Open Innovation through Shared Facilities and Facility Sharing

EURIS SFFS
European Automotive Facility Centers

City of Helmond Navarran
European Business Centre - CEIN
INNONET Centre of Innovation and Technology

Final Report

information of different management approaches recommendations to policy makers facility owners

Open Innovation through Shared Facilities and Facility Sharing EURIS
INTERREG IVC
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EURIS SFFS
www.sffs.euris-programme.eu

A detailed analysis of aiming shared utilization (offering services in an open manner to multiple companies / organizations) as a core element of their business model. Established by the joint work of Subproject partners (Lead Partner, NL), (ES) and (HU) each residing in European regions with significant links to the automotive industry.

The is based on 30 fact sheets, visits to 18 existing facilities and numerous detailed expert interviews conducted over a year under the coordination of , a consultancy firm specialized in development, organization and realization of technological innovation and collaboration in the automotive, mobility and high tech industry.

The resulting publication both provides benchmark and aiming to extend the automotive services of their regions and their respective companies.

() is a subproject in frame of the " initiative, co-funded under the Interregional Cooperation Programme by the ().

For more information about the project visit:
Open Innovation through
SHARED FACILITIES and FACILITY SHARING
Final Report
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EXECUTIVE SUMMARY

The European cooperation program EURIS, aims to help regions to embrace “Open Innovation”, leading to open and accelerated cooperation rates between Innovation Stakeholders in a globalized knowledge economy. As a Mini-program, EURIS provides the opportunity for an in-depth analysis and exchange of Good Practices leading to “Open Innovation”, both at strategic and operational level, through the management of an Interregional Call for Subprojects.

This final report has been the result of the EURIS Subproject Open Innovation through Shared Facilities and Facility Sharing (SFFS), with the main goal to contribute to more effective regional innovation strategies and policies that enhance regional innovation and competitiveness through stimulating open innovation. The basic assumption is that shared facilities and facility sharing can play an important role as an instrument for open innovation and SME stimulation within the automotive industry.

To identify and select good examples on shared facilities and facility sharing, in-depth desk research was performed. A total number of 65 Automotive Facility Centers were identified worldwide and detailed factsheets were made of 30 European Facility Centers. Based on the analysis of the level of experience and size, the level of open innovation and the level of success, the members of the International Steering Group have selected 3 regions that they would like to visit. During 3 study visits to the Gothenburg region (Sweden), Euregion (Germany, Belgium and The Netherlands) and Bilbao region (Spain), 18 existing Facility Centers were visited in total. In addition, detailed interviews were conducted with Testing and Facility Managers and online questionnaires were sent to a total number of 25 experts in Europe.
In general, organizations active in a high-tech industry are subjected to five trends and developments that drive the shift towards open innovation: *Globalization, Technology Intensity, Technology Fusion, New Business Models* and *Knowledge Leveraging*. Also 4 general conditions were identified that increase the level of success of strategic collaboration, sharing and exchanging knowledge and practicing open innovation within a region, sector or individual organization: *organization of the stakeholders*, *definition of a shared vision*, *development of a technology roadmap* and *selection of innovation focus areas*.

Looking at the way large *OEMs* and *TIERs* innovate, the automotive industry has been and still is a very traditional sector. Open innovation proves to be very difficult to establish within the automotive industry. The existing culture of “not sharing” makes it hard to join forces on a commercial or business level. However, 2 strong global technology trends are driving the need for open innovation and strategic collaboration within the automotive sector: *future powertrains* and *smart mobility*. These global trends require the development of new technologies with a high degree of complexity and the combination of technologies from different industries. To ensure successful development and market introduction of new (enabling) technologies, automotive OEMs and TIERs have to start-up *triple-helix* innovation and collaboration projects. Internal knowledge and technologies have to be shared as these trends require more and more cross-sectoral collaboration, directly driving open innovation within the automotive sector.

The basic assumption of the *EURIS SFFS* Project was that *Shared Facilities* and *Facility Sharing* can play an important role as an instrument for open innovation and SME stimulation within the automotive industry. The findings show that shared facility and facility sharing initiatives are not driving open innovation; they only facilitate.
The interest for new Shared Facility initiatives is growing as they enable companies, knowledge institutes and governments to work together on a pre-competitive research level. The role of government in realization of new shared facilities is essential, because they often are responsible for financing an average of 69% of the initial investment.

Sharing existing facilities (Facility Sharing) gives the owner the opportunity to increase the usage and lower his operational costs, while third parties get access to a facility without the need to invest. By opening up, new business relations and collaborations can be established, stimulating knowledge sharing and competence development. The most successful facility sharing initiatives are fully commercial and financed by private funds.

To be successful in stimulating open innovation and strategic collaboration within a certain region, industry or sector, it is recommended to identify and determine its specific drivers and most important conditions. To establish the basic conditions for the development of a comprehensive program based on open innovation, fully supported by the majority of the region, industry or sector, a 6-step approach has been developed and is proposed in this report.

It is also recommended to not initiate shared facilities or facility sharing for the purpose of stimulating open innovation, because they are not direct drivers of open innovation. They are enablers that facilitate open innovation and require a set of pre-conditions for success. Only initiate new Shared Facilities or Facility Sharing initiatives, when they can support the region or industry in developing a strong knowledge position that cannot be achieved by individual excellence. If available, use an existing or develop a new innovation program as a starting point. For starting up new shared facilities and facility sharing initiatives, a second-phase 6-step approach has been developed and is proposed in this report.
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1. INTRODUCTION

1.1. EURIS project

EURIS is a European cooperation program within the Interreg IVC framework with the aim to help regions to embrace “Open Innovation”, leading to open and accelerated cooperation rates between Innovation Stakeholders in a globalized knowledge economy.

EURIS addresses the Lisbon Strategy’s challenge of shifting towards a Knowledge based economy, if EU is to become the more competitive world economy, from 2 complementary perspectives:

- The lack of many EU regions of a critical mass on the RTDI\(^1\) field, as well as the ongoing regional competition on funds, brains and resources, opposed to the increasing globalization of RTDI (Global Networks of Innovation) and the enormous potential in Europe to build on the complementary strengths of different regions.

- The “Closed” and outdated concept of Innovation, versus the “Open Innovation” one, as termed by Henry Chesbrough on 2003, where all Stakeholders involved in the innovation process (both internal and external) have a similar key role and therefore rely on the co-opetition (cooperation/competition) and experimentation between companies, Universities, Research Centers, consumers and public authorities.

The EU urgently needs to translate the Open Innovation culture from the private sector to the “opening up for better horizontal and vertical co-operation of the governance system, in order to accompany Open Innovation processes in economy, more and more trans-national”, as fostered by EC Communications.

\(^1\) Research and Technical Development Infrastructure
A broad framework of policy areas affects Open Innovation, but EURIS focuses on the Collaboration Policy area, because:

- It falls under the direct competencies of Regional Innovation Strategies (RIS);
- Collaborative environments are crucial for companies to embrace OI and
- It benefits from an interregional approach, as OI requires the overcome of the regional strategic thinking, and to open up innovation systems.

**EURIS objectives**

EURIS goal is to contribute to the Opening up of EU Regions Innovation ecosystems. The embracement of Open Innovation, in terms of accelerated cooperation rates among Innovation Stakeholders (companies and research centers) both in the midst of each region, and among EU regions, is the ultimate goal of EURIS, as means to advance on the construction of the European Research Area.

EURIS aims to:

- **Develop more effective Regional Innovation Strategies through the mutual learning, exchange and transfer of Good Practices, on the field of cooperation policies among Innovation Stakeholders, conducive to Open Innovation environments.**
- **Disseminate and transfer such Good Practices to other EU Regions.**
- **Deliver Policy Recommendations for regional Innovation Stakeholders to embrace Open Innovation.**
Specific Objectives

• **To provide methodological tools for the identification, exchange and transfer of Good Practices in the field of Collaboration Policy leading to Open Innovation friendly frameworks, covering all needed stages of the process, from the identification of good practices and policies, to the assessment of their transferability and to the transfer of such good practices in less experienced regions.**

• **To identify, exchange and disseminate to other European Regions the Best Practices and Experiences resulting from successful regional policies in this field, at the EU level, providing practical tools for the assessment of their transferability to other regions.**

• **To exchange Good Practices and/or jointly develop new approaches on the Collaborative Policy area, by the implementation of interregional Subprojects, to be carried out by partners and regional public Participants, which will contribute to the improvement of partners RIS.**

• **To exchange Best Practices on Open Innovation with other EU policy and research initiatives in the Open Innovation field (PRO-INNO, Vision ERA-NET, OECD, etc.).**

• **To transfer and integrate into Regional Innovation Strategies of partners the Good Practices, new approaches and findings coming up from Subprojects implementation.**

• **To produce and disseminate among EU regions and the EC, specific Policy Recommendations for the increase of interregional collaborative and Open Innovation frameworks.**

As the Open Innovation approach demands high level of cooperation between different regions, **EURIS** has been designed as a mini-program,
1. INTRODUCTION

setting an operational framework allowing the definition and support of inter-regional sub-projects.

As a Mini-program, EURIS provides the opportunity for an in-depth analysis and exchange of Good Practices leading to “Open Innovation”, both at strategic and operational level, through the management of an Interregional Call for Subprojects. Mini-programs are projects with a limited number of partners developing a joint framework for interregional cooperation that will be implemented through a limited number of subprojects that are developed via calls for proposals in the participating regions.

1.2. EURIS SFFS subproject

Global trends in the automotive industry ask companies to innovate in an increasingly rapid pace. More and more suppliers are urged to invest in R&D and engineering. Especially paradigm shifts (like electric driving and cooperate driving) ask for investments in new research and test facilities. However, most of the times these facilities require large investments that cannot be made by individual companies and knowledge institutes. A possible solution for this problem could be the realization of shared facilities (demand-driven) or a system of facility sharing (supply-oriented). This leads to the definition of the following questions:

- **What can we learn from existing good examples and best practices of both shared facilities and facility sharing in the automotive industry and adjacent sectors?**

- **How can we translate these examples and practices into business models and recommendations that benefit the project participants and any other regions that face the same issues (i.e. regional validation of the project outcomes)?**
The overall goal of the EURIS Subproject **Open Innovation through Shared Facilities and Facility Sharing (SFFS)** is to contribute to more effective regional innovation strategies and policies that enhance regional innovation and competitiveness through stimulating open innovation. The basic assumption is that shared facilities and facility sharing can play an important role as an instrument for open innovation and **SME stimulation** within the **automotive industry**. The main objective is to exchange knowledge and best practices on development, business models and management of shared facilities and facility sharing.

The project aims at the following sub-objectives:

- To identify, select, analyze and exchange good examples and best practices on shared facilities and facility sharing as a support structure for open innovation;
- To deliver practical guidelines, business models and policy recommendations for regional policy-makers and public innovation stakeholders;
- To transfer the general recommendations and lessons learnt from the exchange activities to the specific regional situation of the participating regions, to either optimize or study the feasibility or start-up of shared facilities and/or facility sharing within the different participating regions;
- To disseminate the knowledge and best practices to other EU-regions.
1. INTRODUCTION

Sub-project Participants

The partnership involves 3 regions with strong automotive clusters: Brainport (Netherlands), Navarra (Spain) and West-Transdanubia (Hungary), represented by the City of Helmond (NL) as lead participant, the Navarran European Business Innovation Centre – CEIN (ES) and INNONET Centre of Innovation and Technology (HU).

