The industry space and entrepreneurship dynamics of Tuscany region. Some lessons for Entrepreneurial Discovery Process and Smart Specialisation Strategy.

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The policy tool of S3: Entrepreneurial Discovery Process

- The main tool thought to implement the S3 is the process of Entrepreneurial Discovery (EDP). Discovery is a process that provokes surprise and can include errors (Kirzner, 1997)

- Discovery mixed to the knowledge asymmetry and informational spillovers derived from Hayek theory (1945) defines the theoretical framework of EDP, where the entire process of economic growth is seen as an "*evolutionary process of discovery*" (Johansson, 2010).

- EDP can be described as "*the tangible exploration of a new domain of opportunities*" (Foray, 2016), where the local policy makers should empower and support the other regional actors (firms, universities, R&D centers) to discover their potentialities, nurturing the innovative capacity of the system (Foray et al., 2009; OECD, 2013; Borrás and Jordana, 2016).

Theoretical Background: the idea of relatedness

- S3 promotes path development of *specialised diversification* able to stimulate the process of regional branching into new activities connected (but not limited) to the existent industrial structure (Boschma and Gianelle, 2014; Tanner, 2014; Xiao et al., 2018).

- Therefore the concept of **related variety** (Frenken et al., 2007) finds a very fitted application on S3 rationales (Foray, 2015).

- A growing number of studies has analysed **co-occurrence** among firms, plants, products, skills technologies (e.g. Teece et al., 1994; Breschi et al., 2003; Hidalgo et al., 2007; Boschma et al., 2012; Neffke et al., 2013; Rigby, 2015; Essletzbichler, 2015, Balland, 2018).

Theoretical Background: entrepreneurship in S3

- In S3 design there is a marked interest to grasp new opportunities even in terms of entrepreneurship (Boschma and Gianelle, 2014; McCann and Ortega-Argilés, 2016).

- One of the possible "innovative outcome" suggested by high levels of relatedness at a territorial level is **the birth of new firm** (Colombelli and Quatraro, 2018).

- The **Knowledge Spillover Theory of Entrepreneurship** (KSTE) (Audretsch and Lehmann, 2005) has been recently assumed as the theoretical base to link the idea of local knowledge base (Colombelli, 2016) with the formation of new firms.

- the idea of KSTE has been recently inserted among **the major theoretical points behind EDP (**Antonietti and Gambarotto, 2018).

Motivation of the study

- **STATE OF ART**

The scientific communities that is analysing relatedness (among them Hidalgo, Boschma, Balland, Rigby, Kogler) and investigating the process of new firm formation in comparison to the knowledge base (among them Colombelli, Quatraro, Antonelli, Qian) have developed interesting models to capture these phenomena.

- **MOTIVATION**

The challenge is to **unfold these concepts** as policy making tools

Analysing the EDP under the lenses of relatedness and entrepreneurial dynamics can be useful to explain the recursive relation between industrial structure, the readiness of the entrepreneurial ecosystem and the process of new firm formation that are at the basis of the discovery process.

Aim of the work

- The aim of this work is to understand the ability of the EDP as a mechanism able to reveal potentialities of a given territory, in comparison to its industrial structure and entrepreneurial dynamics.

Research Design

The analysis has adopted a mix methodological approach:

1) Computation of industrial structure and entrepreneurial dynamics, with a focus on manufacturing and KIBS, **posing Tuscany in comparison to Italy.**

2) *"Fact checking"* with the strategic positions of the stakeholders involved in the EDP concerning the proximities among sectors and the birth of new firms.

- The analysis has been conducted using Tuscany as a case study

Data Sources

Industrial Structure and new firm formation	Fact checking with the strategic actors
- The 2011 Industry Census of ISTAT, to harvest data to compute the industry space, extrapolating employment data at 4 digit level. - The MOVIMPRESE database (Unioncamere) to gather data for new firms divided by 2 digit sector per each province, from the year 2013 to 2016.	- The strategic documents of actors involved in the EDP of Tuscany (the 12 Technological poles) - Semi-structured Interviews administered to the 12 Technological poles (*in fieri*)

Methodology: building the industry space

- To build the industry space, the methodology proposed by Hidalgo et al. (2007) is applied to employees (Innocenti and Lazzeretti, 2018).

