

THE EU-JAPANESE SUSTAINABLE 2050 INITIATIVES FOR THE NEW SILK ROAD



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Abstract: In 2050 over 4 billion people will live along the Euro-Asian infrastructure corridor called the New Silk Road. The strategic economic partnership of Japan and the European Union should support this trans-continental Euro-Asian belt with high-tech and climate-change projects, such as energy efficiency investment, less carbon emissions technology, next-generation nuclear power plant development or renewable energy. The emerging giants as India, Pakistan, Iran or the Central Asian nations are eager for the EU-

Japanese cooperation embodied by 5G or 6G communication networks, cloud, internet of things, Big Data, greener and safer automated road transport, integrated multimodal freight transport systems and logistics, advanced biofuels, shared fundamental values, transport including aeronautics, nano technology and research infrastructures.

Keywords: EU-Japanese projects, India 2050, New Silk Road, smart megacities

Introduction

The current EU Institutions Lack a Bright Vision

The current EU institutions lack a bright vision and powerful strategic research to analyse the future situation of Europe by 2050. A few studies analyze the new scenario. Without a balanced sustainable migration strategy⁸, the European Union will face considerable difficulties in trying to derive benefits from human capital, migration, employment and economic development. The EU's immigration policy will adapt ² the evolving needs of the European economy and the modern nature of global migration mobility patterns. By 2050, more than two billion people will be living in Europe, turning it into the largest economic unit. In 2050, eighty per cent of the European citizens will be of the migrant origin.

By 2050 projects supporting high-techs for health care, operational forecasting of earthquakes, earth observation and climate change, CO2 monitoring, ocean monitoring will be urgently needed. The global impact of the migration and UN development agenda eliminates obstacles to illegal migration. The EU-Japanese sustainable 2050 initiatives should change Mumbai, Dehli, Colcata, Karachi or Dhaka into smart megacities each having from 30 million to 45 million citizens. The Asian parts of the Silk Road often lack principles of democracy, the rule of law, human rights, crime protection, the natural disaster management, energy security, or sustainable development of goods and services.

The United Nations General Assembly resolution on "Agenda 2030 UN" or "Marrakesh Treaty"⁹ will supersede cross-border illegal migration through legal immigration. The population structure of Europe will change dramatically between 2030 and 2050 as it adapts to the world population mobility policy. The economic migrants and also refugees from Africa and Asia suffering from war and political persecution will move to Europe. The practical effect of the United Nations "Agenda for Sustainable Development 2030" will strengthen the links between migration and economic development.

The future EU-Japanese Challenges to Euroasia Belt

The new 2050 initiatives will be targeted at the hyper connected society program using 5G communication network, cloud, Internet of Things or Big Data. The EU-Japan digital

innovation will use EU-Japanese 2050 initiatives projects for advanced nano-technology, metrology, standardization and photovoltaic clean energy. Japan is one of the closest partners of Europe in terms of the international setting. Trade and investment

are still anchors of the Japan-EU relations (Picture No.1), but in the other areas a wide range of dialogue and cooperation programs will be conducted. The relationship between the European Union and Japan is based on the long-standing cooperation and the sharing of basic values.

The EU-Japan agenda covers cooperation in regional and global challenges to strengthen political dialogue and strategic partnership. The cooperation between Japan and the EU will identify and determine the new forms of cooperative activities in the strategic fields such as science, technology, research and innovation. Both EU and Japan are realising a well-balanced power supply configuration which is indispensable for stable living and industries. Japan needs to cooperate with EU to supply Silk Road modernisation projects and transcontinental corridors⁷.

The future Japan-EU programme will continue to support digital change. In 2050, both the EU and Japan will increase to support the new Silk Road Euroasia Belt¹. EU-Japanese 2050 initiatives/projects may support the EU-Japanese investment in India. India, that will reach the population of 1.7 billion citizens by 2050, will be the second largest population in the world. The common principles, as democracy, rule of law, human rights, good governance, market economy are the same for both the European and Japanese citizens. The Japan-EU relations⁶ share many of the same issues as energy security, access to key raw materials, aging population. They advocate a similar approach to the important international issues such as international security and climate change.

