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ICT for governance and policy modelling: Analysis of current FP 7 projects and future research challenges

Results from a Study for the European Commission

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Coordination Action funded in Framework Programme 7 of the EC
Objective 5.6 ICT solutions for Governance and Policy Modelling





- ❖ The e-government agenda to 2020
- ❖ The objectives of ICT solutions for governance and policy modelling
- ❖ Comparison of projects
- ❖ Recommendations for future research

E-government agenda to 2020



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- ❖ Europe 2020 strategy: “In a changing world, we want the EU to become a smart, sustainable and inclusive economy. These three mutually reinforcing priorities should help the EU and the Member States deliver high levels of employment, productivity and social cohesion. Concretely, the Union has set five ambitious objectives - on employment, innovation, education, social inclusion and climate/energy - to be reached by 2020. Each Member State has adopted its own national targets in each of these areas. Concrete actions at EU and national levels underpin the strategy.”

http://ec.europa.eu/europe2020/index_en.htm



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Horizon 2020: The EU Framework Programme for Research and Innovation

❖ 2014-2020, €80 billion budget



❖ Three Key Priorities

➤ Excellent science

➤ Industrial leadership

❖ ...including in ICT

➤ Societal challenges

❖ ...health, food security, energy, transport, climate action & resource efficiency, plus inclusive, innovation & secure societies

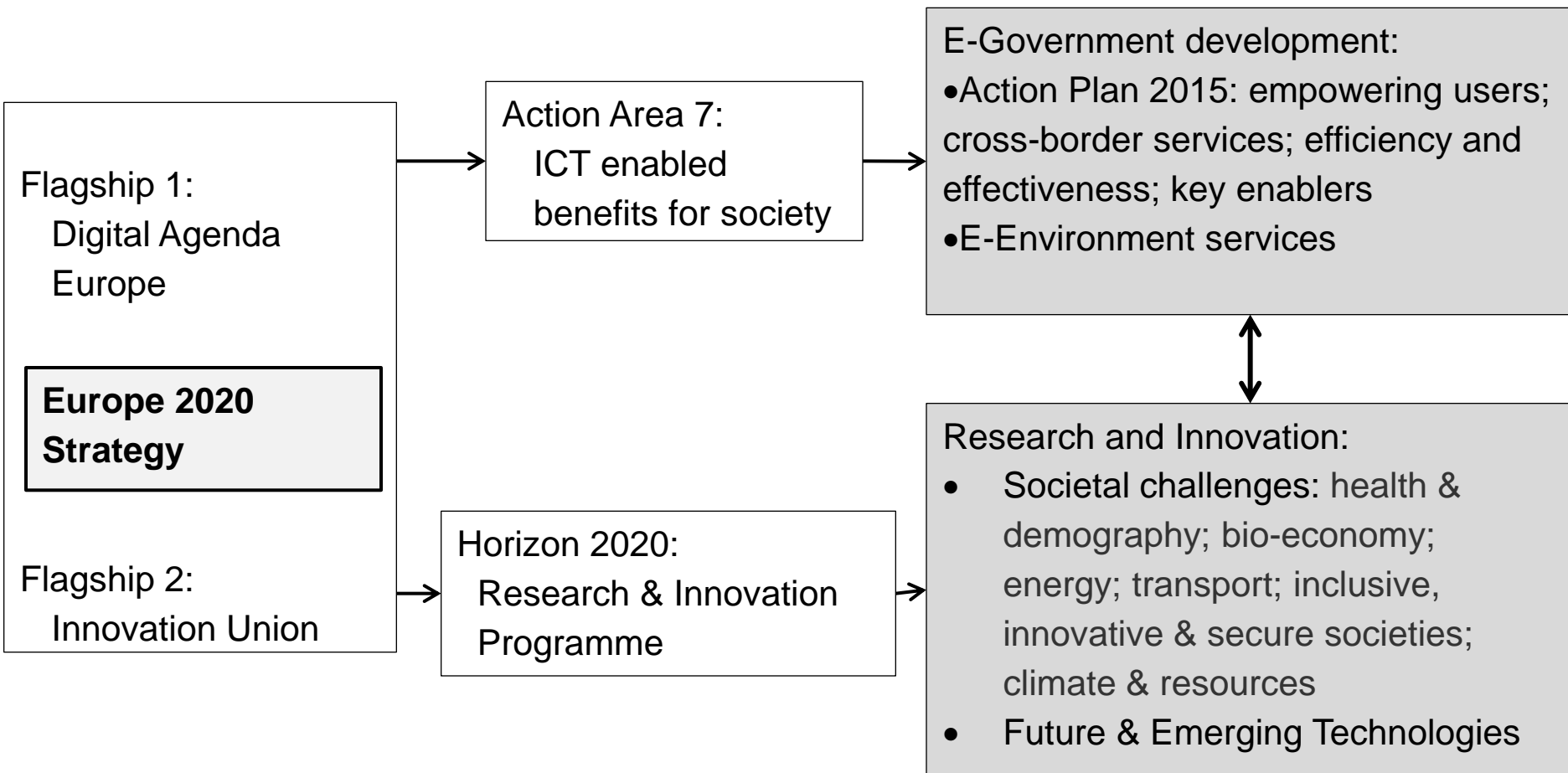
http://ec.europa.eu/research/horizon2020/index_en.cfm

