BRIDGES project, 5th call, additional activities: good practices

January 2022 – April 2022 – July 2022

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Objective of the document

The objective of this document is to introduce to the project partnership concepts and some of the most prominent characteristics of value chain reshoring, inshoring, and nearshoring concepts as part of the good practices (GP) of the BRIDGES project 5th call approved application.

We remind that five (5) themes of good practices have been studied: (a) Theme 1 Tools for targeting value chain reshoring & nearshoring segments; (b) Theme 2 instruments for identifying interregional complementarities related to value chain re- and near- shoring priorities; (c) Theme 3 Targeted, VC related science-based entrepreneurship programmes and TRL[1],[2] 5-8 promotion; (d) Theme 4 Integration of Green Deal & Digital Transformation into VC; (e) Theme 5 Benefitting from EDIHs. The aim is to prepare regions for mainstreaming value chain measures into regional strategies, namely their respective RIS3.

Part 1 Background issues is finalised and besides the present document, it is available online also as a separate document[3]. The aim of Part 1 is to prepare regions for mainstreaming value chain measures into regional strategies and namely their respective RIS3.
Part 2 Identified good practices, lists, discusses and relates the identified good practices to the prioritised good practice themes. The aim is, by an in-depth discussion to create knowledge and facilitate good practice selection and adoption by the BRIDGES project partners, to support formulating the RIS3 improvement approach.
Part 3 Conclusions will follow once partners have selected the GPs they will adopt for their RIS3 improvement.

Part 1 Background issues

Bridges project additional activities (5th call)

According to the BRIDGES project additional activities, Good Practices (GPs) explore five (5) GP themes: (a) Tools for targeting value chain reshoring & nearshoring segments; (b) instruments for identifying interregional complementarities related to value chain re- and near- shoring priorities; (c)Targeted, VC related science-based

[1] **TRL = Technology readiness level = TRL= Technology Readiness Level.** Technology readiness levels (TRLs) are a method for estimating the maturity of technologies during the acquisition phase of a program, developed at NASA during the 1970s. The use of TRLs enables consistent, uniform discussions of technical maturity across different types of technology [Mihaly, Heder (September 2017). "From NASA to EU: the evolution of the TRL scale in Public Sector Innovation" (PDF). The Innovation Journal. 22: 1–23*].* A technology's TRL is determined during a Technology Readiness Assessment (TRA) that examines program concepts, technology requirements, and demonstrated technology capabilities. The European Commission advised EU-funded research and innovation projects to adopt the scale in 2010. TRLs were consequently used in 2014 in the EU Horizon 2020. In 2013, the TRL scale was further canonised by the ISO 16290:2013 standard. "Technology readiness levels (TRL); Extract from Part 19 - Commission Decision C(2014)4995" PDF). *ec.europa.eu*. 20149]. https://en.wikipedia.org/wiki/Technology_readiness_level. ALSO FROM OTHER SOURCES, example: https://www.ic.gc.ca/eic/site/080.nsf/eng/00002.html;

https://www.nasa.gov/directorates/heo/scan/engineering/technology/technology_readiness_level .

[2] A comprehensive approach and discussion of TRLs has been published by the European Association of Research and Technology Organisations (EARTO) [The TRL Scale as a Research & Innovation Policy Tool, EARTO Recommendations (PDF). European Association of Research & Technology Organisations. 30 April 2014].

[3] The report is available in the BRIDGES project location, as part of the Interreg Europe programme. https://drive.google.com/open?id=1U3OyTXXpraajq4awnSJzqmDaVgwLKWIC&authuser=chaniotou%40icloud.com&usp=drive_fs.

entrepreneurship programmes and TRL[4],[5] 5-8 promotion; (d) Integration of Green Deal & Digital Transformation into VC; (e) Benefitting from EDIHs.

— GPs in themes a,b, and c are planned to close knowledge gaps in the partnership, hindering regions from benefitting from VCs localisation and collaboration.

— GPs in themes d and e, are about supporting twin transition. In principle, they "add" technological and knowledge segments to VCs.

The purpose of the good practice exercise is to identify good practices that by provably supporting the re-shoring and near-shoring initiatives of the partner areas, will be mainstreamed into policy measures, namely into the regional S3 of Helsinki-Uusimaa, Kainuu, (both FI) and Western Macedonia (GR); the CLLD of Western Slovenia (SI), and the national S3 of Western Transdanubia (HU). The exercise foresees near-shoring to be based on interregional complementarities mostly within the partnership, but it is not excluding more extensive collaboration schemes and networks.

Besides the BRIDGES project partners, the good practices contribute to the methodological tools of the BERRY+ S3 partnership (https://s3platform.jrc.ec.europa.eu/berry), and to any region & their networks that are interested in institutionalising value chain-based policies and initiatives into their RIS3.

Insights into the five GP themes

These five themes were selected according to four (4) criteria:

(i) **GP Theme 1** Good practices about value chain mapping, identification of competitive advantage and decision-making criteria related to value chain re-shoring and nearshoring. We are aware that value-chain based policies are and will be increasingly important strategic & diversification tools, knowledge which we need to reinforce.

(ii) **GP Theme 2** Good practices for anticipating interregional complementarities and including them into their S3 have not yet been addressed sufficiently (Balland and Boschma 2021)[6].

[4] **TRL = Technology readiness level = TRL= Technology Readiness Level.** Technology readiness levels (TRLs) are a method for estimating the maturity of technologies during the acquisition phase of a program, developed at NASA during the 1970s. The use of TRLs enables consistent, uniform discussions of technical maturity across different types of technology [Mihaly, Heder (September 2017). "From NASA to EU: the evolution of the TRL scale in Public Sector Innovation" (PDF). The Innovation Journal. 22: 1–23*]*. A technology's TRL is determined during a Technology Readiness Assessment (TRA) that examines program concepts, technology requirements, and demonstrated technology capabilities. The European Commission advised EU-funded research and innovation projects to adopt the scale in 2010. TRLs were consequently used in 2014 in the EU Horizon 2020. In 2013, the TRL scale was further canonised by the ISO 16290:2013 standard. "Technology readiness levels (TRL); Extract from Part 19 - Commission Decision C(2014)4995" PDF). *ec.europa.eu*. 20149]. https://en.wikipedia.org/wiki/Technology_readiness_level.

ALSO FROM OTHER SOURCES, example: https://www.ic.gc.ca/eic/site/080.nsf/eng/00002.html;

https://www.nasa.gov/directorates/heo/scan/engineering/technology/technology_readiness_level .

[5] A comprehensive approach and discussion of TRLs has been published by the European Association of Research and Technology Organisations (EARTO) [The TRL Scale as a Research & Innovation Policy Tool, EARTO Recommendations (PDF). European Association of Research & Technology Organisations. 30 April 2014].

[6] Balland P-A, and Boschma R. (2021). Complementary interregional linkages and Smart Specialisation: an empirical study on European regions. Article in Regional Studies · January 2021 DOI: 10.1080/00343404.2020.1861240. https://www.researchgate.net/publication/348587340 .

Iacobucci & Guzzini, 2016[7] identified that "the methods adopted by regions to detect potential links between the specialisation domains is based more on anecdotal evidence than on the application of theoretically grounded methodologies". The reason is, as the authors identified, "the absence of a consolidated methodology to deal with these issues …". Uyarra et al., 2014[8] discuss several instruments for the support of interregional complementarities implementation, as well as planning, such as: (a) INTERREGIONAL COMPLEMENTARITIES IMPLEMENTATION INSTRUMENTS joint research and education programmes; joint provision of research infrastructure; collaborative schemes to support R&D investment in firms; technology transfer infrastructure; innovation support services; innovation support services. These include advisory services for SMEs, technical services, and other knowledge transfer services such as mobility schemes between industry and research, graduate placement schemes and innovation vouchers; financing services; cluster policy (European Commission, 2012[9]; Ketels et al., 2013[10]); and (b) INTERREGIONAL COMPLEMENTARITIES INSTRUMENTS GIVING INPUTS TO POLICY DESIGN, for example, mapping of clusters, competence areas and joint foresight exercises may provide regions with better evidence for decision making and the identification of partners for cross-border collaboration.

In our experience, strategic instruments, such as joint foresight exercises or, even less, joint foresight exercises aiming at joint or coordinated policy design are still unusual. Based on the preceding discussion, is that interregional complementarities, are occasional rather than systemic, and are still linked more to policy delivery than policy design. Moreover, researchers have argued that "innovation policy instruments must be designed and combined into mixes in ways that address the problems of the innovation system. The problem-oriented nature of the design of instrument [policy] mixes is what makes innovation policy instruments systemic" [11]. However, our perspective is that, if policy should be therapeutic, it should equally be anticipatory, preparing for next steps of development, addressing emerging issues and solutions.

With the 2nd GP theme, we seek to reinforce the strategic dimension of interregional complementarities and understand how they can be interpreted in different contexts. We want to shed light into mechanisms leading to complementarity identification, interpretation and exploration in different regional contexts, from the point of view of contributing to long term innovative growth. "What matters is not being connected to other regions per se but being connected to regions that provide complementary capabilities"[12].

(iii) **GP Theme 3** Good practices contributing to the resilience of regional economies by expanding (re-shoring or inshoring) the economic base utilising TRL or MRL[13],[i] scaling up related to competitive advantage peaks.

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[7] Iacobucci, D., & Guzzini, E. (2016). Relatedness and connectivity in technological domains: Missing links in S3 design and implementation. European Planning Studies, 24(8), 1511–1526. https://doi.org/10.1080/09654313.2016.1170108 .

[8] Uyarra, E., Sorvik, J., & Midtkandal, I. (2014). Interregional collaboration in research and innovation strategies for Smart Specialisation (JRC Technical Reports, S3 Working Paper Series No. 6/2014). IPTS.

[9] European Commission (2012), Guide to Research and Innovation Strategies for Smart Specialisation (RIS3), CEC, Brussels.

[10] Ketels, C. (Chair), Nauwelaers, C. (Rapporteur), J. Harper, G., B. Lubicka and F. Peck (2013). The Role of Clusters in Smart Specialisation Strategies, Expert Group report for DG Research, European Commission.

[11] Borrás S., Edquist Ch. (2013). The choice of innovation policy instruments. CIRCLE, University of Lund, Paper 2013/04. http://www.circle.lu.se/publications. https://www.researchgate.net/publication/269630694. [p 1 and 29].

E. Vedung, Policy Instruments: Typologies and Theories, in: M.L. Bemelmans-Videc, R.C. Rist, E. Vedung (Eds.) Carrots, Sticks and Sermons. Policy Instruments and their evaluation, Transaction Publishers, London, 1998.

M.-L. Bemelmans-Videc, R.C. Rist, E. Vedung, Carrots, sticks & sermons : policy instruments & their evaluation, in, Transaction, London, 2003.

[12] Pierre-Alexandre Balland & Ron Boschma (2021) Complementary interregional linkages and Smart Specialisation: an empirical study on European regions, Regional Studies, 55:6, 1059-1070, DOI: 10.1080/00343404.2020.1861240 .

[13] MRL = Manufacturing Readiness Level, is a structured evaluation process to gauge the status of production processes and costs of an emerging technology using a standard set of metrics (Manufacturing Readiness Levels, MRLs) with associated risk elements. MRA evaluates the status of the overall manufacturing activity and assigns a MRL on a 1-10 scale by considering the maturity of the manufacturing process, the maturity of the system or component design, the maturity or readiness of personnel

The TRL or MRL scaling up would include also relocation options, i.e. TRL coming from other areas that are part of the value chain. Entrepreneurship good practices, in this context, would be about initiatives promoting the scaling up of both, localised & relocated TRL or MRL.

(iv) **GP Theme 4** and **GP Theme 5** Practice-based good practices demonstrating twin transition (GP Theme 4) and benefits from EDIH applications (GP Theme 5).

*(iv.1) GP Theme 4 Twin transitio*n, as policy articulation might be relatively recent, however, [environmental] sustainable development and digitalisation policies and practices are not new. The types of good practices we are seeking here, are actions / projects and policy measures demonstrating conceptual and practice solutions, which integrate sustainability with competitiveness, and sustainability with digital transformation. Researchers have recognised (Reinaud 2009:10[14]) that, "policy-makers are also looking for specific policy measures to avoid putting industries exposed to a risk of carbon leakage at a competitive disadvantage vis-à-vis the rest of the world". OECD in a recent report also acknowledges that [OECD 2019:9[15]] "Asymmetric environmental policy induces differences in costs as a first order effect". More recent reports deal with the transition costs and link to competitiveness (Hydrogen Council 2020[16]; McKinsey 2021[17]). The conclusion is that transition costs are closely associated to different industries and therefore, their associated value chains. Within the BRIDGES project partnership, one partner region, in their more recent report currently open to consultation (till 3.11.2021), is emphasising competitiveness with sustainability (and vice versa)[18]. From these inputs, recommended policy measures are already profiling themselves, but more evidence is needed. In conclusion, the twin transition good practices we are seeking are expected to demonstrate their advantages in reference to concrete industries and value chains.

(iv.2) GP Theme 5 EDIH, as innovation infrastructures effectively supporting digital transformation of industries, reinforced by interregional characteristics and benefits, are recent in terms of the emphasis put on the interregional parameter and on the systematisation of services they offer (test before invest, support to find financing, training, and networking). However, they are institutionalised orchestrators of long-time practices. The question here is how EDIHs, through good practice exchange, could benefit the different value chains selected by project partners. We anticipate good practices that reflect the EDIH concept as introduced by the JRC[19] and in which there are clear options addressing the interregional aspects including

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and facilities, and the readiness to provide a quality product that fulfils commercial requirements. A key function of MRA is to assess industry's ability to manufacture at a (set of) given production volume(s), (e.g. pilot phase, full rate production) whose value(s) depend(s) on the specific market being addressed by the product. The end goal of an MRA is to define activities by identifying weaknesses in the manufacturing process or concurring with the transition to the identified production volume(s), https://www.fch.europa.eu/sites/default/files/MRL_support.pdf; https://rescoll.fr/trl-technology-readiness-level-mrl-manufacturing-readiness-level__trashed/ .

[14] Rainaud J. (2009). Trade, Competitiveness and Carbon Leakage: Challenges and Opportunities. Chatham House, Department for International Development. https://www.chathamhouse.org/sites/default/files/public/Meetings/Meeting%20Transcripts/0109reinaud.pdf .

[15] Jane Ellis J., Nachtigall D., and Venmans F. (2019). Carbon Pricing and Competitiveness: Are they at Odds? – Environment Working Paper No. 152. OECD, Environment Directorate. https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/WKP(2019)11&docLanguage=En .

[16] Hydrogen Council (2020). Path to hydrogen competitiveness: A cost perspective. January 2020.

[17] McKinsey (2020). How the European Union could achieve net-zero emissions at net-zero cost. https://www.mckinsey.com/business-functions/sustainability/our-insights/how-the-european-union-could-achieve-net-zero-emissions-at-net-zero-cost .

[18] Uusimaa programme and environmental report [Uusimaa-ohjelma ja ympäristöselostus nähtäville – Luonnokset kommentoitavana 3.11. asti] https://www.uudenmaanliitto.fi/uudenmaan_liitto/uutishuone/tiedotteet/uusimaa-ohjelma_ja_ymparistoselostus_nahtaville_-_luonnokset_kommentoitavana_3.11._asti.37904.blog .

[19] "Digital Innovation Hubs are one-stop-shops that help companies to become more competitive with regard to their business/production processes, products or services using digital technologies. ... DIHs also provide business and financing

pricing of services. We expect that the EDIH transregional services will be able to enable value chain access by first informing value chain potential members of the digital transformation level expected by value chain mainstream players and then helping them to get scaled up. This would happen in collaboration also between EDIHs, and therefore it might be a way of policy impact towards better access to European Value Chains (EVC).

Value chain reshoring, inshoring and near shoring: background

According to the approved BRIDGES project AF, the objective is to reinforce regional resilience by in-shoring and re-shoring value-chain based productive activities, while, at the same time, also identifying those activities that is best to be done in collaboration with other regions (near shoring). On the other hand, the whole BERRY+ effort is reaching and benefitting from interregional complementarities based on the value-chain approach.
The focus of the whole effort is on in-shoring and re-shoring competitive advantage in relation to specific value chains and, in parallel, identifying and investing in near-shoring / off-shoring value chain segments in which a region is not specialised or in which it is not interested. The terminology of reshoring is fundamentally territorial[20].

It is a question of where manufacturing is located, rather than by whom it is performed (that is, whether the manufacturing is insourced or outsourced). 'Reshoring' is the relocation of previously offshored value chain activities (particularly: production; sourcing; research and development; services) back to the EU. It can represent a key trigger to revamp EU's manufacturing industry over the coming years and restore EU as a global location of excellence in manufacturing[21].

Much of the literature on reshoring also tends to present the concept as a reversal of offshoring (Gray et al., 2013[22]). Nearshoring refers to manufacturing being relocated to a country closer to 'home'. This approach is confirmed by recent research[23] and policy makers[24].

support to implement these innovations, if needed across the value chain" . https://s3platform.jrc.ec.europa.eu/digital-innovation-hubs .

https://digital-strategy.ec.europa.eu/en/activities/edihs

European Digital Innovation Hubs in Digital Europe Programme; Draft working document 25-01-2021.

[20] European Parliament Research Service (EPRS) (2021). Post Covid-19 value chains: options for reshoring production back to Europe in a globalised economy. Policy Department for External Relations Directorate General for External Policies of the Union PE 653.626 – March 2021. https://www.europarl.europa.eu/RegData/etudes/STUD/2021/653626/EXPO_STU(2021)653626_EN.pdf

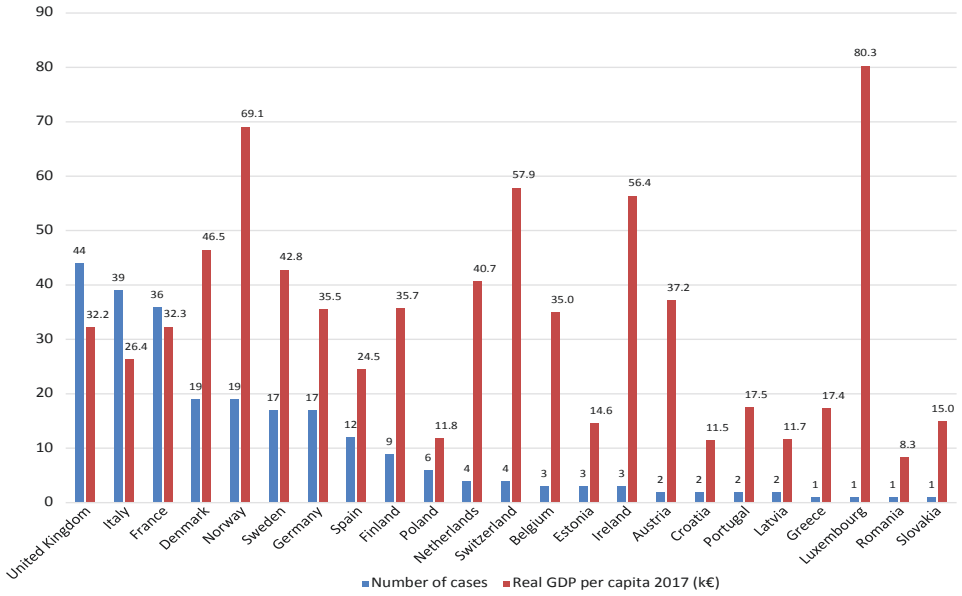
[21] https://reshoring.eurofound.europa.eu .

