

# **Take or Shape: Policy governance modes to address transformation processes**

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# Motivation

Several complex and interwoven change processes in society, economy, and major S&T domains raise two major challenges

- challenge of co-shaping change processes at the level of innovation ecosystems (IE)/ socio-technical systems (STS)
- challenge of overhauling the current STI policy governance sub-system

Towards a more differentiated picture by types of

- transformative changes
- governance approaches
- strategy stances
- forward-looking activities (FLA)

New policy responses?

- re-focusing of policy priorities on IE/STS within a wider (e.g. national) policy frame
- supporting the formation of a diversity of IE types within such a wider frame
- co-shaping of a range of key IE dimensions implies need for policy experimentation and orchestration
- guidance of 'framing' and 'co-shaping' by 'tailored' FLAs

# **Conceptual framework**

Different types of transformation processes require different modes of governance

Determinants of fast disruptive and slow transformative change

Government roles in different governance approaches

The potential of FLAs in the governance of transformative change

# Pace of transformative changes

## A) Fast and disruptive transformations

- new, often digital, business models, introduced by new players
- supersede existing business models and activities
- major repercussions on labour markets, skills needs, income distribution, privacy, safety, ethical issues, ... – occurring very quickly  
⇒ wellbeing

## B) Slow, but equally profound transitions of existing socio-technical systems

- hard-wired systems with strong path-dependences (energy, transport systems, ...)
- more time to actively (co-)shape or prepare for these changes
- also major repercussions on labour markets, skills needs, income distribution, privacy, safety, ethical issues, ... – **but** in a more gradual manner  
⇒ wellbeing



# Pace of transformative changes: determinants

Lone, heroic entrepreneurs (Steve Jobs and the like)?

**Or:** structural, systemic determinants?

A 'pendulum' is swinging between the prevalence of these alternative explanations

Micro, meso **or** macro level determinants?

A systemic view

- agency **&** structural, systemic determinants
- **interactions** among micro-, meso-, **and** macro-level determinants

# Pace of transformative changes: determinants

## Micro level: innovation ecosystems

- agency, entrepreneurial spirit (drive)
- capabilities, resources
- entrepreneurial opportunities, business models

## Meso level: socio-technical systems

- physical infrastructure [also a macro 'variable']
- regulations and standards
- market structures
- collective resources, social capital
- user behaviour (blocking or pushing for change)

## Macro level: techno-economic paradigms

- interconnected, interdependent socio-technical systems; institutional context;
- education and training; higher education and research; financial system;
- widely shared 'common sense' for investment decisions and consumer choices
- social acceptance of transformation (its major elements)

# Pace of transformative changes: the role of the state

A) Direction, scope, speed and level of uncertainty of change processes

B) Policy governance sub-system

power structures: oligopolistic **vs.** decentralised

political-administrative culture: antagonistic **vs.** consensual

reliance on strategic policy intelligence: sparse **vs.** systematic use

methods used: expert-based, tokenistic, or genuine participatory methods

A) & B) **⇒** different strategies and governance approaches

Multi-level governance

Tentative and definitive (established) governance (Kuhlmann et al., 2019)

# Possible roles of state and other actors

Observer

Warner

Mitigator

Facilitator

Lead user

Gatekeeper

Promoter

Initiator

(selected from the 13 roles  
identified by Borrás and Edler, 2020)

Frontrunner

Connector

Toppler

Supporter

(de Haan and Rotmans, 2018)



# Ideal types of (STI) policy governance approaches

## a) Responsive governance

aimed at being prepared for transformative changes and reacting to them in an appropriate way ⇒

- ‘exploratory’ FLA supporting flexibility and responsiveness
- co-operation with major actors and stakeholders is advantageous
- gradual changes in policy-setting and implementation processes

## b) Co-creation governance

aimed at (co-)shaping the transformative changes ⇒

- a strong emphasis on ‘transformative’ FLA to create new opportunities
- a close co-operation with all the major actors and stakeholders is a must
- radically renewed policy-setting and implementation processes
- experimentation plays an accentuated role