European policy and research priorities: Context for future e-government research



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New e-government trends and innovation visions to 2020



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- ❖ Dissolving silos and dissolving borders
- ❖ Collaboration with other actors such as companies, non-profit organisations, communities, citizens and hackers
- ❖ Governments are becoming 'smart' using 'big' data and data analytics
- ❖ Strengthening of social media and mobile
- ❖ Local is smart
- ❖ Blurring actor roles and relationships
- ❖ New roles for government

Developments may also give rise to threats and challenges ...



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- ❖ Loss of control and blurred accountability (by whom to whom?)
- ❖ Quality standards more difficult to determine and maintain with many designers and suppliers
- ❖ Privacy and data security
- ❖ Danger of data and content mis-use
- ❖ Digital elite formation – new digital divides?
- ❖ Information overload – or is this more a filter failure?
- ❖ Crowding out other perhaps more relevant channels

Agenda



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- ❖ The e-government agenda to 2020
- ❖ The objectives of ICT solutions for governance and policy modelling
- ❖ Comparison of projects
- ❖ Recommendations for future research

Mapping projects & gaps



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2009: Quoting objectives in call 7, priority 5.6 – ICT solutions for work programme of call 7 in FP 7):

- development of advanced ICT tools for policy modeling, development of new governance models and collaborative
- innovative ICT solutions (including open source solutions) following:
 - o Modeling new policy initiatives taking into account
 - o Performing societal simulations to forecast potential measures.
 - o Development of tools that identify emerging social environment using innovative approaches such as reflexivity.
 - o Modeling and validating the next generation of policy systems, particularly taking into account the need
- advancing research in simulation and visualization techniques mixed reality technologies while building on Web2.0/Web and dynamics methodology techniques.
- Resulting tools should exploit the vast reserves of European knowledge resources and should build on lessons learnt including those at urban or regional scale.
- Examples of fields of application should address areas where public consultations has been recognized as valuable. State administrations and policy institutes are expected to play

2011: Quoting objectives in call 4, priority 7.3 ICT for Governance and Policy Modelling (see work programme of call 4 in FP 7):