RCA matrix 562 industries x 110 provinces

	sector a	sector b	…	sector z
province a	0	0	:	0
province b	1	1	:	1
⋮	:	:	:	1
province z	0	1	:	0

symmetric adjacency matrix 562x562

	sector a	sector b	…	sector z
sector a	0	0	:	0
sector b	1	0	:	1
…		:	:	:	1
sector z	0	1	:	0

Proximity between sectors:

$$\phi_{ij} = min\left\{ P(RCA_i|RCA_j), P(RCA_j|RCA_i) \right\}$$

- The proximities values of Italy are then multiplied by the RCA matrix of Tuscany

Methodology: mapping new firm formation

- The choice was to use a **location quotient** (LQ) of the new firm birth in Tuscany in comparison to the other Italian regions averaging the data in the period 2013-2016.

$$LQ = \frac{{}^{nf_i}\!/_{nf}}{{}^{NF_i}\!/_{NF}}$$

- An adjusted version was calculated (dividing new firms by incumbents) to control for the evolution of new firms in comparison to the existent industrial structure.

Fact Checking: the stakeholders involved in the EDP

- We have developed a qualitative "fact-checking", based on the **official documents** that Tuscany Regional Government published in relation to the EDP and **interviewing strategic actors** included in the development and implementation of these documents.

- The strategic actors who have provided strategic documents inserted in the EDP of Tuscany are represented by the "**Technological Districts** ".

- Technological Districts arise from the necessity to bring a regional network of public and private scientific laboratories for industrial and applied research that works in synergy, not only to promote the production sectors, but also with the technology transfer services to the firms of Tuscany (Tuscany Region, 2014).

Fact Checking: the qualitative strategy

Scanning of the official documents	**Interviews to strategic actors (*in fieri*)**
▪ The strategic documents have been scanned, searching for the presence of elements referred explicitly to proximities between sectors and the intention to sustain new firm formation (e.g. tax reduction or reduction of administrative barriers)	▪ To deepen the position of the actors, **12 semi-structured interviews** have been planned to directly verify the interest of each Technological District on these themes. ▪ The questions aim to understand how the concept of relatedness linked to new firm formation comes into play in their policy strategies

PRELIMINARY RESULTS

TUSCANY IN BRIEF

Population: 3.742.437 inhabitants

Area: 23.000 km²

GDP per capita: € 29.400 (94 out of 276 regions in Europe) (EU, 2015)

Employment: 1,49M employees, representing 6,81% of total Italy (IT)'s and 0,69% of EU-28 share (EU, 2015)

Registered companies: approximately 351.000 (ISTAT- 2015)

Manufacturing: over 32% of regional workforce (ISTAT- 2015)

Tertiary Education: 19,3 % of total population representing 2,20% of EU-28 share (EU, 2015)

R&D expenditure as a % of GDP: 1,36% (40% from private sector) (ISTAT- 2015)

