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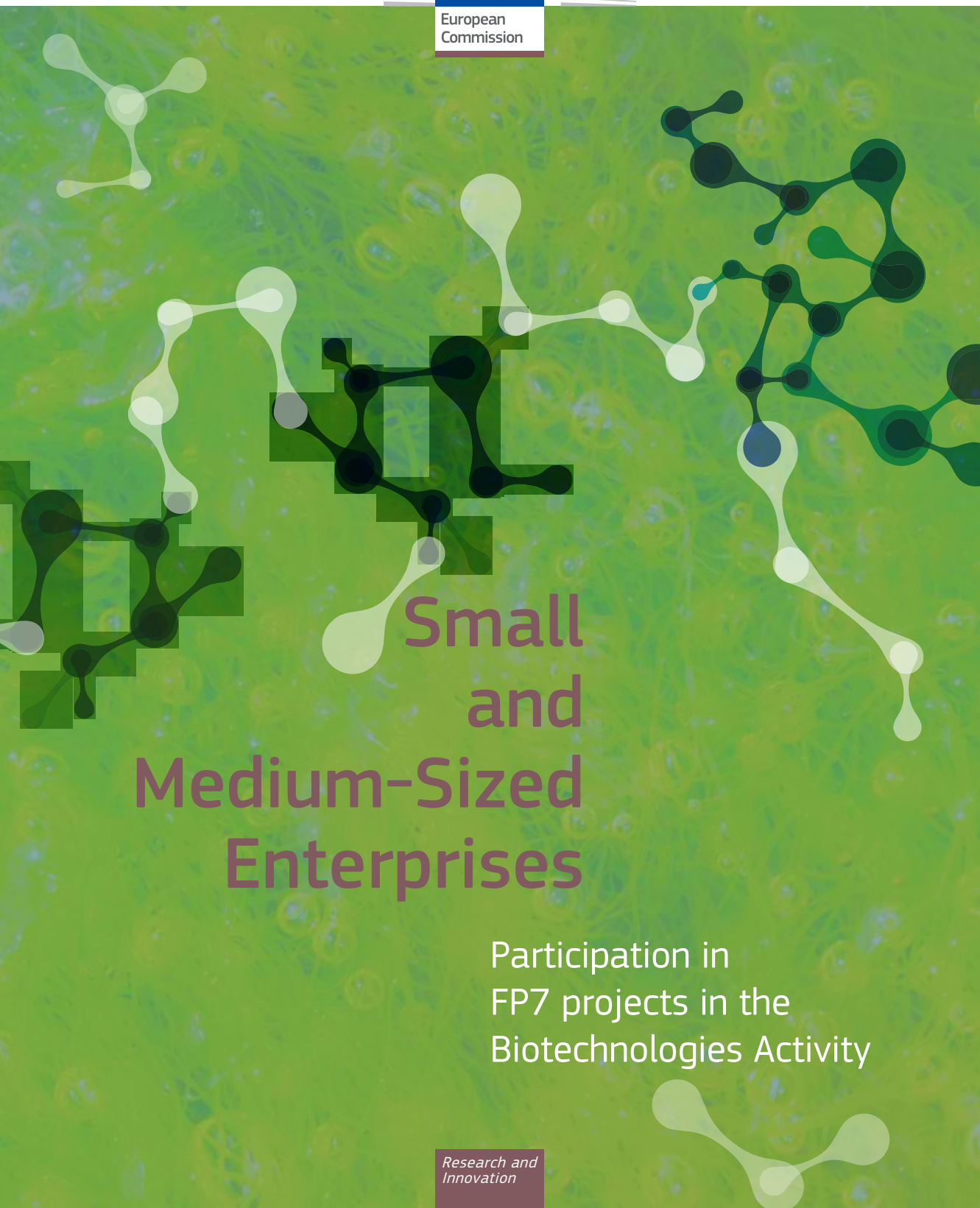

Small and Medium-Sized Enterprises

Participation in FP7 projects in the Biotechnologies Activity

Research and Innovation

EUROPEAN COMMISSION

Small and Medium-Sized Enterprises

Participation in FP7 projects in the Biotechnologies Activity

EUROPEAN COMMISSION

Directorate-General for Research and Innovation
Directorate F — Bioeconomy
Unit F.2 — BioBased products and processing

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Europe's bioeconomy – where opportunities and objectives converge

Robert-Jan Smits
Director-General, Directorate General for Research and Innovation

The bioeconomy can play a key role in helping put Europe back on the path to smart, sustainable and green growth - especially in the context of the current economic difficulties.

In February 2012 the Commission adopted a strategy to help Europe move towards a food-secure more sustainable, post-petroleum society based upon a true bioeconomy. A key component of this strategy is the use of renewable resources from land and sea, transforming waste into valuable resources, and the production of food, feedstuffs, bio-based products and bioenergy, while ensuring environmental protection. The bioeconomy therefore contributes significantly to the objectives of the Europe 2020 flagship initiatives 'The Innovation Union' and 'A Resource Efficient Europe'. At EU level the bioeconomy is already worth €2 trillion, provides 22 million jobs and has the potential to reinvigorate communities in some of our most peripheral and deprived areas.

Biotechnology is one of the main technological drivers of the bioeconomy. Scientists have been modifying plants, animals and microorganisms to change or enhance characteristics for centuries. Today, advances in biotechnology have delivered applications in a broad range of sectors, pushing researchers and companies to new levels of innovation.

These developments are leading to growth and competitiveness in traditional sectors, such as food and the forest-based and chemical industries, and to the emergence of new sectors. We are now able to produce bio-based consumer goods and fuels in more eco-efficient and sustainable ways. Examples of bio-based products include starch-based and cellulose-based ethanol, bio-based adhesives, biochemical and bioplastics.

Small and medium-sized enterprises (SMEs) are among those harvesting the potential in both old and new sectors. They are behind much of the innovation and job creation taking place in Europe, and are particularly active in the biotechnology sector.

This report provides a comprehensive and detailed overview of the very positive impact of the EU's Seventh Framework Programme (FP7) on SMEs in this sector. In total, 25% of EU funding for biotechnology research under FP7 was awarded to SMEs participating

in collaborative projects. The projects benefitted from the SMEs' close relationships with academia and industry, their flexibility and their understanding of customer requirements. And the SMEs themselves gained know-how and expertise, access to advanced tools, opportunities to perform demonstration activities, new customers, and intellectual property right guarantees.

Building on this successful involvement of biotechnology SMEs in FP7, Horizon 2020, the new seven-year EU Framework Programme for research and innovation, will offer even more opportunities for SMEs. The entire programme is open to SMEs, from topics addressing today's major challenges in areas such as health and environment, to topics establishing European leadership in industrial technologies. SMEs can participate as part of a consortium, or through a new SME Instrument for single or groups of SMEs.

The SME instrument has been conceived to fill funding gaps for early-stage, high-risk research and innovation. It targets highly innovative small companies ambitious for growth and interested in new international markets. Its business-oriented focus will bring high-potential innovations closer to the market.

I am pleased to say that with Horizon 2020 we have also made participation simpler, smarter and faster. I am confident therefore that SME participation will increase under Horizon 2020 and we will see even more innovative SMEs getting the very best ideas from the lab to the market.

EXECUTIVE SUMMARY

Between 2007 and 2013, more than 500 small- and medium-sized companies (SMEs) participated in EU-funded projects within the FP7 Activity "Biotechnologies". The successful results show that the European Commission's efforts to provide the most favourable conditions possible to encourage SME involvement have paid off.

SME' involvement contributed to the success of the projects concerned, promoting innovative solutions and bringing the research results close to the market but it also led to concrete benefits for the SMEs themselves. SMEs said they gained many benefits by participating in projects, including the funding needed to do more R&D and innovation, new networks and contacts, and novel skills for staff. The companies also became more competitive and found it easier to gain access to new markets – boosting their profitability and productivity.

Successful SME participants: participation and funding

The European Commission invested €550 million in 129 projects under the "Biotechnologies" activity area of FP7. Some 1 750 research teams were involved. EU-funded projects under this Activity are helping increase EU competitiveness by enhancing scientific knowledge and finding innovative solutions to global problems in relation to demand for renewable sources of energy, waste reduction, greening industries, etc. and key enabling biotechnologies.

The following key figures and data illustrate the main achievements in terms of SME involvement in FP7 biotechnology projects in the period 2007-2013:

- 75% of total EU funding was allocated to topics targeting SMEs.
- SMEs received 25% of the EU contribution provided to project partners. This is well above the EU target of 15%.
- About 38% of participants were SMEs, making them the best represented organisation type (here each SME is counted only once, regardless of the number of projects in which they were involved).
- On average, 90% of EU-funded projects involved at least one SME.

This success can in part be traced back to measures tailoring funding to SMEs' needs and so ensuring their participation in innovative research. The Commission ring-fenced funding for SMEs across the whole of FP7, and strategically targeted areas of particular interest to SMEs in its biotechnology calls. A budget threshold for SME partners was also introduced.

Innovative SMEs towards innovation and market breakthroughs

Participating SMEs were active in four key areas: Research and Development & Manufacturing (56%), consultancy and services (21%), basic R&D (18%), communication and ITC (5%).

Manufacturing, which attracted the most SMEs, mostly involved the production and marketing of bio-based products, goods, services, technologies and facilities. Many were heavily involved in research and technological development to improve and optimise the production chain, proof-of-concept demonstrations, and the commercialisation of research results.

The study shows that they have a crucial role in promoting innovation and facilitating the transition of bio-inventions from the research lab to the market:

- They keep close collaborative relationships with academia and research organisations (e.g.: several SMEs are spin offs, they were founded by scientists and they have highly qualified academic research staff, members of the board of directors or managers are prominent university professors, and they are involved in co-publications, etc.).
- They have more flexible business structures than public organisations such as research centres and universities (and therefore can more easily hire qualified scientific staff).
- They have direct contact with industry at large and the marketplace, so are well-positioned to promote ready-made solutions in the marketplace.
- They are leaders in innovative ideas that meet customers' specific and unique requirements.

SMEs participated as project partners 520 times. Most were private, commercial companies. Spin-offs took part 53 times, spin-outs 8 times and start-ups 25 times. The highest participation rate was from German SMEs (113 times), followed by SMEs from the Netherlands, the United Kingdom and Spain.

Eight SMEs took the lead as project coordinators, while around 130 led at least one work package – the majority of these (52%) were R&D work packages, followed by project management and service provision (41%).

SME participation provided important added-value for the project

The success of a project cannot be attributed to a single participant; project outcomes greatly depend on the degree of cooperation between the different project partners, including academia, research organisations and industry (large enterprises and SMEs). However, the involvement of SMEs does contribute to the performance of an EU-funded project for the following reasons:

- The largest group of SME participants (71%) performed research and technological development tasks. These tasks relied on SME expertise and their specialist profiles, technology and know-how which had an important competitive advantage. This specialisation was crucial to fulfilling project requirements and resulted in added project value.
- SMEs supported project coordinators, ensuring smooth coordination. A 41% of the SMEs led work packages on project management. They performed crucial services on project management including dissemination and communication of project results, preparation of intermediate and final reports, consultancy services (such as market analysis) and life cycle assessments.
- SMEs were strategically positioned to help shape projects from a commercial exploitation perspective: 46% of the SMEs were involved in the commercial exploitation of results, knowledge transfer and intellectual property rights management.

SMEs benefited from their participation in FP7 EU-funded projects

The SMEs involved in EU-funded projects made important contributions to the projects at different stages. At the same time, involvement had a positive impact on many aspects of their business, such as:

- Enhancing or consolidating know-how and expertise in a particular area covered by the project.
- Acquiring new methods, tools, processes and products developed within the projects.
- Making it easier to carry out demonstration activities to identify potential applications and scale them up.
- Acquiring new customers and potential industrial or public partners (networking environment) and developing the company's reputation.
- Working in an environment in which intellectual property rights are well managed. This facilitates patenting of the most promising results for SMEs and safeguards future commercial applications.

While these benefits are clear, it will be necessary to wait a few years for a complete understanding of the full impact for SMEs in terms of exploitable foreground (advancement of knowledge in processes or technologies and commercial exploitation of R&D results) and intellectual property rights (applications for patents, trademarks, registered designs, utility models, etc.). Projects must first be finalised (only about 30% of final reports had been submitted when this report was compiled) and results must be made public (e.g. patents on engineering novel enzymes, chip-scale mass spectrometer systems, treatment methods for the conversion of biomass). Market impacts are therefore also expected to be more visible within a few years.