[22] Gray, J. V. et al. (2013) 'The Reshoring Phenomenon: What Supply Chain Academics Ought to know and Should Do', Journal of Supply Chain Management, 49(2), pp. 27–33. doi: 10.1111/jscm.12012.

[23] Loewendahl, H. (2017). Innovations in Foreign Direct Investment Attraction. IDB, Integration & Trade Sector, TECHNICAL NOTE NUMBER IDB-TN-1572. https://publications.iadb.org/publications/english/document/Innovations-in-Foreign-Direct-Investment-Attraction.pdf .

[24] https://europa.eu/regions-and-cities/programme/sessions/70_en Page 4 of 7: Scaling-up SMEs and attracting FDI: what role for local and regional governments? | European Week of Regions and Cities 14.10.2021, 9.40. "Scaling up SMEs and attracting FDI: what role for local and regional governments?". (Irish contribution).

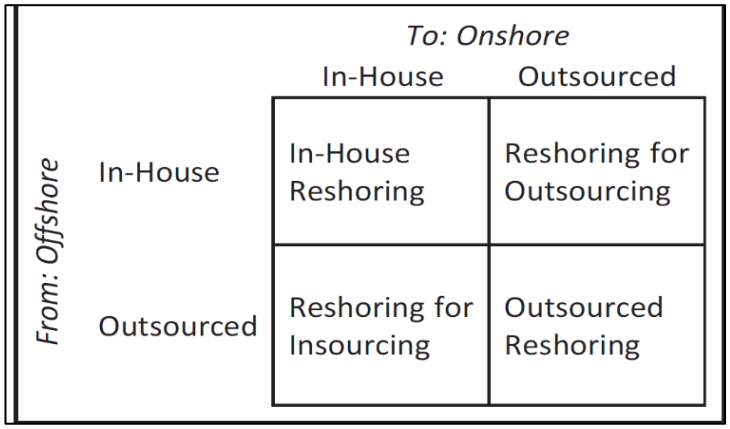
Figure 1 Models of reshoring[25]



Source: *European Reshoring Monitor, Eurostat.*
Note: *GDP per capita (2017 data) except Switzerland (2016 data); France, Greece, the Netherlands, Portugal, Romania and Spain (expected 2017 data).*

Eurofound[26] (2019) Reshoring in Europe[27] investigated various parameters of re-shoring and nearshoring segments of value chains. They reflect businesses' decision making. In some cases, there have been correlations between identified weakening of national industrial performance (e.g. Germany in 2014), followed by reshoring decisions.

Figure 2 Reshoring initiatives 2014-2018 per country[28]



[25] Gray, J. V. et al. (2013) 'The Reshoring Phenomenon: What Supply Chain Academics Ought to know and Should Do', Journal of Supply Chain Management, 49(2), pp. 27–33. doi: 10.1111/jscm.12012:p28.

[26] The European Foundation for the Improvement of Living and Working Conditions is an agency of the European Union which focuses on managing research, gathering information, and communicating its findings.

[27] Eurofound (2019). Reshoring in Europe [RE]: Overview 2015–2018, Publications Office of the European Union, Luxembourg. https://www.eurofound.europa.eu/publications/report/2019/reshoring-in-europe-overview-2015-2018 .

[28] Ibid., above page 18.

Key findings of the 2019 Reshoring in Europe (RE) study observe that[29]:

— reshoring decisions have been increasing since 2014. The Reshoring in Europe (2019) edition anticipates that there would be more re-shoring decisions in the next period, however, with the covid-19 (already) 3-year-old pandemia, re-shoring cases might have increased more than anticipated;

— large companies account for most re-shoring cases (around 60% of all cases);

— manufacturing dominates re-shoring (about 85% of cases).

The European Reshoring Monitor [REM] also tracks policies aiming to support European companies in reshoring their production. Evidence was found in France, Germany, Italy, the Netherlands and the United Kingdom (UK). 'Government support for relocation' (page 38 of the REM 2018) is 4th from the last, among nineteen (19) re-location motivation criteria. Nevertheless, the REM notes that "there is a lack of research on the real effects of such policies" (page 7), and Figure 3.

Table 1 Frequency of cited motivations for reshoring by country[30]

Reshoring motivation	**Frequency and industries of reshoring**
[1]. Firm's global reorganisation	France C14 - Manufacture of wearing apparel (10) Italy C14 - Manufacture of wearing apparel (10) Sweden C14 - Manufacture of wearing apparel (10)
[2]. Delivery time	United Kingdom C14 - Manufacture of wearing apparel (17) Norway C14 - Manufacture of wearing apparel (8) Italy C14 - Manufacture of wearing apparel (6) Spain C14 - Manufacture of wearing apparel (6)
[3]. Automation of production process	Norway C14 - Manufacture of wearing apparel (13) Italy C14 - Manufacture of wearing apparel (8) France C14 - Manufacture of wearing apparel (6 United Kingdom C14 - Manufacture of wearing apparel (6)
[4]. Poor quality of off-shored production	United Kingdom C14 - Manufacture of wearing apparel (14) Denmark C14 - Manufacture of wearing apparel (8) Italy C14 - Manufacture of wearing apparel (8) Norway C14 - Manufacture of wearing apparel (8)
[5]. Proximity to customers	United Kingdom C14 - Manufacture of wearing apparel (11) France C14 - Manufacture of wearing apparel (9) Spain C14 - Manufacture of wearing apparel (7)
[6]. 'Made in' effect	Italy C14 - Manufacture of wearing apparel (18) United Kingdom C14 - Manufacture of wearing apparel (13)
[7]. Know how in the home country	Italy C14 - Manufacture of wearing apparel (18) United Kingdom C14 - Manufacture of wearing apparel (13)
[8]. Implementation of strategies based on product/process innovation	Italy C14 - Manufacture of wearing apparel (12) Germany C14 - Manufacture of wearing apparel (5)
[9]. Need for greater organisational flexibility	United Kingdom C14 - Manufacture of wearing apparel (10) France C14 - Manufacture of wearing apparel (5) Italy C14 - Manufacture of wearing apparel (4)
[10]. Change in total costs of sourcing	United Kingdom C14 - Manufacture of wearing apparel (8) France C14 - Manufacture of wearing apparel (6) Italy C14 - Manufacture of wearing apparel (4)
[11]. Untapped production capacity in the home country	France C14 - Manufacture of wearing apparel (8) Italy C14 - Manufacture of wearing apparel (7)
[12]. Logistics costs	France C14 - Manufacture of wearing apparel (7) United Kingdom C14 - Manufacture of wearing apparel (6) Italy C14 - Manufacture of wearing apparel (5)

[29] Ibid, above, page 7. https://www.eurofound.europa.eu/publications/report/2019/reshoring-in-europe-overview-2015-2018 .

[30] Ibid, above, page 31. https://www.eurofound.europa.eu/publications/report/2019/reshoring-in-europe-overview-2015-2018 .

We note that the highest number of re-shoring tends to coincide home-country strengths (often these are also historical strengths as in the textiles and wearing apparel industries) related to innovation, know how, automation and implementation of strategies based on product / process innovation. This is confirmed by further research (EPRS 2021, and MGI 2020), Figure 4[31] .

Figure 3 The potential for value chains to shift across borders over the next five years depends on economic and non-economic factors[32]

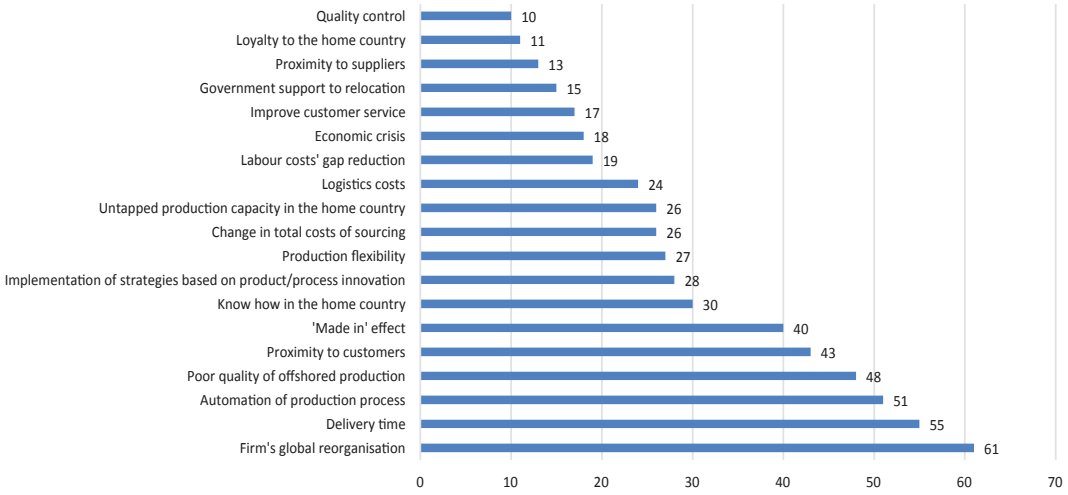
	Value chain	Feasibility of geographic shift: Eco-nomic factors	Feasibility of geographic shift: Non-eco-nomic factors[2]	Value of exports with shift feasibility (annual exports)[1]: Range, $ billion	Value of exports with shift feasibility (annual exports)[1]: Share of value chain exports, %	Total exports, 2018, $ billion	Drivers of economic shift feasibility: Top 3 exporter share change, 2015–18, pp	Drivers of economic shift feasibility: Capital intensity,[3] %	Drivers of economic shift feasibility: Knowledge intensity,[4] %	Drivers of economic shift feasibility: Product complexity[5]	Drivers of economic shift feasibility: Intra regional trade,[6] %
Global innovations	Chemicals			86–172	5–11	1,584	-1.4	72	26	5	57
	Pharmaceuticals			236–377	38–60	626	0	58	41	5	40
	Aerospace			82–110	25–33	333	-2.9	53	40	5	34
	Automotive			261–349	15–20	1,730	-1.6	51	16	5	60
	Transportation equipment			60–89	29–43	209	0	48	18	5	43
	Electrical equipment			213–319	23–34	928	-2.5	43	23	5	54
	Machinery and equipment			271–362	19–25	1,455	-2.2	36	19	6	50
	Computers and electronics			165–247	23–35	708	-1.9	47	57	5	53
	Communication equipment			227–363	34–54	673	9.5	51	45	5	46
	Semiconductors and components			92–184	9–19	995	10.5	62	39	5	81
	Medical devices			100–120	37–45	268	0.1	47	29	5	40
Labor intensive	Furniture			37–74	22–45	164	-5.7	40	15	4	55
	Textiles			67–134	23–45	297	-3.2	34	15	4	55
	Apparel			246–393	36–57	688	-8.1	30	18	3	43
Regional processing	Fabricated metal products			94–141	21–32	440	-3.5	33	16	5	57
	Rubber and plastic			97–145	20–30	488	-2.7	40	16	5	60
	Food and beverage			63–125	5–11	1,149	-1.1	57	14	4	56
	Glass, cement, and ceramics			22–45	11–21	209	-4.5	48	15	5	57
Resource intensive[7]	Agriculture			112–149	20–26	568	0.4	24	10	4	47
	Wooden products			8–17	5–11	155	0.9	43	11	4	57
	Basic metal			77–153	6–12	1,250	-3.6	54	16	4	51
	Petroleum products			212–423	9–18	2,414	1.3	81	32	3	30
	Mining			29–57	6–13	452	3.8	72	16	3	49
		Total	Low	2,900	16						
			High	4,600	26						

[31] European Parliament Research Service [EPRS] (2021). Post Covid-19 value chains: options for reshoring production back to Europe in a globalised economy. European Parliament, Policy Department for External Relations Directorate General for External Policies of the Union PE 653.626 – March 2021:29. And: MGI (2020) Risk, resilience, and rebalancing in global value chains. McKinsey Global Institute.

[32] EPRS page 29.

The European Reshoring Monitor [REM] notes that while some policies supporting re-shoring have been identified, more research is needed to understand better re-shoring policies and motivations. Indeed, *Government support to re-location* is the 4th least cited motivation for re-location, while the most frequent motivations are the 'Made in' effect; Proximity to customers; Poor quality of off-shored production; Automation of production process; Delivery time; Firm's global reorganisation; Figure 4.

Figure 4 Reshoring motivations (only those declared at least 10 times).[33]



Source: *European Reshoring Monitor*
Note: *Multiple motivations can be indicated for a single reshoring case*

The EPRS 2021 study[34] makes several policy recommendations. We retain and list below those which we consider potentially relevant to the BRIDGES project policy impact:

1. If reshoring is employed, it should be one amongst several instruments available to promote specific policy objectives: for example, combining reshoring with twin transition, industrial sovereignty, and so on.

2. Reshoring and related policies need to be tailored to the specific characteristics of the global value chain [GVC] under consideration: Given the diversity and highly specific nature of GVCs, even amongst those within the same sector, no general policy approach to reshoring exists.

3. **Reshoring can be promoted directly by sector-specific policies and indirectly by horizontal policies**. Sector-specific, direct policies include obligations for companies to source domestically or use domestic production or financial incentives to reshore production. Horizontal, indirect policies include measures that make international trade and transport more expensive, such as carbon taxes, preferential tariff rates for nearshored products, or due diligence obligations for lead firms to increase the resilience and robust- ness of their supply chains.

[33] REM 2019, page 22.

[34] European Parliament Research Service [EPRS] (2021). Post Covid-19 value chains: options for reshoring production back to Europe in a globalised economy. Page 74-75.

The discussion (Figures 2,3,4, and 5) confirm the BRIDGES project (additional activities phase) strategy to focus the value chain mapping on technology-based competitive (rather than comparative) advantage, with emphasis on technological, innovation and scientific capabilities. The EPRS recommendations, strongly contributed to the definition of the good practice themes, as tools to further guide policy impact, which is one of the expected outputs of the BRIDGES project.

Part 2 Identified good practices

Overview

According to the BRIDGES project additional activities, Good Practices (GPs) explore five (5) GP themes: (1) Tools for targeting value chain reshoring & nearshoring segments; (2) instruments for identifying interregional complementarities related to value chain re- and near- shoring priorities; (3) Targeted, VC related science-based entrepreneurship programmes and TRL[35],[36] 5-8 promotion; (4) Integration of Green Deal & Digital Transformation into VC; (5) Benefitting from EDIHs.

The purpose of the good practice exercise is to identify good practices that can become policy tools for supporting re-, in- shoring and near-shoring initiatives of the partner areas, namely into the regional S3 of Helsinki-Uusimaa, Kainuu, (both FI) and Western Macedonia (GR); the CLLD of Western Slovenia (SI), and the national S3 of Western Transdanubia (HU)[37]. The exercise foresees near-shoring to be based on interregional complementarities mostly within the partnership, but it is not excluding more extensive collaboration schemes and networks.

The good practice identification took place between 1.10.2021 – 31.3.2022. It proved very challenging to identify good practices for all five themes. Finally, eleven (11) GPs were identified. Three come from BRIDGES project regions (2 come from Greece and 1 comes from Spain), 1 was identified during the Policy Learning matchmaking session organised by the PLP and the BRIDGES project on 30.3.2022, three from the USA, two are European Parliament initiatives, and two come from European Commission studies.

More than half of the good practices identified concern the 1st Theme (6 GPs), while the 2nd theme has two GPs, the 3rd theme 1 GP, and the 4th theme 2 GPs. No satisfactory GPs were identified for the 5th theme on EDIH contributions to value chains. One of the challenges of the 5th thematic area, the EDIHs, is that often, there is a tendency to apply the term "digital innovation hub" or even "innovation hub" in a somewhat general way, often denoting a concentration of activities without specification of qualifications, functionalities, or results. Table 3 provides summary information the identified GPs according to their thematic domain and focus. Detailed

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[35] **TRL = Technology readiness level = TRL= Technology Readiness Level.** Technology readiness levels (TRLs) are a method for estimating the maturity of technologies during the acquisition phase of a program, developed at NASA during the 1970s. The use of TRLs enables consistent, uniform discussions of technical maturity across different types of technology [Mihaly, Heder (September 2017). "From NASA to EU: the evolution of the TRL scale in Public Sector Innovation" (PDF). The Innovation Journal. 22: 1–23*].* A technology's TRL is determined during a Technology Readiness Assessment (TRA) that examines program concepts, technology requirements, and demonstrated technology capabilities. The European Commission advised EU-funded research and innovation projects to adopt the scale in 2010. TRLs were consequently used in 2014 in the EU Horizon 2020. In 2013, the TRL scale was further canonised by the ISO 16290:2013 standard. "Technology readiness levels (TRL); Extract from Part 19 - Commission Decision C(2014)4995" PDF). *ec.europa.eu.* 20149]. https://en.wikipedia.org/wiki/Technology_readiness_level . MORE:

https://www.ic.gc.ca/eic/site/080.nsf/eng/00002.html; https://www.nasa.gov/directorates/heo/scan/engineering/technology/technology_readiness_level .

[36] A comprehensive approach and discussion of TRLs has been published by the European Association of Research and Technology Organisations (EARTO) [The TRL Scale as a Research & Innovation Policy Tool, EARTO Recommendations (PDF). European Association of Research & Technology Organisations. 30 April 2014].