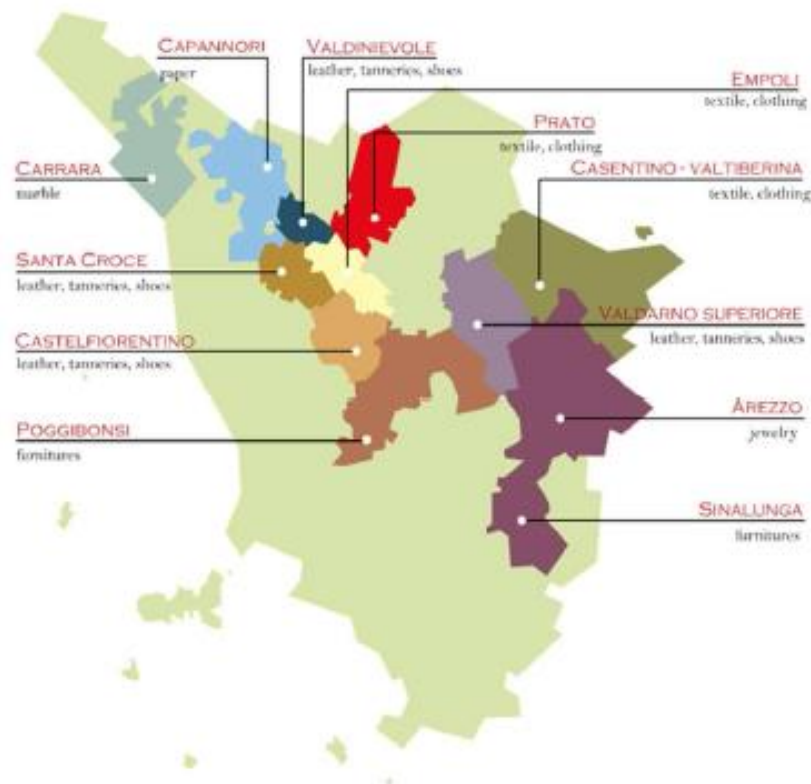# The manufacturing system of Tuscany

Fashion:

- Textile, Clothing,
- Shoes, Leather,
- Tanneries,
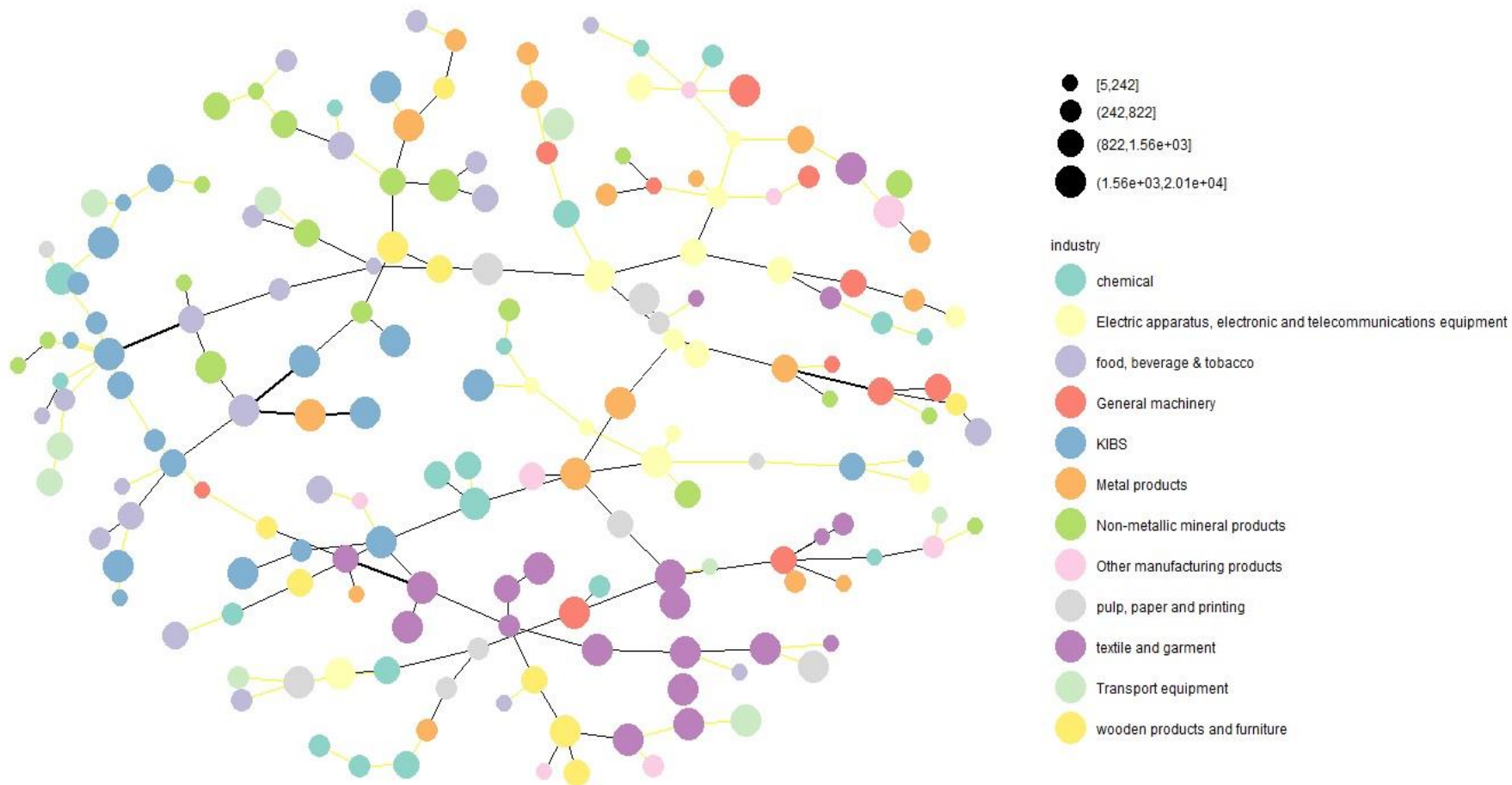- Jewellery

