Eco-systems mapping

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STRATEGY GROUP

How do we **help** our clients?

What technology/industry should be prioritized?

**WHAT
?**

**Investment
Strategy**

How do we help our clients?

What **technology/industry** should be prioritized?

WHAT?

Where **(city/region)** to invest?

WHERE?

Investment Strategy

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How do we **help** our clients?

What **technology/industry** should be prioritized?

WHAT ?

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WHERE ?

Investment Strategy

Who to **connect** with?

WHO ?

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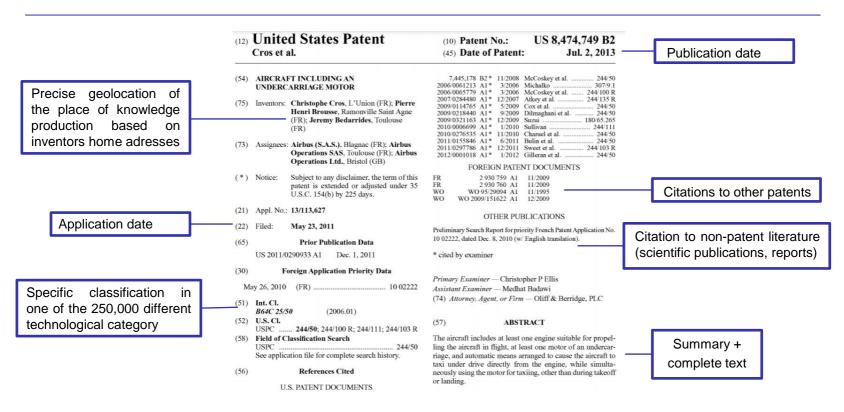
From strategic challenges to data solutions
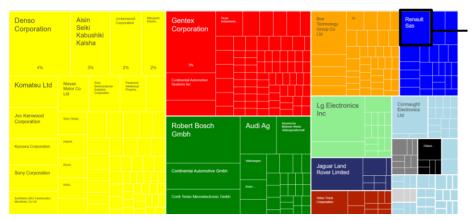
	WHAT?	WHERE?	WHO?
Strategic challenge	What technology should be prioritized?	Where to locate innovation activities?	Who to connect with?
Level of analysis	Technological ecosystems	Urban ecosystems	Actor ecosystems
Key metrics	Classification Velocity Relatedness	Patent counts Relatedness density Comp. Advantages	Patent counts Patent shares
Business decisions	R&D investments Tech diversification New use cases	Spatial scouting Set-up incubators Locate R&D labs	Collaborations M&As Talent acquisitions

Analysis of large patent datasets

Publication date

Precise geolocation of the place of knowledge production based on inventors home adresses

Citations to other patents

Application date

Citation to non-patent literature (scientific publications, reports)

Specific classification in one of the 250,000 different technological category

Summary + complete text

High-end interactive data visualizations tools

Key information for strategy decision making are made available through high-end interactive data visualizations tools (HTML). Links to the interactive material are launched by 👆

Share of patents produced by a given company/inventor – top candidates for strategic collaborations & hiring

Urban ecosystems with the highest relatedness density, relative comparative advantage and patent counts – top candidates for location choices

Technological landscape

Classification of patents in strategic domains

We use a text mining algorithm to identify the patents that corresponds to the 8 strategic domains of head-up displays, computer-aided design, optical systems (general), holography, screen displays (vehicles), optical components, arrangement for software engineering & Automotive ECUs.

First, domain experts & Argos delineate the technological landscape and set up a **list of key words that characterize the different strategic domains.**

Second, a **text mining algorithm** searches these key words and their specific association in the text of **patent documents** as well as in the **Cooperative Patent Classification (CPC) nomenclature.** The CPC nomenclature is developed and maintained by the European Patent Office (EPO) and the US Patent and Trademark Office.

The algorithm returns a list the specific technological classes are most frequently associated with these key words. For 'Screen displays (vehicles)' for instance, the algorithm returns the class B60K2370/152.

In a third step, all the **CPC classes associated by the algorithm with the 8 strategic domains are manually checked** by Continental experts & Argos.