Promising future under Horizon 2020

The information confirms that the results achieved by SMEs during FP7 were positive in terms of participation, share of funding, added value for the projects and business benefits.

The European Commission will continue encouraging and providing attractive conditions for SME participation under the forthcoming "Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020)" which will include even higher SME targets, thus contributing to more jobs, economic growth and an innovative and competitive European Bioeconomy.

INTRODUCTION

Biotechnology is among today's most innovative technologies and is a significant driver of economic growth within the European Bioeconomy. Decades of research and technological development have led to solutions to some of the most pressing societal challenges. We are now able to produce bio-based consumer goods and fuels in more sustainable ways while reducing environmental pressure and mitigating climate change. Biotechnology is gaining pace as an economic driver, for which research, innovation and sustainable development go hand in hand.

Small and medium-sized enterprises (SMEs) working in the biotechnology field have a prominent role in promoting innovation and facilitating the transition of bioinventions from the research lab to market. They also create a significant number of jobs in Europe. SMEs usually have close research collaboration relationships with academia and research organisations. Compared with them, they also have more flexible business structures (e.g. can more easily hire qualified scientific staff) and more direct contacts with the industry at large and the market place. They often lack capital, but are leaders in innovative ideas that meet customers' specific and unique requirements. Supporting their involvement in EU-funded research projects is therefore indispensable.

This report offers an assessment of SMEs' performance within EU-funded research projects within the Activity "Biotechnologies[1]" under the EU's Seventh Framework Programme for research, technological development and demonstration activities (FP7) for 2007-2013. It presents information on the measures taken by the European Commission to encourage SME participation, and on the opportunities that SMEs found. It updates knowledge on business partners, profiles, funding opportunities, etc., and looks ahead to promoting SME participation within the forthcoming Framework Programme, Horizon 2020.

The report is structured in two parts:

PART I analyses participation by SMEs in EU-funded projects within the FP7 Biotechnologies Activity. It outlines the opportunities offered by the European Commission to SME project partners, the results, and an assessment of SME participation. The assessment looks in particular at participating SMEs' profiles, their role within FP7 projects and the benefits they gained.

PART II presents a number of SME case studies. It highlights individual stories and some outstanding results.

The results in terms of participants, share of funding, added value for the projects and business benefits confirm that the European Commission's efforts to support SME participation have paid off.

[1] Activity 2.3. Life sciences, biotechnology and biochemistry for sustainable non-food products and processes of Theme 2 "Food, Agriculture and Fisheries, and Biotechnologies" also refer to as "Knowledge-Based Bio-Economy" (KBBE), one of 10 research themes under FP7's 'Cooperation' programme.

PART ONE
PARTICIPATION BY SMEs IN FP7 BIOTECHNOLOGY PROJECTS

The EU's Seventh Framework Programme for Research (FP7) provided noteworthy opportunities for academia, research organisations, public authorities, non-profit organisations and companies from the private sector, whether large or small, to participate in EU-funded projects in the Activity "Biotechnologies", delivering important benefits for science and society.

1. Supporting biotechnology research and innovation under FP7

The European Commission contributed about EUR 550 million, funding 129 projects in the Activity "Biotechnologies", involving around 1 750 project partners in 2007-2013.

EU-funded projects under this Activity are helping increase EU competitiveness by enhancing scientific knowledge and finding innovative solutions to global problems in relation to **demand for renewable sources of energy, waste reduction, greening industries, etc. and key enabling biotechnologies.**

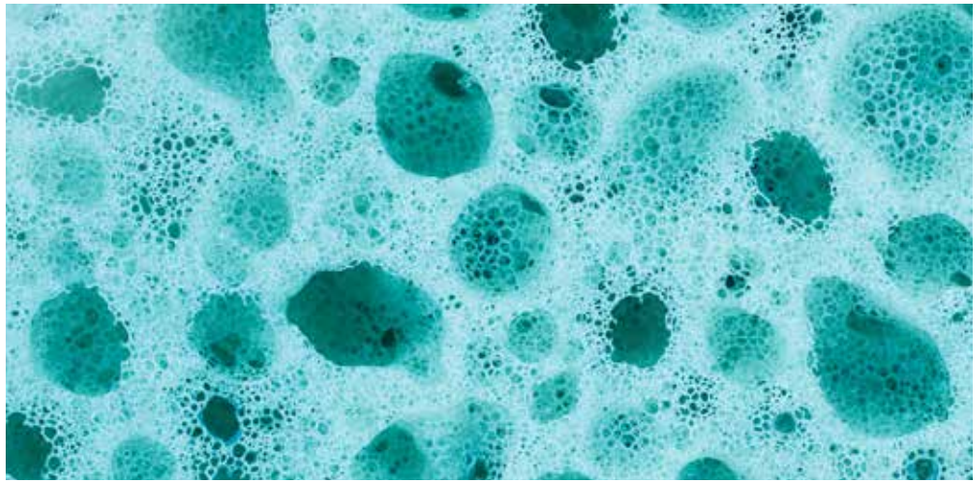
Projects are accepted for funding on the basis of open **calls for proposals** and a peer review process, which is highly competitive. The content, the budget and the rules for implementation are established under **work programmes** – the policy documents prepared annually by the European Commission. Each call for proposals defines the topics for which proposals are requested, as well as the funding scheme (Collaborative Projects, Coordination and Support Actions, etc.), eligibility criteria and the expected impacts of the projects funded.

This report focuses on the eight calls published under the work programme for FP7 Theme 2, "Food, Agriculture and Fisheries, and Biotechnology", or "KBBE" (Knowledge-Based Bio-Economy), for the Activity 2.3, **"Life sciences, biotechnology and biochemistry for sustainable non-food products" referred to as "Biotechnologies"** for (2007-2013)[2].

The funded projects mainly addressed six research areas:

- **Novel sources of biomass and bio-based products** for use in bioindustries or as directly saleable end-products (**28 project**s funded involving a total of **397 project partners**). Topics covered include: analysing the potential of non-food cropping systems; prospecting for novel plant-produced compounds such as proteins or other molecules with potential as new cosmetic, pharmaceutical, industrial and agrochemical agents; developing plants providing oils of the future, etc.

- **Marine and fresh-water biotechnology** (blue biotechnology) to increase understanding of marine and maritime resources and ensure more efficient exploitation of their economic and scientific potential (**28 projects** funded involving a total of **388 project partners**). Topics covered include: overcoming obstacles in marine biodiscovery research, development and commercialisation; developing technologies and tools for measuring and monitoring organisms and elements of marine ecosystems; providing chemically-modified compounds isolated from marine organisms, such as anemones, tunicates and algae, for the development of pharmaceuticals and other products of biomedical and biotechnological interest; etc.



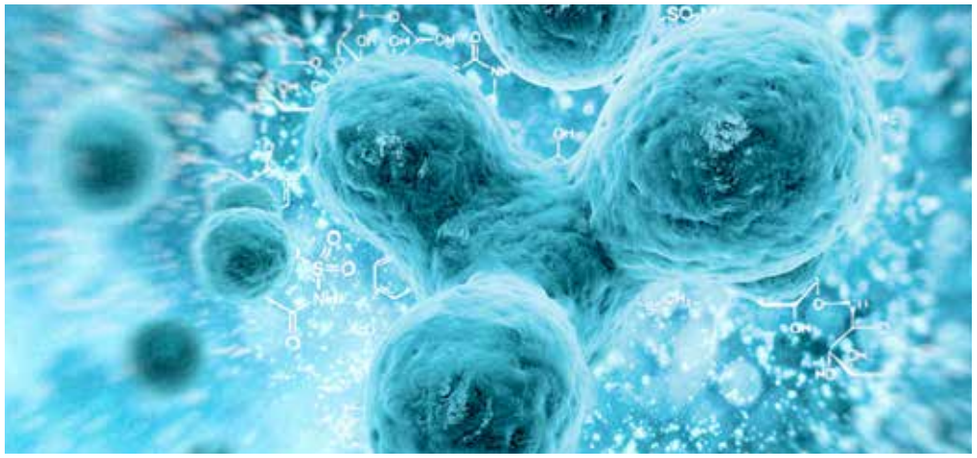
- **Industrial biotechnology** focused on novel high added-value bio-products and bio-processes (**27 projects** funded involving a total of **305 project partners**). Topics covered include: developing and looking for novel enzymes, micro-organisms or biocatalysts for different eco-efficient processes for the starch, carbohydrate, chemical and other industries; biotechnology for "greening" chemical industry; etc.

[2] European Commission C(2007)560 of 26.02.07, European Commission C(2007)5765 of 29.11.07, European Commission C(2008)4598 of 28.09.08. European Commission C(2009)5893 of 29.07.09.

- **Biorefinery for the production of bio-based products and biofuels** (**13 projects** funded involving a total of **199 project partners**). Topics covered include: finding novel enzymes and microorganisms; algae biorefineries; and developing new processes to increase the efficiency of biofuel production from different biomass sources, such as waste bran from milling, wheat straw from farming and spruce chips from paper-making, etc.

- **Environmental biotechnology** to find environmentally friendly solutions for industrial processes and products, with reduced energy consumption and waste production, and which stimulate use of renewable resources (**14 projects** funded involving a total of **246 project partners**). Topics covered include the application of bacterial communities to support the clean-up of toxic hydrocarbons at contaminated sites such as oil spills and leaks from cargo ships; developing innovative waste water treatments and their reuse in agronomical systems; etc.

- **Emerging trends in biotechnology** covering a wide range of interdisciplinary enabling technologies such as synthetic and systems biology, nanobiotechnology, bioinformatics (**16 projects** funded involving a total of **168 project partners**). Topics covered include development of standards in synthetic biology, engineering of microbial cell factories for the production of high value products, metabolic engineering and modelling, nanobiotechnology devices such as sensors, bioinformatics tools for interpretation and prediction of biological data, etc.



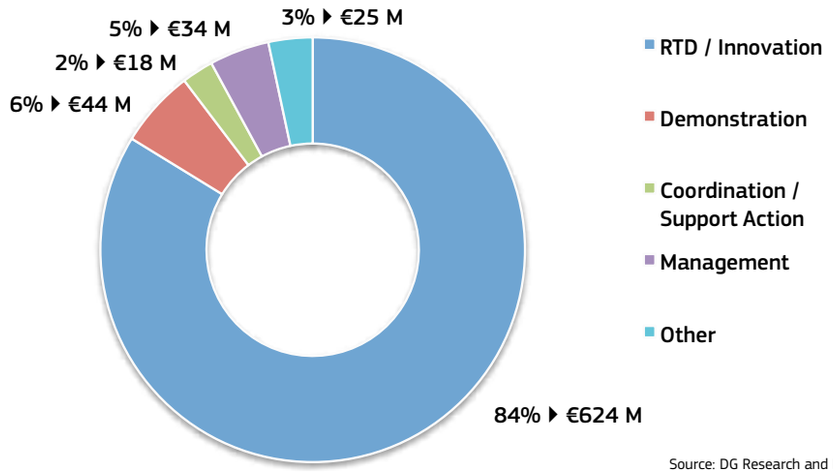
- The category **"others"** includes **3 funded projects** involving **36 project partners** covering socio-economic research, policy support and international collaboration.

The following paragraphs, figures and tables provide a comprehensive overview of the EU contribution and type of participants for the eight calls published from 2007 to 2013.

1.1. EU contribution to FP7 Biotechnology projects

The basic funding principle for research and innovation under FP7 was **co-financing**. This means that by providing a grant for a project, the Commission contributes a certain percentage of the overall eligible costs. The maximum reimbursement rates for project costs depend on the funding scheme, the legal status of the participants and the type of activity. The EU contribution may amount to a maximum of **100% of a project's total eligible cost for management activities, coordination and support activities and "other" activities, which encompasses training, dissemination and networking. The upper ceiling is 75% for R&D activities and 50% for demonstration activities.**

Eligible costs of projects for 2007-2013 in € million (M) and %



Source: DG Research and Innovation

Figure 1: Eligible costs of EU-funded projects for research, management, demonstration and other activities (in € millions and in % of total eligible costs).

1.2. Project consortium

Each project is carried out by a **consortium of partners from different organisation types**, both private and public, from all over Europe and beyond. Consortia include academia (higher or secondary organisations); research organisations; large enterprises; small and medium sized enterprises (SMEs); public authorities, non-profit organisations, etc.

