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REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

Annual Progress Report on the activities of the Joint Technology Initiative Joint Undertakings (JTI JUs) in 2012

{SWD(2013) 539 final}

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1. INTRODUCTION

The Joint Technology Initiatives are public-private partnerships in industrial research at European level that are now well established and have reached cruising speed. They were set up in 2007-2008 under the Seventh Framework Programme[1] in five strategic areas — aeronautics and air transport, public health, fuel cell and hydrogen technologies, embedded computing systems and nanoelectronics.

Bringing together industry, the research community, in some cases regulators and the EU to define common research agendas and invest in large-scale multinational research activities, the JTIs are concrete realisations of the European Union to strengthen its competitiveness through the practice of scientific excellence, openness and innovation. The first years of activity also show that JTIs are a positive response to the need to 'defragment' the research and innovation environment. The facts and figures attached to this report show that JTIs are reaching their objectives in research. In relative terms, the percentage rate of successful SMEs in the 2012 JU calls is notably higher than the corresponding percentage rate of the SME participants in the FP7 Cooperation specific programme. A significant participation from across Europe occurred and the high subscription to the calls accompanied by high success rate demonstrate that both the scientific community and industrial manufactures welcome the process of the JTIs, appreciate their openness, and the continuity offered by the JUs in the management of the activities funded.

An annual report on the progress achieved by the Joint Technology Initiative Joint Undertakings (JTI JUs) is required by Article 11(1) of the Council Regulations setting up the individual JTIs. In each case, this states that '*the Commission shall present to the European Parliament and to the Council an annual report on the progress achieved by the [name of the JTI] Joint Undertaking. This report shall contain details of implementation including number of proposals submitted, number of proposals selected for funding, type of participants, including SMEs, and country statistics*'.

This report analyses the JUs' achievements in particular against the results presented in the previous report, for 2011. It aims to provide information to the European Parliament and the Council and summarises the progress achieved since the JTI JUs were set up.

After a brief introduction to the JTI JUs, this report summarises their progress in 2012, which is elaborated in the accompanying Commission Staff Working Document. An outlook to future challenges closes the report.

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[1] Decision No 1982/2006/EC of the European Parliament and of the Council of 18 December 2006 concerning the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007-13), OJ L 412, 30.12.2006, p. 1.

The Commission Staff Working Document and the annexes attached to this report detail the activities of the respective JTI JUs in 2012 and give the results and progress of calls launched in previous years. A summary of actions related to JTI JUs performed by the Commission (Cost-Benefit Analysis of the JTI JUs, stakeholders' consultation and preparation of the second interim evaluation) is also included.

The present report is being presented after the Commission took the initiative to propose the extension of the activities of the JTI JUs under the next Multiannual Financial Framework (2014-2020)[2]. In this context where this proposal is being discussed in the Council and the European Parliament, the facts and figures required by the Council regulation setting up the JTI JUs constitute a primary source of information for stakeholders and parties involved in the decision making. The second interim evaluation by experts of the JTIs is the subject of a separate report .

2. THE JTI JUS

The Joint Technology Initiatives were set as Joint Undertakings under Article 187 of the Treaty on the Functioning of the EU (TFEU), which states that 'the Union may set up joint undertakings or any other structure necessary for the efficient execution of Union research, technological development and demonstration programmes'. They are 'Union bodies' under Article 185 of the EU Financial Regulation. They were a major new feature of the Seventh Framework Programme (FP7), introduced to support key areas of research and technological development that can contribute to Europe's competitiveness and quality of life but that were not best served by existing FP7 instruments .

Under the FP7 'Cooperation' Specific Programme, five JTI JUs were set up in 2007-2008 for the period to 31 December 2017:

(1) ***Aeronautics and Air Transport (Clean Sky)*** *JU***,** aiming at increasing the competitiveness of the European aeronautics industry while reducing emissions and noise, established by Council Regulation (EC) 71/2008 of 20 December 2007;

(2) ***Innovative Medicines Initiative (IMI)*** *JU***,** aiming at fostering the development of better and safer medicines for patients, established by Council Regulation (EC) 73/2008 of 20 December 2007;

(3) ***Fuel Cells and Hydrogen (FCH)*** *JU***,** aiming at speeding up the development and deployment of hydrogen supply and fuel cell technologies, established by Council Regulation (EC) 521/2008 of 30 May 2008 and amended by Council Regulation (EU) No 1183/2011 of 14 November 2011;