The Business Research Development and Innovation Collaboration

The EU branches of Japanese companies actively participate in the common framework program. In Horizon 2020, 50 European-based Japanese companies have participated in 100 projects, mostly in the field of transport and energy. In addition, 31 projects are funded in the fields of energy, aeronautics, materials, health and robot engineering through nine cooperative calls launched jointly by the European Commission and Japanese ministries between 2011 and 2017. Here we are referring to the small and medium enterprises and their access to risk finance, which are internationally open.

In order to fully draw out the possibility of cooperation between the EU and Japan (see Chart 1), the importance of establishing a streamlined mechanism for joint financing of research and investment projects was recognized. Japanese researchers have been actively involved in additional opportunities developed by the Japan Science and Technology Agency in close cooperation with the European Commission. Nuclear power plants that will not be emitting greenhouse gases, will embody the option the future decarbonization and securing of human resources. The investment into the next-generation of nuclear power plants will improve energy efficiency, sustainable development and technology with less carbon emissions.

The EU government should actively support the development of safe and highly mobile small reactors. The long-term strategy does not mention the rebuilding or new expansion of nuclear power plants. However, the regenerative energy used as the main power supply is expensive and lacks stability. In order to achieve independence from the standard household of the EU, it will be essential to develop a highly efficient and inexpensive storage battery and improve the transmission and distribution network. Japan has particular strengths in the fields of automobiles, pharmaceuticals, biotechnology, electronics and electrical equipment. The Japanese innovation rankings are traditionally above the EU average. Japan is a powerful innovator. Japanese companies very actively apply for patents, the country has the cumulative total of 1.9 million patents. According to the index of the National Institute of Science and Technology Policy (NISTEP), Japan accounts for approximately 5.2% of the world's top 1% cited publications.

Japan's top research and development companies spend about 70% more expenditure than the EU research companies. Performance has improved in business research and development, innovation collaboration, and trademark application. According to the European Innovation Scoreboard the Japanese performance outperforms the EU in terms of the amount of GERD and the number of researchers per million population. Between 2001 and 2014, both the number of Japanese researchers per million population and the number of GERD patents in Japan increased.

The Japan National Contact Point (NCP) of the Japan-EU Industrial Cooperation Center plays an important role in providing guidance, practical information, and assistance on all aspects of Horizon 2020 participation. The Japan Science and Technology Committee (JSTC) considered priority areas for cooperation with Japan-EU Science and Technology Cooperation both at the policy and project level in November 2017. The cooperative calls began onwards between the Japanese Ministry of Public Management, Home Affairs, Posts and Telecommunications (MIC) and Information and Communication Technology Laboratory (NICT) on 5G, the Internet of Things, cloud and big data. Another area of NICT collaboration with Japan is encouraged on non-conventional nano electronics.

Japan is also mentioned under social challenges and encourages cooperation on digital change of health and medical care. A dialogue has been established between the European Commission (DG CNECT) and the Japanese Ministry of Internal Affairs and the Japanese Ministry of Internal Affairs and Communications. These dialogues are supplemented by a series of industry government workshops. Numerous schemes are being implemented, including funding for

long-term visits to Japan by overseas researchers.

The EU Industry Relationship with Japanese Partners

The aeronautical research is the strategic field for cooperation with Japan, providing opportunities for the EU industry to strengthen the relationship with Japanese industrial partners and to improve access to the Japanese market. Aeronautical Research Working Group was established to provide a platform for managing ongoing projects, defining joint priorities and preparing future cooperation.

Up to now cooperations were held between the EU and Japanese Ministry of Economy, Trade and Industry - METI and NEDO, New Energy and Industrial Technology Development Organization. In order to support several future projects, as a high speed aircraft, anti-icing system, passenger friendly cabin, heat exchanger system for engines, composite construction manufacturing, and smarter flight control, NEDO Working Group was established.

