EIT Artificial Intelligence activities report **2019**

eit.europa.eu

European Institute of Innovation & Technology

The EIT is a body of the European Union

Executive Summary

Artificial intelligence (AI) has come a long way since it was first considered in the 1940s. **By 2025, the AI market is expected to be worth USD 59 billion.**[1] AI is a key driver of productivity and economic growth, and already has a significant impact on our daily lives.

With its extensive network and broad thematic coverage, **the EIT is uniquely placed to help Europe make the most of the potential of AI and keep up with the AI technological race.** The European Commission mandated the EIT to support the development and deployment of AI technologies across Europe. The EIT has the capacity to accelerate and harvest AI applications that have a positive societal impact.

The EIT is one of the largest European public-private AI innovation initiatives.

The EIT Community already **powers 120 start-ups** in the field of AI.

By 2021, 250 start-ups in our venture portfolio are expected. We will have helped them leverage **over EUR 500 million.**

In 2019 alone, the EIT Community will provide over **EUR 22 million of support to 36 projects on AI** from a total budget of almost EUR 30 million.

We expect the budget to **reach EUR 220 million by 2021**. Ongoing projects cover a wide range of topics and award-winning technologies: early detection of disease, work skills gap prediction, autonomous robots, data aggregators, and smart maintenance solutions for industry. **The number of commercialised EIT-supported AI products and services should reach 300 within the next two years.**

The **EIT Community supports around 400 Master and PhD graduates in AI.** Our programmes allow for skills development across all levels of education, training and learning, preparing later generations for the future of AI research and innovation.

By 2021, an additional 1 000 Master and PhD graduates in AI programmes, as well as over 30 000 former participants, will have joined EIT entrepreneurial training programmes.

(1) ec.europa.eu/epsc/sites/epsc/files/ai-report_online-version.pdf

What is the EIT?

The European Institute of Innovation and Technology (EIT) has been strengthening Europe's capacity to innovate since its creation in 2008. The figures speak for themselves: so far, **the EIT has enabled the commercialisation of over 900 new products and services and supported over 2 000 ventures.**

As part of Horizon 2020, the EIT acts as a bridge between leading companies, research labs and higher education to enable dynamic and long-term European partnerships. Each of these eight partnerships – called innovation communities – focuses on a specific global challenge and operates through innovation hubs. These cover climate change, sustainable energy, smart mobility, the digital economy, healthy living, food, manufacturing, and raw materials.

50+ Innovation Hubs across Europe

2 300+ Graduates completing EIT programmes

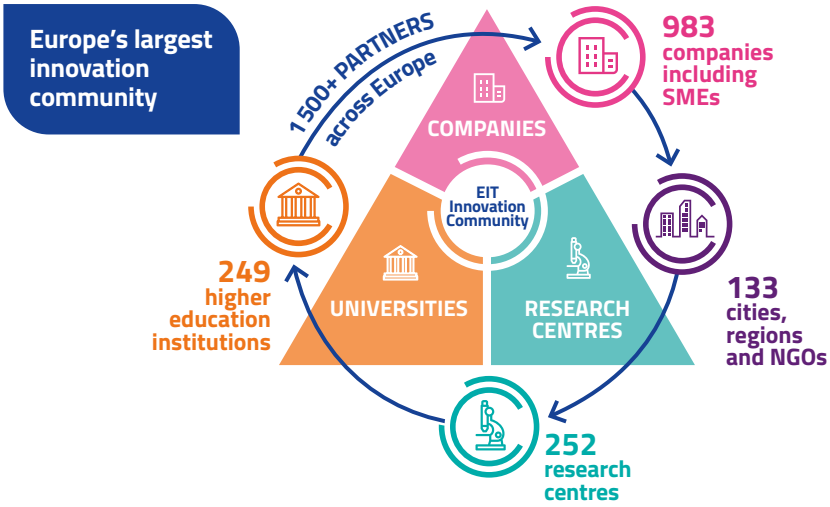
900+ New products and services

2 000+ Ventures supported

1.5B€ Investment raised by EIT ventures

6 100+ Jobs created

*figures August 2019



AI – A key driver to productivity and economic growth

The past few years have seen a dramatic acceleration in the development and deployment of AI. By 2025, the worldwide AI market is expected to grow to USD 59 billion. This is almost 33 times its value in 2016 (USD 1.8 billion[2]). Applications such as the automation of knowledge work, robots and autonomous vehicles, are expected to generate between EUR 6.5 and EUR 12 trillion each year.

