# Lintelcomp

# **Evidence-based Policy Modeling**

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# OUTLINE

- 1. IntelComp platform
- 2. Conceptual framework
- 3. Measurements and data sources process followed
- 4. Domain specific needs Cancer
- 5. Next steps



### **IntelComp** Platform

What it is about



# The IntelComp platform

- 1. A cloud platform that will offer artificial intelligence based services for STI policy.
- It is designed to assist the whole spectrum of STI policy: agenda setting, policy formulation, implementation, monitoring & evaluation and tested on specific STI policies: artificial intelligence, climate change and health
- 3. It will be **co-created with public administrations and all relevant stakeholders** (academia, industry and citizens) to address specific policy questions
- 4. It will be able to process and analyze large volumes of **textual data** from open data (e.g. OpenAIRE datasets), **using artificial intelligence techniques**
- Conceptually it relates with two existing platforms for STI policy: Corpus Viewer and Data4Impact



## Evidence-based Policy Modelling – WP1 summary

#### Objectives

- Identify policy needs and barriers including domain specific needs
- Identify relevant policy cycle indicators and open data repositories in the pilot domains
- Combine data and indicators to provide solutions for policy makers in the three pilot domains

#### Tasks

- Identification of domain-specific needs, PA and stakeholder consultation
- Selection of indicators and collection of Input Data (T1.2)
- Model Design Solution and Monitoring

#### Domains

- Artificial Intelligence
- Climate Change –
   Blue economy
- Health Cancer

#### WP/Task linkages

- Technical WP2-5
- Conceptual WP6-7

Expert-in-the-loop co-creation methodology



# **CONCEPTUAL FRAMEWORK**

**Policy questions** 



### How did we arrive to the long list of policy questions?

# 1. INNOVATION SYSTEM FUCTIONS

Activities that (may) contribute to the diffusion and utilisation of new science and technology (both positive and negative) are called functions of innovation systems

# 2. POLICY CYCLE

Policy stylized in five policy phases:

- 1. Agenda Setting
- 2. Policy Formulation
- 3. Policy Adoption
- Policy Implementation (and Monitoring)
- 5. Evaluation

#### **3. STAKEHOLDERS**



Stakeholders in focus for Intelcomp Political leadership, Policy officers, Policy analysts, Evaluation agencies, Monitoring managers, EU policy makers, Academic experts, Research institutes, Industry (associations), National funding agencies ....

# 4. DOMAIN SPECIFIC QUESTIONS Domain specific Technology questions to account for stakeholders and

interactions

We use all three dimensions ... but not all possible combinations to create a basic set of questions



## What are innovation system functions accounted for?

**Definition:** Activities that (may) contribute to the diffusion and utilisation of new science and technology (both positive and negative) are called functions of innovation systems

Function 1. Entrepreneurial activity

Function 2. Knowledge creation

Function 3. Knowledge diffusion through networks

Function 4. Guidance (creating legitimacy for stakeholders, visibility and clarity)

Function 5. Market formation (create markets through regulation of incentives)

Function 6. Human and financial Resources mobilisation

**Function 7.** Creation of legitimacy for society/counteract resistance to change (Hekkert, et al., 2006)



# Which definition of the policy cycle did we use?

The basic rationale behind the policy cycle is that policies build up on past knowledge and experiences and as long as you exploit past evidence your policy gets better (policy is not formulated in a vacuum)

#### Agenda setting: Definition of the problem(s) to address

Understand the array of sectoral/technological/institutional potential for a specific future period, determined by internal and external factors

#### • Policy formulation: Explore different courses of action

How can these dimensions be addressed; good practices, positive and negative experiences; rationale

#### Policy adoption: Make a choice

Build an intervention logic to select based on national characteristics and the actions identified in the previous stage

#### Policy Implementation and Monitoring

Implement efficiently and simultaneously collect all data necessary for corrective action and evaluation

• Evaluation

Check coherence, efficiency, effectiveness, value added and impact to help adapt the design of the next cycle





## What policy questions can IntelComp provide answers to?



# **MEASUREMENTS AND DATA SOURCES**

**Process** 



### From 160 policy questions to quantifiable STI measurements

Policy questions and corresponding quantifications are questioned as follows:



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## Policy questions in and out of scope for IntelComp

#### In scope

#### Out of scope

- 1 Policy questions which require AI intelligence (e.g. Policy questions which require traditional statistical data R&D fields of Top R&D investors)
- 2 Policy questions for which we can source sufficient Policy questions for which no sufficient (text) data is available text data (e.g. parliament discussion minutes, TED, or no good proxies can be designed (e.g. € royalties produced by patents)
- 3 Policy questions which are complex but technically Policy questions which require a holistic analysis and a mix of feasible (e.g. What has been the leverage of national sources (e.g. on cost effectiveness or cost benefit) support measures for EU competitive funding?)
- 4 Policy questions in scope in the three domains and Policy questions which require statistical analysis or (e.g. living labs (e.g. In which ways has the diffusion of counterfactual analysis) knowledge taken place?)
- 5 Policy questions requiring AI intelligence not Policy questions for which while AI tools can be used the developed by other (EU) initiatives intelligence they offer policy is limited (e.g. new markets using public consultation data; scale ups leaving the country via news)



# Sources of data identified as relevant for policy questions

Sources of data are assessed in terms of their:

- 1. Text mining potential
- 2. Temporal data availability
- 3. Availability of classifiers
- 4. Open Access vs. paid license
- 5. Resources needed to compille/process
- 6. Representativeness

Туроlоду	Source_label
Company financials/websites/reports	opencorporates
Company financials/websites/reports	Orbis
Company financials/websites/reports	Country Business Registers
Skills demand	Euraxess
Skills demand	Cedefop
Skills demand	LinkedIn
Innovation	Patstat
Innovation	ETSI - standards
Innovation	ISO micro data - standards
Innovation	Github
Innovation	stack overflow
Innovation	EUIPO trademarks and design
Investments pub	Framework Programmes
Investments pub	National Funders
Investments priv	Crunchbase
Investments priv	National Venture Capital sources
Legislation	EURLEX
Legislation	Legislation national/international sources
Policy documents	Overton
Policy documents	Parliament discussion minutes
Policy documents	Government sources
Policy documents	Policy research working papers: OECD; World bank; ECB working
	papers; World Economic Forum
Policy documents	EU publications
Policy documents (evaluations and IAs)	SIPER
Policy documents (evaluations and IAs)	Fteval
Foresight studies	EC; Competence centre on foresight; OECD strategic foresight
Procurement	TED
Skills supply	LinkedIn
Skills supply	LFS
Science	OpenAire
Science	Open science observatory
Science	google scolar
Social media/News	European Media Monitoring /Twitter

# APPROACH TO IDENTIFY DOMAIN SPECIFIC NEEDS

**Preliminary needs identification in the domain of Cancer** 



# **Example: Cancer domain:** identification of STI policy needs

#### Desk research

#### Health scope in IntelComp: EC plans to tackle cancer

#### **The European Beating Cancer Plan**

Sets concrete goals to achieve in 4 strategic areas: control and prevention, diagnosis and screening, treatment, quality of life of survivors and caregivers Cross-cutting themes: **research and innovation**, digital and personalised medicine, and reducing inequalities R&I flagships :

## Knowledge Centre on Cancer (2021)

#### Examples of actions

- Secure access and sharing of patient data in the European Health Data Space (2021-2025)
- Expanding European Cancer Information System (2021-2022)

#### Application



 Integrated approach cross policy areas
 Builds on the existing
 European Cancer Information System, ERNs on rare cancer, the Innovative Partnership for Action Against Cancer, European Commission Initiative on Breast Cancer... Over €3 billion invested in +/- 2000 cancer R&I projects

#### Contributes & informs The European Cancer Mission

One of five mission areas under the umbrella of Horizon Europe, focused on the **future of research and innovation** 

Objective: achieve a measurable goal that could not be achieved through individual actions

Portfolio of actions : research projects, policy measures or even legislative initiatives