Chart No.1 The EU-Japanese Science, Technology Research and Business Institutions

SB-MIAC	Statistics Bureau, Ministry of Internal Affairs and Communications	https://www.stat.go.jp
OECD	Organisation for Economic Co-operation and Development	http://www.oecd.org
JSPS	The Japan Society for the Promotion of Science, Gakushin	http://www.jsps.go.jp
OS WG	G7 Open Science Working group	http://www.g7italy.it/
AIST	Japan's National Institute of Advanced Industrial Science and technology	https://www.aist.go.jp
JAXA	The Office of National Space Policy	http://global.jaxa.jp
INCO	The European Union's programme for Research and Innovation projects HORIZON 2020	https://ec.europa.eu/research ec.europa.eu/info/research-and-innovation
NISTEP	National Institute of Science and Technology Policy	http://www.nistep.go.jp
EERA	The European Energy Research Alliance	https://www.eera-set.eu
IEA	The International Energy Agency Technology Collaboration Programmes	https://www.iea.org
JRC	The Joint Research Centre - the European Commission's science and knowledge service	https://ec.europa.eu/jrc/en
DG ENER	Directorate-General for Energy	https://ec.europa.eu/energy
ITER	The ITER Organization	https://www.iter.org/
MIC	The Ministry of Internal Affairs and Communications (総務省 Sōmu-shō)	www.soumu.go.jp
NICT	National Institute of Information and Communications Technology	www.nict.go.jp
METI	Ministry of Economy, Trade and Industry	http://www.meti.go.jp
NEDO	New Energy and Industrial Technology Development Organization	https://www.nedo.go.jp
JST	Japan Science and Technology Agency	https://www.jst.go.jp
JAXA	Japan Aerospace Exploration Agency	jaxa.jp
JASRI	Japan Synchrotron Radiation Research Institute	http://www.jasri.jp
NANoREG	the NanoSafety Cluster	http://www.nanoreg.eu
EUJAPCIC	The EU-Japan Centre for Industrial Cooperation	https://www.eu-japan.eu
JAEA	Japanese Atomic Energy Agency	https://www.jaea.go.jp
ESFRI	European Strategy Forum on Research Infrastructures	https://www.esfri.eu
IEPI	Central Research Institute of Electric Power Industry	https://criepi.denken.or.jp
EuroCirCol	The European Circular Energy-Frontier Collider Study	http://eurocircol.eu
EISCAT 3D	Europe's Next- Generation Radar for Atmospheric and Geospace Science European Incoherent Scatter Scientific Association	https://www.eiscat.se
SIOS	Svalbard Integrated Earth Observing System and arctic sciences	https://sios-svalbard.org
GNSS	Copernicus data, the Copernicus programme Earth observation and climate change, Global Navigation Satellite System https://www.gsa.europa.eu/european-gnss	https://cor.europa.eu/et/news/Pages/EU-space-programme.aspx
EGNOS	European Geostationary Navigation Overlay Service	https://www.gsa.europa.eu/european-gnss/what-gnss
GNSS Galileo	Galileo is Europe's Global Navigation Satellite System gnss/galileo/galileo-european-global-satellite-based-navigation-system	https://www.gsa.europa.eu/european
AMED	The Japan Agency for Medical Research and Development	https://www.amed.go.jp/en
IRDIRC	the International Rare Diseases Research Consortium	http://www.irdirc.org
GloPID-R	the Global Research Collaboration for Infectious Diseases Preparedness	https://www.glopid-r.org
EDCTP	the European and Developing Countries Clinical Trials Partnership	http://www.edctp.org
JPIAMR	the Joint Programming Initiative on Anti-Microbial Resistance	https://www.jpiaimr.eu
GACD	the Global Alliance for Chronic Diseases	https://www.gacd.org
IHEC	the International Human Epigenome Consortium	http://ihec-epigenomes.org
HFSP	the Human Frontier Science Programme organisation	http://www.hfsp.org
IHMC	the International Human Microbiome Consortium	http://www.human-microbiome.org
ICGC	the International Cancer Genome Consortium	https://icgc.org
NRA	Japan Nuclear Regulatory Authority	http://www.nsr.go.jp
IMPC	the International Mouse Phenotyping Consortium	http://www.mousephenotype.org
UNISDR	United Nations Office for Disaster Risk Reduction	https://www.unisdr.org
MCRC	Making Cities Resilient Campaign	https://www.unisdr.org/we/campaign/cities
DRR	disaster risk reduction and sustainable urbanisation	https://www.unisdr.org
DPR	Disaster Prevention Research Institute of Kyoto University,	http://www.dpri.kyoto-u.ac.jp
EMI	Earthquakes and Megacities Initiative	http://emi-megacities.org
BRI	Japanese Building Research Institute http://www.tsukuba-network.jp/english/kikan/30_kenchiku.html	http://www.kenken.go.jp/english
MLIT	Ministry of Land, Infrastructure, Transport and Tourism	http://www.mlit.go.jp/en/index.html
ICRI	International Conference of Research Infrastructures	http://www.iter-europe.net/events/icri-2018
ERIC	European Research Infrastructure Consortium	https://ec.europa.eu/research/infrastructures