1.3. Used definitions

Shared Facility: A joint investment in new facilities by multiple organizations, with the goal to share and exploit the facilities together, in order to ensure a high level of usage and reduce the overall costs.

Facility Sharing: Sharing of existing facilities with third parties, in order to increase the level of usage and reduce the overall costs.

1.4. Approach and methodology

To identify and select good examples on shared facilities and facility sharing, in-depth desk research was performed, consisting of internet-based and literature-based research. A total number of 65 Automotive Facility Centers were identified worldwide (Appendix A1). Based on a first selection, detailed factsheets were made of 30 Facility Centers in Europe (Appendix A2). Focusing on important aspects such as experience with Facility Sharing and Shared Facilities, level of open innovation and level of success, 8 relevant examples were identified (Appendix A3). Based on specific selection criteria (Appendix A4) all examples were sorted and a shortlist of European examples of shared facilities and facility sharing within the automotive sector was identified:
### Shared Facilities

- Automotive Engineering Campus
- Automotive Facilities Brainport
- Automotive Intelligence Center
- Combustion Engine Research Center, Chalmers University
- Dutch Integrated Testsite for Cooperative Mobility
- Lindholmen Science Park
- Vehicle and Traffic Safety Center - SAFER
- Test Site Sweden – TUCAP and Closer
- VTI Swedish National Road and Transport Research Institute
- University of Ingolstadt – CARISSMA

### Facility Sharing

- Benteler Engineering Services
- Bradford University - Automotive Research Centre
- Flanders’ DRIVE Engineering Centre
- Ford Lommel Proving Ground
- Forschungsgesellschaft Kraftfahrwesen Aachen (FKA)
- Institut für Kraftfahrzeuge Aachen (IKA)
- Millbrook Proving Grounds Ltd.
- MIRA Ltd.
- Politecnico di Torino
- Swedish Hybrid Vehicle Center, Chalmers University

To analyze the performance of these examples in Europe and exchange knowledge about important aspects of Facility Sharing and Shared Facilities, detailed interviews were conducted with Testing and Facility Managers and online questionnaires were sent to a total number of 25 experts ([Appendix A5](#)). Additionally, the members of the International Steering Group have selected 3 best examples that they would like to visit and have an in-depth discussion about the basic requirements and success criteria for new Shared Facility and Facility Sharing initiatives:
1. **Lindholmen Science Park** – Gothenburg – Sweden

2. **MIRA Ltd.** – Nuneaton – United Kingdom

3. **Flanders’ DRIVE Engineering Centre** – Lommel – Belgium

Although MIRA Ltd. was identified as one of the best examples of shared facilities and facility sharing within the automotive sector, it was not possible to analyze their performance in detail. MIRA Ltd. has chosen not to share detailed information with the project participants about their business approach and actual performance. Also Institut für Kraftfahrzeuge Aachen (IKA) and Forschungsgesellschaft Kraftfahrwesen Aachen (FKA) have not participated in the project because of the same reason. The members of the International Steering Group have therefore decided to visit another European example of shared facilities and facility sharing within the automotive sector:

4. **Automotive Intelligence Center** – Amorebieta-Etxano – Spain

During these 3 study visits to the Gothenburg region (Sweden), Euregion (Germany, Belgium and The Netherlands) and Bilbao region (Spain), 18 existing Facility Centers ([Appendix A6](#)) were visited in total. During these study-visits, the members of the International Steering Group ([Appendix A7](#)) attended presentations by local experts, workshops and discussions on Shared Facility and Facility Sharing, next to guided tours around local automotive test and research facilities.
2. AUTOMOTIVE FACILITY CENTERS

In this chapter, the highlights of the desk research are presented. A large number of automotive facility centers in Europe are studied in detail and analyzed on 3 levels:

- *Experience and size*
- *Level of open innovation*
- *Level of success*

The desk research was mainly focused on facility centers within the automotive sector that still exist today. As the EURIS SFFS project is looking for best practices, automotive facility centers that have existed, but were not able to withstand the competition, have not been included in the analysis.

2.1. Experience & size

To identify representative examples of shared facilities and facility sharing, the years of experience with facility sharing and shared facilities of existing automotive facility centers were analyzed, next to the number of test- and research facilities offered and the height of the initial investment.

**Years of experience**

2 of the oldest Automotive Facility Centers are the Institut für Kraftfahrzeuge in Aachen (Germany), founded in 1902, and MIRA Ltd. in Nuneaton (United Kingdom), founded in 1946. The analysis of all automotive facility centers in Europe showed that 58% of all currently existing facility centers was founded after the year 2000. ([Appendix B1])
Number of facilities
Some facility centers offer only one facility, while others offer more than 70 different types of facilities (MIRA Ltd.). The oldest facility centers also offer the widest range of test- and research facilities for the international automotive sector. The ten oldest facility centers offer on average 35 different types of facilities, while the 10 newest facility centers, offer on average 4 different types of facilities. (Appendix B1)

Initial investment
For a representative analysis of the average investment in Automotive Facility Centers, only the Facility Centers that were founded after the year 2000 were taken into account (Appendix B3). Starting at € 2.5 million, the initial investments can be as high as € 28 million (CARISSMA). On average the initial investment amounted € 11.8 million. While some new initiatives are 100% funded by Government (CARISSMA), others are completely funded by industry (3C Test limited). On average, Local, Regional and National Governments contribute 69% of the initial investment. The other 31% is contributed by large (multinational) companies (14%), small and medium enterprises (2%), universities (11%) and knowledge institutes (4%).
Funded by industry, 3C Test Unlimited has the aim to earn back the initial investment within a scope of 5 years. 33% of the new initiatives have a scope of at least 10 years for earning back the initial investment. 60% of the new initiatives has been started without the intention to earn back the initial investment. They consider the initial investment as sunk costs and concentrate on covering only the operational costs by providing testing and research services to the automotive sector on a commercial basis. (Appendix B4)

2.2. Level of open innovation

To identify representative examples of shared facilities and facility sharing with a high level of open innovation, the involvement of and collaboration between companies, universities, knowledge institutes and government was analyzed. (Appendix B5)
Number of partners / members
To ensure a good utilization rate of the test and research facilities, most of the facility centers have a large number of partner and member organizations. While some Facility Centers only choose to have a small number of strategic partners for research (Automotive Research Centre), others have developed a strong automotive cluster with over 170 members to support the activities of the facility center (Flanders’ DRIVE). On average the automotive facility centers are supported by a group of 28 partners and members. (Appendix B6)

Involvement of Small Medium Enterprises (SMEs) and Multinational Companies
SMEs are seen as a very important source of break-through technological innovations. In order to successfully exploit the economic value of these innovations, collaboration with large Original Equipment Manufacturers (OEMs) and suppliers (TIERs) is often required to reach market introduction. 19% of all automotive facility centers indicates that they are performing test and research activities for SMEs. In order to be attractive for SMEs, the facility centers offer special discounted rates for (member) SMEs.

All facility centers confirm that they have strong relations with large automotive OEMs and TIERs for testing and research. These relations prove to be necessary for a high utilization rate of the facilities. In order to be able to work for large automotive companies, facility centers have to offer state-of-the-art facilities with high-quality engineering support. Knowledge based OEMs, TIERs and SMEs are the primary customers of automotive facility centers.

Involvement of Universities and Knowledge Institutes
In privately held commercial facility centers, the involvement of Universities and Knowledge institutes is limited (Millbrook Proving
Initiatives where government funding is significant, universities and knowledge institutes are important partners. 77% of the facility centers have one or more universities as partner. 88% of the facility centers have one or more knowledge institute as partner.

**Involvement of Government**

The involvement of Government in automotive facility centers is substantial. With the aim to strengthen the (regional) automotive sector, the main role of Government is to provide public funding for the initial investment. Only fully commercial facility centers such as Benteler Engineering Services, 3C Test Unlimited and Ford Lommel Proving Ground are operating without public funding. Since the year 2000, 93% of the new facility centers have been initiated with substantial government funding, ranging from € 1.5 to 28 million.

**2.3. Level of success**

To identify representative examples of shared facilities and facility sharing with a high level of success, the average utilization rate of the facilities was analyzed, next to the profitability and the ability to attract international customers.

**Average utilization rate**

Looking at the 10 oldest facility centers, the utilization rate of the automotive test and research facilities varies from 30% to 95%, with an average utilization rate of 69%. Looking at the 10 newest facility centers, the utilization rate varies from 25% to 90%, with an average utilization rate of 48%. Especially, the unique, state-of-the-art testing facilities are attractive for external parties, resulting in the highest utilization rates. For example, the climate controlled 4-poster test-rig with sunlight simulation of Flanders Drive and the 24 channel (6-DOF) road load simulator of Benteler Engineering Services. Facilities primarily used for
research purposes appear to have a lower utilization rate than facilities used for commercial durability and functional testing. (Appendix B7)

Profitability
The oldest facility centers prove to be the most successful in terms of profitability. Out of the 10 oldest facility centers, 6 are profitable, 1 is break-even and 3 are not profitable. Of all Facility Centers founded after 2000, only the fully commercial facility center has been able to be profitable (3C Test limited). All other facility centers have not been able to be profitable yet. (Appendix B8)

International Customers
The oldest facility centers also have the strongest international customer focus. 9 of the 10 oldest facility centers have established strong long-term relations with multiple international customers over the years. Most of the new facility center initiatives have a mainly regional customer focus. 2 of the 10 newest facility centers have been able to attract international customers to their location, due to state-of-the-art facilities with unique specifications. (Appendix B9)
3. SHARED FACILITIES

Based on the desk research results, the international steering group of the EURIS SFFS subproject has identified 4 representative examples of shared facilities: a joint investment in new facilities by multiple organizations, with the goal to share and exploit the facilities together in order to ensure a high level of usage and reduce the overall costs.

- **Automotive Intelligence Center – AIC – Spain**
- **Lindholmen Science Park – Test Site Sweden – Active Safety Test Area – Sweden**
- **Dutch Integrated Testsite for Cooperative Mobility – The Netherlands**
- **AutomotiveCampusNL – Automotive Facility Brainport – The Netherlands**

In this chapter, these 4 examples are briefly described, and the main advantages, main challenges and basic requirements for shared facilities are presented.

3.1. Representative examples of shared facilities

**Automotive Intelligence Center – Amorebieta-Etxano and Ermua - Spain**

<table>
<thead>
<tr>
<th>Experience &amp; Size:</th>
<th>★★★★★</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of Open Innovation:</td>
<td>★★★★☆</td>
</tr>
<tr>
<td>Level of Success:</td>
<td>★★★★☆</td>
</tr>
</tbody>
</table>
The Automotive Intelligence Center (AIC), located in Amorebieta-Etxano and Ermua, is a European Center generating value for the automotive industry, managed by ACICAE-Basque Country Automotive Cluster.

