Technology transfer as “set of practices”: towards a maturity model

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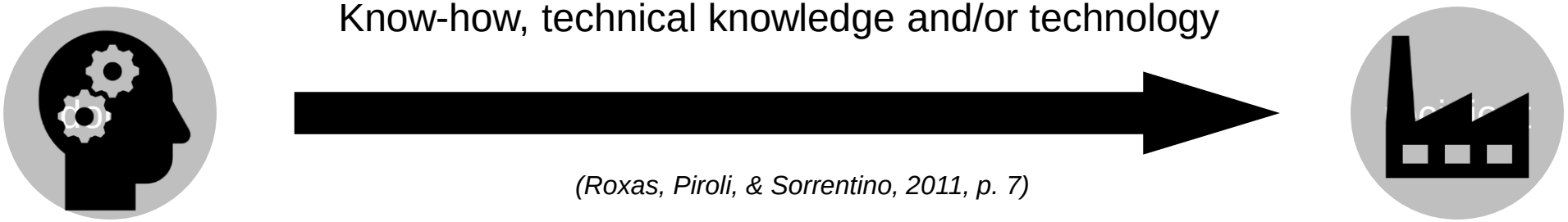
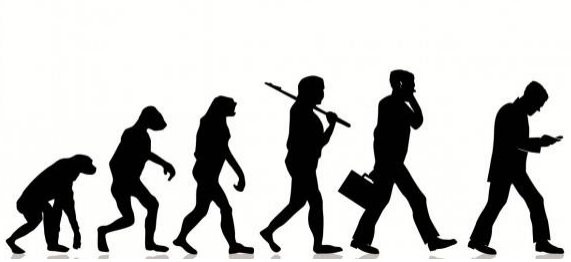
Introduction to ‘technology transfer’ & practices



(Roxas, Piroli, & Sorrentino, 2011, p. 7)

University-industry technology transfer (UITT)

Practice = organization’s routine use of knowledge to conduct a particular function



UITT channels and activities

collaborative research

informal relationships

consulting

contract research

‘academic engagement’

Patenting and licensing of inventions (IP creation)

Academic entrepreneurship (spin-offs/start-ups)

‘commercialisation’

(Perkmann et al 2013)

UITT actor: technology transfer organisation

Tech Transfer Organisation (TTO)

'Innovation intermediary'
(Chesbrough 2006)

Technology Transfer Offices:
(Wright et al 2008)

Internal
External

university

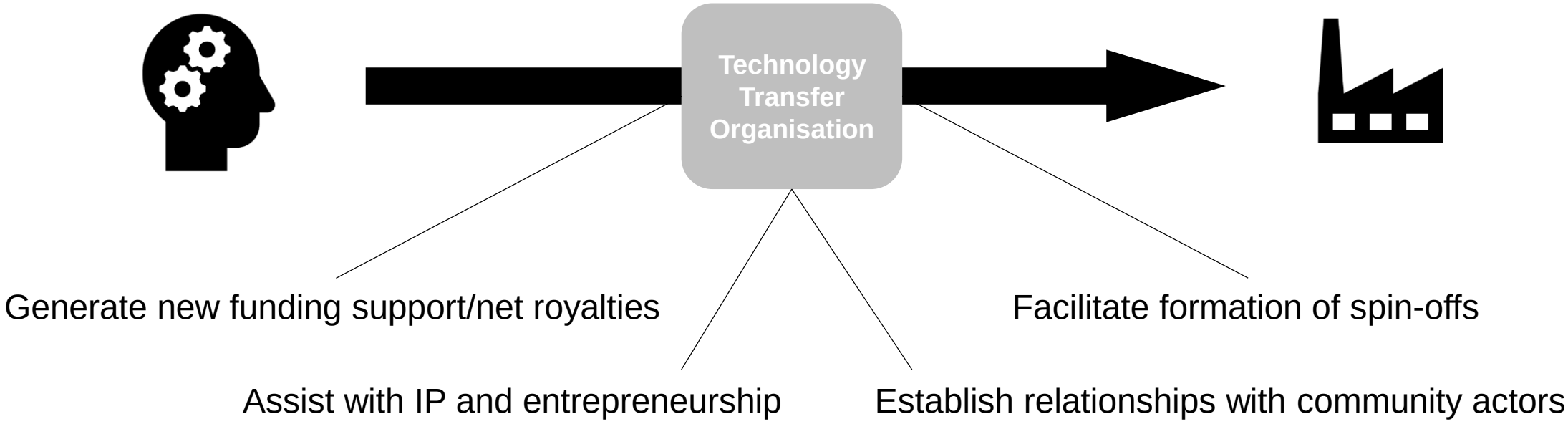
Patenting and licensing of inventions (IP creation)