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The new form of logistics of hybrid-electric aircraft has a significant quality impact on integrated multimodal freight transport systems. Automatic air transport aims for more environmentally friendly and safe aviation and enhances aviation safety. Transportation and logistics investment will be the core of the EU and Japanese cooperation of hybrid electric multimodal transport, low emissions freight transport system.

In particular, in connection with icing (2018), hybrid electric propulsion (2019), high-speed aviation (2020), the EU and Japan opened multinational international cooperation, project INCO for safer and

environmentally friendly airlines. For other transportation areas, there is a dialogue between the EU, Japan, the USA in the field of automobile vehicles. As a result, automated road vehicles and maritime transport can be expected to play a role in science and technology cooperation between Japan and the EU. This is reflected by the Horizon 2020 programme, too. Japan is the target country covering INCO's flagship on "road automation and safety". In addition, Japan is encouraged to participate in INCO's flagship on "Integrated Multimodal, Low Emissions Freight Transport System and Logistics" and INCO's flagship on "Reducing the Impact of Transport

on Air Quality". Finally, Japan's cooperation to multimodal topic "Human Factor in Traffic Safety" is encouraged.

Japan-EU Common Strategic Interests

Moreover, the areas for the possible Japan-EU cooperation are space technology, scientific data exploration, space weather. The EU and Japan have advanced space science technology and powerful space industry. The ongoing Copernicus program cooperates with earth observation and climate change, including CO₂ monitoring, ocean monitoring, and natural disaster management. Copernicus data and information are available to all users, including international partners on a full, open, and free of charge basis.

The principle of reciprocity will form the basis for future discussions on sharing Copernicus data with the Japanese side. Regarding the satellite navigation system, there is a great potential for cooperation in the field of new services such as applications (autonomous operation, 3D mapping, railway, agriculture, GNSS - Global Navigation Satellite System, receivers, and emergency situations. Warning Service cooperation agreement between The European Commission and the Japan Space Policy Secretariat was signed in 2017. The EU and Japan can deepen the future cooperation in the areas of rail, agriculture, GNSS standards or emergency alert service.

The Japan-EU cooperation is based on the policy level (common strategic interests) and regulated science and nanosafety project level. A several of successfully coordinated calls have occurred recently between the EU and the Science and Technology Agency (JST) on key raw materials, on critical raw material research, covered by JST's co-financing scheme, and a call on demand supply forecast. Raw materials will flow at the global level; therefore, the participation of Japan and the USA is necessary. It is desirable to achieve a better balance between the investment of the EU and the funds that Japan provides for those synchronous projects. In addition, further opportunities for cooperation with Japan may be of mutual interest in the field of material sustainability and energy efficiency in the construction and building sector.

Post -Fukushima Accident Cooperation

Following the Fukushima accident, cooperation with Japan in the field of radiation

protection and radiation ecology has greatly increased through FP7 OPERRA projects on epidemiology of thyroid cancer. Promising fields for future cooperation are radiation protection, severe accident management, radioactive decommissioning and decontamination management,

It is stipulated that nuclear power plants that do not emit greenhouse gases will be an option for decarbonization and encourage future development and securing of human resources. The strategic aspect of controlled thermonuclear fusion has been effective since 1988. There are several agreements between Euratom and Japan in this field.

Japan is the most prominent foreign partner of the Euratom Consortium joining more than a dozen groups and organizations participating at nuclear disarm actions and nuclear research. The European nuclear community conducts nuclear fusion energy research activities, projects on radioactive waste management, nuclear fuel reprocessing and reactor safety are in progress.