The ACICAE cluster organization is a private association funded for 75% by participating companies and for 25% by the Basque Government. Over the years ACICAE has developed a clear strategic vision with corresponding agenda for the long term in close cooperation with the automotive industry. This has resulted in 4 strategic roadmaps:

- 2007: Technological roadmap
- 2008: Internationalization roadmap
- 2009: Logistical roadmap
- 2010: Training roadmap

ACICAE has 6 permanent employees, responsible for execution of their core cluster activities. Additional capacity or expertise is hired when necessary for execution of specific projects. This approach results in a very effective, low-cost and lean organization, which is also acknowledged by the Basque government.
In October 2006, regional government and private sector organizations formed a foundation whose task is to investigate the opportunity to start-up a shared facility. The results of the investigation showed that they had to establish an open innovation center, in order to be competitive and effective in the future. This has resulted in the development of sector roadmaps (2007 and 2008) and the opening of the Automotive Intelligence Center (1st phase) in 2009. Because of its success, AIC also received the approval for execution and realization of the 2nd (2010) and 3rd phase (2011). Although the private sector initiated the idea, the infrastructure of the Automotive Intelligence Center (AIC) was fully financed by the Basque government.

The founding partners of AIC were: Provincial Council of Bizkaia, Amorebieta-Etxano City Council, City of Ermua, ACICAE-Basque Country Automotive Cluster, ZF Lemförder TVA, Pierburg, CIE Automotive, Amaya Telleria and Microdeco.

The concept of AIC is based on open innovation, where business improve their competitiveness, through cooperation. AIC integrates knowledge, technology and industrial development under one umbrella. Members of AIC can locate their training units, R&D units and development units at the AIC facilities, were they can work independently or in cooperation with other members at projects in a broad range of areas.
AIC initiates new projects, but can be either involved (as a project manager or project partner) or not involved during the execution. Their most important role is to stimulate and facilitate the innovation process, rather than contributing to the innovation process of developing new products and systems itself. The main goal of the AIC is to create value for the automotive industry, with a focus on:

- People, producing the best professionals
- Processes, leading advanced technologies
- Products, ascending the product development process chain

Currently, 22 automotive organizations are located in AIC. These organizations include OEMs, TIERs, Knowledge and Education Institutes, engineering firms. AIC has a total area of 37,000m² of facilities where their clients can perform their own research and development activities and share knowledge with other organizations.

AIC has the ambition to become a renowned World Competence Center that promotes business competitiveness, turning companies into attractive strategic partners. AIC provides valuable services through competitive intelligence, R&D, training and developing new business. An important characteristic of AIC is that they can provide their clients with all the required competences (internal or external) and that AIC has extensive experience with the different dynamics and speeds of local SME businesses in comparison with large multinational OEMs.

Important to consider is that both ACICAE and AIC are 2 separate corporate entities and also operate with different business models. The costs for the initial investment of the AIC infrastructure is fully financed by the Basque government and not taken into account in the business model for daily operations. The full market rates for using the facilities of
AIC is based on actual operating costs with a margin to cover for future investments and idle-time. Although these full market rates have been a topic for discussion at the beginning, nowadays the industry is covering all operating costs of AIC.

The Biscay Provincial Council chief executive José Luís Bilbao, who doubles as Chairman of AIC, announced the approval and launch of Phase III in November 2011. It involves an investment of approximately €15 million, for the construction of an additional 9,000 square-meter building with shared facilities. This approval confirms the long term commitment of the Basque government to AIC as a shared facility and its added value for the region.

**Lindholmen Science Park – Test Site Sweden – Active Safety Test Area**

- **Experience & Size:** ★★★★★
- **Level of Open Innovation:** ★★★★★
- **Level of Success:** ★★★★★
3. SHARED FACILITIES

Lindholmen Science Park is an international Science Park focusing on the areas of mobile internet, intelligent vehicles and transport systems, and modern media and design. In this open innovation environment, stakeholders from business, university and public sectors collaborate. The projects carried out within Lindholmen Science Park are characterized by cross-border cooperation, both in terms of competence, organization and between countries.

Research infrastructure for testing and verification is an important part in the innovation chain where the understanding of the problems can be obtained and new opportunities identified. Knowledge of the problems is a prerequisite for effective technology development with great innovation height. The availability of empirical data and test and measurement capabilities is a prerequisite for good vehicle research.

Test Site Sweden (TSS), is a national resource for demonstrations and validation of research results. TSS complements the winter testing facilities with new test environments that focus on active safety, electric and hybrid vehicles, and intelligent transport systems. TSS was started in 2006 with a goal to create a world unique demonstration and testing environment for products and services within ITS, where industry, academia and the authorities are offered new opportunities to collaborate.

Together with SP Technical Research Institute of Sweden, TSS is developing a novel proving ground for active safety systems named Active Safety Test Area (ASTA). By creating a globally unique environment for integrated traffic safety research in Europe, where authorities, academia and industry can work together, TSS want to make significant advances in order to lead the way for a further 20 years.
Implementing active safety technologies in vehicles requires new types of testing. Making transportation more energy efficient while maintaining traffic safety standards, places new demands on future traffic systems. The Active Safety Test Area (ASTA) provides for the development of light, small cars with maintained safety standards. ASTA will contribute to the efforts to achieve the ‘zero vision’ that nobody shall die or be seriously injured on our roads.

The availability of other testing facilities in the region provides a competitive advantage for European automotive OEMs and TIERs since the development work lead time, in which development work and testing are often sandwiched, can be shortened. Furthermore, unique competence will be gained at the testing installation itself, which will be beneficial to the European automotive industry at large.
Dutch Integrated Testsite for Cooperative Mobility

- Experience & Size: ★★★★★
- Level of Open Innovation: ★★★★★
- Level of Success: ★★★★★

The Dutch Integrated Testsite Cooperative Mobility (DITCM) is a unique consortium of 22 partners from industry, research organizations and government, with the shared goal to realize cooperative mobility, acceleration of new mobility concepts and solving mobility problems. The main objective of the DITCM project is to create a strong and efficient solution for improving traffic flow, for increasing safety, decreasing emissions and making driving more comfortable. Because it is difficult to realize these objectives for a single company, it requires collaboration between disciplines, involving different technologies with different life cycle times and organizations with differences in cultures. The actual implementation requires extensive investigation on the functionality and effects in an integrated environment, over the total chain from concept to deployment.

All DITCM Partners share the vision of cooperative technology and efficient solutions for mobility problems and defined the ambition to be number 1 in Europe in the field of cooperative technology and services. The shared vision and innovation focus of DITCM is defined through a technology roadmap, comprising 5 project streams:
• **In-vehicle information display**

• **Floating car data**

• **Local hazard detection and warning**

• **Intersection safely / green wave**

• **Logistics and transport, the green corridor**

The aim of DITCM is to test new cooperative driving technology, using the existing infrastructure of the area where it will be implemented. Not only in the Helmond region, but also on national and European level. At this moment the Helmond region is the only independent test site in Europe, which offers an open environment for testing cooperative driving technologies at a public road. Together with a broad range of unique test facilities DITCM claims a leading position in the development of smart mobility technologies within Europe.

**AutomotiveCampusNL – Automotive Facility Brainport**

- **Experience & Size:** ★★★★★
- **Level of Open Innovation:** ★★★★★
- **Level of Success:** ★★★★★
3. SHARED FACILITIES

The Dutch automotive sector has defined a shared vision with the goal to increase the annual turnover from € 12 billion in 2012 to € 18 billion in 2015. The aimed growth is established by focusing on 4 main activities for the next 3 years:

- **Extend the automotive research, development and engineering activities within the sector**
- **Concentrate on automotive education**
- **Collaborate with innovative production companies and R&D departments**
- **Provide world class automotive test facilities to support these activities**

In order to support and strengthen these activities, AutomotiveCampusNL has decided to set-up the Automotive Facility Brainport (AFB). The objective of AFB is to build Shared Technical Facilities and an Accelerator Center. The Shared Technical Facilities will contain high tech automotive research- and test facilities, which can be used by OEMs, TIERs, SMEs and research- and knowledge institutes active in the automotive industry. The Shared Technical Facilities will be open for everyone and offer 4 dedicated laboratories:

- **European Electric Mobility Center (EEMC)**
- **Driving Guidance lab (D&G)**
- **Manufacturing & Process lab (M&P)**
- **Test & Education lab (T&E)**

The total investment is funded by public (50%) and private (50%) money. In order to be successful with these shared facilities, AFB wants to operate business driven. They are also trying to attract SMEs by giving them 30% discount (subsidy) on the full market rates. € 18.1 million is the total budget for investments in buildings and testing facilities. € 9
million will be made available over the years as subsidy for supporting SMEs in using the facilities. This year AFB will start with the construction of the Manufacturing & Process lab and Test & Education lab. The European Electric Mobility Center and Driving Guidance lab will be made available through new shared facilities and reorganizing and sharing existing facilities located at other organizations. All labs should be ready for operation in September 2013. The government is considering AFB a long-term investment and is hoping to earn back the investment by business success of automotive SMEs in the future.

The main challenges for AFB are:

- To continuously adapt the facilities and services offered to the actual market demand
- To be able to follow the fast technology developments within the industry
- To establish a good mix between OEM and SME projects

3.2. Main advantages of shared facilities

Opportunity to share the initial investment and operational costs

The main driver for initiating new Shared Facility initiatives is the opportunity to share the initial investment and operational costs between a number of parties. The shared investment results in the availability of new facilities for all parties, while the operational costs for the individual organizations are low.

Opportunity to invest in state-of-the-art facilities with high specifications

By combining the investment capacity of a large number of organizations, the total budget for a new facility is enlarged, providing
the opportunity to invest in state-of-the-art facilities with high specifications. For a single company, it is not possible to make a similar investment. The high-end specifications of the shared facility are a direct result of the combined requirements defined by the owners.

**Opportunity to establish a high utilization rate**

New shared facility initiatives are driven by market demand, as they are the direct result of the complementary need for specific functionalities by their owners. Based on the sum of the current market demand for the facility by its owners, a relatively accurate estimation of the required size or capacity for the new shared facility can be made. It provides the shared owners with the opportunity to establish a high utilization rate of the facility, and therefore minimize the shared costs for idle time. State-of-the-art facilities with high specifications will also attract other (external) parties, providing the owners with the opportunity to maximize the utilization rate.

**Opportunity to develop a strong technology / knowledge profile of the region**

Large shared facilities function as a central location and meeting place for a high number of organizations, providing them with critical mass. They provide an excellent opportunity to develop a strong technology or knowledge profile of the region, strengthening the competitive market position of the organizations in the region. Shared facilities with a strong profile will also be able to attract large international organizations and knowledge workers to the region. This will have a positive effect on knowledge based / knowledge driven companies, especially SMEs.
3.3. Main challenges for new shared facility initiatives

**Definition of a clear set of terms and conditions**

One of the main challenges for new shared facility initiatives is the development of a shared business model for operational management, supported by all stakeholders. The stakeholders have to define a clear set of terms and conditions for utilization of the facility, for both the internal customers (owners) as well as external customers. Important aspects considering the terms and conditions for utilization are the prioritization between internal and external customers, operation of the facility, responsibility and confidentiality.