- a) **Governance and Participation Toolbox**
 - Advanced tools embodying structural, organizational and new governance models to
 - o empower and engage all types of societal groups and communities,
 - o enable them to utilize mass cooperation platforms and
 - o allow governments to incorporate their input while safeguarding against misuse.
 - Tools enabling the creation, learning, sharing and tracking of group knowledge that cuts across language and cultural interpretation.
 - Tools facilitating transparency and tracking of inputs to the policy making process
 - Toolbox must include security, identity and access controls to ensure privacy and, where appropriate, the delineation of constituency domains according to the specific needs of government applications.
 - b) **Policy Modeling, Simulation and Visualization**
 - Real-time opinion visualization and simulation solutions based on modeling, simulation, visualization and mixed reality technologies, data and opinion mining, filtering and aggregation.
 - Novel instruments which allow consideration of options based on the simulated behaviour and wishes of individuals, groups or communities (at local, regional and national levels) to understand the possible outcomes of government proposals, decisions and legislation.
 - Tools and techniques help to understand, model, simulate and validate the next generation of public services as complex service systems in the environment of social networking and collaborative society, including the needs of the younger generation.
 - Advanced tools and technologies to perform societal simulations integrating all possible variables, parameters, interferences, scenarios necessary to forecast potential outcomes and impacts of proposed policy measures.
 - Tools should exploit the vast reserves of Europe's public sector collective data and knowledge resources which are also developing dynamically. Underlying functions to be integrated include translation, process modeling, data mining, pattern recognition and visualization as well as other gaming-based simulation, forecasting and back-casting as well as goal-based optimization
 - Solutions to take into account, but not be limited to, state of the art techniques on dynamics methodology to analyse and model complex systems, cooperative vs. competitive systems, and "cloud" computing applications resources for large scale data analysis.
- Expected Impact**
- Improved empowerment and engagement of individuals, groups and communities in policy making processes. Increased trust of the citizens through transparency and feedback of their contributions.
 - More efficient collection of feedback to continuously improve governance. Improved prediction of impacts of policy measures, with increased contribution and involvement of individuals and communities, and based on intelligent and optimised use of vast public sector knowledge resources.
 - Strengthened competitive position of European industry in the fields of cooperation platforms, optimization, simulation and visualization tools.

Agenda



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- ❖ The e-government agenda to 2020
- ❖ The objectives of ICT solutions for governance and policy modelling
- ❖ **Comparison of projects**
- ❖ Recommendations for future research

Comparison of projects along the call objectives



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Projects funded in the two calls

Table 1: Objectives regarding “ICT for governance and policy modelling” stressed in calls 4 and 7 of FP 7, area Information and Communication Technologies

			2009	2011	2009							2011						
					+spaces	Cockpit	Impact	OCCOPOMO	Padgets	UbiPol	MeGov	CRISIS	FUPOL	ePolicy	Live+Gov	MOSIPS	NOMAD	UniteEurope
Governance	(new) governance models	Empower stakeholder groups	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Mass collaboration platforms	✓			✓	✓	✓										
		Collaborative solving of complex societal problems	✓	✓			✓	✓							✓			
	Tools to support governance models	Tools for stakeholders and government for data & knowledge (creation (cross-borders), multi-lingual, multi-culture sharing, learning, tracking)	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
		Tools to support transparency, tracking of inputs to policy modelling	✓		✓	✓	✓	✓			✓	✓		✓	✓			
		Tools for security, identity, access to ensure privacy, delineation of constituency domains	✓						✓				✓					

Comparison of projects along the call objectives



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Projects funded in the two calls

Table 1: Objectives regarding “ICT for governance and policy modelling” stressed in calls 4 and 7 of FP 7, area Information and Communication Technologies

		6002	1102	2009						2011								
				+spaces	Cockpit	Impact	OCOPOMO	Paddets	UbiPol	MeGov	CRISIS	FUPOL	ePolicy	Live+Gov	MOSIPS	NOMAD	UniteEurope	urbanAPI
Policy modelling, visualisation and simulation	1) Opinion	Mining, mapping, simulation, aggregation, visualisation			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2) simulation/ modelling of policy options / new policy options	Instruments (methods, tools, theories) for impact on groups, options, behaviour (micro-level)			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Tools for overall societal simulations of outcomes (macro-level)			✓			✓	✓		✓	✓	✓	✓	✓			
	3) tools and models for public services as complex systems	Social networking			✓	✓												
		Collaborative society				✓												
		Youth							✓				✓					
	4) tools for exploiting public sector data and knowledge	Translation													✓	✓		
		Modelling			✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓
		Mining			✓	✓			✓	✓	✓			✓	✓	✓	✓	✓
		Gaming									✓							
	5) modelling complex systems	Dynamics					✓				✓		✓					
		Large scale data analysis			✓				✓	✓	✓							
		Cloud										✓						