## c) ‘Wait and see’ governance

# Strategy stances to transformative changes

Change Governance	Fast disruptive changes (A)	Slow transformative changes (B)
<b>Responsive governance (a)</b>	“Risk avoidance”: adapt to changes by trying to minimise negative impacts in a broad sense and to exploit new opportunities to a lesser extent, given the pace of changes [Aa]	“Precautionary opportunism”: more emphasis on being well prepared to exploit the new opportunities evolving, but not even taking major risks, let alone facing or creating uncertainty in a proactive way [Ba]
<b>Co-creation governance (b)</b>	“Agile modulation”: try to co-shape fast changes – largely driven by external factors – to the possible extent [Ab]	“Pro-active path-creation”: take the driving seat, take considerable risks, or even create some uncertainty [Bb]

# Types of forward-looking activities (FLA)

The aim of an FLA to support

- responsive mode of governance ⇒ exploratory (or preparatory) FLA
  - what developments might evolve in the future
  - how to prepare for those futures (future states of affairs)
- co-creation mode of governance ⇒ transformative (or directional) FLA
  - identify what opportunities can be created
  - select a desired (feasible, but not necessarily the most probable) future
  - recommend strategic actions to foster the desired changes

Path scenarios in both cases: what types of changes are needed, when, by whom

The level of participation

- expert-based
  - relatively quick, less costly, no process benefits, no ownership and commitment to act upon the recommendations
- participatory
  - more time-consuming, more costly, important process benefits, ownership and commitment to act upon the recommendations



# Strategy stances and types of FLAs

Change Governance	Fast disruptive changes (A)	Slow transformative changes (B)
<b>Responsive governance (a)</b>	<p>“Risk avoidance”: adapt to changes by trying to minimise negative impacts in the short sense of opportunity, given the extent, given changes [Aa]</p>	<p>“Precautionary opportunism”: more being well prepared to opportunities by taking major risks, creating a proactive way [Ba]</p>
<b>Co-creation governance (b)</b>	<p>“Agile modulation”: take the shape of changes, driven by the possible extent [Ab]</p>	<p>“Agile modulation”: take the shape of changes, driven by the possible extent [Bb]</p>

**Preparatory FLA**

**Transformative FLA**



# The ‘fit’ between strategy stances and FLAs

Change Governance	Fast disruptive changes	Slow transformative changes
<b>Responsive governance</b>	“Risk avoidance” stance: expert-based FLA (hearings, advisory boards, ...); widely used, well-known methods	“Precautionary opportunism” stance: can be expert-based or participatory FLA; widely used, well-known methods
<b>Co-creation governance</b>	“Agile modulation” stance: should be embedded (real-time) participatory FLA; strong need for devising new methods and new modes (e.g. a pronounced role for horizon scanning and similar methods to collect signals of change, ..., as a first step, but that is not the end of the process)	“Pro-active path creation” stance: should be participatory FLA; widely used, well-known methods

**ILLUSTRATION: FAST DISRUPTIVE CHANGES**

# Mobility as a Service (MaaS): definition

“...a system, in which a comprehensive range of mobility services are provided to customers by mobility operators” (Heikkilä, 2014, p. 8)

“...an integrative concept that bundles different transport modalities into joint, seamless service offerings, in order to provide tailored mobility solutions that cater for users' travel needs” (Mukhtar-Landgren et al., 2016).