**High-quality staff and state-of-the-art facilities**

In order to develop a strong technology or knowledge profile, it is essential to install a professional management organization with experienced operational staff. The stakeholders not only have the challenge to attract qualified personnel, but also have to keep their theoretical and practical knowledge up-to-date according to the fast pace of technical developments. State-of-the-art facilities with high specifications will attract external customers, but in order to keep the facilities at a high-quality level, regular updates and additional investments are required.

**Rules of government funding**

Although the research shows that many shared Facility initiatives are funded for a large part by Local, Regional and National Governments, the use of public money for the initial investment often comes with regulations and restrictions. Because the public funding is expected to contribute to economic growth on a national level, it often creates the challenge to successfully exploit the new shared facility, focusing on the
customers located within the national boundaries. Attracting sufficient private funding for new initiatives can also be a challenge.

3.4. Basic requirements for new shared facility initiatives

Shared vision with long-term commitment

In order to identify the opportunities for new shared facility initiatives, a shared vision with long-term commitment is required. Companies, universities, knowledge institutes and government have to develop a (technology) roadmap together, showing the main goals and ambitions for the region. This roadmap will be used to define the (technology) focus of new shared facilities and require hard long-term commitments from individual organizations to invest in the realization and utilization of these facilities. Based on the hard long-term commitments, a solid business case for exploitation of the shared facilities can be developed.

Sufficient market demand to develop critical mass

In order to define a solid business case for exploitation of the shared facilities, the future market demand for these facilities has to be quantified. The commitment from regional partners and international customers has to be sufficient to develop critical mass. Only with critical mass, it will be possible to develop a strong technology or knowledge profile and attract new business to the region. This positive effect on the regional economy should be embedded in the shared vision and (technology) roadmap, and will also be a pre-requisite for acquiring national or regional government funding.

Clear set of terms and conditions for operational management

With a solid business case and sufficient funds for the initial investment, it is necessary to define a clear set of terms and conditions for utilization
and management of the facilities. Professional management is essential to realize coordinated utilization of the facilities, operating independently from the stakeholders to ensure flexibility and confidentiality towards all users. The stakeholders have to develop a shared business model and collaboration agreement with clear statements on sharing costs for operational management, maintenance, new investments and facility updates, and profits.

3.5. Business model template for new shared facility initiatives

To summarize the good examples and best practices and define a Business Model Template for new shared facility initiatives, the Business Model Canvas Template developed by Mr. Alexander Osterwalder was used. It provides a good overview of the most important aspects that need to be taken into account in order to increase the chance of success.
Key Partners
- National, regional and local Governments for public funding of the initial investment.
- Existing cluster or network organizations and industry campuses to reach out to customers through their channels.
- Knowledge Institutes for their knowledge on specific fields of expertise.
- OEMs, Tier 1s and SMEs for initiation of new research projects.

Key Activities
- Improvement of knowledge position and operational expertise and maintenance / calibration of the facilities.
- Initiation of new innovation projects.
- Pro-actie customer relations and increased market share within international view.
- Supporting customers with in-depth knowledge, operational position and strategic collaboration.

Value Propositions
- Supporting customers with in-depth knowledge, operational expertise and state-of-the-art facilities to find solutions for fundamental and applied research problems.
- Performing independent research for customers or in close cooperation with existing customers, using a professional website.
- Providing up-to-date information about the facility specifications and basic terms and conditions.

Channels
- CRM software and existing industry clusters and network organizations.

Customer Segments
- Knowledge driven organizations, focusing on technological product innovation and applied research in the fields of functional testing and durability:
  - Tier 1s
  - SMEs
  - OEMs (limited)

Business model template for new shared facility initiatives:
- Professional front and back-office setup.
- Innovative cooperation with existing clusters and business-to-business customer relations.
- Strategic cooperation with industry experts and applied research programs.
- Performance independent research on two levels of cooperation: fundamental and applied research solutions for customers relying on existing clusters and network organizations, focusing on technological product innovation and applied research in the fields of functional testing and durability:
  - Tier 1s
  - SMEs
  - OEMs (limited)

Revenue Streams
- Full market rates based on actual operating costs plus margin, to cover for:
  - Operational costs (personnel, education & training, power, etc.)
  - Maintenance costs (wear, repair, calibration, software updates, etc.)
  - Improvement costs (investments to keep facilities state-of-the-art)
- Business models for IP sharing, collaboration including financing.
- A professional front and back-office for customer support.

Key Resources
- Shared vision, technology roadmap and long-term (financial) commitment from the key partners.
- A strong knowledge position, operational expertise and state-of-the-art facilities.
- Business models for IP sharing, collaboration including financing.
- A professional front and back-office for customer support.

Cost Structure
- Operational costs (personnel, education & training, power, etc.)
- Maintenance costs (wear, repair, calibration, software updates, etc.)
- Improvement costs (investments to keep facilities state-of-the-art)
4. FACILITY SHARING

Based on the desk research results, the international steering group of the EURIS SFFS subproject has identified 4 representative examples of facility sharing: sharing of existing facilities with third parties, in order to increase the level of usage and reduce the overall costs.

• Center of Automotive Research on Integrated Safety Systems and Measurement Area – Germany
• Flanders’ DRIVE – Belgium
• Ford Lommel Proving Ground – Belgium
• Benteler Engineering Services – The Netherlands

In this chapter, these 4 examples are briefly described, and the main advantages, main challenges and basic requirements for new facility sharing initiatives are presented. Although MIRA Ltd. was identified as one of the best examples of facility sharing within the automotive sector, it was not possible to analyze their performance in detail. MIRA Ltd. has chosen not to share detailed information with the project participants about their business approach and actual performance, and is therefore not presented here.

4.1. Representative examples of facility sharing

Center of Automotive Research on Integrated Safety Systems and Measurement Area

• Experience & Size: ★★★★★
• Level of Open Innovation: ★★★★★
• Level of Success: ★★★★★
Center of Automotive Research on Integrated Safety Systems and Measurement Area (CARISSMA) is a long-term project with the goal to significantly contribute to the development of effective responses to mid and long term challenges in the field of road safety. It is initiated by the Ingolstadt University and was approved by the German Council of Science and Humanities on July 2, 2010. The construction work will commence early in 2012 and is scheduled to be completed in 2015.

The main goal of CARISSMA is to contribute to the “Vision Zero” campaign. The Vision Zero campaign has a long term vision of zero road deaths, as traffic still causes large casualty numbers on Europe’s roads. The main focus of CARISSMA is protecting passengers in the vehicles and preventing injury of the vulnerable road-users. The main approach of CARISSMA is the realization of a facility center for traffic and vehicle simulation including vehicle dynamics and testing sites. CARISSMA comprises test facilities for validation tests at an early development stage and facilities for mechanical component tests, setups for driving,
traffic, vehicle and component simulation as well as an outdoor area for driving and vehicle tests. The test facilities enable researchers to develop these systems and demonstrate the feasibility of new systems in substitute tests at an early stage.

All facilities of CARISSMA Test Center will be new. The total costs for the buildings and test facilities are budgeted for € 28 million. The funding is provided by the German government (50%) and the state of Bavaria (50%). The operating costs have to be funded by research projects for industrial partners.

**Flanders’ DRIVE**

- **Experience & Size:** ★★★★★
- **Level of Open Innovation:** ★★★★★
- **Level of Success:** ★★★★★

Flanders’ DRIVE is the Flemish initiative that develops competencies for the automotive industry with a focus on innovation in products and processes. They focus on the private vehicle, commercial vehicle, bus, trailers and off-road vehicle markets, including their subcontractors and service suppliers. Since 2008, Flanders’ DRIVE has evolved from a knowledge network and test platform into a full and internationally recognized competence pool.

Over the years they have been able to establish strong cooperation with international research centers in the global automotive industry. Flanders’ Drive is driven and founded by the automotive industry, but is funded by the Flemish and European government for 60%. 40% of the funding is generated by research projects and commercial services for industry.

The goal of Flanders’ Drive is to develop a wide network with the objective of exchanging experience and cooperation in a safe and secure
IP environment. Their mission is to be an internationally acknowledged competence center for the automotive industry. Their vision can be divided in 3 pillars; Platform for innovation stimulation and network organization, research and development and high tech infrastructure for vehicle, system and component testing. The research and development activities of Flanders’ Drive are focused on 4 fields of technology:

- **Lightweight solutions**
- **Intelligent driver and traffic systems**
- **Clean and energy efficient vehicles**
- **Advanced manufacturing processes**

All projects are initiated and coordinated by Flanders’ Drive. All the equipment that is installed is fully owned by Flanders’ DRIVE and fully financed and depreciated within projects, driven by industry. Currently 65 unique project partners are involved in approximately 10 research projects.
Flanders’ Drive offers high-quality and state-of-the-art facilities for durability testing of complete vehicles and components:

- Climate controlled 4-poster test-rig with sunlight simulation
- General durability test rig with servo controlled hydraulic actuators
- Test installation for battery management systems
- 4WD chassis dynamometer (currently under construction)
- 3 vehicle preparation rooms where customers can work under full confidentiality
- CAE / CAD Simulation Tools

The Flanders’ Drive facilities are mainly used by members of Flanders’ Drive and large international OEMs and TIERs. Members will get a significant discount on the international rate used for large international customers. The attractiveness of the facilities at Flanders’ Drive is enlarged by offering access to Ford Lommel Proving Grounds.

A lot of the facilities is used for research projects, financed by public (80%) and private (20%) money. The facilities are fully financed within these projects, so Flanders’ DRIVE can commercially exploit them after the projects. Flanders’ DRIVE will receive full ownership of all IP, while the project partners get a royalty free license. This offers Flanders’ DRIVE the opportunity to build a strong IP position as a knowledge institute, focusing on the selected technology fields.
Ford Lommel Proving Ground

- **Experience & Size:** ★★★★★
- **Level of Open Innovation:** ★★★★★
- **Level of Success:** ★★★★★

Ford Lommel Proving Ground (LPG) was established in 1965. Dearborn (Canada), Dunton (United Kingdom), Dagerham (United Kingdom) and Lommel (Belgium) are the 4 proving grounds owned by Ford Motor Company. LPG is the biggest and most important test track for their activities in Europe. LPG is operated 24 hours a day, 7 days a week. Currently, 350 people are working at LPG. The total length of all the tracks is 80 km and it is divided in 20 different track types, from high speed track to off-road tracks.

Tests that can be done at LPG are for example: durability testing, corrosion testing, function testing, brake testing, vehicles dynamics and noise testing. 95% of all testing activities is focused on own test- and
research activities by Ford Motor Company. The remaining capacity is offered to third parties (for example Toyota and PSA), but always giving priority to activities by Ford. The members of Flanders’ Drive get a special rate when using LPG. Large international customers contact LPG directly and are charged regular full market rates.