Europe certainly has the potential to compete in the race for AI. But there is still much work to be done.

AI is now considered as a general-purpose technology (GPT) – a key driver of productivity and economic growth already having considerable social and economic implications[3]. According to the OECD, almost one in two jobs will be significantly affected by AI-enabled automation[4].

Europe certainly has the potential to compete in the race for AI. Now **Europe accounts for the largest share of the top 100 AI research institutions worldwide**, with 32 research institutions in the global top 100 for AI-related research paper citations. The US and China have 30 and 15, respectively. European businesses are not to be underestimated either. Start-ups in the field of AI constitute about 25 % of the global market[5] and there is an opportunity to increase this number. Meanwhile, strong European corporations, particularly from the manufacturing and transportation sectors (Airbus, Volvo, Bosch, Siemens, BMW — all of them EIT Innovation Community partners), also have the potential to keep Europe in the AI race.

However, there is still work to be done. For example the current AI market is driven by the private sector and Europe, despite its technological and market potential, is still lagging behind in this aspect[6].

(2) https://ec.europa.eu/epsc/sites/epsc/files/ai-report_online-version.pdf

(3) http://publications.jrc.ec.europa.eu/repository/bitstream/JRC113826/ai-flagship-report-online.pdf

(4) https://www.oecd-ilibrary.org/fr/employment/automation-skills-use-and-training_2e2f4eea-en

(5) 'Notes from the AI Frontier: Tacking Europe's Gap in Digital and Artificial Intelligence', McKinsey & Co, 2019.

(6) '10 imperatives for Europe in the age of AI and automation', McKinsey, 2017.

Moving forward: EIT and Horizon 2020

The European Commission is well aware of the need to push AI higher on political agendas and address Europe's weaknesses. On 25 April 2018, it unveiled its strategy — Communication Artificial Intelligence for Europe[7] — and emphasised the need to encourage the development of AI applications centred on people's needs.

The EC strategy builds upon Europe's scientific and industrial strengths. It seeks to:

- increase public and private investment in AI, with at least EUR 20 billion of investment by the end of 2020 and more over the following decade;
- prepare for disruptive socioeconomic changes by means of dedicated training and learning schemes;
- support an adequate ethical and legal framework in strict accordance with fundamental rights.

With these objectives in mind, the EC tasked the EIT with integrating AI in the education courses it supports, as well as contributing to the development of an AI talent pool in Europe.

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The EC published its coordinated plan on AI on 7 December 2018[8]. **The plan suggests an increase in investment and outlines Horizon 2020 objectives for the period 2018-2020**. The EIT is mentioned several times, in particular EIT Digital in the context of the plan's operationalisation and in reference to the acceleration of AI uptake through digital innovation hubs.

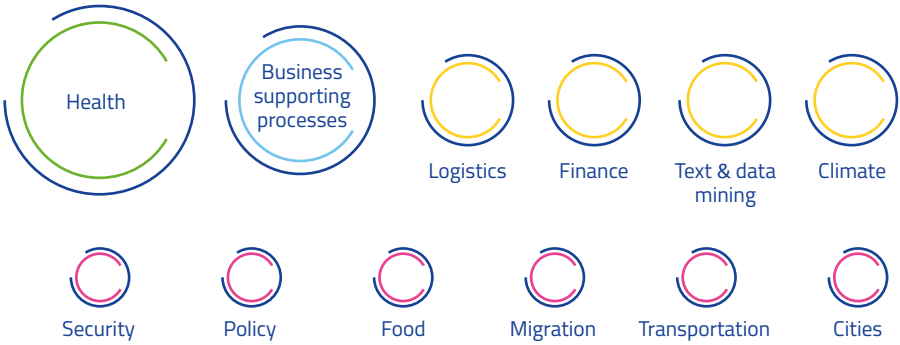
EIT activities are expected to contribute to the adoption of AI by the public and private sectors between 2018 and 2020, thanks to EU investment in supporting activities.