Academic entrepreneurship (spin-offs/start-ups)

'commercialisation'

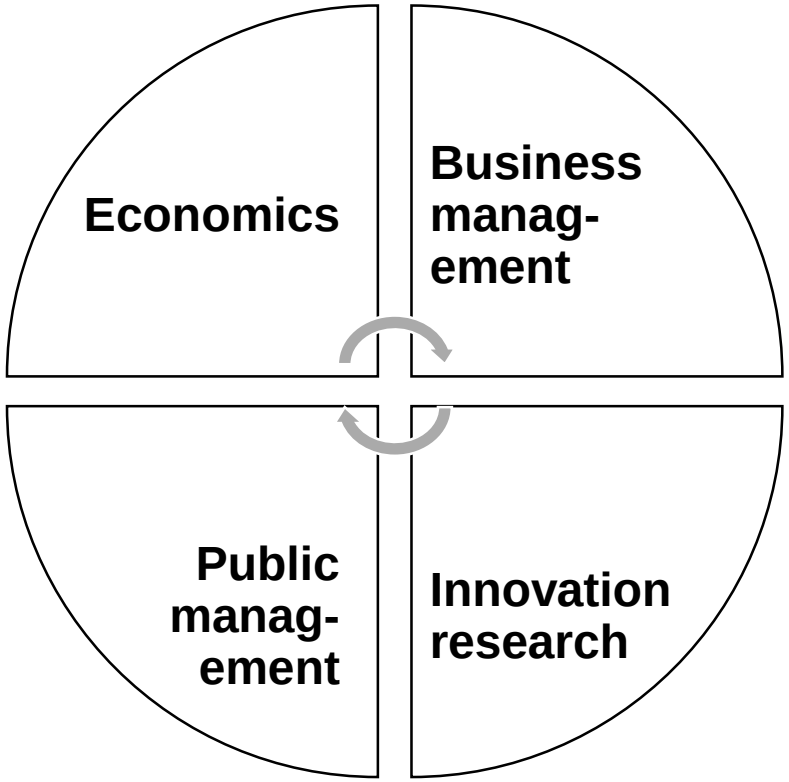
(Perkmann et al 2013)

Practices are contingent upon TTO strategy

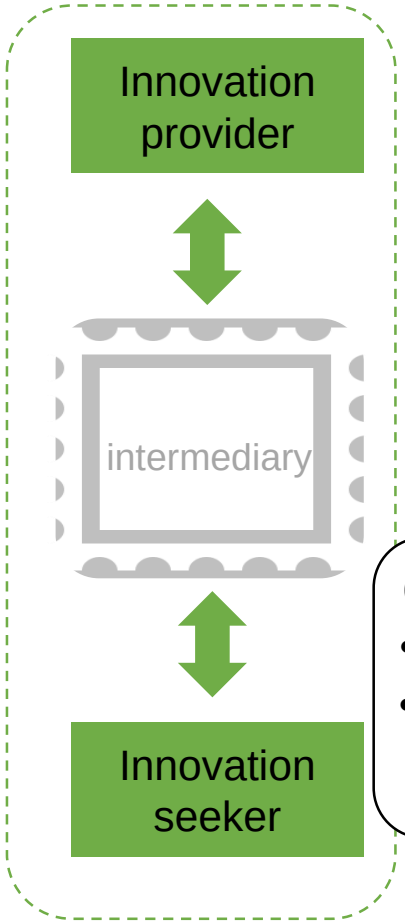


(Innovation Policy Platform, OECD 2011)

