



Pays de la Loire case study: Developing regional industrial policy capacity

[Developing regional industrial policy capacity](#)

Future of Manufacturing in Europe

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Preface

The objective of this case study is to map and assess the industrial policy capacity in the Pays de la Loire region and to analyse the processes of the overall regional policy design and implementation by identifying good practices.

This work is prepared in the framework of the Pilot Project ‘The Future of Manufacturing’, proposed by the European Parliament and delegated to Eurofound by the European Commission (DG Internal Market, Industry, Entrepreneurship and SMEs). The European Foundation for the Improvement of Living and Working Conditions (Eurofound) is a tripartite European Union Agency, whose role is to provide knowledge in the area of social and work-related policies. The study on ‘Developing Regional Industrial Policy Capacity’, of which this case study is part, is one of several studies being conducted as part of the Future of Manufacturing Project.

The specific research questions addressed by the study include:

- What is the existing industrial policy capacity in EU regions? Among the EU regions, what is the existing industrial policy capacity of the EU regions managing industrial restructuring processes related to manufacturing?
- For identified regions, what are the industrial policy capacity key components (involved actors, policy areas and instruments)?
- What are the good practices in regional industrial policies, with focus on a future-oriented manufacturing eco system, including (if applicable) reconversion and structural change towards new (potentially more service oriented) regional economic structures?
- What are the success factors in regional industrial policy (capacity) and factors that facilitate or hinder regional industrial policy success and capacity building?
- How to further develop the current industrial policy capacity to match the identified good practices?

In the context of this study, industrial policy is defined as ‘the set of strategic measures targeted at improving the competitiveness of the regional economy, taking into consideration the specific characteristics of the region’ (Warwick, 2013). Policy capacity is defined as the ‘capacity of government and other public actors to plan, develop, implement, and evaluate purposeful solutions to collective problems’ (Denis et al, 2014).

The study team has conducted eight in-depth regional case studies across selected EU Member States. Case studies are meant to illustrate how regional industrial policy is interpreted in different regional settings, how it is governed, implemented and evaluated. Case study regions have been selected on the basis of an extensive literature review and indicator analysis, expert interviews and the use of a number of selection criteria (such as geographic, economic, demographic) in order to ensure a good balance of the sample. An open definition of ‘regions’ has been adopted for this study. An open definition of ‘regions’ has been adopted for this study, with most of the selected regions corresponding to NUTS II regions.

This case study is based on half-standardised qualitative interviews with 14 individual/representatives of institutions involved in the regional policy process. Interviews have been conducted in September and November 2016. In addition, an extensive desk research and literature review has been also conducted.

The contents and views expressed in this report do not necessarily reflect the opinions or policies of the regions, Member States, Eurofound, or the European Commission.

Executive Summary

The regional industrial profile: a diversified economy relying on a dynamic industry and outstanding collaborative networks

Pays de la Loire is the eighth largest French region, organised around one central urban axis (Nantes), and including both rural areas and the Nantes-Saint-Nazaire industrial port. The region stands out for its population growth and attractiveness, driven by its quality of life and economic opportunities. Regional employment is concentrated in a few companies, many of which are active in industrial production. The region's productive capacity is structured around a core network of medium-sized companies. The region also stands out for its recovery from the economic crisis, thanks to its diversified economy and industries, the recent redeployment of its production capacities, and its trend towards servitisation.

Benefiting from its location and the presence of large players purchasing industrial products, industry's contribution to Pays de la Loire's regional GDP amounts to 18.3%, while regional employment in industry is 16.1% in 2013, which remains large compared to other EU regions (ORES Pays de Loire, 2016). Pays de la Loire has a strong cultural heritage favouring local cooperation, and relies on its regional clusters to foster collaborative innovation.

The agri-food industry remains the most important sector, along with maritime industry, mechanical engineering and equipment manufacturing, and electronics. The region is specialising in six key manufacturing sectors as defined in its smart specialisation strategy¹:

- Advanced production technologies: machines;
- Agri-food;
- Marine industries: naval construction;
- Health and biotechnologies
- Design and the creative and cultural sector: cross fertilisation in the fields of urbanism;
- Electronics and computing.

From the mid-2000s, Pays de la Loire has focused on advanced manufacturing as the key to preserving its industrial capacity, capitalising on its historical know-how in the manufacturing of large-scale infrastructures (related to maritime industry).

The regional industrial policy: regional value-chains' analysis at the heart of the industrial policy

Industrial policy in the Pays de la Loire region is a combination of various regional policies, mostly integrated in an 'economic development policy' with a strong emphasis on innovation policy (in terms of funding and existing support schemes).

The industrial policy implemented at regional level originates primarily from the state (the 'National competitiveness cluster policy', 'New Industrial France'). Indeed, in France industrial policy has always been developed nationally and there is no such thing as an 'industrial policy' defined at the regional level.

However, within the broader framework of the regional economic development policy, whose definition falls under the remit of the regional authority (Regional council), several policy elements can be identified as a regional innovation policy.

¹ Regional Innovation Strategy for Smart Specialisation in Pays de Loire, Regional Council of Pays de Loire, 2014-2020

First of all, over the last decade, the regional council has paid strong attention to the development and organisation of its regional value-chains, being traditional sectors (maritime) or emerging sectors (renewable marine energy). The regional policy documents put this priority at the top of their strategies. This value-chain approach was reinforced when Pays de la Loire had to draft its smart specialisation strategy in 2014 as a pre-condition to accessing European Regional Development Fund (ERDF) funding.

In addition, innovation was mentioned clearly as a key means to address the challenges of a transforming economy (for example in terms of digitalisation.). Finally, internationalisation is also a policy priority mentioned as part of the industrial policy. A dedicated policy document was established in 2013.

The regional industrial policy governance and policy coordination mechanisms: an array of stakeholders with a single goal

The overall policy governance at regional level is in the hands of different public administrative levels. The industry policy mix is implemented by different actors: the state, the regional councils, cities and their respective agencies and financial institutions.

These actors are organised informally as well as formally through various policy coordination mechanisms which contribute to the strength of the industrial policy capacity in Pays de la Loire.

Regional policy makers but also actors of the policy implementation are characterised by a strong team spirit which is rooted in history and interpersonal relationships. Furthermore, Pays de la Loire institutions have set up various formal policy coordination tools that gather a large array of actors who are used in the definition of regional strategies impacting the industrial sector: regional conference on economy and sustainable employment (CREED), Regional consultative committee for RTD (CCRDT), and so on.

Enterprises are engaged in the policy planning and implementation in various ways, either through the participation of industry representatives in the above-mentioned commissions, or in co-financing major regional projects (for example, Technocampuses). Finally, coordination is organised through multi-annual contracts (state-region contract plans), between the state and the local authorities or between public authorities and the industrial stakeholder in a given sector.

The industrial policy implementation process and policy mix: a comprehensive policy mix with the final objective to root industrial companies in the region

Regional industrial policy in Pays de la Loire is supported by a comprehensive policy mix which combines a strong fiscal policy (tax credit state policy), the development of financial engineering instruments (such as loans or guarantees, mostly operated by the financial public institution Bpifrance) and direct policy support measures to firms (grants) targeting innovation, skills and internationalisation challenges. The key aspect of the policy mix is the set of measures aimed at developing a favourable ecosystem for industry to expand and modernise. These measures support the development and operation of clusters in traditional or emerging industrial sectors (for example, cluster EMC2, Neopolia), the financing of collaborative R&D projects and institutes (Technological research Institute Jules Verne), and the development of major public-private industrial projects: the Technocampuses and to a lesser extent the regional innovation platform.

The regional industrial policy's monitoring and evaluation system: a sophisticated observatory tool and various evaluation initiatives

Pays de la Loire is well equipped with policy intelligence tools, in particular related to the industrial policy sector. The Regional Economic Development Agency runs a dedicated observatory, the Socio-

Economic Regional Observatory² (ORES) created in 2006 which collects and analyses data from a large number of regional observatory structures (about 40 structures at sub-regional level, regional level and national level) in various thematic areas (economy, employment, environment and more). It can be considered as the umbrella observatory for the Pays de la Loire region. ORES is used, though not systematically and yet to a limited extent in the policy evaluation process.

Conclusion

The overall regional policy objective of keeping industrial groups, and therefore jobs, in the region, through massive investments in collaborative infrastructure has proven successful. In terms of policy capacity, public authorities should put greater emphasis on monitoring and evaluating the impact of policies.

Secondly, even though the numerous actors in charge of supporting industrial policy are operating quite smoothly, regional firms would benefit from a simplified policy support landscape with fewer and even more accessible support measures.

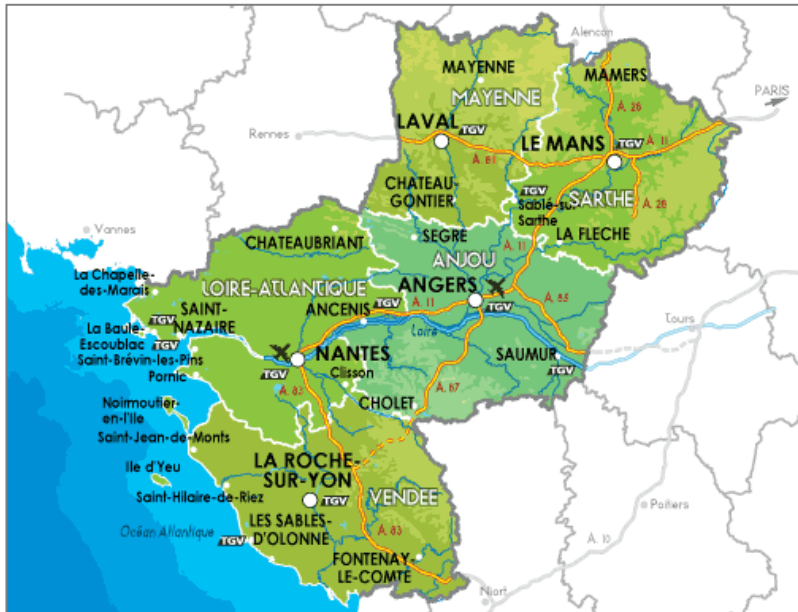
² <http://ores.paysdelaloire.fr/>

Industrial profile

An ever increasingly attractive region sustained by a diversified economy

Bordering the Atlantic Ocean and four other regions (Britany, Normandie, Centre, Nouvelle-Aquitaine), Pays de la Loire is the eighth largest French region, with a surface of 32,082 km². It is divided into five 'départements' (counties) (Loire-Atlantique, Vendée, Maine-et-Loire, Mayenne, Sarthe). The region's territory is articulated around its major city (Nantes), one central urban and industrial axis (spreading from Saint-Nazaire to Angers and Le Mans, including Nantes), a constellation of medium-sized cities evenly spread across the territory (for example Laval, Cholet, La Roche-sur-Yon, Saumur, Châteaubriant) and rural areas.

Figure 1: Région Pays de la Loire



Pays de la Loire had 3.71 million inhabitants in 2015, representing 5.5% of France's total population (INSEE, 2015). Its population density is about 110p/km² at NUTS 3 level (France's average population density is about 98.8p/km²). The demographic growth of 0.8% per year since 2011 is higher than France's average of 0.5%, supported by an increase in birth rates (high fertility rates: 2.1 births per woman on average in 2011, France's highest figure) and migration flows, reflecting the attractiveness of the region. According to projections of the French Statistical Office (INSEE), the region will have 900,000 additional inhabitants by 2040, France's biggest demographic rise after the Île-de-France and Rhône-Alpes regions.

The active population is increasingly concentrated – due to strong economic growth to the west of the Châteaubriant-Cholet-Luçon arc – on the littoral and in the cities of Nantes and La Roche-sur-Yon. With a growth in employment of 25% in 20 years (compared to 16% for France), the region was home to more than 1.5 million employees in 2014, employed across 305,000 enterprises and public organisations.

The industrial port complex of Nantes-Saint-Nazaire plays a crucial role in the economic development of the region. It represents a total workforce of 24,400 employees, 7,700 of which work in the maritime industry, while the remaining 16,700 work in industry or service activities linked directly to the port's activity (INSEE, 2015).

Pays de la Loire is one of nine French regions that rank among the 50 biggest EU regions in terms of gross domestic product (GDP) (RIM base profile). In 2014, the regional GDP amounted to €106.5 billion, representing 5% of France's total.

GDP per capita reached €28,800 in 2014, about 10% below the average for France (€32,200) and about 5% above the EU28's average (€27,500) (EUROSTAT).

The region also stands out thanks to its overall good economic performance and its swift recovery from the economic crisis (Technopolis Group, 2016, RIM Report, Pays de Loire). Between 2007 and 2013, the region Pays de la Loire registered an annual average growth of 1.56%, higher than France's and EU28 growth over the same period (1.34%, and 1.16 % respectively, Eurostat). The region already returned to its pre-crisis GDP in 2011. Following a 3% recession in 2009 and neutral development in 2010, its GDP grew by 4% in 2011, two percentage points above the national average. The productive capacity is structured around medium-sized companies (between 50 and 500 employees) engaged in subcontracting industrial orders, flexible enough to innovate but not always strong enough to develop and export (Montaigne Institute, 2015).

Even though the 2008 crisis negatively impacted Pays de la Loire's socio-economic indicators, the rise in unemployment, from 5.5% in 2008 to 9.1% in the second semester of 2015, was one percentage point below the national average. Unemployment in Pays de la Loire is lower than the French average (8.4% in Pays de la Loire in 2016 compared to 9.6% at the national level) (ORES Pays de la Loire, 2015). This unemployment rate is the lowest of all French regions. This performance is explained by Pays de la Loire's diversified economy and industries, recent reorganisation of its productive capacities, and servitisation in added-value market niches, notably business and financial services. Employment in the service sector grew by 1.1 million jobs in 2015 in Pays de Loire, to make up 78.9% of total employment in the region, due to the dynamic banking and insurance sector, while the number of jobs in agriculture and industry decreased.

Even if declining, employment in industry remains high, at 16.1% of the workforce in 2015, about 1 percentage point higher than the average for the EU28. Nationally, the region ranks first in business creation. Pays de la Loire is characterised by more fixed-term or part-time jobs than the national average.

Regional industry has recently witnessed an important shift of the workforce. Post-graduates (all sectors regionally) are underrepresented (their share is relatively lower than at national level as percentage of the total workforce) (ORES Pays de la Loire, 2015) whereas the holders of lower qualifications (levels IV and V in ISCED classification) are strongly represented in the active population, consistent with the significant weight of industry in the economy. However, the shift from declining low value-added sectors (agriculture, maintenance industry) towards customised high value-added sectors requires specific competences: today, high-technology skills and know-how constitute a regional competitive advantage, as the region ranks third in France for its level of employment in high-tech industries and knowledge intensive services (with a 4.7% share of the French total in these sectors).

Table 1: Key socio-economic indicators for the Pays de la Loire region

Demography			
	2015	Evolution (2011-2015)	EU28 (last year available)
Number of inhabitants	3716068	1%	508450856
Population under 30	36%	0%	33%
	2014	Evolution (2010-2014)	EU28 (last year available)
Inhabitants per km2	115.4	1%	116.7
Economic Profile			
	2014	Evolution (2010-2014)	EU28 (last year available)
GDP (in million euro)	106572	2%	13959739
Number of enterprises in manufacturing (Number of local units)	15623	2%	N/A
	2015	Evolution (2011-2015)	EU28 (last year available)
Employment - Percentage of population	68%	1%	66%
Unemployment - Percentage of population	9%	2%	9%
Share of employment in manufacturing	16%	-2%	15%
Share of employment in high and medium high-technology manufacturing	5%	0%	5%
Share of employment in high technology manufacturing	1%	-6%	1%
Share of employment in knowledge intensive services	43%	0%	39%
	2013	Evolution (2009-2013)	EU28 (last year available)
Share of gross value added at basic prices - Industry	18%	0%	19%
Share of gross value added at basic prices - Manufacturing	16%	-1%	15%
Share of gross value added at basic prices - Agriculture, forestry and fishing	3%	3%	2%
Share of gross value added at basic prices - Construction	7%	-1%	5%
Share of gross value added at basic prices - Services	72%	0%	74%
Human capital			
	2015	Evolution (2011-2015)	EU28 (last year available)
Persons with tertiary education (ISCED)	35%	5%	33%
Persons employed in science and technology	33%	2%	31%
Persons with tertiary education (ISCED) and employed in science and technology	21%	4%	21%

Disclaimer: This working paper has not been subject to the full Eurofound evaluation, editorial and publication process.

Participation rate in education and training (last 4 weeks) - %	20%	37%	11%
Innovation performance			
	2013	Evolution (2009-2013)	EU28 (last year available)
SMEs introducing product or process innovations as percentage of SMEs			
R&D expenditure : Business enterprise sector (% of GDP)	1%	0%	1%
R&D expenditure : HERD + GOVERD (% of GDP)	0%	2%	1%
	2012	Evolution (2008-2012)	EU28 (last year available)
Patent applications to the EPO by priority year per million inhabitant	60.3	-2%	70.4
High-tech patent applications to the European patent office (EPO) by priority year per million inhabitant	7.2	-4%	14.3

Source: Technopolis Group based on Eurostat data, 2016

In the nineteenth century, metallurgy and shipbuilding industries renewed the Loire estuary's old agricultural economy. Capitalising on its history and location, Pays de la Loire then specialised in key economic sectors – such as the leather industry, textile, agriculture and food-processing industry, plastic industry – while sea-related activities also flourished, such as fishing, aquaculture, tourism, ports and offshore renewable energies. Benefiting from the presence of large players purchasing industrial products (such as Airbus or STX), the region developed its shipyards, aeronautics, motors and automotive industries.

The port historically hosts shipyard and floating structures manufacturers, and more recently aeronautics and emerging industries have arrived. Deeply impacted by the economic crisis, which reduced traffic in the port, it is now investing massively in the emerging renewable marine energies sector as per the regional investment plan to modernise intermodal infrastructures in the port.

The Pays de la Loire region still lags behind national standards in terms of research and innovation performance. Indeed, the latest consolidated data available at regional level show that in 2013 the region's overall expenditure on R&D contributed just 2.71% (€1.29 billion) of the French total, well below its share of GDP (5.1%). Regional R&D expenditures as share of regional GDP (1.22%) remain one percentage point below the national average (2.24%) (ORES Pays de la Loire, 2016) and the EU28 average (2.03%). The trend is nevertheless positive, with total regional R&D expenditure (GERD) rising by 36% between 2008 and 2012, which is more due to the rise in public R&D expenditures (+50%) than in private R&D expenditures (+30%). R&D employment in Pays de la Loire (13,877) represents 3.32% of the French total. In 2012, the region registered 502 requests for patents, ranking sixth among French regions. The local research and development system is business-dominated (in 2013 the business share of R&D expenditures amounted to 64.8%, in line with the national average of 64.7%) (Technopolis Group, 2016, RIM Report Pays de la Loire).

The 2012 Community Innovation Survey highlights the dynamism and innovative behaviours of regional enterprises (INSEE, 2012, Community Innovation Survey in Pays de la Loire): 52.3% of enterprises with 10 to 249 employees say they have developed an innovation in a broad sense (product, processes, internal organisation), which is higher than the national average of 51%. This share reaches 57.2% among regional manufacturers and 65.2% among service providers. It also increases with the size of the company: it concerns 44% of companies from 10 to 19 employees, 53%

from 20 to 49 and 67% from 50 to 249. However, companies with 10 to 19 employees innovate more than in other regions.

Innovation strategies vary according to economic sectors. In the metallurgy sector (which traditionally has low levels of R&D spending), regional SMEs swiftly shifted from an offensive innovation strategy – aiming at improving and/or developing new products/services and entering new markets (including export markets) – towards a more defensive innovation strategy, focused on improving productivity (reduce running and supply costs, improve organisational flexibility) in the midst of the economic crisis (INSEE, 2015).

In the sectors of machinery, equipment and transport material production, however, which are particularly active in advanced manufacturing, companies aiming to penetrate new markets adopted offensive strategies by differentiating their offer through non-price criteria, most often related to technological innovations allowing the introduction of new products and services, improving quality and developing competences. These sectors witnessed a substantial rise in the overall share of innovative companies (from 58.4% in 2008 to 62.2% in 2012), with a very high share of technological innovation (from 47.2% in 2008 to 53.6% in 2012) (Technopolis Group, RIM Report 2016).

Leading industries and emerging sectors sustained by a dynamic collaborative network

Pays de la Loire is the third-ranked industrial region in France, with industrial activities producing 17.9% of regional added value. Thanks to a dense and diversified production basis, industry accounted for 18.3% of GDP and 16.1% of employment in 2013, representing a workforce of 253,300 employees, against respectively 14.0% and 12.5% on average in France (ORES Pays de Loire 2016).

Among manufacturing industries, the agri-food industry is the most important sector, including a number of market leaders (FleuryMichon³, Pasquier⁴, Sodebo⁵, Tipiak⁶). Other prominent industrial sectors are aerospace, military and civil maritime industry, mechanical and equipment material, metallurgy and electronic material. The civil maritime industry represents 4.1% of the wealth generated by regional companies while only representing 1.9% of its workforce. Bénéteau (leisure shipyard) and STX (cruise shipyard) are two world leaders located in Pays de la Loire.