Each project partner provides a unique contribution to a project and the **cooperation** between all partners is key to achieving the project goals.

When the term **"participants"** is used, it refers to "unique project partners", so project partners are counted only once, regardless of the number of projects in which they are involved.

The next figures provide an overview of project partners. Some participated in more than one project, so information is presented both in terms of participation and participants. For "**participation**", each project partner is re-counted each time it participates in a new project.

The difference between both data provides information on the disposition and chance of different type of organisations to repeat their participation in new projects. Academia was the type of partners who found easier to participate again in a new project.

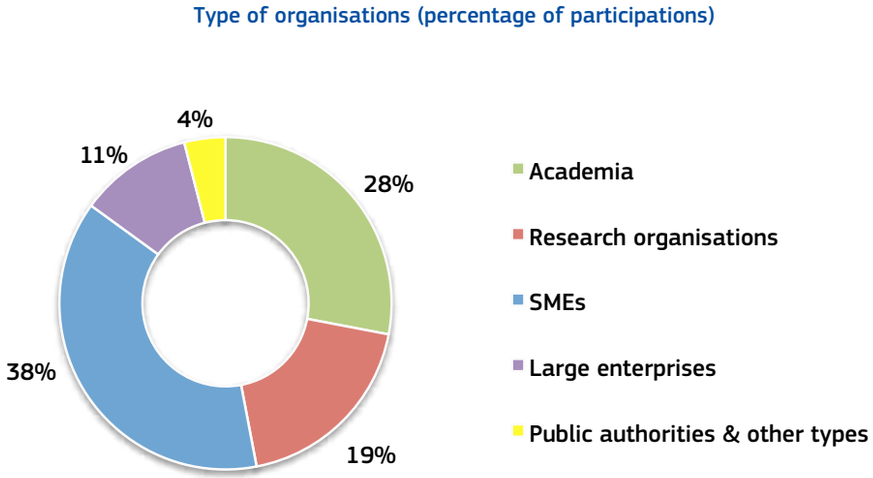


Figure 2: Participation by type of organisation in EU-funded projects within the FP7 Activity "Biotechnologies" for 2007-2013 (%).

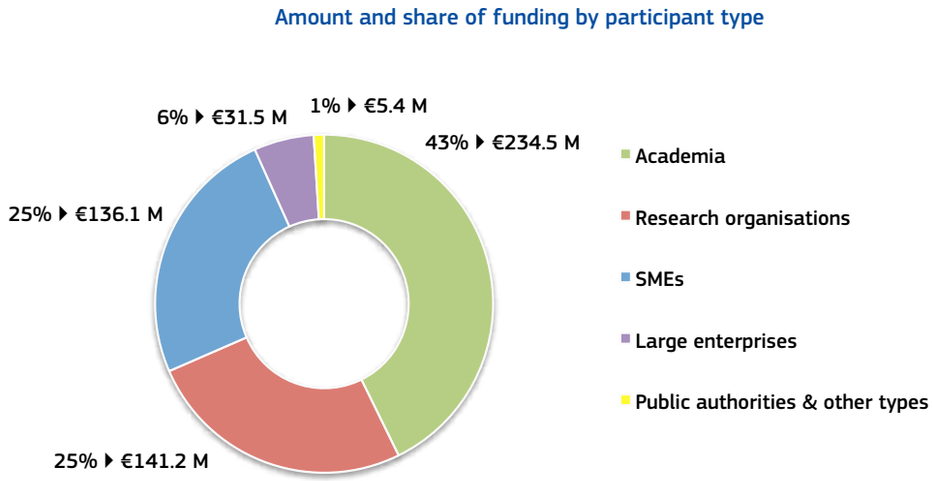


Figure 4: Share of funding by organisation type (€ millions (M) and % of total) in EU-funded projects within the FP7 Activity "Biotechnologies" for 2007-2013.

KEY HIGHLIGHTS

PARTICIPANTS IN FP7 PROJECTS – BIOTECHNOLOGIES ACTIVITY

- A total of 1 744 project partners (participation) were involved in 129 projects from 2007 to 2013 and received on average an EU contribution/partner of about € 350 000.
- Projects had on an average of 13.5 partners, 5 from academia, 4 SMEs, 3 research organisations, 1.2 large enterprises and 0.3 public authorities from the Administration or other type of partners (non-research and education)
- Academia received the largest share of funding and represented the largest proportion of 'participations' (each project partner is counted each time it participates in a project)
- SMEs were the largest group of participants (each project partner is counted only once regardless of the number of projects in which they are involved).
- About 40% of research organisations and academic partners participated in more than one project versus only 20% for SMEs and Industry/large enterprises.

CHAPTER TWO
OPPORTUNITIES FOR SMEs IN FP7

2.1 Opportunities under the FP7 Cooperation Programme

SMEs, according to the official EU definition[3], are enterprises with fewer than 250 employees. They also have an annual turnover of no more than € 50 million, or a balance sheet total of no more than € 43 million.

Company Category	Employees	Turnover	Balance sheet
Medium-sized	< 250	≤€ 50 m	≤€ 43 m
Small	< 50	≤€ 10 m	≤€ 10 m
Micro	< 10	≤€ 2 m	≤€ 2 m

Table 1: Categories of small and medium-sized enterprises (medium, small and micro).

> "Most new jobs in Europe were generated by SMEs in 2002-2012."

The EU's 21 million SMEs promise a bright future for Europe. They are considered the backbone of the European economy and the Europe's largest job engine. A study published by the European Commission in January 2012 revealed that 85% of new job openings in the EU between 2002 and 2010 were created by SMEs, which had a much higher employment growth rate (1% annually) than large enterprises (0.5% a year)[4].

Besides creating a significant number of jobs in Europe, they have a crucial role in getting innovative solutions to the market in flexible ways, improving the EU economy's competitiveness. They often lack capital, but are **leaders in terms of innovative ideas**. They have flexible business structures and direct contact with the market place. They are therefore well positioned to help bridge the gap between academia and industry.

According to the Report "*Innovation Union Scoreboard 2013*"[5] the indicator "**EU innovation performance" was driven more than anything else by innovating SMEs collaborating with others**. This indicator shows an annual **average growth rate of 7.9%**. The Scoreboard also highlights how **research collaboration with public partners** is particularly important for SMEs (i.e. the report shows that almost 90% of SME-produced research publications in 2010 were co-produced with public sector partners).

> "SME participation in EU-funded research projects is a priority for the EU."

Recognising the importance of SMEs, the Commission committed to allocating **15% of all available funding to SMEs** (target requested by the European Council and Parliament). Therefore, measures to boost the participation of SMEs across the "thematic priorities" within the FP7 Cooperation Programme were taken.

[3] The current definition of Small and Medium-sized Enterprises (SMEs) is set out in the EU Recommendation 2003/361/EC (http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm).

[4] Do SMEs create more and better jobs? Prepared by EIM Business & Policy Research with financial support from the EU Competitiveness and Innovation Programme 2007-2013.

[5] A report prepared by the European Commission (Directorate-General for Enterprise and Industry) that gives a comparative assessment of the innovation performance of the EU27 Member States.

FP7 offered better funding conditions for SMEs than previous framework programmes. Examples included: funding up to 75% of total costs for SMEs' research and development activities, compared with the 50% under previous programmes; drafting intellectual property rights with particular attention to SMEs' needs; and reducing requirements for financial checks and bank guarantees (a guarantee fund covered the financial risks of defaulting project participants). Together, these measures made **participation by SMEs much easier and less costly**.

> "The Commission has kept and surpassed the target on research funding for SMEs, having ensured that at least 15% of the FP7 budget went to SMEs."

According to the stock taking report[6] published by the Commission in September 2013, **16.3% of the spent budget across all FP7 thematic programmes went to SMEs,** funding 19.1% of all participations.

> "In the Activity biotechnologies the EU target of funding for SMEs is well above the average percentage reached in all the thematic areas (25% vs. 16, 3%)."

When looking only at the **Biotechnologies Activity**, this figure is even more encouraging for SMEs. EU funding allocated to SMEs from 2007 to 2013 amounted to about €137 million. This was about **25% of the total budget allocated to biotechnology research under FP7**.

[6] http://ec.europa.eu/research/sme-techweb/index_en.cfm?pg=publications.

2.2. Opportunities within EU-funded biotechnology research projects

Biotechnology is among the **most innovative and cutting-edge technological drivers** behind Europe's Bioeconomy. This is widely acknowledged as being largely attributable to SME breakthroughs. As such, a great deal of effort was put into **enhancing and supporting SME participation in the calls for proposals published under the "Biotechnologies" work programmes in the period 2007-2013.**

2.2.1. Work programmes geared towards the needs of SMEs

Measures were taken to tailor calls to SMEs' needs and step up research participation by SMEs as active stakeholders with a view to applying and exploiting results in innovation projects. In practical terms, this was achieved:

> "For 2007-2013, 75% of the EU budget was allocated to topics targeted to SMEs."

> "On average 90 % of EU-funded research projects involved at least one SME."

1) **By incorporating topics of relevance for industry, and in particular SMEs, in the calls.** Examples include: robust and novel biocatalysts for industrial applications; innovative aquatic biosensors; novel biotechnological approaches for transforming industrial and/or municipal bio-waste into products; and increasing the accessibility, usability and predictive capacities of bioinformatics tools for biotechnology applications.

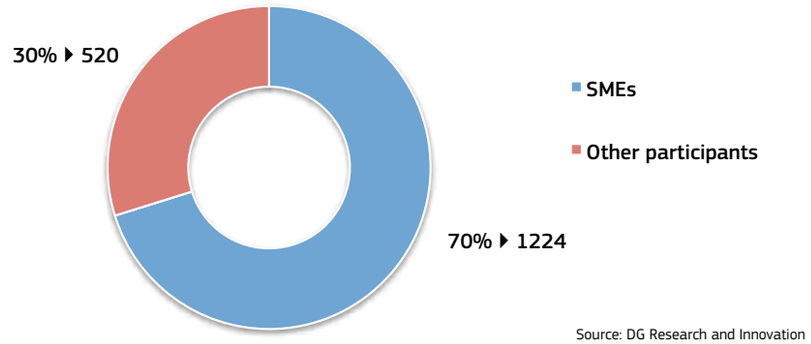
2) Encouraging SME participation in projects on these topics by recommending and/or enforcing a **compulsory budget threshold** dedicated to SMEs, so that allocating a minimum budget to SME participants (as % of total EU contribution) became an eligibility criterion.

SME targeted measures were launched in the 2010 Work Programme, encouraging SME participation on a voluntary basis. From the 2011 work programme onwards, this measure was made a requirement (a substantial proportion of the topics required that 25% of the EU contribution should go to SMEs).

The following tables and figures on SME participation and share of funding received by SMEs are testimony to the positive impact of these measures.

SME participation

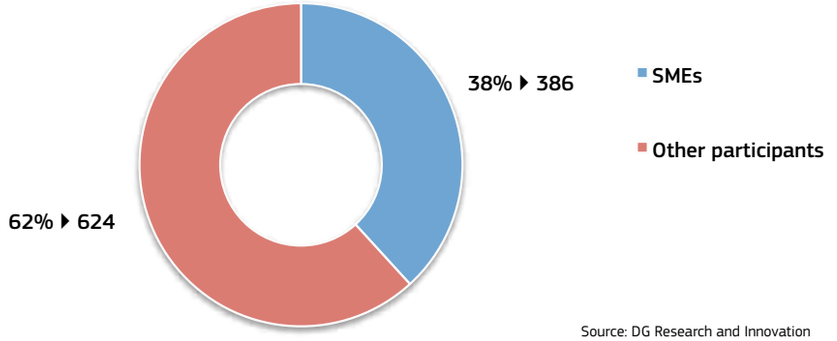
SME participation (number of "particpations")



Source: DG Research and Innovation

Figure 5: SME participation (absolute figures and % of total) for 2007-2013.

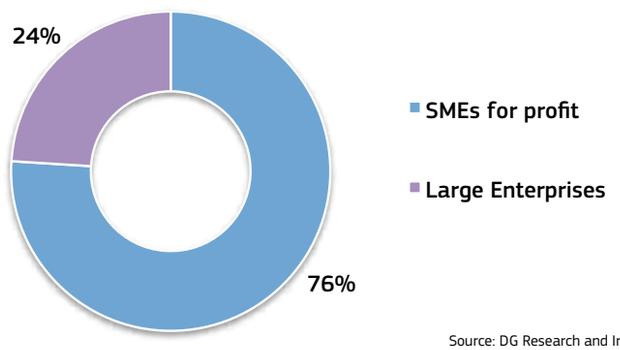
SME participation (number of participants)



Source: DG Research and Innovation

Figure 6: SME participants(absolute figures and % of total) for 2007-2013.