Euratom's research and training programme is based on the implementation of ITER nuclear fusion energy, advanced materials and in nuclear fusion safety programs. In the field of direct fission Euratom cooperates with Japanese Joint Research Center (JRC), Japan Atomic Energy Agency (JAEA), Central Research Institute of Electric Power Industry (CRIEPI) or Japan Atomic Energy Research and Development Organization. The Japan Atomic Energy Regulatory Authority (NRA) and Euratom follow participation in the field of nuclear fuel and fuel cycle safety, nuclear protection and security, including training and education and nuclear measurement.

Japan is the strategic partner of nuclear fusion physics and technology development, supporting ITER and DEMO, and being an important international element of the European Fusion Roadmap. The ITER project enters a new phase, moving from the construction stage of the ITER building to the assembly stage of the ITER machine/⁴, and faces the integration challenge. From this perspective, there is a possibility that cooperation with Japan will be strengthened in the field of nuclear decommissioning measures.

This excellent multilateral cooperation dates back to 1988. Since 1989, it has been embodied in the ITER Agreement to predict the construction and operation of ITER

equipment at Cardache in France, next in Korea, China, India, Russia and USA. This agreement supports collaboration on the construction of JT 60-SA machinery in Chubu (Japan), research and development to support future irradiation of international fusion materials, facility (IFMIF), collaborative design and research to expand the activities of a wide range of approaches.

The Renewable Energy Research and Innovation

There has been a mutual benefit in considering expansion of cooperation in the upcoming years in many fields including renewable energy (non-nuclear). The activities from 2030 to 2050 will proceed with the adoption of the latest energy and environmental strategy for common technological innovation in the EU and Japan, both declaring the development of low-carbon energy as their priorities. The long-term energy strategy is related to mitigation of climate change and is aimed at reviewing current power supply composition. The 2050 strategy shows various power options such as hydrogen, sunlight or wind power as forms of renewable energies.

Cooperation with Japan goes on the research and innovation of non-nuclear energy in the areas such as hydrogen fuel cells, energy

storage. Next, recovery and storage of carbon, electric vehicles, important new materials for energy has been debated. Cooperative success regarding solar power began between the EU and Japanese NEDO in the past years.

Furthermore, the European Energy Research Alliance (EERA) JP Wind is also interested in cooperation with the Japanese research institutes. Japan is particularly interested in floating offshore style, and the both parties are holding a series of common workshops. The active participation of Japan and the EU on the International Cooperation Program of the International Energy Agency (IEA) (along with the European Commission's JRC and DG ENER) will provide opportunities to host strategic energy research and development discussions.

Japan is also a member of EU's Mission Innovation and it is generally targeted at Horizon 2020 INCO's main products on clean energy. Japan participated in the clean energy research, too. Regarding advanced biofuel and bioenergy, there is a joint opportunity in biomass conversion and catalyst development for emission reduction.

Picture 1: Selected participants of EU- Japanese cooperation.



Source: by author

Medical Research Initiatives

The EU and Japan cooperate with multilateral initiatives aimed at global health problems. In the medical field, the cooperation is developed through several bilateral initiatives, including medical technical materials, predictive toxicology for new technologies for global healthcare and ecotoxicology models for global health care.

These are the International Human Epigenome Consortium (IHEC), the Human Frontier Science Program Organization (HFSP), the International Human Microbiomes Consortium (IHMC), the International Cancer Genome Consortium (ICGC) and the International Mouse Phenotypic Consortium (IMPC). The Medical Research and Development Organization (AMED), established in 2015, is an important dialogue on health cooperation with the EU. In 2015 AMED participated in the International Rare Disease Research Consortium (IRDiRC) and the Global Research Collaborative Research for Infectious Disease Control (GloPID-R). In 2016 AMED became member of the world chronic disease association (GACD). Japan and the EU are the most important donors of HFSP. These initiatives will constitute a framework for ensuring cooperation between Japan and the EU in the future.

Cooperation with Japan is also the main business in the field of technologies for global health care. A coordinated call between the EU and MIC/NICT WP 2016-17 initiated ICT robotics for active and healthy aging and funded several new projects. There is further space for the cooperation through the European and developing country clinical trial partnerships (EDCTP). The cooperation might be strengthened in the areas of antibacterial resistance within the framework of the Joint Programming Initiative on Antimicrobial Resistance (JPIAMR).