Concentration of manufacturing industries in a number of areas is a key characteristic of Pays de la Loire: 40% of the available workforce is located in La Ferté-Bernard, Sablé-sur-Sarthe, Les Herbiers and Segré.

³ www.fleurymichon.fr

⁴ www.pasquier.fr

⁵ www.sodebo.com

⁶ www.tipiak.fr

Table 2: Overview of key manufacturing value-chains related indicators of Pays de la Loire

Value-chain	Indicator	Value
Agri-food	Number of companies	2,600 (2013)
	Number of employees	52,700 (2013)
	Share of the national employment	13% (2013)
	Share of the regional industry employment	25% (2013)
	Share of the regional employment	3.5% (2013)
Electronics	Number of companies	260
	Number of employees	15,000
	Share of the national employment	6%
	Share of the regional industry employment	7%
	Share of the regional employment	2%
Marine renewable Energy	Number of companies	NA
	Number of employees	1,000 (forecast)
	Share of the national employment	NA
	Share of the regional industry employment	NA
	Share of the regional employment	NA

Maritime industry	Number of companies	167
	Number of employees	3,700
	Share of the national employment	18,1%
	Share of the regional industry employment	3%
	Share of the regional employment	1%
ICT	Number of companies	1,971
	Number of employees	35,200
	Share of the national employment	5%
	Share of the regional industry employment	3.2%
	Share of the regional employment	2.2%
Robotics	Number of companies	60
	Number of employees	1,500
	Share of the national employment	NA
	Share of the regional industry employment	NA
	Share of the regional employment	NA
Aeronautics	Number of companies	111
	Number of employees	14,000
	Share of the national employment	4.5%
	Share of the regional industry employment	6.6%
	Share of the regional employment	0.9%

N/A = no information available

Source: Technopolis Group 2016, based on data displayed on ORES Pays de la Loire 2017, NACE level data not available; Agrifood: Source greste, Draaf, Insee 2013; Electronics: Source Acooss 2015; Maritime industry (construction and repair of boats, naval demolition, equipment, transformation of boats): Source Acooss 2015; ICT (Consulting, Ingeniering, ICT training, infomanagement, telecommunication, commerce, software editing, internet, ICT construction): Source Acooss 2015; Robotics: Source ADIT 2016; Aeronautics: Source Astrée Base 2013

The region can also rely on a dynamic digital sector, with excellence competencies in the fields of software engineering, data models and virtual and augmented reality, developing dedicated applications for the manufacturing sector and designing new digitalised production systems (from

design to production). The Industrial Centre for Virtual Reality (CIRV) in Saint-Nazaire⁷ is one of the main R&D players in the field.

Three main features characterise the regional industrial fabric:

- Pays de la Loire's industrial sector is characterised by a few large, internationally leading firms coupled with a dense network of local suppliers. The most preeminent industrial firms actively involved in advanced manufacturing in Pays de la Loire include: DAHER Aerospace in Saint-Nazaire (Aircraft manufacturer), STX France in Saint-Nazaire (formerly Alstom marine until 2006, shipbuilder), Bénéteau (yachting), Auto Chassis International in Le Mans (subsidiary of Renault specialised in design, validation and fabrication of chassis), Airbus in Saint-Nazaire (assembly, testing and equipping of plane front and centre fuselages), Manitou France in Ancenis (machinery for handling and agriculture), Mecachrome France in Amboise (high-precision machinery), Europe Technologies (Loire Atlantique), Valeo systèmes thermiques in Laval (thermal system to reduce vehicle consumption), Man Diesel and Turbo France in Saint-Nazaire (motors), SAH Leduc in Ligné (building and repair of hydraulic cylinders) (Technopolis Group, 2016, RIM Report Pays de Loire). According to local decision-makers, these leading industries aspire to play a pioneer and leading role on global markets, by differentiation through product and process innovation, positioning themselves at the vanguard of smart production systems.
- Regional companies in Pays de la Loire favour cooperation and strategic alliances with local market players rather than academic partners (INSEE 2012, Community Innovation Survey in Pays de la Loire). Indeed, almost two thirds of companies which introduce innovations through cooperation estimate that collaborations with market partners (providers, clients, competitors or consultants) are the most important ones. This propensity is greater in industry (66%) than among service providers (53%) (INSEE 2012, Community Innovation Survey in Pays de la Loire). According to the Community Innovation Survey performed by INSEE (2012) 9% of regional companies consider their direct competitors as potential partners, against 6% in the rest of French regions. Only 35% of cooperating companies are seeking partners internationally. These figures are an illustration of the region's strong cultural heritage favouring local cooperation, as well as the importance of regional industry associations, business clusters, and innovative clusters (the so-called 'poles of competitiveness') in fostering collaborative innovation.
- The regional industrial fabric is characterised by overall low levels of internationalisation. In 2013, Pays de la Loire was the ninth French region in terms of export value, representing 4.3% of France's total exports, whereas the region ranks third as industrial region in France, and fifth in terms of GDP. While the regional economy can rely on diversified industrial sectors, paradoxically some of the most dynamic sectors (notably aeronautics and food processing) are not sufficiently export-oriented: the regional authorities have identified the structure of the productive capacity, dominated by medium-sized family-owned original-equipment manufacturers that often lack an 'international culture' (Regional Council, 2013, Regional plan for internationalisation of regional companies 2013/2015) as a major barrier to internationalisation.

The region exports mostly agri-food products, parts for the automotive, shipyard and aviation industries, and machinery. Export rates vary widely across industrial sectors, having been higher than 40% for more than six years in the sectors most active in advanced manufacturing, including machinery and equipment production (50.8% in 2013), electrical and electronic equipment and components (44.6% in 2013) and production of transport material (39.4% in 2013) (ORES Pays de la Loire 2016).

The region imports mostly pharmaceutical products, raw materials (construction, wood, chemical products for plastics, rubber) and energy products. In 2013, the trade deficit amounted to €4.9 billion, most of which is due to the import of energy products for major refinery sites (Donges, Cordemais) (ORES Pays de la Loire 2016). The latest trends in external trade highlight a sharp fall in exports and

⁷ <http://www.technocampus-smart-factory.fr/fr>

imports following the crisis of 2009, followed by a fast recovery from 2011 to 2013 and stable levels of exports and imports in 2014 and 2015.

The latest industry sales figures provide rather optimistic perspectives in Pays de la Loire. According to a survey of CEOs performed in November 2015 by the Bank of France, following a sharp decline from 2011 to 2013, industrial production has been growing since 2013, driving the post-crisis recovery thanks to a reduction in raw material and finished products' prices. Short-term forecasts are also positive. Some major achievements confirm this positive tendency, including record orders for Airbus in 2015, the order of two giant ocean liners and four ferries for STX, the implantation of EON (world leader in the field of 3D interactive applications) in Laval, and about €1.5 million worth of new orders for SMEs involved in the emerging Neopolia business cluster dedicated to Marine Renewable Energy.

Uptake of advanced manufacturing

Since the mid-2000s, Pays de la Loire's Regional Council has focused on advanced manufacturing. Regional stakeholders from both the public and private sectors became aware of the threat of wide-scale deindustrialisation imposed by increased international competition as a result of the announced restructuring plans of major regional industrial employers like Airbus and Alstom.

Against this background, in order to preserve its industrial capacity on its territory, Pays de la Loire had to upgrade its productive system and become more competitive through differentiation on quality and on extra-cost criteria. Advanced manufacturing was then seen as the opportunity for regional authorities to capitalise on the region's know-how in the manufacturing of large-scale infrastructure, machinery and manufacturing production systems in the shipyard and automotive sectors, and also to enter into emerging markets such as marine renewable energies (MRE).

To date, regional public and private actors have concentrated on the design and integration of complex parts and structures and the development of innovative manufacturing processes (such as developing disruptive technologies for the implementation of new materials, composites, metal and hybrid structures) (Regional Council Pays de la Loire, 2012, Regional strategy of Innovation); as well as the design and regional implementation of the national strategy 'Industry of the future' (see section 0).

The research competencies dedicated to advanced manufacturing are mainly concentrated in medium-high-tech sectors around a number of key clusters and research centres in the region's traditional mid-tech industries, most prominently in the aerospace, marine, rail, transport, and raw material and energy products sectors, in and around the Nantes Saint-Nazaire area. Examples for respective research infrastructures are the competitiveness cluster EMC2 (innovative cluster for advanced manufacturing technologies, which includes as members the larger regional manufacturers and their sub-contractors), the Institute for Technological Research Jules Verne (IRT) and three 'Technocampus', that is technological platforms (see section 0 for details). The ambition is to exploit the potential of geographic concentration arisen from a historical dense network of collaboration between local original equipment manufacturers in industries directly concerned with the technological challenges related to advanced manufacturing techniques. All these stakeholders (EMC2, IRT Jules Verne, Technocampus) were grouped in 2015 under the same umbrella and branded 'The Jules Verne Manufacturing Valley'.

Pays de la Loire plays a central role within the national plan 'Industry of the Future'. As an example, in 2016 the national Alliance for the Industry of the Future has designated the factory of Daher in Nantes as a 'flagship technological model'⁸, which highlights the potential for inter-regional cooperation with market leaders in other industrial sectors.

⁸ Another laureate is the DIGI IO project launched by the SNCF (national railways) at its industrial technical centre in Oullins, close to Lyon, which introduces smart systems (internet of things, robotics, 3D printing) to improve rail maintenance. Gaz Liquide, world leading supplier of industrial gases and related services, was also rewarded for the "Connect" project, a €20 million investment plan to create a highly innovative control centre in the area of Lyon that guarantees real-time control over production processes.

Challenges for the future of manufacturing

One key for the region's industrial success is the creation of framework conditions for collaboration among regional actors in order to create a regional innovation value chain in advanced manufacturing techniques. The design and the creation of industrial pilot lines and demonstrators in advanced manufacturing are also the key to mitigate risk and spread the diffusion of these advanced manufacturing techniques across industrial sectors. Linked to these strengths, and as stated in the Regional Innovation Monitor plus 2016 report⁹, possible opportunities and challenges for the future of manufacturing in Pays de la Loire are:

- Increasing the regional outreach of the Jules Verne Manufacturing Valley in a variety of industrial sectors, relying on its core members EMC2 and IRT Jules Verne.
- Consolidating the position of Pays de la Loire as an innovation-hub of advanced manufacturing, and enhance cooperation with the renowned centres from other regions in France (as other centres in France are considered to have an important track record of experience and relatively high potential in specific research topics related to Industry 4.0 and smart systems). Consolidating the existing potential in key regional sectors should go hand-in-hand with long-term partnerships with other leading French regions. This can create synergies in a wider array of industrial sectors, so that Pays de la Loire can further develop a critical mass of SMEs in the area of advanced manufacturing technologies.
- Engaging regional firms in global value-chains through strategic cooperation with other French and European regions, and participation in EU-funded programmes, notably Horizon 2020 and European networks such as the Vanguard Initiative¹⁰. Through this initiative, Pays de la Loire aims to modernise traditional sectors towards future-oriented industries and focuses on entrepreneurial innovation.
- Overcoming the region's structural weakness in R&D spending. Regarding private R&D spending, this requires a balance between the necessity to focus R&D spending on a limited number of promising areas of activity on which the region can build its competitive advantages, and the need to guarantee the spread of innovation throughout all regional economic sectors. As for public R&D spending, beyond the region's leading universities, the region's local public research landscape remains structurally weak, and is concentrated in a limited number of major projects. In the less innovative areas of the regional economy and in less developed sub-regions, universities of applied science play a supporting role in the R&D projects, which, however, needs to be further developed.
- Increasing innovation within SMEs by fostering the integration of SMEs into European R&D collaborative projects and increasing the participation of SMEs in regional clusters and the outreach of regional clusters support measures (for instance, individual and collective support for access to funding, development of international activities, etc.).
- R&D concentration in a limited number of industries may weaken the region's ambition to generate technological cross-fertilisations with the 22 sectors identified in the regional smart specialisation strategy. In the medium to long term, other regional sectors may see their competitiveness weakened as a result of a missed opportunity to introduce advanced manufacturing techniques and the technological or business model transformations they imply. This challenge is currently being addressed with notable initiatives, such as the opening of another Technocampus in Le Mans and the animation of the dense network of Regional Innovation Platforms.

⁹https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/sites/default/files/report/2016_RIM%20Plus_Regional%20Innovation%20Report_Pays%20de%20la%20Loire.pdf

¹⁰ <http://www.s3vanguardinitiative.eu/>

- Supporting the upgrade of regional workforce skills to trigger innovation within enterprises and support the regional shift of industrial and services activity towards higher added-value activities and the emergence of more innovative sectors, in connection with the Competencies 2020 plan (regional strategy for job and skills forecast management) and the six key specialisations priorities of the Smart Specialisation strategy 2014-2020 (see next section).

Industrial policy objectives

The scope and objectives of the regional industrial policy

Historically, industrial policies in France were top-down and vertical in the sense that policies were drafted at state level and targeted industrial value-chains. As an inheritance of a highly centralised political, economic and administrative system, France applied a model combining industrial protectionism, currency devaluation, nationalisation of industries, granting of subsidies, and setting up of public contracts (state-guaranteed orders). With the opening of markets and globalisation, this model became obsolete. From 1980, French governments believed that the state should not intervene if not to support the free market, thus they consciously chose to divest from the industry and manufacturing industries. The government launched a wave of privatisation and developed competition and deregulation policies in the 1980s. From 1980 to 2004, at the peak of deindustrialisation, French industry lost about a third of its jobs (1.5 million) and industry's contribution to GDP decreased from 30% to 20%. During this period, state policies concentrated on mitigating the impact of deindustrialisation rather than focusing on reinventing industry and a new productive model. These national policies, or absence of support, had profound negative impacts on regional manufacturing industries throughout the whole of France.

From the early 2000s, state intervention as well as a vertical approach gained a new momentum as the country continued to face an industrial crisis and mitigation measures undertaken were not effective enough. The national industrial policy laid on a vertical and sectorial logic, aiming at supporting the most affected sectors of the economy (Laurent Musine, BSI Economics, 2013). One of the first and most emblematic state interventions illustrating the drastic change in French industrial policy is the Alstom case¹¹ in 2004: by then this second leading global company for train transport and naval construction was close to bankruptcy; French authorities convinced the European Commission and financially supported the technologically diversified conglomerate with €3.2 billion, of which €800 million came from the state.

In 2005, the Beffa report (2005) drew acknowledgement of the importance of industry for France's economy. In reaction to this report, the state formalised (the same year) a totally revised industrial strategy and set up a new economic framework (Direction Générale du Trésor et de la Politique Economique, 2005) targeting SMEs and technological innovation, the so-called New Industrial Policy (Ministère de l'économie, 2005) to address France's industrial decline.

Since 2004 French regions have the mandate to be strategic leaders of the regional economic development policy¹². While from one region to another, the importance of industry within the regional economic development policy varies, for the Pays de la Loire region, the industry topic is a key to its economic development policy.

Even though there is no such thing as a 'industrial policy' defined at the regional level, the Pays de Loire industrial policy has to be understood within the broader framework of regional economic development policy described in its three successive economic development strategy documents since 2006 (2006-2011, 2011-2016, 2017-2022, see Table 3). While there has been a real continuity in

¹¹ In 2003, the Alstom Group, which has been in poor financial health since its initial public offering in 1998, was facing a liquidity crisis that led it right into bankruptcy. Forced to repay defective gas turbines, the manufacturer of the TGV was close to bankruptcy, with €1.4 billion in losses and a debt of €5.3 billion. A first rescue plan was drawn up by Economy Minister Francis Mer, but this plan was blocked by Brussels in September 2003: the European Commission was opposed to the state taking a direct shareholding in Alstom on behalf of respect for competition. In March 2004, Nicolas Sarkozy made Alstom his priority. After lengthy negotiations with the European Commissioner for Competition, Mario Monti, a new rescue plan for partial renationalisation was accepted on 7 July 2004.

¹² France engaged into a first decentralisation process in 1982-1983. The new 2004 Act increased the responsibility of the local and regional authorities. Then, a third step has been made in 2014 (merger of regions) and 2015 ('Loi NOTRe') giving to the Regional Authorities full leadership (vis à vis the 'département', the metropolitan areas, and the cities) on regional economic development, innovation, and export policies.

policy design over the last 10 years, Pays de Loire has put more and more emphasis on innovation (triggered by national and European policies) and, more recently, on internationalisation so as to support the regional industry overcoming its challenges (see paragraph 1.4). There is a consistency in the priorities selected and a constant attention paid to the industrial sector. The region’s industrial policy objectives are focused on:

- Networks and SMEs within networks with the aim to reinforce collective dynamics in value-chains (fostered by the national competitiveness cluster policy in particular)
- Innovation as the key tool to address the challenges of a transforming economy, which has been emphasised in most policy document developed since the mid-2000s (in particular, the regional innovation strategy smart specialisation SRI-SI)
- Internationalisation of value-chains and exports.

These policy objectives are in line with the challenges faced by the industrial actors in Pays de la Loire (see 1.4) as they insist on strengthening the industrial regional value chains, on being better included in the global value chains, and on strengthening industrial actors research and development activities to be more competitive.

The following table presents the key policy documents, both regional and national, in which the principles of Pays de la Loire’s industrial policy are outlined. The main documents are discussed in the following paragraphs.

Table 3: Key policy documents

Policy document	Brief overview
National Policy Documents	
J. L. Beffa (2005), For a New Industrial Policy (<i>Pour une Nouvelle politique industrielle</i>)	This policy document advocated the relaunch of a national industrial policy and state intervention in the industrial sphere targeting in particular large public-private R&D programmes that are able to reorganise industrial sectors as a whole.
Ministry of Economy, Phase 1 (2005-2008), Phase 2 (2008-2012) Competitiveness clusters Policy (<i>La Politique des pôles de compétitivité</i>)	This policy is embedded in the ‘New Industrial Policy’. The document details measures to promote a favourable environment to SMEs and innovation through competitiveness clusters.
Ministry of Economy, New Phase (2013), Competitiveness cluster Policy (<i>La Politique des pôles de compétitivité</i>) 2013-2018	The document details the measures to promote a favourable environment for SMEs and innovation through the support to 71 thematic poles of competitiveness (innovative clusters) and R&D collaborative projects between SMEs, large companies and research institutions. The 71 poles cover the following manufacturing and technological sectors: automotive, aeronautics, energy, biotech, medical devices, digital, environmental technologies, advanced manufacturing.
Ministry of Productive Recovery, (2013), The New Industrial France (<i>La nouvelle France industrielle</i>), Ministry of Productive Recovery, 2013-2030 revised in 2015 and renamed Ministry of Economy and Finances, (2015), The New Industrial France: building the Industry of the Future (<i>La nouvelle France industrielle: construire l’industrie du Futur</i>) 2015-2030	States 3 priorities, 34 plans and 7 ambitions for innovation for a time horizon up until 2030. In its revised version, states the ‘Industry of the Future’ as a priority and targets nine others which were selected through a thorough analysis of the global position of France on each of these markets: the data economy, smart ‘objects’, digitalisation, smart food, new materials, sustainable city, ecological mobility, medicine of the future, smart and sustainable transports

Regional Policy Documents	
Regional council Pays de la Loire (2006), Regional scheme for economic development, <i>Schéma régional de développement économique</i> (SRDE) 2006-2011	<p>Organisation of regional stakeholders in the field of economic development. Eight policy orientations are mentioned:</p> <ul style="list-style-type: none"> • Fostering value-chains / sectors dynamic • Safeguarding economic balance in regional sub-territories • Fostering internationalisation • Improving territorial marketing • Supporting Innovation • Supporting the creation and transfer of very small businesses • Developing the social economy • Coordinating the economic policy among various actors
Regional Council of Pays de Loire (2011), Regional Plan for a Sustainable Economy and Employment (SREED) 2011-2016	<p>Includes support measures designed to mitigate the 2008 crisis and preserve the industrial and employment fabric</p> <ul style="list-style-type: none"> • Reinforce collective dynamics in value chains, anchored in territories • Propose to SMEs an individual pathway to innovation in a context of a changing economy • Support men and women to succeed in their careers through an adequate education, life-long learning, and wellbeing at the workplace • Support tourism, food industry and agriculture, maritime economy, and social economy
Regional Council of Pays de Loire (2013) Regional Plan for Internationalisation 2013-2015	<p>The document includes measures to support two priorities:</p> <ul style="list-style-type: none"> • Sensitising new exporting companies to the challenges of internationalisation • Structuring the approach of exporting companies for sustainable internationalisation
Regional Council of Pays de Loire, (2014), Regional Innovation Strategy for Smart Specialisation in Pays de Loire (SRI-SI) 2014-2020	<p>Includes priorities of the innovation strategy of Pays de Loire in the light of the actual challenges of innovation policy</p> <ul style="list-style-type: none"> • Continue catching up in terms of capacity for research and technological development • Experiment with new approaches and forms of innovation and accompany the dissemination of a culture of change • Accelerate changes in the industry • Achieve the energy transition • Develop, disseminate and appropriate digital tools
Regional Council of Pays de Loire, (2014), ERF/ESF Regional Operational Programme 2014-2020	<p>The objective of the ERDF/ESF Operational Programme (OP) is to increase the competitiveness of the region and the well-being of its inhabitants through sustainable development. Two of the six priorities are dedicated to supporting industry in Pays de Loire (Priority 1 on Innovation and 3 on Competitiveness). A total of 67% of funds are dedicated to SMEs, innovation and the sustainable energy transition, and 37% of funds are dedicated to Priority 1 and 3.</p>
Regional Council of Pays de Loire (2017) Economic, Innovation and Internationalisation Development Strategy for 2017-2022 (SRDEII)	<p>Defines the regional economic development policy, the policy priorities:</p> <ul style="list-style-type: none"> • Spur the development of the SMEs of the future • Use the economic transformation as a driver for change in production • Ensure that training and education guarantee the jobs of tomorrow • Use territorial specificities as leverage for growth

Source: Technopolis Group 2016, key national and regional documents

The national competitiveness cluster policy

At national level, in a context of growing structural deficit in the competitiveness of French industry, France returned to state intervention in the industrial sphere. In 2005 the government adopted a New Industrial policy marked by a vertical approach and developed measures to promote innovation and reorient R&D to high-tech sectors (such as ICT or biotech).