(4) ***Embedded Computing Systems (ARTEMIS)*** *JU***,** aiming at helping European industry to consolidate and reinforce its world leadership in embedded computing technologies, established by Council Regulation (EC) 74/2008 of 20 December 2007;

[2] See the COM(2013) 494 adopted on 10 July 2013

(5) ***Nanoelectronics (ENIAC) JU*****,** aiming at achieving a very high level of miniaturisation required for the next generation of nanoelectronics components, established by Council Regulation (EC) 72/2008 of 20 December 2007.

The SESAR[3] initiative (Single European Sky Air Traffic Management Research) should also be mentioned since it is funded under FP7 and implements activities which are complementary to those addressed in the Strategic Research Agenda of Clean Sky.

The European Commission, as a co-founding member, was responsible for starting up the JTI JUs. Once they had built up their legal and financial framework and demonstrated their capacity to manage their own budgets, they were granted autonomy.

The Joint Undertakings select projects through annual open and competitive calls for proposals following one- or two-stage submission and evaluation. They provide funding for collaborative projects and coordination and support actions.

3. PROGRESS ACHIEVED IN 2012

3.1. First results and promising advances

Combining the analysis for airports and air traffic systems, the results indicated that **Clean Sky** is on track to reduce noise, to reduce CO_2 emissions by 50 % and NO_X by 80 % and to minimise the life-cycle impact of aircraft on the environment by 2020. The assessment by the Technology Evaluator[4] showed the benefits of linking work programmes closely to the key technical and demonstration milestones within the Integrated Technology Demonstrators.

IMI is supporting a project, currently in patenting stage, which successfully developed a device and protocol related to the possibility to quickly diagnose (less than half an hour) what kind of infection and what treatment is needed for patients.

In the **fuel cells and hydrogen sector**, market introduction has been achieved for some early applications such as forklifts and small back-up power units. For both energy and transport applications, progress has been made in materials performance, durability and cost reduction for both components and systems for transport and stationary power applications. Within the FCH, a Danish SME has developed and facilitated the commercialisation of two innovative products: H2Station (Hydrogen refuelling stations for automotive, bus and materials handling applications'), and H2Drive (Fuel cell systems for materials handling vehicles such as forklift trucks and airport tow tractors). FCH has currently submitted 13 patents.

In the **embedded systems sector**, new partnerships have been established and a growing number of SMEs been involved in networks of stakeholders; there is growing interest in building prototypes and demonstrators, including trials and field testing; the impact on business has mainly been to reduce development costs and time to market, while increasing the level of re-usability.

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3 This document does not report on the SESAR JU. Although it has the same legal basis as the other JUs, it is funded under FP7 and the trans-European Transport Networks Programmes, over a different lifetime, and has different governance and reporting mechanisms from the other JUs.

4 Gathering the 12 Integrated Technology Demonstrator (ITD) leaders and the major aeronautical research establishments in Europe

In the **nanoelectronics components sector**, a major effort concerned the launch, evaluation and selection of 5 Manufacturing Pilot Lines. These projects include advanced R&D environments to allow the testing and demonstration of new technologies in close to production conditions. This significantly improves Europe's ability to close the gap between technology development and deployment. The pilot lines provide access to advanced technologies to actors, in particular SMEs.

3.2. Participation and geographical coverage

Participation in terms of numbers of projects selected for funding remained stable in the last two years while the overall success rate increased from 35.8% in 2011 to 45% in 2012. This confirms that JUs are successful in funding highly specific, industry-driven research and that stakeholders are getting more acquainted with the modus operandi of these new instruments.. Concerning industrial participation in 2012, large companies represented 31.1% of total participations and SMEs another 30 %.

SMEs participation increased from 28% to 30% in the last two years (2011 and 2012); as a basis for comparison, in the Cooperation Specific Programme of FP7, SMEs participation accounted for 19% in 2012. SMEs success rate also improved from 35% to 44%.

In terms of distribution of participation from Member States and Associated Countries, in 2012 as in the previous year the five JTI JUs involved, on average, 20 different countries in the implementation of their research agendas. EU-12 countries' access to JTI JU research activities increased. Overall, 11 out of EU-12 Member States were represented in projects selected for funding.