“... new transport paradigm (that) addresses many of society's grand challenges in transport, promising improvements in terms of environmental sustainability, reduced congestion and better accessibility...”  
(Smith et al., 2018)

# A case in a nutshell: Finland

LVM: ITS strategy – Transport Revolution Program – transport code (2017)

- ‘promote the creation of new service models, ease market entrance, dismantle national regulation that limits competition and reduce the level of public guidance’
- Deregulation of prices and licences, passenger transport permit, open inter-operable data interfaces
- Multi-modal mobility packages

LVM/TEKES: joint programme for the development of MaaS (2015)

- Studies, pilots, partnership

MaaS Global Oy emerged as major operator

- Whim service comprising PT, rental, taxis
- Expanding to other countries (NL, SN, UK)

Strong vision of “MaaS champions”, little engagement – if not emerging opposition – of PT incumbents



# A case in a nutshell: Finland (2)

## FINLAND

### Actors

- Export Finland** Public organization that aims to promote export of Finnish industry
- HSL** Helsinki Regional Transport Authority
- LVM** The Ministry of Transportation & Communications
- MaaS Global** MaaS start-up, formerly known as MaaS Finland (pilot: Whim)
- Sito** Finnish tech consultancy firm (pilot: Kätävä)
- Telia** Finnish telecom company, formerly known as TeliaSonera & Sonera (pilots: Ylläs Around & Reissu)
- Tekes** The Finnish Funding Agency for Innovation
- Tuup** MaaS start-up (pilot: Tuup)



Source: Smith et al., 2018

# A case in a nutshell: Finland (3)

Seven key policy levers (Smith et al. 2018)

- 1) Engaging a broad set of strategic and operational key stakeholders that have the mandate and discretion to govern MaaS
- 2) Developing formal and informal networks based on geographical proximity to the centres of power
- 3) Creating a strong vision for MaaS that tackles sustainability problems in local/ regional/ national contexts
- 4) Using and iteratively revising this vision to create a climate of open innovation within the MaaS ecosystem, where risks are translated into business opportunities
- 5) Supporting pilots and implementations with financial capital from the public and private sectors
- 6) Experimenting with new institutional arrangements (e.g. redistribution of subsidies for PT) that are conducive to MaaS developments *and* sustainable travel behaviour
- 7) Learning as part of an interactive, co-creative process that aims to develop MaaS services

# A case in a nutshell: Austria

## 1<sup>st</sup> generation: ride-sharing scheme Compano (2004)

- Real time multimodal travel information and travel agency service that arranges ride-shares for the entire Austrian region
- Geared towards periodic trips of commuters and intended as a supplement to public transport services
- Emerged from two publicly funded research projects as bottom-up initiative
- Lack of political support, administrative-institutional barriers (e.g. taxation)
- Integration into offer of PT operator Austrian Railways; now offered in all Austria

## 2<sup>nd</sup> generation: Uber/car2Go/DriveNow car-based mobility services (2015)

- Introduction of – mainly urban - private floating car taxi/rental services
- Extensive conflicts between Uber and taxi drivers associations, with – now - restrictive taxi regulations imposed on User, mytaxi and the like



# MaaS

	Fast change
Micro	<p>Changes in patterns of mobility behaviour (intermodal) (Somewhat) less car ownership Integrated business model (FI), based on compensation for digital intermediation of services and pay-per-use ➔ Entrepreneurship, user-oriented integrated service, change in user behaviour</p>
Meso	<p>Use of existing infrastructures (mobile broadband) Open data solutions (floating car data, GIS-based, location-based services) Inter-operational apps Strong incumbents (PTs as well as taxi drivers) competing with new IT-based 'outsiders' with financial muscles (Uber), bottom-up newcomers (compano) or strategically nurtured integrators (Global Oy) Multimodal coalition-building (FI) vs. individual entrepreneur (AT) vs. global player (AT) Integration with PT incumbent (Compano) vs. competition with taxi incumbents (Uber) vs. additional layer of integration (Global Oy) Protective regulations (licences, tests, labour regulation, etc.) ➔ Sectoral regulations and ability to integrate services under a common roof matter most</p>



# MaaS

	Fast change
Macro	<p>Income tax (Compano)</p> <p>Physical road and rail infrastructure as commodities</p> <p>Basic IT infrastructure as commodity</p> <p>Generic open data policy</p> <p>➔ Limited constraints by infrastructures, but some generic regulation may create problems</p>