[37] Besides the BRIDGES project partners, the good practices contribute to the methodological tools of the BERRY+ S3 partnership (https://s3platform.jrc.ec.europa.eu/berry), and to any region & their networks that are interested in institutionalising value chain-based policies and initiatives into their RIS3.

descriptions of the GPs are included in this document Annex 1 Good practices, while more information can be found also directly from the web, see cited url:s in Table 2, below.

Table 2 BRIDGES project additional activities, good practices (GP)

GP number and name	Theme	Focus
Good practice 1 The Future of Manufacturing in Europe (FOME) pilot project.	**1**	Pilot project of the European Parliament, 2015-2018. https://europa.eu/european-union/about-eu/agencies/eurofound_en. Study investigating re-shoring industries, priorities, practices.
Good practice 2 Reshoring decision framework (Brookings)	**1**	Brookings Metropolitan Policy Programme (2020). Reshoring advanced manufacturing supply chains to generate good jobs. July 2020. https://www.brookings.edu/interactives/metro-recovery-watch/ . Policy recommendations for re-shoring, 6 measures, fiscal, financial, and guaranteed contracting are proposed.
Good practice 3 Reshoring decision framework (EPRS)	**1**	European Parliament (2021). Post Covid-19 value chains: options for reshoring production back to Europe in a globalised economy. European Parliament, Policy Department for External Relations Directorate General for External Policies of the Union PE 653.626 – March 2021. Near/off shoring and re-shoring decisions are required to be based on *multi-dimensional optimisation approaches*, while policies supporting re-shoring, should take into account the specific characteristics of the GVC under consideration, i.e.,"no general policy approach to re-shoring exists". Policy recommendations for re-shoring; reshoring decision framework. ACCESS: https://www.europarl.europa.eu/thinktank/en/document/EXPO_STU(2021)653626 SECTORIAL: https://www.europarl.europa.eu/RegData/etudes/STUD/2021/659437/EPRS_STU(2021)659437_EN.pdf OLDER: https://www.europarl.europa.eu/EPRS/140791REV1-Reshoring-of-EU-manufacturing-FINAL.pdf
Good practice 4 The use of 3D printing in manufacturing: The case of Inertia Racing Technology	**1**	Reshoring Institute (https://reshoringinstitute.org/), in collaboration with the University of San Diego Supply Chain Management Institute. Re-shoring case study. Gives ides for business-based projects preparatory funding for re-defining business model in view of re-shoring interests.
Good practice 5 Increased innovation and service level in fashion: The case of Todd Shelton	**1**	Reshoring Institute (https://reshoringinstitute.org/), in collaboration with the University of San Diego Supply Chain Management Institute. Re-shoring case study. Gives ideas for business-based projects preparatory funding for re-defining the business model in view of re-shoring interests.
Good practice 6 BILAKATU programme (direct incentives to promote re-location and near-shoring)	**1**	Policy Learning Platform session, 30.3.2022 Policy initiative for re-location associated with value chains, three types of incentives / policy measures are proposed: direct incentives, collaboration with clusters, thriving companies needs (direct subsidies to strengthen embeddedness). https://www.spri.eus/es/ayudas/bilakatu/ https://www.fundacioncarmengandarias.com/contenidos.php?seccion=3&categoria=14&subcategoria=5&lang=en
Good practice 7 Exploring the impact of inter-regional linkages on regional	**2**	European Commission, report by Baland & Boschma 2019 https://ec.europa.eu/regional_policy/sources/docgener/brochure/impact_ir_linkages_en.pdf

GP number and name	Theme	Focus
diversification in Europe in the context of smart specialisation.		
Good practice 8 Mapping the potential of EU regions to contribute to Industry 4.0	**2**	European Union, Balland, P.A. and Boschma, R. (2021). Mapping the potentials of regions in Europe to contribute to new knowledge production in Industry 4.0 technologies. Regional Studies, 55:10-11, 1652-1666, DOI: 10.1080/00343404.2021.1900557 https://www.tandfonline.com/doi/full/10.1080/00343404.2021.1900557
Good practice 9 DEFINE network	**3**	ePlatform for the development of fashion networks. *https://www.define-network.eu/*
Good practice 10 Symbiotic networks of bio-waste sustainable management	**4**	*https://symbiosisproject.eu/* Applying digital tools to develop symbiotic networks, to improve cross industry resource efficiency through waste, by-products and raw material trading and sharing assets in an environmentally sustainable way.
Good practice 11 SYMBIOICT	**4**	*https://apps.symbiolabs.gr/symbio/* A digital platform to collect and analyse datasets relating to industrial facilities, regional waste production and supply chain economics with the aim to detect and visualize geographic areas and industrial sectors with high Industrial Symbiosis potential. GP 11 has complementarities with GP 8.

By analysing the eleven (11) GPs, we found thirteen (13) policy measures proposed by them. We notice that the same policy measures can be found in more than one GPs (Table 3), i.e. there is convergence of understanding and optimisation approaches.

Table 3 Policy measures proposed by the identified good practices

Proposed policy measures	Relevant GPs (*)										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1. Tools for the Identification of interregional complementarities							X	X			
2. Financial & fiscal incentives[38] Investment (subsidies) support, for example, for technological upgrading to Industry 4.0 / additive manufacturing, research centres and academic programmes for workforce upgrading; Interest rates, provisions oriented to facilitate re-shoring, i.e. a way of directing investments.	X		X			X					
3. Monetary policies, financial measures, subsidies.		X	X			X					

[38] Financial, fiscal and monetary: **financial** (relating to finance, which is the commercial activity of providing funds and capital, or to put it the other way, the ways in which individuals and organizations raise money); **fiscal** (relating to financial matters, especially government tax revenues and government expenditure and debt); **monetary** (relating to the money supply: the amount of money in circulation, its rate of growth, and interest rates). https://difference-between.com/finance/financial-fiscal-monetary/.

Proposed policy measures	Relevant GPs (*)										
	1	2	3	4	5	6	7	8	9	10	11
Interest rates, provisions oriented to facilitate re-shoring, i.e. a way of directing investments.											
4. Innovation policies Financial incentives for mission oriented, technological upgrading / investments, upskilling of workforce, research centres-university synergies.			**X**								
5. Industrial policies Identification of grand challenges, missions, strategic sectors, industrial clusters, etc. to channel investment into strategic areas, Industrial clusters / smart spec.	**X**	**X**	**X**	**X**	**X**	**X**	(x)	(x)			
6. Trade policies Anti-dumping / countervailing duty orders; Tariffs / quotas; Patent / copyright enforcement.	X		X								
7. Environment policies Lower energy cost; Lower tax on energy use; Lower environmental standards.			X								
8. Public procurement (including defence policies), including guaranteed contracting.		X	X	X	X			X			
9. Competitive advantage; crash test Map most important industries locally and assess their performance ("crash test"); identify competitive advantage for re-shoring and in-shoring.	X	X	X	X	X	X	X	X			
10. Connect to and leverage regional talent generators and workforce development providers. With the labour demand of many manufacturers shifting from low-skill, low-cost labour to mid- to high-skill engineering and technical capabilities, U.S. educational institutions are well positioned to produce the very talent that will increasingly be in demand from these sectors. Connect to the need for a digitally fluent workforce, massive disruption is underway in manufacturing, with an increased reliance on technology as opposed to low-cost labour.	X	X		X	X	X					

Proposed policy measures	Relevant GPs (*)										
	1	2	3	4	5	6	7	8	9	10	11
11. Take advantage of Opportunity Zones https://eig.org/opportunityzones		X		X	X	X					
12. Invest in regionally based soft-landing services Companies setting up new operations in any community will need assistance with site selection, permits and local approvals, and optimizing their processes.		X		X	X						
13. E-Platforms facilitating value chain cooperation									X	X	X
LEGEND: GP 1 FOME; GP 2 BROOKINGS; GP3 EPRS; gp4 & GP5 RESHORING INSTITUTE; GP 6 Basque Country; GP 7 & 8 identification of interregional complementarities as a tool to focus reshoring, in shoring and near-shoring initiatives; GP 9, 10, 11: e-platforms as tools supporting the implementation of thematic interregional complementarities.											

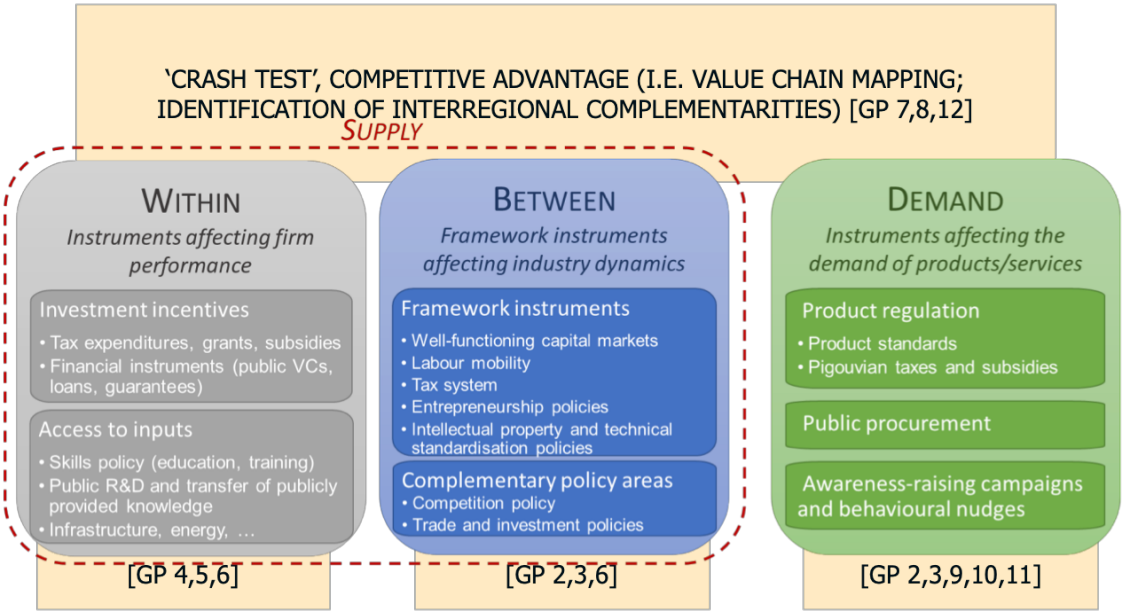
The proposed policy measures cover a wide range of interventions, some of which go beyond regional jurisdictions. They reveal a well-structured, multi-dimensional, optimisation approach that appears to rely on the complementarity between and among policy instruments. For example, instruments affecting firm performance, industrial dynamics and demand for products & services are all present among the 13 measures included in Table 3. It is worth mentioning that these 13 measures, appear to be aligned with the OECD taxonomy of policy instruments. The OECD (OECD 2022[1][39] and OECD 2022[2][40], page 19) proposes a new taxonomy of industrial strategy policy instruments (**Error! Reference source not found.**), which "allows identifying the channels through which instruments operate and potential complementarities". … In addition to keeping with the traditional distinction between horizontal and targeted policies, the taxonomy distinguishes between demand-pull instruments and two types of supply-push instruments: those that improve firm performance ("within" instruments) and those that affect industry dynamics ("between" or framework instruments) [OECD 2022[2], page 19]. The 13 measures & the associated GPs go beyond the alignment with the OECD policy instrument taxonomy. They reveal an implementation path, an optimal re- and in-shoring potential decision making. In this path, the notion of the 'crash test', of competitive advantage' is predominant and it is this concept that is supported by the policies (**Error! Reference source not found.**).

Figure 5 Policy instruments taxonomy and the BRIDGES project good practices (source: adjusted from OECD

[39] Criscuolo, C. et al. (2022), "Are industrial policy instruments effective? A review of the evidence in OECD countries", *OECD Science, Technology and Industry Policy Papers*, No. 128, OECD Publishing, Paris. Accessed at https://www.oecd-ilibrary.org/docserver/57b3dae2-en.pdf?expires=1656421972&id=id&accname=guest&checksum=15E3AF775AC84757C3AFF89F02F402CA .

[40] Criscuolo, C., et al. (2022), "An industrial policy framework for OECD countries: Old debates, new perspectives", OECD Science, Technology and Industry Policy Papers, No. 127, OECD Publishing, Paris, https://doi.org/10.1787/0002217c-en. Accessed at https://www.oecd-ilibrary.org/docserver/0002217c-en.pdf?expires=1656418796&id=id&accname=guest&checksum=102441FCC1D46A6B1629CA71A29C0220 .

2022[2], page 19).



Relevance of the good practices to the BRIDGES project & recommendations for the GP selection in Part 3

GP 1-2-3-6

Reshoring drivers include operative factors (flexibility, quality) and the ones related to knowledge and capabilities (access to skills and knowledge, proximity to R&D and product development, and time-to-market). When compared to other countries findings, Finnish companies seem to have a higher rate of reshoring decisions[41].

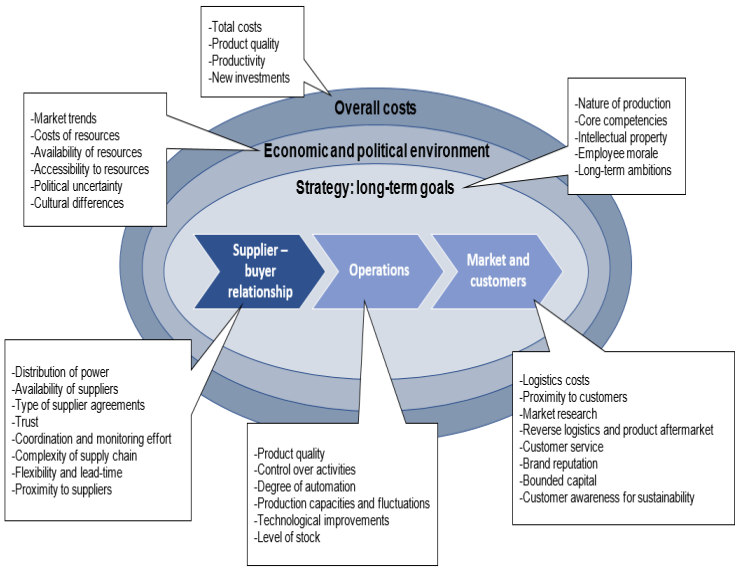
With respect to the relocation drivers, labour cost has been cited as the most important factor for the initial offshoring decisions, while reshoring decisions are based on a broader set of drivers like quality, flexibility, lead-time, access to skills and knowledge, access to technology, proximity to R&D and time-to-market[42]. The nature of the reshoring decision confirms that it is a very complex decision which requires the companies to take a close look at many different factors, as shown in Figure 6. The reshoring decision itself varies quite substantially depending

[41] Heikkilä J.; Martinsuo M.; Nenonen S. (2018) Backshoring of production in the context of a small and open Nordic economy *Journal of Manufacturing Technology Management*. DOI: 10.1108/JMTM-12-2016-0178. Url: https://www.emeraldinsight.com/doi/abs/10.1108/JMTM-12-2016-0178.

[42] Heikkilä J.; Nenonen S.; OlhagerJ.; Stentoft J. (2018) Manufacturing relocation abroad and back: empirical evidence from the Nordic countries World Review of Intermodal Transportation Research Vol. 7, No. 3 pp.221–240. https://doi.org/10.1504/WRITR.2018.093563 .

on the company, it is important that companies adapt these factors to their specific needs. Only when considering this step, a correct decision can be ensured[43].

Figure 6 Factors impacting re-shoring decisions.



→**Policy measures** could be envisaged as horizontal and as vertical (industrial policy) actions. For example, horizontal actions could refer to helping businesses make re-shoring plans, offering some fiscal or financing support to re-shoring businesses, linking re-shoring to FDI attraction. Vertical actions relate to industrial policy and localisation / territorialisation of value chain segments related to an industry. For example, identification of the most important value chains present in the region, mapping of value chains and liaising competitive advantage to re-shoring, in-shoring and near-shoring opportunities, investing in specialised intermediary services, all form parts of consistent industrial and value-chain policies. GPs 2, 3, and 6 are complemented by identification of interregional complementarities GPs 7 and 8.

GP 4–5

For a company to decide to re-shore, it appears that the company needs to re-define its image and more than that, its business model. It has to position itself within a different productive context and criteria than the one in which it was operating before. Regional policies can help businesses re-shore by providing support for re-shoring plans and maybe some funding for re-location (as e.g. in the case of GP6).

[43] André Eiler, Sebastian Schwarz, Leif-Magnus Jensen (2017). A reshoring decision framework. Jönköping University, International Business School. Master Thesis in Business Administration.

→ **Policy recommendations** would include feasibility studies supporting companies re-define their business plans in the re-shoring context and direct support to the business plan itself. GP5 is also directly linked to one of the mapped value chains (renewable & recyclable textiles, PP4).

GP 7 - 8

With a strong learning potential, GP 7 & 8 are important in three ways: they (i) provide methodologies for regions to identify and select industries within which they can have leadership; (ii) the methodology is based on measuring relatedness, and in that sense it is positioning leadership within relevant contexts; (iii) it provides evidence for the need of background research regions could /should invest in when planning & renewing regional innovation and development strategies and funding programmes.

→**Policy measures** The BRIDGES project additional activities have included a value chain mapping action, leading to identification of regional peaks and valleys, and linking the former to re- and in-shoring initiatives and the latter to near-/ off- shoring initiatives. The methodology applied is based on identifying regional competitive advantage within the context of the mapped value chains, measured by related regional turnover including export strengths. This has proven to be an emerging good practice, ensuring a better granularity required by value chain mapping than patents for example (GP7). Nevertheless, many regions faced challenges to apply this baseline methodology, and therefore, maybe one of the policy impact recommendations is training regions and experts into value chain mapping approaches. Moreover, it appears as highly relevant that regions,

— when planning or renewing innovation strategies, invest in interregional complementarity studies, revealing promising fields of development and collaboration with other regions, and making such potential operation through value chain mapping studies;

— need to bring together industrial policy with innovation policy and value-chain based measures;

— formulate targeted re-, in- and near- shoring strategies and for that purpose, reviewing the 13 items listed in Table 3 is recommended.

GP 9–10–11

These are useful good practices for re-localising TRL in a concrete sector (GP9) and improving twin transition options (GP 10 & 11) and the localised, associated ecosystem including specialised services. Moreover,

→**Policy measures** Within the context of broader policy measures, as discussed in relation to GPs 1, 2, 3, 6, implementation of GPs 9, 10, 11 reinforces the coherence and effectiveness of the overall approach and strengthens industrial specialisation.