([7]) https://ec.europa.eu/digital-single-market/en/news/communication-artificial-intelligence-europe

([8]) Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, Coordinated Plan on artificial intelligence (COM(2018) 795 final) — https://ec.europa.eu/digital-single-market/en/news/coordinated-plan-artificial-intelligence

EIT AI activities: over EUR 22 million of investment in 2019

Themes of EIT supported innovations in AI



The EIT has allocated over EUR 22 million to AI activities in 2019. Currently, the EIT supports 120 AI start-ups and before the end of April 2019, 19 of them received financial support for a total of EUR 700 0000. EIT Innovation Communities currently run 36 AI research-driven innovation projects for a total value exceeding EUR 27 million. Meanwhile, EIT education and training programmes have led to the graduation of almost 400 students now equipped to become the AI innovators of tomorrow.

EIT-supported activities range from text and data mining to transportation (including autonomous vehicles), improvement of cities' operations, mitigation of climate change, business support processes, security, logistics and finance. However, **there is a clear dominance of health-related activities.**

EIT Innovation Communities currently run 36 research-driven innovation projects for a total value exceeding EUR 27 million.

The EIT also contributes to policy analysis at the EU level. In January 2019, the EIT and the Joint Research Centre (JRC) finalised the artificial intelligence regulatory barriers project. The project aimed to explore major legal challenges in working with AI technology. It was published by the JRC on their website in March[9].

([9]) https://ec.europa.eu/jrc/en/publication/legal-and-regulatory-implications-artificial-intelligence-case-autonomous-vehicles-m-health-and-data

EIT education activities

The EIT supports five education projects dedicated to AI in 2019, with a total value reaching over EUR 1.9 million. These are education programmes encompassing blended Master's, summer schools and boot camps, which are currently implemented by 27 EIT partners coming primarily from the academic sector. These include universities from Eindhoven, Milan, Madrid, Budapest, Lisbon, Ljubljana, Turku and Nürnberg. Now almost 400 students have already seized these opportunities.

The Master's programmes offered by EIT Digital focus on the provision of solid technical knowledge as well as business opportunities arising from AI. EIT Digital currently offer two such programmes: blended Master's in Embedded Systems, and Data science. The EIT Health summer school focuses on machine learning for financial analytics, while the boot camp gives an insight into digital health.

One project is also shared among all EIT Innovation Communities: the **Cross-Innovation Community project Human capital**. It aims to optimise the design and delivery of educational activities by using AI for skills gap analysis.

MASTER SCHOOL DATA SCIENCE AND MASTER SCHOOL EMBEDDED SYSTEMS: PREPARING TODAY'S STUDENTS FOR TOMORROW'S OPPORTUNITIES – EIT DIGITAL

AI thematic area: Education

AI in action: The Data Science Master offers a unique two-year academic programme, whereby students study data science, innovation and entrepreneurship leading European universities. They learn how to use and develop a suite of tools and technologies that address data capture, processing, storage, transfer, analysis, visualisation, and related concepts (e.g., data access, data pricing, and data privacy).
The mission of the two-year EIT Digital Master School Embedded Systems (ES) programme is to expose students to a cross-disciplinary studying and working environment and provide a holistic skillset on embedded intelligent systems, their underlying technologies, their development, and their integration.

Partner universities: Aalto University (Aalto) Royal Institute of Technology (KTH), Technical University Berlin (TUB), Technical University Eindhoven (TUE), University of Turku (UTU), Budapest University of Technology and Economics (BME), University of Trento (UNITN), Eötvös Lorand University (ELTE), Politecnico di Milano (POLIMI), Technical University of Madrid (UPM), Université Côte d'Azur (UCA), University of Rennes 1 (UR1), University of Twente (UT), University Paris Sud (UPS).

EIT financial support: Budget of EUR 679 391

Key successes: The Dutch ICT trade journal, Computable, nominated the EIT Digital Master School as one of the best ICT educators in the Netherlands in the computable Awards 2019.

Further information: masterschool.eitdigital.eu/programmes/dsc and masterschool.eitdigital.eu/programmes/es

HUMAN CAPITAL: SKILL GAP PREDICTION IN THE ENERGY SECTOR

AI thematic area: Education

EIT connection: The cross-Innovation Community Human Capital project was kicked off in 2019. The project is run by EIT InnoEnergy, EIT Digital, EIT Health, EIT Food, EIT Climate-KIC, and EIT RawMaterials.

AI in action: This project uses AI tools to support development of EIT Education programmes. The objective is to predict future skill gaps in the energy sector and help bridge them with relevant courses. The project currently covers four subdomains affected by innovation within the energy sector– wind, solar, storage and digital – and will be extended to other sectors in 2020.

