** Circle Lund University: Papers in Innovation Studies Paper no. 2015/38.
http://wp.circle.lu.se/upload/CIRCLE/workingpapers/201538_Karo_Kattel.pdf

Policy Design & Policy Mixes



Howlett, M., 2014. **From the 'old' to the 'new' policy design: design thinking beyond markets and collaborative governance.** Policy Sciences 47, 187–207. https://doi.org/10.1007/s11077-014-9199-0
Rogge, K.S., Reichardt, K., 2016. **Policy mixes for sustainability transitions: An extended concept and framework for analysis**. Research Policy 45, 1620–1635. https://doi.org/10.1016/j.respol.2016.04.004

Innovation Policy Instruments

Table 1: Taxonomy of innovation policy instruments

Innovation policy instruments	Overall orientation: Supply	Overall orientation: Demand	Goals: Increase R&D	Goals: Skills	Goals: Access to expertise	Goals: Improve systemic capability, complementarity	Goals: Enhance demand for innovation	Goals: Improve framework	Goals: Improve discourse
1 Fiscal incentives for R&D	●●●		●●●	●○○					
2 Direct support to firm R&D and innovation	●●●		●●●						
3 Policies for training and skills	●●●			●●●					
4 Entrepreneurship policy	●●●				●●●				
5 Technical services and advice	●●●				●●●				
6 Cluster policy	●●●					●●●			
7 Policies to support collaboration	●●●		●○○		●○○	●●●			
8 Innovation network policies	●●●					●●●			
9 Private demand for innovation		●●●					●●●		
10 Public procurement policies		●●●	●●○				●●●		
11 Pre-commercial procurement	●○○	●●●	●●○				●●●		
12 Innovation inducement prizes	●●○	●●○	●●○				●●○		
13 Standards	●●○	●●○					●○○	●●●	
14 Regulation	●●○	●●○					●○○	●●●	
15 Technology foresight	●●○	●●○							●●●

Notes: ●●● = major relevance, ●●○ = moderate relevance, and ●○○ = minor relevance to the overall orientation and stated innovation policy goals of the listed innovation policy instruments.
Source: Adapted from Edler *et al.* (2016b, p. 11).

Edler, J., Fagerberg, J., 2017**. Innovation policy: what, why, and how**. Oxford Review of Economic Policy 33, 2–23. https://doi.org/10.1093/oxrep/grx001

Table 1. Variety of instruments that could be used as building blocks of a policy mix.

Instrument /policy		References	Supply Side (S)/ Demand Side (D) (Edler and Georgiou 2007)	Regulatory (R)/ Financial (F)/ Soft (S) (Borrás 2009)
Grants for R&D		Lall and Teubal (1998), Vedung (2003), Mani (2004), Hsu, Shyu, and Tzeng (2005), Edler and Georghiou (2007), UNU-MERIT et al. (2009), Rogge and Reichardt (2013)	S	F
Direct subsidies for R&D		STRATA-ETAN (2002), Ghazinoory, Mirzaei, and Ghazinoori (2009), European Union (2011), Rogge and Reichardt (2013)	S	F
R&D loan		Edler and Georghiou (2007), Rogge and Reichardt (2013)	S	F
Public support for VC funds		STRATA-ETAN (2002), Hsu, Shyu, and Tzeng (2005), Edler and Georghiou (2007), European Union (2011), Borrás and Edquist (2013), Rogge and Reichardt (2013)	S	F
R&D tax credit for firm		Mani (2004), Hsu, Shyu, and Tzeng (2005), Edler and Georghiou (2007), UNU-MERIT et al. (2009), European Union (2011), Rogge and Reichardt (2013), Crespi and Maffioli (2014)	S	
Collaborative grants		Edler and Georghiou (2007), UNU-MERIT et al. (2009)	S	
Financial support for R&D alliances or consortia (state, businesses, universities)		European Union (2011), Borrás and Edquist (2013), Rogge and Reichardt (2013)	S	
Public procurement for R&D		Edler and Georghiou (2007)	D	
Public procurement for innovative products,		Edler and Georghiou (2007)	D	
Catalyst procurement for innovative products		Edler and Georghiou (2007)	D	
Financial support for universities, and educational and research institutions		STRATA-ETAN (2002), Edler and Georghiou (2007), Borrás and Edquist (2013)	S	
Support for human resources	PhD training	STRATA-ETAN (2002), UNU-MERIT et al. (2009)	S	
	Subsidies for personnel hiring	Lall and Teubal (1998), STRATA-ETAN (2002), UNU-MERIT et al. (2009)	S	
	Reductions in employers' payroll tax and social contributions	Edler and Georghiou (2007)	S	
	Industrial research Studentship	Edler and Georghiou (2007)	S	
	Subsidies for personnel	Edler and Georghiou (2007),	S	