Part 3 Good practice selection

Partners analysed the good practices and selected those that were most relevant to them. The selection process 1.4.4044 – 30.6.2022, included interregional, national (in some cases) and regional stakeholder as well as administrative meetings, with date marking the final decision making, the 17th ISC (Interregional Steering Committee), organised online on 14.6.2022. To make the good practice selection, GPs were analysed according to approaches, measures [see the proposed thirteen (13) measures already discussed (Table 3)] and intervention Types (IE taxonomy). **Error! Reference source not found.** below, summarises the GP selection process, including also the types of policy instrument improvements according to the taxonomy proposed by the Interreg EUROPE programme.

Table 4 Good practice selection, relevance of GPs to individual regions, 1.10.2021 – 14.6.2022.

Good practices	**Partner regions and specific aspects of GPs, to be I be included into the policy improvement recommendations**				
	PP2/LP	**PP4**	**PP5**	**PP6**	**PP7**
Good practice 1 The Future of Manufacturing in Europe (FOME) pilot project.					
Good practice 2 Reshoring decision framework (Brookings)	Value chain mapping / competitive advantage for in-shoring and re-shoring	Value chain mapping / competitive advantage for in-shoring and re-shoring Guaranteed contracting (requires negotiations with national level, too)	Value chain mapping / competitive advantage for in-shoring and re-shoring	Value chain mapping / competitive advantage for in-shoring	Value chain mapping / competitive advantage for in-shoring and re-shoring
Good practice 3 Reshoring decision framework (EPRS)	Regionally based soft landing services	Regionally based soft landing services	Regionally based soft landing services	Regionally based soft landing services	Regionally based soft landing services
Good practice 4 The use of 3D printing in manufacturing: The case of Inertia Racing Technology		Branch-based feasibility studies regarding in shoring, re shoring and near shoring. As enablers for business and research projects. Business plans for re-shoring and in-shoring.	Branch-based feasibility studies regarding in shoring, re shoring and near shoring. As enablers for business and research projects.		
Good practice 5 Increased innovation and service level in fashion: The case of Todd Shelton					

Good practices	Partner regions and specific aspects of GPs, to be I be included into the policy improvement recommendations				
	PP2/LP	PP4	PP5	PP6	PP7
			Business plans for re-shoring and inshoring.		
Good practice 6 BILAKATU programme (direct incentives to promote re-location and near-shoring)	Collaboration with clusters Thriving companies needs	Collaboration with clusters Thriving companies needs	Collaboration with clusters Thriving companies needs	Collaboration with clusters Thriving companies needs	Collaboration with clusters Thriving companies needs
Good practice 7 Exploring the impact of inter-regional linkages on regional diversification in Europe in the context of smart specialisation.		Network (at least 3) feasibility studies to identify complementary technologies for joint development; important for coordinated near-shoring with in-shoring			
Good practice 8 Mapping the potential of EU regions to contribute to Industry 4.0	Network (at least 3) feasibility studies to identify complementary technologies for joint development	Network (at least 3) feasibility studies to identify complementary technologies for joint development			Network (at least 3) feasibility studies to identify complementary technologies for joint development
Good practice 9 DEFINE network					
Good practice 10 Symbiotic networks of bio-waste sustainable management					
Good practice 11 SYMBIOICT	Link to I4.0; knowledge of data management and applications; algorithms for specific. branches	Link to I4.0; knowledge of data management and applications; algorithms for specific. branches			Link to I4.0; knowledge of data management and applications; algorithms for specific. branches
LEGEND (*): PP2/LP Kainuu; PP4 Helsinki-Uusimaa; PP5 Western Macedonia; PP6 Western Slovenia; PP7 Western Transdanubia					

Partner regions made their GP and measure selection according to their interests (development priorities and absorptive capacity). However, certain cross – cutting observations deserve more attention: (i) value chain mapping, as operational as well as strategic tool appears to be relevant for all partners; (ii) building on competitive advantage and associated (and localised) eco-system, is a shared priority among all partners; (iii) industry-related business and innovation services & collaboration with cluster units appear to be relevant to all partners as well; (iv) branch-related preparatory projects like feasibility studies and business plans for re-shoring have been important to two partners; (v) measures supporting competitive advantage of value chains (such as targeted development

projects to large or medium size businesses, are also important to all regions; (vi) bilateral value chain mapping, for the establishment of interregional collaboration contexts and then implementing relevant activities, including EDP (entrepreneurial discovery process) sessions has been introduced by two partners and tested accordingly. Results indicate that the process might deserve further development, leading to its mainstreaming.

Table 5 Policy instrument improvement recommendations, 14-6-2022 – 14.7.2022

Type of policy impact (Type 1 = new projects; Type 2= improvement of the policy instrument management; Type 3= new policy instrument)		**PP2/LP**	**PP4**	**PP5**	**PP6**	**PP7**
Good practice 1 The Future of Manufacturing in Europe (FOME) pilot project.						
Good practice 2 Reshoring decision framework (Brookings)						
Type 2	Value chain mapping / competitive advantage for in shoring and re-shoring	**1**	**1**		**1**	**1**
Type 2	Guaranteed contracting (requires negotiations with national level, too)		**1**			
Good practice 3 Reshoring decision framework (EPRS)						
Type 2	Regionally based soft landing services (competence building and specialisation of intermediaries to effectively support re-shoring and in-shoring)	**1**		**1**	**1**	**1**
Good practice 4 The use of 3D printing in manufacturing: The case of Inertia Racing Technology						
Type 1	Branch-based feasibility studies helping businesses re-define their business concept to re-shoring. As preconditions for res-shoring business and research projects, for the sports equipment sector and stressing utilisation of 3D printing.					**1**
Type 1	Business plans implementing primarily re-shoring and in-shoring business plans based on the respective feasibility studies; for the sports equipment sector and stressing utilisation of 3D printing.				**1**	**1**
Good practice 5 Increased innovation and service level in fashion: The case of Todd Shelton						
Type 1	Branch-based feasibility studies helping businesses re-define their business concept to re-shoring. As preconditions for res-shoring business and research projects, for the textiles sector.		**1**			
Type 1	Business plans implementing primarily re-shoring and in-shoring business plans based on the respective feasibility studies; for the textiles sector, and especially renewable and re-cyclable textiles.		**1**			**1**
Good practice 6 BILAKATU programme (direct incentives to promote re-location and near-shoring)						
Type 3	Direct incentives					
Type 1	Collaboration with clusters (this is aligned with GP3)	**1**	**1**	**1**	**1**	**1**
Type 2	Thriving companies' needs (this is aligned with GP2, option 1)	**1**		**1**		**1**
Good practice 7 Exploring the impact of inter-regional linkages on regional diversification in Europe in the context of smart specialisation.						

Type of policy impact (Type 1 = new projects; Type 2= improvement of the policy instrument management; Type 3= new policy instrument)		**PP2/LP**	**PP4**	**PP5**	**PP6**	**PP7**
Type 2	Network (at least 3) feasibility studies to identify complementary technologies for joint development; important for coordinated near-shoring with in-shoring	**1**	**1**	**1**	**1**	**1**
Good practice 8 Mapping the potential of EU regions to contribute to Industry 4.0						
Type 2	Network (at least 3) feasibility studies to identify complementary technologies for joint development	**1**				
Good practice 9 DEFINE network						
Type 1	e-Platform for the development of fashion networks.					
Good practice 10 Symbiotic networks of bio-waste sustainable management						
Type 1	Applying digital tools to develop symbiotic networks, to improve cross industry resource efficiency through waste, by-products and raw material trading and sharing assets in an environmentally sustainable way.					
Good practice 11 SYMBIOICT						
Type 1	A digital platform to collect and analyse datasets relating to industrial facilities, regional waste production and supply chain economics with the aim to detect and visualize geographic areas and industrial sectors with high Industrial Symbiosis potential.	**1**				
LEGEND (*): PP2/LP Kainuu; PP4 Helsinki-Uusimaa; PP5 Western Macedonia; PP6 Western Slovenia; PP7 Western Transdanubia						

Annex 1 Good practices

GP Theme 1 Value chain reshoring and nearshoring good practices

Good practice 1 The Future of Manufacturing in Europe (FOME) pilot project.

1 Country of origin: European Union

2 Background

The Future of Manufacturing in Europe was a pilot project proposed by the European Parliament and delegated to Eurofound (European Foundation for the Improvement of Living and Working Conditions) by the European Commission (DG GROW). The project commenced in April 2015 and ran for four years, till the end of 2018. The EUROFOUND is a tripartite European Union Agency established in 1975. Its role is to provide knowledge to assist in the development of better social, employment and work-related policies according to Regulation (EU) 2019/127. The Agency conducts research projects and 3 EU-wide surveys on working conditions (European Working Conditions Survey, EWCS); quality of life (European Quality of Life Survey, EQLS); company practices (European Company Survey, ECS)[44].

Future of Manufacturing in Europe (FOME) – sub projects: (1) European reshoring monitor; (2) Mapping of regional industrial policy capacity; (3) Impact of new game changing technologies; (4) Review of dual apprenticeship programmes; (5) Born globals and supply chains; (6) Analysis of the task content of significant manufacturing jobs; (7) Scenarios for the future of manufacturing.

We have identified that for the purposes of the BRIDGES project 5th call, the European reshoring monitor and the Mapping of regional industrial policy capacity are directly relevant, while very important is also the Impact of new game changing technologies.

3 Focus

The European Reshoring Monitor (ERM) is a regularly updated online database set up in 2015 to collect information on individual reshoring cases identified in media articles and other sources. The Monitor was updated until the end of 2018.

'Reshoring' is the relocation of previously offshored value chain activities back to the EU and can be an important source of new manufacturing employment in Europe. Monitoring the evolution, magnitude and motivations of reshoring is crucial in understanding the drivers of reshoring decisions, to learn the way reshoring is implemented, and to evaluate the role of policy in encouraging this development. The data base revealed re-shoring references as early as 2007. The data base is very useful because decision making criteria and contingency factors relating to re-shoring are discussed from many sides, while several case studies are also presented.

The Mapping of regional industrial policy capacity, reviewed from the perspective of value chains, indicated that globalisation impacts relate to cost reduction and automation (:21) and the "challenge of more developed regional economies, is to maintain large industrial companies in the territories, creating conditions for them to become deeply rooted so that it becomes costly for them to leave"(:21). However, regional policies, in general, do not reflect corresponding measures "international cooperation in industrial development … is not generally identified as a policy priority or objective in policy documents" (:61). However, these findings reflect pro-covid19 realities.

4 Type (institutional, policy instrument, policy measure, policy delivery, industry-specific; the GP can be of one type or a combination of types).

Evidence for business, as well as industrial and innovation policy decision making.

5 Maturity

Completed.

6 Results & relevance to any BRIDGES prioritised value chains

— Reshoring drivers include operative factors (flexibility, quality) and the ones related to knowledge and capabilities (access to skills and knowledge, proximity to R&D and product development, and time-to-market). When compared to other countries findings, Finnish companies seem to have a higher rate of reshoring decisions[45].

[44] https://europa.eu/european-union/about-eu/agencies/eurofound_en.

[45] Heikkilä J.; Martinsuo M.; Nenonen S. (2018) Backshoring of production in the context of a small and open Nordic economy *Journal of Manufacturing Technology Management*. DOI: 10.1108/JMTM-12-2016-0178. Url: https://www.emeraldinsight.com/doi/abs/10.1108/JMTM-12-2016-0178.

GP Theme 1 Value chain reshoring and nearshoring good practices

Good practice 1 The Future of Manufacturing in Europe (FOME) pilot project.

— With respect to the relocation drivers, labour cost has been cited as the most important factor for the initial offshoring decisions, while reshoring decisions are based on a broader set of drivers like quality, flexibility, lead-time, access to skills and knowledge, access to technology, proximity to R&D and time-to-market[46].

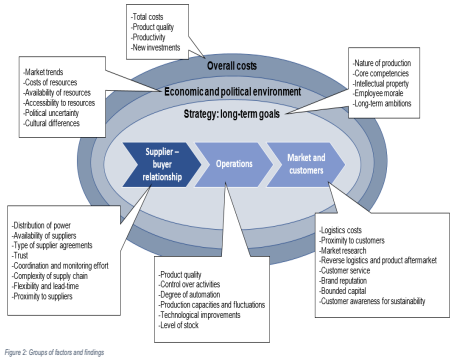


Figure 2: Groups of factors and findings

— The five game-changing technologies studied in FOME: advanced industrial robotics (AIR), additive manufacturing (AM), industrial Internet of things (IIoT), electric vehicles (EVs) and industrial biotechnology (IB) are potentially transformative, mainly due to the centrality of data. Other relevant aspects are the acceleration of flexible specialisation and servitisation in manufacturing[47].

— The country of origin is important for all types of brands. However, how each country of origin dimension is important varies depending on brand expertise, strategic business plan, brand positioning, identity, and brand message. Still, lack of skills, resources, labour cost and weather issues, have a significant influence on managerial strategic decision-making, and this contributes managerial implications[48].

— The nature of the reshoring decision confirms that it is a very complex decision which requires the companies to take a close look at many different factors, as shown in figure 5. The reshoring decision itself varies quite substantially depending on the company, it is important that companies adapt these factors to their specific needs. Only when considering this step, a correct decision can be ensured[49].

— "Soft factors": TRUST: "trust is decisive for sustaining successful cooperation among companies, since partnerships and cooperation agreements are often based on unwritten agreements that require time and face-to-face interaction to consolidate"[50].

— Policy reference: in Italy the concept of "made in REGIONx", involving local banks and industrial associations, signing agreements supporting manufacturing and especially focusing on reshoring to the respective areas (Umbria, Marche, Padova, Vincenza, Treviso)[51].

— *In conclusion*, labour and transport costs appear to be less important than earlier, while country of origin, access to R&D, skills, knowledge & technology, automation, and time-to-market have gained importance for re-shoring decisions. In addition, regional policies relating to interregional cooperation and value chains – based development are rare. Among these rare initiatives are the agreements signed in 2015 & 2016, in different parts of the Veneto region with Industrial Federations for the re-shoring of industries.

Factors impacting re-shoring decisions.

7 Discussion points (these, if any, result from the literature review and the discussions with the partners)

[46] Heikkilä J.; Nenonen S.; OlhagerJ.; Stentoft J. (2018) Manufacturing relocation abroad and back: empirical evidence from the Nordic countries World Review of Intermodal Transportation Research Vol. 7, No. 3 pp.221–240. https://doi.org/10.1504/WRITR.2018.093563 .

[47] Eurofound (2019), The future of manufacturing in Europe, Publications Office of the European Union, Luxembourg. Page 56.

[48] Arooj Rashid A., and Barnes L., (2017). Country of Origin: Reshoring Implication in the Context of the UK Fashion Industry. DOI: 10.1007/978-3-319-58883-4_9. https://www.researchgate.net/publication/318322135 .

[49] André Eiler, Sebastian Schwarz, Leif-Magnus Jensen (2017). A reshoring decision framework. Jönköping University, International Business School. Master Thesis in Business Administration.

[50] Eurofound (2019), The future of manufacturing in Europe, Publications Office of the European Union, Luxembourg. Page 27.

[51] https://reshoring.eurofound.europa.eu/reference-material?field_type_target_id%5B%5D=404&field_year_value%5Bvalue%5D%5Bdate%5D=&field_authors_value=&keys= .

GP Theme 1 Value chain reshoring and nearshoring good practices

Good practice 2 Reshoring decision framework (Brookings)

1 Country of origin Research paper by Brookings (USA), aimed at improving Central New York State economy[52].

2 Background

An orchestrated approach to address operational and strategic economic challenges revealed or intensified by the close downs caused by covid19. Recommendations are a mix of importance of industries for the regional economy, stress tests, incentives, and territorial aspects: "Before designing any interventions, communities need a better understanding of which industries may be deemed "essential" by a government entity. A good way to do this is to use the list of industries that were allowed to remain open (or reopen first) during the pandemic's initial shutdown phases. Communities must map the supply chains of these industries to understand their relative localisation. Next, we would suggest conducting a "stress test," as described in a recent Harvard Business Review article, to measure the resiliency of supply chains[53]. Once those industries are defined and mapped and key opportunities are identified, communities can think about executing a series of programs and strategies to address some of the concerns raised above regarding cost competitiveness"[54][p6].

3 Focus

The focus is on GVC re-shoring framework conditions.

4 Type (institutional, policy instrument, policy measure, policy delivery, industry-specific; the GP can be of one type or a combination of types)

Evidence for policy measures and recommendations.

5 Maturity

Research is complete and applicable.

6 Results & relevance to any BRIDGES prioritised value chains

Proposed policy measures	Relevance to the BRIDGES project
Innovation policies (financial incentives) Mission oriented, technological upgrading / investments, upskilling of workforce, research centres-university synergies.	Focus on RIS3; I4.0 and green deal included.
Industrial policies Identification of grand challenges, missions, strategic sectors, industrial clusters, etc. to channel investment into strategic areas, Industrial clusters / smart specialisation, e.g. "crash test", and regional talent.	Circular economy; linkages to competitive advantage
Environment policies Lower energy cost; Lower tax on energy use; Lower environmental standards.	Subsidies and financial and fiscal facilitation for twin transition.
Map most important industries locally and assess their performance ("crash test")	Value chain mapping and reveal competitive advantage
Connect to and leverage regional talent generators and workforce development providers. With the labour demand of many manufacturers shifting from low-skill, low-cost labour to mid- to high-skill engineering and technical capabilities, U.S. educational institutions are well positioned to produce the very talent that will increasingly be in demand from these sectors. Connect to the need for a digitally fluent workforce, massive disruption is underway in manufacturing, with an increased reliance on technology as opposed to low-cost labour.	Value chain mapping and reveal competitive advantage.
Invest in regionally based soft-landing services	Cluster management and innovation intermediary units

[52] Brookings Metropolitan Policy Programme (2020). Reshoring advanced manufacturing supply chains to generate good jobs. July 2020. https://www.brookings.edu/interactives/metro-recovery-watch/ .

[53] David Simchi-Levi and Edith Simchi-Levi, "We Need a Stress Test for Critical Supply Chains," The Harvard Business Review, April 28, 2020.

[54] Brookings Metropolitan Policy Programme (2020). Reshoring advanced manufacturing supply chains to generate good jobs. July 2020. https://www.brookings.edu/interactives/metro-recovery-watch/ .