Paper

Interiors:

- Marble, Furniture
- Furnishing

Shipbuilding

The industry space of Tuscany
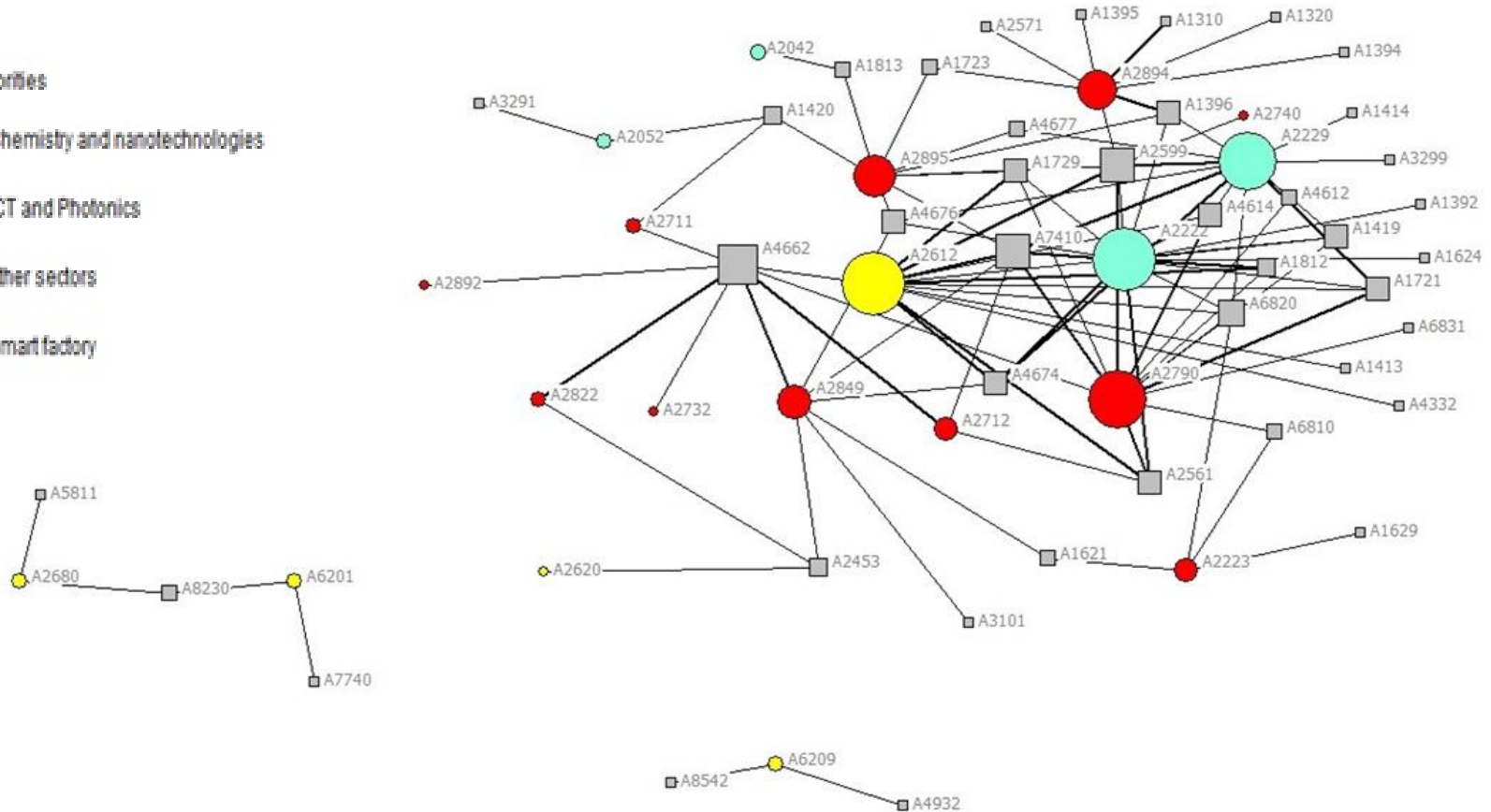(considering only manufacturing and KIBS with proximity values > 0.5)