Table 1. Continued.

Instrument /policy		References	Supply Side (S)/ Demand Side (D) (Edler and Georgiou 2007)	Regulatory (R)/ Financial (F)/ Soft (S) (Borrás 2009)
		STRATA-ETAN (2002), Vedung (2003), Edler and Georghiou (2007)		
Technology platforms		Edler and Georghiou (2007)	S	F
Representation projects, exhibitions		Edler and Georghiou (2007), Rogge and Reichardt (2013)	S	F
Market	supporting new stock markets	European Union (2011)	S	F
	Market design	Rogge and Reichardt (2013)	D	F
	Encouraging bank financing	European Union (2011)	S	F
Support for intellectual property rights (patent policy)		STRATA-ETAN (2002), Wu, Popp, and Bretschneider (2007), UNU-MERIT et al. (2009), European Union (2011), Borrás and Edquist (2013), Rogge and Reichardt (2013)	D	R
Guarantee	Loss guarantee	Edler and Georghiou (2007)	S	F
	Loan guarantee	European Union (2011)	S	F
	Export credit guarantees	Rogge and Reichardt (2013)	S	F
Competition policies		UNU-MERIT et al. (2009), Crowley and Jordan (2017)	D	R
Standardization (in order to encourage innovation)		Edler and Georghiou (2007), Ghazinoory, Mirzaei, and Ghazinoori (2009), Borrás and Edquist (2013), Rogge and Reichardt (2013)	D	S
Creating culture and public awareness	Increasing public awareness	Ghazinoory, Mirzaei, and Ghazinoori (2009)	D	R
	Public awareness campaign	Rogge and Reichardt (2013)	D	S

Source: Compiled by Authors; Classification of policy instruments into the Supply Side (S)/ Demand Side (D) and Regulatory (R)/ Financial (F)/ Soft (S)) is mainly based on Edler & Georgiou (2007) and Borrás (2009) respectively.

Ghazinoory, S., Amiri, M., Ghazinoori, S., Alizadeh, P., 2018**. Designing innovation policy mix: a multi-objective decision-making approach**. Economics of Innovation and New Technology 0, 1–21. https://doi.org/10.1080/10438599.2018.1500115

Evaluating the policy mix approach…

"The desirable nature of a policy mix is often explained in terms of its characteristics, using terms like consistency, coherence, congruence, credibility, stability, and comprehensiveness" (Ghazinoory et al 2018, p. 3).

" […] existing policy mix studies often fall short of reflecting the complexity and dynamics of actual policy mixes, the underlying politics and the evaluation of their impacts" (Rogge and Reichardt 2016, p. 1620).

Research Gap

"The design of a good policy is, to a considerable extent, the **design of an organizational structure** capable of learning and of adjusting behavior in response to what is learned." (1982, 384-385) Yet, most current innovation policy debates have one thing in common: **implementation of policies is often assumed to be exogenous to policies**; what matters is the policy choice (e.g., what kind of R&D tax breaks work? should we have a public venture capital fund?), and not how this choice is designed and implemented, and by whom. **Thus, there's an inherent policy bias when we typically talk about innovation and the state**". (Karo and Kattel 2015, p. 2)

Karo, E., Kattel, R., 2015. **Innovation Bureaucracy: Does the organization of government matter when promoting innovation?** Working Paper, http://wp.circle.lu.se/upload/CIRCLE/workingpapers/201538_Karo_Kattel.pdf

Limitations of ‘instruments approach’

Table 2
Type-purpose instrument typology (with instrument examples).