3.3. Main achievements in 2012 at a glance

CLEAN SKY

Strategic Research Agenda (SRA)	The targets set in the CS SRA were re-assessed, as were the actual progress and validity assumptions. The results were: an updated Development Plan and updated forecasts of achievable environmental benefits by the end of the programme. The First Internal Assessment was published in 2012. The assessment of the first Technology Evaluator was also performed and results are available on line. (http://www.cleansky.eu/sites/default/files/documents/cs-te-assessment-special-edition-2012.pdf)
Call implementation	Number of calls launched in 2012: 3 Number of proposals submitted: 344 Number of eligible proposals: 317 Number of proposals funded: 120 **Global project portfolio: 347**
	Success stories: **Wind tunnel test campaigns –** A series of wind tunnel test campaigns were performed in 2012 on three different technologies. The BLADE demonstrator (Breakthrough Laminar Aircraft Demonstrator in Europe) will be based on an A340 Flying Test Bed modified in the outer wings with two Natural Laminar Flow (NLF) wing portions – a key technology stream within Clean Sky Smart Fixed Wing Aircraft in order to reduce aircraft drag.

	In the framework of Clean Sky, ETW **European Transonic Wind tunnel** has been used to contribute to a wing design methodology aiming at robust laminar performance taking into account different surface imperfections. Rolls-Royce and the SNECMA have performed independently a series of tests on their own test rigs to assess uninstalled characteristics of their Open Rotor design (especially the blades), and then participated in performance and aero-acoustics tests on a complete model together with Airbus in DNW. Finally, three systems for wing anti-icing and de-icing, which no longer use bleed air from the engine, were investigated and dedicated Icing Wind tunnel tests were performed: two electro-thermal systems, developed by Liebherr and Zodiac, and one electro-mechanical system, developed by SAAB. **Composite repair technology for aircraft maintenance –** The ADVANCED project (Advanced heating system and control mode for homogeneous high temperature curing of large composite repairs) has been recently completed. It concerned the development of innovative solutions for the application of very large composite repairs, to be performed outside autoclaves. The expected benefits are significant, as reducing autoclave utilisation directly reduces both the overall repair costs and the CO_2 footprint of repairs. The equipment has been successfully tested and approved for industrial environments, on an extremely demanding application.
Participation, including SMEs	Total number of participants: 483 Number of participants in funded projects: 245 Number of SMEs in funded projects: **94** – 38% of number of participants in funded projects, with a 50% success rate. Participants by category in funded projects: 53 research organisations; 54 higher or secondary education; 44 private for profit. Participation in funded projects broken down by country: 17countries involved. The table shows the countries performing best in 2012 with 178 participations altogether out of 245.

Geographical distribution of projects selected for funding – Top players	
ES	47
UK	36
IT	33
FR	33
DE	29
	178

IMI

Strategic Research Agenda (SRA)	After the SRA was updated in 2012, the emphasis shifted to 'think big' projects. In particular, with the 5th and 6th calls, the focus has been put on the European Lead Factory and the antimicrobial resistance programme New Drugs for Bad Bugs
Call implementation	Number of calls launched in 2012: 5; final stages of Calls 3 and 4 were implemented. Number of proposals submitted (Expressions of Interest, first-stage proposal): 37 Number of eligible proposals: 33 Number of proposals funded: 5