Comparison of projects along the call objectives



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	6) identifying emerging societal trends	Input from 1 and 4 (2009)															
		Using 5 from 2009 as instrument						5	✓								
	7) merging (1) opinions and (4) data & knowledge and using (5) instruments	advanced simulation and visualisation techniques and tools			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	8) stakeholders	policy institutes, public administrations,			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	9) application fields involving public consultations	examples of fields of application, where public consultation of citizens has been perceived as valuable			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	

Comparison of projects along the call objectives

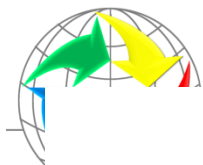


Projects funded in the two calls

Table 1: Objectives regarding "ICT for governance and policy modelling" stressed in calls 4 and 7 of FP7, area Information and Communication Technologies

		2009	2011	2009							2011						
	Youth			+spaces	Cockpit	Impact	OCOPOMO	Padqets	UbiPol	YveGov	CRISIS	FUPOL	ePolicy	LiverGov	MOSIPS	NOMAD	UniteEurope
	4) tools for exploiting public sector data and knowledge	Translation															
		Modelling	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
		Mining	✓	✓			✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
		Gaming								✓							
	5) modelling complex systems	Dynamics				✓				✓	✓						
		Large scale data analysis	✓				✓	✓	✓	✓	✓						
		Cloud									✓						
	6) identifying emerging societal trends	Input from 1 and 4 (2009)															
		Using 5 from 2009 as instrument						✓	✓								
	7) merging (1) opinions and (4) data & knowledge and using (5) instruments	advanced simulation and visualisation techniques and tools	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓				
	8) stakeholders	policy institutes, public administrations,	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	9) application fields involving public consultations	examples of fields of application, where public consultation of citizens has been perceived as valuable	✓	✓		✓		✓	✓	✓	✓		✓	✓	✓	✓	✓

Comparison of projects along the call objectives



Projects funded in the two calls

Table 2: Impacts expected from calls 4 and 7 of FP 7, area Information and Communication Technologies

		2009						2011								
		+spaces	Cockpit	Impact	OCOPOMO	Padgets	UbiPol	WeGov	CRISIS	FUPOL	ePolicy	Live+Gov	MOSIPS	NOMAD	UniteEurope	urbanAPI
Empowering & engaging stakeholders in policy making	Generally addressing topic	✓		✓	✓	✓	✓			✓	✓		✓	✓	✓	✓
	Increasing trust	✓	✓	✓	✓	✓	✓			✓				✓		
	All stakeholders	✓	✓		✓	✓	✓									
More efficient collection of feedback for governance	Public sector governance	✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓	✓
	Using data & knowledge	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓
	Using stakeholder input	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Strengthening competitive position of European industry	Instruments as cooperation platforms	✓		✓	✓	✓	✓		✓				✓		✓	✓
	Instruments for optimisation, visualisation and simulation		✓			✓			✓		✓		✓	✓		✓

Comparison of projects along the call objectives



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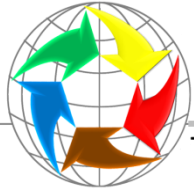
Table 3: Instruments [to be] used and/or developed by the projects of calls 4 and 7 of FP 7, area Information and Communication Technologies

		2009						2011								
		+spaces	Cockpit	Impact	OCOPOMO	Padgets	UbiPol	WeGov	CRISIS	FUPOL	ePolicy	Live+Gov	MOSIPS	NOMAD	UniteEurope	urbanAPI
Theories explaining phenomena					✓					✓			✓			
Methods addressing procedural aspects and guidelines					✓			✓	✓	✓			✓	✓	✓	
Models	Meta models	✓			✓		✓	✓		✓			✓			✓
	Domain models	✓			✓		✓	✓		✓						✓
ICT	HW, SW, solutions	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	technologies and languages		✓	✓						✓	✓	✓				
	Tools	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
	Devices/channels			✓	✓	✓	✓	✓		✓	✓	✓	✓			✓



Gaps identified

- ❖ Aspects like new governance models for collaborative solving of complex societal problems or tools for security, identity, access to ensure privacy, delineation of constituency domains
- ❖ In the area of policy modelling and simulation, tools and models for public services as complex systems only addressed in the context of social networking, but generally neglected in terms of supporting collaborative society and the youth
- ❖ Gaming and translations to exploit public sector data and knowledge included in only two (per topic) projects of the 2011 projects.