	PRIMARY PURPOSE		
PRIMARY TYPE	Technology push	Demand pull	Systemic
Economic instruments	RD&D* grants and loans, tax incentives, state equity assistance	Subsidies, feed-in tariffs, trading systems, taxes, levies, deposit-refund-systems, public procurement, export credit guarantees	Tax and subsidy reforms, infrastructure provision, cooperative RD&D grants
Regulation	Patent law, intellectual property rights	Technology/performance standards, prohibition of products/practices, application constraints	Market design, grid access guarantee, priority feed-in, environmental liability law
Information	Professional training and qualification, entrepreneurship training, scientific workshops	Training on new technologies, rating and labelling programs, public information campaigns	Education system, thematic meetings, public debates, cooperative RD&D* programs, clusters

Source: Own elaboration (based on del Río González, 2009a; Edler and Georghiou, 2007; Hemmelskamp, 1999; Hufnagl, 2010; IEA, 2011b; Mowery, 1995; Rammer, 2009; Rennings et al., 2008; Smits and Kuhlmann, 2004; Sterner, 2000; Wieczorek and Hekkert, 2012).

* RD&D = Research, development and demonstration.

Rogge, K.S., Reichardt, K., 2016. **Policy mixes for sustainability transitions: An extended concept and framework for analysis**. Research Policy 45, 1620–1635. https://doi.org/10.1016/j.respol.2016.04.004

Focus on ‘policy capacity’

Table 1
Policy capacity: skills and resources.

Levels of resources and capabilities	Skills and competences		
	Analytical	Operational	Political
Individual	Individual analytical capacity	Individual operational capacity	Individual political capacity
Organizational	Organizational analytical capacity	Organizational operational capacity	Organizational political capacity
Systemic	Systemic analytical capacity	Systemic operational capacity	Systemic political capacity

Source: Wu, Ramesh & Howlett (2015)

Howlett, M., Ramesh, M., 2016. **Achilles’ heels of governance: Critical capacity deficits and their role in governance failures**. Regulation & Governance 10, 301–313. https://doi.org/10.1111/rego.12091

Wu, X., Ramesh, M., Howlett, M., 2015. **Policy capacity: A conceptual framework for understanding policy competences and capabilities**. Policy and Society 34, 165–171. https://doi.org/10.1016/j.polsoc.2015.09.001

Wu, X., Howlett, M, Ramesh, M. , 2018. **Policy capacity and governance: assessing governmental competences and capabilities in theory and practice** / Xun Wu, Michael Howlett, M. Ramesh (eds) Studies in the political economy of public policy. Springer International Publishing AG, Cham, Switzerland.

Howlett, M., Vince, J., Río, P. del, 2017. **Policy Integration and Multi-Level Governance: Dealing with the Vertical Dimension of Policy Mix Designs**. Politics and Governance 5, 69–78. https://doi.org/10.17645/pag.v5i2.928

Limitations of ‘policy capacity approach’

“**it is impossible to understand policy capacity** (or policy effectiveness, or performance), how it is generated, maintained and changed, **without public management**; in order to understand policy capacity we have to speak about the ***co-evolutionary processes*** between political and policy ideas, public management or implementation, and private-sector dynamism” (Karo and Kattel 2014).

What is missing…

- Complex policy problems & missions require a deeper understanding of the **public management and implementation topology** (Kopp 2019 @ICPP)
- Mapping **"distributed agency"** and understanding balance across old & new organisations/ entities (Kattel & Mazzucato 2018)
- Distributed **capabilities** (Sowell 2019 @ICPP) **and capacities** (Lodge & Wegrich 2014)
- Dynamic **coordination capacity** across departments, ministries, regulatory agencies and innovation agencies
- **Oversight capacity**, which is generally located at the rule-making level, not always at policy-making level

A brief example…

Department for Business, Energy & Industrial Strategy

Policy paper

The Grand Challenges

Updated 22 May 2019

Contents

The Industrial Strategy sets out Grand Challenges to put the UK at the forefront of the industries of the future, ensuring that the UK takes advantage of major global changes, improving people's lives and the country's productivity.