Preparatory phase





#### **L**intelcomp

	EU Inten	ention Lo	ogic on Cancer (sim	nplistic version)		
Vision	To leave no stone unturned to take action against cancer contributing to a stronger European Health Union					
Operational objectives	<ul> <li>"New technologies, research and innovation and the service of patient-centred cancer prevention an care"</li> <li>"Saving lives through sustainable cancer prevention"</li> <li>"Improving early detection of cancer"</li> <li>"Ensuring high standards in cancer care"</li> <li>"Improving the quality of life for cancer patients, survivors and carers"</li> <li>"Reducing cancer inequalities across the EU"</li> <li>"Putting childbood cancer under the spotlight"</li> </ul>					
Targets	<ul> <li>"By 2030, reduce by o and promote mental h</li> <li>"Achieve universal hea care services and acce all" Targets from areas rep</li> <li>"A tobacco-free gener</li> <li>"Crelative reduction "Reduce harmful alcoh (relative reduction of exposure to alcohol m</li> <li>"A 10% relative reduct</li> <li>"A 30% relative reduct</li> <li>Halt the rise in diabete</li> <li>"In Line with EU's Acti premature deaths caus Health Organization's g</li> </ul>	ne third c ealth and lth covera sss to safe presenting ation: ens in preval iol consun at least 11 arketing" don in pre- ss and obe on Plan: 1 sed by air   guidelines	of premature mort l well-being" age, including finar e, effective, quality g enabling conditio suring that less that lence of current to mption in line with 0% in the harmful evalence of insuffic evalence in mean p esity Fowards Zero Pollu pollution by 2030 a s and reduce exposi-	cality from cancer t notal risk protection v and affordable ess ons an 5% of the popula blacco use in perso the targets of the L l use of alcohol by clent physical activi population intake o ution for Air, Wate and align the EU's a sure to carcinogeni	hrough   , accessi sential n ation use ns aged JN Susta 2025) ai ty" f salt/sou r and So ir quality c substa	prevention and treatment to quality essential health- nedicines and vaccines for as tobacco by 2040° and a 15+ years inable Development Goals nd reduce young people's dium" illalve the aim is to halva standards with the World nces and radiation"
Policies / Programmes	EU4Health programme	Horizon	i Europe	Digital Europe programme		Legislative proposals
Roadmap/ Actions			EBCP 10 flagsh EBCP 42 :	ip initiatives actions		
STI actions/ initiatives	KNOWLEDGE-DIFFUSION EU Knowledge Centre on Ca EU Network of national comprehensive Cancer Cent Helping Children with Initiative European Reference Netwo Strategic Agenda for Ionising Radiation App (SAMIRA) 2 dedicated HE partnership: healthcare (including cance 1.Innovative Health initiativ 2.Transforming Health and systems Innovative Partnership for Arginst Cancer (IRAAC)	incer Cancer rks Medical lications s on r) e Care r Action	KNOWLEDGE Cl European Canco Initiative EIT and MSCA p Europe) Projects EU Cancer Treatment Capa Capability Mapp European Initiat Understand Car	REATION er Imaging rojects (Horizon acity and bing' project tive to toer (UNCAN)	DATA Europ Syster Geno projer Millio Repo: health Europ	(Platforms) ean Cancer Information m er Inequalities Registry mic for Public Health ct (alongside the 1+ n Genomes Initiative) sitory of digital twins in neare ean Open Science Cloud
STI Outcomes	<ul> <li>Against Cancer (IPAAC)</li> <li>"Reducing cancer ine across the EU"</li> <li>"Putting childhood under the spotlight"</li> </ul>	qualities cancer	<ul> <li>"New tech research a</li> <li>"Saving liv sustain able prevention</li> </ul>	nologies, nd innovation" es through e cancer 1"	•	"New technologies research and innovatior and the service of patient- centred cancer preventior and care"



# **Example: Cancer domain:** identification of STI policy needs



#### Stakeholder Consultation

#### Additional Evaluation questions

#### Unit of analysis: project

- Identification of new collaborations arising (including Public-Private Partnerships)
- Adoption and replicability of innovations to different healthcare systems in the EU. Whether possible/ happening?
- Advancements in Technology Readiness Level (TRL) or Interactive Machine Learning (IML) for the different areas of projects?
- Identification of TRL tranches were projects need more support?
- Project replicability
- Post-marketing data collection (after clinical trials)
- Creation of other ancillary jobs e.g., start-up ecosystem regulators
- Training and skills evolvement/new directions of trained personnel? Adoption of different career profiles?
- Do gender/ age aspects play a role (e.g. research teams' approaches, etc.)?