	Global project portfolio: 40
	Success stories: The **EUROPAIN** project has made important findings that contribute to a better understanding of the mechanisms of chronic pain. For instance, the project discovered similarity between pain caused by chemotherapy and the cold-induced pain caused by concentrated menthol, and identified a molecule that causes the pain of sunburn, raising hopes for the development of new, more effective painkillers. This newly discovered pain mechanism in sunburn could help to understand more about pain in other inflammatory conditions like arthritis and cystitis as well. Studying brain imaging (scans), the researchers have found that changes in how the brain functions in patients with chronic pain can also be seen after minimal pain in healthy volunteers. The **SUMMIT** project is developing methods to identify risk factors for chronic complications in diabetes patients, that lead to strokes or problems with the heart, kidneys or eyes, impose an immense burden on the patients' quality of life and account for more than 10% of health-care costs in Europe. Together with other initiatives, SUMMIT has generated the largest data collection on genomic studies (Genome Wide Association Studies) up to date. SUMMIT combines genetic, biomarker and imaging data to identify non-invasive imaging markers of complications in blood vessels from carotid (large artery in neck and chest) examinations. SUMMIT has constructed computer models that will help to predict complications and response to treatment, based on changes in the body. The **MARCAR** project has developed and proved the effectiveness of methods that help identify chemical changes in the genetic material (chromosomes) that are related to cancer (non-genotoxic carcinogenesis). The detection of these so-called epi-genetic changes can be used as early biological indicators (biomarkers) to predict if drugs in development are likely to cause unwanted effects (cancer) in patients. The findings will therefore contribute to better assessment of the safety of candidate drugs. In addition, MARCAR has demonstrated that magnetic resonance imaging (MRI) can be used to reliably detect liver tumours in mice when they are just 1 mm across – previously more invasive techniques were needed to pick up tumours of this size – and to detect tumours at an early stage, and to monitor their reversibility. This makes these methods an invaluable tool in assessing the cancer risk of potential drugs.
Participation, including SMEs	Total number of participants: 418 (calls 5, 6 and 7) Participants in funded projects: 62 Number of SMEs in funded projects: **16 –** 26% of the total of participants in funded projects, with a 15.3% success rate. Participants by category in funded projects: 18 research organisations; 25 higher or secondary education; 3 others. Participation in funded projects broken down by country: 26 countries involved. The table shows the countries that performed best in 2012, including calls 3 and 4 (launched in 2011 but not analysed in the 2011 Progress Report because not available at that time).

Geographical distribution of projects selected for funding – Top players	
DE	18
NL	12
FR	10

	UK	9
	ES	3
		52

FCH

Strategic Research Agenda (SRA)	Multi-Annual Implementation Plan — Market introduction has already been achieved for some early applications such as forklifts and small back-up power units. For both energy and transport applications, progress has been achieved notably in materials performance, durability, and cost reductions in both components and systems for transport and stationary power applications.
Call implementation	Number of calls launched in 2012: 1 Number of proposals submitted: 72 Number of eligible proposals: 68 Number of proposals funded: 28 **Global project portfolio: 98**
	Success stories: In the 'early market' field of back-up power, **'FITUP'** is a demonstration project in which a total of 19 market-ready fuel cell systems from two different suppliers have been installed as back-up power sources by final users in Italy, Switzerland and Turkey. Real-world customers from the telecommunications industry are using these fuel cell-based systems on their sites. These units are under test to demonstrate a level of technical performance that qualifies them for market entry, thereby accelerating their worldwide commercialisation, in particular: (i) reliability greater than 95%, and (ii) durability of more than 1500 hours and more than 1000 cycles. The project involves the benchmarking and certification of units from both fuel cell suppliers according to a test protocol developed by the consortium in order to conduct extensive tests in field trials on sites selected by the final users. About 50% of the planned tests have been performed (about 1300 total hours) and analysis of the data collected so far indicates that the progress achieved will allow the project targets to be met and show that the systems developed are competitive with current technology. The project **SOFT-PACT** ('stationary applications' portfolio), led by E.ON, is intended to deploy 100 micro-CHP units (Gennex SOFC-based, provided by Ceramic Fuel Cell Limited) in Germany, the UK, Italy and the Benelux and to demonstrate electrical efficiency of at least 60%. The project also addresses the most important commercial challenges by developing the whole supply chain, mass manufacturing aspects and European housing stock availability, ultimately addressing the certification schemes in the different Member States, standard assessment procedures and grid connection standards. To date, more than 30 units have been successfully installed in the UK and Germany in two different configurations and electrical efficiencies of 62% have been reported for some of them. Some installation issues not related to the technology itself but to the different requirements in the Member States will be addressed in the final phase of the project.

<table>
<tr><td>Participation, including SMEs</td><td>Total number of participants: 573

Participants in funded projects: 222

Number of SMEs in funded projects: 55 – 25% of the number of participants in funded projects.

Participants by category in funded projects: public bodies – 3; research organisations – 59; higher or secondary education – 31; private for profit – 68; others – 6.