# Strategy stances in MaaS

Change Governance	(Potentially) fast disruptive changes (A)
<b>Responsive governance (a) AUSTRIA</b>	<ul style="list-style-type: none"><li>• Little regulatory support for Compano, in spite of research funding</li><li>• Restricted policy approach: Uber obliged to comply with taxi regulations</li><li>• Defensive regulation by national and local authorities, no proactive multi-modal policy (Uber)</li><li>• Legal action by taxi drivers (based on outdated regulation and closed markets)</li></ul>
<b>Co-creation governance (b) FINLAND</b>	<ul style="list-style-type: none"><li>• Close collaboration of different ministries and support to private entrepreneurs</li><li>• Introduction of a new layer of multi-modal service integration</li><li>• Adapting regulation (minimum social security standards, experimentation for automated driving)</li><li>• Adaptation strategies of taxi drivers (more flexible schemes, emulating Uber)</li></ul>

# The role of FLA?

Hardly any systematic FLAs to anticipate or explore future pathways and strategies

- Traditional FLAs are too slow

Responsive governance (Austria):

- Exploratory studies on current situation and potential consequences (e.g. European Forum Vienna 2015)
- No systematic foresight or visioning
- Confrontative relationship with taxi services

Co-creation governance (Finland):

- As part of public funding, formulation of scenarios, vision and strategic pathways
- Rather continuous activities
- Network development underpinned by vision, including also taxi services

**ILLUSTRATION: SLOW TRANSFORMATIVE CHANGES**



# Automotive industry in the 20<sup>th</sup> century

Disruptive technological innovations in mobility:

“horsepower” → machine power

Competing technologies → the combustion engine became the dominant design

Together with other innovations and driving forces → a new techno-economic paradigm: “the age of oil and mass production”

major infrastructure projects, related services, regulations, financial innovations, education, ...

1970s–1980s: incremental technological innovations,  
major organisational innovations

# **Automotive industry and mobility in the 21st century**

Disruptive technological innovations in mobility

- autonomous vehicles (driving)
- electric vehicles

Is a new a new techno-economic paradigm emerging?

# Automotive industry in the 21<sup>st</sup> century: Pace of change

	Slow change
Micro	<p>No promising new business model has emerged yet (Tesla vs. traditional car companies)</p> <ul style="list-style-type: none"><li>• expensive vehicles, weakening overall demand for cars, new mobility models (car sharing, car ownership vs. use, ...)</li><li>• fatal accidents, bad publicity</li></ul> <p>Weak entrepreneurial opportunities</p> <p><b>BUT:</b> strong pressure to overhaul the industry</p>
Meso	<p>Market structure</p> <ul style="list-style-type: none"><li>• very strong incumbents: changing their product portfolio</li><li>• new players, 'outsiders' with financial muscles, management and IT competence, lots of customers: already entered or planning to enter (both Schumpeter mark I and II?)</li></ul> <p>Collective resources, co-operation partners</p> <ul style="list-style-type: none"><li>• major cultural differences between the partners automotive firm – IT dept at a university – dynamic, agile IT firm traditional, rigid transport service provider – dynamic, agile IT firm traditional logistics firm – ???</li></ul>

# Automotive industry in the 21<sup>st</sup> century: Pace of change (2)

	Slow change
Macro	<p>Physical infrastructure</p> <ul style="list-style-type: none"><li>• smart roads for smart cars: sensor and software technologies, IoT, broadband internet (wifi)</li><li>• for public or semi-public transport can be confined to a 'isolated district'</li><li>• for private cars (drivers) should cover large territories (no disruption)</li><li>• charging stations for electric vehicles</li></ul> <p>Σ: Expensive, time-consuming to replace the existing, rigid, massive infrastructure</p> <p>Regulations</p> <ul style="list-style-type: none"><li>• insurance</li><li>• ethical issues (liability, privacy, safety: who should be 'saved' by the driving software in a dangerous situation, ...)</li></ul> <p>Σ: Demanding to devise, difficult to implement, resistance by major actors</p>