GP Theme 1 Value chain reshoring and nearshoring good practices

Good practice 2 Reshoring decision framework (Brookings)

Companies setting up new operations in any community will need assistance with site selection, permits and local approvals, and optimizing their processes.	

7 Discussion points (these, if any, result from the literature review and the discussions with the partners)

The GP is discussing policy measures encouraging re-shoring in both the UE and USA. It is a tool for policy makers to consider what would be relevant for mainstreaming.

GP Theme 1 Value chain reshoring and nearshoring good practices

Good practice 3 Reshoring decision framework (EPRS)

1 Country of origin Research paper from the EPRS (European Parliament Research Service[55])

2 Background

Till recently, GVCs have been mostly determined by efficiency considerations (Petersen 2013, 2020)[56], [57] while risk management approaches paying attention to security of supply have only been of secondary importance in the management practices of firms (Bogaschewsky, 2020[58]). Due to several reasons, the factors impacting value chain decisions have changed, e.g. slowing down of trade: the acceleration of global trade has not translated into output growth rates to the same degree as in the 'golden age' of the 1950s to 1970s, (UNCTAD, 2018),[:3]; growing vulnerability of global value chains due to various risks that have become more prominent: business disruptions, economic, social, and exogenous shocks (climate, pandemia,…) [:6 &7]; growing importance / renaissance of geopolitics [:10]; new production models: digitalisation and its impact on production [:12] as well as green transition regulations and priorities.
Reshoring can be encouraged through increasing production costs in countries that traditionally attracted offshoring firms, improved competitiveness in the home country, and greater flexibility (just-in-time (JIT), rapid response to changes in consumer demand) by moving production closer to markets (Piatanesi and Arauzo-Carod, 2019[59]). It implies that both, off shoring and re-shoring decisions are required to be based on multi-dimensional optimisation approaches, while policies supporting re-shoring, should take into account the specific characteristics of the GVC under consideration, i.e.,"no general policy approach to re-shoring exists[60]".

3 Focus

The focus is on GVC re-shoring framework conditions.

4 Type (institutional, policy instrument, policy measure, policy delivery, industry-specific; the GP can be of one type or a combination of types)

Evidence for policy measures and recommendations.

5 Maturity

Research is complete and applicable.

6 Results & relevance to any BRIDGES prioritised value chains

Proposed policy measures	Relevance to BRIDGES project
Innovation policies (financial incentives) Mission oriented, technological upgrading / investments, upskilling of workforce, research centres-university synergies.	I4.0 and green deal included.
Industrial policies Identification of grand challenges, missions, strategic sectors, industrial clusters, etc. to channel investment into strategic areas, Industrial clusters / smart spec.	Circular economy; linkages to competitive advantage
Environment policies Lower energy cost; Lower tax on energy use; Lower environmental standards.	Subsidies and financial and fiscal facilitation for twin transition.
Map most important industries locally and assess their performance ("crash test")	Value chain mapping and reveal competitive advantage

[55] European Parliament (2021). Post Covid-19 value chains: options for reshoring production back to Europe in a globalised economy. European Parliament, Policy Department for External Relations Directorate General for External Policies of the Union PE 653.626 – March 2021.

[56] Ellram, L. M., Tate, W. L. and Petersen, K. J. (2013) 'Offshoring and Reshoring: An Update on the Manufacturing Location Decision', *Journal of Supply Chain Management*, 49(2), pp. 14–22. doi: 10.1111/jscm.12019.

[57] Petersen, T. (2020) 'Globale Lieferketten zwischen Effizienz und Resilienz', *ifo Schnelldienst*, 73(5), pp. 7–10. https://www.ifo.de/DocDL/sd-2020-05-2020-05-13.pdf (15.12.2020).

[58] Bogaschewsky, R. (2020) 'Lieferketten im Stresstest – aber wollen wir wirklich die alten wiederhaben?', *ifo Schnelldienst*, 73(5), pp. 31–34. https://www.ifo.de/DocDL/sd-2020-05-2020-05-13.pdf (15.12.2020).

[59] Piatanesi, B. and Arauzo-Carod, J.-M. (2019) 'Backshoring and nearshoring: An overview', *Growth and Change*, 50(3), pp. 806–823. doi: 10.1111/grow.12316.

[60] European Parliament (2021). Post Covid-19 value chains: options for reshoring production back to Europe in a globalised economy. European Parliament, Policy Department for External Relations Directorate General for External Policies of the Union PE 653.626 – March 2021.

GP Theme 1 Value chain reshoring and nearshoring good practices

Good practice 3 Reshoring decision framework (EPRS)

Connect to and leverage regional talent generators and workforce development providers. With the labour demand of many manufacturers shifting from low-skill, low-cost labour to mid- to high-skill engineering and technical capabilities, U.S. educational institutions are well positioned to produce the very talent that will increasingly be in demand from these sectors. Connect to the need for a digitally fluent workforce, massive disruption is underway in manufacturing, with an increased reliance on technology as opposed to low-cost labour.	Value chain mapping and reveal competitive advantage.
Invest in regionally based soft-landing services Companies setting up new operations in any community will need assistance with site selection, permits and local approvals, and optimizing their processes.	Cluster management and innovation intermediary units

7 Discussion points (these, if any, result from the literature review and the discussions with the partners)

The GP is discussing policy measures encouraging re-shoring in both the UE and USA. It is a tool for policy makers to consider what would be relevant for mainstreaming.

GP Theme 1 Value chain reshoring and nearshoring good practices

Good practice 4 The use of 3D printing in manufacturing: The case of Inertia Racing Technology

1 Good practice country of origin: This GP comes from California, United States. The GP is based on a report prepared for the Reshoring Institute (https://reshoringinstitute.org/), in collaboration with the University of San Diego Supply Chain Management Institute.

2 Background

Inertia Racing Technology, also known as iRT Wheels, is a company that was established in California, U.S., in 2010. The company produces hand-built carbon racing bicycles. More specifically, the producer has twelve lines of products for professional competitive cyclers. In 2013, iRT Wheels announced its commitment to re-shore manufacturing jobs back to the United States. Since the announcement of its Reshoring initiative, more than 80% of the producer's components for its products are sourced from U.S. companies. To aid its reshoring initiative, iRT Wheels invested in the development of locally located 3D printing production hubs for its products.

3 Focus

This GP focuses on bringing industrial production close to the market, for three main reasons:

[1]. Minimization of lead time, since 3D printing is realized locally. The cost of additive manufacturing is not related to labour costs, and thus offshore production does not have any financial advantage over local production.

[2]. Customized production, based on the customer's needs. With the use of 3D printing technologies, on-demand manufacturing is promoted since the customer can choose from a large range of designs, rather than a short number of available alternatives. Moreover, the technology enables the production of complex designs, often not possible to be manufactured with conventional production methods. 3D printing provides manufacturers with practically endless production flexibility, which is critical towards business success.

[3]. Invest on "Made in" label, so as to increase customer satisfaction, while also allowing producers to interact with its customers at a faster and more personal level.

4 Type (institutional, policy instrument, policy measure, policy delivery, industry-specific; the GP can be of one type or a combination of types)

Industry-specific tool.

5 Maturity (includes transferability)

Additive Manufacturing technology has been evolving for several years. New material options, better processing speeds and greater autonomy are some of the characteristics of this technology that is constantly provides more opportunities for producers internationally. To date, a large number of mature Additive Manufacturing techniques are available for industries in order for them to strategically design the company's production portfolio, in parallel with conventional production methodologies, within the concept of a "focused" factory. In the literature, studies based on cost-benefit analysis have documented that Additive Manufacturing can be economically viable, to the moment mostly for low volume production.

6 Results & relevance to any BRIDGES prioritised value chains

The introduction of 3D printing in the company's production portfolio saved the company $100,000 over a two-year period, enabling it to compete in the competitive bicycle racing industry. Because of 3D printing locally (and therefore close to its customers), iRT Wheels was able to go above and beyond for customers. The major advantage for the company lied in the minimization of time-to-market. More specifically, by choosing to produce with 3D printing technologies, the company was able to satisfy orders of customized wheels with very short lead times (even overnight). The close attention to customers' tailored requirements satisfaction and the focus on the service level provided would not have been possible if iRT continued with its conventional production policy and still manufactured overseas instead of using 3D printing. Like most companies, in the pre-3D printing era, iRT transported all of its components via cargo ships. The company noticed that the 90-day lead-time was not only an inconvenience but could potentially cause a loss of business. Additionally, if an issue in an order was discovered, iRT first had to correct the issue with the supplier and then wait another 90 days for a new shipment. The lead time with international logistics did not only prove long, but also unpredictable. For instance, the company faced a major delay of critical parts' shipment due to union strikes at the Port of Los Angeles in 2015, which meant financial hardship to the SME. Moreover, the company significantly improved supply chain efficiency, since international logistics and working with partners located overseas makes communications difficult, due to many reasons; different time zones, cultural habits, to name a few.

GP Theme 1 Value chain reshoring and nearshoring good practices

Good practice 4 The use of 3D printing in manufacturing: The case of Inertia Racing Technology

Frustrated by the situation, the company invested in 3D printing production and that became a game changer. 3D printing enabled iRT Wheels to rapidly produce a prototype at a much lower cost and saved the company over $100,000 in two years. The whole manufacturing strategy changed, and the company did not any no longer have to make molds before production. Following this manufacturing re-engineering and the 3D printing implementation, iRT Wheels has created 7 new jobs, hired 6 contractors, and increased their purchase orders by $270,000, thus benefitting their local suppliers as well.

(v) The use of 3D printing and additive manufacturing technologies is considered as a most valuable tool for targeting value chain reshoring & nearshoring segments, also in BRIDGES prioritised value chains. Its introduction in a producer's production portfolio may increase flexibility, minimise time-to-market, reduce warehousing costs, and assist the company towards the adoption of a mass customization business strategy. More specifically, while Additive Manufacturing basically affects the time-to-market, Rapid Prototyping could affect the whole spectrum of modern supply chains and logistic networks. It would further require strategic business changes, such as increased collaboration and relationship with equipment vendors and material suppliers, since those are expected to become critical links of the supply chain in the near future.

7 Discussion points (these, if any, result from the literature review and the discussions with the partners)

Additive Manufacturing capitalises on its autonomous manufacturing, thus making labour costs a non-critical parameter. Furthermore, Additive Manufacturing production strategies can assist producers on shifting from a currently dominant make-on-stock strategy to a make-on-demand strategy, especially for products with sporadic or low demand, providing also high customization and flexibility. That is expected to further enhance the ability of supply chains to re-shore or near-shore production, thus via postponement to produce the differentiated items closer to local markets. Another merit of a make-on-demand strategy is that it can significantly improve a company's profitability through lowering overall production costs, and cash flow considering that retail takes place before production. Such a negative cash-to-cash time may eliminate inventory related expenses regarding material, unfinished and finished products, while also may efficiently reduce business risk. Due to its significantly reduced time-to-market length of time, additive manufacturing can support the production of innovative products. Additive Manufacturing can provide significant benefits in respect to product's life-cycle environmental performance. Short supply chains (short-distanced transportation) on one hand and minimization of waste material during production on the other (only the required material is added to the product, eliminating scrap material during manufacturing) drastically reduce products' carbon footprint. However, despite the fact that Additive Manufacturing shows significant merits, such production techniques have also limitations. In this light, hybrid manufacturing technologies could be also encountered. For instance, parts of a specific product could be manufactured with the use of injection molding or other traditional techniques, while others could be additively manufactured.

GP Theme 1 Value chain reshoring and nearshoring good practices

Good practice 5 Increased innovation and service level in fashion: The case of Todd Shelton

1 Country of origin: This GP comes from East Rutherford, New Jersey, United States. The GP is based on a report prepared for the Reshoring Institute (https://reshoringinstitute.org/), in collaboration with the University of San Diego Supply Chain Management Institute.

2 Background

Tod Shelton is a clothing company established in 2002 in the United States. Between 2002-2009, the company continued to develop his brand in a "beta-type" form. This allowed the firm to keep operations small and to mitigate the risk of a full-launch. However, by 2009 Todd Shelton, the company's founder, realized that the time was right to begin producing his products full-time. Within the next two years (2020-2011) the company's sales increased, and with that came increased demand for production. However, Shelton's unique, tailor-made designs and unyielding dedication to quality were difficult for Asian suppliers to achieve. It became clear that Todd Shelton's unique business strategy and need for adaptability suited itself better to domestic, in-house production. In 2012, Todd Shelton decided to re-shore its product manufacturing to the United States. Today, the company highly advertises its re-shoring strategy by highlighting that it produces high-quality clothing made in USA (see https://toddshelton.com).
What makes Todd Shelton's business unique is its dedication to customizability, or the ability to make an article of clothing that fits each customer perfectly. Moreover, the company aims at promoting the "low stress" way in which it provides this service. Todd Shelton claims that extra cost for getting a customer the perfect fit up front is not negative for the company's financial performance and viability, "because once a man has found his perfect garment, he'll become a repeat buyer". To guarantee the customer orders the correct size, Shelton employs a unique system in which a "fit-kit", or a range of sizes of the item the customer believes will fit, is mailed to the potential user. This allows the customer to make sure that he is ordering the perfect size. The customer then has seven days to use the kit and then mail the items back to the factory. The entire process is completely free of charge. The ability to try different sizes at one's leisure in the comfort of one's own home adds to and enhances the consumer's buying experience.

3 Focus

This GP focuses on a different value proposition in comparison to traditional clothing manufacturing. Specifically, Todd Shelton offers the direct delivery of a high-end, tailor fit product at the peak of current fashion, coupled with excellent customer service. This requires a business with low lead-times and the ability to be agile and adaptable to catch consumer trends in the rapidly changing fashion industry. These needs make offshore manufacturing almost impossible, and domestic production the reasonable choice. The company is targeting the niche market of the fashion conscious, high-end customer who has a need for specific clothing sizes not traditionally offered at large outlet stores. These consumers expect excellent customer service, short delivery time, and the ability of the manufacturer to create the unique item he or she requests.

In order to efficiently support its business model, the company conducts all sales online to reduce costs, with the factory also serving as a showroom. Todd Shelton outsources its distribution to America's extensive, advanced, and cost-effective pre-established distribution system. This allows the firm to employ fewer people and focus more time on its core production and innovation focus (clothing), rather than logistics. The strategy also creates a personal touch with the customer, something that can be lost in retail sales. Moreover, the company has gone to extreme lengths to keep its product 100% sourced and manufactured in the United States, working as much as possible with America's denim mills, so as to highlight the "Made in U.S.A." label.

4 Type (institutional, policy instrument, policy measure, policy delivery, industry-specific; the GP can be of one type or a combination of types)

Industry-specific tool.

5 Maturity (includes transferability)

The GP is complete. The company has realized the re-shoring of its production since a decade and continues its "Made in USA" strategy to date.

6 Results & relevance to any BRIDGES prioritised value chains

Todd Shelton's decision to re-shore production and contract manufacturing to in-house production, was a more difficult and resource intensive process. The indication is that only ambitious companies with the following 3 traits can make this transition; leadership that does not fear the challenge of internal manufacturing, commitment to product quality and innovation, long-term vision and commitment for their company. Also, a company needs to be resourceful, employing cost saving techniques such as "lean manufacturing," i.e., eliminating any waste that does not add value to production or the supply chain.

With its strategy, the company succeeded in the following:

GP Theme 1 Value chain reshoring and nearshoring good practices

Good practice 5 Increased innovation and service level in fashion: The case of Todd Shelton

- Product quality and product innovation have dramatically increased
- Product development has become faster and easier
- Inventory costs and obsolete product have decreased dramatically and is expected to continue to do so
- Since the internal manufacturing is stable, more resources are being used on the product, service, and content initiatives instead of on managing the supply chain
- Lead times for product have decreased by months
- Positive country of origin effects have been experienced through free media exposure by publications and trade industries who believe in domestic manufacturing

The company's strategy has also some drawbacks if compared with offshore production. Re-shoring clothing manufacturing resulted in increased labour costs, which has caused production costs to rise considerably. Moreover, the costs of establishing and maintaining a factory in the United States are very high as well. However, this cost increase is well confronted by the increased service levels, the increased sales in high-end markets and the increased price that customers are willing to pay for premium products. Another constraint for the company is workforce sourcing and training, which can be hard in advanced economies, representing one of the largest complications for in-house, re-shored production.

In conclusion, Todd Shelton has experienced enhanced product quality, increased innovation, and greatly reduced lead times since the company began manufacturing in-house. Negatives such as higher labour and fixed costs, as well as the challenge of sourcing qualified labour, have been encountered as well. The increase in cost also forced a rise in the price of the garment ranging between 25-40% for certain items. However, Todd Shelton's business model, which employs very high-quality materials, rapid delivery, extreme customizability, and excellent customer service, helps to mitigate this high price point.

7 Discussion points (these, if any, result from the literature review and the discussions with the partners)

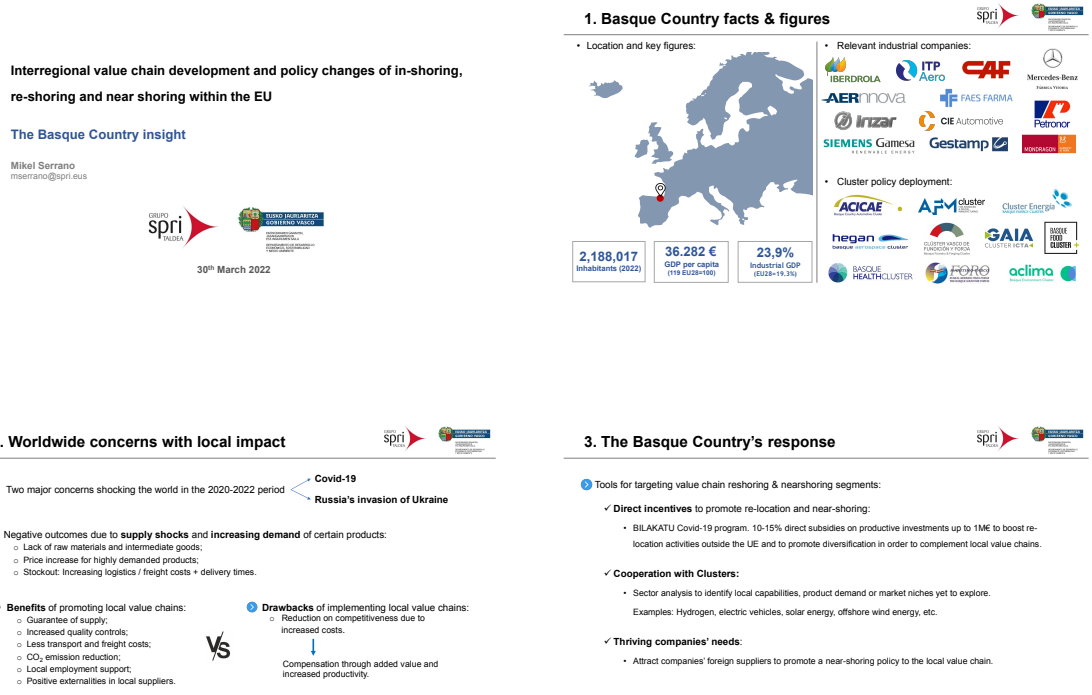
- Transferable to businesses in the same industry
- Methodologically relevant to any re-shoring business, i.e. the need to adjust the value proposition to the targeted regional context conditions.