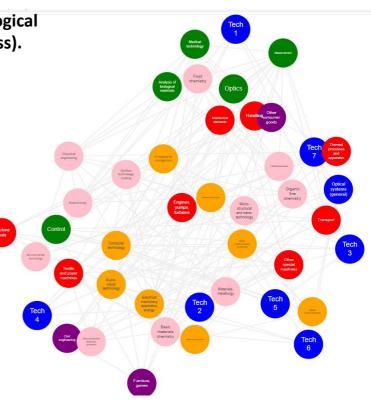# Technology space and relatedness measure

The technology space is a representation of the technological links between the different strategic domains (relatedness).

Elements of the TS represent different (sub-) strategic domains and **links between them represents their degree of relatedness**. The **degree of relatedness** is measured in 2 steps:
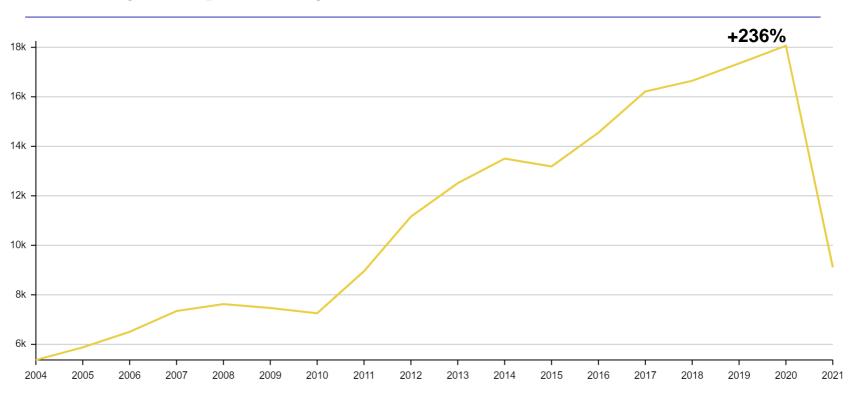
- Count of **co-occurrences** of 2 domains in the same patent
- **Normalization** of theses cooccurrences using the cosine index

The exploration of the technology space allows to understand the links between technologies and the way **knowledge recombines into new inventions**.

Relatedness metrics are the building blocks of recommendation systems predicting new location hubs or company's diversification potential in different domains.
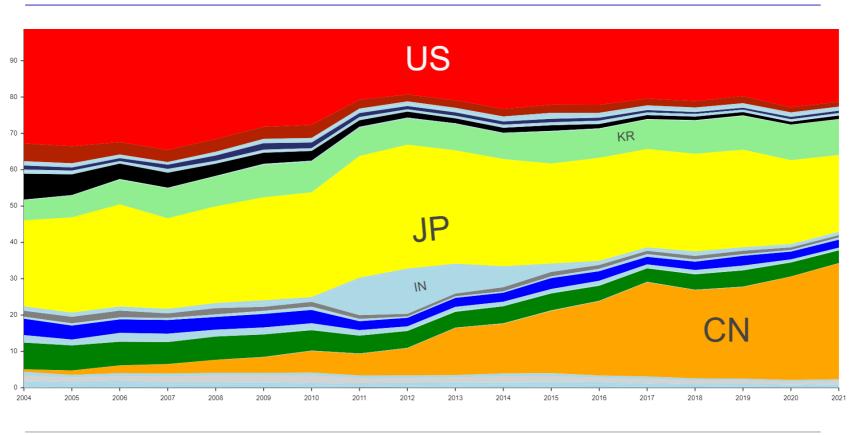
Velocity – Optical systems