Authors' elaboration

How S3 priorities are linked to the other sectors?

(focus on the RIS3 sectors with a proximity value > 0.5)

Authors' elaboration

New entrepreneurship in Tuscany: what sectors are more dynamic? (with LQ>1)

LQ Rank	Activity	LQ 2013-2016	LQ adj. 2013-2016	Difference
1	Leather	5,508	1,211	4,297
2	Garment	3,608	1,48	2,129
3	Textiles	3,501	1,098	2,403
4	Pharmaceutical	3,37	2,875	0,495
5	transport equipment	1,874	1,065	0,809
6	Other manufacturing	1,671	1,098	0,572
7	Chemicals	1,642	1,62	0,022
8	Furniture	1,548	1,095	0,454
9	Manufacture of non metallic products	1,337	1,003	0,334
10	Paper	1,324	0,791	0,533
11	Computer, electronic and optical products	1,234	1,399	-0,166
12	Basic metals	1,209	1,527	-0,317
13	Wood	1,164	1,123	0,041
14	Rubber and plastic	1,1	1,469	-0,369
15	Printing and reproduction	1,095	1,235	-0,139
16	Repair of machinery	1,051	0,962	0,089
17	Scientific research and development	1,017	0,964	0,053

The EDP of Tuscany
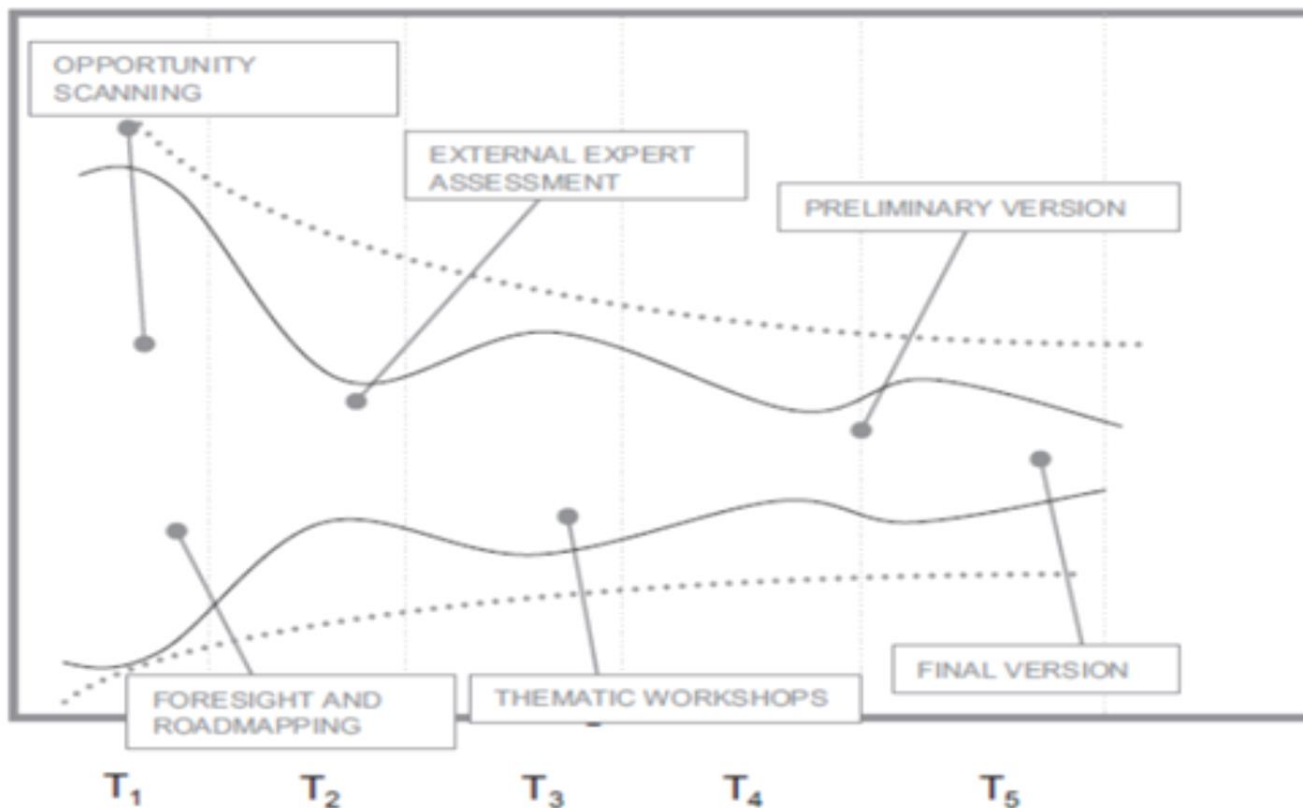
Source: Fabbri (2016)

The fact-cheking

- Examples of fact checking applied to 3 Technological District:

Technological District	Proximity levels	Creation of new firm	Fact check with the strategic document
Fashion	high level of relatedness with paper, printing, rubber, plastic, metal products, machine for textile	from 3 to 5 times more than the national average	Synergies even in other sectors (e.g. ICT, design); role of incubator of Start-ups
Life Science	good level of relatedness with textile, computer electronic and optical products, machinery.	from just above the national average up to 3 times more than the national average	Synergies even in other sectors (e.g. ICT); creation of Start-ups among the purpose of the district