Private sector participation by organisation type

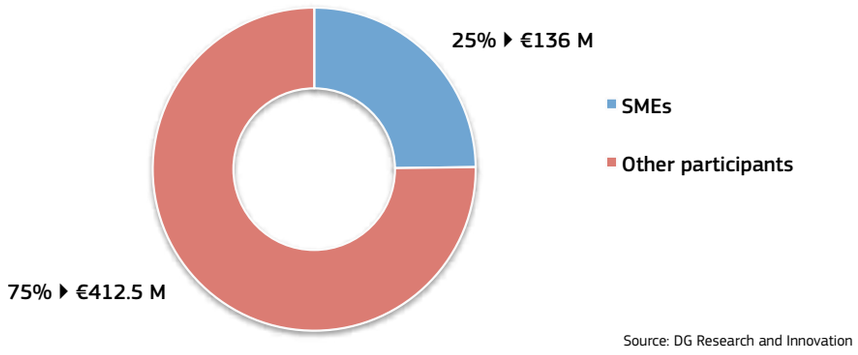


Source: DG Research and Innovation

Figure 7: Private sector participation by organisation type (absolute figure and %) for 2007-2013.

Share of funding received by SMEs

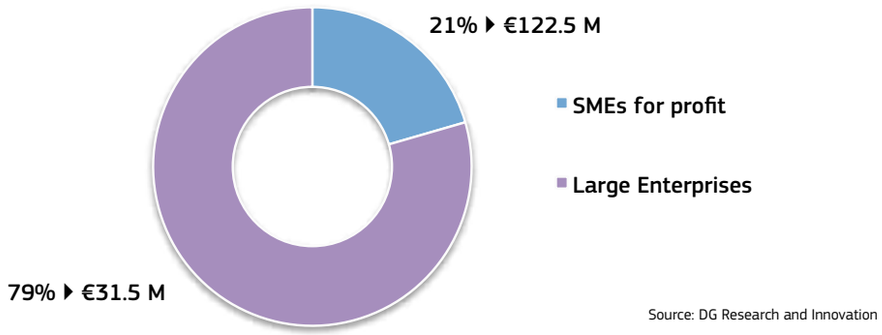
Share of funding by organisation type



Source: DG Research and Innovation

Figure 8: Funding for SMEs (in € millions (M) and % of total EU contribution) for 2007-2013.

Funding received by private-sector participants



Source: DG Research and Innovation

Figure 9: EU contribution to SMEs in comparison to other private partners (absolute figure and %) for 2007-2013.

2.2.2. Support for demonstration helps bridge the "valley of death"

> "FP7 helped fill the funding gap for SMEs carrying out demonstration activities."

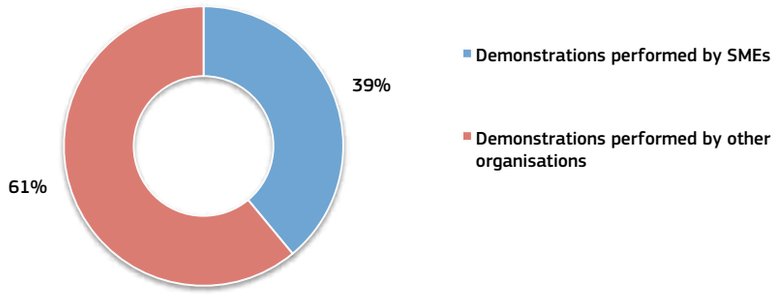
Demonstration activities for technologies that are close-to-market were promoted within several FP7 topics. They aimed at proving (demonstrating) the viability of new solutions offering potential economic advantages but which were not ready for immediate commercialisation as further technological or other developments were required.

A total budget of over €41 million was allocated for demonstration activities (with European Commission funds covering 50% of costs). Of this, about 39% was spent or will be spent by SME project partners. **SMEs**, which usually struggle to find funding, were **key beneficiaries** of the European Commission's efforts **to support demonstration activities through FP7**. The support facilitated the commercial exploitation of the technologies developed within the projects.

> "For 2007-2013, 157 SMEs (about 30%) were involved in demonstration activities, within 45 projects."

Demonstration activities were visibly strengthened from the 2011 calls onwards; they became recommended or compulsory for several topics, particularly for more mature technologies, for which commercial realisation is expected in the short to medium term (e.g. CO_2 algae biorefineries). **In the 2013 work programme, one third of the budget for supporting demonstration activities was allocated to SMEs.**

Demonstration activities performed within projects (% of the eligible costs)



Source: DG Research and Innovation

Figure 10: Demonstration activities performed by SMEs as a percentage of total eligible costs for 2007-2013.

The evolution of the approach and measures taken to support SMEs and promote the demonstration technologies that are close-to-market is shown below (figure 11).

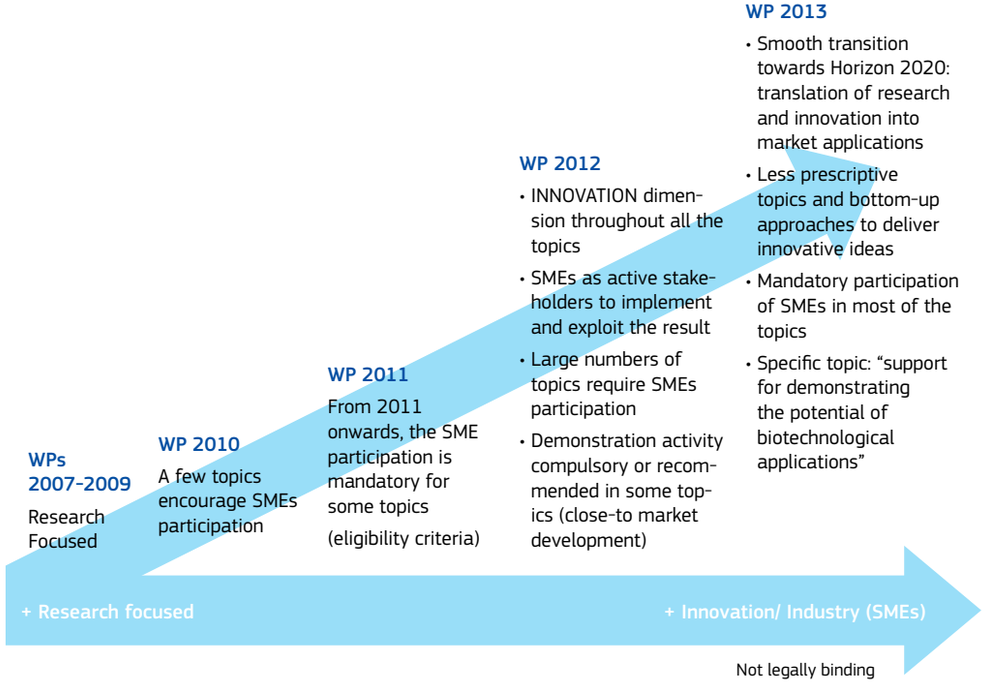


Figure 11: Evolution of measures taken within work programmes to promote SME involvement.

CHAPTER THREE
SME PARTICIPANTS: PROFILE AND CHARACTERISTICS

This section gives an overview of the **profile and characteristics of SMEs** as project participants.

3.1. Fields of specialisation

SMEs took part in EU-funded biotechnology projects some 520 times. The core of their activities can be clustered into four main categories in line with their areas of specialisation:

1. Basic Research and Technological Development (18%)
2. R&D Manufacturing (56%)
3. Consultancy and Services (21%)
4. Communication and ITC services (5%)

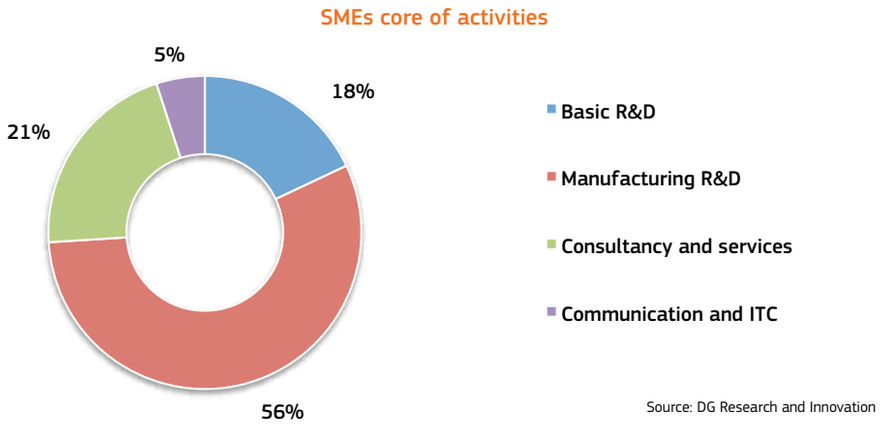


Figure 12: Profile (core activities) of SMEs participating in FP7 EU-funded projects in the "Biotechnologies" Activity for 2007-2013.

1. Research and Technological Development:

This encompasses SMEs performing **basic research and technological development activities** in the field of natural sciences and engineering. Their main motivation is research and innovation. Although they may be open to selling licences, concepts (technology transfer and know-how) and products in the marketplace, they normally do it through other partners who can offer more effective distribution systems and complement the SMEs in terms of development capacity.

Examples include:

- **NAICONS, the New Anti-infectives Consortium (Italy)** – an organisation aimed at integrating resources in the field of infectious diseases.
- **AINIA, the Association for Research in the Food Industry (Spain)** – a technological transfer research centre focused on the food industry (food transformation, packaging, etc.).
- **HENRI, the Health and Environment Research Institute (United Kingdom)** – a contract product development company, provides support to a broad range of organisations including cutting-edge R&D services, from initial concept generation through to knowledge and technology development and ultimately assistance with market stimulation and commercialisation.

2. R&D Manufacturing:

This encompasses SMEs involved in the production and marketing of **bio-based products**, including both goods and services, technologies, facilities, equipment and **bio-based processes** (e.g.: crops, bacteria, fungus, wood, foods, enzymes, biocatalysts, tools for growth and screening of microorganisms, chemicals, pharmaceuticals, drugs, equipment for laboratory, fibre-optic sensors, mass spectrometers, microfluidic platforms, designs for bioethanol plants, software tools, models for monitoring chemical reactions, etc.). They are in most cases involved in **research and technological development** activities with a focus on improving products or optimising processes so that they may be sold in the marketplace, and developing innovative solutions to meet customer's specific requirements.

Examples include:

- **Green Fuels LTD (United Kingdom)** – a world leader and long-established manufacturer of biodiesel processors.
- **Insilico Biotechnology AG (Germany)** – a market-leader in solutions and software for the simulation of living cells for the chemical and pharmaceutical industries.
- **Ingenza (United Kingdom)** focuses expertise and technology on producing robust, economical and scalable industrial bioprocesses.

3. Consultants and Services:

This encompasses SMEs specialised in environment, renewable energies, research, etc. regulatory and policy issues (SMEs specialists in doing life cycle assessments, projects for industrial plant construction, sustainable energy solutions, environmental impact assessments, management of research projects, policy making support, scientific studies, etc.).

Examples include:

- **Biobasic Environnement SARL (France)** – an environmental private engineering and consulting company focused on environmental biotechnology (provides specific solutions in the fields of biodegradation, recovery of organic wastes, etc.).
- **PNO Consultants BV (the Netherlands)** – a pan-European consultancy that supports clients in analysing needs, defining projects and selecting and linking partners for national and international innovation and grant programmes.
- **BioBridge (United Kingdom)** – a bioscience innovation consultancy focuses on understanding and overcoming barriers to commercialisation for innovation in bioscience technologies and products covering the entire product chain, from discovery development to market entry.

4. Communication and ITC:

This encompasses SMEs specialised in developing IT and web solutions and information platforms, providing services for a science-society dialogue, carrying out training, etc.

Examples include:

- **Minerva Consulting and Communication (Belgium)** – a full-service communication agency very active in EU funded projects. It provides companies and consortia with concrete support on effective communication and dissemination activities.
- **Knowledge Now Limited (United Kingdom)** – helps organisations to integrate information with improved IT platforms.
- **Biofaction (Austria)** – a research and science communication company working with emerging sciences and technologies.