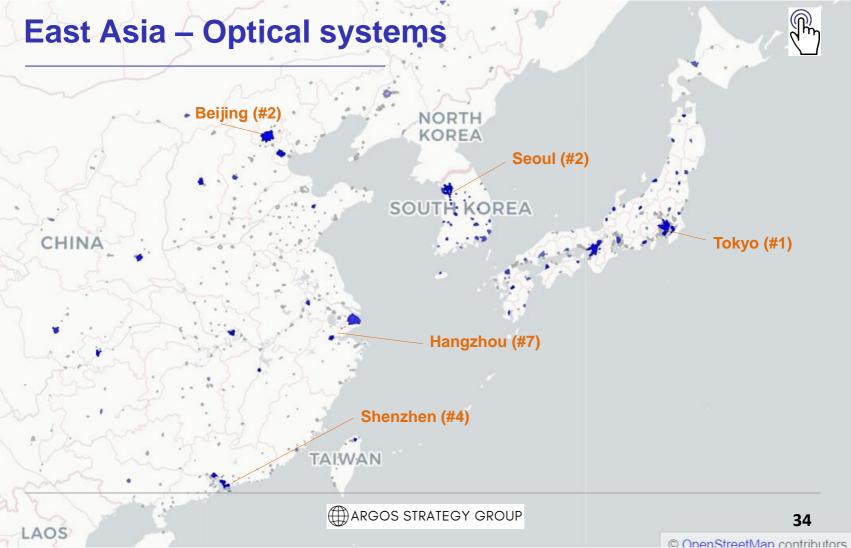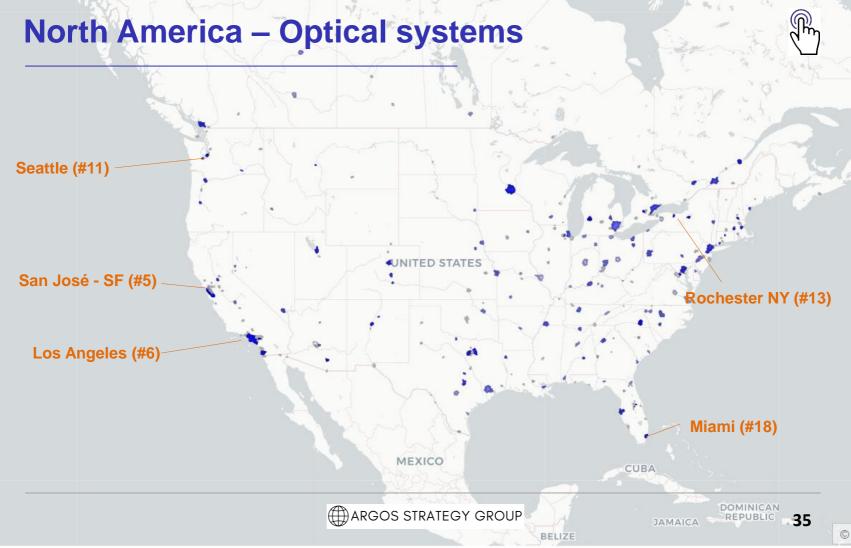# Velocity per country – Optical systems

World urban ecosystems

East Asia – Optical systems

Beijing (#2)

Seoul (#2)

Tokyo (#1)

Hangzhou (#7)

Shenzhen (#4)

NORTH KOREA

SOUTH KOREA

CHINA

TAIWAN

LAOS

ARGOS STRATEGY GROUP

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North America – Optical systems

Seattle (#11)

San José - SF (#5)

Los Angeles (#6)

Rochester NY (#13)

Miami (#18)

Europe – Optical systems

Tempere (#15)

Eindhoven (#31)

Aachen (#28)

Jena (#17)

Rennes (#10)

Tel Aviv (#22)

Key organizations & inventors

Boe Technology Group Co Ltd

Shenzhen China Star...

Hkc Corporation Limited

Huawei Technologies Co Ltd

Beijing Bytedance Network...

Fujifilm Corporation

Sony Semiconductor Solutions Corporation

Nitto Denko Corporation

Canon...

Olympus Corporation

Sony Corporation

Sony Group Corporation

Sz Dji Technology Co Ltd

Sony Group Corporation

Microsoft Technology Licensing Llc

Samsung Electronics Co Ltd

Lg Chem...

Lg...