Gaps identified

- ❖ Unclear whether the potentials of gaming and the needs for translation in a multifaceted European single market space are sufficiently exploited with the limited set of projects tackling these issues
- ❖ Modelling complex systems, system dynamics and especially the cloud not extensively addressed
 - combinations of opinion mining and mining of large data amounts to inform policy simulations for identifying emerging societal trends
 - combination of advanced tools and techniques to conceptualize and deploy instruments for identifying emerging societal developments
- ❖ Tools and models for public services as complex systems particularly for youth missing



Gaps identified

- ❖ Impacts expected on empowering and engaging stakeholders in policy making and in deploying instruments for more efficient collection of feedback for governance
- ❖ Instruments of projects to advance or to use theories, methods, models and/or with ICT vary
 - Difficult to identify theories used or developed to explain relevant phenomena
 - Methods addressing procedural aspects and guidelines, and models (metamodels and/or domain models) to conceptualize particular fields of policy modelling and simulation or governance models not found in every project
- ❖ Hampering qualitative research and rigour in research design

Agenda



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- ❖ The e-government agenda to 2020
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Recommendations for e-government research building blocks



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- ❖ Sharing infrastructure, data and other resources across government
- ❖ Data analytics for sophisticated evidence-based decision making
- ❖ Responsible public sector innovation together with social innovation to tackle complex societal problems
- ❖ Government as an open participation and collaboration platform
- ❖ Addressing youth issues
- ❖ Social media, social networks and gamification

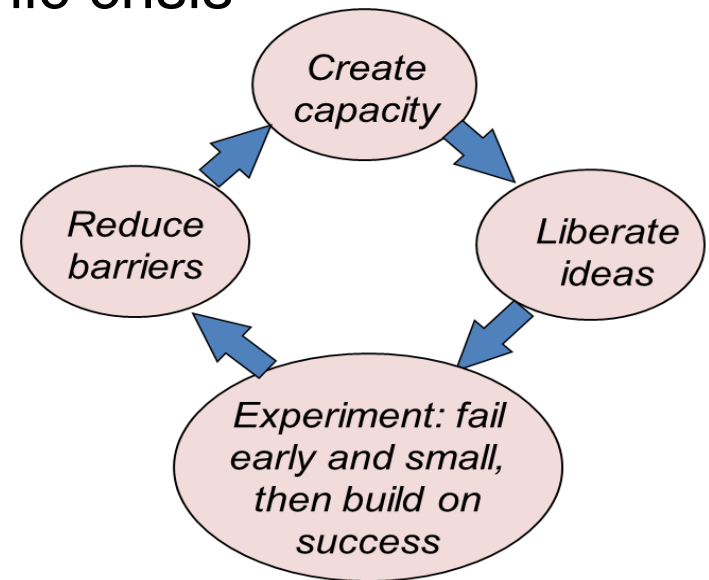
Recommendations for e-government research building blocks



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- ❖ Addressing financial and economic crisis
- ❖ New business models
- ❖ Local, everyday and smart
- ❖ Following and supporting changes in user behaviour
- ❖ Empowering the civil servant
- ❖ Cybersecurity for e-government



New business models



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Recommendations for continuing FP 7 ICT for governance and policy modelling research

- ❖ Tools and methods for modelling complex systems across different policy domains
- ❖ Common and flexible toolbox of models
- ❖ Layered model complexity and use
- ❖ Improving the validation and performance measurement of models
- ❖ More focus on theory building to explain data and complex systems
- ❖ Smaller but more coordinated projects needed to tackle societal challenges in a concerted way
- ❖ Research spanning across European regions and involving international organisations in policy development projects, including knowledge transfer on ICT4D



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