3.2. Non-profit SMEs

The largest group of SMEs assessed were private, commercial companies. However, the EU-funded projects also attracted a number of private non-profit organisations with the status of "SME" – **35 out of 520 "participations" were non-profit SMEs (7%)**. An assessment of their profiles shows that they have the following points in common:

- they are well-established research and technological development organisations;
- they generally do multidisciplinary research and therefore are active in various fields;
- they are medium-sized centres with more than 50 scientific staff on average;
- they are backed by public research organisations and universities and/or public institutions, and/or private companies;
- they have vast experience of participation in national or EU-funded research projects. Some examples:

Austrian Centre of Industrial Biotechnology (ACIB) GmbH (Austria)

With more than 20 years of experience, this is a research centre specialised in the disciplines of industrial biotechnology and bioengineering. The centre focuses on biocatalysis, enzymes and (pharmaceutical) protein production. Its expertise is provided by around 120 employees, research institutes and university departments as well as high-ranking industrial partners. Excellent cooperation between industry and science is the basis for the ambitious ACIB research programme.

IFEU, Institut für Energie- und Umweltforschung Heidelberg Gmbh (Germany)

A non-profit ecological research institute founded in 1978 as an independent centre of excellence for environmental research by scientists from the University of Heidelberg. Currently, IFEU has a staff of more than 50, mostly scientists in the fields of biology, chemistry, physics, geography, and engineering.

Instituto de Biologia Experimental e Tecnologica (Portugal)

Created in 1989, iBET is a private non-profit biotechnology and life sciences research organisation specialised in the areas of health-pharma, agro-industry, forestry and the environment. iBET brings together, as partners and collaborators, private companies and public institutions. Its main mission is to promote the transfer of scientific knowledge and contribute to bridging the gap between academic and industrial research. iBET collaborates with over forty companies in the EU and USA.

Bio Base Europe Pilot Plant VZW (Belgium)

A joint initiative between Ghent Bio-Energy Valley and BioPark Terneuzen, Bio Base Europe is funded by the EU, Belgium and the Netherlands within the framework of the EU's INTERREG programme (€13 million facility Pilot Plant) and has been operational since 2010. It participated in four FP7 projects within the "Biotechnologies" Activity. It is capable of scaling up and optimising a broad variety of bio-based processes up to a pre-industrial level (10 m^3). It is a one-stop-shop covering the entire value chain in a single plant, from green resources to the final product. It intends to close the gap within the bio-based economy innovation chain, bridging scientific and industrial production.

3.3. SME spin-offs and spin-outs

Some 53 spin-offs (business stemming from the academic world or from research institutions) **and 8 spin-outs** (SMEs originating within industry, bigger companies, or in a new autonomous form as autonomous departments) were among the SMEs taking part in the FP7 biotechnologies projects. **These SMEs represented 12% of all SMEs participating in SME projects.**

Spin-off SMEs participating in EU-funded projects in the FP7 Activity "Biotechnologies" tend to have the following points in common:

- their core competence stems from their founders' extensive experience;
- they are market leaders;
- they have flexible structures, allowing them to hire contract staff and keep close contact with industrial partners;
- they particularly rely on intellectual property rights, especially through patents;
- they generally have highly qualified, academically trained research staff (5-25 employees).
- almost 70% of the SMEs come from Germany, the Netherlands, France, Italy and Switzerland.

Some examples:

C-Lecta (Germany)

This industrial biotechnology company was founded in 2004 as a spin-off from the University of Leipzig. C-LEcta is specialised in developing and implementing sustainable and economic industrial processes based on customised enzymes and microbial production strains. Its patented technologies are designed to speed up process and product developments in this field.

EcoTechSystems Srl (Italy)

This spin-off from the Polytechnic University of Marche (Department of Marine Science – DiSMar) was founded in 2003 by a highly qualified academic research staff with extensive know-how in environmental issues. ETS provides services and tools for environmental monitoring and protection, impact assessment and restoration and environmental design, with special focus on marine ecosystems.

BIO-PRODICT BV (The Netherlands)

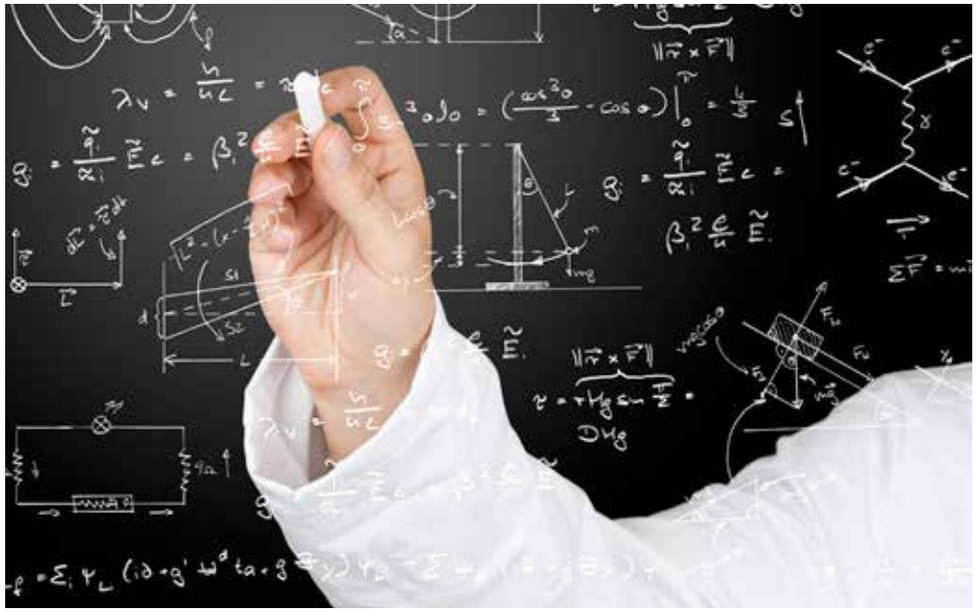
This spin-off from Wageningen University was founded in 2008 and specialises in bio-informatics related services. Bio-Prodict has developed 3DM, a software suite that can automatically generate superfamily specific databases designed to guide scientific research in the field of protein engineering, drug design, and DNA-diagnostics.

3.4. Start-up SMEs

EU-funded projects under the FP7 Activity "Biotechnologies" attracted a modest number of start-ups, i.e. companies or partnerships designed to identify repeatable and scalable business models: **start-ups participated 25 times (out of 520 "participations") (about a 5%)**. Although this figure is not so high, it shows a wish within these companies to embark upon new projects. It also shows that they found support via EU-funded projects that enabled them to overcome capital or funding constraints.

The start-up SMEs participating in EU-funded projects within the FP7 Activity "Biotechnologies" have the following points in common:

- their core competence is their specialist and unique profile;
- they offer both tailor-made solutions and standard bio-based products/processes;
- intellectual property rights are very important, in particular patents;
- they have few employees (from 1 to 5 on average), are young companies (most of them founded 2002-2009), and are in development phase, identifying appropriate markets;
- the top countries of origin are Switzerland, Germany, Greece, France, Ireland, Israel, Italy and the Netherlands;
- they generally look for private partners or/and other sources of public funding (e.g. EU funded research projects);
- some are also spin-offs, and so founded by experienced scientists.



Some examples:

Algae Health (Ireland)

Established in 2009, Algae Health is specialised in the cultivation of micro algae for the extraction of high-value and organic compounds of interest for the cosmetic, pharmaceutical, chemical and nutraceutical markets. Following three years of intensive research and development using their proprietary cultivation technology (patenting), they are now in a position to scale up production of their first product, ASTAXANTHIN, a carotenoid with high anti-oxidant properties.

MICRODISH BV (The Netherlands)

Established in 2008, MicroDISH is working to improve microbial culture through the design, manufacture and use of microengineered culture chips and nanoscale reagents. The company makes direct sales of its MicroDISH Culture Chips (MDCC) and is involved in co-development projects with industrial and academic partners. It is building productive strategic partnerships with complementary technology providers and both commercial and academic organisations.

Plant Advanced Technologies (France)

Created in 2005, this company is using a proprietary technology (Plant Milking Technology) that allows the recovery of bioactive products from the roots of hydroponically or aeroponically grown plants. The technology has been validated for several classes of plant chemical compound and particularly terpenoids (i.e. Taxans).

3.5. Geographical distribution

An analysis of the geographical spread of the SMEs that participated in the projects provides a useful overview of the most active countries and regions participating in these projects. It also highlights the location of key incubator business centres and networking areas.

Of the 520 "participations" by SMEs, **482 (93%) were by companies based in the European Union or Associated Countries**[7].

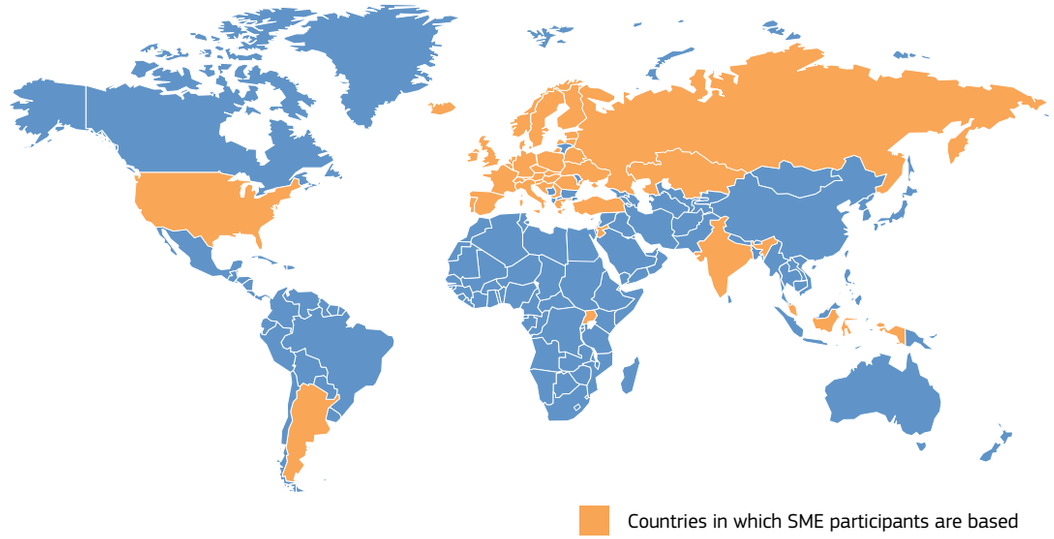
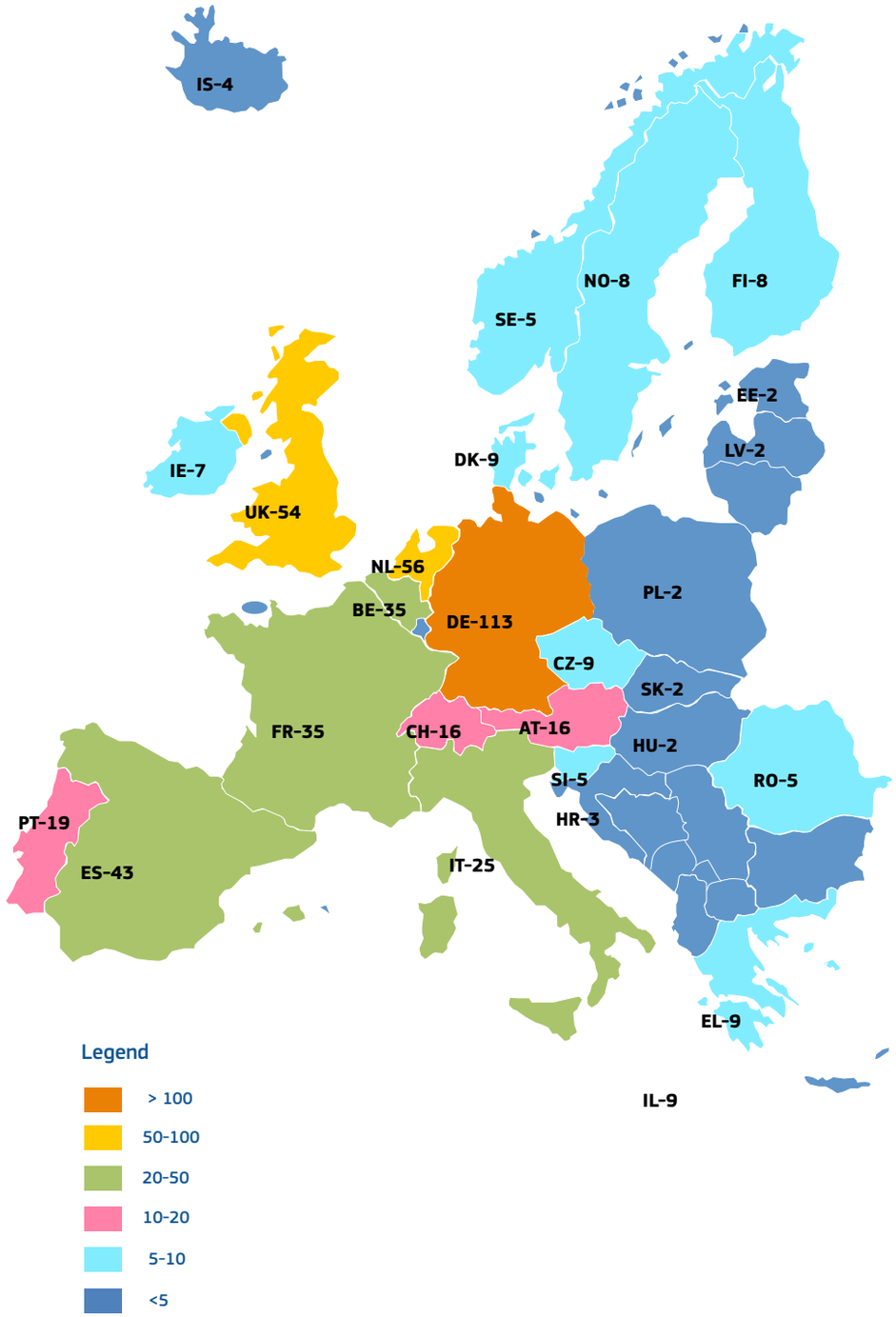