While innovation actors were working in silos, the ‘competitiveness clusters policy’ was initiated by the Inter-Ministry Committee for Territorial Development in early 2005 with the aim to mobilise key competitiveness factors, notably innovation capacities, as well as to foster growth and employment around key sectors and value-chains. This cluster policy considered innovation as a vehicle for growth and as such set three main objectives:

- Increasing innovation through networking, development of synergies and collaborations between SMEs, research institutes and training institutes in targeted territories;
- Sustaining and developing innovative and creative activities, generating employment and added-value on territories;
- Improving the attractiveness of these territories and, more generally, competitiveness of the industrial sector, with an enhanced international profile.
- The above policy initially covered the 2005-2008 period, and has been renewed twice since 2008. In its second phase (2008-2012), the policy completed the initial approach with three pillars:
- reinforcing the strategic management of the competitiveness clusters;
- financing large projects in addition to standard R&D projects funded under the Single Inter-Ministerial Fund – FUI, see section 0) and innovation platforms;
- and reinforcing the development of innovation and growth ecosystems.

In its latest version (2013-2018) the competitiveness cluster policy supports 71 thematic clusters and R&D collaborative projects between SMEs, large companies and research institutions. The 71 clusters cover different manufacturing and technological sectors such as in automotive, aeronautics, energy, biotech, and medical devices, digital, environmental technologies, advanced manufacturing. Capitalising on its past and current industrial dynamism, Pays de Loire has strived to obtain the national recognition of nine competitiveness clusters as described in section 0, of which one is particularly dealing with advanced manufacturing (EMC2). For SMEs, this entails access to business support, integration into local value-chains by facilitating access to end markets and to intermediary markets, linking to research and higher education as well as life-long education. For Pays de la Loire, it clearly allows to be identified as a leader in the field of advanced manufacturing. The national competitiveness cluster policy document presents three objectives which apply to all clusters, including Pays de Loire’s:

- Building partnerships between SMEs and bigger companies, with recognised and complementary skills;
- Favouring the emergence of strategic collaborative R&D projects which can benefit from public support, notably the Single Inter-Ministerial Fund (FUI);
- Promoting an environment favourable to innovation and stakeholders of the competitiveness clusters by conducting activities to facilitate, pool or support access to private funding, internationalisation, intellectual property, anticipatory management of skills and human resources.

The competitiveness clusters policy was embedded in the New Industrial policy set up in 2005 at the national level and its more recent version named ‘the New Industrial France’ policy (see 2.1.2).

The New Industrial France policy- building the industry of the future

In 2013, French government drafted the ‘New Industrial France’ policy (‘Nouvelle France Industrielle’ - NFI) with the objective to achieve French reindustrialisation by enabling every industrial company to step towards modernisation and digitalisation so as to transform its business model (Ministère de l’Economie et du Numérique, 2014). The objective was to set up action plans to modernise 34 French industrial sectors and gain leadership in the Third Industrial Revolution. Each of the 34 plans focused on a single market (being at times a sector, a value-chain or a product) and was selected based on the potential to contribute to the reindustrialisation of France. One of these 34 plans was called ‘Factory of the Future’.

In April 2015, the ‘New Industrial France’ policy document was reshuffled and amended after political changes in the government. The Industry of the Future programme was launched with the objective to ‘modernise France’s production tools and provide support for manufacturers as digitalisation transforms their business models, organisations and the way they design and market their products’ (Ministry for economy and finance, 2015).

The new version of the New Industrial France policy focused on nine priority targets (instead of 34 plans), the objective of which was to address the overall ‘Industry of the future’ challenge. The nine industrial priorities¹³ were defined as solutions to address major economic and social challenges and accelerate the development of ambitious industrial projects in the following sectors: data economy, smart objects, trust in digital products and services, smart food, new material, smart and sustainable cities, ecological mobility, medicine of the future, and transport of tomorrow.

The new version of the policy was officially launched in Nantes in May 2015, because the regional stakeholders (large companies, EMC2, IRT Jules Verne and others) had been deeply involved since 2013 in the implementation of the national policy at the regional level, taking part in the design of the policy and the R&D collaborative projects promoted by this policy.

The ‘Industry of the Future’ was again first and foremost a strategic exercise that gathered motivated industrial stakeholders. Stakeholders were in charge of defining a strategy and action plans based on identified challenges in the field of transforming and modernising French industry. Relevant projects could be funded with a dedicated €2 billion allocated in the Investment for the Future Programme (PIA). From 2013 to 2016, 1,000 projects were supported, one of the flagship projects being the creation of the 1,000 m² Pays de la Loire ‘smart objects city’ in Angers.

Pays de la Loire Regional Plan for a Sustainable Economy and Employment 2011-2016 and the Regional Plan for Internationalisation 2011-2016

Under the influence of national policies as described, and along with its strategic role in piloting economic development, the Pays de Loire regional council defined a Regional Plan for a Sustainable Economy and Employment (SREED) for the 2011-2016 period. The document combined objectives to support the regional economy, employment, education, innovation and internationalisation with the following priorities:

- Reinforcing collective dynamics in local value-chains
- Engaging SMEs in their pathway to innovation to address the challenges of a transforming economy;
- Supporting men and women to succeed in their careers through adequate education, life-long learning, and well-being at the workplace;
- Supporting tourism, food industry and agriculture, maritime economy, and social economy.

¹³ <http://www.economie.gouv.fr/vous-orienter/entreprise/industrie/nouvelle-france-industrielle>

Throughout the document, the priority is to support the manufacturing sector and notably SMEs included in value-chains or specific sectors and engaging in innovation processes. Pays de Loire more specifically decided to focus on:

- Supporting collaborative projects and strengthening value-chains. One of the flagship initiatives being the cluster Loire Economique Application Valley, a cluster of 75 member firms in 2011 (126 member firms in 2016 and a change of name to West electronic network cluster¹⁴);
- Integrating strategies for innovation, research and higher education. One of the flagship initiative is the IRT Jules Verne (see section 0);
- Roll-out the value-chain policy to the entire economy, and not to only a few sectors;
- Developing eco value-chains towards the Third Industrial Revolution.

Concerning the development of the local economy, Pays de Loire more specifically decided to support:

- Innovation in local value-chains;
- Ensuring a balanced growth of both SMEs and larger companies;
- Developing interregional partnerships and internationalisation of value-chains towards regional performance.

In parallel, Pays de Loire also developed a Plan for internationalisation of its economy in 2013-2015 with the aim to support regional SMEs and companies to export and integrate global value-chains. It sets two objectives:

- Raising awareness about the challenges of internationalisation for new exporting companies
- Structuring exporting companies' approach to sustainable internationalisation.

Regional Innovation Strategy for Smart Specialisation in Pays de Loire 2014-2020 (SRI-SI)

The European Structural and Investment Funds constitute one important source of funding for the Pays de Loire regional economic development policy. Hence, the Smart Specialisation Strategy (SRI-SI) 2014-2020 which was drafted under the ESIF impulse is a key document for the region. It sets priority directions for the economic development of the region through innovation, concretely the development of innovative products and services that are competitive locally, in Europe and globally.

The Smart Specialisation Strategy document builds on a history of mobilisation for innovation and an already performing regional innovation system. Pays de Loire takes into account in this document the national industrial policy, as well as the European policy and the Horizon 2020 programme. The process of identifying smart specialisation areas was based on the provisions of the Regional Plan for a Sustainable Economy and Employment (SREED) as described in section 2.1.3.

A consultation exercise was run in order to draw up an analysis of economic strengths, weaknesses, barriers and opportunities of the region. This allowed the identification of 22 value-chains which, together with the national competitiveness cluster operating in Pays de Loire, are the reference point for smart specialisation. Six sectors were identified as key for the SRI-SI, with at times cross-sectoral or cross-value-chains. Targeted industrial sectors were selected for their current performance and potential for the future, namely: advanced manufacturing technologies, maritime industries (naval and new energies), as well as agri-food and bio-material, the leading economic sectors in the region.

Overall, Pays de la Loire SRI-SI's major objective is to accelerate changes in industry, notably by reinforcing value-chains of the manufacturing sector and promoting leading industries (aeronautic, automobile, railway). While the New Industrial France policy has a dedicated priority for development of interregional cooperation initiatives, the SRI-SI also puts forward interregional cooperation

¹⁴ <http://www.we-n.eu/network/le-cluster/>

initiatives and smart specialisation complementarities, while local value-chains expand beyond Pays de la Loire administrative borders notably to the Brittany region.

A key focus in the SRI-SI is put on innovation in the high-technology sectors, and not on a set of industrial activities. Partnerships are an essential dimension of the projects and innovation is seen as a process of cross-fertilisation and hybridisation across different domains.

The region indeed aims to become a 'European leader in advanced manufacturing for the development and competitiveness of all regional industrial sectors'¹⁵. The ambition is to foster the creation of high tech products by the development of cutting-edge manufacturing technologies with cross-sectorial and transversal applications, which promote efficiency, quality, flexibility, and respect for the environment and humans. Relying on the European definition of Key Enabling Technologies Advanced Manufacturing System (KET AMS)¹⁶, these advanced processes integrate manufacturing systems and associated services, processes, factories and equipment, automation, robotics and collaborative robotics (cobotics), measurement and sensorial systems, and IT systems controlling production processes.

¹⁵ State-Region Pays de la Loire Contract Plan 2013. State-Region Contract Plans are tools for public investments in territories. The new generation of State-Region Contract Plans started in 2015 up to 2020.

¹⁶ AMS encompass the use of innovative technology to improve products or processes that drive innovation, including all production equipment that deploys a KET or any other innovative technology, but excluding the actual production as this is attributed to the individual KETs (De Heide et al (2013); Horizon 2020 (2014), KET, Booster for European Leadership in the Manufacturing Sector).

Table 4: Pays de Loire policy framework

Needs and challenges	Objectives	Policy sources	Outcomes envisaged in policy documents	Expected impacts
<ul style="list-style-type: none"> • At national level • Deindustrialisation • At regional level • Continue increasing R&D and innovation • Weak presence of national public research organisations • Networks and collaborative initiatives to be developed 	<ul style="list-style-type: none"> • At national level • Reindustrialisation • Become a leader in the Third Industrial Revolution • At regional level • Continue catching up in terms of capacity for research and technological development • Experiment with new approaches and forms of innovation and accompany the dissemination of a culture of change • Accelerate changes in the industry, notably in advanced manufacturing technologies, agri-food, bio material • Achieve the energy transition • Reinforce collective dynamics in value chains, anchored in territories • Propose to SMEs an individual pathway to innovation in a context of a mutating economy • Support men and women to succeed in their careers through an adequate education, life-long learning and wellbeing at the workplace 	<ul style="list-style-type: none"> • Government • Policy documents • Economic, employment and innovation strategies 	<ul style="list-style-type: none"> • Pays de Loire becomes a leader in innovation • Pays de Loire becomes a leader in the field of advanced manufacturing • Pays de Loire becomes a leader in the Third Industrial and Agriculture Revolution 	<ul style="list-style-type: none"> • Strengthening of the regional economic development, innovation, and competitiveness, together with employment and education levels

Source: Technopolis (2016)

Links to other policies

Industrial policy (even though it is not titled as such in Pays de la Loire) is strongly linked with land planning policies and infrastructure development policies. Two policy documents deal with the topic:

- the regional scheme for sustainable land planning 2008-2020 (SRADDT): Its objective is to set the scene for all policies that are implemented regionally, whether initiated at local, regional or national level. In particular, the SRADDT adopted in 2008 presents a list of key infrastructures

that are deemed necessary for the development of regional economic activities: the construction of a new airport in Nantes (Notre-Dame des Landes); the high-speed railway between Brittany and Pays de la Loire, highway interconnections and the development of the Nantes-Saint-Nazaire industrial port.

- The regional scheme for infrastructure and transportation (SRIT) selects the priorities for the 2008-2030 period in order to sustain industry goods and material traffic.

Another key policy document is the strategic project 2015-2020 of the Nantes-Saint-Nazaire port which updates a strategy adopted in 2009. The port is defined as an industrial infrastructure and has developed three strategic orientations:

- Being at the core of regional value-chains;
- Ensuring effective and efficient services;
- Ensuring a shared policy oriented towards the sustainable development of the port's geographic zones.

Finally, the Regional Scheme for Higher education, Research and Innovation 2014-2020 (SRESRI, see section 0) addresses the topic of industry but in a limited way. It develops the following objectives tied to the region's industrial policy:

- Supporting the diffusion of the scientific, technical and industrial culture, together with scientific mediation structures and cultural and scientific centres
- Engaging in scientific and academic collaborations and development of Chairs and Master degrees on industry.

The link between the higher education policy and the industrial policy is therefore low and the link between education (primary and secondary education) is even lower. The education policy is a state policy and not a regional policy which can be an explanation for it.

Future plans

Pays de Loire's future plans concerning industrial policy are described in the recently adopted (December 2016) Economic, Innovation and Internationalisation Development Strategy for 2017-2022 (SRDEII, 2016). In this document, the regional council committed itself to supporting its industrial assets, but also to becoming a leader in key technologies of the future, namely robotics, collaborative robotics (cobotics) and additive manufacturing (3 D-printing). It also defines a new ambition for its immediate future, called Pays de la Loire Manufacturing, pursuing the following objectives:

- Supporting centres of excellence expert in innovation and R&D, to network and collaborate in manufacturing;
- Advising SMEs and supporting SMEs and companies to adapt their competences and business;
- Facilitating access to finance for SMEs and companies for essential investments;
- Supporting innovation and development of innovative solutions for manufacturing in Pays de Loire, notably through SMEs facilitated access to innovation clusters that support SMEs' efforts in R&D.

Industrial policy governance

Institutional set-up and responsibilities

Historically, French industrial policy **lies in the hands of different public administrative levels**. France's institutional set up is commonly referred to as a '**mille-feuilles**', the French pastry made of 'thousand layers' of puff pastry. Indeed, a minimum of four layers can be identified as active in this field (from the higher to the lower level of administration):

- the national state level;
- the regional level (Regional Council);
- the departmental level (until 2016 and the NOTRe law, see below);
- local level (cities, agglomerations which are city groupings).

The distribution of competences between the different administrative levels was for a long time in favour of **the state administration**, with the Ministry for Economy and Finances (name as of October 2016¹⁷) being the predominant actor. Over the years, the **regional level gained power** over the state level, in particular in defining the policy orientations of the industrial policy but also in funding and implementing the policy. For instance, the regional and city funding allocated to competitiveness clusters has increased since their creation (mid-2005) to finally exceed the contribution of the state in many French competitiveness clusters as of 2016.

In 2015, the NOTRe law¹⁸ reshuffled the competences in the field of economic development between the various levels of administrative governance, in particular at the regional and sub-regional level. The rationale for this new distribution of competences is that economic development (including innovation, internationalisation of SMEs) should be dealt with better at the local level.

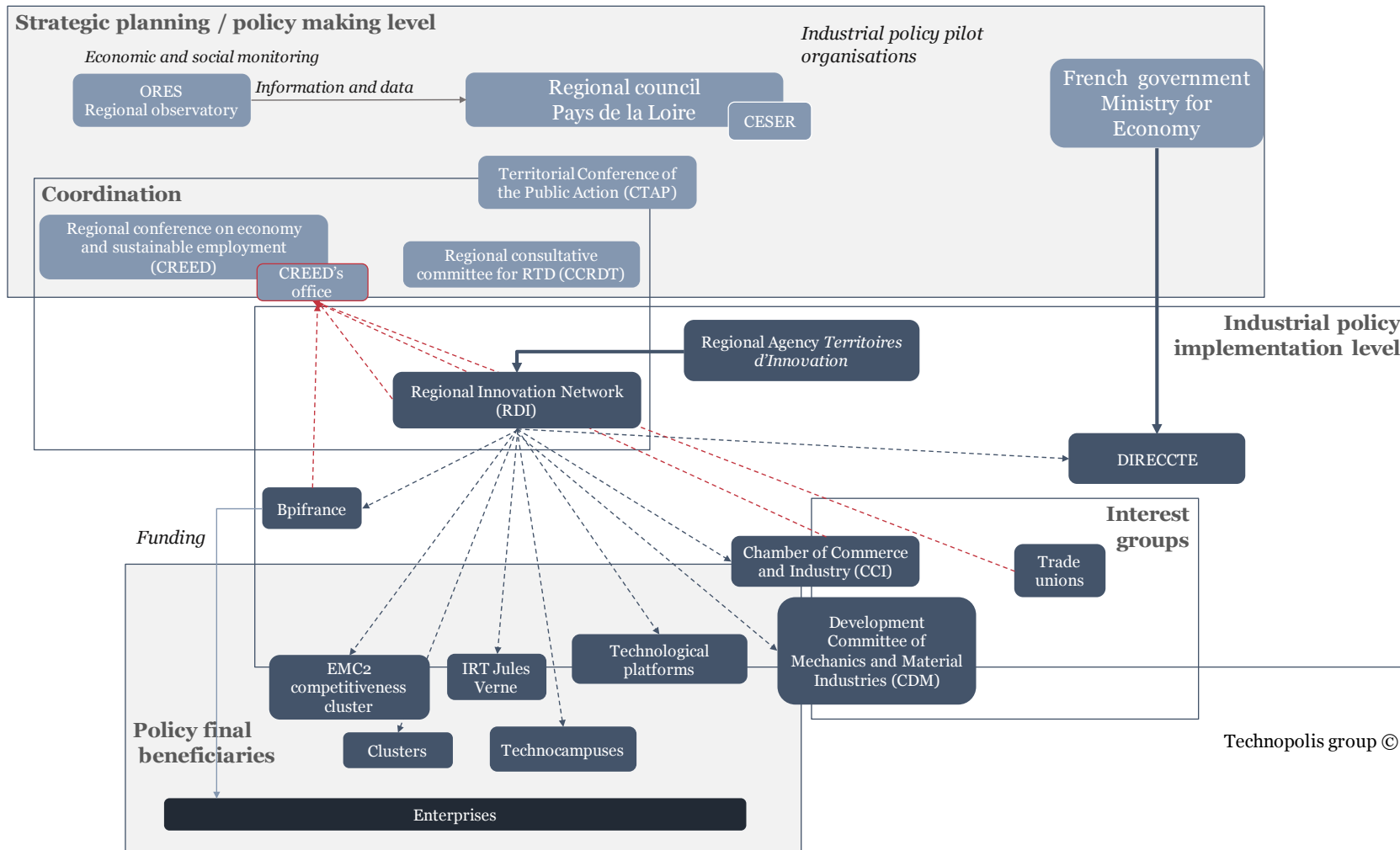
The institutional set-up with actors and their mission is described below:

- Strategic planning / policy making level actors
- Industrial policy implementation level actors (including interest groups). The coordination bodies presented in Figure 2 are described in section "*Policy coordination mechanism*".

¹⁷ The name of the ministry in charge of industry has changed several times.

¹⁸ LOI n° 2015-991 du 7 août 2015 portant nouvelle organisation territoriale de la République

Figure 2: Presentation of key industrial policy actors and stakeholders



Source: Technopolis Group, 2016

Strategic planning and policy making level actors

The policy decision-making and funding in the field of industrial policy lies in the hands of the state administration and the Regional Council, and to a lesser extent with metropolitan authorities. Since the new Decentralisation Act (Loi NOTRe) in 2015, the departments no longer have a formal role in economic development policies. All these actors coordinate their action through different policy coordination mechanisms (informal mechanisms, and formal mechanisms such as committees and contracts as described in section “*Policy coordination mechanism*”).

At the national level, industrial policy returned as a major priority in the mid-2000s (see section 0). A strong stimulus was given in 2005 after the publication of the so-called ‘Beffa report (see section 0). The successive initiatives, such as the 2009 Industry General Conference (*Etats Généraux de l’Industrie*), and the 2013 ‘34 plans for a New industrial France’¹⁹, which then turned into nine solutions for a New Industrial France²⁰ in 2014 (described in section 2), illustrate the weight of the French central government in industrial policy orientation. Indeed, through these policy documents, the state decides on the sectors that should be primarily supported by public authorities at regional or local level. The industrial sectors identified in the smart specialisation strategies (SRI-SI) developed by the Regional Councils usually corresponded to the sectors of the existing 71 competitiveness clusters, originally selected in 2005 by the state through a call for projects.