Furnitures	good level of relatedness with non-metallic mineral products and metal products, garment, electrical equipment	just above the national average	Synergies even in other sectors (e.g. finishing of stones, renewable energy, Fashion, ICT,); no reference to new firm

Conclusions and future advancements

- In general the EDP of Tuscany, considering the first findings, was well structured. The methods used have even the possibility **to add new information** for the building of future EDP.
- The proximity levels and new firm formation represent a part of the EDP, but more nuances need to be accounted for future:

a. **The direction of the proximity** (what sector influence the others? The birth of new firms as a possible determinant of the direction?)
b. **The mechanism behind the process of new firm formation** (incentives, tax reduction, R&D partnerships)

- We have planned **semi-structured interviews** to the stakeholders involved in the EDP aimed to deepen these themes with the managers of Technological Districts.

Challenges for EDP and S3

- Embracing the idea of relatedness and KSTE at a policy level is a challenge that EDP should consider given the theoretical bases of S3.

- This idea reinforces the point that the discovery of the "adjacent possible" (Foray, 2015) should avoid policy targeted only on high-tech sectors (Brown et al., 2017). However the enhancement of "wild cards" or "unrelated paths" can represent a complementary perspective.

- Some challenges have emerged for the future of the EDP:

a.   Are these type of information valuable for the EDP building?
b.   The Issue of taxonomy and methodology within the EDP
c.   The engagement of the stakeholders involved in the EDP

Thank you for listening!

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