TTO practices - a cross-disciplinary field of research



Research framework – TTO practices

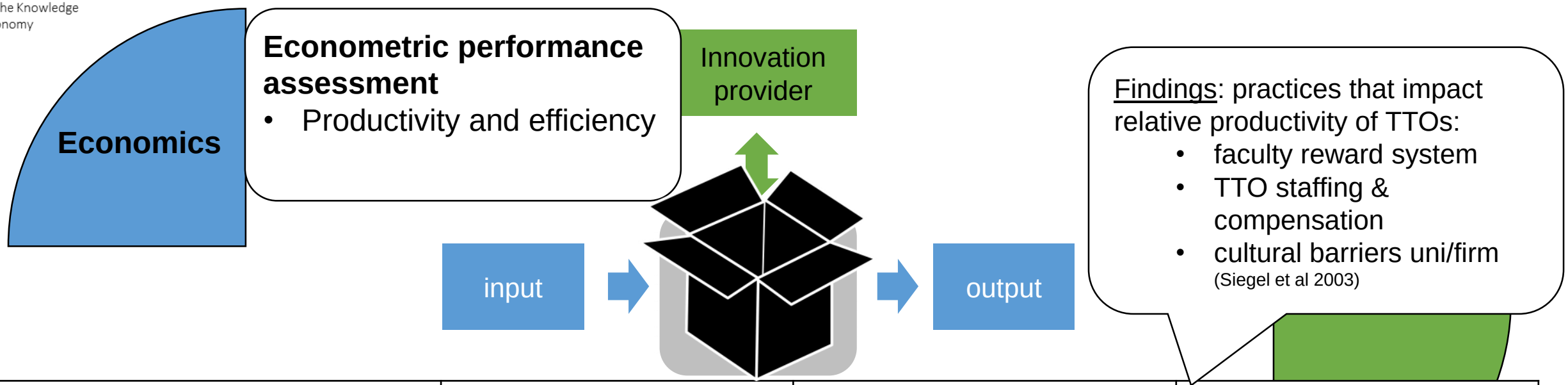


Open innovation research
- Innovation intermediaries
- Collaborative practices in clusters (Ollila & Yström, 2017)

Innovation manag-ement

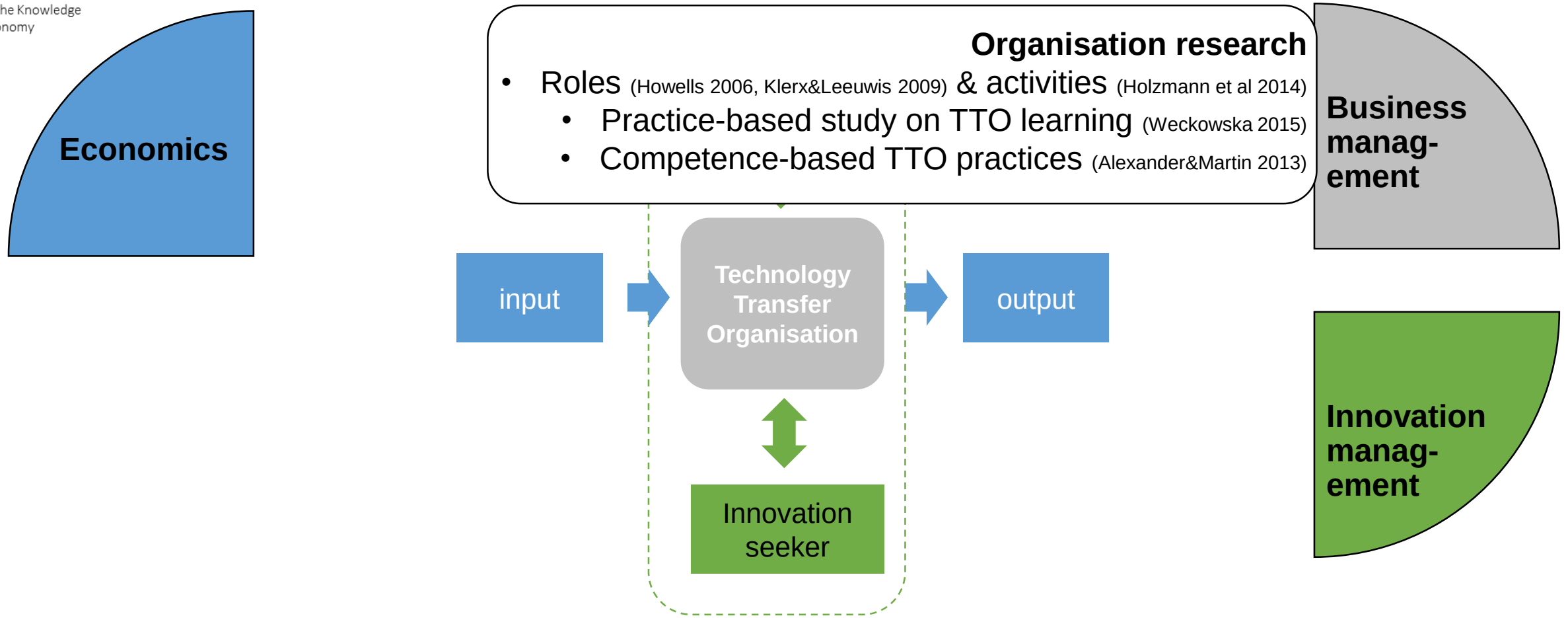
(Gianiodis et al 2010)