The implementation of the national industrial policy is operated by the state’s representative organisation at the regional level: The Regional Direction for Enterprises, Competition, Consumers, Labour and Employment (DIRECCTE²¹). The DIRECCTE work under the umbrella of two ministries: the Ministry of Economy and Finances and the Ministry of Work, Employment, Life-long Learning and Social Dialogue. DIRECCTE is in charge of supervising the implementation of the ‘New Industrial France’ in the region, establishing a dialogue with the local authorities (the Regional Council in particular) and the private sector in relation to the industrial policy, and monitoring the activities of the poles of competitiveness on behalf of the ministry.

At the regional level, the main institutional body in charge of industrial related policies is the Regional Council.

The mid-2010 French devolution acts adopted in 2014 and 2015 entailed several modifications for the French regions starting with the merger of several existing regions²². The Pays de la Loire region did not merge with any other French region even though a merger with the Brittany region was considered at a certain point. Pays de la Loire and Brittany share various policy instruments within the scope of industrial policy with regional neighbours:

- Several competitiveness clusters and business clusters are interregional: EMC2 in the field of advanced manufacturing, Images et Réseaux in the field of ICT are also present in the Brittany region, the Smart Electricity Cluster is also in the Centre region and Limousin region.
- The Technology Transfer Acceleration Company Ouest Valorisation (SATT²³) is shared with the Brittany region. Ouest Valorisation acts as the Technology Transfer Office (in charge of

¹⁹ <http://www.entreprises.gouv.fr/politique-et-enjeux/34-plans-industriels>

²⁰ <http://www.entreprises.gouv.fr/politique-et-enjeux/rallying-the-new-face-of-industry-in-france>

²¹ Direction Régionale des Entreprises, de la Concurrence, de la Consommation, du Travail et de l’Emploi

²² For instance, the Aquitaine region merged with the Poitou-Charentes Region and the Limousin region to form the New-Aquitaine region, the size of Austria.

²³ <http://www.ouest-valorisation.fr/en/home-page/> SATT : Société d’Accélération et de Transfert de Technologies

valorisation of research results, IPR management) of the main universities and engineering schools of both Brittany and Pays de la Loire.

- At the same time, in terms of industrial policy and visibility the relative small weight of the region may be a handicap in the long run.

The new role of the Regional Council since 2015 is defined in the law on the New Territorial Organisation of the Republic (NOTRe²⁴). The law stipulates that *'the region is in charge of defining, on its territory, the policy orientations in the field of economic development'* (Art. L. 4251-12). These orientations should consider and articulate the policies carried out at various levels: local (cities) and national (state government).

For that purpose, the region had to adopt an Economic Development, Innovation and Internationalisation Scheme (SRDEII) (Art. L. 4251-13) in 2015, that organises, on the regional territory, the complementarity of actions carried out by all public authorities (local, regional, national). The draft of the scheme is currently (February 2017) under development by the Regional Council. The scheme must be presented and discussed at the Territorial Conference of the Public Action (CTAP), which gathers all local authorities' representatives with the objective that public policies are developed collectively between the various level of governance (cities, departments, region). The law did not set particular rules with regard to its functioning (number of meetings, etc.) and each regional CTAP is free in this regard. The CTAP differs from the regional conference on economy and sustainable employment (CREED, see section 0) in that only elected members of local authorities participate. The scheme is also presented, for information purposes only, to the various professional bodies (chamber of commerce and industry, chamber of crafts and so on) that typically represent businesses and the Regional Chamber for Social Economy.

The region has enjoyed a long period of political stability (2004-2015). This stability is viewed by many of the interviewees as a favourable environment for the deployment of a coherent set of policies.

As far as sub-regional institutional actors are concerned, the Pays de la Loire region has five departments (sub-regional administrative authorities) which are

- Loire-Atlantique
- Maine-et-Loire
- Mayenne
- Sarthe and
- Vendée.

The departments used to play a significant role in economic development, specifically in the field of spatial planning, in order to attract new firms to their territory (through the creation of a dedicated economic area with tax exemptions, for instance). They were also able to support business real-estate infrastructures. At department level, the economic support was implemented either directly by the Department Council or by a specific agency under the status of associations or private agencies (sociétés publiques locales, SPL) in charge of creating a favourable and attractive environment for local firms to grow or for foreign direct investors. The new act 'Loi NOTRe' in 2015 gives no formal powers anymore to departments in the field of economic development and direct support to firms (grants).

At **local level**, the strong involvement of Nantes Métropole, Saint-Nazaire Métropole or Angers Métropole (metropolitan authorities) in supporting economic development and industry should be underlined (see section 4). These metropolises are concerned with all local infrastructures and lands dedicated to industries.

²⁴ Note: Inofficial translation by Technopolis Group. NOTRe: Nouvelle Organisation Territoriale de la République

Industrial policy implementation actors

Industrial policy implementation is shared among different levels of actors operating in Pays de la Loire:

- the Regional Economic Development Agency (Agence Régionale Pays de la Loire Territoires d'Innovation)²⁵,
- the DIRECCTE,
- financial institutions such as Bpifrance,
- other intermediary organisations do participate in the policy cycle (design and implementation) such as the Chamber of Trade and Industry (CCI).

The Regional Economic Development Agency implements the Regional Council policies.

The agency has developed activities to fulfil four main objectives:

- Support local actors in order to ensure that economic activities and employment are 'rooted' in the regional territory;
- Encourage all forms of innovation in enterprises and territories;
- Strengthen the internationalisation of the regional economy;
- Develop the attractiveness of the regional territory;
- Coordinate and facilitate the Regional Innovation Network.

The Ministry for Economy and Finances implements its industrial policy via the DIRECCTE Pays de la Loire, the Regional Direction for Enterprises, Competition, Consumers, Labour and Employment. It is organised along three sub-directorates, the first one clearly addressing industrial policies. The directorate for enterprises, employment and economy is in charge of:

- Supporting the creation, innovation and development of enterprises;
- Developing employees' competencies within the framework of a strategy for activity and employment growth;
- Anticipating and supporting economic transitions;
- Supporting young people and unemployed by improving the effectiveness of public employment services;
- Supporting the development of tourism and develop territories attractiveness;
- Supporting enterprises in internationalisation and promoting competitive intelligence;
- Controlling life-long learning activities.

The DIRECCTE is also in charge of the regional management of EU funding allocated under the European Social Fund. An agreement²⁶ was signed between the state, in charge of ESF, and the Pays de la Loire Regional Council, in charge of ERDF, in order to organise the complementarities of actions funded.

The DIRECCTE (which is also depending on the ministry for labour, life-long learning and social dialogue) is in charge of ensuring the enforcement of the law on labour, promoting employment

²⁵ <http://www.agence-paysdelaloire.fr/>

²⁶ http://pays-de-la-loire.direccte.gouv.fr/sites/pays-de-la-loire.direccte.gouv.fr/IMG/pdf/lignes_de_partage_etat_region.pdf

quality, improving working conditions and health at work, strengthening social dialogue and development of trade unions, and finally monitoring individual and collective relationships at work.

Pays de la Loire benefits from the presence of state-owned financial institutions, of which the key player is the Public Investment Bank for SMEs (Bpifrance) and the Deposits and Consignments Fund (*Caisse des dépôts et Consignations*) which operates as a long-term public investor. While Bpifrance is independent from the Regional Council, being a state-owned public bank, they work closely together. Bpifrance is a national operator for the state. It manages funds from three different sources:

- Bpifrance manages, on behalf the Regional Council, financial instruments (loans, reimbursable grants and guarantee funds) funded by the Regional Council to support regional (industry) SME creation and growth.
- In addition, Bpifrance manages funds from the state including funds from the national Investment for the Future Programme (PIA). PIA is a €47 billion investment in the national economy that started in 2010 and runs until 2012. About a third of the fund is dedicated to industry.
- Finally, Bpifrance manages financial resources on behalf of the state.

A large part of the public funding for industrial policy and innovation spent on regional firms is channelled through Bpifrance. As a comparison, the regional budget for economic development, innovation and research is one eighth of the Bbifrance budget for a year (see section below and chapter four “The Industrial policy mix” for details on Bpifrance).

One good practice with regards to institutional set-up in Pay de la Loire is the Regional Innovation Network (RDI)²⁷. The network gathers all the economic development support structures that provide business development services in the region (from human resources to technology specialists and service providers), that is about 270 actors. The overall network’s objective is to support the development of regional SMEs.

It is a good practice since it increases coherence of policy delivery. RDI operates as single entry point to the public support system. Firms have a more comprehensive view of the landscape of support actors.

RDI members are:

- The Regional Economic Development Agency
- 28 technical centres that provide applied R&D and technological services to SMEs
- 23 technological and innovation platforms that offer mutualised equipment and shared competencies in the field of research, technology transfer and business. The objective is to disseminate the latest technologies to enterprises all over the territory.
- 25 clusters and competitiveness clusters
- Technological Research Institute Jules Verne is an industrial research and technology organisation (RTO) dedicated to advanced manufacturing
- The SATT Ouest Valorisation (Tech Transfer Office)
- The incubators and science parks
- The Chamber of Commerce and Industry
- Bpifrance
- DIRRECTE

²⁷ RDI : <http://www.territoires-innovation.paysdelaloire.fr/comment-innover/les-conseils-a-l-innovation/les-organismes-de-soutien-a-l-innovation/>

The Regional Economic Development Agency is in charge of coordinating the network. Some of the RDI members play a significant role all along the industrial policy cycle, from policy intelligence, data collection and production, agenda setting (through taking part to consultations) and implementation.

Finally, intermediary organisations and interest groups also take part in overall policy design and implementation. These are:

- The Chambers of Commerce and Industry (CCI). There is one regional CCI that represents firms' interest vis-à-vis public decision-makers and provides support for the region's SMEs (trade register, training programmes, and so on). The CCIR heads a network of five local CCIs (one for each department). There is a national trend of regionalisation of chambers of commerce and industry, the regional level becoming preeminent over the departmental structures.
- The business federations and unions, such as the regional Metallurgy Industries Union²⁸ (UIMM), the regional office of the National Technical Centre for Mechanical Industries²⁹ (CETIM), the West Platurgy Industries Group³⁰ (Plasti-ouest), the Federation of Mechanical industries³¹ (FIM). With the regional CCI, these organisations created a Development Committee of Mechanic and Material Industries (Comité de développement des industries mécanique matériaux, CDM)³² in 2006. The CDM acts as a business forum to align the strategic vision of industry in the region vis à vis decision-makers. In addition, it has developed and implemented a capacity-building programme targeting industrial firm managers. The programme has three strands: analysing changes in the firms' framework conditions and feed the firms' strategic thinking; transforming analysis into action; developing firms' capability to adapt to a constantly evolving world.

Those organisations and their representatives sit on different regional consultative and coordination committees. Two of them are of particular importance: the Regional Conference on Economy and Sustainable Employment (CREED), and the Regional Economic, Social and Environmental committee (CESER).

Institutional capacity

The institutional capacity is concentrated in the Regional Council administration and in the regional agency 'Agence Régionale Pays de la Loire Territoires d'Innovation' (referred to as the regional Economic Development Agency hereafter) which implements the Regional Council policy.

At the Regional Council, industrial policies are dealt with in the Directorate for Enterprises, Innovation and Internationalisation (for example dealing with exports). This directorate is composed of two sub-directorates (as of September 2016):

- The Directorate for Enterprises and Innovation (hereafter DEI);
- The Directorate for Agriculture, Fisheries and Food-industry.

A new unit was created in 2016 for the internationalisation of enterprises, which used to be dealt with in the Directorate for European funds within a service dedicated to internationalisation and enterprises. This highlights the growing importance of export issue at regional level.

As far as industry is concerned, a service within the DEI is dedicated to industrial development and innovation. Innovation is therefore identified as key for developing industries. The service is currently divided into two units staffed with small teams:

²⁸ <http://www.ui44.fr/>

²⁹ <http://www.cetim.fr/Le-Cetim/Implantations/Sites/Nantes>

³⁰ <http://www.plasti-ouest.com/>

³¹ <http://www.fim.net/fr/sites-fim/accueil>

³² <https://reseaulia.com/space/cdm>

- One dedicated to mature industries (naval aviation, mechanics, material, automotive industry, nautical industries, building) staffed with two employees, one head of unit and one office manager.
- One dedicated to emerging industries (textile, design, fashion, digital sector, marine renewable energy) staffed with three employees plus one head of unit.

The agents have an education in economics, management or law with a background in public affairs. They specialised along the way in the various economic sectors they are in charge of.

As far as the budget is concerned, the share of the budget dedicated to industrial policy related policies (development and economic activities, higher education, research and innovation) was stable over the period 2011-2015 with approximately €167 million per year on average, 11.5% of the annual budget of the region (see Table 5). This is good considering the other key competence areas of the region (interregional transport and mobility, secondary education infrastructures) and compared to other French regions (for instance Ile de France has dedicated approximately 5.5% of its annual budget to economic development). Within the 2015 budget for development of economic activities, higher education, and research and innovation, €36.7 million were given in support of Industry for the Future and technological development for a new Technocampus project (Pléiade, in the field of acoustics) and the development of a technological platform managed by the French Alternative Energies and Atomic Energy Commission (Commissariat à l’Energie Atomique et aux Energies Alternatives, CEA); €42.2 million was given for schemes such as DINAMIC enterprise, Performance Objective or FRAC industry (these schemes are presented in the policy mix section)³³.

Table 5: Regional Council budget over the 2011- 2015 period

Year	Overall budget (€ million)	Development and economic activities, higher education, research and innovation (€ million)	Share of the total annual budget
2011	1,406	160	11.4%
2012	1,387.6	162.4	11.7%
2013	1,475	172.8	11.7%
2014	1,490	172.7	11.6%
2015	1,518	167.5	11.0%

Source: Press releases 2011, 2012, 2013, 2014, 2015

In 2006, the Regional Council created the Regional Economic Development Agency through the merger of three different entities. The agency is, as of 2016, organised into five directorates:

- Department for innovation and 'integrated sectors' meaning industrial value chains;
- Department for events, tourism, territories and internationalisation;
- Department for marketing and promotion;
- Department for real-estate projects;
- Department for administration and finances.

In terms of resources, in 2015, there were 91 staff in total working for the Regional Economic Development Agency, of which five employees were on fixed-term contracts and 86 employees on

³³ <http://www.paysdelaloire.fr/conseil-regional/le-budget/actu-detaillee/n/budget-2015/>

open-ended contracts. The staff numbers have steadily grown since 2012 (74 employees at that time). The 2015 social assessment of the Regional Economic Development Agency showed that about 50% of the employees have been trained (collective training) in the following subjects: English language, safety, human resources (individual assessments), time management). A total of 44 individual trainings were performed. On average, the number of training hours per employee is 14 hours. The overall training budget of the Regional Economic Development Agency is €63,000 (Agence régionale Pays de la Loire Territoires d’innovation, 2015).

As far as the Chamber of Trade and Industry (CCIR) is concerned, the overall budget amounted to approximately €100 million for 2015 (Chambre du Commerce et de l’Industrie Régionale, 2015). 88% of the budget is spent on wages.

Nantes Métropole, at the local level, had an overall budget dedicated to innovation of €120 million between 2001 and 2013, of which €95 million was for investment and €25 million for the functioning of supported structures. This budget was used for various initiatives such as:

- support to the integrated sector representative organisations (competitiveness cluster, Technological Research Institute Jules Verne),
- communication infrastructures and business parks and premises,
- support to non-technological innovation,
- support to events and support to emerging sectors (creative industries, digital, biotherapies).

The interviews revealed that the human resources dedicated to industrial policy were concentrated in the Directorate for Economy (eight staff) but not exclusively. A total of 18 staff have been identified as working closely or more loosely on industrial policy. Nantes Métropole also has a development agency which has merged in 2015 with the development agency of the Saint-Nazaire Metropole (Nantes Saint-Nazaire Développement³⁴). The agency has five people working to attract companies onto the territory and one person dedicated to advanced manufacturing issues.

Table 6: Overview of regional institutional capacity in support of industrial and economic development (estimates)

	Regional Council	Regional Economic Development Agency	Chamber of Trade and Industry	DIRECCTE	Nantes Métropole
No of staff	8	91 (2015)	1500 (estimates)	approx. 10 heads of unit (2016)	18
Background of staff	Economics, management or law with a background in public affairs	Economics, management, scientific profiles	n/a	n/a	n/a
Operational budget for economic development (per year)	€ 167 million (average 2011-2015)	n/a	€ 100 million	n/a	€ 8 million

³⁴ <https://www.nantes-saintnazaire.fr/>

Agenda setting processes

Pays de la Loire is characterised, according to the stakeholders interviewed for this project, by a strong collective spirit of ‘doing things together’. For the last 10 years, all industrial and innovation policy strategies have benefited from a large and open consultation process initiated and led by the Regional Council. Typically, the agenda setting process makes use of existing policy coordination mechanisms at the regional level (see section 3.4) that make it easier to reach a consensus amongst the key stakeholders, even if it does not prevent conflict. It is also built upon large consultations, either with thematic experts, firms or with citizens.

Several years before the ‘entrepreneurial discovery process’ promoted by the European Commission in EU regions in 2012/2013 through the S3 platform, Pays de la Loire elaborated through an extensive consultative and inclusive process the 2006 Regional Economic Development Scheme (SRDE). This was done through the organisation of 32 thematic workshops (out of which 10 were directly related to economic issues, including start-ups, SMEs, business associations). The Regional Council initiated and led the process. Each workshop gathered regional stakeholders and economic development policy’s beneficiaries. The findings of the workshops were then made public to all the region’s citizens³⁵.

An example of another sophisticated collective priority-setting exercise is the definition of the Regional Strategy for Research, Higher Education and Innovation (SRESRI) for the 2014-2020 period (taking place over nine months in 2012). This work entailed the deployment of various tools and intensive consultation processes initiated and led by the Regional Council:

- Face-to-face interviews with the five thematic commission presidents of the Regional Consultative Committee for Research and Technological Development (CCRRDT) (see section 3.4);
- Collective interviews with the members of each sub-thematic commission of the CCRRDT;
- The production of 30 foresight briefs ranking Pays de la Loire at national and international level in the fields of research innovation and training;
- Synthesis workshops with the five thematic commissions of the CCRRDT;
- Targeted interviews with policy makers on the external coherence of the previous 2007-2013 strategy for research;
- A benchmark of research support measures and schemes in other regions and associated funding models and implementation;
- Transversal workshops with the associated stakeholders;
- A total of approximately 500 stakeholders (researchers, students, SMEs, business associations, start-ups) consulted.

The regional council was assisted by a consortium of three partners of which two consulting firms (Technopolis group and Pluricité³⁶) and the Science and Technology Observatory. The Science and Technology Observatory is a national institute, publicly funded, the mission of which is to produce indicators on higher education, research and innovation. The total amount of assistance work for the SRESRI was about 80 days.

The definition of the regional Smart Specialisation Strategy (SRI-SI) 2014-2020 was also conducted according to a large and open participatory process. For many French regions, the drafting of the Smart Specialisation Strategy was an opportunity to implement the entrepreneurial discovery process. Pays de la Loire was already familiar with this process. The SRI-SI made use of the Regional

³⁵ SRDE (2006), available at:

http://www.paysdelaloire.fr/uploads/tx_oxcsnewsfiles/00_SRDE_resume.pdf

³⁶ www.pluricite.fr

Conference on Economy and Sustainable Employment (CREED), the CCRRDT and the Regional Commission for Innovation (CRI, *Commission Régionale de l'Innovation*), which gathers enterprises, value-chain leaders, professional training institutions and actors involved in technological, social and cultural innovation.

The process was the following³⁷:

- an analysis of academic strengths in the region and the publication of the Regional Scheme for Higher Education, Research and Innovation (SRESRI);
- a SWOT analysis of the regional innovation system;
- the definition of strategic roadmaps for regional clusters;
- an in-depth analysis and the consolidation of strategic roadmaps for the 22 industrial sectors of the region (annexed to the smart specialisation strategy);
- the organisation of six workshops to discuss the six smart specialisation domains, including a first inventory of potential collaborative R&D projects.

Following this consultation phase, three structural axes were defined, in six specialisation areas in which the region presents strong competitive advantage.

In terms of policy capacities, in addition to the various policy mechanism tools involved in the process, the regional council contracted a private consulting firm (Katalyse³⁸) to organise the process, set up the whole methodology, set up the meetings and workshops, to take notes during meetings and finally to draft the various versions of the strategy. The detailed calendar of the agenda setting and consultation process is provided in Figure 3.

The latest example of the agenda setting process is the two-step process developed for the Regional Scheme for Economic Development, Innovation and Internationalisation (SRDEII) which is still under development. The first semester of 2016 was dedicated to the collection of policy proposals based on challenges identified in-house at the Regional Council. A meeting of the CREED in July 2016 was dedicated to the SRDEII and territorial meetings were planned in various regional locations (La Roche-sur-Yon, Angers, Laval, Le Mans and Ancenis).