**Benteler Engineering Services**

- **Experience & Size:** ★★★★★
- **Level of Open Innovation:** ★★★★★
- **Level of Success:** ★★★★★

Benteler Engineering Services (BES) is specialized in complex durability testing and engineering of components and systems, where re-engineering is involved. They shifted their focus from complete vehicles to full service durability testing (durability+) on a system and component level, supporting their customers with highly skilled and experienced engineers. The turnover of BES is primarily (80%) derived from the Automotive industry. The other 20% is derived from other industries, such as public transport and rail. 40% of the turnover is generated through testing activities for its mother company Benteler, while the other 60% is generated through collaboration projects with external customers.

BES is located on the Automotive Campus in Helmond offering very good collaboration opportunities with knowledgeable companies like TNO and TÜV/TNO Automotive International (TTAI). Through collaboration, BES can cover all aspects of testing that are required to get projects from an OEM. By offering those facilities and services required by the market, BES realizes a very high utilization rate of all their facilities. On average, their testing facilities are 80% to 90% of the time in use. The remaining capacity is used for Small and Medium Enterprise (SME) projects. As the high-quality services of BES are too expensive for SMEs, the remaining
capacity is offered at a lower rate. This way BES is able to use their experience and knowledge about the automotive industry to help SMEs with product development and engineering.

BES offers low-end testing services focusing on local customers and offers high-end testing facilities for global customers. Most of their customers are situated within an area of 300 km from one of the local offices of BES. BES always keeps in mind that OEMs have their own facilities to perform all possible tests in-house and are therefore only interested in test facilities of third parties, if they require additional capacity or require special testing equipment. Therefore it is important for independent Facility Centers to be flexible. The external facilities have to be of a similar quality level and supported by highly-skilled staff. BES will not invest in testing facilities for Electric Vehicles (EV). The main reason is that many organizations are currently investing in these facilities and BES expects that this will result in a significant overcapacity on the short term.
4.2. Main advantages of facility sharing

**Opportunity to increase the utilization rate**

Facility sharing offers external parties the opportunity to use the existing facilities within an organization. The initial investment was fully made by the owner, so external parties do not have to invest themselves. They only pay for using the facilities and the engineering support. By combining the internal and external need for a facility, the overall utilization rate can be increased and additional income can be generated to cover the costs for operations.

**Opportunity to develop new business relations**

By opening up, organizations offer their facilities and services to external parties. This provides them with a new opportunity to develop new business relations and generate income by sharing their knowledge and competences. By working together with external parties, new competences and knowledge is developed, increasing the competiveness of all parties.

4.3. Main challenges for facility sharing

**Changing from an internal orientation to an external orientation**

One of the main challenges for facility sharing within the automotive sector is breaking the strong culture of “not sharing”. The strong competitive character of this industry makes it difficult to be open, although it has become easier over the last few years. When looking at successful facility sharing, it appears to be easier for owners to share their facilities with knowledge driven SME’s, than with other OEMs or TIERs. Working with large OEMs and TIERs requires additional terms and conditions which makes it more complex.
When opening up, an organization has the challenge to reorganize their activities from an internal orientation to an external orientation. The organization has to become service-oriented with service-minded staff, offering its facilities on a commercial basis. This requires staff with different mindset than the existing staff that is primarily focused on developing the best product for their company only. The fact that commercial organizations do better in this respect underpins this.

**Prioritization between internal and external customers**

The availability of facilities for internal use can be limited when they are used by third parties. When an organization is planning to offer their facilities to third parties, they have to develop a clear policy on prioritization between internal use and the use by external customers. The balance between required flexibility for efficient operation of internal processes and the desired flexibility towards third parties is very important to define. This is mainly a matter of professional management to prevent or solve increasing tension or friction.

**4.4. Basic requirements for new facility sharing initiatives**

**Flexible and service-oriented organization**

Working for different customers, requires flexibility in terms of availability and support. In order to share existing facilities with third parties, a clear set of terms and conditions for using the facility needs to be defined. External customers demand to get a quick response on their request, would usually like to use the facility on a short term and they demand the appointments to be reliable. This also requires a service-oriented organization, with an installed front-office for customer support and efficient and professional operational staff (back office).
Up-to-date facilities and professional engineering support

In order to be successful in facility sharing, the facilities that are offered have to be up-to-date, well maintained and with high specifications that are of value for third parties. Working with external customers also requires an infrastructure where external customers have the opportunity to work under full confidentiality. The facilities need to be offered at a competitive price level, in combination with professional staff, providing operational and engineering support.

Pro-active marketing and acquisition

To attract external customers, the owner has to provide detailed information about the technical specifications and availability of the facilities. Also it requires a clear communication of the opportunities and rates for third parties to use the facilities. The installed front-office for customer support should be responsible for pro-active marketing and acquisition.

4.5. Business model template for new facility sharing initiatives

To summarize the good examples and best practices and define a Business Model Template for new facility sharing initiatives, the Business Model Canvas Template developed by Mr. Alexander Osterwalder was used. It provides a good overview of the most important aspects that need to be taken into account in order to increase the chance of success.
### Customer Segments
- Knowledge-driven companies, focusing on technological product innovation and applied research in the fields of functional testing and durability:
  - TIERs
  - SMEs
  - OEMs (limited)

### Value Propositions
- Full market rates based on actual operating costs plus margin, to cover for:
- Operation of the test and research facilities
- First-time and recurring profit from operational staff
- Idle time and future investments, for full market rates based on actual operating costs plus margin, to cover for:
- Improvement costs (investments to keep facilities up-to-date)
- Maintenance costs (wear and tear, calibration, software updates, etc.)
- Operational costs (personnel, education & training, power, etc.)

### Key Partners
- Existing business relations and cluster or network organizations to reach out to new customers through their channels.

### Business Model Template for New Facility Sharing Initiatives

#### Channels
- Professional website, including information about the facility, price list, and strategic collaboration.
- Industry contacts and networks, reaching out to potential and existing customers.
- CRM software and existing industry clusters and network organizations.

#### Key Resources
- A strong knowledge position, operational expertise (standard test procedures), and up-to-date facilities.
- Business model for IP sharing, collaboration including financing.
- A professional front- and back-office for customer support.

#### Key Activities
- Performing applied research.
- Customer intimacy and strategic collaboration.
- Pro-active customer relations.
- Building internal and external partnerships.

#### Key Partners
- New customers through their expertise and existing business relations.
- Establishing new collaborations to reach out to experts and operational knowledge, operational knowledge.

#### Customer Relationships
- Invest in long and strong relationships (customer intimacy) on two levels of cooperation:
  - Business-to-business
  - Business-to-business (standard test procedures)
5. CONCLUSIONS

Essentially, innovation is the successful commercial exploitation of new ideas. Innovation can be divided into 4 categories: product innovation, service innovation, process innovation and business model innovation. The EURIS SFFS project has been concentrated on product and systems innovation within the automotive industry. Product and systems innovation is successfully designing and introducing new products onto the market where the functional characteristics are substantially improved.

5.1. General drivers for open innovation

Advances in information and communication technology, globalization and other forces have all generated innovations faster than companies can reasonably sort through them. Openness is becoming increasingly necessary for the simple reason that in some industries innovation and growth is only possible when companies collaborate. It might be financially unattractive for individual companies to innovate alone. Collaboration between organizations to share and combine valuable resources, such as knowledge, skills and facilities, for the development of new products or systems is considered open innovation.

Although a trend towards open innovation can be observed and it is receiving more attention, open innovation is not yet a dominant principle, widely used within the industry. Open innovation is also not an imperative for every company and every innovator. Instead, there is a need for a contingency approach regarding the management of innovation. It needs to be determined which factors that drive higher performance are preferred by open innovation and which factors are preferred by closed innovation models. The nuclear and military
5. CONCLUSIONS

industries are typical examples of closed innovation industries in which non-proliferation of technology and protection remain important. Organizations active in a high-tech industry are subjected to five trends and developments that drive the shift towards open innovation:

1. **Globalization**
2. **Technology Intensity**
3. **Technology Fusion**
4. **New Business Models**
5. **Knowledge Leveraging**

**Globalization**

Globalization is driven by a higher mobility of capital, lower logistics costs, more efficient ICT, and increased market homogeneity across different countries. Globalization has not only lowered entry barriers for new international competitors by decreasing cost pressure, but also provides the companies that can innovate faster and are able to adapt better with an opportunity for competitive advantage. Global industries favor open innovation models because they achieve economies of scale more swiftly than the traditional closed model and promote more powerful standards and dominant designs.

**Technology intensity**

In most industries, technology intensity has increased to such a degree that not even the largest companies can cope with or afford to develop technology on their own. The reasons are due to the lack of capabilities to cope with all upcoming technologies and due to the lack of financing to exploit them alone. Companies in high-tech sectors (e.g., semiconductors) show a higher openness to cooperate, extensively using...
external sources to support product development in an environment characterized by rapid technological change.

**Technology fusion**

Technologies are increasing morphing into new fields such as mechatronics, optronics and bioinformatics. Consequently, industry borders are shifting or even disappearing. For example, IBM is ranked eighth in a list of the world’s largest holders of biotechnology patents. The more interdisciplinary cross-border / cross-sectoral research is required, the less a single company’s existing capabilities are sufficient to provide successful innovations.

**New business models**

With the rapid shift of many industry and technology borders, new business opportunities arise. For example, the multimedia industry brings together firms active in sectors as different as hardware, software, telecommunication, information and entertainment. Consequently, new alliances have been formed, leading to complementary partnerships, e.g. Vodafone-Swisscom, Sony-Ericsson or Sony-BMG. The main motives for these alliances are the sharing of risks, the pooling of complementary competencies, and the realization of synergies. Organizations also tend to acquire those innovations and technologies that fit their business model.

**Knowledge leveraging**

Knowledge has become the most important resource for firms. Despite discussions regarding tacit knowledge that is bound to specific persons, the mobility of knowledge has increased over the last decades. Open source software development can have thousands of decentralized programmers working on one platform and has become possible because of the special character of software: high separability and
codability as well as its high knowledge intensity. Developing a car engine in open innovation modes is much more difficult – at least in the physical prototype stage. New ICT, especially the Internet, accelerated the knowledge diffusion process and increased the personal mobility of knowledge workers. Many specialized knowledge workers (freelancers, consultants or part-time engineers) make a living as portfolio workers, offering their service to different organizations at the same time. Instead of hiring the best engineers internally, organizations are forced to act as knowledge brokers. New capabilities and organizational modes are needed to cope with this outside-in thinking.

5.2. General conditions for open innovation

There are 4 general conditions that increase the level of success of strategic collaboration, sharing and exchanging knowledge and practicing open innovation within a region, sector or individual organization:

1. Organization of the stakeholders
2. Definition of a shared vision
3. Development of a technology roadmap
4. Selection of innovation focus areas

**Organization of the stakeholders**

In order to establish open innovation, it is important to get the concept known and supported by all people and organizations involved. To see the opportunities of open innovation, it is essential to hear and learn more about the knowledge and expertise of others. An independent platform, cluster or network organization is needed to facilitate neutral meetings and informal contacts between stakeholders and to establish a
basic level of understanding, support and trust that is required for sharing knowledge.