Figure 13: Map showing the country of origin of all SME participants (all around the world).

[7] The countries associated to FP7 were Switzerland, Israel, Norway, Iceland, Liechtenstein, Turkey, Croatia, former Yugoslav Republic of Macedonia, Serbia, Albania, Montenegro, Bosnia & Herzegovina, the Faroe Islands and Republic of Moldova.



The top 10 countries for SME involvement were (figures in "participations"): Germany (113), the Netherlands (56), United Kingdom (54), Spain (43), Belgium (35), France (35), Italy (25), Portugal (19), Austria (16) and Switzerland (16).

Figure 14: Map showing Member States and Associated Countries in which SME project participants are based (number of participants by member state or associated country).

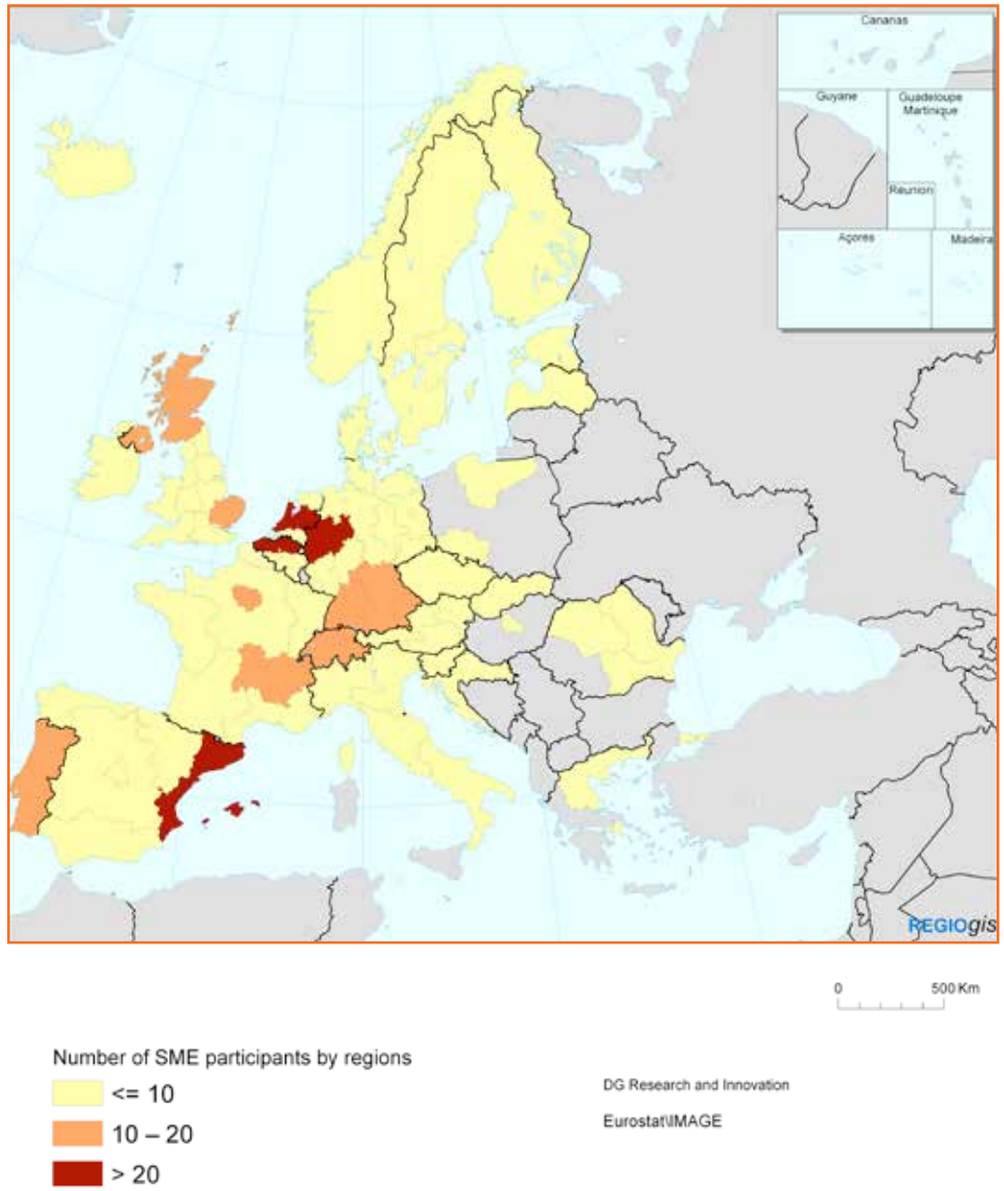


Figure 15: Map showing the top regions in which SME participants are based (NUTs Level 1)

The top regions for SME involvement were:

BE2-VLAAMS GEWEST in Belgium (28 SMEs)
DEA-NORDRHEIN-WESTFALEN in Germany (25 SMEs)
NL3-WEST-NEDERLAND in the Netherlands (24 SMEs)
ES5-ESTE in Spain (22 SMEs)
NL2-OOST-NEDERLAND in the Netherlands (22 SMEs)
PT1-CONTINENTE in Portugal (19 SMEs)
CH0-SHWEIZ/SUISSE/SVIZZERA (16 SMEs)
DE1-BADEN-WÜRTTEMBERG in Germany (15 SMEs)
DE2-BAYERN in Germany (13 SMEs)
FR7-CENTRE-EST in France (12 SMEs)
UKM-SCOTLAND in the United Kingdom (12 SMEs)
FR1-ÎLE DE FRANCE in France (10 SMEs)
UKH-EAST OF ENGLAND in the United Kingdom (10 SMEs)

An assessment of SME distribution at regional level shows that the three top regions in which the SMEs participants are based on are: **Flanders in Belgium, North Rhine-Westphalia in Germany and Western Netherlands**.

CHAPTER FOUR
SMEs AS PROJECT PARTNERS: IMPACTS AND BENEFITS

This section provides information on the SME impacts as project partners. Impact is evident at two different levels:

- **The added value the SMEs bring to the consortia**
- **Benefits for SMEs as participants of EU-funded projects.**

The information used for the assessment came from European Commission databases[8] and from project documents.

The assessment was complemented by individual telephone interviews with certain SME partners[9]. The interviews were entirely voluntary for the SMEs and were carried out in October and November 2011. Twenty-seven interviews were carried out with SMEs with a diverse range of profiles: R&D intensive, service providers, consultants, etc. SMEs involved in projects resulting from the early FP7 calls for proposals (2007, 2008 and 2009) were selected as these projects were either close to completion or already completed at the time of the interview. The first results were therefore already available and the SMEs had already experienced the benefits and impacts of participating in an EU-funded project.

[8] CORDA (Common Research DAta Warehouse) is a database containing data on applicants/proposals and signed grants/beneficiaries with regards to a specific Framework Programme for Research. CORDA is refreshed daily with data coming from a wide variety of systems and applications. It, therefore, contains almost up-to-date information on Framework Programme activities. CORDA is communicated to Member States and FP7 Programme Committee members while also used for the production of statistics and reports, internally, within DG Research and Innovation.

[9] The SMEs interviewed were: Ascenion GmbH, Biogold, Bio-Iliberis R&D, C-Lecta GmbH, Core Biotech SA, Cosmetic, Diagnoswiss, Dyadic Netherlands, Fluxome, G R Wright and Sons Ltd, Gillet Chitosan EURL, Green Sugar GmbH, GTP Technology SA, Keygene, Libragen, Lyon Enginerie, Metabolic Explorer, Microsaic, Nofima, Organic Waste Systems, Petra Tewes-Schwarzer - Care Sense Consulting, Precision Sensing, SC Rodax Impex Srl, SoluCel Oy, Stiftelsen Fraunhofer Chalmers Centrum För Industrimatematik and Wiedemann GmbH.

4.1. Added value brought to projects by SMEs

SME project partners have a wide range of profiles: R&D intensive, manufacturers, service providers, consultants, etc., in addition, projects have different scopes, approaches and funding schemes (from coordination and support actions to collaborative research projects) therefore the role they have in the project's development and the added value they contribute varies. The following paragraphs assess the type of activities carried out within the projects, and the elements in which SMEs stood out.

> "35% of the SMEs carrying out R&D tasks were also involved in exploiting project results so that they may become marketable products and processes."

4.1.1. Types of activity developed within projects

The assessment showed that SMEs participating in EU-funded research projects mainly belonged to one of the following three, non-mutually exclusive categories:

Group 1 Research and technological developers: About 71 % of the SMEs were involved in research and technological development activities, including demonstration, within the projects.

Group 2 Test material-providers: About 6 % of the SMEs provided raw materials and bio-based products, including manufactured products, to be used along the project.

Group 3 Service providers: About 36 % of the SMEs assisted with project management and consultancy services within the project.

It is important to note that about **some of the SME participants were involved in more than one task** (e.g. biomass provider SMEs were also involved in technological development activities, while research and technological developers were also involved in dissemination and exploitation of results, etc.).

SMEs belonging to **group 1** were involved in one or more of the following tasks within their projects (from research, proof of concept to scale-up):

- **Laboratory research** (screening, gene sequencing, cultivation, protein recombination, molecular breeding, analysis of microorganism responses to toxic compounds, etc.)
- Technological development of new or optimised **bio-based processes** within the production chain (examples of bio-process include: pre-treatment of biomass, hydrolysis, feedstock detoxification, enzymatic reactions, fermentation, enzymatic enrichment, etc.)
- Technological development of new or improved **bio-based products** (enzymes, proteins, yeast, catalysts, genes, transgenic plants, ionic liquids, etc.)

- Technological development of new or improved **equipment/tools** (bio-informatics platforms, nano-biotechnology devices, equipment for enzymatic processing, sensors, etc.)
- **Technology demonstration** and/or scaling up of project results (from lab, pilot to demonstration and commercial scale).

SMEs belonging to **group 2** were involved in one of the following tasks within their projects:

- Providing **raw material** to be used along the value chain (crops, biomass, microalgae, etc.)
- Providing **manufactured** bio-based products, equipment, etc. (e.g. fibres samples, feed enriched products, polymers, etc.).

SMEs belonging to **group 3** were involved in one or more of the following tasks within their projects:

- **Dissemination and communication** of project results, contributing to several tasks, such as website development, databases, workshops, conferences, articles, scientific platforms, videos, slides, training, etc.
- **Exploitation of results and knowledge transfer** from science to the market: market analysis, customer needs surveys, identification of marketable new or improved products and services, promotion of the commercial viability of bio-based products; participating in the standardisation of methods, etc.
- **Advice on intellectual property rights** (IPR) to ensure the protection and economic exploitation of inventions, materials and know-how, so providing guidance on patenting issues or evaluating and exploiting IPR.