The first 4 Grand Challenges are focused on the global trends which will transform our future:

- Artificial Intelligence and data
- ageing society
- clean growth
- future of mobility

We are developing ambitious missions to tackle the Grand Challenges. Each of these will focus on a specific problem, bringing government, businesses and organisations across the country together to make a real difference to people's lives. As we do this, we are working with leading experts such as University College London's Commission for Mission Oriented Innovation and Industrial Strategy.

Press release

Plans announced to introduce new laws for internet connected devices

Plans to ensure that millions of household items that are connected to the internet are better protected from cyber attacks have been launched

Published 1 May 2019
From: Department for Digital, Culture, Media & Sport and Margot James MP

One of the core aims of the consultation is to listen to feedback on the various implementation options we have developed in partnership with industry and stakeholders. These include the following three options:

- **Option A:** Mandate retailers to only sell consumer IoT products that have the IoT security label, with manufacturers to self declare and implement a security label on their consumer IoT products.
- **Option B:** Mandate retailers to only sell consumer IoT products that adhere to the top three guidelines, with the burden on manufacturers to self declare that their consumer IoT products adhere to the top three guidelines of the Code of Practice for IoT Security and the ETSI TS 103 645.
- **Option C:** Mandate that retailers only sell consumer IoT products with a label that evidences compliance with all 13 guidelines of the Code of Practice, with manufacturers expected to self declare and to ensure that the label is on the appropriate packaging.

Consultation outcome

Proposals regarding setting standards for smart appliances

Published 16 March 2018
Last updated 16 October 2018 — see all updates
From: Department for Business, Energy & Industrial Strategy

This consultation has concluded

Download the full outcome

Government response to consultation on proposals regarding smart appliances

PDF, 317KB, 31 pages

This file may not be suitable for users of assistive technology. Request an accessible format.

Decisions taken following this Consultation

The Government is committed to ensuring there is appropriate regulation for smart appliances in the UK. This is to encourage the uptake of smart appliances, to ensure there is adequate protection against potential risks associated with smart appliances and, as regulatory approaches are planned internationally, to avoid the UK becoming a dumping ground for sub-standard smart appliances. Our key decisions are below. Additional decisions are set out in our response to each of the consultation questions.

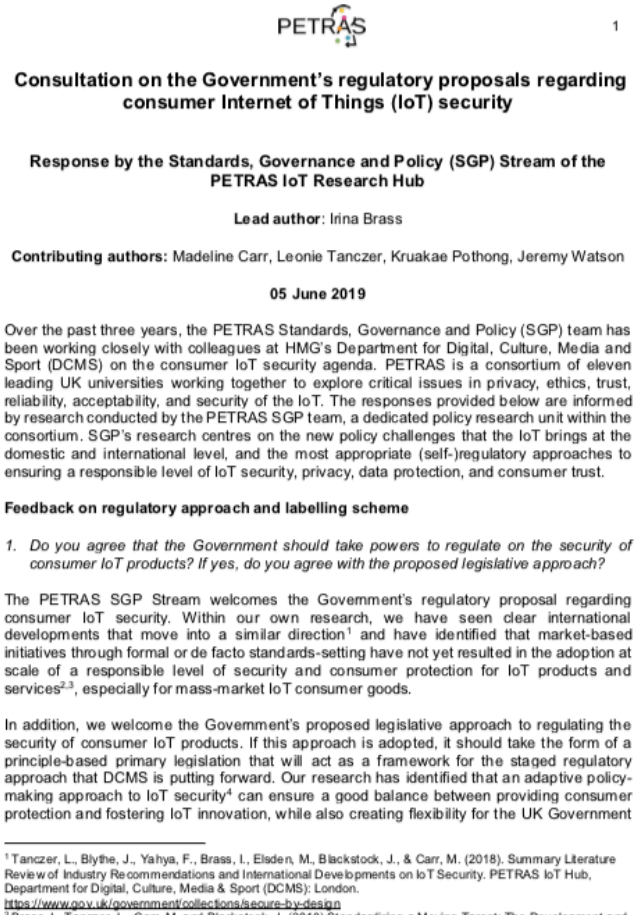
1) **The Government intends to take powers to set regulatory requirements for smart appliances.**