Participation in funded projects broken down by country: 21 countries involved. The table shows the countries that performed best in 2012:
<table><tr><th colspan="2">Geographical distribution of projects selected for funding – Top players</th></tr><tr><td>DE</td><td>50</td></tr><tr><td>FR</td><td>36</td></tr><tr><td>UK</td><td>30</td></tr><tr><td>IT</td><td>20</td></tr><tr><td>BE</td><td>13</td></tr><tr><td></td><td>149</td></tr></table></td></tr>
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ARTEMIS

<table>
<tr><td>Strategic Research Agenda (SRA)</td><td>Multi-Annual Strategic Plans (MASP), with related Research Agendas were further updated and adopted in 2012 to include the findings of the ARTEMIS-ITEA Sherpa group.</td></tr>
<tr><td rowspan="2">Call implementation</td><td>Number of calls launched in 2012: 1

Number of proposals submitted (Full Project Proposals): 25

Number of eligible proposals: 24

Number of proposals funded: 8

Global project portfolio: 44</td></tr>
<tr><td>Success stories:

The CESAR (Cost-efficient methods and processes for safety relevant embedded systems) project ended on 30 June 2012. A significant number of breakthroughs and innovations are part of CESAR’s results, particularly on: cross-sector developments and/or overcoming obstacles to reusing design approaches, reference architecture for embedded systems technology platforms and tools in the embedded systems community at large. A large number of pilot applications demonstrated the impact of the technology development..

The objective of POLLUX — Process Oriented Electronic Control Units for Electric Vehicles developed on a multisystem real-time embedded platform — is to develop a distributed real-time embedded systems platform for next-generation electric vehicles, by using a component and programming-based design methodology. This approach is extremely promising in predicting the drive behaviour of the electric car, which underpins the successful market appreciation of such a vehicle. The Project has achieved inter alia the Software in the loop (SIL) simulation vehicle dynamics. Investigations are ongoing on the usability of an ethernet approach to in-car communications (including safety-critical communications).</td></tr>
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<tr><td></td><td>eSONIA — Embedded Service-Oriented Monitoring, Diagnostics and Control: Towards the Asset-Aware and Self-Recovery Factory — aims at realising asset-aware and self-recovery plant through pervasive heterogeneous IPv6-based embedded devices, bringing on-board specialised services, glued through middleware capitalising the service-oriented approach. This approach will be applied in industry for the first time, in order to support continuous monitoring, diagnostics, prognostics and control of assets, regardless of their physical location. The project will reduce maintenance costs and increase up-time in manufacturing in the specified use cases but also in other industries as the technology is generic and the solutions are designed in a way that can be applied to current production systems.</td></tr>
<tr><td>Participation, including SMEs</td><td>Total number of participants (Full Project Proposals): 631

Participants in funded projects: 326

Number of SMEs in funded projects: 106 – 32.5% of the number of participants in funded projects with a success rate of 47%

Participants by category in funded projects: research organisations/higher or secondary education – 108; private for profit – 112.

Participation in funded projects, broken down by country: 18 countries involved. The table below shows the countries that performed best in 2012.

<table><tr><th colspan="2">Geographical distribution of projects selected for funding – Top players</th></tr><tr><td>ES</td><td>45</td></tr><tr><td>IT</td><td>44</td></tr><tr><td>FR</td><td>38</td></tr><tr><td>DE</td><td>37</td></tr><tr><td>NL</td><td>32</td></tr><tr><td></td><td>196</td></tr></table></td></tr>
</table>

ENIAC

<table>
<tr><td>Strategic Research Agenda (SRA)</td><td>The Annual Work Programme 2012 (AWP2012) is based on the ‘Vision, Mission and Strategy for European Micro- and Nanoelectronics’ jointly set out with CATRENE.</td></tr>
<tr><td rowspan="2">Call implementation</td><td>Number of calls launched in 2012: 2

Number of proposals submitted (Full Project Proposals): 17

Number of eligible proposals (FPPs): 17

Number of proposals funded: 11

Global project portfolio: 50</td></tr>
<tr><td>Success stories:

The IMPROVE project partners developed computational models for equipment behaviour and history enabling virtual metrology, predictive maintenance and adaptive control plans to improve throughput, stability and reproducibility, and the overall wafer fabrication efficiency. According to the project coordinator: ‘In IMPROVE, six manufacturers with operations in Europe collaborated with 14 research laboratories, institutional and academic, and 10 industrial solution providers to considerably advance the state of the art in manufacturing sciences and get ready to compete based on</td></tr>
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<table>
<tr><td></td><td>efficiency and innovation'. More than 90 publications resulted from the IMPROVE project which have further been cited, showing their value. Exchanges with other ENIAC projects have allowed further development and implementation of the results obtained.