**Definition of a shared vision**

Only with clear statements on the shared long-term objectives and strategic innovation ambitions, organizations can directly align their innovation processes to create and deliver value, while building a sustainable competitive advantage together. Long-term commitment and support from the organizations involved (covering a time-frame of at least five years), is required to ensure a continuous contribution to the objectives and ambitions, for the scope of the shared vision.

**Development of a technology roadmap**

In order to increase the chances of success, it is essential to have an in-depth understanding of the specific market trends, the direct technological and competitive environment, and its impact on the shared objectives and ambitions. It is also important to identify the gaps between the current knowledge and market position and the future expectations, and the added value of innovation to close these gaps.

**Selection of innovation focus areas**

To concentrate the available resources on achieving the objectives and ambitions defined, it is important to select a limited number of innovation focus areas and identify the most appropriate innovation processes. These innovation processes are required for the development of a comprehensive program of complementary projects that directly contributes to the improvement of the knowledge and market position in a timely manner.
5. CONCLUSIONS

5.3. Open innovation within the automotive sector

Looking at the way large OEMs and TIERs innovate, the automotive industry has been and still is a very traditional sector. Open innovation proves to be very difficult to establish within the automotive industry. The existing culture of “not sharing” makes it hard to join forces on a commercial or business level. Closed innovation with a small number of technology suppliers is the standard approach, although the number of strategic alliances is slowly increasing. Some examples of open innovation between industry and knowledge institutes on a pre-competitive research level can be given, but close to the point of commercialization, companies prefer to exclusively claim the intellectual property (IP). Currently, open innovation within the automotive sector is only successful when the knowledge and competences of the collaboration partners are complementary to each other, the individual business goals are not similar, and they will not compete for the same market. The main driver of strategic collaboration seems to be the improvement of the company its competitiveness and not primarily a faster and better innovation process. However, 2 strong global technology trends are driving the need for open innovation and strategic collaboration within the automotive sector.

Technology trends driving open innovation within the automotive sector

Within the global automotive market, it is generally expected that conventional combustion engines will remain the main powertrain configuration for vehicles in the next 10 to 15 years. Therefore, automotive OEMs will focus their internal innovation process on the improvement of the efficiency and emissions of their combustion engines, electrification and hybridization of their vehicle drivetrains. To further improve the efficiency and emissions of their vehicles, OEMs
have the opportunity to make use of several enabling technologies that are not the core business of OEMs. For example:

- **The development of low emission and high performance fuels** (biofuels, synthetic fuels, hydrogen, fuel blends, etc.).
- **The development of new lightweight and high performance materials** (high-strength steels, carbon-fiber reinforced plastics, laminated composites, etc.).
- **The development of a strong supply chain and corresponding infrastructure with sufficient coverage for the supply of future fuels and electric power.**

Another global market trend is the development of safe and intelligent transport systems. OEMs are focusing their internal innovation on Vehicle Dynamics Control and Advanced Driver Assistance Systems. However, new technology developments in the field of communication of information, new road infrastructure and mobility technologies, enable the development of new mobility concepts such as platooning (i.e. SARTRE project with a.o. Volvo Cars), car sharing initiatives (i.e. DriveNow by BMW), cooperative mobility (i.e. DITCM) and Car-to-X communication (i.e. SimTD project with a.o. Daimler), also require external knowledge, expertise and enabling technologies.

For example:

- **The development of different communication platforms** (radio, GSM, Wi-Fi, etc.)
- **The development of intelligent roads and intelligent roads-side infrastructures and communication networks.**
- **The development of new information and communication technologies (ICT) for the secure exchange of data between different systems and organizations** (communication protocols and standards, regarding reliability, safety, privacy, etc.).
5. CONCLUSIONS

To ensure successful development and market introduction of these new enabling technologies, automotive OEMs and TIERs have to start-up triple-helix innovation and collaboration projects, involving small and medium sized companies, large and multinational companies, education and knowledge institutes, network organizations and governments. Internal knowledge and technologies have to be shared, directly driving open innovation within the automotive sector. Another important aspect is that this development requires cross-sectoral collaboration, involving other industries (oil, energy, materials, road infrastructure, ICT and mobility services, etc.).

5.4. Shared facilities and facility sharing as an instrument for open innovation and SME stimulation

The basic assumption of the EURIS SFFS Project was that shared facilities and facility sharing can play an important role as an instrument for open innovation and SME stimulation within the automotive industry. The findings show that shared facility and facility sharing initiatives are not driving open innovation; they only facilitate. Shared Facilities enable companies, knowledge institutes and governments to work together on a pre-competitive research level. Within the automotive sector, the level of open innovation within collaboration is limited by the culture of continuous competition. Because of the pre-competitive and also applied research level, mainly knowledge based / knowledge driven SMEs will be able to contribute to the innovation projects that are initiated. The role of government in realization of new shared facilities is essential. With an average public funding of 69%, its role in financing the initial investment is substantial. The expected positive impact of shared facilities on the competitive position of the regional and national industry, the growth of GDP and the
labor market, are the main arguments for governments to justify large investments in shared infrastructure and avoid discussions on unfair competition and state-aid. After establishment of the shared facility, the role of government is to ensure good alignment of the government policies with the strategy of the shared facility and through an active membership in the board to contribute to the success of the initiative on a long-term.

Facility Sharing does enable the owner and customer to perform open innovation and collaborate on applied research and durability testing. However, in practice customers are mainly showing interest in using the facilities on a business to business level with full confidentiality. Because the operational costs of existing facilities are lower, facility sharing is more attractive for SMEs. SMEs are usually not able to invest in facilities themselves and do not require high quality, state-of-the-art equipment. Facility Sharing enables SMEs to perform applied research and innovate, without requiring large investments in test and research facilities. The most successful facility sharing initiatives are initiated and managed through an independent network and cluster organizations, responsible for pro-active matchmaking of market-demand and supply in the field of test- and research facilities.

5.5. Conclusions on existing automotive facility centers

The largest facility centers are located in countries with a dominant automotive history such as the United States, Germany and the United Kingdom. The oldest facility centers offer the widest range of test facilities and also prove to be the most profitable. All facility centers combined, offer a complete range of test facilities, equally covering all aspects of vehicle testing. The average overcapacity for all automotive test and research facilities is 42%. Most of the facility centers have focused their
testing services on a specific field of technology, usually based on regional developed expertise and the demands of the regional industry.

Successful facility centers are closely located to their customers and have built long and strong relationships with them. Their customers are primarily knowledge based / knowledge driven companies, ranging from OEMs (56%), TIERs (32%) and SMEs (12%). All facility centers offer multiple business models for clients to use their facilities, depending on the requested type of service and customer. Only unique, state-of-the-art, one-of-a-kind facilities are able to attract international customers from all over the world. Existing relations (31%) and accurate website information (27%) are the main tools for the acquisition of new business. Facility Centers with a commercial orientation and organization are more successful in generating new business than Facility Centers focusing on applied research for internal use.

For most Automotive Facility Centers, offering high-end testing facilities with experienced and qualified personnel is their core business. Application of and sharing their knowledge is key to their competitive advantage. Open innovation in the field of testing will become more important in the future, when the BRIC countries will also be able to offer high-quality support, in combination with state-of-the-art test and research facilities.

5.6. Conclusions on shared facilities within the automotive sector

The interest for new Shared Facility initiatives is growing. Shared Facilities do facilitate collaboration and open innovation, but mainly on a pre-competitive research level for future technologies. They are expected to increase the competitive position of the regional industry by:
• **Improvement of its knowledge and technology position**

• **Generation and development of new business**

• **Creation of new products and jobs.**

A joint investment in Shared Facilities reduces the costs and risks for the individual parties. It can facilitate open innovation when clustering and knowledge sharing is pro-actively stimulated. Shared Facilities can function as a meeting place for innovation and attract high-quality personnel, when the facility center has built up a strong knowledge position with significant competences and a critical mass.

All new shared facility initiatives have been realized by a significant financial contribution by Local, Regional or National Government (up to 100% in some examples) and none of the existing Shared Facilities have been able to be profitable yet. Most of the existing Shared Facilities are initiated as Non-Profit Organizations, as profitability is not the primary goal for the stakeholders. The best shared facility examples are able to cover the operating costs, while taking the initial investment as sunk costs. They define their rates based on actual operating costs plus margin, to cover for idle-time and future investments.

Three primary business models are applied for Shared Facilities:

1. **Performing research for the stakeholders and external customers, fully operated by the professional staff of the Shared Facility (for the customer)**

2. **Performing research together with stakeholders and external customers, providing professional support to the engineers of the stakeholders and external customers (with the customer)**

3. **Performing research by stakeholders and external customers, operated by their own qualified staff (by the customer)**
5. CONCLUSIONS

To establish a successful Shared Facility, the government, research institutes and the industry need to define a shared vision on the future technological developments, their ambitions in the field of innovation and R&D, and the required facilities to support the activities. All parties have to agree on the shared initial investment, the availability of the facilities, define a clear set of terms and conditions for utilization, and install an independent operational management with the responsibility for maintenance and day-to-day exploitation of the facilities. To support their clients, shared facilities have to offer flexible collaboration models, models for sharing intellectual property, business models for exploitation of shared outcomes, and financing models. All stakeholders involved should give a strong and long-term commitment for using the facility and make a shared forecast of the expected financial results, taking the initial investment, future investments and operating costs into account.

5.7. Conclusions on facility sharing within the automotive sector

Sharing an existing facility gives the opportunity for the owner to increase the usage and lower his operational costs, while third parties get access to a facility without the need to invest. By opening up, new business relations and collaborations can be established, stimulating knowledge sharing and competence development. The most successful facility sharing initiatives are not founded with a direct financial investment from Local, Regional, or National Government.

In order to be successful in facility sharing, the facilities need to be attractive, up-to-date, easily accessible for third parties and operated by skilled and service-oriented staff. A clear set of terms and conditions (focusing mainly on ensuring confidentiality and responsibility of usage, etc.) is required, next to a flexible set of business models for using the facility.
Two primary business models are applied for Facility Sharing:

1. Performing tests for the external customer, fully operated by own engineers (completely outsourced);
2. Performing tests together with the external customer, providing professional support to the engineers of the client (collaboration during operation).

Large automotive OEMs and TIERs can perform most of the testing in-house and are only using external facilities when they need additional capacity. The tests performed at independent facility centers are focused on durability testing and applied research, limiting the opportunities for open innovation and strategic collaboration.

Profitable automotive facility centers such as MIRA Ltd, Flanders’ DRIVE and Benteler Engineering Services, are able to realize utilization rates up to 95%. They define their rates based on actual operating costs plus margin, to cover for idle-time and future investments. Approximately 90% of their work is performed for large OEMs and TIERs. The available knowledge and expertise is made accessible to SMEs by offering them the remaining capacity at a lower rate.
5. CONCLUSIONS
6. RECOMMENDATIONS

Based on the desk research findings, information gathered through study visits and the conclusions drawn in chapter 5, the International Steering Group of the EURIS SFFS project has defined some policy recommendations for stimulating open innovation and strategic collaboration and starting up new shared facilities and facility sharing initiatives. General recommendations are made for enhancing the chances on successful business with shared facilities or facility sharing within the automotive sector and finally some recommendations for further research are presented.