The Government believes that there is a strong case for there to be regulatory requirements for smart appliances. Therefore, we will prepare proposals to take powers (when Parliamentary time allows) to set regulatory requirements for smart appliances. Depending on the outcome of the EU Exit negotiations, in certain circumstances, these powers might be taken through secondary legislation. If that is not feasible, then the Government intends to take these powers through primary legislation, when Parliamentary time allows. The UK's relationship with EU regulation, including in this area, is a matter for ongoing negotiations and these proposals are without prejudice to the UK's future relationship with the EU, after the UK has left in March 2019.

2) **The Government expects industry to develop technical standards for smart**

Key Challenges

- ✓ Beyond policy mix - **regulatory regime misalignment**: security, safety, privacy, liability, interoperability (i.e. affects market structure)
- ✓Policy vs **regulatory instruments**: principles-based regulation vs labelling
- ✓ Policy **ambit**, administrative 'turf' & **coordination capacity**: smart appliances & consumer IoT?
- ✓ **Oversight capacity** and governance **topology**: Office for Product Safety & Standards (BEIS), OFCOM, ICO?



PETRAS 1

Consultation on the Government's regulatory proposals regarding consumer Internet of Things (IoT) security

Response by the Standards, Governance and Policy (SGP) Stream of the PETRAS IoT Research Hub

Lead author: Irina Brass

Contributing authors: Madeline Carr, Leonie Tanczer, Kruakae Pothong, Jeremy Watson

05 June 2019

Over the past three years, the PETRAS Standards, Governance and Policy (SGP) team has been working closely with colleagues at HMG's Department for Digital, Culture, Media and Sport (DCMS) on the consumer IoT security agenda. PETRAS is a consortium of eleven leading UK universities working together to explore critical issues in privacy, ethics, trust, reliability, acceptability, and security of the IoT. The responses provided below are informed by research conducted by the PETRAS SGP team, a dedicated policy research unit within the consortium. SGP's research centres on the new policy challenges that the IoT brings at the domestic and international level, and the most appropriate (self-)regulatory approaches to ensuring a responsible level of IoT security, privacy, data protection, and consumer trust.

Feedback on regulatory approach and labelling scheme

1. *Do you agree that the Government should take powers to regulate on the security of consumer IoT products? If yes, do you agree with the proposed legislative approach?*

The PETRAS SGP Stream welcomes the Government's regulatory proposal regarding consumer IoT security. Within our own research, we have seen clear international developments that move into a similar direction[1] and have identified that market-based initiatives through formal or de facto standards-setting have not yet resulted in the adoption at scale of a responsible level of security and consumer protection for IoT products and services[2,3], especially for mass-market IoT consumer goods.

In addition, we welcome the Government's proposed legislative approach to regulating the security of consumer IoT products. If this approach is adopted, it should take the form of a principle-based primary legislation that will act as a framework for the staged regulatory approach that DCMS is putting forward. Our research has identified that an adaptive policy-making approach to IoT security[4] can ensure a good balance between providing consumer protection and fostering IoT innovation, while also creating flexibility for the UK Government

[1] Tanczer, L., Blythe, J., Yahya, F., Brass, I., Elsden, M., Blackstock, J., & Carr, M. (2018). Summary Literature Review of Industry Recommendations and International Developments on IoT Security. PETRAS IoT Hub, Department for Digital, Culture, Media & Sport (DCMS): London. https://www.gov.uk/government/collections/secure-by-design

Another brief example…

EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH

Advanced therapy medicinal products: Overview

Share

Advanced therapy medicinal products (ATMPs) are medicines for human use that are based on genes, tissues or cells. They offer groundbreaking new opportunities for the treatment of disease and injury.