GP Theme 1 Value chain reshoring and nearshoring good practices

Good practice 6 BILAKATU programme (direct incentives to promote re-location and near-shoring)

The BRIDGES project asked the help of the Policy Learning Platform [PLP], Innovation section[61], to support identify good practices on value chain re-shoring policies, with special focus on EU experiences. A matchmaking session was organised on 30.3.2022. The agenda of the event is available in Annex 2 BRIDGES project collaboration with the Interreg Europe Policy Learning Platform, matchmaking event. One of the presentations made during this event, focused on a good practice from the Basque Country[62], called BILAKATU, relevant to regional policy making. BILAKATU is a regional programme combining three tools for targeting value chain reshoring and near-shoring segments: subsidies (10-15% of productive investments up to 1 000 000€), sectorial studies to identify local capabilities, market demand and niches to explore, and foreign direct investment (FDI) efforts, to attract suppliers of local value chains to re-locate to the Basque Country and therefore also co-locate with the associated value chains, Figure 8. The industrial branches in focus are hydrogen, electric vehicles, solar energy, offshore wind energy.
https://www.spri.eus/es/ayudas/bilakatu/
https://www.fundacioncarmengandarias.com/contenidos.php?seccion=3&categoria=14&subcategoria=5&lang=en

Figure 7 Good practice presentation from the Basque Country, BILAKATU, addressing value chain reshoring.



Relevance to the BRIDGES project: The good practice is relevant and easily transferable. It is also very interesting as a strategic approach for attracting FDI in relation to localised value chain strengths. It also demonstrates how value chain mapping and building development policies on the base of value chain strengths, is operational in many ways. It implies that regions should both develop and systematically apply value chain mapping tools.

[61] PLP Thematic experts in Research & Innovation, Marc Pattinson, Arnault Morisson, Elena Ferrario.

[62] Mikel Serrano (2022). Interregional value chain development and policy changes of in-shoring, re-shoring and near shoring within the EU.

Good practice Theme 2 Instruments for identifying interregional complementarities

Good practice 7 Exploring the impact of inter-regional linkages on regional diversification in Europe in the context of smart specialisation.

1 Good practice name & country of origin: This GP comes from a European Commission (Directorate-General for Regional and Urban Policy) project (Project 2018CE160AT089/090). The GP is based on the final report of the project, prepared by Balland & Boschma in 2019[63].

The GP is about the interregional complementarity indicator that is proposed in the report, and which has been demonstrated in examples across the EU. The GP is very good methodological tool that regional can utilise during policy planning & revision stages and which can be further developed through the learning that takes place during the policy delivery stages.

2 Background

According to the policy approach, "The objective of S3 is building competitive advantage in new domains in which regions possess capabilities.". However, the authors observe that (page 7) "There is yet little focus in S3 on the role of inter-regional linkages, as there is little understanding of how inter-regional linkages may affect the development of new activities in regions, and to what extent these linkages may compensate for the lack of regional capabilities. … Moreover, it seems this is especially true for inter-regional linkages that give access to new capabilities that are related to existing capabilities in the region. Finally, *a complementarity indicator has been developed that can be used by regions in their S3 strategy to identify regional strategic partnerships, depending on the presence of complementary capabilities in other regions*" [64].

3 Focus

The focus is twofold: identifying the impact of interregional complementarities and the methodology for identifying interregional complementarities. The project analyses 292 NUTS2 regions in the EU. The research has two key objectives:

(i) it tests whether inter-regional linkages have a positive effect of regions to diversify, on top of the impact of regional capabilities. It asks: do linkages that give access to additional capabilities in other regions that are related to existing capabilities of regions have a stronger impact on regional diversification?" [page4]. Previous research indicates that external ties, interregional linkages are most important to peripheral regions. The present research addresses the issue horizontally. To do this, it investigates the impact and nature of interregional linkages on regional diversification. This is done by measuring the impact of interregional complementarities on the relative technological advantage (RTA) of a region and its associated technological density. The two terms and the process are explained below.

(ii) it identifies an indicator for interregional complementarity. The new indicator is based on calculating relevant technology advantage and technological relatedness measures. Relative Technological Advantage (RTA) assesses whether a region becomes specialized in a technology that is new to it. RTA is a binary variable that assumes the value 1 when a region possesses a greater share of patents in technology class *i* than the reference category (EU as a whole) and assumes value 0 otherwise. A region *r* has RTA in the production of technological knowledge *i (r = 1,..., n; i = 1, ..., k)* such that $\boldsymbol{RTA^t\ r,i = 1}$ if:

$$\frac{patents^t_{r,i} / \sum_i patents^t_{r,i}}{\sum_r patents^t_{r,i} / \sum_r \sum_i patents^t_{r,i}} > 1$$

The degree of relatedness between each pair of technologies (654 CPC technology classes) is calculated. This is done by making use of co-occurrence analysis of technology classes on a patent document, which measures the frequency of occurrence of combinations of two technology classes on a patent. A high frequency of co-occurrence is understood to be an indicator of technological relatedness. A European knowledge space was formulated according to this principle.
This relatedness information is used to calculate a relatedness density (RD) measure, to assess the effect of regional capabilities on regional diversification. That is, for each region r, we calculated the density of technology production in the vicinity of individual technologies i.

[63] https://ec.europa.eu/regional_policy/sources/docgener/brochure/impact_ir_linkages_en.pdf .

[64] https://ec.europa.eu/regional_policy/sources/docgener/brochure/impact_ir_linkages_en.pdf , page 7.

Good practice Theme 2 Instruments for identifying interregional complementarities

Good practice 7 Exploring the impact of inter-regional linkages on regional diversification in Europe in the context of smart specialisation.

Following Hidalgo et al. (2007)65 and Boschma et al. (2015)66, the density of knowledge production around a given technology i in region r at time t is derived from the technological relatedness φi, j,t of technology i to all other technologies j in which the region has relative technological advantage (RTA), divided by the sum of technological relatedness of technology i to all the other technologies j in the reference region (Europe) at time t:

$$\text{RELATEDNESS\_DENSITY}_{i,r,t} = \frac{\sum_{j \in r, j \neq i} \varphi_{ij}}{\sum_{j \neq i} \varphi_{ij}} * 100$$

4 Type (institutional, policy instrument, policy measure, policy delivery, industry-specific; the GP can be of one type or a combination of types)

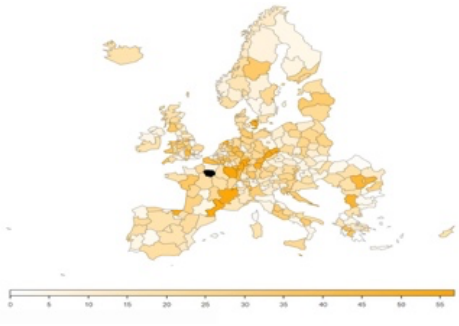
Methodology for identifying interregional complementarities based on technology relatedness, which can be useful to policy planning and policy delivery, including RIS3.

5 Maturity (includes transferability)

The methodology is applicable to any regional and national context. The technology relatedness through co-occurrence in patents is a good measure of complementarity. The relatedness density is very useful for considering embeddedness and sector-based development.

To apply this methodology, (i) skills for applying the methodology should be ensured, i.e. econometrics skills and programming, data access, and also patents; (ii) patents are required. However, often, patents are not necessarily good proxies in peripheral areas, would it be possible to replace or have proxies for patents in areas where radical diversification is the objective? For example, could we consider as a patent proxy the concept of competitive advantage, whereby, competitive advantage is measured by the concentration of added value of products understood as technology & know-how outputs? Or, maybe another way, would be to have the patent analysis at national level, and map and match technologies at regional level? and (iii) is institutionalisation of interregional complementarities at policy planning and delivering stages, i.e. agreements of collaboration on certain technologies between and among regions, required or recommended?

6 Results & relevance to any BRIDGES prioritised value chains



The GP proposes a way of integrating interregional complementarities into regions' RIS3. This is done by identifying by calculating technological relatedness, technologies that are related to a region's S3 priorities. S3 could include these relatedness – based technologies into their S3 and thus have access to new capabilities. This is possible, relevant to any type of region. An example is presented, based on new hydrogen technologies located in Île de France.

A map is produced referring to interregional complementarities across the EU. [page15].

The approach as a whole is very useful to BRIDGES regions, as it is to any regions that are discussing integration of the value chain approach into their regional or national policies. To apply it, preconditions (i) and (ii) mentioned in § 5 above, must be ensured.

7 Discussion points (these, if any, result from the literature review and the discussions with the partners)

[65] Hidalgo, C.A., Klinger, B., Barabási, A.L., Hausmann, R. (2007). The product space conditions the development of nations. Science 317, 482-487.

[66] Boschma, R., Balland, P. A. and Kogler, D. (2015). Relatedness and Technological Change in Cities: The rise and fall of technological knowledge in U.S. metropolitan areas from 1981 to 2010, Industrial and Corporate Change 24 (1), 223-250.

Boschma, R. (2017). Relatedness as driver behind regional diversification: a research agenda, Regional Studies 51 (3), 351-364.

Iacobucci, D. and E. Guzzini (2016). Relatedness and connectivity in technological domains: missing links in S3 design and implementation, European Planning Studies 24(8), 1511-1526.

Good practice Theme 2 Instruments for identifying interregional complementarities

Good practice 8 Mapping the potential of EU regions to contribute to Industry 4.0

1 Country of origin: This European Union.

The GP is based on the paper prepared by Balland & Boschma in 2021[67]. It makes use of a background research in the 'Europe 4.0' flagship project for the Worldbank[68].
https://www.tandfonline.com/doi/full/10.1080/00343404.2021.1900557

2 Background

At international level, industry is lately undergoing a Fourth Industrial Revolution (Industry 4.0) phase, which is mainly associated with cyber-physical systems, the Internet of Things, robotics, and artificial intelligence. Radical advancements in those technological fields, will affect -if not already affecting- a wide range of sectors of the economy. Inevitably, the undergoing changes in industry, no matter how beneficial can be to production/cost efficiency, social well-being and numerous other parameters, are expected to result also on negative effects, such as job losses or displacement. Moreover, the Fourth Industrial Revolution may also have dramatic effects on the geography of knowledge and innovation in Europe and internationally. Currently Industry 4.0 is unevenly booming as it is mostly concentrated in specific regions across Europe, such as South Germany (Baden-Württemberg and Bavaria), North Rhine–Westphalia, Rhône-Alpes, Île-de-France, and the Italian region of Lombardia (Ciffolilli and Muscio, 2018)[69]. On the contrary, Eastern and Southern Europe still significantly lag behind in Industry 4.0 technologies. However, it is highly expected that Industry 4.0 will open windows of opportunities for many regions, create new regional leaders, and provide the potential to shift the geography of knowledge production in Europe.

3 Focus

This GP focuses on the identification of future Industry 4.0 centres of knowledge production in Europe. The GP's concept is based on the principle of relatedness[70] to diversify and participate in Industry 4.0 technologies, and the fact that according to literature, new activities within a region do not start from scratch but are often related to existing local activities. The latter seem to provide capabilities from which new activities draw resources to advance. The methodology used for identification of potential Industry 4.0 regional leaders is based on the following steps:

(i). As a first step, patent data from the OECD-REGPAT database (contains patent applications to the European Patent Office) is used in order to identify patents that are related with Industry 4.0 Technologies. This is realized at NUTS2 level for EU (based on inventors' addresses) and 290 regions across Europe are examined over the period 2002-2016 in order to define the current Industry 4.0 centres in Europe. To be included in the analysis, key technologies related to Fourth Industrial Revolution are only examined, while also those need to be connected to the Cooperative Patent Classification which is one of the most precise technological classifications in the world, breaking down technologies in approximately 250,000 categories.

(ii). At a second step, the effort is put on the identification of the potentials of all EU regions to develop into future leaders in Industry 4.0 technologies and become Industry 4.0 centres of knowledge in Europe. To that direction, the same patent data are used to identify technologies that are frequently recombined with Industry 4.0 Technologies based on cooccurrences of patent claims. To measure technological relatedness between patent classes, the methodology uses the distribution of knowledge claims by Cooperative Patent Classification class on each patent application. This is done by counting the number of EU patents for a given period that contains a co-class pair, say i and j, and then standardizing this count by the total number of patents that record knowledge claims in I4T/CPC classes i and j. Relatedness is, therefore, a standardized measure of the frequency with which two I4T/CPC classes appear on the same patent. Relatedness between technologies can be expressed in the form of an n × n network.

(iii) In order to understand to what extent the current knowledge bases of regions impact their likelihood to become Industry 4.0 leaders, the results from the previous steps are used to estimate the impact of relatedness on the entry of Industry 4.0 technologies in EU regions. For each region r, the density of technology production in the vicinity of I4T i (Industry 4.0

[67] Balland, P.A. and Boschma, R. (2021) Mapping the potentials of regions in Europe to contribute to new knowledge production in Industry 4.0 technologies, Regional Studies, 55:10-11, 1652-1666, DOI: 10.1080/00343404.2021.1900557

[68] https://live.worldbank.org/europe-digital-dilemma . For the full report: Mary Hallward-Driemeier, Gaurav Nayyar, Wolfgang Fengler, Anwar Aridi, Indermit Gill (2020). Europe4.0: Addressing the Digital Dilemma. World BanK Group and the Federal Ministry, Republic of Austria, Finance. https://live.worldbank.org/?intcid=wbw_xpl_overlay_en_ext_sm22-pre .

[69] Ciffolilli, A. and Muscio, A. (2018) Industry 4.0: national and regional comparative advantages in key enabling technologies, European Planning Studies 26 (12), 2323-2343.

[70] Hidalgo C., Balland, P.A., Boschma, R., Delgado, M., Feldman, M., Frenken, K., Glaeser, E., He, C., Kogler, D., Morrison, A., Neffke, F., Rigby, D., Stern, S., Zheng, S., and Zhu, S. (2018) The Principle of Relatedness, Proceedings of the 20th International Conference on Complex Systems.

Good practice Theme 2 Instruments for identifying interregional complementarities

Good practice 8 Mapping the potential of EU regions to contribute to Industry 4.0

Technology) is calculated. The density of knowledge production around a given I4T i in region r at time t is derived from the technological relatedness of technology i to all other technologies j (I4T and non-I4T) in which the region has a relative technological advntage (RTA), divided by the sum of technological relatedness of technology i to all the other technologies j in the reference region at time t, as follows:

$$\text{RELATEDNESS\_DENSITY}_{i,r,t} = \frac{\sum_{j \in r, j \neq i} \varphi_{ij}}{\sum_{j \neq i} \varphi_{ij}} * 100$$

RTA is a binary variable that takes value 1 when a region has a greater share of patents in technology class i than the reference region (all EU regions) and takes the value of 0 otherwise. All specifications are estimated at the region-technology-period level. The methodology uses a linear probability model (LPM) to assess the probability that a region specializes in a new I4T (entry).

(iv) The fourth step focuses on mapping the future diversification opportunities in Industry 4.0 Technologies for EU regions.

According to Ménière et al. (2017)[71] the top EU regions in Industry 4.0 Technologies (e.g. Île-de-France and Upper Bavaria) are similar to the ones that dominated the list of top EU regions of the Third Revolution. This is highly attributed to the fact that large established ICT companies from the Third Revolution also stand out as the champions in the Fourth Industrial Revolution. It is evident from numerous studies in literature[72] that a region has a higher probability to develop new products when these are related to already existing products.

In respect to the key technologies related to Fourth Industrial Revolution, those are determined in the following; (i) additive manufacturing, (ii) artificial intelligence, (iii) augmented reality, (iv) autonomous robots, (v) autonomous vehicles, (vi) cloud computing, (vii) cybersecurity, (viii) quantum computers and (ix) system integration. Table 1 shows the number of patents registered at the European Patent Office, for the period 2002-2016. It is evident that patenting in Industry 4.0 Technologies is gradually increasing over time.

Table 1. I4T patent count per period

I4T	patents (2002-2006)	patents (2007-2011)	patents (2012-2016)
Additive manufacturing	823	1,040	1,739
Artificial intelligence	483	828	1,321
Augmented reality	992	1,673	2,545
Autonomous robots	745	970	1,154
Autonomous vehicles	1,979	2,457	3,099
Cloud computing	65	97	224
Cybersecurity	11,501	11,513	10,237
Quantum computers	2,294	1,255	266
System integration	538	2,007	1,326
Total	19,420	21,840	21,911

As discussed, Industry 4.0 Technologies are expected to thrive, only if connected to an established, mature eco-system of related technologies. This is measured with the distribution of knowledge claims by Cooperative Patent Classification class on each patent application. The result of the knowledge space is indicatively illustrated in Figure 1 for the 2012-2016 period. For the figure it is evident that Industry 4.0 Technologies tend to cluster around similar technologies. A group around computer-related technologies and another one around autonomous technologies are identified, while Additive Manufacturing seems to be more isolated from other technologies. In Figure 2, relatedness between technologies is displayed as a heatmap, with more blue-intense colours meaning a stronger level of relatedness. Once again, it becomes obvious that strong levels of relatedness appear for specific technologies, while Augmented Reality and Additive Manufacturing appear to be more disconnected.

[71] Ménière, Y., Rudyk, I. and Valdes, J. (2017) Patents and the Fourth Industrial Revolution. The inventions behind digital transformation, European Patent Office, Munich.

[72] Boschma, R. (2017) Relatedness as driver behind regional diversification: a research agenda, Regional Studies, 51 (3), 351-364.