Research framework – TTO practices

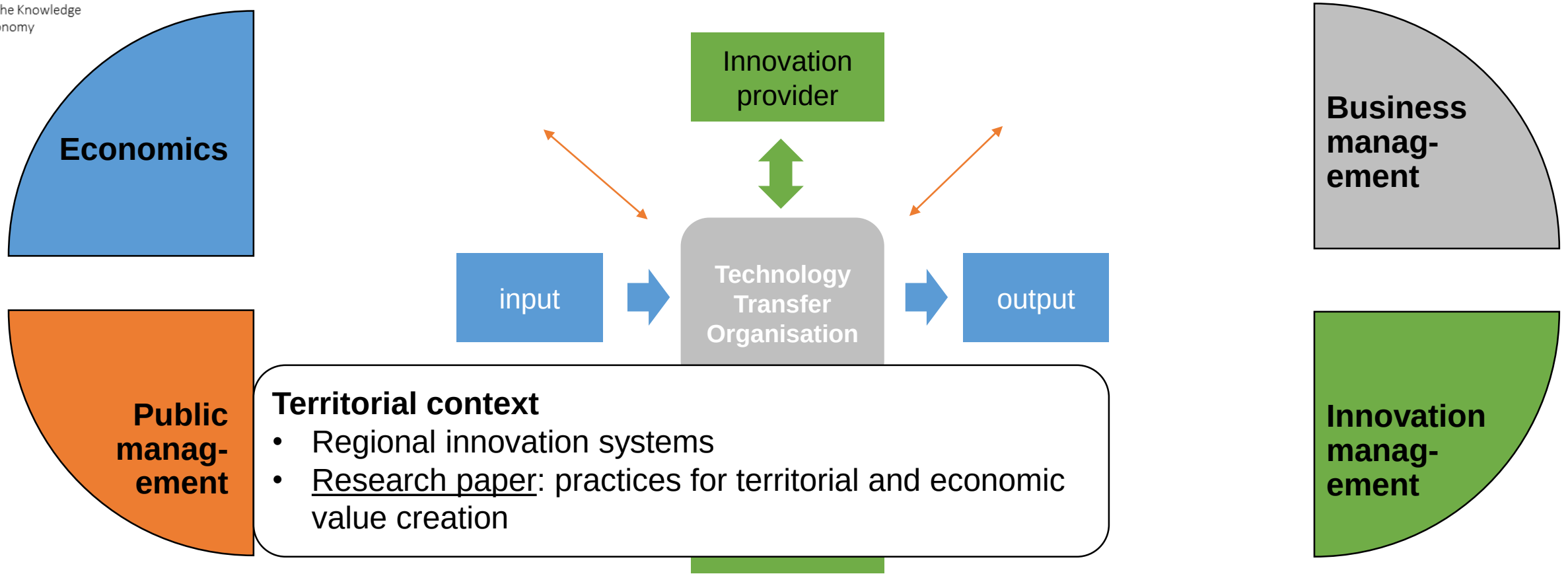


Impact of org. practices on relative **productivity** of university TTOs	Invention disclosure TTO employees External legal expenditure	Licensing agreements Licensing income	Siegel et al 2003
Use of DEA to assess TTO **efficiency** in private US universities	total research spending	Licensing income Licenses & option executed # start-ups US patents filed & issued	Anderson et al 2007
Productivity of French TTOs	labour (FTE) & knowledge	patent applications	Curi et al 2015