ATMPs can be classified into three main types:

- **gene therapy medicines:** these contain genes that lead to a therapeutic, prophylactic or diagnostic effect. They work by inserting 'recombinant' genes into the body, usually to treat a variety of diseases, including genetic disorders, cancer or long-term diseases. A recombinant gene is a stretch of DNA that is created in the laboratory, bringing together DNA from different sources;
- **somatic-cell therapy medicines:** these contain cells or tissues that have been manipulated to change their biological characteristics or cells or tissues not intended to be used for the same essential functions in the body. They can be used to cure, diagnose or prevent diseases;
- **tissue-engineered medicines:** these contain cells or tissues that have been modified so they can be used to repair, regenerate or replace human tissue;

In addition, some ATMPs may contain one or more medical devices as an integral part of the medicine, which are referred to as **combined ATMPs**. An example of this is cells embedded in a biodegradable matrix or scaffold.

For detailed definitions of the different groups of advanced therapy medicinal products, refer to Regulation (EC) No 1394/2007 and Directive 2001/83/EC.

Regulatory pathway	Main feature	Product requirements
Conditional Approval (EMA)	Marketing authorization for 1 year, granted before comprehensive data are available. Can be renewed and converted to full authorisation.	The product should belong to one of these categories: • Addresses a serious or life-threatening disease; • Addresses a public health emergency; • Addresses an orphan disease
PRIME (EMA)	Dedicated support and guidance in meeting regulatory compliance. Scientific advice and possibility to engage with other stakeholders.	Product has to be innovative and "of major public health interest". Targeting unmet medical needs and having preliminary clinical evidence.
Accelerated Assessment (EMA)	Evaluation of Marketing Application within 150 days (instead of 210)	Product "of major public health interest" and innovative.
Breakthrough (FDA)	Intensive guidance on efficient drug development and clinical evidence production.	Product has to target serious conditions and unmet medical needs. Preliminary clinical evidence to support improvement over existing alternatives.
Priority Review (FDA)	Aims to complete review in 6 months (instead of 10)	Product that "treats a serious condition" and offers "significant improvement in safety or effectiveness".

Source: De Grandis and Brass 2019

Key Challenges

- ✓ Beyond policy mix - **regulatory regime restructuring**: new EMA remit - consumer protection vs promoting biotech innovation
- ✓ Policy vs **regulatory instruments**: adaptive regulation, more flexibility – more regulatory discretion – less predictability – high innovation costs (e.g. trial size, evidence requirements)
- ✓**Coordination capacity** challenges: centralized authorisation (EMA) - health tech assessment HTA (NICE), healthcare provision (reimbursement)
- ✓ **Oversight capacity:** more post-marketing oversight under conditional approval, but do both regulators and regulated have this capacity?

Conclusions

- ✓ Policy instruments/ mixes need to be studied in conjunction with regulatory instruments/ mixes/ regimes
- ✓ Complex policy problem and missions require governance topology mapping to assess remit overlap and gaps
- ✓ Coordination and oversight capacity are fundamental to understand operational capacity & require further investigation beyond existing policy instrument/ public administration literature

Thank you!

Looking forward to your questions.

Please get in touch if you are interested in our work.

Irina Brass, UCL, i.brass@ucl.ac.uk @InaBrass

Andreas Kopp, UCL, andreas.kopp.16@ucl.ac.uk @AndyPKopp

References

Brass, I., Tanczer, L., Carr, M., Blackstock, J., 2017b. Regulating IoT: Enabling or Disabling the Capacity of the Internet of Things? Risk and Regulation Magazine. LSE Centre for Analysis of Risk and Regulation 33.

De Grandis, G., Brass, I., Petersen, A., 2018. The promise and perils of biotech in personalized healthcare: Can new regulatory pathways protect the vulnerable? CARR Risk and Regulation Magazine.