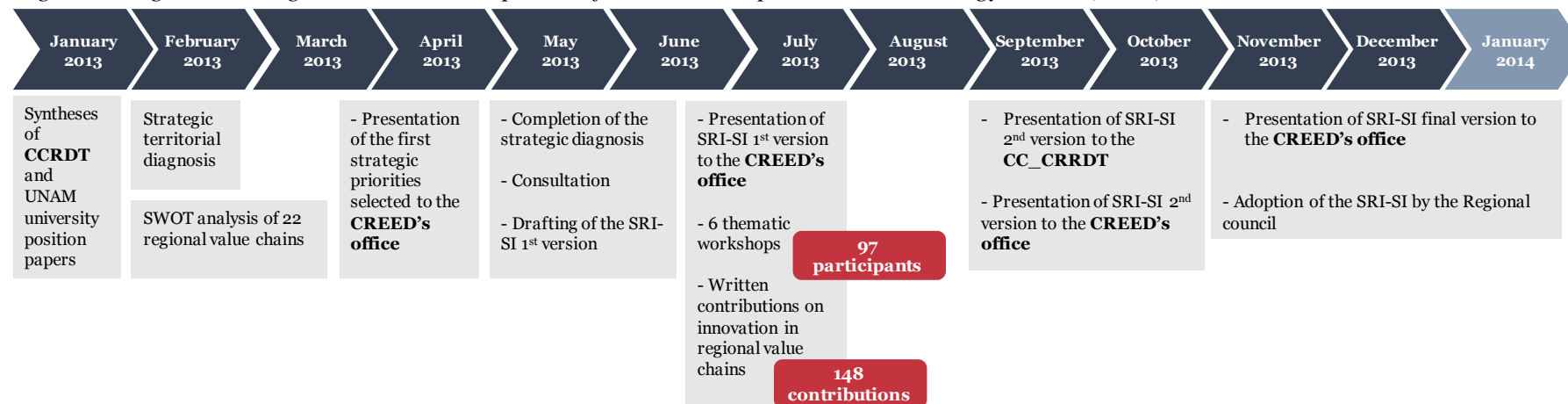
A second round of discussion was opened in autumn 2016 to discuss operational measures and the first regional priorities selected. Between 19 September 2016 and 10 October 2016, new territorial meetings were organised. In parallel, a digital platform³⁹ was set up to follow the developments of the regional concertation for the drafting of the scheme but also to enable citizens to contribute to the scheme. Finally, a call for contributions was addressed to more than 200 structures of the territory (competitiveness clusters, for instance). The detailed calendar of the agenda setting process is provided in Figure 4. The SRDEII was finally adopted in December 2016.

³⁷ Section from Technopolis, 2016, Regional Innovation Monitor + Pays de la Loire (Industry 4.0 and smart systems)

³⁸ www.katalyse.com/en/

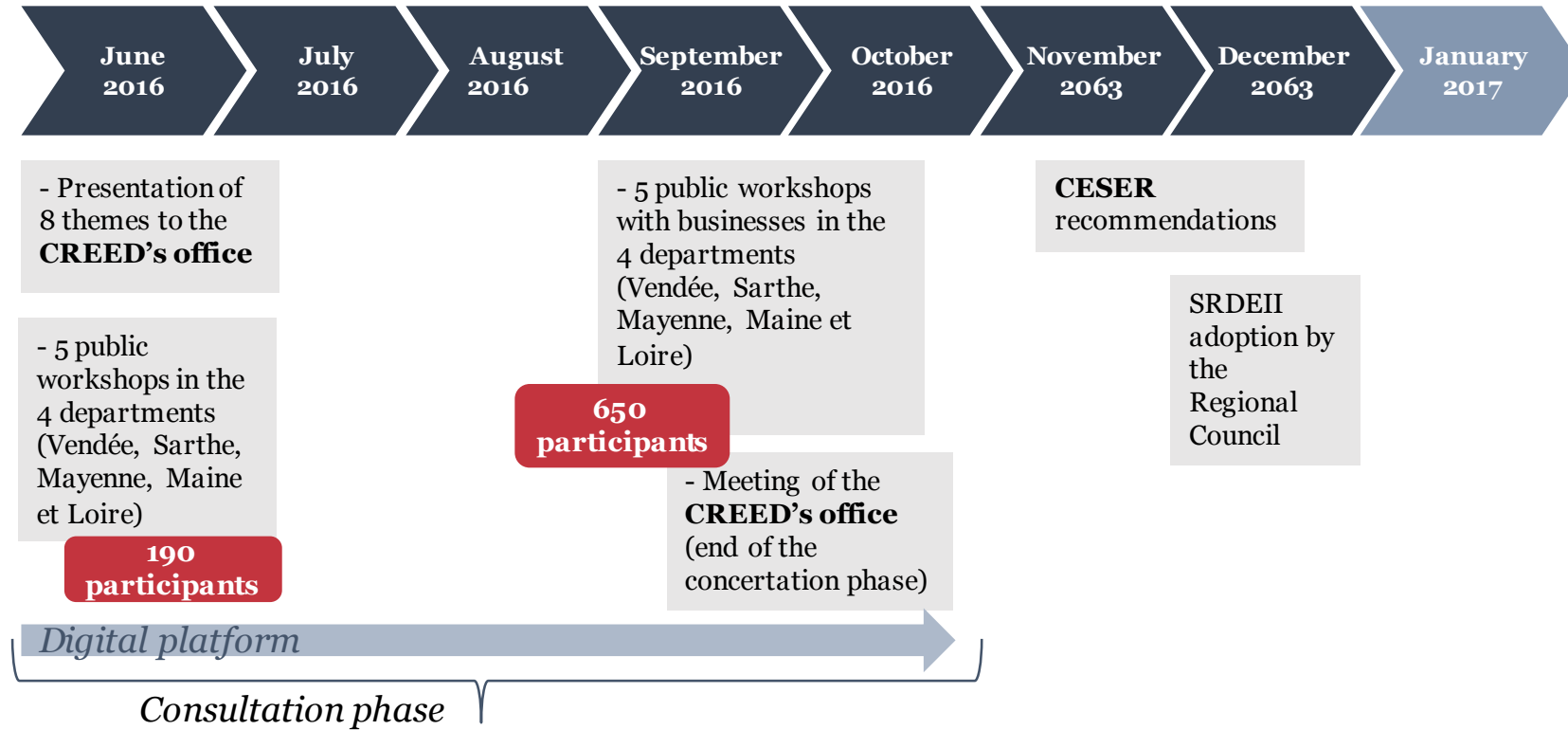
³⁹ <http://paysdelaloire.strikingly.com/>

Figure 3 : Agenda setting and consultation process for the smart specialisation strategy SRI-SI (2014)



Source: TechnopolisGroup, 2016

Figure 4 : Agenda setting and consultation process for the SRDEII (2016)



Source: Technopolis Group, 2016

Policy coordination mechanisms

As described in the previous sections, the institutional landscape in Pays de la Loire is rich and the competences with regards to industrial policies are shared among the different public authorities, business associations and business unions, or trade union representatives to a lesser extent. Policy coordination mechanisms involve an array of regional practices and structures that effectively cover the diversity of regional stakeholders. It allows for policy strategies to be recognised, accepted and used. Three types of policy coordination mechanisms can be distinguished:

- Informal policy coordination between individuals (regional team spirit);
- Formal policy coordination through committees;
- Formal policy coordination through contracts.

The first element that needs to be considered is the regional spirit that is specific to Pays de la Loire. Interviews revealed several regional immaterial assets (which are hardly transferable) such as a strong team spirit called '*Nantes playing style*' ('*jeu à la nantaise*'), Nantes being the capital city of Pays de la Loire. Interviews also revealed that some key civil servants have worked on the territory for a long time (15-20 years) assuming job positions in different key public institutions in charge of economic development. This facilitated the development of interpersonal informal relations, and quicker collective responses to new challenges.

These informal factors impacting policy coordination are strengthened by the existence of formal policy coordination mechanisms. This second element mostly takes the form of policy fora, the main objective of which is to share information and consult on policy strategy developments. These mechanisms are stable and have been used for different strategies. Indeed, when the region developed the Smart Specialisation Strategy (SRI-SI, 2014) and the Regional Economic Development, Innovation and Internationalisation Scheme (SRDEII, 2016), the regional council decided to make use of already existing policy coordination mechanisms used for the development of the Regional Scheme for Sustainable employment and economic development (SREED, 2011).

The formal policy coordination mechanisms used are the following:

The Regional conference on economy and sustainable employment (Conférence Régionale de l'Économie et de l'Emploi Durable, CREED) which brings together a very broad audience, from economic development actors to actors in charge of life-long learning, employment and territories (more than 500 members). The overall CREED mission is to organise the consultation for sectors, value-chains and territory strategies, to organise the complementarity and coherence of regional public policies, to share a vision on the evolution of regional support schemes and monitor the major regional projects.

Its members are the state representative in the region, the departments, the largest cities and metropolitan areas, the Assembly of French Communities (*Assemblée des Communautés de France*), trade unions, Chamber of commerce and industry (CCI), Chamber of agriculture (CA) and Chamber of crafts (CMA), Regional Chamber for Social Economy (Chambre Régionale de l'Économie Sociale et Solidaire, CRESS), CCRRDT (see below), the president of the University Nantes-Angers-Le Mans (UNAM); national job (*Pole emploi*), Association for the employment of disabled people (*Association de Gestion du Fonds pour l'Insertion Professionnelle des personnes Handicapées*), organisation in charge of employment for the youth (*Association des Missions Locales*), federation of life-long learning (*Fédération de la formation professionnelle*), Regional Federation of (vocational) Training Organisations (UROF) Pays de la Loire, Bpifrance, Nantes Atlantique Place Financière (NAPF), Business France, and the regional innovation network (RDI).

The CREED meets once a year to discuss regional topics. Amongst the CREED participants, a smaller and more operational group called the 'CREED's office' meets at least three times a year with about

30 participants (main public authorities, trade unions, chambers of commerce, and economic development agencies). The CREED's office can discuss topics in a more concrete way and take decisions on subjects that should be put higher on the regional agenda.

The CREED was set up in 2011 and is still operational. It participated in the definition of the last Regional Economic Development, Innovation and Internationalisation Scheme (SRDEII) in 2016. The CREED's office (*Bureau élargi de la Conférence Régionale de l'Économie et de l'Emploi Durables*) met twice at the beginning and close to the end of the agenda setting process (in July and October 2016). Its main task was to discuss policy orientations, selecting priority orientations and identify policy measures that ought to be reworked in the final policy document.

The Regional Economic, Social and Environmental committee (CESER) is an institutional body which represents the civil society. The CESER is part of the institutional set up of the region, according to law, and contributes as a consultative assembly to decision-making. CESER is the twin assembly of the regional council assembly. Working as a laboratory of ideas, the CESER pilot studies on various topics (for example on working in 2030 or on water management policy), either responding to a specific request from the Regional Council or on its own initiative. CESER also systematically provides recommendations on the Regional Council's annual budget and on all strategic or planning documents. However, the Regional Council is free not to take its recommendations into account. The CESER is composed of an assembly, whose role is mainly to debate on the proposals and reports submitted, and seven thematic commissions that analyse study topics and carry out hearings: finance, foresight, Europe, inter-regionality; health and social topics; economy, employment, research and innovation; infrastructures, mobility, telecommunication and energy; land planning; education, life-long learning, and jobs of the future; culture, sport, tourism and associations.

The Regional Consultative Committee for Research and Technological Development (Comité Consultatif Régional pour la Recherche et le Développement Technologique, CRRDT), which gathers public and private universities; national research organisations and intermediary institutions supporting valorisation of research results and technological transfer.

Its missions are to participate in the organisation and development of regional research in the wider context of the European Research Area⁴⁰ (ERA). The CRRDT is elected for three years (current period is 2014-2017) and gathers 200 members. For the majority, members are from the regional scientific community (universities, research centres, technology transfer offices). There are also state and regional representatives, clusters, chambers of commerce, trade unions represented. The CRRDT provides expertise and opinions when it comes to research, training/education and innovation.

As of 2016, there are six thematic commissions: biology-health; agri-food-plant; mechanics- material-civil engineering; ICT-maths; sea-environment and human/social sciences. There are also three horizontal commissions: innovation, scientific and industrial culture and higher education.

The Regional Commission for Innovation (Commission Régionale de l'Innovation, CRI) gathers decision makers from regional industrial sectors, businesses, life-long learning support structures and innovation actors. Their mission is to bring expertise in the area of innovation. For instance, the CRI developed the selection criteria for public support to non-technological innovation in firms. Another task was to define the principles for the commercialisation of public research results that would be applicable in the Pays de la Loire region.

The third policy coordination mechanism is the 'contracts' established between different stakeholders. The first contract is the state-region Contract plan (CPER). This tool was first used between the state and the French regions in the mid-1980s (1984-1988). It was initiated by the state to ensure coherence between the state and regional councils' interventions.

⁴⁰ http://ec.europa.eu/research/era/index_en.htm

The current State Region Contract Plan for 2015-2020 sets jointly defined priorities by the state and the Regional Council for public investments in the regional territory. A total of €1.2 billion are secured in the CPER, including €412 million from the state and €395 million from the Regional Council. The rest of the financing comes from other local authorities. The national programme ‘factories of the future’ represents a total of €120 million.

The CPER has seven objectives, of which one is directly dedicated to supporting regional industry. Among the targeted actions are:

- The development of the Nantes-Saint-Nazaire Maritime Port to attract more industries and facilitate regional industries’ expansion, possibly located downstream (notably naval and mechanic construction sectors, but also the development of the Renewable Marine Energy (RME) sector).
- The development of higher education and research infrastructures, and notably the national engineering school of *Arts et Métiers* (ENSAM Paris tech), a technological school associated to the IRT Jules Vernes and hosting a Regional Platform of Innovation dedicated to Advanced Manufacturing System (AMS).
- The funding of innovative projects which favour synergies between top-down policies and regional economic development policy and regional innovation policy. The overall goal is to modernise the regional productive apparatus. This objective supports entirely the operational development of the cluster policy and Regional Innovation Strategy (SRI-SI).
- Securing jobs and tackling the needs for new competences and jobs.

Another type of contract used jointly by the Regional Council and the state is the Sectoral contract (*Contrat de filières*)⁴¹. These contracts are concluded between policy-makers (national and regional) and an the representatives of an industry sector (business organisations). The objective is to organise the policy dialogue in a given industry sector, to set joint targets and to coordinate the national and regional public and private actions and investments. These contracts are a common tool used at the regional level in many French regions.

In Pays de la Loire, the mechanics-material sector has signed two such contracts since 2008 (for a three-year period each time). The latest contract (2011-2014 period) was concluded between the state, the Regional Council, the Development Committee of Mechanic and Material Industries (CDM) partners, the competitiveness cluster EMC2 and the business cluster Neopolia. The objective was to strengthen inter-firm cooperation, improve R&D and training, being more offensive with regard to international development and develop an effective policy intelligence tool (see section 3.5). The contract also set quantitative objectives: to involve 500 enterprises in at least one of the three professional organisations (CDM, Neopolia or EMC2) and engage 50 enterprises in regional support schemes such as DINAMIC or Performance Objective)⁴².

The contract was structured in three axes:

- Explore new solutions for growth
- Internationalisation and exports
- Innovation

And it was divided into seven challenges:

- Improve the competitiveness of the regional industry,
- Foster market access and adapt towards sustainable development challenges,

⁴¹ http://www.paysdelaloire.fr/no_cache/actualites/actu-detaillee/n/dossier-un-nouveau-contrat-pour-la-filiere-mecanique-et-materiaux/

⁴² <http://www.cetim.fr/fr/Actualites/En-France/A-la-une/Contrat-de-developpement-en-Pays-de-la-Loire-une-dynamique-renouvelee>

- Foster the development of mid-caps enterprise (*'Entreprises de taille intermédiaire'*⁴³),
- Engage SMEs in regional value chains
- Support internationalisation, innovation and sustainability among SMEs
- Internationalise businesses
- Foster access to funds for enterprises and investments in general.

Interviewees indicated that the last contract has not yet been renewed, but that actors continued working together.

Use of policy intelligence

Pays de la Loire is well equipped with policy intelligence tools, in particular related to the industrial policy sector. Some regional actors (public and private) have been developing policy intelligence tools for more than a decade. The data are sophisticated and easily accessible compared to other French regions, for which data are either unpublished or dealt with through the regional branches of the national statistical institute (INSEE), which are not as policy oriented as dedicated observatories. The regional actors are aligned and well-coordinated in the Socio-Economic Regional Observatory (ORES) (see box below).

The Regional Economic Development Agency has a dedicated observatory, the Socio-Economic Regional Observatory⁴⁴ (ORES) created in 2006 and integrated to Agence régionale Pays de la Loire territoires d'innovation. ORES collects and analyses data from a large number of regional observatory structures: about 40 organisations such as local observatories at sub-regional, regional and national level in various thematic areas (such as economy, employment, environment) It can be considered as the umbrella observatory for the Pays de la Loire region and six people work in the observatory.

ORES can be considered as a good practice since it is unique in France, apart from very politically autonomous regions (for example, Wallonia, Catalonia). ORES also avoids redundancy and duplication of work for the individual observatories and, at the same time, it offers a single point of entry on regional data for any interested citizen/firm, etc.

ORES is in charge of producing background indicators to monitor the Regional Council strategies and provides the Regional Council and the general public with background information with three different levels of data disclosure:

- Data disclosure for the Regional Council staff to support the steering of regional activities
- Data disclosure to other observatories and data professionals
- Data disclosure for the public.

ORES produces various kinds of studies: from briefing notes which depict very clearly the regional economic landscape over a short period of time (for example, quarterly publications of the industrial production data or a selection of innovation show cases identified in the selected regional sectors⁴⁵).

The observatory also produces foresight reports and produces up-to-date information on the 22 sectors identified in the smart specialisation strategy. The data are used internally by the Regional Economic Development Agency and the Regional Council administration.

⁴³ This is a French category between SMEs and large groups introduced in 2008 for businesses that employ between 250 and 4,999 employees and have an annual turnover below €1.5 billion. This category was created on the grounds that France would not have enough of these businesses that are the most adapted to innovate and export

⁴⁴ <http://ores.paysdelaloire.fr/>

⁴⁵ <http://ores.paysdelaloire.fr/1084-1-innovation-des-filieres.htm>

Even though the ORES does not have a formalised evaluation mandate, nor a mandate for the monitoring of specific policy measures, it has participated to the evaluation of the SRI-SI in 2016. Furthermore, two employees out of six did contractualise with the Regional Council Directorate for Economy and Innovation since 2014 to produce information used for policy monitoring.

With regard to the specific industrial policy intelligence tools, an interesting good practice is the information produced by the Development Committee of Mechanic and Material Industries (CDM)⁴⁶ which was created in 2006. The baseline question was 'are all industrial companies' needs covered in terms of information?'. The initiative received support from the Regional Council and the state in the beginning (but no longer does so from the state). The CDM is a partnership between several industrial federations: the regional Metallurgy Industries Union⁴⁷ (UIMM), the Technical Centre for Mechanical Industries⁴⁸ (CETIM), the West Plasturgy Industries Group⁴⁹ (Plasti-ouest), the Federation of Mechanical industries⁵⁰ (FIM) and the Regional Chamber of Commerce and Industry (CCIR).

The CDM produces biannually a foresight note based on interviews with a network of about 300 people asking CEOs from regional firms about industry trends but does not collect facts and figures, which are available elsewhere. The idea is to spot 'weak signals' and to anticipate market evolutions. The set of information obtained from the survey is discussed with a panel of CEO members of CDM. As far as resources are concerned, only 1.3 full-time equivalent (FTE) staff are working on this and the tool is now shared with the Brittany region and the Nord Pas de Calais region⁵¹.

This is a good practice because it provides additional and original information to industrial CEOs. It is also a good practice since information feeds into the policy-making process. Indeed, the CDM and its members contribute to the policy coordination committees. Pays de la Loire is one of the French regions where industries are consulted the most during the policy-making process.

Another interesting observatory is the Regional Observatory of Industrial Competences⁵² (ORCI). The ORCI is a partnership and foresight tool which produces analysis to support decision-making in the field of employment and training policy at regional level. The ORCI was launched in 2012 and is financed jointly by the UIMM, the IRT Jules Verne, the DIRECCTE and the Regional Council.

The ORCI targets specifically the mechanical-material industry sector, which accounts for 120,000 employees (automotive, aeronautic, naval, nautical, electronic, metallurgy, plastics and composite-material industry). Its mission is to provide actors in the field of employment and training with robust data on trends in employment and competences. The ORCI should identify precisely the industrial needs in the short, medium and long term. This tool should support regional training actors to adapt or create training and courses.