Good practice Theme 2 Instruments for identifying interregional complementarities

Good practice 8 Mapping the potential of EU regions to contribute to Industry 4.0

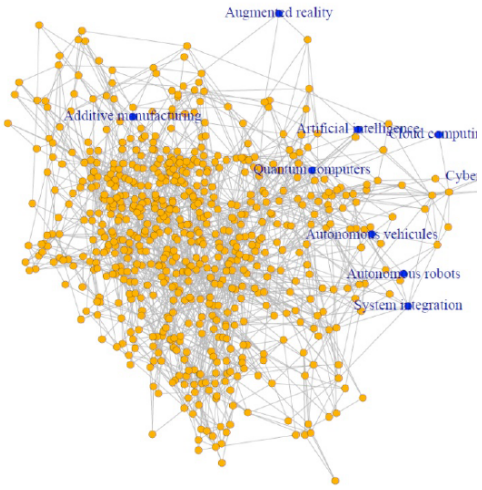


Fig 1. The position of I4Ts in the Knowledge Space 2012-16

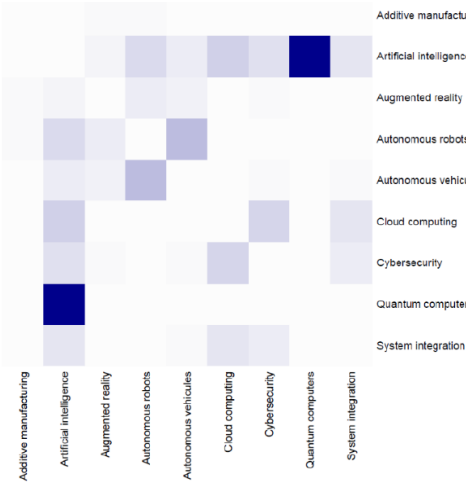


Fig 2. Relatedness between I4Ts

Relatedness density has a positive and significant effect on the probability that a region specializes (RTA>1) in a new I4T. From the analysis, it is also apparent that regions with a higher GDP/capita and a larger population base are more likely to enter in I4T. This is also consistent with findings that more complex technologies (such as I4T) disproportionally concentrate in large cities.

Based on the knowledge space and diversification model, the potential for future diversification opportunities in I4Ts for all EU regions is mapped. The regions that have the fittest technological ecosystem and highest potential to develop I4Ts on average are the following; (i) Oberbayern [DE], (ii) Île-de-France [FR], (iii) Outer London [UK], (iv) Länsi-Suomi [FI], (v) Berlin [DE], (vi) Östra Mellansverige [SE], (vii) Wien [AT], (viii) Inner London [UK], (ix) Comunidad de Madrid [ES], (x) Bretagne [FR], (xi) Praha [CZ], (xii) Małopolskie [PL], (xiii) Śląskie [PL], (xiv) Prov. Antwerpen [BE], (xv) Surrey, East and West Sussex [UK], (xvi) Stuttgart [DE], (xvii) Mittelfranken [DE], (xviii) Provence-Alpes-Cote d'Azur [FR], (xix) Chemnitz [DE]. In the same way, relatedness density can be calculated per discrete Industry 4.0 Technology, as discussed in the work of Balland and Boschma (2019)[1].

From the analysis in the work, huge differences across EU regions are reported with respect to their potential future participation in Industry 4.0 Technology. It is only three European countries (Germany, France and the UK) which take up more than half of all top EU regions in Industry 4.0. It is also noticeable that top ranked regions is spread over 10 different European countries. In respect to regions' specialization in specific Industry 4.0 Technology, German regions like Oberbayern and Stuttgart tend to dominate and show high potentials in System Integration, Additive Manufacturing, Autonomous Robots and Autonomous Vehicles. UK regions tend to score high on Augmented Reality and Artificial Intelligence (which is also fairly distributed across other European countries, often found in their capital city regions, like Île-de-France and Comunidad de Madrid). High potentials in Cybersecurity are found in regions in France, UK and Finland in particular. At the same time, many EU countries are rarely mentioned, or not mentioned at all in these top ranked regions, suggesting a weak technological potential to develop Industry 4.0 Technologies in the near future.

4 Type (institutional, policy instrument, policy measure, policy delivery, industry-specific; the GP can be of one type or a combination of types)

Methodology for mapping regional competence by calculating the potential of a region to become a leader in Industry 4.0 Technologies.

5 Maturity (includes transferability)

The methodology is applicable to any regional and national context. Moreover, the methodology can be replicated for other sectors, other than Industry 4.0 Technologies.

6 Results & relevance to any BRIDGES prioritised value chains

Good practice Theme 2 Instruments for identifying interregional complementarities

Good practice 8 Mapping the potential of EU regions to contribute to Industry 4.0

This GP focuses on the identification of future Industry 4.0 centres of knowledge production in Europe. The GP's concept is based on the principle of relatedness[73] to diversify and participate in Industry 4.0 technologies, and the fact that according to literature, new activities within a region do not start from scratch but are often related to existing local activities.

With a strong learning potential, this GP is important in three ways: (i) it provides a methodology for regions to identify and select industries within which they can have leadership; (ii) the methodology is based on measuring relatedness, and in that sense it is positioning leadership within relevant contexts (iii) it provides evidence for the need of background research regions could /should invest in when planning & renewing regional innovation and development strategies and funding programmes.

7 Discussion points (these, if any, result from the literature review and the discussions with the partners)

The analysis is according to technologies. However, experience indicates that this is 50% of the issue. The other 50% are the uptake models (25%), i.e. the process, skills, organisational adjustments, and capital investments needed.

[73] Hidalgo C., Balland, P.A., Boschma, R., Delgado, M., Feldman, M., Frenken, K., Glaeser, E., He, C., Kogler, D., Morrison, A., Neffke, F., Rigby, D., Stern, S., Zheng, S., and Zhu, S. (2018) The Principle of Relatedness, Proceedings of the 20th International Conference on Complex Systems.

Good practice Theme 3 Contribution to the resilience of regional economies by expanding (re-shoring or inshoring) the economic base utilising TRL[74] or MRL[75]		
Good practice 9 DEFINE		
[13]. Author contact information		
Name	***Juan Carlos Martinez Barrio***	
Email	*jcmartinez@ceeiburgos.es*	
Telephone	*+34658969464*	
Your organisation		
Country	*Spain*	
Region	*Castilla y Leon*	
City	*Burgos*	
Organisation in charge of the good practice *[If your organisation is not the one in charge of the good practice, you can indicate the relevant organisation in this section of the form. But your contact details will still be linked to the submitted good practice.]*		
Is your organisation the main institution in charge of this good practice?	*No*	
Location of the organisation in charge:	*Country*	*Italy*
	Region	*Lombardy*
	City	*Milano*
Main institution in charge	*Politecnico di Milano (POLIMI)*	
Good practice general information		
Title of the practice	*DeFINE network*	
Does this practice come from an Interreg Europe Project	*No*	
Please select the project acronym		
Thematic objective of the practice	*Targeted, VC related science-based entrepreneurship programmes and TRL 5-7 promotion (GP3)*	
Geographical scope of the practice	*International (EU level)*	
Location of the practice	Country	*Italy, UK, France, Belgium, Bulgaria, Germany, Spain and Cyprus.*

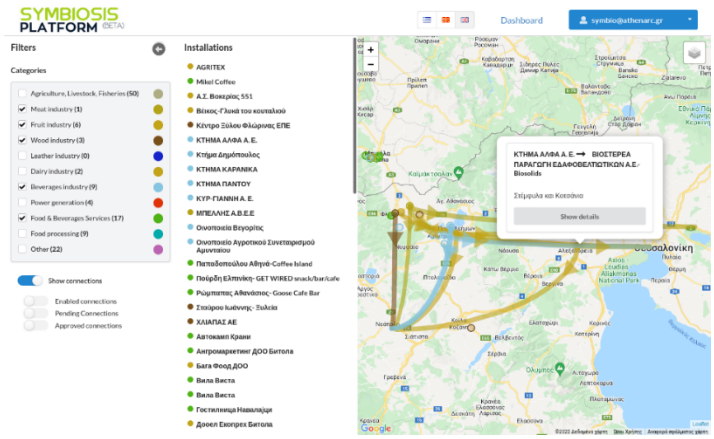
[74] TRL = Technology Readiness Level

[75] MRL = Manufacturing Readiness Level. For more information see in the ENDNOTE section, item ii.

Good practice Theme 3 Contribution to the resilience of regional economies by expanding (re-shoring or inshoring) the economic base utilising TRL[74] or MRL[75]		
Good practice 9 DEFINE		
	Region	
	City	
Detailed description		
Short summary of the practice	*Development of a fashion-tech innovation network for Europe focused on sustainability and SMEs scaling-up opportunities.*	
Detailed information on the practice	*DeFINE is a collaborative project co-funded by the European Commission's COSME programme which aims to support the fusion of cutting-edge technologies and innovation with the European fashion and design industries by developing a fashion-tech innovation network for Europe. https://www.define-network.eu/* *The cross-sectoral networks and ecosystems tackled the challenges that the European fashion industry faces and supported:* ▪ *start-ups/SMEs to develop innovative and advanced commercial services and products that respond to consumer requirements for aesthetics, physical needs and functionality,* ▪ *incubators and accelerators to deal with investor readiness of Fashion-Tech start-ups and SMEs scaling up,* ▪ *financiers to understand the value of investing in Fashion-Tech businesses, and in a complementary way Fashion-Tech enterprises understanding how presenting themselves to access investment,* ▪ *all stakeholders to organize and manage cross-sectoral knowledge related to fashion, design, engineering, business and investment domains.* *In order to develop this network of incubators & accelerators, start-ups & SMEs, and financiers to form a European fashion-technology community where cross-sectoral knowledge will be shared, ideas will grow and transnational collaboration will be nurtured with a sustainability approach.*	
Resources needed	*The overall budget for the action was €1.567.000.- A total of ten partners from the listed countries were actively involved all along the implementation phase of the project allocating two staff members each average.*	
Timescale (start/end date)	*July 2018 – August 2021*	
Evidence of success (results achieved)	*27 selected business ideas of innovative start-ups were prepared for entering the market and scaling -up through a bespoken mentoring programme.* *Besides, innovators in Fashion-Tech can count on 76 specialised business supporting organizations and an investment community with investors.* *Additionally, DeFINE helped innovators developing more than 120 business ideas paving the way to advanced prototyping of innovative products and services.* *Fashion-Tech networks have been set-up and are operational.*	
Challenges encountered (optional)	*[Developing the bespoken mentoring programme, as it required an additional effort in order to adapt the supporting services provided to the actual needs and circumstances of the innovators and SMEs selected.*	
Potential for learning or transfer	*DeFINE could be included in the third group of GPs (Targeted, VC related science-based entrepreneurship programmes and TRL 5-7 promotion), relevant for bio-based and recyclable textiles (forest industry side-streams and*	

Good practice Theme 3 Contribution to the resilience of regional economies by expanding (re-shoring or inshoring) the economic base utilising TRL[74] or MRL[75]	
Good practice 9 DEFINE	
	recycling of low-quality cotton into viscose-like textile; it is already possible to commercialise) value chain. *This GPs has been successfully implemented within the given grant period with any major issues to be pointed out – COVID pandemic impact aside – So, its transference, adaptation and subsequent deployment within the framework of a bio-based and recyclable textiles value chain development would be feasible taking into account the recipient region/s and new BRIDGES concepts and anticipated trends.*
Further information	*https://www.define-network.eu/*
Keywords related to your practice	*Innovation, sustainability, fashion-tech, bio-based textiles*
Upload image	DeFINE
Expert opinion	*[1500 characters]* ***[to be filled in by the Policy Learning Platforms experts]***

Good practice Theme 4 Twin transition		
Good practice 10 Symbiotic networks of bio-waste sustainable management		
Author contact information *[Technical: Contact information comes from your community profile. You can edit it by visiting your user dashboard]* *Ideally, the owner of the good practice should fill in the form. Indeed, if you submit a good practice, your personal and organisational profile in the Interreg Europe community will be linked to it.*		
Name	***Athanasios Gentimis***	
Email	*thanasis@symbiolabs.gr*	
Telephone	*+30 697 73 82 436*	
Your organisation		
Country	*Greece*	
Region	*Attiki*	
City	*Athens*	
1. **Organisation in charge of the good practice** [If your organisation is not the one in charge of the good practice, you can indicate the relevant organisation in this section of the form. But your contact details will still be linked to the submitted good practice.]		
Is your organisation the main institution in charge of this good practice?	***No***	
Location of the organisation in charge:	*Country*	*Greece*
	Region	*Western Macedonia*
	City	*Kozani*
Main institution in charge	***Waste Management of Western Macedonia (DIADYMA) S.A.***	
2. Good practice general information		
Title of the practice	*SYMBIOTIC NETWORKS OF BIO-WASTE SUSTAINABLE MANAGEMENT*	
Does this practice come from an Interreg Europe Project	*YES*	
Please select the project acronym	*SYMBIOSIS*	
Thematic objective of the practice	*Integration of Green Deal & Digital Transformation into Value Chain*	
Geographical scope of the practice	*Regions of Western Macedonia in Greece (former pref. of Florina) & The municipality areas of Bitola and Novatsi in Repubic of North Macedonia*	
Location of the practice	Country	*Greece*
	Region	*Western Macedonia*

Good practice Theme 4 Twin transition		
Good practice 10 Symbiotic networks of bio-waste sustainable management		
	City	*All cities*
3. Detailed description		
Short summary of the practice	*Applying digital tools to develop symbiotic networks, bringing together companies and stakeholders from all business sectors, aiming to improve cross industry resource efficiency through waste, byproducts and raw material trading and sharing assets in an environmentally sustainable way.*	
Detailed information on the practice	*SYMBIOSIS aims to set up an integrated, sustainable, bio-waste management and trading scheme between the partner regions of Western Macedonia in Greece (former prefecture of Florina) and the municipality areas of Bitola and Novatsi in Repubic of North Macedonia following the Industrial Symbiosis concept. SYMBIOSIS promotes re-manufacturing, reuse and recycle, and transforms one industry's waste to another's raw material and/or fuel, to pave the way for a more circular economy for the regions, where waste is eliminated, and resources are used in an efficient and sustainable way.* *This is facilitated via the implementation of a web platform (available at https://platform.symbiosisproject.eu) to be used by companies and agro-industries within the cross-border area. Companies can register their facilities with the platform, marking their position on an interactive map, and detailing whether they are 'users' or 'producers' of bio-wastes. The platform then connects 'offer' with 'demand' of bio waste, suggesting synergies and business opportunities providing new solution for exploitation of bio-waste. The platform can then track the achieved real matching of those companies, including any steps up until the signing of cooperation agreements between them.* 	
Resources needed	*The development of the SYMBIOSIS platform was fully funded by the SYMBIOSIS project and cost approximately 22.500 Euros.*	
Timescale (start/end date)	*The duration of the project was from May 2018 to May 2020.*	
Evidence of success (results achieved)	*A key aim of the SYMBIOSIS project was to improve cross industry resource efficiency through waste, byproducts and raw material trading and sharing assets in a sustainable way. The SYMBIOSIS platform was a key tool to implement this aim, by giving local industries and farmers the ability to register and self-declare the waste and byproducts they produced and/or needed. The resulted into suggested connections between industries in order to bring them*	

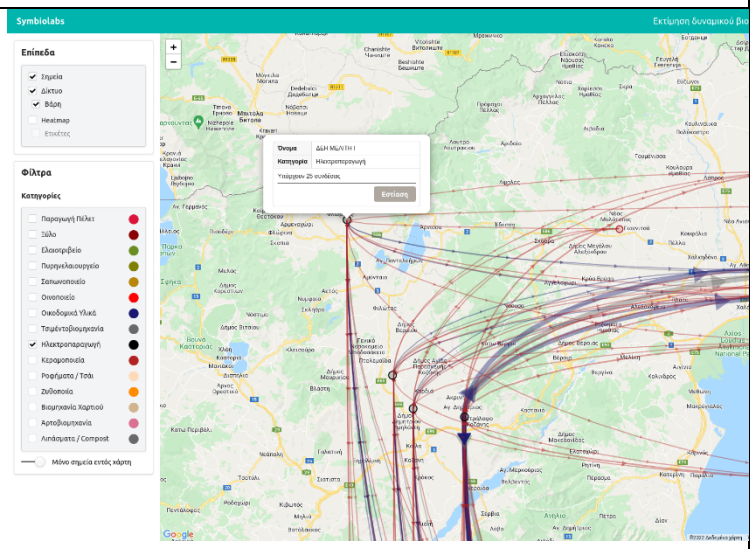
Good practice Theme 4 Twin transition	
Good practice 10 Symbiotic networks of bio-waste sustainable management	
	into collaboration and trade the materials based on the data they provided. *During the 10-month pilot operation of the SYMBIOSIS project, a total of 87 companies have been registered in Greece and 36 companies have been registered in North Macedonia. Within this period, 48 connections were created by the SYMBIOSIS platform between companies, based on the data stated in their respective profiles.*
Challenges encountered (optional)	*Motivation of stakeholders and industries is a key challenge for the successful operation of this approach. This has become evident after the conclusion of the project, and in this sense DIADYMA has laid a plan to promote the use of the platform in combination with a follow-up project which is about to start in the following months (BECircular project - CBC Greece - the Republic of North Macedonia 2014-2020) and will extend the functionality of the SYMBIOSIS platform.* *A secondary challenge is addressing the legal and other limitations regarding cross-border waste transport, which in some cases limits the application of the Industrial Symbiosis approach.*
Potential for learning or transfer	*The SYMBIOSIS approach is fully transferable to other regions, with minor adjustments and customization. An upgrade and relaunch of the web platform is scheduled in 2022 by DIADYMA SA.*
Further information	*https://symbiosisproject.eu/*
Keywords related to your practice	*Industrial Symbiosis, biowaste, sustainability, circular economy*
Upload image	SYMBIOSIS PLATFORM (BETA)
Expert opinion	*[1500 characters] **[to be filled in by the Policy Learning Platforms experts]***