It has to be considered that these policy and general recommendations are primarily based on the analysis of good examples and best practices within the automotive sector and might include some specific outcomes that are not directly applicable to other industries or sectors. It is also important to state that there is not one single solution that fits all situations. These recommendations should be considered as guidelines for new Shared Facility and Facility Sharing initiatives and for each initiative a tailor made solution has to be developed, based on the sector, the region, the stakeholders involved and the economic situation.

6.1. Policy recommendations for stimulating open innovation and strategic collaboration

To be successful in stimulating open innovation and strategic collaboration within a certain region, industry or sector, it is recommended to identify and determine its specific drivers and most important conditions. Also focus on a regional or national level and slowly expand to an international level, when the regional and national
sector is fully organized and supporting the initiative. To establish the basic conditions for the development of a comprehensive program based on open innovation, fully supported by the majority of the region, industry or sector, it is proposed to follow a 6-step approach:

**Step 1**
Identify strong existing cluster and network organizations, to actively involve stakeholders, or start building a new cluster first that will be fully dedicated to supporting the initiative.

**Step 2**
Establish a steering group of founding fathers, consisting of at least 6 companies (2 OEMs, 2 TIERs and 2 SMEs), 2 Knowledge Institutes (1 Research Center and 1 University) and 2 Governments (1 National or Regional and 1 Local), that is willing to carry the new initiative together, from first concept towards realization.

**Step 3**
Under supervision of an independent (network) organization, create a shared vision with the primary stakeholders and define the innovation focus areas based on the industry needs and opportunities.

**Step 4**
Use the (existing) clusters, network organizations and business relations of the founding fathers to increase the number of organizations involved. Through technology workshops, develop a technology roadmap for the regional economy that can be used as a compass for achieving the shared vision.
Step 5

Collectively sharpen and quantify the strategic goals and long-term ambitions with stakeholders. Use the shared vision and technology roadmap to apply focus and select specific fields of technology and expertise on which the region would like to develop a unique technology and knowledge position.

Step 6

Develop an innovation program together with stakeholders that contains a portfolio of complementary (open) innovation projects and activities that individually contribute to the strategic goals and long-term ambitions.

6.2. Policy Recommendations for new shared facilities and facility sharing initiatives

Do not initiate shared facilities or facility sharing for the purpose of stimulating open innovation, because they are not main drivers. They are enablers of open innovation, facilitating open innovation and require a set of pre-conditions for success.

- Only initiate new Shared Facilities or Facility Sharing initiatives, when they can support the region or industry in developing a strong knowledge position that cannot be achieved by individual excellence.
- If available, use an existing or develop a new innovation program as a starting point for the analysis of new shared facilities or facility sharing initiatives.
- New initiatives should be based on a quantified market demand for the sharing of existing or new facilities.
6. RECOMMENDATIONS

After this market demand is quantified and considered to be significant, a second-phase 6-step approach is proposed:

**Step 1**

Analyze what facilities and functionalities are required or desired for proper execution of the innovation program or separate innovation projects.

**Step 2**

Identify the facilities and functionalities that are currently not existing or not publically available in the regional, national and international market.

**Step 3**

Estimate the required specifications and capacity for the facilities and functionalities for proper execution of the innovation program or projects.

**Step 4**

Determine the initial investments for new facilities and the additional investments for establishing new functionalities with existing facilities. Calculate the commercial rates for the facilities and functionalities, based on a break-even scenario at 50% utilization (equal to the required capacity for proper execution of the innovation program or projects), looking at a timeframe of at least 10 years for the initial investment. Considering new (shared) facilities, analyze the market conformity of the calculated rates and determine the required level of public funding in order to be commercially successful and prevent discussions on unfair competition and not allowed state-aid.

**Step 5**

Present the required initial investments and calculated commercial rates to the most important stakeholders and analyze their long-term
commitment on 3 levels:

1. The willingness of stakeholders to contribute to the required investments for new (shared) facilities or functionalities (improvement of existing facilities).
2. The willingness of stakeholders to pay the full market rates presented.
3. The willingness of stakeholders to develop additional (open) innovation projects, to further increase the utilization.

Step 6

Analyze the business case for each new facility and functionality based on the total commitment given and make a go / no-go decision together with the stakeholders involved.

6.3. General recommendation for new shared facility initiatives

- Only initiate new Shared Facilities, when you are able to offer unique, state-of-the-art, one-of-a-kind facilities, together with high quality knowledge and expertise.
- Focus the daily operation primarily on business-to-business collaboration, while initiating (open) innovation projects on a pre-competitive research level. Install an independent management organization, responsible for high utilization of the facility on behalf of all stakeholders.
- Install a pro-active front and back office for professional daily operation, focusing on successful commercial exploitation.
- Develop a clear set of terms and conditions for operation of the shared facilities, covering the aspects of full confidentiality and responsibility.
- Offer the facilities using full commercial and market-conform rates, based on the actual operating costs, plus a margin to cover for damage, wear and future investments.
6.4. General recommendation for new facility sharing initiatives

- Only initiate new Facility Sharing initiatives, when the facilities available are of high quality and can be offered in combination with highly skilled and service oriented engineering support.

- Focus primarily on business-to-business collaboration, by offering the facilities in combination with applied research and durability testing, supported by qualified engineering staff of the owner.

- Install a pro-active front office that identifies potential customers and maintains existing relations to generate a constant flow of external business.

- Develop a website with up-to-date information about general information about the facilities and basic terms and conditions.

- Offer the facilities using full market rates, based on the actual operating costs, plus a margin to cover for damage, wear and future investments.

6.5. Recommendations for future research

The EURIS SFFS project has focused her research on good examples and best practices of shared facilities and facility sharing within the automotive sector. The International Steering Group recommends further research on two fields:

- Analysis of the Automotive Facility Centers that were not able to survive, performing research on the critical circumstances and factors that were responsible for making some initiatives not successful.

- Analysis and comparison of the drivers and conditions for open innovation between industrial sectors, performing research on differences and similarities per sector, and the challenges and opportunities for cross-sectoral innovation programs.
APPENDICES
A. DESK RESEARCH METHODOLOGY

A1. List of Automotive Facility Centers (worldwide)

1. 3C Test Limited - Silverstone Technology Park - United Kingdom
2. Active Safety Test Area - Gothenburg - Sweden
3. Applus+ IDIADA - Santa Oliva - Spain
4. Automotive & Rail Innovation Center Aachen - Aachen - Germany
5. Automotive Engineering Campus - Turin - Italy
6. Automotive Facilities Brainport (AFB) - Helmond - The Netherlands
7. Automotive Innovation Facility - Palo Alto - United States
8. Automotive Intelligence Centre (AIC) - Amorebieta-Etxano - Spain
9. Automotive Research and Testing Center (ARTC) - Lugang - Taiwan
10. Automotive Research Centre - Bath - United Kingdom
11. Automotive Supplier Park (ASP) - Rosslyn - South Africa
12. AVL - Graz - Austria
13. Bath University - Bath - United Kingdom
14. Benteler Engineering Services - Helmond - The Netherlands
15. Bradford University - Bradford - United Kingdom
16. BRP - Valcourt - Canada
17. Center for Automotive Research (CAR) - Ann Arbor - United States
18. CEIIA - Maia - Portugal
19. Center of Automotive Research on Integrated Safety Systems and Measurement Area - Ingolstadt - Germany
20. Centre for Automotive Research - Durham - United Kingdom
21. Chalmers University of Technology – Gothenburg - Sweden
22. CITEAN - Centro Tecnológico de Automoción de Navarra - Pamplona - Spain
23. Closer Arena for Transport Research - Gothenburg - Sweden
24. Combustion Engine Research Center (CERC) - Gothenburg - Sweden
25. Cranfield University - Cranfield - United Kingdom
26. Durham University - Durham - United Kingdom
27. Dutch Integrated Testsite for Cooperative Mobility (DITCM) - Helmond - The Netherlands
28. Eindhoven, University of Technology - Eindhoven - The Netherlands
29. FEV Motorentechnik - Aachen - Germany
30. Flanders’ DRIVE Engineering Centre - Lommel - Belgium
31. Ford Lommel Proving Ground - Lommel - Belgium
32. Forschungsgesellschaft Kraftfahrwesen mbH Aachen (FKA) - Aachen - Germany
33. Fräunhofer Institute - Munich - Germany
34. Fundación TECNALIA Research & Innovation - San Sebastian - Spain
35. Győr Ipari Park - Győr - Hungary
36. HAN University of Applied Sciences - Arnhem - The Netherlands
37. High Tech Automotive Campus - Helmond - The Netherlands
38. Innonet - Győr - Hungary
39. Institut für Kraftfahrzeuge Aachen (IKA) - Aachen - Germany
40. Lighthouse Maritime Research Center - Gothenburg - Sweden
41. Lindholmen Science Park - Gothenburg - Sweden
42. Michelin-Clermont - Ferrand - France
43. Millbrook Proving Ground Ltd. - Millbrook - United Kingdom
44. MIRA Ltd. - Nuneaton - United Kingdom
45. National Automotive Testing and R&D Infrastructure Project (NATRiP) - New Delhi - India
46. Nevada Automotive Test Center (NATC) - Carson City - United States
47. PLDS – Philips & Lite-on Digital Solutions - Wetzlar - Germany
48. Politecnico di Milano - Milan - Italy
49. Politecnico di Torino - Turin - Italy
50. Dutch Road Vehicle Approval Authority (RDW) - Lelystad - The Netherlands
51. Regionales Innovations Centrum for Efficient Powertrain Technologies - Gunskirchen - Austria
52. RWTH Aachen University - Aachen - Germany
53. SP Technical Research Institute of Sweden - Gothenburg - Sweden
54. Stanford University - Stanford - United States
55. Swedish Hybrid Vehicle Center (SHC) - Gothenburg - Sweden
56. Technologie- und Gewerbezentrum e.V. (TGZ) - Schwerin - Germany
57. Test Site Sweden - Gothenburg - Sweden
58. TNO Automotive - Helmond / Delft - The Netherlands
59. Transportation Research Centre inc. (TRC) - East Liberty - United States
60. TUCAP - Gothenburg - Sweden
61. TÜV Rheinland - Cologne - Germany
62. University of Chicago - Chicago - United States
63. Vehicle and Traffic Safety Centre (SAFER) - Gothenburg - Sweden
64. Veritas AG - Gelnhausen - Germany
65. VITO - Mol - Belgium
66. VTI Swedish National Road and Transport Research Institute - Gothenburg - Sweden
### A2. List of European Facility Centers (factsheets)