The ORCI⁵³:

- Centralises the information linked to employment and competences in the industrial sector;
- Implements surveys towards businesses (CEO, HR directors);

⁴⁶ Comité de développement des industries mécanique matériaux : <https://reseaulia.com/space/cdm>

⁴⁷ <http://www.ui44.fr/>

⁴⁸ <http://www.cetim.fr/Le-Cetim/Implantations/Sites/Nantes>

⁴⁹ <http://www.plasti-ouest.com/>

⁵⁰ <http://www.fim.net/fr/sites-fim/accueil>

⁵¹ Publications available here :

<https://reseaulia.com/space/cdm/contents/?orderBy=creationDate&listFormat=default>

⁵² <http://www.orci-pdl.fr/>

⁵³ The information produced feeds in the policy process, however, no details on how it is formally used was found in the framework of this research project.

- Cross-checks data from various sources;
- Drafts operational diagnostic and foresight studies.

The ORCI goes together with another initiative launched in 2013: the ‘Competences 2020’, financed by the Regional Council (25%), the state (25%) and the European Union (50%) for a total of €250,000 over two years. This exercise has three objectives:

- Address businesses’ needs on a three years’ timeframe and root in the territory their high value added and innovative industrial activities.
- Introduce new management tools within firms to help them anticipate their needs in terms of human resources.
- Support access to sustainable jobs and qualifications for a large and diversified audience, with specific attention paid to more excluded people from industrial employment (for example, women)

The first sectors targeted were the aeronautics sector, marine renewable energies and the naval industry.

Policy implementation

The industrial policy mix

The industrial policy mix combines large and transversal fiscal policies, as well as tailor-made support measures dedicated to industrial SMEs (see Figure 5).

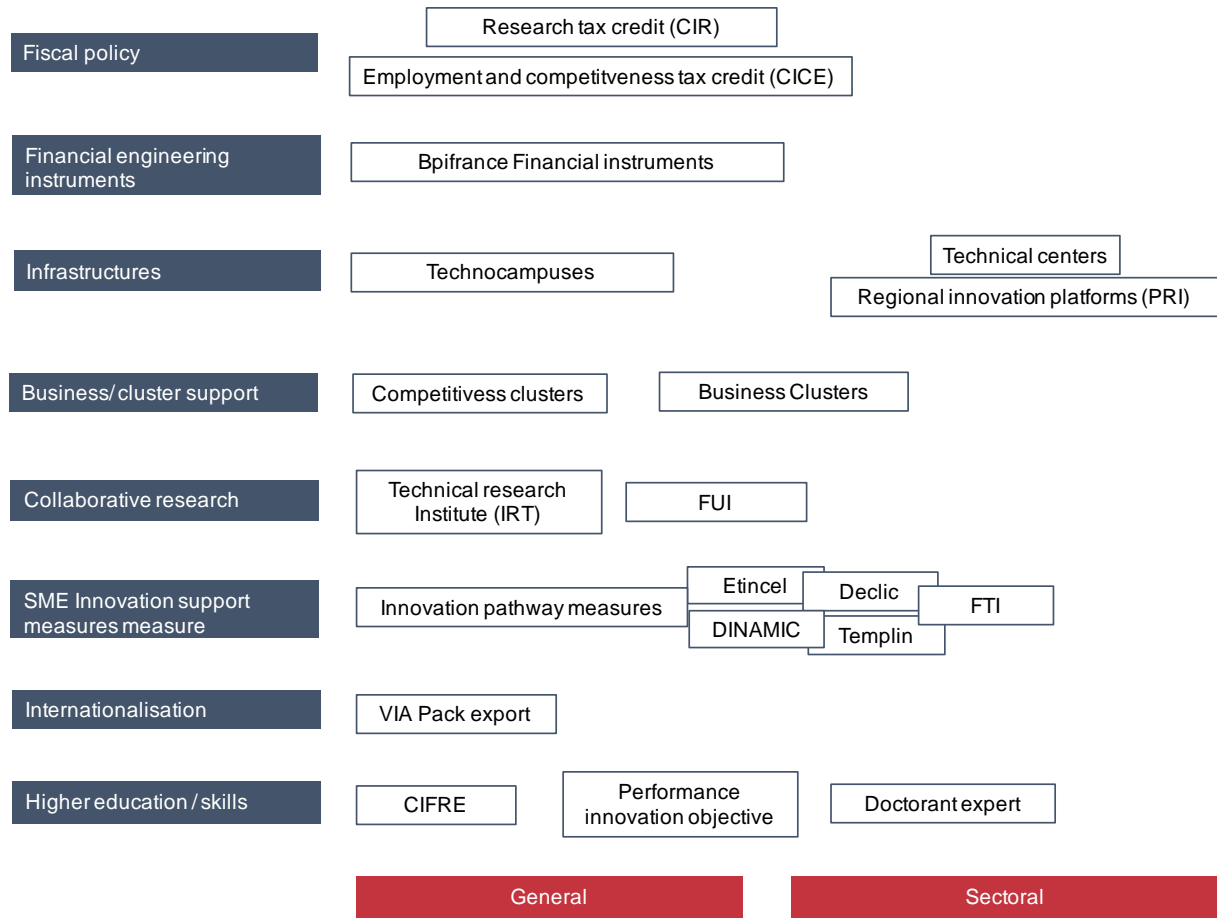
The policy mix is in line with the policy objectives (see section 0) and reflects the importance of the national level on industrial policy (fiscal policy, clusters policy). The policy mix largely favours networking and collaborative activities as well as innovation.

In terms of financial volumes, fiscal measures are way ahead of the other policy measures (see following section).

The policy mix also reflects the ‘doing things together’ philosophy with the development of ‘pathways’ of measures operated jointly by different actors and the willingness to address firms’ needs in a comprehensive and coherent way. Several policy measures were developed during the last 10 years, either launched by the French national administration and adapted regionally, or completely originating from the regional or local level. None of these initiatives was conducted by only one of these authorities. Most policy measures and structures are co-financed by the various administrative levels (local, regional, national, EU).

With regards to the mix of instruments implemented, the trend observed (also at the national level) is to act indirectly rather than directly with businesses, with the objective to create a favourable ecosystem (for example, easy access to technologies etc.) instead of giving out direct subsidies to firms. In parallel, the public authorities reduced the volume of direct grants allocated as a standard financial support vehicle, and favoured reimbursable loans and guarantees (financial engineering instruments).

Figure 5: Policy measures in support of industrial development in Pays de la Loire



Source: Technopolis Group, 2016

Fiscal policy

The fiscal policy targets the framework conditions for the industrial policy to develop. The two main fiscal tools impacting industrial firms have been initiated and are managed by the national level:

The research tax credit (Crédit Impôt Recherche, CIR) is the largest industrial modernisation support tool implemented at the national level. It was created in 1986 to spur R&D primarily in firms. It has been reformed four times since its creation and represents €6 billion per year for France (2016).

Expenses qualified to the research tax credit are essentially expenditures on human and material resources allocated to R&D within the firm, subcontracted research and technology, monitoring, applying and defending patents. Data for 2013 show that regional firms tend to be under-represented when it comes to the expenses declared compared to their weight at national level. This shows that investments in R&D of regional firms is relatively smaller than in other regions (for example Ile de France, see *Table 7: Research tax credit data Pays de la Loire for 2013*). In 2013, the CIR would represent €110 million in Pays de la Loire (Prefecture Pays de la Loire, 2015).

Table 7: Research tax credit data Pays de la Loire for 2013

	Number of firms benefiting from the research tax credit	Share of firms (as % of national level)	Share of expenses declared
Pays de la Loire region	820	5.38%	2.06%
Ile de France region	5,276	34.61%	60.32%
France	15,245	100%	100%

Source: Ministry for research (2016)

The tax credit for competitiveness and employment (crédit d'impôt compétitivité emploi, CICE) became operational in January 2013 following the publication of the report 'A pact for the competitiveness of the French industry' (Gallois, 2012). The objective is to increase competitiveness of firms through additional efforts in investments, research, innovation, training, recruitments, prospection of new markets, ecological and energy transition. CICE is a tax credit which is calculated on the part of the payroll which is not higher than 2.5 times the minimum wage (set as €17,599.40 in 2016). The tax credit amounted to 3% in 2013 and 6% in 2014. As of February 2016, firms located in Pays de la Loire benefited from €406.6 million of tax credit on 2013 salaries and €613.1 million calculated on 2014 salaries (Préfecture Pays de la Loire, 2015).

Financial engineering instruments

Financial engineering instruments (FEIs) are a form of support contributing to public policies increasingly present in Europe, notably through the implementation of the cohesion policy. A large variety of FEIs exists, ranging from loans to interest rates subsidies, from equity or venture capital to guarantees. In comparison to 'traditional' grants, they have several advantages:

- Sustainability, as they are repayable investments, impacting positively the leverage of public money;
- Improved quality of projects, as investments must be repaid;
- Fostering cooperation between public and private sectors, as the repaying of investments offers returns, increasing private sector involvement (and funding) in public policy objectives.

Regional enterprises can benefit from the support of the National Innovation Bank Bpifrance which intervenes on innovation issues and has signed a framework contract with the Regional Council to provide FEI to regional SMEs. In the past, Bpifrance used to provide SMEs with grants and are now mostly offering loans and guarantees as well as capital investment⁵⁴. In 2015, Bpifrance in Pays de la Loire supported 5,714 firms within a €1.3 billion funding.

As of 2016, a regional loan for industrial redeployment, P2RI (Prêt de redéploiement industriel), is implemented which can amount to between €200,000 and €2 million reimbursable over four years. The objective is to offer a financial opportunity for a project aiming at maintaining or developing industrial equipment or human resources. This P2RI is funded through the national Investment for the Future programme. The measure target industrial firms (SMEs and larger firms) and the selection criteria are the following:

- Firms must be performing well and have a sound management

⁵⁴ <http://www.bpifrance.fr/Actualites/Dossiers/Comprendre-l-offre/L-offre-Bpifrance-pour-qui-pour-quoi-17487>

- Firms must already have in-house specific competences that are strategic to the firms
- Firms must be able to engage on a project on the medium term.

Access to technological infrastructures for the industry

Within the policy mix, a lot of effort is dedicated to the modernisation of industry via facilitated access to technological infrastructures. These infrastructures are technical centres, of which some have been selected and awarded the label of regional innovation platforms (PRI) receiving public funding to operate. The regional approach combines a facilitated access to technologies for SMEs over all the regional territory (regional innovation platforms) with a massive concentration of funding in four Technocampuses that address the largest companies (such as Airbus) as well as SMEs.

Pays de la Loire has:

- **28 technical centres:** Among the 28 technical centres, some are directly addressing advanced manufacturing challenges such as the Technical Centre for Mechanical Industries (CETIM) in the field of mechanics or the Centre for Advanced Composite Materials in the field of Transportation (CEMCAT). These provide technical support to SMEs with specific technical equipment that SMEs cannot afford individually.
- **23 regional innovation platforms (PRI):** These play an essential role for the diffusion of R&D results to local industries. PRIs emerged in 2009 in Pays de la Loire in order to find solutions to the technical need of companies through specialised and agile regional collaboration networks. The PRI were conceived as a response to the financial and then economic crisis that impacted the industrial sector as well. PRIs are resource centres dedicated to open innovation for companies. In the field of Industry 4.0 the PRI ProxinnoV platform plays a central role. Inaugurated in 2013 in La Roche-Sur-Yon, ProxinnoV is dedicated to industrial robotics. Capitalising on the experience and expertise of regional leaders in the field of robotics (notably Sepro Group, *'the leading independent manufacturer of Cartesian robots for injection moulding machines'*⁵⁵), the platform's mission is to increase awareness among regional companies on the opportunities offered by robotics and support the introduction of robotics in their production processes. To that purpose, it supports the whole robotisation process, from diagnostic of needs and R&D efforts to industrialisation and commercialisation. The platform also performs feasibility studies and provides training programmes for industry employees in the adoption of robotics. Its demonstration facilities now count four industrial robots and one humanoid. There are about 10 PRIs directly involved in advanced manufacturing activities, such as PRI Clarté (virtual reality), design' in Pays de la Loire (integrate design thinking in all industrial projects), PRI Cisna 2.0 (virtual reality, fast prototyping), PRI Atrium (connected objects), PRI CEMCAT (research centre on advanced composite materials for transports), PRI Orace (energy consumption in industrial processes), and PRI Primabor (agricultural machinery). Financial support of the region is guided by cooperation contracts signed with PRIs based on three-year strategic plans. This support can take various forms, from real-estate investment, equipment purchases or funding of human resources.
- **4 Technocampuses:** Technocampuses are public-private infrastructures that concentrate funds in selected regional sectors in order to support advanced manufacturing in regional enterprises.

The Technocampus platforms are certainly the most representative public-private infrastructures in Pays de la Loire dedicated to advanced manufacturing. This is a good practice as it concentrates a massive public-private investment around regional excellence sectors. The investment in these buildings alone for the three first platforms amounts to €90 million. Technocampuses are a set of three

⁵⁵ www.sepro-group.com

shared technological research platforms that bring together high-performance materials and industrial and academic players that work on strategic sectors. They aim to position the region at the vanguard of advanced manufacturing by encouraging an interdisciplinary approach and collaborative R&D.

The three platforms are: Technocampus Composites (created in 2009), Technocampus Smart Factory (created in 2013) and Technocampus Ocean (created in 2015). A fourth Technocampus dedicated to acoustics and its application to industrial processes was foreseen in Le Mans by the end of 2016 (Technopolis, 2016). The Technocampus platforms are based on a public-private partnership original model. They are managed, animated and promoted by Technocampus Group.

The Regional Council is the owner of Technocampuses (and rent the space to the Technocampus Group, a public structure) but financial support is coming from all levels of public authorities: The European Regional Development Fund, the French state administration, the Regional Council, the Loire Atlantique Department, the two metropolises Nantes and Saint-Nazaire.

The Technocampus Composit Material is identified as an example of an effective collaboration which was set up in a short period of time. The first Technocampus was an answer to the Power8⁵⁶ restructuring plan engaged by Airbus in 2007 which could have caused job losses at the regional level (10 000 jobs cuts at national level planned for 2010 of which 50% in sub-contractors). The idea was to keep R&D at local level with the financial support of the Regional Council in exchange for technology transfers to local suppliers. The overall investment in the first Technocampus was €80 million, of which €50 million was for buildings and €30 million for the industrial processes.

Clusters and creation of ecosystems

The cluster approach is heavily supported by the public authorities (national, regional and local) as part of the industrial policy. There are two main types of policies funded by the public authorities: competitiveness clusters and business clusters (grappes d'entreprises). The business cluster policy was developed before the competitiveness cluster policies but with less financial means: nationally, the budget for every 10 members was €64,300 for the competitiveness clusters in 2011 compared to €49,700 for business clusters. It decreased in 2013 to €33,700 for business clusters due to a decrease in public funding (CGET, 2015). Another difference is the scope of membership, which is more geared towards SMEs in business clusters whereas competitiveness cluster also hosts research centres, large firms. There are however cross-memberships: nationally 23.4% of business clusters members are also members of competitiveness clusters and 12.6% are members of other business clusters (CGET, 2015). Pays de la Loire hosts nine competitiveness clusters (see Table 7), and 25 business clusters.

Table 8 : The 9 regional competitiveness clusters

Name of cluster	Sectors	Products and technologies	Members
Vegepolys	Agriculture, Agri-food	Vegetal innovation Protection of plants Vegetal and health	More than 600
Images & Réseaux	ICT	ICT	Between 200-300
Mer Bretagne Atlantique	Energy Transport	Maritime industry Marine energies	Between 100-200

⁵⁶ <http://www.ladepeche.fr/article/2007/06/07/904-exclusif-power-8-les-details-du-plan.html>

	ICT	Blue Biotechnologies Ports Infrastructures Maritime transport	
EMC2	Material Micromechanics Mechanics	Metallic and complex composites	Between 200-300
iD4CAR	Transport	Product engineering and process of small series Material and architecture of vehicles Smart embarked systems	Between 200-300
S2E2	Energy	Energy production Electronics for energy storage and usage Smart systems and equipment	fewer than 200
Valorial	Agriculture, Agri-food	Food products Process and packages	Between 200-300
Elastopôle	Chemistry, material	Material Process Energy	fewer than 200
Atlanpole Biothérapies	Biotechnologies/ Health	Cell therapy, Immunology, molecular engineering	fewer than 100

Source: Technopolis Group 2016, based on ORES Pays de la Loire data 2015

EMC2 is the competitiveness cluster dedicated to advanced manufacturing technologies. The cluster was founded in 2005 by five major regional companies (Airbus, DCNS, STX, Bénéteau and ACI, a subsidiary of Renault) active in various sectors but sharing common issues related to the modernisation of production processes for large-scale parts under harsh environmental constraints. The cluster's ambition is twofold: support the development of the territory through collaborative innovation, and become a world reference in the field of smart production processes. Collaborative projects selected by the cluster can then be funded by the Single Inter-Ministerial Fund (Fonds unique interministériel, FUI). As of 2011, there were 185 firms and 77 higher education and research institutions in this cluster. The cluster's budget was mainly funded through public funds (national funds, regional funds and from other local authorities). However, public funding is now limited to a maximum of 50% of the total cluster budget in order to comply with EU state aid regulation. Since its

creation EMC2 has supported 230 collaborative projects for an overall €1.35 billion of funding (of which €523 million came from public sources).

In addition, Pays de la Loire hosts 25 business clusters. The most interesting industrial cluster is Neopolia, which appeared in its current form in 2007, at the time the naval industry was economically weaker. However, the cluster originated from the national policy of business clusters developed in 1999, which targeted (mainly industrial) SMEs with the objective to spur innovation in a specific industrial sector as a factor to increase competitiveness. There are more than a 100 business clusters in France. Neopolia gathers mainly local entrepreneurs, SMEs and mid-cap equipment manufacturers. The cluster's main tool is project-based collaborations to develop new solutions to the local and international markets and to the main local buyers (STX, Airbus). As of 2017, six Neopolia business clusters have developed out of the original one (Neopolia Aerospace in 2009, Neopolia Marine, Neopolia Oil&Gas, Neopolia Rail, Neopolia Marine Renewable Energy and AtomOuest in the field of nuclear energy). At the end of 2016 Neopolia had 235 member firms (two-thirds are SMEs) representing 30,000 jobs and with a calculated turnover of €42 million over the last five years⁵⁷.

Public-private collaborative research

In addition to supporting enterprises' networking through clusters, public authorities (national, regional and local) provide support for collaborative RDI projects initiated in the competitiveness clusters.

The funding for collaborative research projects between enterprises and laboratories goes mainly through the competitiveness clusters via the Single Inter-Ministerial Fund (FUI) which is the original competitiveness clusters collaborative projects' funding vehicle. Funded projects should aim at developing one or several products or services with a highly innovative content; it should be collaborative (involving at least two businesses and one public laboratory) and the project leader must be an enterprise with a view that the project results will be directly used for market purposes. The project must be coherent with the strategic axis defined in the national industrial policy and in line with the roadmaps developed by the sectoral strategic committees⁵⁸, which cover a broad spectrum of the industrial landscape, but also with the nine 'solutions' for the Industry of the Future⁵⁹. In 2015, eight collaborative research and development projects (R&D) were selected for an overall €10.8 million of public funding, of which half was from the FUI and the other half from regional and local authorities (Préfecture de la Région Pays de la Loire, 2015). Collaborative projects usually run for two to four years.

Another tool that supports public-private technological research is the Technological Research Institute Jules Verne (IRT Jules Verne). This is an industrial research and technology organisation (RTO) dedicated to advanced manufacturing. It brings together the private sector and scientific research institutions in a public-private partnership (PPP) model with the view to improving the competitiveness of regional industry⁶⁰. It aims at '*becoming a world reference in the field of advanced production for composite and metallic materials and hybrid structures by providing solutions to the technological challenges facing industrial segments, e.g. the design and*

⁵⁷ <http://www.neopolia.fr/presentation>

⁵⁸ Aeronautique, food, automotive, consumer goods, wood, chemistry and material, eco-industries, rail industry, extractive industries, industries and technologies related to health, fashion, naval, nuclear industry, digital

⁵⁹ New resources, sustainable city, eco mobility, transports of the future, medicine of the future, big data, Internet of things, digital trust and smart food.

⁶⁰ idem

*implementation of advanced breakthrough technologies for manufacturing and production engineering*⁶¹.

IRT Jules Verne specifically targets four strategic industries:

- aeronautics
- shipbuilding
- automotive
- energy.

The IRT Jules Verne provides technological resources, and carries out research projects for and with enterprises. In 2015 it also created an event dedicated to bridge the gap between industries' needs in terms of human resources and students willing to engage in industry-related training, through apprenticeship. The 'Alternance manufacturing event' is a match-making event that gathered in April 2016 about 500 students, 31 enterprises and 30 training structures.

Support measures for innovation within SMEs

Policy-makers (local, regional national) have stressed the importance of fostering innovation as a means to increase regional firms' competitiveness. The Regional Innovation Network (RDI) (see section 0) has organised the following policy measures in a coherent innovation path⁶².

In order to provide incentives to SMEs to innovate, three schemes are run by Regional Innovation Network actors (the Industrial Chamber of Commerce or the Regional Economic Development agency):

- **Étincelle Innovation:** a one-hour coaching session, free-of-charge, during which SME managers meet innovation experts to discuss their innovation potential and potential steps forwards.
- **Déclic Innovation:** a two-and-a-half-hour meeting, free of charge, in which SME managers discuss their company's capacity to implement innovation projects with acceptable levels of risk.
- **Tremplin Innovation:** a four-day training seminar in which the SME manager discusses with innovation experts and realises a preliminary feasibility study of his innovation project. Tremplin is co-financed since €1,500 remain at the charge of the company).