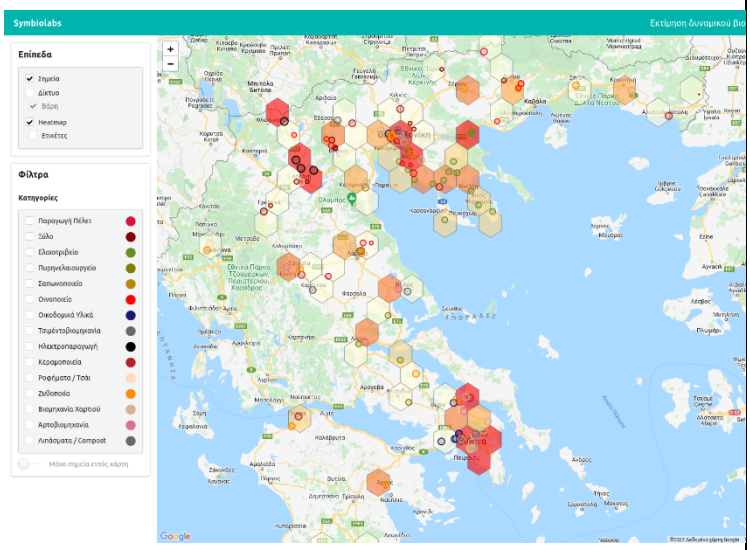
[14]. Good practice Theme 4 Twin transition		
Good practice 11 SYMBIOICT		
1. Author contact information [Technical: Contact information comes from your community profile. You can edit it by visiting your user dashboard] Ideally, the owner of the good practice should fill in the form. Indeed, if you submit a good practice, your personal and organisational profile in the Interreg Europe community will be linked to it.		
Name	***Athanasios Gentimis***	
Email	*thanasis@symbiolabs.gr*	
Telephone	*+30 697 73 82 436*	
Your organisation		
Country	*Greece*	
Region	*Attiki*	
City	*Athens*	
2. Organisation in charge of the good practice [15]. [If your organisation is not the one in charge of the good practice, you can indicate the relevant organisation in this section of the form. But your contact details will still be linked to the submitted good practice.]		
Is your organisation the main institution in charge of this good practice?	***YES***	
Location of the organisation in charge:	*Country*	
	Region	
	City	
Main institution in charge		
3. Good practice general information		
Title of the practice	***SYMBIOICT***	
Does this practice come from an Interreg Europe Project	*NO*	
Please select the project acronym	-	

[14]. Good practice Theme 4 Twin transition		
Good practice 11 SYMBIOICT		
Thematic objective of the practice	*Integration of Green Deal & Digital Transformation into Value Chain*	
Geographical scope of the practice	*Regional*	
Location of the practice	Country	*Greece*
	Region	*Various regions in Northern and Central Greece*
	City	
4. Detailed description		
Short summary of the practice	*A digital platform to collect and analyze datasets relating to industrial facilities, regional waste production and supply chain economics with the aim to detect and visualize geographic areas and industrial sectors with high Industrial Symbiosis potential.*	
Detailed information on the practice	*By processing and analyzing various collected datasets, potential symbiotic connections can be detected, i.e., potential exchanges of waste and raw materials among industrial facilities within a geographical region.* *Such datasets mainly include: (i) location and activity data of industrial facilities (e.g., location, magnitude, industrial NACE codes), (ii) input/output flow data of industrial facilities (e.g., based on life cycle inventory (LCI) data), (iii) waste production data (e.g., national statistical data), and (iv) data describing possible material/fuel substitutions (e.g., curated list of wastes that can replace raw materials in input flows).* *Each detected symbiotic connection is weighted based on the distance between the industrial facilities (transport cost), the facility magnitude and the savings from the suggested exchange. Results are visualized on an interactive map, indicating potential symbiotic connections and "hot spots" of Industrial Symbiosis regional synergies among industries, depicted in "heat maps". Using these heat maps policy makers can make better informed decisions on future actions to promote the collaboration and networking of industries activated in the same and/or different industrial sectors, to exchange material flows.* *The platform has been used to detect potential symbiotic connections in a number of regions in Northern and Central Greece. These symbiotic links are detected based on the analysis of data relating to each industrial facility (e.g., waste production, production capacity, distance from other facilities). Results are available on the platform demo website https://apps.symbiolabs.gr/symbio*	

[14]. Good practice Theme 4 Twin transition

Good practice 11 SYMBIOICT





Resources needed	*The platform was self-funded by Symbiolabs, without outside funding. For the development of the platform, approximately 18 Person Months (primarily programmers and chemical engineers) were required. Operational costs are covered by Symbiolabs, regardless of the project.* *The use of the platform is part of the services offered by Symbiolabs. There is an option to access the platform for free, and an advanced option for paid access to detailed analysis on a specific region and/or domain.*
Timescale (start/end date)	*Ongoing [Started in September 2018]*
Evidence of success (results achieved)	*Symbiolabs has collected and analyzed datasets relating to industrial facilities, regional waste production and supply chain economics in Greek Regions. These datasets are for more than 6.000 Greek companies activated in various*

[14]. Good practice Theme 4 Twin transition	
Good practice 11 SYMBIOICT	
	activities, as well as detailed waste production (per EWC) in municipal level (for a range of the past three years). *Moreover, Symbiolabs has collected and curated a proprietary dataset of European best practices of applied Industrial Symbiosis activities. It consists of 49 industrial facilities, with 99 distinct industrial processes, with 154 Materials exchange in Symbiotic connections. This repository of best practices has been used in order to detect and visualize geographic areas and industrial sectors with high Industrial Symbiosis potential.* *It should be noted that based on the platform's preliminary achievements, its functionalities will be further expanded within the near future, as part of the SYMBIOICT project (co-financed by the Operational Program Competitiveness, Entrepreneurship and Innovation, under the Greek call Research-Create-Innovate).*
Challenges encountered (optional)	*A key challenge for maximizing the impact and utilization of this platform is the access to detailed data from specific industries and/or chambers of commerce, etc., combined with the quality of data collected and analyzed.*
Potential for learning or transfer	*This approach is fully transferable to other regions, with minor adjustments and customization.*
Further information	*https://apps.symbiolabs.gr/symbio/*
Keywords related to your practice	*Industrial Symbiosis, sustainability, circular economy*

Annex 2 BRIDGES project collaboration with the Interreg Europe Policy Learning Platform, matchmaking event

In Annex 2 can be found the agenda of the event. More information & the presentations are available here URL.

To support interregional value chain development and respond to policy challenges of in-shoring, re-shoring and near-shoring within the EU

BRIDGES project, additional activities; request by the Regional Council of Kainuu: Online matchmaking session[1],

Date 30th March 14-15.30H

Duration:	*c.90 min.*
Short rationale and objectives:	The Regional Council of Kainuu has requested, on behalf of the BRIDGES project additional activities partnership, insights into policy tools and operational instruments that can support interregional value chain development and respond to policy challenges of in-shoring, re-shoring and near-shoring within the EU. The BRIDGES project additional activities key objective is reaching policy impact (Type 1, and/or Type 2, and / or Type 3) recommendations relating to in-shoring, re-shoring, and near-shoring of selected value chains. The selected value chains are as follows: bio-based and recyclable textiles; dairy industry; dairy industry side-streams, forest industry side-streams, and ICT solutions for health care, targeting disability services. Of particular interest are tools that can help respond to policy challenges that could be impacted by the use of mechanisms leading to complementarity identification, interpretation and exploration in different regional contexts, scope for interregional value chain cooperation, that together can contribute to long term innovative growth within smart specialisation choices. The purpose of the matchmaking session is to extract ideas for policy impact aligned with the objectives of the BRIDGES project additional activities. The BRIDGES partnership submitted a request for a matchmaking session on this very specific topic that is high on the agenda of many EU regions, and not covered fully by the projects the applicant is currently involved in.
Main beneficiary and proposed peers (incl. type of stakeholders if relevant)	The matchmaking host Regional Council of Kainuu is the main beneficiary and is lead partner of the BRIDGES project additional activities partnership:, Some of the other project partners will also participate : Regional Council of Helsinki-Uusimaa PP4, Regional Development Agency Of Western Macedonia S.A. – ANKO PP5, Soča Valley Development Centre -SVDC PP6, Pannon Business Network Association PBN PP7; advisory partners European Business and Innovation Centre of Burgos -CEEI Burgos PP8, Centre For Research & Technology-Hellas / Institute For Bio-Economy & Agri-Technology -CERTH PP9. The proposed peers and experts: Karel Herman HAEGEMAN – from the Joint Research Centre-SEVILLA Mikel SERRANO, SPRI – Basque Country Laura IZAGUIRRE - SPRI – Basque Country, And inputs from Anita TREGNER DG Regio Expert on S3 Industrial Modernisation Partnerships Total number of workshop participants expected: 15-20

[1] An online matchmaking session is different from an online discussion upon demand for the following main reasons:
1) The meeting aims at discussing the policy challenge of one beneficiary: in the meeting, there is a beneficiary and the selected peers (whereas the online discussion all participants have the same "status")
2) The meeting focuses on one specific policy challenge related to the territorial context of the beneficiary (whereas in the online discussion, the topic is not "territory-specific" of one of the participants)

Interreg Europe Policy Learning Platform: on line matchmaking session

Agenda

10m	**Welcome and who's who** Moderators: Marc Pattinson and Arnault Morisson, Thematic Experts in Research and Innovation
15m	**Introduction to the policy challenge** Host region: The regional government of Kainuu – Finland – short presentation to set the scene Q&A and interactive discussions with peers Contributions: BRIDGES partners and experts.
10m	**Introduction of the questions** (PLP coordinates the session with the host) participants then all take turns to express challenges, solutions and findings that will be then discussed by the host and BRIDGES observer partners and peers). **THEME 1.- What instruments exist for identifying interregional complementarities related to value chain re- and near-shoring priorities.** **THEME 2.- What type of tools can regions deploy for targeting value chain reshoring & nearshoring segments**
75m	**BRIDGES partners, Peer presentations and drawing of conclusions on approaches and initiatives to promote either:** • Tools for targeting value chain in-shoring, re-shoring & near-shoring segments; and • Instruments for identifying interregional complementarities related to value chain re- and near- shoring priorities. (8 minutes/4 slides per peer), with insights from other partners/participants. • Karel Herman HAEGEMAN – from the Joint Research Centre-SEVILLA • Mikel SERRANO, SPRI – Basque Country • Laura IZAGUIRRE - SPRI – Basque Country, And inputs from Anita TREGNER DG Regio Expert on S3 Industrial Modernisation Partnerships
5min	**Wrap up, take away messages and next steps**
	End

2022_03_online matchmaking_Kainuu - final agenda .docx | 2 / 3

Annex 3 BRIDGES project, 5th call, summary of the value chain mapping methodology.

The methodology was developed during Phase 1 of the BRIDGES project, as part of the feasibility study supporting Action 2 of the Regional Council of Kainuu / Kainuun Etu joint action plan.

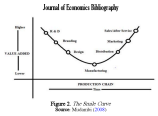
Summary of the value chain mapping methodology

The purpose is to map the selected value chains to identify localised strengths (peaks, competitive advantage), valleys (weaker points) as well as industrial and regional interactions within the same value chains. The objective is, based on the evidence generated by the VC mapping, to generate regional and interregional initiatives which strengthen re-shoring and in-shoring relevant activities and coherently position/align such activities together with near-shoring (=off shoring), with the aim to reach VC-based strong and solid development paths.

The idea is to be able to identify strengths / peaks for any type of region within a defined VC. For this purpose, regional concentrations of activities are identified and assessed in terms of four (5) parametres: business activities & products, research solutions (TRL 5+), knowledge and research (TRL 0-4), labour skills, and policies. As indicated in Table 6, below, different indicators are utilised to identify peaks and valleys.

Table 6 Summary of the value chain mapping approach

VC mapping parametres	**Value chain mapping components and proxies. These components take into account the VC smiling curve[76].**								
	Raw materials	**Technologies / R&D**	**Design**	**Production**	**Products**	**Branding**	**Funding**	**Distribution**	**After sales service**
Business	Turnover for the total of the sector		Turnover for the total of the sector	Turnover for the total of the sector	Range and added value of the sector as a whole	Projects funded of the sector as a whole Visibility of sector across the EU.		Range and turnover from sales	Turnover



76 Aggarwal, S. (2017).Smile Curve and its linkages with Global Value Chains. Page 4; https://mpra.ub.uni-muenchen.de/79324/1/MPRA_paper_79324.pdf .

VC mapping parametres	Value chain mapping components and proxies. These components take into account the VC smiling curve[76].								
	Raw materials	**Technologies / R&D**	**Design**	**Production**	**Products**	**Branding**	**Funding**	**Distribution**	**After sales service**
Research solutions		Funded projects for TRL or MRL scaling up Results of projects TRL5+		Funded projects for TRL or MRL scaling up Results of projects TRL5+					
Knowledge and research base		TRL0-4 projects; University faculties)	TRL0-4 projects; University faculties; targeted entrepreneurship	University faculties; targeted entrepreneurship		University faculties; targeted entrepreneurship			
Labour skills			Average educational level in businesses and skills training in the region	Average educational level in businesses and skills training in the region	Average educational level in businesses and skills training in the region				Average educational level in businesses and skills training in the region
Policies (regional and national)	Funding schemes and policy measures	Funding schemes and policy measures	Funding schemes and policy measures	Funding schemes and policy measures	Funding schemes and policy measures	Funding schemes and policy measures	Funding schemes and policy measures Collaoration with financing organisations for possible alignment with financial instruments.	Funding schemes and policy measures	Funding schemes and policy measures

This value chain mapping approach can be tailored to all types of regions, innovation leaders or leaders + to innovation modest regions, according to the identified regional concentrations. This methodology has been conceived as a complementary approach to that introduced by GP7 which identifies interregional linkages based on the technologies participating in patents.

To identify interregional complementarities, requires that two regions interested in the same value chain, are making in parallel the value chain mapping.

Finally, our point of view is that for this methodology to be characterised as a good practice, it might need to be further refined in terms of indicators for example and further tested.

In case the VC mapping methodology would be approved by the Interreg Europe JTS and PLP as good practice, then it would be listed under the heading *GP 12 Value chain mapping methodology*.

Annex 4 NACE codes of the manufacturing industries

Code	Sector
C10	Manufacture of food products
C11	Manufacture of beverages
C13	Manufacture of textiles
C14	Manufacture of wearing apparel
C15	Manufacture of leather and related products
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
C17	Manufacture of paper and paper products
C18	Printing and reproduction of recorded media
C20	Manufacture of chemicals and chemical products
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
C22	Manufacture of rubber and plastic products
C23	Manufacture of other, non-metallic mineral products
C24	Manufacture of basic metals
C25	Manufacture of fabricated metal products, except machinery and equipment
C26	Manufacture of computer, electronic and optical products
C27	Manufacture of electrical equipment
C28	Manufacture of machinery and equipment n.e.c.
C29	Manufacture of motor vehicles, trailers and semi-trailers
C30	Manufacture of other transport equipment
C31	Manufacture of furniture
C32	Other manufacturing
C33	Repair and installation of machinery equipment
C35	Industrial and commercial machinery and computer equipment

Helpful readings

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Endnotes

[1] On MANUFACTURING READINESS LEVELS

https://rescoll.fr/trl-technology-readiness-level-mrl-manufacturing-readiness-level__trashed/

https://www.fch.europa.eu/sites/default/files/MRL_support.pdf

Manufacturing Readiness Level (« MRL ») is a measure used by some United States government agencies and many of the world's major companies (and agencies) to assess the maturity of manufacturing readiness serving the same purpose as Technology Readiness Levels serve for technology readiness. They can be used in general industry assessments, or for more specific application in assessing capabilities of possible suppliers.

MRLs are quantitative measures used to assess the maturity of a given technology, component or system from a manufacturing perspective. They are used to provide decision makers at all levels with a common understanding of the relative maturity and attendant risks associated with manufacturing technologies, products, and processes being considered. Manufacturing risk identification and management must begin at the earliest stages of technology development, and continue vigorously throughout each stage of a program's life-cycles.

Why Manufacturing Readiness?

• Manufacturing risk identification and management must begin at the earliest stages of technology development, and continue vigorously throughout each stage of a program's life-cycle.

• Matters of manufacturing readiness and producibility are as important to the successful development of a system as those of readiness and capabilities of the technologies intended for the system.

Assessing MRLs is performed to:

• define the current level of manufacturing maturity

• identify maturity shortfalls and associated costs and risks

• provide the basis for manufacturing maturation and risk management

Immature manufacturing processes may lead to the following problems:

• Inattention to manufacturing during planning and design

• Poor supplier management planning

• Lack of workforce knowledge and skills

Assessing technology readiness levels does leave some major transition questions unanswered:

• Is the level of performance reproducible?

• What will these cost in production?

• Can these be made in a production environment by someone without a PhD?

• Are key materials and components available?

Manufacturing Readiness Assessments (MRAs) address these unanswered questions in order to reduce manufacturing risk. However, it still does not address the question of whether the product is reliable or maintainable.

Definition of MRL, source https://www.fch.europa.eu/sites/default/files/MRL_support.pdf .

MRL-1	Manufacturing Feasibility Assessed
MRL-2	Manufacturing Concepts Defined
MRL-3	Manufacturing Concepts Developed
MRL-4	Laboratory Manufacturing Process Demonstration
MRL-5	Manufacturing Process Development
MRL-6	Critical Manufacturing Process Prototyped
MRL-7	Prototype Manufacturing System
MRL-8	Manufacturing Process Maturity Demonstration
MRL-9	Manufacturing Processes Proven
MRL - 10	Full Rate Production demonstrated and lean production practices in place

Contributions

— Part 1: Ninetta Chaniotou, Regional Council of Kainuu, LP/PP2; section approved during the online ISC on 20.4.2022.

— Part 2: Thomas Bartzanas, Charis Achillas, CERTH PP9, Juan Carlos Martinez CEEI Burgos PP8, Ninetta Chaniotou Regional Council of Kainuu LP/PP2; section approved during the online ISC on 20.4.2022.

— Part 3: All project partners participating in the BRIDGES 5th call additional activities (Regional Council of Kainuu PP2/LP (Ninetta Chaniotou), Regional Council of Helsinki-Uusimaa PP4 (Ari Lainevuo, Venla Virkämäki), ANKO PP5 (Tasos Sidiropoulos), SVDC PP6 (Miro Kristan), PBN PP7 (Andrea Kurcz), CEEI Burgos PP8 (Juan Carlos Martinez), CERTH PP9 (Thomas Bartzanas, Charis Achillas); section approved during the online ISC on 14.6.2022.

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https://docs.google.com/document/d/1D-UqY1kUopRI5Xiq3eTpDKq81ny496PH?rtpof=true&authuser=chaniotou%40icloud.com&usp=drive_fs