Lithography is the essential technology for scaling semiconductor devices. The sophistication and cost of the equipment increases rapidly as the patterned feature size decreases. To extend the incumbent immersion lithography technology as far as possible down to the 22 nm technology node, the 12 partners in the LENS project considerably advanced the multiple facets of the technology using double exposure. LENS successfully demonstrated the applicability of the incumbent immersion lithography technology for at least two more technology nodes using dual exposure or pitch doubling techniques, 'thereby allowing the timely and economically efficient development of the next generations of semiconductor devices'.</td></tr>
<tr><td>Participation, including SMEs</td><td>Total number of participants (Full Project Proposals): 360

Participants in funded projects: 247

Number of SMEs in funded projects: 58 – 23% of the number of participants in funded projects with a success rate of 83%

Participants by category in funded projects: research organisations – 39; higher or secondary education - 42; private for profit – 108.

Participation in funded projects, broken down by country: 21 countries involved. The table shows the countries that performed best in 2012.
<table>
<tr><th colspan="2">Geographical distribution of projects selected for funding – Top players</th></tr>
<tr><td>FR</td><td>30</td></tr>
<tr><td>NL</td><td>20</td></tr>
<tr><td>DE</td><td>19</td></tr>
<tr><td>AT</td><td>15</td></tr>
<tr><td>IT</td><td>7</td></tr>
<tr><td></td><td>91</td></tr>
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4. CHALLENGES AND OUTLOOK

Fully aware of the importance of the JTIs as instruments for a more efficient execution of Union research programmes, the Commission has addressed all identified weaknesses or areas for possible improvement in its proposals for JTIs under Horizon 2020

Some major challenges for JTI JUs were identified by the independent experts involved in the first interim evaluations. The external experts' recommendations included improving communication with citizens, setting key performance indicators and delegating more of the Governing Boards' responsibilities for day-to-day management to the JUs' Executive Directors. The recommendations should be fully implemented before the second interim evaluations are concluded.

In 2012, JTI JUs considerably progressed in **improving communication** activities directed at stakeholders and public visibility of their actions. The relatively high percentage of members of the public that took part in online open consultations — on average 25 % of the respondents

in Clean Sky, FCH and IMI — might be taken as a sign of increased awareness of the scope and activities of the JTI JUs.

The JUs increased their visibility and raised the standard of their main communication tools (e.g. web sites).

JTI JUs also **set up key performance indicators** (KPIs) that are constantly used to monitor the progress of their administrative structures and to check their performance in executing the respective Strategic Research and Innovation Agendas.

IMI set up key performance and results indicators for two major priorities: SRA implementation and programme office performance. Indicators are mainly linked to objectives set in the AIP and assigned specific targets. In 2012, in addition to the usual set of indicators, IMI conducted a bibliometric analysis on running projects. This was meant to collect additional information on research achievements. The JU's performance on budget execution is monitored in terms of 'time to grant' (TtG) and 'time to pay' (TtP). In 2012, TtP of late payments for running costs was reduced by about 30 % as compared to 2011.

Clean Sky also set up KPIs that are presented in the Annual Activity Report through a monitoring scoreboard. These KPIs focus mainly on assessing SME participation in terms of numbers and budget allocation, the success rate of research topics launched via calls for proposals, the time put into finalising grant agreements and reporting for partners and members, budget execution and audit planning and follow up. The 17 KPIs monitored in the scoreboard 2012 show the JTI JUs' performance to be fairly good, in particular concerning the implementation of research activities and the participation of SMEs.

FCH introduced 'operational indicators' (OIs) to monitor progress in RTD activities; these are set against results indicators using targets and latest known results. OIs are aimed (i) at assessing the technological and non-technological barriers to the commercialisation of FCH technologies and (ii) at monitoring aspects of dissemination and the use of results with a view to commercialisation. To this end, the level of participation of industry and SMEs is closely checked as a percentage of funding granted. TtP improved considerably in 2012, in particular TtP for experts in relation to previous years (89 % of payments on time in 2012 compared with only 62 % in 2011). Furthermore, 100 % of payments for grant agreements were paid on time.