EIT financial support: EUR 650 000

EIT innovation activities

EIT Innovation Communities ran 36 research and innovation projects on AI in 2019. The total budget for these projects exceeds EUR 27 million, with an EIT contribution amounting to almost EUR 20 million.

Most projects focus on the digital health sector and were implemented by EIT Digital and EIT Health. Issues to be dealt with include the early identification of skin cancer, prostate cancer diagnosis, cardiac issues and mental health problems.

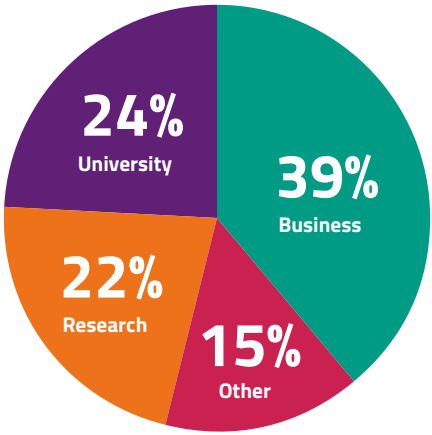
Several projects revolve around social welfare. These notably include projects aiming to prevent psychological problems caused by cyberbullying, analyse the wellbeing of workers, or design and adjust therapeutic plans.

Most projects will focus on the digital health sector.

Other AI projects being implemented by the EIT Community look into the likes of decision-making in traffic analysis, people flow, industry, city management, autonomous warehouses or autonomous vehicles.

EIT-backed AI activities are largely business-driven. Businesses account for 39 % of innovation projects partners, followed by academia (24 %), research organisations (22 %), and other relevant actors such as cities and NGOs (15 %). **A total of 120 partners support the implementation of EIT innovation activities.** They are located in Italy, Spain, Germany, France, the Netherlands and Scandinavia.

Overview of the type of partner



ADPS: A SMARTPHONE TEST TO PREDICT THE ONSET OF ALZHEIMER'S DISEASE - EIT HEALTH

AI thematic area: Health monitoring

AI in action: The Alzheimer's Disease Prediction Service (ADPS) uses a simple smartphone test to predict the likelihood of the neurodegenerative disease emerging within the next six years. The test claims accuracy of 90 %. It will be one of the first commercially-available solutions able to predict the risk of Alzheimer's for people over 50 in the EU.

Partners: Global Brain Health Institute at Trinity College Dublin, GMV Innovating Solutions, Institut d'Investigacions Biomèdiques August Pi i Sunyer

EIT Community support: EIT Health's extensive network has helped increase the visibility and acceptance of ADPS across Europe. It was also a catalyst for collaboration with healthcare professionals, industry and academia.

Key successes: So far, the team has conducted longitudinal EU-funded studies at 22 sites with 4 500 candidates. ADPS developer Altoida has been recognised as one of the Rice Alliance's 10 most promising life science companies at the 2017 Texas Life Science. The company also won the EIT Innovators Award 2018.

Further information: altoida.com

AWARD — AUTONOMOUS WAREHOUSE AND LAST MILE DELIVERY — EIT DIGITAL

AI thematic area: Automated warehousing and last-mile delivery

AI in action: The AWARD platform increases efficiency of the logistics process from warehouse to last-mile delivery. The easy to implement solution uses intelligent planning algorithms, machine learning and smart robotics (i.e. drones and AGVs). The AWARD solution will be able to coordinate a fleet of autonomous vehicles using advanced planning and scheduling techniques to improve productivity and reduce the costs of logistics operators in dealing with movement of goods within a warehouse and in preparation for last mile delivery in areas where traditional solutions are expensive. Further developments in 2019 include integration with AGV and unmanned aerial vehicles for last mile delivery.

Partners: Ferrovial Corporacion, S.A., University of Surrey, Fundación Centro de Innovación de Infraestructuras Inteligentes, Ferrovial Servicios S.A.

EIT Community support: This is an innovation project of EIT Digital with a budget of EUR 825 663 in 2019

Further information: brightcape.nl/owl

FIBRICHECK: STROKE PREDICTION IN 60 SECONDS — EIT HEALTH

AI thematic area: Health monitoring

AI in action: FibriCheck is the world's only medically-certified application able to help prevent strokes. It does so by detecting atrial fibrillation and other heart rhythm disorders. Users can measure their heart rhythm simply by placing their finger on the camera of their smartphone.