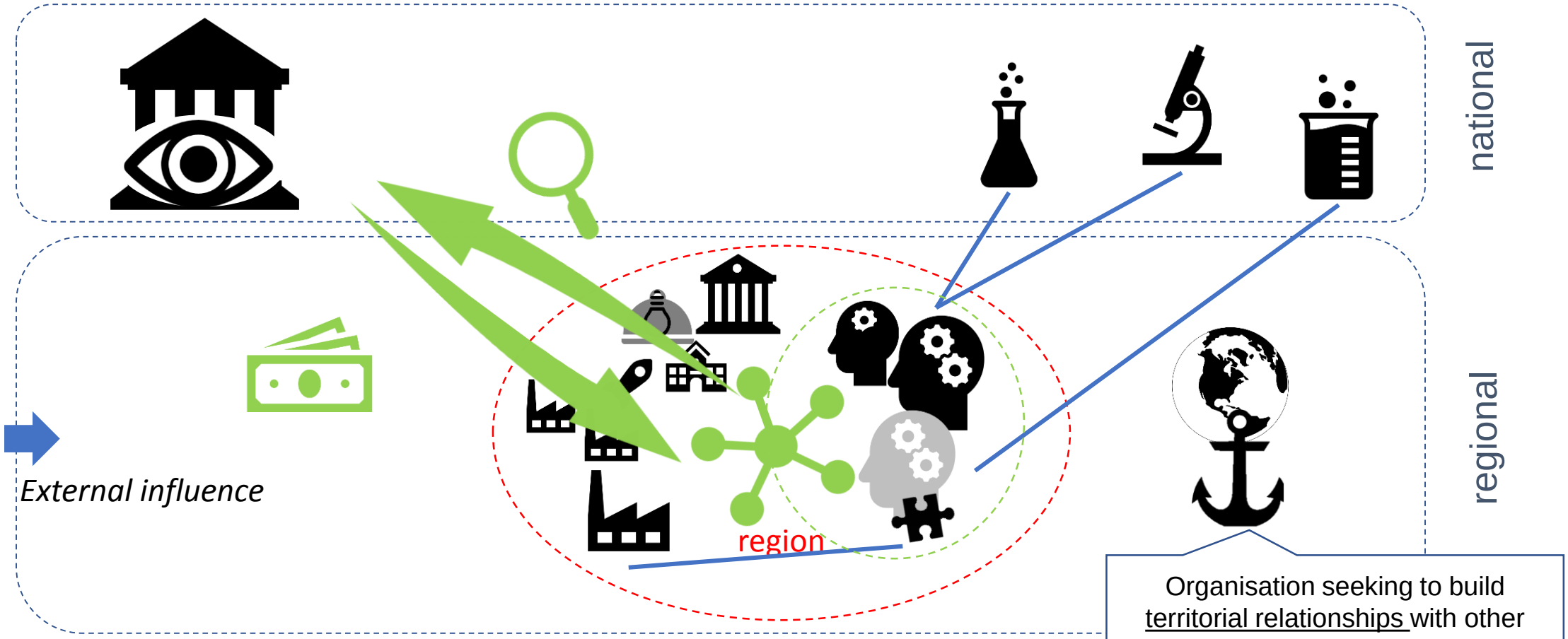
Research framework – TTO practices



Research framework – TTO practices



New actor in the French innovation system



Organisation seeking to build territorial relationships with other regional actors, and is committed to a territorial development purpose
(Serval, 2015)