ENIAC introduced KPIs to monitor the research agenda, the ecosystem, ethics, JU commitments and the timing of execution (the time taken from the public authorities board funding decision to the first payment to each beneficiary). The latter indicator was stable in 2012, having increased steadily in the previous years.

ARTEMIS uses KPIs in its internal control framework. In 2012, for the first time, the JTI JU measured its performance against well-defined organisational KPIs (TtG, TtP, number of project reviews, number of dissemination activities and time to receive the end of project certificates/audit reports from the national funding authorities); further measures were planned for 2013.

Given the gain in speed and the progress made in finalising GAs, the JUs generally recorded better TtG than in the previous year and showed they were on track, even if targets were not always met. In Clean Sky, TtG fell by two months but has not yet reached the eight months TtG standard set in the AIP. IMI considerably reduced its TtG between calls 4 and 6 (i.e. from about 360 to 160 days); this was partly helped by the typology of calls 5 and 6. In ENIAC, the

time taken from launching the call to the closing date averaged 11 and 10 months for calls 2012-1 and 2012-2 respectively. In ARTEMIS, the measurement of the TtG is still under discussion with the Court of Auditors, mainly because of the two-stage submission and evaluation procedure. Recent decisions are likely to set the TtG cover the period from closing the full project proposal (FPP) phase to signing the GA. On this measure, ARTEMIS improved in 2012 and the average TtG is 12 months. This represents a fall of over 10%. TtG information is not available for FCH for the moment.

The second interim evaluation will be the right way to assess the appropriateness and quality of the KPIs used by JUs and the progress achieved against their targets and the objectives set.

From a general point of view, it is already possible to weigh up a number of **benefits** that affect the **scientific and industrial environment in Europe**, as follows.

SMEs are attracted to the JTI JUs' research topics, especially because of the stability and continuity of the research and innovation environments, the funding arrangements and the involvement of larger value chains. Overall, SMEs have received about €170 million, which accounts for roughly 27% of all EU funding available after evaluation. This increase is partially due to the role played by SMEs in one of the major activities launched by IMI in 2012: the European Lead Factory, in which over €55 million has been granted to SMEs.

As reported in Section 3.2, JTIs met the challenge of becoming an attractive way of implementing research for SMEs, as they can benefit from participation in specific working environments, from research topics that are clearly geared to the market and from the JUs as an instrument which better meets their needs.

Industry commitment to the achievement of general objectives **remained stable** despite the difficult macroeconomic context in the EU. This entailed a steady allocation of funds and involvement in strategic decision-making.

For both large industry and SMEs, JTI JUs are being considered the tool of choice to shorten time to the market, expand technological competencies and build on market-driven networks of partners that cover the entire value chain. Taking a broader view, **overall stakeholder participation continues to be well balanced** and all parties have been involved in JTI JUs' research activities. Efforts have been made to attract organisations from less well-represented countries, which accounted for roughly 6% of total participations in funded projects overall.

Following major updates in 2011, the JTI JUs **strategic research and innovation agendas have been fed with ambitious objectives over a longer timeframe** and now include a more ambitious approach towards innovation, in line with Horizon 2020. The links to the strategy put forward by the Commission with the new framework programme will ensure consistency and will make it easier to align EU actions with the overall objective of increasing competitiveness in industry, excellence in science and growth and job creation.

Looking to the future and to align with the EU's climate and energy priorities, concerned JTI JUs will be asked to demonstrate a positive impact in terms of a competitive low carbon economy. In particular, the SRIAs for FCH and Clean Sky will need to emphasise their environmental focus further and measure their achievements accordingly.

JTI JUs have been confirmed as **ambitious European initiatives** with the potential to be recognised as public-private partnership models.

This potential was also recognised in a set of consultations run in 2012 as part of the preparatory work done to extend the mandate of the current JTI JUs under Horizon 2020. In particular, open consultations with stakeholders, the results of which are included in the Impact Assessment attached to the renewed legislative packages, strongly support their continuation under Horizon 2020 and pick out a number of positive achievements. Respondents especially highlighted the **clear European added value of PPPs** in specific technological sectors[5].

The JUs' **administrative consolidation** continued, particularly the development of their internal control frameworks, with significant advances in their control mechanisms. A set of ex post audits of beneficiaries has been finalised and audits on in-kind contributions provided by industry members have been prepared.