This award-winning application created by Qompium is built around highly accurate, patented measuring and detection algorithms. It can detect atrial fibrillation (AFib) and other common arrhythmias in only 60 seconds.

EIT Community support: EUR 145 000

Funding attracted/'commercialisation story': Raised EUR 1.5 million in series A funding.

Key successes: Winner of EIT Health's European health catapult contest in the Digital health category. The award comes with healthcare market advice, access to the international EIT Health network, and a EUR 20 000 grant in December 2017; winner of the Social Care Award at the Arch Summit organised by Vodaphone, leading to collaboration with Vodaphone and a EUR 50 000 grant in May 2018; winner of EIT Venture Award at Innoveit. EU-wide promotion and EUR 50 000 grant in October 2018.

Further information: fibricheck.com/

ZRR: THE SMART WASTE SORTING ROBOT – EIT CLIMATE-KIC

AI thematic area: Waste management

AI in action: the 'ZRR for Municipal waste' project aims to evaluate the performance of ZRR, a robot from Finnish start-up, ZenRobotics, that continuously monitors waste flows by means of sensors. An artificial intelligence module analyses the information captured by sensors in real time, while the robot's articulated arms pick waste items of different shape, size and materials with a speed and precision of up to 6 000 picks per hour (three arms).

Robotics in waste management is expected to remove the need for long conveyor belts to separate waste mechanically and manually in waste-treatment plants. It will also improve the quality of recycled materials and facilitate their reintroduction into the value chain.

Partners: Ferrovial Corporación, S.A. (leader), Wuppertal Institut für Klima, Umwelt, Energie GmbH, NTU International, Fundacion Centro de Innovación en Infraestructuras Inteligentes, Compañía Española de Servicios Públicos Auxiliares S.A.

EIT Community support: of EUR 488 441 and partners co-funding EUR 488 445

Key successes: The robot has been installed at the Ecoparc 4 waste treatment plant in Els Hostalets de Pierola, a municipality close to Barcelona. The installed unit features two robotic arms and will initially be trained to identify up to 13 different materials.

Further information: http://bit.ly/2N6aBv9

EIT Community business creation and acceleration activities

The EIT Community currently supports **120 early-to-mid-stage European start-ups working in the field of AI**. It intends to invest a total of EUR 3.14 million into these companies by the end of 2019.

A majority (56) of these EIT-supported start-ups focus on health. Other themes include energy (24 companies), business support processes (11 companies) and transportation.

ENWAY: DRIVERLESS STREET SWEEPERS — EIT CLIMATE-KIC

AI thematic area: Autonomous vehicles

AI in action: Thanks to AI, Enway's robots increase the efficiency of sweeping operations compared to manual vehicles. The use of this technology is expected to accelerate the cleaning process, provide better results, and reduce operating costs by 65 %.

The company already operates trucks across Germany thanks to a partnership with EAD Darmstadt (waste management services). In 2019, Enway plans to introduce its city sweepers in Singapore and Scandinavia.

EIT Community support: EUR 45 000

Funding: In July 2017, it raised seed funding from venture capital firms b10 and Atlantic Labs. It also obtained funding from Investitionsbank (IBB) Berlin under the ProFIT project, along with a private grant from Amazon Credits as part of the EIT-Climate KIC programme.

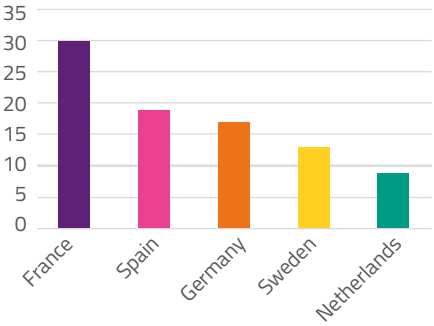
Key successes:

- EIT Climate-KIC Accelerator Award in 2017;
- European Transportation Innovator prize by the European Union, as an innovative start-up in the transport sector, in 2017;
- AI Start-up of the year by the Deep Berlin Community in 2018;
- Top 100 most innovative start-ups of Germany by The Hundert Magazine (Volume 11, 2018).

Further information: enway.ai

Nineteen of the 28 EU Member States are represented in the EIT's list of AI start-ups. France leads with 30 EIT-backed AI start-ups, followed by Spain with 19 and Germany with 17.