The DINAMIC Enterprises is a more comprehensive innovation programme (of which an assessment was carried out, see section 5). DINAMIC is a nine-months programme that reinforces SMEs' innovation potential through individual coaching sessions (21 half-day sessions), training seminars (20 days) and joint methodological seminars between SME managers (16 half-day sessions). The programme is funded at 70% by public authorities, with €3,000 to €6,000 remaining the responsibility of the company. As of 2016, about 1,000 have received personalised coaching since the launching of the programme in 2007.

In 2016, the regional fund '*Fonds Pays de la Loire Territoires d'Innovation*' (FTI), co-funded by the Regional Council, the state (through the Investment for the Future programme) and operated by Bpifrance, was created and provides a wide array of funding instruments to foster innovation in Pays de la Loire. It is conceived as a flexible toolbox targeting innovation in a broad sense (including non-technological innovation), which mobilises several funding instruments (subsidies, repayable advance, interest-free loans). FTI funds a series of support measures like Innovation Vouchers (*Chèque Territoires d'Innovation* – CTI) of up to €8,000 grants to fund early-stage feasibility studies of innovation ideas or First Steps Innovation Territories (*Premiers Pas Territoires d'Innovation* – PTI),

⁶¹ see IRT website : <http://www.irt-jules-verne.fr/industrial-research-institute/>

⁶² <http://www.territoires-innovation.paysdelaloire.fr/comment-innover/un-parcours-innovation-pour-tous/le-parcours-de-l-innovation-3045.kjsp>

up to €8,000 grants to support technical diagnostic, tests and patent acquisition). A call for projects has been launched in 2016 under the FTI, worth €20 million of investment, for R&D projects undertaken in one of the six areas of specialisation (funded 50% by the National Investment for the future programme and 50% by the Regional Council).

Internationalisation

As of 2016, 11 support measures⁶³ are organised in a ‘Pack export pathway’ (VIA le Pack export). The philosophy is the same for internationalisation and for innovation: to create a coherent pathway for firms instead of only supporting them on a single action.

The Pack export pathway measures are dedicated primarily to SMEs in specific industry sectors (such as maritime industries, advanced manufacturing, digital and electronics) but also to larger firms provided they fall into strategic regional sectors. The measures are operated jointly by several operators (CCI, DIRECCTE, the Regional council or Bpifrance). In 2015, the regional council spent €8.2 million on internationalisation measures. Over 2008-2013, the total budget for internationalisation was €23.5 million and targeted 1,439 enterprises for 5,075 support measures.

Of the 11 measures, the main ones are the following:

- VIA Init export: This support measure targets SMEs that need financial resources for communication and marketing material. Each year, the firm benefited up to 50% of the cost incurred for a maximum of €2,000.
- VIA Prim export: This support measure targets SMEs that need financial resources for participation in international fairs, for instance. They can benefit from a maximum of three grants each year for a maximum of €10,000.
- VIA VIE: International volunteering in enterprise (VIE) is a national scheme that allows French firms to hire a young professional (18-28 years old) for a specific mission abroad for a maximum duration of 24 months. The Pays de la Loire regional council supports this scheme by financing 100% of the VIE salary for a year.

Table 9: Internationalisation support schemes in Pays de la Loire (2014)

	Number support schemes delivered (different from the number of beneficiaries)
VIA Init export	143
VIA Prim export	659 (for 432 SMEs)
VIA International volunteering in enterprise (VIE)	49

Source: Pays de la Loire (2015)

Skills development, higher education

Within the regional policy mix, another set of measures targets enterprises’ skills development. Two of these measures clearly target scientific skills across all enterprises (SMEs and large enterprises).

⁶³ VIA Conseil Export, VIA Junior Export, VIA Senior Export, VIA Init’Export, VIA Prim’Export, VIA Prospect Export, VIA Etude export, Via DINAMIC, VIA Filière Export, VIA VIE, VIA Performance Objective.

A major national scheme is the Industrial Agreement of Training through Research (CIFRE). CIFRE fellows sign a three years' full-time work contract⁶⁴ with a French company (SME or large firm). CIFRE fellows are enrolled in a doctoral course in a French university laboratory and attend all relevant courses. The PhD candidate is monitored by a thesis supervisor. This is co-funded by the French ministry for research and the company employing the PhD candidate. In 2015, among the 1,383 CIFREs selected nationally, 43 were hired in Pays de la Loire (3.1%) which is stable compared to previous years. The main beneficiaries are the computer sector, the health/ biotechnology sector, the agri-food sector and the mechanics-materials sector (Préfecture Pays de la Loire, 2015).

Another lighter scheme in terms of length, which is regional, is the PhD candidate Expert (Doctorant expert)⁶⁵ which offers the possibility for an enterprise (SME or large firm) of hiring 32 person days over a year (with about €335/month for the candidate) preferably in the second or third year of a PhD.

A last scheme to be mentioned is the Performance Innovation Objective. The beneficiaries are exclusively SMEs but there is a possibility for mid-cap enterprises⁶⁶ (ETI) to benefit from the scheme as well. The financial support is a grant amounting to 30-70% of the gross wage of a senior/management position. The grant only targets the industrial sector.

Policy implementation process

The policy implementation process in Pays de la Loire lies in the hands of the actors operating under the umbrella of the Regional Innovation Network (RDI).

Most industrial support policy measures are implemented through open schemes that are not competitive (DINAMIC scheme, Bpifrance loans) but also through calls for proposals (for example funding related to competitiveness clusters).

The trend that was emphasised with the smart specialisation strategies and the general acknowledgement of a growing scarcity of public financial resources is to concentrate on selected regional policy priorities. As a result, the selection criteria of most of the schemes target the sectors selected in the smart specialisation strategies (advanced manufacturing techniques (TAP - *technologies avancées de production*); maritime industries; food and bio-resources; computer science and electronics; design and cultural and creative industries and 'therapies of tomorrow' and health). The other important selection criteria relate to the expected economic returns and job creation.

Regional stakeholders are informed about the policy measures through direct contacts with RDI actors or directly via their online platforms. There is also a single entry point for information about economic support measures and a directory of actors (see the good practice box).

Concerning innovation support measures, the Regional Council created a single entry point for information which is the Regional Innovation Development Network (RDI). The RDI is facilitated by one agent from the Regional Economic Development Agency. The RDI developed a dedicated website⁶⁷ which aims at being pedagogic, comprehensive and informative.

The website has four categories:

⁶⁴ http://www.anrt.asso.fr/fr/espace_cifre/accueil.jsp#.WBIX19wTunc

⁶⁵ <http://www.univ-nantes.fr/doctorant-expert>

⁶⁶ An mid-cap enterprise (ETI) is a company with between 250 and 4,999 employees, and a turnover which does not exceed € 1.5 billion or a balance sheet total which does not exceed € 2 billion. A company with fewer than 250 employees but a turnover greater than €50 million and a balance sheet exceeding € 43 million is also considered to be of intermediate size. ETIs represent an intermediate category between small and medium enterprises and large companies.

⁶⁷ <http://www.territoires-innovation.paysdelaloire.fr/>

- *Discover innovation* – with reports and notes introducing the concept of innovation, with data on innovation at regional level, a presentation of the regional innovation strategy and a presentation of the innovation support structures
- How to innovate
- Success stories
- Events

This website is useful as an entry point, however, the large number of innovation support structures can make it difficult to select a specific operator. One of the challenges of the loi NOTRe and the new economic strategy SRDEII is to further organise the innovation support system.

Interviews did not reveal any form of tensions or oppositions with regard to implementation, apart from the need to make the administrative burden lighter for businesses, which is a standard criticism addressed to the French support system to firms as a whole.

International cooperation

The Regional Council supports the international networking activity of regional actors and is aware of the importance of international activities in terms of access to knowledge, attractiveness, visibility, funding.

The region benefits from international industrial development support programmes and in particular programmes related to advanced manufacturing (IRT Jules Verne acts as a national contact point on this matter). The actors implementing the industrial policy are involved in international and specifically EU networks.

The Regional Council itself is part of the Vanguard Initiative, an EU initiative that seeks ‘to lead by example in developing interregional cooperation and multi-level governance for supporting clusters and regional eco-systems to focus on smart specialisations in priority areas for transforming and emerging industries’⁶⁸.

However, there is little information that leads to the conclusion that the regional policy capacity is fed by international cooperation even though there are some examples.

International collaborative R&D projects

A major challenge for French actors and also for the regional actors is to strengthen their participation in Horizon 2020 projects. Indeed, the participation of French actors in the last three EU framework programmes (FP) (1998-2013 period) has declined steadily. During FP5, France received 13.4% of the EU funds available. This share has fallen to 11.4% for FP7, amounting to €5 billion. During the first year of implementation of Horizon2020, the share of French actors continued to decline (IGEANR, 2016).

In order to tackle this decline, EMC2 is taking part in the national ‘Pro-SME’ initiative, in collaboration with other French competitiveness clusters in other French regions (Plastipolis and LUTB – Auvergne Rhône-Alpes region and Véhicule du Futur – Grand Est region). EMC2 also created a European Task Force: three times a year, this task force gathers companies and research organisations engaged or interested in European projects, in order to share good practices and discuss new opportunities. It is run by EMC2 together with IRT Jules Verne and UNAM (Université Nantes Angers Le Mans).

⁶⁸ <http://www.s3vanguardinitiative.eu/ambitions>

The IRT Jules Verne is the National Contact Point for the Horizon2020 Nanotechnologies, advanced materials and advanced Manufacturing and Processing⁶⁹ (NMP Programme). The IRT is in charge of awareness-raising and informing French companies about the opportunities of Horizon2020 and supports the submission of project proposals.

IRT Jules Verne is a member of several European networks, including:

- EFFRA (European Factories of the Future Research Association)
- EARPA (European Automotive Research Partners Association)
- EUROBOTICS⁷⁰ (European Robotics Association)

The region, through the Regional Economic Development Agency, is also increasing its involvement in the Vanguard Initiative.

Interclustering and brokerage activities

At European and international level, the EMC2 cluster has signed a series of bilateral partnership agreements, (Technopolis group et al., 2016). These are part of an internationalisation strategy of EMC2 cluster to its members and the objective of increasing the cluster visibility worldwide as well as promoting trans-national research and development projects. Partnerships include the following:

- In Europe – M2i, TU Delft and NAG in the Netherlands, M.A.I Carbon & Carbon composites e.V., Fraunhofer Lightweight Alliance in Germany, VM CATAPULT and KTN in the UK, Tecnalia, CTAG, IK4 and PRODINTEC in Spain, among others.
- EMC2 has a strong partnership with CRIAQ in Quebec since 2009.
- EMC2 has a new partnership with the National Composites Center, the Gifu Composites Center and the Ishikawa Composites Center and in Greater Nagoya, Japan (2014).
- EMC2 signed a partnership agreement with Berkeley University in the USA in 2014.
- EMC2 also organises trade missions with its members and receives international delegations and visits, in cooperation with the regional Chamber of Commerce and Industry.

These agreements do not necessarily contain precise sets of actions but can imply exchange of students or researchers, mutual promotion, exchange of good practices, cross-invitation of speakers to conferences, etc.

Since 2011, EMC2 has also been organising an Inter-Cluster Brokerage Event (ICBE) to discuss opportunities to join EU-funded projects and strategies for cross-cluster collaboration. It is an opportunity to network with European clusters and research centres such as CFK-Valley⁷¹ from Hamburg or Campaniaerospace⁷² in Italy.

On 24 June 2015 EMC2 and IRT Jules Verne jointly organised the first edition of the European Brokerage Event on Advanced Manufacturing and Processing in the wake of Horizon 2020's NMP Programme. The purpose of the event is to stimulate match-making between potential partners (firms or public research organisms) of research and development projects that could be submitted to calls for projects within Horizon 2020. The event will now be organised once every two years in Nantes and every other year in the UK by High Value Manufacturing Catapult⁷³ HVM. The event attracted 150

⁶⁹ <http://ec.europa.eu/programmes/horizon2020/en/h2020-section/nanotechnologies-advanced-materials-advanced-manufacturing-and-processing-and>

⁷⁰ <http://roboproject.h2214467.stratoserver.net/>

⁷¹ <http://cfk-valley.com/en/association/club/>

⁷² www.italsystemsrl.it/en/campaniaerospace

⁷³ <https://hvm.catapult.org.uk/>

participants from 14 different countries, with about 130 persons involved in more than 280 business-to-business (B2B) meetings.

In 2016 the Jules Verne Manufacturing Valley, with the support of Daher Group and national, regional and local authorities organised the first edition of the 'Manufacturing Thinking' conference⁷⁴ directed to industrial audience. The objective was to:

- Strengthen participating firms' response to changing market conditions
- Understand current market dynamics and the impact on manufacturing,
- Identify the issues affecting the business
- Optimise firms' networking.

⁷⁴ <http://www.manufacturing-thinking.com/en>

Monitoring and Evaluation

The interviews and literature review report that public authorities do monitor the regional industrial policy measures. However, the nature of industrial policy, scattered among different actors, results in the fact that monitoring processes are conducted on a measure by measure basis. Therefore, there is no formalised and a centralised monitoring process of industrial policies, gathering monitoring data across the different policy measures and across the different organisations in charge of the implementation of the policy (such as the Regional Economic Development Agency, DIRECCTE, CCIR, Bpifrance).

The monitoring process is organised along three different layers:

- At the single policy-measure level (micro): each policy measures and funding scheme funded by the Regional Council is monitored by the regional administration and the Regional Economic Development Agency, collecting information on the number of projects, beneficiaries, funding.
- Within the organisations in charge of the implementation (meso), an annual activity report generally informs about the implementation of policy measures and specific projects:
- the CCI Pays de la Loire publishes detailed annual reports with indicators such as the number of enterprises visited and supported, the number of trainings delivered. The annual accounts are also published⁷⁵ (2015 report is publicly available);
- The DIRECCTE publishes an annual activity report with monitoring data available (2012 to 2015 reports are available);
- The Regional Economic Development Agency Territoires d'Innovation publishes an annual activity report on activities implemented (data, briefing of events, successful projects, etc.⁷⁶ (2015 report is publicly available);
- Bpifrance annual activity report for Pays de la Loire are available on the web (2013, 2014)⁷⁷.

At the regional level (macro), the Socio-Economic Regional Observatory (ORES) provides monitoring data, regional indicators, and produces knowledge on the regional industrial fabric, its performance and its challenges. However, it is less an instrument for monitoring the implementation of policy measures (activity, outputs, outcomes, effects) than a tool for providing intelligence to regional policy-makers to inform policy decisions.

The monitoring process, even scattered across different levels and organisations, still informs the annual decision-making process on the budget of the Regional Council. For instance, the reports drafted by the Regional Council administration feed in the discussion of the Regional Assembly on the annual budget and include some data and information on the implementation of the policy measures funded by the Regional Council.

In addition, in 2009 the Regional Council set up the Regional Commission for the monitoring and evaluation of economy⁷⁸, the assignment of which is to control the efficient use of regional public funding by socio-economic actors. The Commission is composed of elected people from the Regional Council, union representatives, chambers of commerce representatives, and the regional agency for

⁷⁵ <http://www.paysdelaloire.cci.fr/nous-connaître/consulter-notre-rapport-dactivite>

⁷⁶ <http://www.agence-paysdelaloire.fr/nospublications/rapport-dactivite-2015-de-lagence-regionale-pays-de-loire/>

⁷⁷ <http://www.bpifrance.fr/Actualites/A-la-une/Bpifrance-Pays-de-la-Loire-bilan-d-activite-2014-15292>

⁷⁸ <http://www.paysdelaloire.fr/politiques-regionales/economie/actu-detaillee/n/aides-regionales-creation-dune-commission-d8217evaluation-et-de-suivi/>

working conditions. The Commission is supposed to publish annual reports but none are available online at the time being.

Last but not least, there is a comprehensive monitoring system for the implementation of the ERDF and ESF 2014-2020 regional operational programme (ROP) in place. This system is managed by the Managing Authority of the ROP (which is the Regional Council) under the supervision of the European Commission. However, it monitors only the industry-related policy measures and projects co-funded by the ERDF and ESF (the Technocampus for instance). In addition, the monitoring system is not accessible to the public. Indicators are available in the operational programmes, these are output (number of participants in a training session) and result indicators (number of new products on the market).

Monitoring and evaluation is not completely 'embedded' into the implementation process. All policy support schemes have defined standard activity and output indicators (such as number of grants delivered, number of firms receiving the grants or other support) that are usually collected on an annual basis. However, when it comes to measuring the impacts of the policies implemented, the results and impact indicators are mostly collected during ex-post evaluations via final beneficiaries' surveys and not necessarily collected during the implementation process. There are examples though, such as the competitiveness cluster policy, which sets up a detailed reporting process with indicators that makes interim and final evaluations easier when it comes to measuring results. As such, there is no clear evidence of the existence of a 'virtuous learning cycle' in the policy implementation phase.

Evaluation of policy

As for monitoring, there is no regular or standardised external evaluation process across policies and public authorities. First, evaluation is not widely developed in France, but the value added of such exercise is becoming more and more obvious for policy makers. Second, there is also confusion between monitoring/reporting, auditing and a comprehensive evaluation process which investigates not only effectiveness/efficacy criteria but also efficiency, relevance, coherence. Therefore, the evaluation policy of the region is rather a collection of single evaluations carried out from time to time rather than a systematic and comprehensive evaluation policy.

At the regional level, when evaluations take place, they focus on specific policy support schemes or specific structures rather than on the overall policy strategy (meta-evaluation). The Regional Council indicates that several evaluations were carried out for some major parts of the 2007-2013 strategy, such as DINAMIC Enterprises, the regional innovation platform or the RDI network.

In addition, three region-wide evaluations were produced by external consultants:

- Evaluation of technology transfer and innovation structure / *Évaluation des dispositifs d'innovation et de transfert de technologie en Pays de la Loire* (2005-2006) Conseil Régional et DRIRE Pays de la Loire – 2006 (not published)
- Mid-term evaluation of the CPER / ERDF 2007-2013 - Evaluation à mi-parcours du CPER et PO FEDER des Pays de la Loire (2007-2013) - Préfecture de région Pays de la Loire – 2010 (published⁷⁹). The scope of the evaluation was an overall assessment of the two programmes and a focus on three topics including the DINAMIC Enterprise programme⁸⁰. The evaluation was commissioned by the European Commission.
- Évaluation du schéma régional de développement économique (SRDE) 2006-2010 - Région Pays de la Loire – 2010 (not published)

⁷⁹ <http://www.europe-en-france.gouv.fr/content/download/16352/138487/version/1/file/Pays-de-la-loire.zip>

⁸⁰ The two other topics were on water and biodiversity and mobility.

At national level, the first major piece of evaluation was performed for the poles of **competitiveness policy**. Three rounds of external evaluations have been performed since 2005, the last one was completed in 2016. The three evaluations followed the same methodology. These are quite comprehensive exercises with two evaluation strands, the first one concerning an individual evaluation of each pole (71 clusters in 2016) and the second strand an evaluation of the policy. Recommendations were formulated for each pole, and for the national level. The individual reports are kept as confidential, only available for the state administration (ministry, and DIRECCTE), the Regional Council, and the board of the pole of competitiveness. As such, EMC2 and the other regional competitiveness clusters were evaluated. The evaluation was completely externalised. Only the synthesis report of the first and second round of evaluations are published on the national competitiveness cluster website⁸¹.

Policy measures of the Investment for the Future Programme are also evaluated. The IRT Jules Verne was evaluated as well as the Technology Transfer Acceleration Companies (SATT⁸²), the regional one being Ouest Valorisation, which was evaluated in 2015. For these two evaluations, none of the reports were made public, and they tend to be extremely confidential as it is often the case in the French culture.

The local level can be the most virtuous in terms of evaluation culture. Indeed, the Nantes Metropole local authority evaluated 10 years of innovation policy support (see next section). In 2012, the CARENNE Metropole (Saint-Nazaire) commissioned a private firm for an *ex ante* evaluation for the development of a potential innovation policy.

Finally, the Regional Court of Auditors (*Cour régionale des comptes*) is a public body with the objective to control and evaluate public spending and public or semi-public structures. In 2013, the Regional Court of Auditors produced three reports⁸³ dealing with the regional policy management of the economic/industrial policy with one report dealing with the management of the Regional Council and two reports dealing with the legal entities forming the Regional Economic Development Agency⁸⁴.

Evidence on effectiveness

Evidence on effectiveness of the industrial policy measures is not easily accessible first and foremost because evaluations are mostly carried out on a single policy measure basis. Summing up the results of the evaluations available, the conclusions could be the following:

- Measures are usually deemed relevant by beneficiaries that show their satisfaction in being supported in developing their business;
- The evaluation system is not yet sophisticated enough to address the impact on firms and on the overall regional competitiveness. It remains difficult to identify the pathway originating from a given support measure and to its possible impacts on the territory;
- The large number of actors supporting industrial firms could definitely be a barrier to effectiveness. However, they are organised in a way that limits redundancy (see section 0. and the support measures organised as pathways).