Lg Electronics Inc

Legend: US · SE · FR · JP · DE · CN · UK · KR · CA · IL · NL
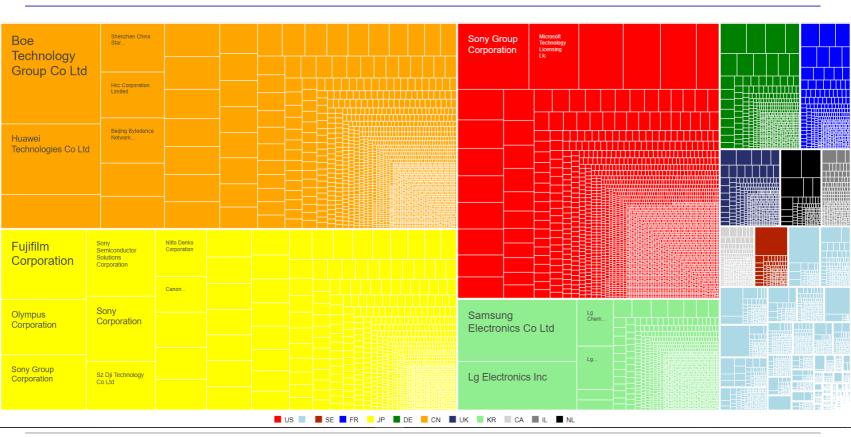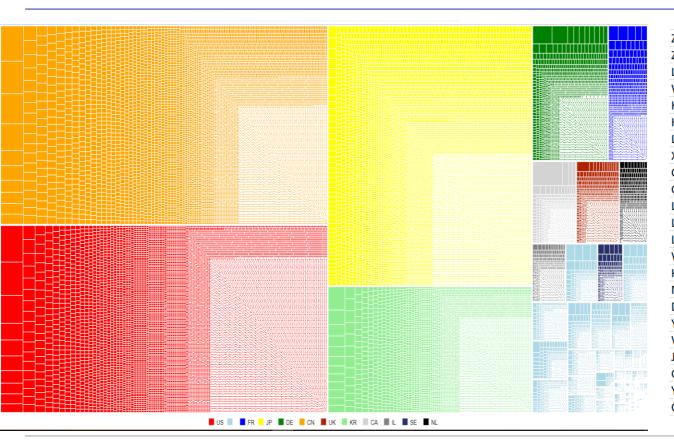
Key actors (inventors) – Optical systems

ZHANG, Li	797
ZHANG, Kai	727
LIU, Hongbin	660
WANG, Yue	607
KIM, Seunghwan	373
KARCZEWICZ, Ma	365
LIU, Shan	341
XU, Jizheng	318
CHEN, Jianle	276
CHEN, Xiaochuan	255
LI, Xiang	241
LIM, Jaehyun	241
LI, Yi	211
WANG, Ye-Kui	191
HEO, Jin	181
NAM, Junghak	179
DONG, Xue	172
YANG, Haitao	172
WANG, Wei	165
JANG, Hyeongmo	164
CHIEN, Wei-Jung	159
YOO, Sunmi	146
CHEN, Ching-Yeh	144

Legend: US, FR, JP, DE, CN, UK, KR, CA, IL, SE, NL

Key organizations & inventors in urban ecosystems

Key actors (app) in Tokyo – Optical systems & tech 2

Optical systems (general)

- Fujifilm Corporation — 9%
- Olympus Corporation / Sony Group Corporation — 7%
- Sony Semiconductor Solutions Corporation — 7%
- Sony Corporation — 7%
- Canon Kabushiki Kaisha / Mitsubishi Electric Corporation — 7%
- Nippon Telegraph And Telephone Corporation — 3%
- Nikon Corporation — 2%
- Nec Corporation
- Sumitomo Chemical Company Limited
- Sony Interactive Entertainment Inc
- Japan Display Inc
- Fujikura Ltd — 2%
- Konica Minolta Inc — 2%
- Semiconductor Energy Laboratory Co Ltd — 1%
- Dic Corporation — 1%
- Nissan Chemical Corporation — 1%
- Toppan Printing Co Ltd — 1%
- Zeon Corporation
- Agc Inc
- Dai Nippon Printing Co Ltd
- Ricoh Company Ltd
- Fuji-Film Corporation
- Jvckenwood Corporation
- Furukawa Electric Co Ltd
- Hoya...
- Jnc Corporation
- Hitachi Ltd
- Mitsui...
- Nippon Sheet Glass...
- Nit...
- Jvc...
- Sony...
- Alps...
- Jnc Petrochemical Corporation
- Nippon Kayaku...
- Nec Display...
- V...
- Hitachi Kokusai Electric Inc
- Mitsubishi...
- Koito Manufacturing Co Ltd
- Hitachi Chemical...
- Toray Industries Inc
- Jsr Corporation
- Dexerials Corporation
- Komatsu Ltd

tech 2

- Mitsubishi Electric Corporation
- Nec Corporation
- Hitachi Ltd
- Nippon Telegraph And Telephone Corporation

Key actors (inv) in Paris – Optical systems & tech 2

Optical systems (general)   tech 2

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