Number of EIT supported AI start-ups per country



DISQOVER: BIG DATA AGGREGATION FOR BETTER HEALTHCARE — EIT HEALTH

AI thematic areas: Health

AI in action: Disqover is a unique data aggregator to support decision-making in healthcare. The platform facilitates access to information and democratises big data for citizens, hospitals and companies who can easily find the right schools, therapies, doctors, and treatment. Created by Ontoforce, Disqover aggregates data from various sources (public, third-party or private big data). It presents this data on an intuitive platform where it can be easily interpreted and used. Once the system understands the semantics of the data and searches, it automatically generates the correct interface, presenting complex, seemingly unrelated data in a simple, connected manner.

EIT Community support: EUR 72 000

Funding obtained: EUR 8.8 million

Key successes:

- EIT Health's top prize for digital innovation;
- EIT Health catapult winner 2016;
- EIT Health GoGlobal 2017;
- EIT Venture Award 2017;
- EYs scale-up of the year 2018.

Further information: ontoforce.com

KONUX: PREDICTIVE MAINTENANCE FOR RAILWAYS — EIT DIGITAL

AI thematic area: Transportation and logistics

AI in action: KONUX's smart sensor systems allow industrial and rail companies to reach a new level of asset performance and help digitise the rail industry. The IoT solutions combine smart sensors, data fusion and artificial intelligence-based analytics to increase asset availability and optimise maintenance.

EIT Community support: Konux was awarded EUR 40 000 in the EIT Digital idea challenge cyber-physical systems category in 2014. The company benefited from sales training across Europe and expanded its network in the US with the help of the business development team at EIT Digital's Silicon Valley Hub.

Funding: EUR 51 million in total investment attracted to date

Key successes:

- won the EIT Digital idea challenge 2014 in the Cyber-physical systems category;
- listed in Forbes' 30 under 30 list in 2017;
- 2017 technology pioneers at World Economic forum;
- 2018 CogX Award in the 'outstanding innovations in AI: IoT and Sensors' category.

Further information: konux.com

Conclusions

The EIT, as a pan-European network with a broad thematic coverage across sectors, is uniquely placed to accelerate the innovation process and harvest AI applications that have a positive societal impact. It bridges research, education and business to do so. It is a natural platform for a cross-cutting and multidisciplinary approach.

The EIT is Europe's largest and most successful public-private AI innovation programme. It brings together, in a structured manner, stakeholders from the likes of academia, research and business to develop new services and products.

The Commission's strategic documents provide the EIT with a clear mandate to support the development of European capabilities to develop and deploy AI technologies.

In 2019, the EIT funds projects and activities in AI of a total of EUR 22 million, of a total budget of almost EUR 30 million.

EIT Innovation Communities have developed and are currently implementing very high-quality AI education and training programmes. The acceleration of education activities could be one of the most important tasks undertaken by EIT Innovation Communities in the AI field, as it prepares Europe's innovators and entrepreneurs for the future.

The number of EIT supported start-ups in the field of AI (120) is strong, with a major focus on digital health. The EIT is one of the strongest European business acceleration programmes supporting AI technologies.

Our ambitions in AI by 2021

- Over 250 AI start-ups;
- Over EUR 500 million leveraged by the EIT supported AI start-ups;
- EUR 220 million allocated to AI activities by the EIT Community;
- Over 300 AI products and services launched;
- Over 1 000 PhD and Master's graduates in AI programmes;
- Over 30 000 participants in EIT training programmes.

EIT Climate-KIC

Accelerate the transition to a zero-carbon economy

EIT Digital

Drive Europe's digital tranformation

EIT Food

Lead a global revolution in food innovation and production

EIT Health

Give EU citizens greater opportunities for a healthy life

EIT Urban Mobility

Smart, green and integrated transport

EIT RawMaterials

Develop raw materials into a major strength for Europe

EIT Manufacturing

Strengthen and increase the competitiveness of Europe's manufacturing industry

EIT InnoEnergy

Achieve a sustainable energy future for Europe

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The EIT is a body of the European Union

DU-02-19-593-EN-N

Manuscript completed in December 2019

First edition

European Union, 2019

ISBN 978-92-95082-47-2
doi:10.2850/840978

eit | European Institute of Innovation & Technology

Publications Office of the European Union