⁸¹ <http://competitivite.gouv.fr/>

⁸² SATT – Société d’Accélération du Transfert de Technologies

⁸³ Chambre régionale des Comptes Pays de la Loire, 2013, Observations définitives concernant la gestion de la SEM régionale des Pays de la Loire, Années 2006 et suivantes ; Chambre régionale des Comptes Pays de la Loire, 2013, Observations définitives concernant la gestion de la région des Pays de la Loire, Années 2007 et suivantes; Chambre régionale des Comptes Pays de la Loire, 2013 , Observations définitives concernant la gestion de la société publique régionale des Pays de la Loire

⁸⁴ legal status : Société Publique Locale and Société d’Economie Mixte

The content of some evaluations illustrates these overall conclusions. For example, the **evaluation of the DINAMIC scheme performed in 2010** concluded the following:

- The scheme's objectives were rather ambitious (2,000 firms in seven years over the 2007-2013 period), that is to say more than 280 firms a year.
- This ambition was reduced to 225 firms per year due to the 2008 economic crisis.
- At the halfway mark, the scheme had benefited 445 enterprises, with a total of 18,486 employees.
- The smallest businesses (fewer than 50 employees) represented 76% of beneficiaries.
- The industrial sectors represented in the DINAMIC scheme provide a good match with the regional landscape (manufacturing of metallic products, repairing, manufacturing of machines and equipment, pharmaceutical industry).

The evaluator concluded that the scheme contributed to strengthening the existing economic landscape. DINAMIC also has a positive impact, although to a lesser extent, on innovation. As of October 2015, 1,032 SMEs had been supported by the DINAMIC scheme, corresponding to 50,000 employees. This was the date of a new assessment performed by the French National Central Bank (*Banque de France*) and a satisfaction survey implemented by a private firm. The assessment evaluated a population of 402 firms for the September 2008 to August 2011 period and 395 firms for the January 2010 to December 2013 period. The assessment found that 41% of SMEs entering the programme had a deficit and, from 2008 to 2011, SMEs were on average more fragile than the rest of regional SMEs (*Banque de France* indicator). The satisfaction survey was very positive, finding that the scheme has a positive impact on two-thirds of businesses, and a significant impact on 55% of them. There was an impact on sales for 58% of the businesses surveyed at the end of the DINAMIC intervention. And 50% of SMEs indicated an increase in their staff. When measured two years after the end of the DINAMIC interventions, supported SMEs were responsible for the creation of 400 new jobs. Finally, 85% of beneficiaries were satisfied with the support provided.

Since its creation in 2001, **Nantes Metropole** supports innovation through investments in shared research equipment and business parks and incubators, support to innovative enterprises, support to business clusters and competitiveness clusters, organisation of events and support to the Atlanpole Technopole⁸⁵ (EU business and innovation centre). In 2013, the Metropole launched a comprehensive external evaluation of **10 years of innovation policy**. This evaluation concluded that the most effective actions were the ones dedicated to innovative sectors (biotechnologies, ICT, aeronautic, marine energies), the organisation of events, and the policy of hosting researchers (which enabled the emergence of composite materials as a topic at the engineering school Ecole des Mines of Nantes⁸⁶). The metropole supported eight competitiveness clusters.

Recognising the efforts of working together with the other institutional partners (through co-funding in particular), the areas identified for improvement were:

- increase work on the co-building of a common strategy;
- act as a facilitator/leader for innovation support actions within the metropole;
- for all sectors with a dedicated governance body, increase involvement in the RDI network (in particular in the information database).

The evaluation recognised the increase (with respect to innovation policy) in dedicated human resources (from 0.5 FTE in 2002 to 1.6 FTE in 2012) but identified the need for even greater efforts, in particular for the monitoring of the strategy. One should note that a synthesis of the evaluation was made public and a communication document was developed, which is still an uncommon practice.

⁸⁵ <http://www.atlanpole.fr/>

⁸⁶ <http://www.mines-nantes.fr/en/>

The 2013 report of the Regional Court of Auditors investigated the Regional Council intervention in the field of economic development. The court underlined the Regional Council's commitment to address the impact of the economic crisis, through innovation and increased support to enterprises and sectors. This took the form of increased funding, even though there was no public budget increase until 2012. The court observed that the large number of actors in the field of economic development made the organising role of the Regional Council even more necessary. The Regional Council should improve the coherence and transparency of its support system to its beneficiaries and should seek a greater coherence among its various interventions, with the objective of an optimised use of public money. The court finally stressed the fact that the Regional Council had not developed the evaluation of its support schemes to a great extent, and suggested that it should do so.

Assessment of the regional industrial policy capacity and its transferability

Five key aspects of the regional industrial policy may be highlighted. Only some of them can be transferred. Some of them need to be transferred together as a package (for instance the comprehensive policy mix and an effective cross-institutional collaboration).

The major regional asset in terms of industrial policy capacity is its multi-stakeholder involvement and collaborative approach: This asset is not transferable as such since it relies on ‘collaboration as a regional cultural heritage’. ‘The collaborative approach is deeply rooted in the culture of the region. The manufacturing sector has a long tradition of local collaboration, which was already illustrated by its capacity to recover from the economic crisis of the 1930s, which hit particularly the shipyard industry, at that time the region’s first employer, by shifting the production capacity towards new markets, in particular the aerospace and automotive industries’ (Technopolis et al., 2016). The interviews carried out insisted strongly on this point.

The ‘*jeu à la Nantaise*’, which means being offensive and collective at the same time, is reflected in formal and informal actions carried out by public and private decision-makers. Informal means the attention paid by local and regional policymakers to large industrial groups’ needs in times of local or regional crisis (for example in terms of restructuring policies, such as the Power8 airbus plan), or during the economic crisis, or even in more positive times (for example observation of industrial groups organised internally by Nantes Métropole). ‘Offensive’ means also a capacity of decision-makers to act collectively but within a short timeframe, and despite the administrative ‘*mille-feuille*,’ which is an obstacle to smooth and efficient public intervention. The most interesting example of quick policy interventions were the development of the Technocampus on composites or the creation of regional innovation platforms as an answer to the economic crisis. In addition, regional actors can be seen as ‘offensive’ in the way they aim at being the European leaders in advanced manufacturing.

Another evidence of the multi-stakeholder approach is the priority in regional public interventions given to mutualisation of resources. The most obvious example being the Regional Innovation Platforms (PRI, *Plateformes Regionales d’Innovation*) where collective investment in equipment are available to firms.

The second regional asset of Pays de la Loire is that the region benefits from a complete and comprehensive policy mix tackling its industrial challenges in various ways: through direct financial support to individual industries (via Bpifrance, tax credits), to support measures to spur innovation in industrial firms (innovation pathway), to support to collaborative work (clusters, collaborative R&D, etc.) and improved access to high-tech infrastructures (Technocampuses for example). However, it is unlikely that a single public authority can finance all policy mix measures from its own budget. Indeed, in Pays de la Loire, the policy mix is financed by different levels such as the Regional Council, the state, the EU. Implementing a comprehensive policy mix is transferrable provided there is an effective collaboration between different levels of institution (see point four on cross-institutional collaboration below).

The third regional asset, although there is a complete policy mix, is a clear policy orientation towards the development of favourable ecosystems to boost industrial firms. The policy objective of developing favourable ecosystems, such as R&D and technical infrastructures in Technocampuses, regional innovation platforms, and technical centres and work practices, through the support to networks and clusters, can be defined as an indirect approach (compared with targeting firms directly by granting direct financial support). This indirect policy approach is more strategic but the results and impacts are more difficult to capture and measure without an embedded evaluation scheme. The policy impact is not direct, and results on regional economic competitiveness can only be measured in the long term. This means that the large investments (public and private) necessary to create such ecosystems can easily be put at risk, or at least questioned in view of political change. This approach is transferable, but setting up a dedicated monitoring, reporting and evaluation policy in order to prove

the effectiveness of the policy and ensure that investments are secured over the long-term despite any political changes is advisable.

The fourth regional asset is cross-institutional collaboration. This was a pre-condition for Pays de la Loire to implement its economic development policy, given the administrative nature of the French system. This cross-institutional collaboration is effective and facilitated by the fact that local actors pursue the same goal. This is a transferable good practice provided that coordination mechanisms are in place, whether informal or formal and contractual.

The fifth regional asset is private sector involvement/ entrepreneurial discovery: Pays de la Loire benefits from the proximity of local authorities to industrial groups, and the attention paid to them as heads of sectors, was a good practice.

In more general terms, businesses are completely engaged in policy-making. First, at least since 2006, the drafting of strategies has engaged enterprises in the process. Second, the region has financed key policy instruments which rely heavily on industry (both industrial groups and SMEs): the EMC2 cluster, the IRT Jules Verne and the business cluster Neopolia.

This is transferable with the pre-conditions that: i) key entrepreneurs and business CEOs are identified in each regional sector (this can be done through industry federations, if they exist, or business clusters) and are integrated in formal collaboration mechanisms; ii) that larger consultations or surveys are carried out with regional firms when regional strategies are defined, in order to capture their opinion and share their priorities; iii) that firms, and mainly larger firms (buyers), are involved in the financing of public-private projects.

The final regional asset is the existence of policy intelligence: The Pays de la Loire region has a wealth of policy intelligence to use, produced by many structures. The good practice in this case is the existence of the umbrella regional structure ORES, which compiles and analyses a wide range of local and regional data. The information is accessible and available on very specific subjects. This policy intelligence is used by the Regional Council and Regional Economic Development Agency. The next step would be to use it as a more strategic tool and combine it with a proper and systematic evaluation system at regional level in order to capture policy impacts in the medium to long-term. This is a transferable practice as long as the regional authority is able to ensure the coherence of various data providers and information exchange.

Based on the finding of the case study, the following good practices can be highlighted.

Table 10 : Summary of good practices/industrial policy capacity

Factors of good practice	Good practice	Short description	Transferable elements to other regions
Multi-stakeholder involvement and cross-institutional collaboration	Different types of policy coordination mechanisms	<p>Informal policy coordination mechanisms through interpersonal relationships</p> <p>Setting up of inter-institutional commissions gathering different types of stakeholders to provide critical analysis of new policies or expert advice on specific issues</p> <p>Elaboration of formal contracts between various stakeholders, whether institutional stakeholders or economic stakeholders</p>	<p>Only the formal policy coordination mechanisms are transferable. In order to be successful in implementation, the commissions that are set up should remain stable over the years and be used even if different strategies are set up (for example, the definition of the smart specialisation strategy made use of the commissions that were set up for the definition of the economic development strategy).</p>
Supporting the 'entrepreneurial discovery' process	Firms as part of the policy capacity	Engagement of firms in most parts of the policy design and implementation process	In order to be successful in the entrepreneurial discovery process, the policy makers should identify key entrepreneurs/business CEO's in each regional sector for participation in formal

			<p>collaboration mechanisms.</p> <p>Firms can therefore channel policy information and engage other firms to participate in large consultations or surveys, when regional strategies are defined periodically.</p> <p>One key aspect for a successful participation of firms is that they have an interest in their participation. To involve larger regional firms in the financing of key measures through public-private projects are a way to ensure 1) the relevance of the action, 2) an effective involvement in the definition of the policy.</p>
Rapid deployment and up-scaling of advanced manufacturing technologies	Technocampuses and regional innovation platforms	Develop technology and R&D platforms accessible to regional actors (including SMEs) in order to favour the upgrade and modernisation of productive capacities	As it requires massive investments, ensure that co-funding between various public authorities is managed and that the private sector is also engaged in the co-funding.
Use of policy intelligence	Umbrella regional structure ORES	Compilation and analyses a wide range of local and regional data from various regional observatory	Easily transferable as it only requires different funding bodies to work together.

Policy pointers

The overall regional policy objective of keeping the large industrial groups on site, thanks to the development of favourable and innovative ecosystems, was quite successful as of 2016. The presence of large buyers kept smaller suppliers in the region. Suppliers developed and started to modernise their production. This has resulted in the fact that industrial jobs are kept in the region and that higher-level competences are needed in the industries there.

The development of innovative ecosystems was more the result of a strong and stable political vision, based on collaborative policy mechanisms, than the result of an evidence-based policy approach.

In terms of industrial policy capacity, a step forward could be to better monitor industrial policy results and impacts and systematically evaluate support schemes put in place. Among the possible improvements are:

- **Setting clear and transparent objectives:** Clear objectives have been formulated for future-oriented/anticipatory policies. However, the strategic documents could be more ambitious and set quantitative targets. The existing observatories and information merged in the ORES could be used for that purpose.
- **Systematic and objective monitoring and evaluation:** Evaluation of strategies and instruments (*ex ante*, interim and *ex post*, counterfactual impact evaluation) should result, where needed, in adapting policies to achieve value-added for the region (also in relation to cost effectiveness). Several policy support schemes have already been evaluated. However, evaluation is neither systematic nor strategic enough to support policy-making.
- **Evaluation capacity/existence of adequate skills:** Data and time resources for preparing and conducting regional industrial policy evaluations (or outsourcing them effectively) should be ensured. The interviews performed did not allow the collection of sufficient information, but it seems that evaluation capacities are not sufficient to systematically monitor the regional policy.
- **Indicator framework:** It would be useful to define a limited set of outputs, outcomes and impact indicators at the strategy and/or programme level associated to the new regional scheme of economic development, innovation and internationalisation (SRDEII 2017-2022).

A final policy pointer would be to reduce the overall number of support schemes available to enterprises. The organisation of pathways (innovation, internationalisation) were a first step to propose a clearer landscape to potential beneficiaries and can be identified as a good practice. However, the simplification of the landscape could go a step further in making collaboration of policy support structures transparent to the final beneficiaries. It means that for example instead of 11 different schemes proposed to address internationalisation of firms, a single tool could be co-funded by the different actors.

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Annex A: Key socio-economic indicators for the Pays de la Loire region

Demography							
	2011	2012	2013	2014	2015	Evolution (2011-2015)	EU28 (last year available)
Number of inhabitants	3,601,113	3,632,614	3,660,852	3,688,401	3,716,068	1%	508,450,856
Population under 30 - Percentage of total population	37%	37%	37%	37%	36%	0%	33%
	2010	2011	2012	2013	2014	Evolution (2010-2014)	EU28 (last year available)
Inhabitants per km2	111.8	112.7	113.7	114.5	115.4	1%	116.7
Economic Profile							
	2010	2011	2012	2013	2014	Evolution (2010-2014)	EU28 (last year available)
GDP (in million euro)	96,625	101,912	103,149	105,175	106,572	2%	13,959,739
Number of enterprises in manufacturing (Number of local units)	14,483	N/A	14639	14838	15623	2%	N/A
	2011	2012	2013	2014	2015	Evolution (2011-2015)	EU28 (last year available)
Employment - Percentage of population (from 15 to 64 years)	65%	67%	67%	68%	68%	1%	66%
Unemployment - Percentage of population (15 year and over)	9%	8%	9%	9%	9%	2%	9%
Share of employment in manufacturing (Percentage of total employment)	18%	17%	16%	15%	16%	-2%	15%
Share of employment in high and medium high-technology manufacturing (Percentage of total employment)	5%	5%	4%	5%	5%	0%	5%
Share of employment in high technology manufacturing	1%	1%	1%	1%	1%	-6%	1%

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(Percentage of total employment)							
Share of employment in knowledge intensive services (Percentage of total employment)	42%	41%	40%	42%	43%	0%	39%
	2009	2010	2011	2012	2013	Evolution (2009-2013)	EU28 (last year available)
Share of gross value added at basic prices - Industry (except construction)	18%	17%	18%	18%	18%	0%	19%
Share of gross value added at basic prices - Manufacturing	16%	15%	16%	16%	16%	-1%	15%
Share of gross value added at basic prices - Agriculture, forestry and fishing	2%	3%	3%	3%	3%	3%	2%
Share of gross value added at basic prices - Construction	8%	7%	7%	7%	7%	-1%	5%
Share of gross value added at basic prices - Services	72%	73%	72%	72%	72%	0%	74%
Human capital							
	2011	2012	2013	2014	2015	Evolution (2011-2015)	EU28 (last year available)
Persons with tertiary education (ISCED) - Percentage of active population	29%	29%	31%	33%	35%	5%	33%
Persons employed in science and technology - Percentage of active population	31%	31%	31%	31%	33%	2%	31%
Persons with tertiary education (ISCED) and employed in science and technology - Percentage of active population	18%	19%	19%	20%	21%	4%	21%
Participation rate in education and training (last 4 weeks) - %	6%	6%	20%	21%	20%	37%	11%
Innovation performance							
	2009	2010	2011	2012	2013	Evolution (2009-2013)	EU28 (last year available)
SMEs introducing product or process innovations as percentage of SMEs				47.60%			

R&D expenditure : Business enterprise sector (% of GDP)	1%	1%	1%	1%	1%	0%	1%
R&D expenditure : HERD + GOVERD (% of GDP)	0%	0%	0%	0%	0%	2%	1%
	2008	2009	2010	2011	2012	Evolution (2008-2012)	EU28 (last year available)
Patent applications to the EPO by priority year per million inhabitant	66.0	74.1	80.1	70.4	60.3	-2%	70.4
High-tech patent applications to the European patent office (EPO) by priority year per million inhabitant	8.5	11.0	9.0	11.7	7.2	-4%	14.3

Source: Eurostat, 2016

Annex B: Policy measures in support of industrial development

Title	Duration	Policy priorities	Budget	Managing organisation
Etincelle Innovation	2013-ongoing	5.3. Innovation awareness- raising	n/a	RDI - Réseau de Développement de l'Innovation en Pays de la Loire
Déclic Innovation	2013 - ongoing	5.4. Innovation management and advisory services	n/a	Chamber of Commerce and Industry (departmental level)
Tremplin Innovation	2013 - ongoing	5.4. Innovation management and advisory services	n/a	Chamber of Commerce and Industry (departmental level)
Dinamic Entreprises	2007 - ongoing	5.4. Innovation management and advisory services	n/a	Chamber of Commerce and Industry (departmental level)/ DIRECCTE / Agence
Innovative Territory Chèque	2013 - ongoing	4.1. Direct funding to business R&D and innovation / 5.4. Innovation management and advisory services	n/a	RDI - Réseau de Développement de l'Innovation en Pays de la Loire
First step Innovative Territory	2013 - ongoing	4.1. Direct funding to business R&D and innovation / 5.4. Innovation management and advisory services	n/a	RDI - Réseau de Développement de l'Innovation en Pays de la Loire
Participatory loan CCI Innovation / (Prêt participatif CCI Innovation)	2014 - ongoing	4.1. Direct funding to business R&D and innovation	n/a	CCI Pays de la Loire (level of department), in cooperation with BPI France
Prêt régional de redéploiement industriel - P2RI	2016 - ongoing	4.1. Direct funding to business R&D and innovation		Regional council & Private banks
Fonds Pays de la Loire Territoires d'Innovation	2015-2016	4.1. Direct funding to business R&D and innovation	€ 20 million	PIA + Regional council
Fonds régional d'aide au conseil - secteur industrie	n/a	4.1. Direct funding to business R&D and innovation		n/a
CIFRE	2013 - ongoing	2.1. R&D cooperation projects between academy and industry /4.1. Direct funding to business R&D	n/a	Ministry of Higher Education and Research

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		and innovation		
EFFER ' V SENS	2013 - ongoing	2.1. R&D cooperation projects between academy and industry	n/a	CCI Pays de la Loire
Doctorant conseil	n/a	2.1. R&D cooperation projects between academy and industry		n/a
Objective Performance Innovation	2013 - ongoing	4.1. Direct funding to business R&D and innovation	n/a	Agence Régionale Pays de la Loire – Territoires d'Innovation
Maturation fund SATT	2014 - 2020	2.1. R&D cooperation projects between academy and industry / 2.3. Knowledge transfer structures between academia and industry	€ 70 million dedicated to R&D projects	SATT Ouest Valorisation
Research Tax credit	1983 - ongoing	4.6. Tax incentives for business R&D and innovation	n/a	Ministry of Higher Education and Research
Unique Interministerial Fund / (Fonds Unique Interministeriel)	n/a	2.4. Demonstration projects, proto-types and proofs of concepts / 5.1. Cluster development/ 5.2. Science-, technology parks and incubators	n/a	BPI France
Regional Innovation Platform (PRI)	2009 – ongoing	2.4. Demonstration projects, proto-types and proofs of concepts	n/a	Agence Régionale Pays de la Loire – Territoires d'Innovation
Competitiveness clusters	2005 onward	n/a	n/a	n/a
VIA Pack Export – International Volunteers in Enterprises	2012 - ongoing	7.3. Support to participation in international R&I programmes	n/a	CCI Pays de la Loire, in cooperation with Ubifrance
Enterprise Europe Network	2009 - ongoing	7.3. Support to participation in international R&I programmes	n/a	Enterprise Europe Ouest
ABAB (Atlantique Business Angels Booster)	2007 - ongoing	5.5. Seed and early-stage capital vehicles, business angel networks	n/a	ABAB (Atlantique Business Angels Booster)

n/a = information not available

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