- **Assistance in environmental, regulatory, health and safety analysis:** life cycle assessments (LCA), environmental analysis, governance and regulations issues, etc.
- **Project management** financial and administrative support: preparation of reports for the European Commission, coordination of consortia partners, organisation of official project meetings, etc.

KEY HIGHLIGHTS

ROLE OF SMEs IN EU-FUNDED PROJECTS IN THE FP7 ACTIVITY "BIOTECHNOLOGIES"

- SME research and technological developers (group 1) made up the largest group of SME participants (71%). They participated at different levels of research and/or technological development, from basic research to technological demonstration, from both lab to pilot scale and commercial exploitation.
- Their main role in the projects was to improve products or optimise processes so as to meet the project's specific and unique requirements.

- Their role was primarily the exploitation of research outputs and advances, with the goal of triggering the commercialisation of the products, processes and technologies developed within the project.

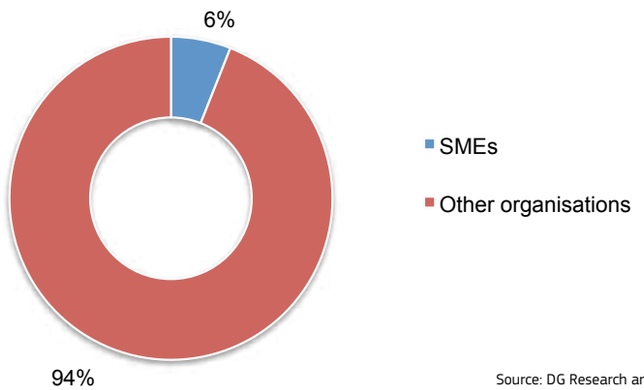
- SME Service providers (group 2) were the second largest group of SME participants (36%) and had an important role in bringing research results closer to the market. Within this group, 46% of SMEs contributed towards the exploitation of results, knowledge transfer and intellectual property rights management. Some 32% were involved in the communication and dissemination of project results.

- Although Test provider materials (group 3) were in percentage the smallest group of SMEs, they had an outstanding role in the projects: 55% provided raw material whereas the 45% were manufactured products providers. In addition more than half of them were also involved in R&D tasks.

4.1.2. Coordinators and work package leaders

A total of **8 SMEs were project coordinators**. In addition, about **130 SMEs were leaders of at least one work package**. Each project is organised into work packages in line with its objectives and activities. 52% of the SMEs led research and technological development tasks, 7% led tasks relating to the provision of raw material and products and 41% led project management and other service tasks.

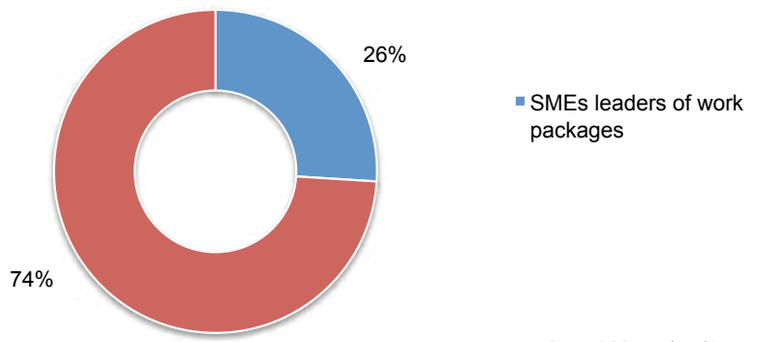
Project coordinators by organisation type



Source: DG Research and Innovation

Figure 16: Projects coordinated by SMEs.

SME work packages leaders



Source: DG Research and Innovation

Figure 17: Role of SMEs within the work packages.

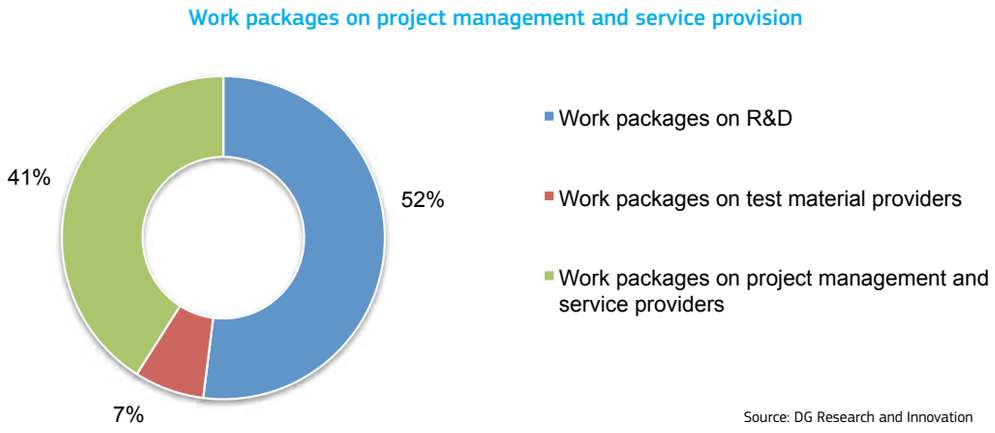


Figure 18: Work packages led by SMEs.

4.2. Benefits obtained by SMEs

This section provides information on the benefits reported by project coordinators in final reports and phone interviews.

The benefits gained by SME project partners can be analysed at several levels:

- Funding
- R&D and innovation capabilities
- Networking and new business contacts
- Staff competences (boost to technological and scientific skills)
- Competitiveness (market position, competitors)
- New business partners and exploration of new markets at European and global level
- Profitability and productivity (new or improved services, production lines or products)
- Growth in employment.

> "Each and every one of the SMEs interviewed had experienced benefits in at least one these areas."

The assessment reveals that involvement in an EU-funded project had a positive impact on many areas of business.

While some SMEs consider more work is needed to obtain mature commercial products and processes, they see their participation as a necessary investment in efforts to enhance or consolidate know-how and expertise in a particular area.

Participation gives SMEs the opportunity to exploit new know-how or technology, to extend their range of services; and/or to gain an edge over other competitors; and/or – crucially – to reduce the risk of investing in the development of new biotechnologies.

> "SMEs can greatly benefit from new methods, tools, processes and products developed within the projects, including through patenting the most promising results."

The projects also represent a significant networking opportunity. SMEs working on an EU-funded project increase their chances of acquiring new customers and partners (e.g. participation in dissemination of project results in conferences and publications).

Moreover, they have the opportunity to learn about the latest technological developments within the field covered by the project, and to develop the company's reputation.

> "The 100% of SMEs participating in the telephone survey claimed that they would participate again in an EU-funded project, indicating that their expectations from the project were generally fulfilled."

The benefits are clear:

- All recognised the value of the support provided by the EU: **"without funding, research could probably not have been carried out"**.
- Almost 80% answered that they experienced **improvements in R&D/innovation capabilities** and gained up-to-date knowledge from other partners when participating in a project.
- Almost 90% forged **new contacts/cooperation/ partners** as a result of a project.
- Staff **competences and competitiveness** were boosted in all cases. Participation is an opportunity to work with specialists in a field and to identify common interests.
- More than half (56%) are using or were planning to **use the project results** and expected to benefit from them.
- Half contributed with their own **background Intellectual Property.**
- **A few SMEs reported taking on new staff** – technicians or skilled personnel for the project. SMEs participating in a project for first time were most likely to recruit these personnel.
- **All were satisfied with the communication between consortium partners.**

The projects' final reports highlight the impacts of EU-funded projects in terms of publications, dissemination activities, intellectual property rights (applications for patents, trademarks, registered designs, utility models, etc.) and exploitable foreground (advancement of knowledge on processes or technologies and commercial exploitation R&D results). The information on patents and other licences, as well as on the exploitable foreground, was confidential in some cases. Good IPR management safeguards future commercial applications, making investment and innovation more attractive.

According to final reports, promising results in terms of patents **have already been reported for about 60% of projects**. Although some SME project partners are or will be owners/ beneficiaries of exploitable foreground and intellectual property rights (e.g. engineering novel enzymes, chip-scale mass spectrometer systems, treatment methods for the conversion of biomass, etc.), it is not possible to provide a complete overview of them today. Patents need to be made public and projects need to be finalised (only about 30% of final reports had been submitted when this report was compiled). Market impact will therefore be even more visible within a few years.

PART TWO:
CASE STUDIES

SME “Green Sugar” Germany

In 2007, the newly established Green Sugar was not looking to participate in a collaborative project, and the company was frankly surprised when approached.

But the idea sounded interesting, and the fact that the company knew neither the coordinator nor any of the other participants was not an obstacle.

Green Sugar produces sugar using vegetable biomass and its residues, while the project was set up to look for novel enzymes and microbes for second generation bioethanol production – a field of interest for the SME. Although they joined the consortium late, Green Sugar was able contribute its ideas to the final version of the project proposal prior to submission.

Collaborating with competitors

The proposal was successful and the project – called NEMO (Novel high-performance enzymes and micro-organisms for conversion of lignocellulosic biomass to bioethanol) – was launched with Green Sugar on board – this was to be the company’s first EU project.

There were eight other companies participating in the project – both SMEs and large companies. The way the work packages were distributed meant that every participant had certain obligations. Green Sugar led one of the work packages. Its main objectives were to collect and pre-treat the selected raw materials – an energy crop, straw from agriculture and wood – and to ensure a constant supply of these to the consortium members from the very beginning of the project. Some of partners were competitors for Green Sugar, but collaboration was smooth nonetheless.

For Green Sugar, involvement in the project was linked to clear objectives: a boost to business, networking opportunities and the chance to follow developments in the field.

Success all round

The project itself was also a success. The consortium’s results were close to the market, and just needed marketing for sales to begin. In innovation terms, several patent applications are planned both at national level and European level. These will clearly lead to advantages for Green Sugar.

Every SME expects a lot from its first EU-funded project. The expectations range from finance to acquiring new technology. Building new contacts is also a crucial issue for a fledgling SME.

After participation in an EU-funded project, a company’s work is better known (both within science and industry). At the same time, increased potential for innovation, combined with clear results, can bring in money. In the case of Green Sugar, the company now has a new production technology. Companies also see clear benefits in terms of staff competences and competitiveness. It is therefore no surprise that SMEs tend to reply positively when asked whether they would like to take part in another EU-funded project.

Green Sugar would however like to see funds for demonstration activities available to SMEs. Otherwise SMEs will always have to seek partnerships with big industry players in order to take their innovations closer to the market.

SME “METabolic Explorer” France

While access to finance is welcome for all SMEs, this is certainly not the only factor determining how a company grows.

The SME METabolic EXplorer is keenly aware of this, as illustrated by its decision to get involved in its first EU-funded research project solely for the experience, without receiving a single cent in funding.

METabolic EXplorer is a green chemistry company developing industrial solutions that make it possible to use a wide range of renewable resources to circumvent problems associated with burdensome, costly, fossil fuel chemistries. It was founded in 1999 in France. It is one of the leading SMEs in metabolic engineering, and is predominantly producing bulk chemical intermediates for the production of everyday products, such as textile fibres, paints, solvents, animal feed supplements, cosmetics, detergents and renewably sourced plastics.

Global ambitions

With more than 40 employees in its R&D department, METabolic Explorer had been involved in several regional and national projects. But to make possible its ambition of using its innovative processes within collaborative project involving global chemical players, the SME needed to look further afield.

So when the coordinator of the SYSINBIO (Systems Biology as a Driver for Industrial Biotechnology) project approached METabolic EXplorer in 2008, the company was immediately interested. It was clear from the outset that there would be no financial gain for the SME; benefits would instead be drawn from networking opportunities and experience at European level. This was a unique opportunity to explore, learn and apply new knowledge and experiences. The project would also serve as an introduction to the coordination of EU projects.

The right decision

The three-year SYSINBIO project was coordinated very effectively, and succeeded in implementing several educational and training activities in metabolic engineering.

Although METabolic EXplorer’s part within the project mainly involved assisting, the company is now armed with knowledge and experience of an EU project, meaning that it will be able to play a more proactive role in the future.

And the company’s gamble paid off. The project had a positive impact on competitiveness, R&D/innovation capabilities, staff competence level and network of contacts.