Edler, J., Fagerberg, J., 2017. Innovation policy: what, why, and how. Oxford Review of Economic Policy 33, 2–23. https://doi.org/10.1093/oxrep/grx001

Edquist, C., 2011. Design of innovation policy through diagnostic analysis: identification of systemic problems (or failures). Industrial and Corporate Change 20, 1725–1753. https://doi.org/10.1093/icc/dtr060

Edquist, C., 2006. Systems of Innovation: Perspectives and Challenges. The Oxford Handbook of Innovation. https://doi.org/10.1093/oxfordhb/9780199286805.003.0007

Ghazinoory, S., Amiri, M., Ghazinoori, S., Alizadeh, P., 2018. Designing innovation policy mix: a multi-objective decision-making approach. Economics of Innovation and New Technology 0, 1–21. https://doi.org/10.1080/10438599.2018.1500115

Howlett, M., 2014. From the 'old' to the 'new' policy design: design thinking beyond markets and collaborative governance. Policy Sciences 47, 187–207. https://doi.org/10.1007/s11077-014-9199-0

Howlett, M., Ramesh, M., 2016. Achilles' heels of governance: Critical capacity deficits and their role in governance failures. Regulation & Governance 10, 301–313. https://doi.org/10.1111/rego.12091

Howlett, M., Vince, J., Río, P. del, 2017. Policy Integration and Multi-Level Governance: Dealing with the Vertical Dimension of Policy Mix Designs. Politics and Governance 5, 69–78. https://doi.org/10.17645/pag.v5i2.928

References

Karo, E., Kattel, R., 2015. Innovation Bureaucracy: Does the organization of government matter when promoting innovation? Circle Lund University: Papers in Innovation Studies Paper no. 2015/38.

Karo, E., Kattel, R., 2014. Public management, policy capacity, innovation and development. Brazilian Journal of Political Economy 34, 80–102. https://doi.org/10.1590/S0101-31572014000100006

Kattel, R., Mazzucato, M., 2018. Mission-oriented innovation policy and dynamic capabilities in the public sector. Ind Corp Change 27, 787–801. https://doi.org/10.1093/icc/dty032

Mariana Mazzucato, 2013. The Entrepreneurial State: Debunking Public vs. Private Myths in Risk and Innovation. Anthem Press.

Metcalfe, J.S., 1995. Technology systems and technology policy in an evolutionary framework. Cambridge J Econ 19, 25–46. https://doi.org/10.1093/oxfordjournals.cje.a035307

Olson, D.L., Birge, J.R., Linton, J., 2014. Introduction to risk and uncertainty management in technological innovation. Technovation 34, 395–398. https://doi.org/10.1016/j.technovation.2014.05.005

Rogge, K.S., Reichardt, K., 2016. Policy mixes for sustainability transitions: An extended concept and framework for analysis. Research Policy 45, 1620–1635. https://doi.org/10.1016/j.respol.2016.04.004

Rosenberg, N., 2009. Uncertainty and Technological Change, in: Studies on Science and the Innovation Process. WORLD SCIENTIFIC, pp. 153–172. https://doi.org/10.1142/9789814273596_0008

Singapore, n.d. Research, Innovation, Enterprise 2020 Plan: Winning the Future through Science and Technology.

Smits, R., Kuhlmann, S., 2004. The rise of systemic instruments in innovation policy. IJFIP 1, 4. https://doi.org/10.1504/IJFIP.2004.004621

Thompson, V.A., 1965. Bureaucracy and Innovation. Administrative Science Quarterly 10, 1–20. https://doi.org/10.2307/2391646

Wu, X., Ramesh, M., Howlett, M., 2015. Policy capacity: A conceptual framework for understanding policy competences and capabilities. Policy and Society 34, 165–171. https://doi.org/10.1016/j.polsoc.2015.09.001

Xun Wu, editor, Michael Howlett, editor, M. Ramesh, editor, 2018. Policy capacity and governance: assessing governmental competences and capabilities in theory and practice / Xun Wu, Michael Howlett, M. Ramesh, editors., Studies in the political economy of public policy. Springer International Publishing AG, Cham, Switzerland.