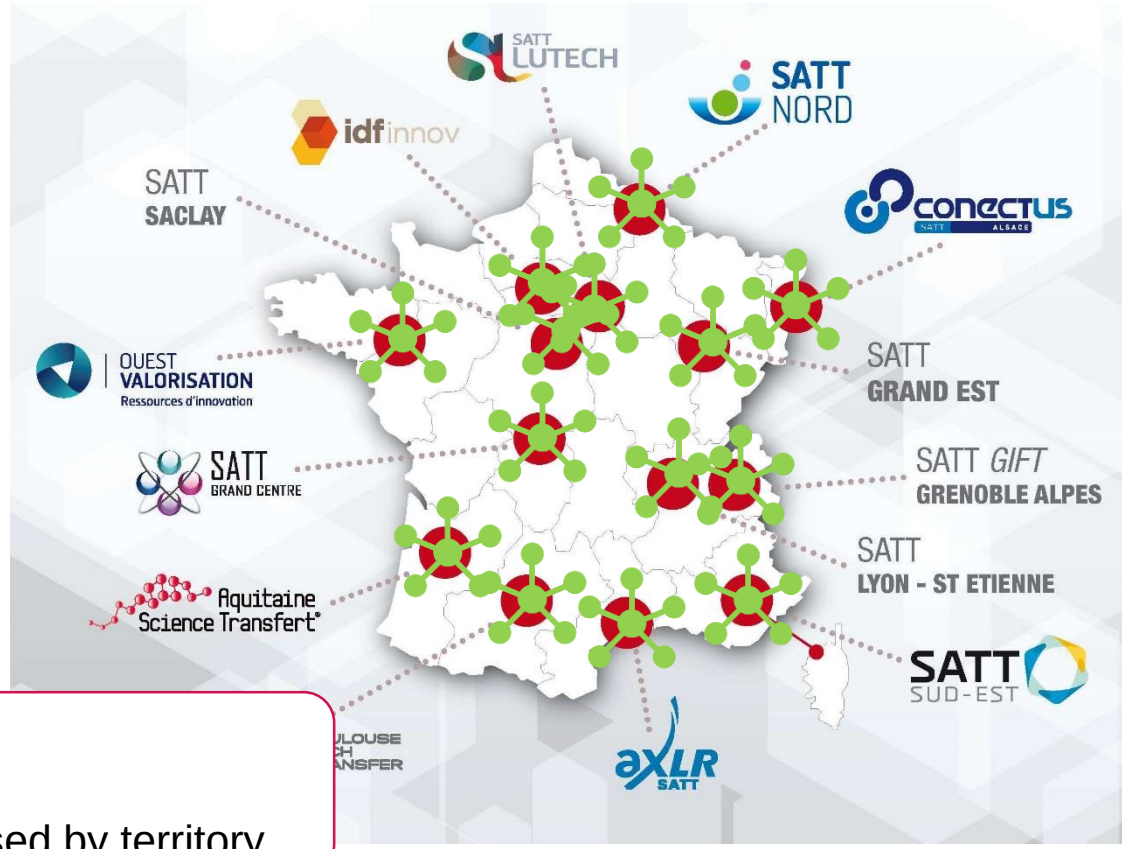
Research object – external TTO

Réseau SATT
Les Sociétés d'Accélération du Transfert de Technologies

14 organisations created 2012-14

856m EUR budget (10 years)

- regular performance assessment
- 3-year reviews



Key features:
✓ private companies
✓ federatively organised by territory

Research question

To what extend does the territorial anchoring of SATT generate a tension between economic and territorial value and how is it regulated?

=> SATT: we suppose, the territorial anchoring might generate tension with their economic mission

Roles and activities
(Howells, 2006; Klerx and Leeuwis 2009; Roxas et al., 2011; Hoppe-Wewetzer & Ozdenoren, 2005; Holzmann et al 2014; Huyghe et al., 2014; Weckowska, 2015)

Effectiveness and performance criteria
(Bozeman, 2000; Siegel et al., 2003)

SATT performance assessment

- **1489 patent application** submitted
- **953 maturation projects** worth EUR 1.6m investment
- **387 licences** issued to companies
- **124 start-ups** created based on an asset valorised by a SATT

as of March 1st 2017

External TTO
due to overlap
(economic vs. territ
(Cervantes and M

ractices to
n global

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Findings

- Two paradoxical roles endorsed concurrently: investor & territorial builder
- Paradox more acute on individual level (Ambos et al. 2008): managers' motivation
  - Private sector mission – solely focus on economic value creation
  - Public service ethos – out-the-door, market and public value criteria (Bozeman et al 2015)

  => ability to 'wear two hats' (Gibson & Birkenshaw 2004)
- Learning process to be able to manage the paradox:
  1. focus on territorial role
  2. creation of economic value
  3. operational project selection

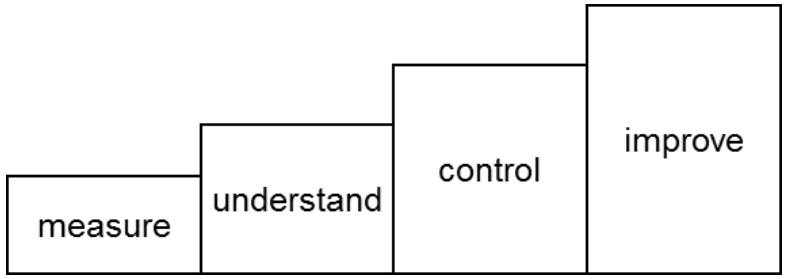
  } stratification

  oscillation practice (Josserand and Perret 2003)

  ⇒management of paradox - Ambidexterity capacity (Clegg et al 2002)

Maturity, performance and maturity models

- **Maturity** : ability of an organisation for continuous improvement



If you can't *measure* something, you can't *understand* it.
If you can't *understand* it, you can't *control* it.
If you can't *control* it, you can't *improve* it."