SME “Microsaic Systems Ltd” United Kingdom

SMEs are market-driven, and Microasaic is no exception. But by synchronising its own business objectives with those of an EU-funded project, it was exposed to new opportunities for growth. The result is a selection of products very close to the market.

The story of Microsaic Systems Ltd began in 2001. It was the baby of two researchers from Imperial College London (the SME is a spin-off), experts in the field of microsystems and nanotechnology. Today it is a high technology company developing and marketing next generation mass spectrometry instruments for the analysis of gaseous, liquid and solid samples.

Going European

After involvement in several national and regional projects, Microsaic was ready for the next stage: the innovation opportunities under FP7. The first step was a meeting at Valtion Teknillinen Tutkimuskeskus (VTT) Technical Research Centre in Finland. Two researchers there had recently become coordinators of a new EU-funded project known as NANOBE (Nano- and microtechnology-based analytical devices for online measurements of bio-based processes). The NANOBE coordinators were glade to have Microsaic on board.

From the very beginning, it was easy for the company to approach the project preparation proactively – the proposal was very much in line with its business plan. Furthermore, Microsaic already knew NANOBE’s coordinator and partners from working together previously. This guaranteed smooth collaboration and efficient project management.

The NANOBE project was designed to develop a compact, flexible tool for analysing reactions and monitoring applications in industrial biotechnology. The resulting integrated measurement platform for the real-time monitoring of industrial bio-based processes will significantly improve automation while reducing analysis time during production.

The platform will also enable real-time feedback-based control of large-scale production processes, simultaneously raising process productivity and product quality.

A key project player

Microsaic was able to play a key role in all stages of the project. During the implementation stages, the SME played an active role in management activities and the decision-making process. Its key contribution to the project remains however the development of a chip-scale mass spectrometer system. This has proved extremely useful for the identification of metabolites and enzymes, which are important products and indicators within biotechnology processes. This was the result of the consortium’s sheer hard work, combined with the SME’s long history and experience of developing micro and nano-fabricated devices.

Focusing on the project’s success, Microsaic made its IPR background completely transparent to its partners. It did this without profiting from its partners’ IPR, since its own experience and expertise appeared to be sufficient for the project purposes. This is why Microsaic’s owners define it as “self-contained”.

Looking ahead

The whole experience has been a definite success story for Microsaic. The impact of the participation covers increased R&D and innovation capabilities, more advanced staff competences and services, plus greater competitiveness.

Microsaic Systems Ltd is now a well-established company and has subsequently established a large portfolio of more than 80 patents. The company launched the world’s smallest mass spectrometry system in April 2013.

SME “Rodax Impex srl” Romania

To alleviate the depletion of the world’s natural resources, it is crucial to find ways of making better use of wood, without chopping down more trees. Next time you hold a cardboard box in your hands, give some thought to where it comes from; it could be made from forest by-products, using a process conceived and patented during the EU-funded project FORBIOPLAST (Forest resource sustainability through bio-based-composite development).

Small beginnings

The SME SC Rodax Impex srl, specialising in the design and manufacture of packaging machines, stainless furniture, devices, instruments and medical furniture, was founded in Bucharest in 1993. It was seven years later that the company first ventured into the coordination and management of nationally funded research projects. This led to frequent collaboration with universities and research institutes working in diverse fields: applied research for improving food quality and safety; stretching wrapping equipment; top-sealing equipment for fresh-cut products; specific materials and raw materials, to name a few.

At the end of 2007, the SME was approached by the future coordinator of an EU-funded project; the company’s data had been spotted in the EU’s CORDIS database due to parallels with the proposed project. The goal was to single out raw forestry resources or industry by-products connected to the forest (bark, chips, sawdust, black liquor from the wood pulp industry, etc.) for the production of eco-compatible foams and composites suitable for a range of applications. As the company already had know-how on equipment for biodegradable packaging and applications, the opportunity was immediately interesting.

Partnering up with major players

The project was selected for funding and FORBIOPLAST was born in July 2008. It brought together partners from research institutes, universities and private sector companies from Belgium, Hungary, Italy, Latvia, Norway, Romania, Spain, Greece and Germany.

Rodax quickly established itself as an important partner within the consortium, both at the preparation and implementation levels. During the proposal stage, the SME was extremely proactive in the definition of the project objectives and activities. During implementation, the SME collaborated well with both the research institutes and industrial representatives involved in the consortium. The involvement of an exploitation and dissemination manager, dealing with the IPR issues, was welcomed by all.

The implementation stage afforded RODAX the opportunity to grow in many ways. The SME was able to collaborate with large companies involved in the project, and was able to contribute to the decision-making process. Sitting around the table with major industrial players and research centres such as Centro Ricerche FIAT SCPA was quite an experience for the SME.

Helping to make sure that each partner got as much as possible out of the project, an external industrial advisory board attended some of the consortium meetings, giving advice on how to achieve the project’s technical and business objectives.

Reaping the benefits

There is no question over the benefits to Rodax of participation in FORBIOPLAST. The company’s R&D/innovation capabilities received a significant boost, as did in-house skills. The extremely fruitful relationship between the partners also strengthened contacts, mutual understanding and cooperation. Rodax remains confident that exploiting renewable natural resources, such as forestry residues and waste, more efficiently and sustainably will enable Europe to reduce its dependency on fossil fuels when producing value-added products.

Industrial partners and research centres are carrying out the exploitation of FORBIOPLAST products, in particular for fertiliser sticks, tomato yarns and pots, biodegradable materials for packaging and composites with recycled polypropylene and wood fibres for automotive applications. At least four new patent applications have been submitted as a result of the project. These will clearly lead to advantages for Rodax Imperial. The SME is happy to report that its expectations were met, and that both its experience and expertise in the field benefited considerably from involvement in the project.

The goal now is to secure more funding so that Rodax can further develop the promising results already obtained. FORBIOPLAST was simply a first step into the arena of EU-funded projects.

SME “Bio-Iliberis Research and Development” Spain

Bio-Iibiris R&D is a spin-off company from the Spanish Council for Scientific Research (CSIC). It is a biotechnology-based company with an active R&D programme and valuable know-how in the field of environmental restoration using patented processes based on microorganisms.

Bio-Iliberis R&D was well-placed to play a key role in an EU project seeking to improve the effectiveness of bacteria in the treatment and prevention of environmental pollution.

Bacteria are used widely to clean up oil spills, abandoned chemical plants and contaminated land. But the results depend on the interaction between the specific bacteria used and the pollutant. The project BACSIN (Bacterial abiotic cellular stress and survival improvement network) led to new understanding of the factors involved, meaning that bacteria can now be applied in a more rational way.

Major role for small company

Bio-Iliberis was a key player in the project BACSIN, involved from the beginning after the project coordinator approached the company. This meant that the SME not only contributed to the proposal preparation, but was represented in the steering committee and therefore involved in all decision-making.

And this involvement paid off. The company’s goal was to identify a microorganism with new properties for environmental remediation. Bio-Iliberis has identified this microorganism and has also invested in new technology to further expand what these microorganisms are capable of doing.

The project provided the funds needed for this additional research and new know-how and technology, which, importantly, boosted profits. Commercialisation is underway, assisted by a large company following an agreement on profit-sharing.

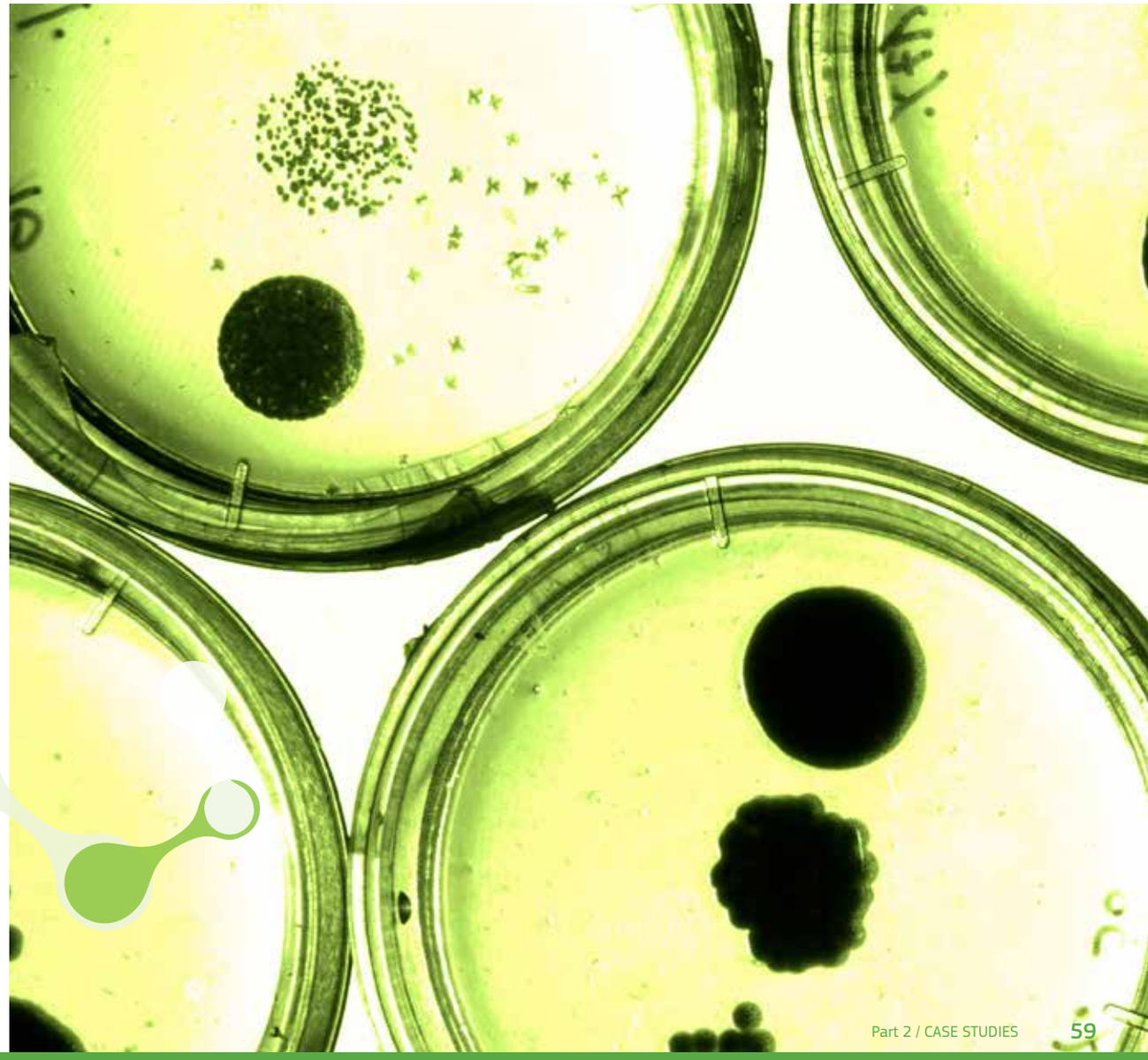
Intellectual property safe and sound

The company owns the intellectual property rights (IPR) for the inventions for which it was responsible within the project. This was planned, along with other IPR provisions, in the consortium agreement. Bio-Iliberis was consulted before this agreement was finalised.

Fruitful collaboration

Bio-Iliberis also has new contacts and partners as a result of the BACSIN project. The company has collaborated effectively with other industrial participants dealing with research, technological transfer and testing activities. The SME built up a particularly fruitful relationship with a Croatian company.

Although Bio-Iliberis had taken part in regional and national research projects, this was the company’s first EU-funded project. The experience and results were however so positive that Bio-Iliberis has already embarked upon a second – ST-FLOW (Standardisation and orthogonalisation of the gene expression flow for robust engineering for new-to-nature biological properties), launched in December 2011.



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Biotechnology is among today's most innovative technologies and is a significant driver of economic growth within the bioeconomy. We are now able to produce bio-based products in more eco-efficient and sustainable ways. Small and medium-sized enterprises (SMEs) working in the biotechnology field, which are behind much of the innovation and job creation taking place in Europe, are among those harvesting the potential of the bioeconomy.

This report provides a comprehensive overview of the measures taken by the European Commission to encourage SME participation in EU-funded projects within the FP7 Activity "Biotechnologies", and of the opportunities that SMEs found. It updates knowledge on SMEs' profiles, share of funding received, their added value for projects, business benefits, etc. The positive results confirm that the European Commission's efforts to support SME participation have paid off.

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