1. 3C Test limited - Silverstone Technology Park - United Kingdom
2. Active Safety Test Area - Gothenburg - Sweden
3. Automotive & Rail Innovation Center Aachen - Aachen - Germany
4. Automotive Engineering Campus - Turin - Italy
5. Automotive Facilities Brainport (AFB) - Helmond - The Netherlands
6. Automotive Intelligence Center (AIC) - Amorebieta-Etxano - Spain
7. Automotive Research Centre - Bath - United Kingdom
8. Benteler Engineering Services - Helmond - The Netherlands
9. Center of Automotive Research on Integrated Safety Systems and Measurement Area - Ingolstadt - Germany
10. Centre for Automotive Research - Durham - United Kingdom
11. Chalmers University of Technology – Gothenburg - Sweden
12. Closer Arena for Transport Research - Gothenburg - Sweden
13. Combustion Engine Research Center (CERC) - Gothenburg - Sweden
14. Dutch Integrated Testsite for Cooperative Mobility (DITCM) - Helmond - The Netherlands
15. Flanders’ DRIVE Engineering Centre - Lommel - Belgium
16. Ford Lommel Proving Ground - Lommel - Belgium
17. Forschungsgesellschaft Kraftfahrwesen mbH Aachen (FKA) - Aachen - Germany
18. Fundación TECNALIA Research & Innovation - San Sebastian - Spain
19. Institut für Kraftfahrzeuge Aachen (IKA) - Aachen - Germany
20. Lindholmen Science Park - Gothenburg - Sweden
21. Millbrook Proving Ground Ltd. - Millbrook - United Kingdom
22. MIRA Ltd. - Nuneaton - United Kingdom
23. Politecnico di Torino - Turin - Italy
24. RWTH Aachen University - Aachen - Germany
25. SP Technical Research Institute of Sweden - Gothenburg - Sweden
26. Swedish Hybrid Vehicle Center (SHC) - Gothenburg - Sweden
27. Test Site Sweden - Gothenburg - Sweden
28. TNO Automotive - Helmond / Delft - The Netherlands
29. TUCAP - Gothenburg - Sweden
30. Vehicle and Traffic Safety Centre (SAFER) - Gothenburg - Sweden
31. VTI Swedish National Road and Transport Research Institute - Gothenburg - Sweden
A3. List of relevant examples of Shared Facilities and Facility Sharing

Automotive Facilities Brainport

- European Electric Mobility Center (EEMC)
- Driving Guidance lab (D&G)
- Manufacturing & Process lab (M&P)
- Test & Education lab (T&E)

Automotive Intelligence Center - AIC

Chalmers University of Technology

- Combustion Engine Research Center
- Swedish Hybrid Vehicle Center

Dutch Integrated Testsite for Cooperative Mobility - DITCM

Flanders’ Drive Engineering Centre

- Ford Lommel Proving Ground

Lindholmen Science Park

- Test Site Sweden
- VTI Swedish National Road and Transport Research Institute
- Vehicle and Traffic Safety Centre (SAFER)
- TUCAP
- Closer Arena for Transport Research

MIRA Ltd. - Nuneaton
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Politecnico di Torino
- Automotive Engineering Campus

RWTH University Aachen
- Institut für Kraftfahrzeuge Aachen (IKA)
- Forschungsgesellschaft Kraftfahrwesen Aachen (IKA)

University of Bradford
- Automotive Research Centre

University of Ingolstadt
- Center of Automotive Research on Integrated Safety Systems and Measurement Area (CARISSMA)
A4. Selection Criteria

Experience & Size

- Year of Foundation
- Total investment
- Number of partners / members involved

Level of Open Innovation

- Involvement of SMEs
- Involvement of OEMs
- Involvement of Universities
- Involvement of Knowledge Institutes
- Involvement of Government

Level of Success

- Average utilization rate
- Annual Turnover
- Profitable / Break-even
- International Customers
A5. List of Experts

**Audi Hungaria Internal Combustion Engine Department**
- Csaba Tóth-Nagy - Associate Professor

**Automotive Intelligence Center**
- Ines Anitua – Managing Director
- Raquel Piñan – Internationalization Manager

**Automotive & Rail Innovation Center Aachen**
- Martin Pölöskey – Managing Director

**Benteler Engineering Services**
- Martin van Besouw – Manager Testing & Protobuild

**Bradford University**
- Andrew Day – Head of Automotive Research Centre
- Felician Campean – University Director

**Brainport Development**
- Peter Portheine – Project Manager Automotive Facilities Brainport

**CARISSMA**
- Christian Lauerer – Scientific Technical Director

**Combustion Engine Research Centre**
- Ingemar Denbratt – Professor, Department of Applied Mechanics, Head of Combustion Division

**Dutch Integrated Testsite for Cooperative Mobility – DITCM**
- Joëlle van den Broek – Senior Project Manager
Flanders’ Drive
- Ger van den Kerkhof – Manager Innovation Projects
- Willem Nieuwland – Facility Manager – Flanders’ Drive

Ford Lommel Proving Ground
- Jo Mannaerts – Technical Engineer

Fundación TECNALIA Research & Innovation
- Claudia Hunziker – International Development & Open Innovation
- Jennifer Stack – Ventures
- José Luis Elejalde – Director of Technological Services Division
- Isabel Aramburu – Manager Material Testing Facilities

HVEC Hungarian Vehicle Engineering Cluster
- Zoltán Kabács – Cluster Manager

Institut für Kraftfahrzeuge
- Christian Sahr – Chief Engineer

Lighthouse Maritime Competence Center
- Klas Brännström – Director

Lindholmen Science Park
- Niklas Wahlberg – Chief Executive Officer

Millbrook Proving Ground Ltd.
- Neil Fulton – Head of Sales and Marketing

MIRA Ltd.
- Andy Bugg – Manager, TFE
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RWTH Aachen University
- Bram Wijlands – Technology Transfer

SAFER
- Anna Nilsson-Ehle – Managing Director
- Daniela Michael – Project Coordinator

Széchenyi István University – Knowledge Management Centre
- Tibor Dőry – Director

SP Technical Research Institute of Sweden
- Jan Jacobsen – Technical Expert

Swedish Hybrid Vehicle Centre
- Saeid Haghbin – PhD Student, Electric Power Engineering Division
- Torbjörn Thiringer – Professor, Head of Electric Power Engineering Division

Test Site Sweden
- Peter Öhman – Programme Manager

TNO Companies
- Jan van den Oetelaar – Managing Director Automotive

VTI Swedish National Road and Transport Research Institute
- Lena Nilsson – Research Director
A6. List of Facility Centers (visited)

- Automotive Facilities Brainport – Helmond – The Netherlands
- Automotive Intelligence Center – Amorebieta-Etxano – Spain
- Benteler Engineering Services – Helmond – The Netherlands
- Chalmers University of Technology – Gothenburg – Sweden
- Combustion Engine Research Centre – Gothenburg – Sweden
- Dutch Integrated Testsite for Cooperative Mobility (DITCM) – Helmond – The Netherlands
- Flanders’ DRIVE – Lommel – Belgium
- Ford Lommel Proving Grounds – Lommel – Belgium
- Fundación TECNALIA Research & Innovation – San Sebastian – Spain
- Lindholmen Science Park – Gothenburg – Sweden
- Swedish Hybrid Vehicle Research Centre – Gothenburg – Sweden
- Vehicle and Traffic Safety Centre (SAFER) – Gothenburg – Sweden
- VTI (Swedish National Road and Transport Research Institute) – Gothenburg – Sweden
A7. International Steering Group Meeting Members

**Automotive Facilities Brainport**
- Hans Tossaint – Technical Advisor
- Thijs Nooijen – Business Advisor

**CITEAN (Fundación CETENA)**
- Xabier Troyas – Chief Executive Officer
- Jorge Biera – Technical Director CITEAN
- Iñaki Arrequi – Experimental Mechanics Manager

**City of Helmond**
- Daniel de Klein – Project Manager Automotive
- Ton van Lier – Coordinator Subsidy Projects & External Affairs
- Inez van Poppel – Assistant Project Manager Automotive

**INNONET – Centre of Innovation and Technology**
- László Budavári – Managing Director
- Bálint Vasvári – Project Manager

**INROADS – professionals in innovation**
- Daan de Cloe – Partner
- Henk Zeegers – Partner
- Franks Steeghs – Consultant
- Robert-Jan Boonstra – Consultant

**CEIN – Centro Europeo de Empresas e Innovación de Navarra**
- Begoña Vicente – Project Manager
- Charo Villaruel Casado – Project Manager
- Beatriz Blasco – R&D Area Manager
B. REPORT OF FINDINGS

B1. Year of Foundation

![Bar chart showing the percentage of facilities offered by year of foundation]

- Before 1980: 45%
- Between 1980 and 1990: 20%
- Between 1990 and 2000: 5%
- Between 2000 and 2005: 10%
- Between 2005 and 2010: 15%
- After 2010: 0%

B2. Number of facilities offered

![Bar chart showing the percentage of facilities offered by number of facilities]

- 1 to 5: 45%
- 6 to 10: 20%
- 11 to 20: 15%
- 21 to 30: 10%
- 31 to 40: 5%
- More than 40: 0%
B3. Initial investment

![Bar chart showing initial investment amounts and corresponding percentages.]

B4. Expected period for earning back the initial investment

![Bar chart showing expected periods and corresponding percentages.]

- Less than 5 million euro: 30%
- Between 5 and 10 million euro: 25%
- Between 10 and 15 million euro: 20%
- Between 15 and 20 million euro: 15%
- More than 20 million euro: 10%

- No intention: 70%
- Less than 5 years: 30%
- More than 10 years: 20%
B5. Involvement of SMEs, OEMs, Universities, Knowledge Institutes and Government

![Graph showing the involvement of different entities.

B6. Number of Partners and Members

![Graph showing the number of partners and members.

- Yes
- No
B7. Average Utilization Rate

B8. Profitability
B9. International Customers

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<tr>
<th></th>
<th>Yes</th>
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<tr>
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<td>56%</td>
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Open Innovation through Shared Facilities and Facility Sharing (EURIS SFFS)

A detailed investigation and analysis of European Automotive Facility Centers aiming shared utilization (offering services in an open manner to multiple companies/organizations) as a core element of their business model. Established by the joint work of EURIS SFFS Subproject partners City of Helmond (Lead Partner, NL), Navarran European Business Centre - CEIN (ES) and INNONET Centre of Innovation and Technology (HU) each residing in European regions with significant links to the automotive industry.

The Final Report is based on 30 fact sheets, visits to 18 existing facilities and numerous detailed expert interviews conducted over a year under the coordination of INROADS, a consultancy firm specialized in development, organization and realization of technological innovation and collaboration in the automotive, mobility and high tech industry.

The resulting publication both provides benchmark information of different management approaches and recommendations to policy makers and facility owners aiming to extend the automotive services of their regions and their respective companies.

„Open Innovation through Shared Facilities and Facility Sharing“ (SFFS) is a subproject in frame of the “European Collaborative and Open Regional Innovation Strategies – EURIS” initiative, co-funded under the Interregional Cooperation Programme INTERREG IVC by the European Regional Development Fund (ERDF).

For more information about the EURIS SFFS project visit: www.sffs.euris-programme.eu