J.Harrington

- **Performance** <= maturity (positive relationship)
- **Maturity model**:
  - matrix of practices - defining for organizational area, maturity level of practices (Bititci et al 2015)
  - qualit. assessment (Mettler 2011)

people/culture
processes/structures
objects/technology

Maturity model examples

Capability Maturity Model (CMM)

- Software Engineering institute (SEI), Carnegie Mellon University, in 1989
- Quality model for software development organisations

Organization

ISO 15504 / SPICE

- SPICE (= Software Process Improvement and Capability Determination), 1993-2004
- Transfer specific process assessment & process reference framework (2009-2012)

Single processes

innoSPICE

- SPICE family: Automotive SPICE®
  Enterprise SPICE®
- Evaluation tool for **TTOs develop 'transfer capability'**
- Benefits:
  - Highlights problems in processes / areas for improvement
    "picture of reality"
  - Enables justification for budget requests
    "helps to have vision of your job"
- Limitation: appraisal of status quo

=> Important internal evaluation, dangerous if external in terms of legitimacy

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Challenges & opportunities today

Limitations current maturity models

functions
(Secundo et al 2015)

operational

1. appraisal of status quo
2. roadmap how to proceed
3. monitor progress

strategic

Solely appraisal of status-quo

European TTO comparability

- Participation in (inter-)national data collection

Incentivize to participate / support

- Comparability of national metrics

Need to standardize existing metrics

Develop approach for strategic management of TTO practices

Foster measurement and benchmarking of TTO performance

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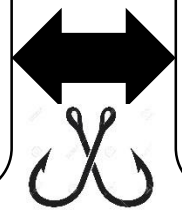
Future work

Develop approach for strategic management of TTO practices



Foster measurement and benchmarking of TTO performance

Pre-requisites

- Considering maturity of practices
- Understanding influence of stakeholders on TTO roles and practices

- Broader conceptualization of performance (public value, stakeholder impact etc.)
- Develop indicators & link to TTO practices

contingent TTO performance assessment framework

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Thank you for your attention

EU Expert Group on Knowledge Transfer Metrics

- 7 core indicators:
  - commercialization of public science:
    - Invention disclosures
    - Patent applications
    - Patent grants
  - use of public science by firms:
    - Licenses executed
    - Gross license revenue
    - Spin-offs/start-ups

ASTPPROTON
KNOWLEDGE TRANSFER EUROPE

General indicators
- Year KTP established for which your KTO is the major service provider
- Give us your opinion on any aspect of the survey

Inputs
- Number of KTO staff in full-time equivalents (FTEs) at the end of FY2015
- Total gross expenditures of the KTO, less out-of-pocket costs for IP protection (€)
  - Out-of-pocket costs for IP protection by your KTO and PRO(s) combined
- Number of **PROs**
- Aggregate Research Expenditures for all PRO(s) for which your KTO is the major provider
  - Of the aggregate Research Expenditures amount was spent in the Science, Technology, Engineering and Mathematics (STEM) and Life Sciences/Medicine fields?
- Research effort of your PRO(s), expressed in Full Time Equivalents (FTEs)? (excl teaching)
  - Of the (combined) research effort, what number of FTEs was engaged in the Science, Technology, Engineering and Mathematics (STEM) and Life Sciences/Medicine fields?

Outputs
- Number of invention disclosures received
- Number of agreements with industry concluded
- Aggregate amount (€) received directly by your PRO from for-profit parties
- Number of priority patent applications filed in FY2015
- Patents were first granted
- Number of active patent families in the patent portfolio of your KTO
- Percentage of active patent families in the patent portfolio that is licensed or optioned
- Number of licenses for software?
- Number of IP agreements executed
- How many IP agreements yielded more than 1M€ in gross revenues?
- Gross revenues from commercialisation of IP
  - Of the gross revenues, what amount was generated by patent licenses
  - Of the gross revenues, what amount was generated from running royalties
  - Of the gross revenues, what amount relates to cashed-in equity
- How many spin-offs were established?
- How many start-ups did your KTO deal with?