#### Unit of analysis: programme

- Means to track long term employment
- Retaining skilled / trained talent (also non-EU) (is linked to the creation of employment)
- Mapping of complementary/synergetic/substitute sources of funding
- For subsequent programming period the time window to receive results is important (Cancer is a "race against time")
- Definition of whether the programme is realistic (e.g., time, budget, resources)
- Situational analysis for prioritization (e.g., what field of cancer linked to what return on investment? Quality of life of patients?) it may be a secondary need, but it can help leverage funds
- Measuring research outcomes with a focus on different age groups, namely pediatrics and gender distinctions
- The impact on citizens (Do socio-demographic variables play a role (long-term assessment/monitoring/ evaluation))?

#### **Evaluation needs**

- Quantifying health impact
- Comparing / measuring qualitative impact and patient experience (quality of life, life expectancy gains, etc.)
- Assessment of relevant qualitative data sources, for e.g., during a gap analysis for efficient policy programme planning
- Longer term monitoring of Patient-reported outcome measures and Patient-reported experience measures
- Connecting science practitioners with data analysis to ensure reproducibility of research and technology transfer
- Assessing/ Evaluating medium/long-term indicators to select the right projects to receive funding
- ullet Toolbox for the analysis of various data sources and respective relations
- Exchange platform to discuss results and ask questions
- Improving the evaluation process as a whole (including efficiency)

#### **STI priorities**

- Knowledge: Clinical trials as a driver of research. Importance of monitoring effects, producing statistics, attribution to policy measures
- Knowledge diffusion: Improving (inter-)connectivity between stakeholders and information sharing. Includes considerations on the needs of both public and private entities
- Guidance: The needs of patients at the center. Includes early diagnosis, quality of life, clinical pathways, the patients' journey, measuring/comparing qualitative impacts (such as QoL, life expectancy gains)
- Better data: Includes information sharing, data inter-operability, data protection elements and speeding up data transfer
- Human capital: Upskilling (digital and soft skills)
- Entrepreneurship: The development of health technologies. Includes the role of scale-ups and their sustainability. It is necessary to consider why good hybrid devices/software solutions are not included/considered in the procurement process (they often miss out on these opportunities and then do not survive on the market)
- Other: Understanding the intersection of data between the different policy phases (from foresight, agendasetting to evaluation)



# Example: Cancer domain: identification of STI policy needs

Prioritisation by living lab [provisional]

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Analysis of the impact of funded research projects and the characterization of 'impact pathways'



Source: High Council for Evaluation of Research and Higher Education, 2020

Three levels of needs	In terms of:	Domain specific data requirements
To characterize in a broad way the scientific production ("output") of funded projects	<ul><li>Scientific publications</li><li>Patents</li><li>Clinical trials</li></ul>	<ul> <li>Scientific publications</li> <li>Patent</li> <li>Clinical trials</li> </ul>
To identify and characterize the medical impact ("outcomes") of research projects	<ul> <li>Good practices (citations in clinical guidelines)</li> <li>New treatments (pharmaceutical industry)</li> <li>New diagnostic screening techniques (industrialists / start-ups)</li> </ul>	<ul> <li>Drugs</li> <li>New Diagnostic technologies</li> <li>Social media buzz</li> </ul>
To identify and characterize the social impact ("outcomes") of funded projects	<ul> <li>Media impact (via the media &amp; social networks)</li> <li>Topics of funded projects most often included in position papers</li> <li>Topics of funded projects corresponding to the expectations of patient organizations.</li> <li>Positioning of projects in relation to public health data (incidence, mortality, quality of life of patients etc.),</li> </ul>	<ul> <li>Health data</li> <li>Position papers</li> <li>Position papers patient associations</li> </ul>



### Next steps – short term

By December 2021

- 1. Propose the list of policy questions under 'evaluation' and 'agenda setting'
- 2. Propose **measurements and indicators** that could be calculated
- 3. Propose **suitable data sources** for the calculation of indicators
- 4. Provide a preliminary Identification of **sources for ontologies** of relevance to the domains (where relevant)
- 5. Select the **domain specific policy questions and corresponding measurements** which will serve as the basis for discussion within the living labs



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### https://intelcomp.eu/

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