In 2012, as part of their audit plans, ENIAC and ARTEMIS continued to cooperate to collect information on audit practices implemented at Member State level. All JUs improved their IT and logistical functions; in particular, Clean Sky, FCH and IMI made significant progress in harmonising the JUs' IT systems and in ensuring business continuity plans. In addition, access to CORDA has been improved and tests at systems level were performed during the year.

For the future, a number of challenges remain open:

1. Administrative burden

The problem of the relatively small size of the JUs and their relatively high running costs is still a major challenge. The European Commission and the JUs are elaborating solutions to provide future JTI JUs with tools to perform better and to concentrate their efforts on executing the SRIA (e.g. to follow the suggestions of the Court of Auditor of pulling resources).

2. Maintaining the level of commitment from Industry and Members States.

To prove the success of JTI JUs, commitment from industry and Member States is a key factor. It will ensure not only the achievements of objectives by the programme's end but also a suitable leverage effect by combining EU and national funding and industry investment. Irrespective of the funding mechanisms, certain difficulties have arisen in recent years in matching funds from industry and Member States and only in 2012 did the trend reverse, not in the least due to added flexibilities in operations, and the fact that the nascent partnership is maturing, with confidence building between partners.

3. Effectively integrating results achieved in research projects into the Commission communication and dissemination system

This is becoming more important as the JUs advance in implementing their research activities and FP7 reaches an end. Information on the results of research conducted by JTI JUs should converge into the appropriate research themes in cooperation in order to be assessed and evaluated as a whole. To achieve this, cooperation between JTI JUs and Commission departments and the technical compatibility of IT systems must be made priorities.

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5 Additional information on participation to the online open consultations launched by the European Commission in July 2012 is presented in the attached CSWD.

With a view to reinforcing the policy on new management modes in the European Commission, the JUs will probably be called upon under Horizon 2020 to adopt tools and working arrangements that will enable all parties involved to constantly assess results and to use them so the JUs and Executive Agencies progress with programme implementation and the Commission can formulate policies appropriate to facing the challenges.

To summarise the **experience gained** in the first years of autonomy of all the Joint Undertakings, the following **successful results** can be highlighted [6]:

Successes in 2012 included cutting manufacturing and maintenance costs in aeronautics, identifying new models for data interpretation and biomarkers in pharmaceutics, patenting devices, bringing new products to market in the field of hydrogen and fuel cells, launching significant pilot lines for nanoelectronics manufacturing in Europe and opening up competing companies to their industrial partners (e.g. via a central database of results). These demonstrate that JTI JUs are able not only to address technical challenges, but also to boost the industrial and research environment.

JTIs are continuing at a steady pace to reach their objectives in research and beyond. Promising results are emerging, the participation of SMEs has been high and a broad participation from across Europe has been ensured. Moreover, the calls have consistently been well subscribed to.

In terms of management, the JTI JUs have gained speed. In 2012, they generally reduced their Time to Grant (TtG), which is now 11.6 months on average, taking into account results from Clean Sky, IMI, ARTEMIS and ENIAC. This result is very much in line with the average TtG in DG RTD and DG CNECT, which is close to 12 months.

The visibility of JTI JU activities was also enhanced in 2012, among stakeholders and beyond. They started to be seen as relevant players in their fields of technology at global level.

The JTI JUs' achievements started to be monitored and evaluated against a set of KPIs, which have been formulated in a way that reflects their diversity. An overall comparison should be performed soon.

JTI JUs should maintain and even increase their simplicity, openness and accessibility to all potential beneficiaries. Particular consideration should continue to be paid to new entrants from less well-represented countries and to SMEs.

The overall strategy on partnering with industry should be reinforced and JTI JUs activities and achievements be considered in an overall frame, which includes the European Technology Platforms and the Contractual PPPs set up under the European Economic Recovery Plan.

In assessing the extent of the JTI JUs' impact on the implementation of research and innovation activities at EU level, future analysis will refer to the criteria set in *Horizon 2020* programme. In this respect, the JTI JUs' experience so far will also be assessed against the criteria set for setting up future PPPs.

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6 See the Call Implementation section for the concerned JTI JUs in the attached CSWD

Another interesting insight on progress achieved so far will be provided by the second interim evaluation, which will cover the period from setting up until 2013 and will be published as a separate report by November 2013.