## **DISCUSSION**

# Four types of strategy stances: pros and cons

Change Governance	Fast disruptive changes (A)	Slow transformative changes (B)
<b>Responsive governance (a)</b>	<ul style="list-style-type: none"><li>• avoids major risks</li><li>• uses well-known FLA methods</li><li>• gives up co-setting, co-shaping trends (first mover advantage)</li><li>• opportunities are grabbed by other economies/ IEs</li></ul>	<ul style="list-style-type: none"><li>• avoids major risks</li><li>• prepares thoroughly for exploiting new opportunities</li><li>• uses well-known FLA methods</li><li>• avoids co-setting, co-shaping trends (first mover advantage)</li><li>• opportunities are grabbed by other economies/ IEs</li></ul>

## Four types of strategy stances: pros and cons (2)

Change Governance	Fast disruptive changes (A)	Slow transformative changes (B)
<b>Co-creation governance (b)</b>	<ul style="list-style-type: none"><li>• can influence trends (chance to exploit first mover advantage)</li><li>• seizes opportunities (national IS, IEs)</li><li>• <b>demanding (agility, skills, processes, ...)</b></li><li>• <b>rather risky: big, costly failures can occur</b></li><li>• <b>new, “real-time”, participatory FLA methods need to be devised, tested and refined</b></li></ul>	<ul style="list-style-type: none"><li>• can influence trends (chance to exploit first mover advantage)</li><li>• seizes opportunities (national IS, IEs)</li><li>• can use well-known participatory FLA methods</li><li>• <b>still risky – but significantly less so than [Ab]</b></li></ul>

# FLA to support transformative changes

Different benefits should be expected from participatory  
**vs.** expert-based FLA

Wide-ranging and far-reaching implications

A systemic approach

- considering multiple futures
- drawing on a diverse set of knowledge and experience helps in dealing with complex changes

Major uncertainties

A shared vision, developed – and thus ‘owned’ – by the major stakeholders can reduce uncertainty

**BUT:** pace of changes, time needed for participatory processes

Different benefits should be expected from S&T centred FLA **vs.**  
FLA focussing on innovation systems



## **POLICY IMPLICATIONS**

# The importance of taking a multi-level perspective

National and regional innovation systems, together with their policy governance sub-systems, provide key framework conditions for addressing transformative changes

- fora for major actors to communicate, interact, and co-operate
- strategy-setting capabilities
- competences in using decision-preparatory tools, especially “futures literacy”
- regulations
- financial and other support

Yet, transformative changes manifest themselves most directly and most forcefully at the level of innovation ecosystems

⇒ That is the the appropriate level to attempt co-shaping the transformative changes to create new opportunities and/or finding appropriate governance responses

# Diversity

Any given country or region is likely to be fairly diverse in terms of having Aa, Ba, Ab, and Bb “pairs” at the level of innovation ecosystems

⇒ National and regional policy-makers need to be aware of this diversity and find effective ways to assist in creating appropriate, and therefore diverse, governance approaches for these different innovation ecosystems

Policy experimentations

# Policy orchestration

Governance challenge: How to achieve policy orchestration in the prevailing compartmentalised ('silo') structures?

Theoretical argument:

- Preparing for transformative changes requires a conscious cross-cutting approach
- Employment, education and training, sectoral and R&I policy, etc.
- Sustainability, circular economy can be enabled by digitalisation  
e.g. via mass customisation, smart logistics, smart cities, smart homes

Empirical evidence:

- Decisive for MaaS in Finland



# Methodological implications: tailored FLA

The chosen type of FLA and its main objectives need to “fit” the purpose (responsive **vs.** co-creation governance mode)

Co-creation governance mode requires participatory FLA

New type of FLA methods and approaches are needed to support co-creation governance mode aimed at co-shaping fast disruptive changes (‘keep pace’ or ‘agile modulation’)

Thank you!

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