The Cooperation on Disaster Mitigation Research

We are expecting an increase in the cooperation between Japan and Europe on disaster-resistant society, operational forecasts and the early warning capability of the earthquake. EU-Japanese 2050 initiatives will cooperate with aspects related to trade in international climate change institutions. The cooperation may be strengthened in the areas such as earthquake

operation prediction, cold district changes, arctic research.

The environmental research is recognized through multilateral initiatives together with Earth Observation Group, Belmont Forum, Future Earth initiatives. In the recent years, a series of high-level workshops on climate change research has been held to focus on climate change issues³. Another potential area of future cooperation is "Nature-based solution" for disaster risk reduction (DRR) and sustainable urbanization. Disaster Risk Reduction - DRR, has been engaged in collaborative research for many years with JRC and Kyoto University Disaster Mitigation Research Institute.

EU-Japanese 2050 initiatives cooperation with Japan will be aimed at INCO's main focus on prediction of earthquake operation and early warning capability to more resilient cities. A long-term collaborative research has EU project teams with the Japanese Building Research Institute (BRI) of the Japanese Ministry of Land in areas as the weakness of the infrastructure to earthquake impact, protection of civil engineering building.

Arctic Research Projects

The EU-Japanese 2050 Arctic projects and initiatives will bring the overall new evaluation of the Arctic. The purpose of the Arctic initiatives are related to radical climate changes. A vast and rapid transformation of the Arctic climate and its surrounding areas is occurring. This is happening beyond the size of the region, country and region.

The facilities are involved in the field of roadmap of European research infrastructure such as Cherenkov telescope array CTA, environmental science EISCAT 3D - a next generation radar for atmospheric and geospatial science in Europe and Arctic Science -Svalbard or integrated earth observation system - SIOS.

The EU is interested in projects with Japan such as changing cold and arctic research under Marie Skłodowska-Curie Action -MSCA. Here we see the Japanese participation in INCO WP 2018-2020 E-JADE and JENNIFER changing cold and arctic research projects.

CERN led the European Circular Energy-Frontier Collider Research (EuroCirCol) funded to investigate disk collisions of various designs for the post LHC era under the research infrastructure. Japan and Europe are mutually beneficial partners, both of which

currently lead the world with its excellent HEP facilities. In addition to high energy physics, the EU - Japanese dialogue is ongoing in agriculture, biotechnology and genomics.

The Opportunities for Ageing Population and Human Brain Simulation

Cooperation between the European and Japanese research base is considered to be very strategic in the field of ageing population (SHARE) related to in social science, prediction of population change and humanities. The announcement of the ESFRI Research Infrastructure roadmap provides additional opportunities for population ageing collaboration. Updating the ESFRI roadmap and organizing the International Research Infrastructure Conference (ICRI) are also important opportunities to promote the Japan-EU research foundation dialogue. EU-Japanese 2050 initiatives aims to cooperate with Japan in INCO's integration and population ageing activities.

Cooperation with Japan is progressing in the context of the EU FET Flagship on Human Brain Project (HBP) aimed at developing large scale simulations of human brain and mouse brain data. Another FET flagship on graphene is also a field of cooperation. In both areas regular workshops are held with the participation of renowned European and Japanese research institutions. Additional fields with potential future science and technology cooperation were proposed by the so-called Joint EU-Japan Committee, High Level Dialogue, or Thematic Services.

The health care and nanosafety technology will be a field of promising cooperation. The harmonization of regulations and promotion of global cooperation between the United States, Europe, India, New Silk Road countries and Japan will promote the adoption of common reference standards and global technical standards. Japan is actively participating in the activities of OECD - WPMN, NanoSafety Cluster, NANoREG. Tesla 2050 Bridge will target with Japan INCO's flagship products on technology for global health care and nanosafety.

Exploration for Water Security Ecosystem

The absence or unreliability of water supply, sanitation and irrigation services, unmistakable and degraded water environment of floods and droughts is a serious problem in the supply chain of the

earth's population. This is all secondary related to financial shocks, immigration, political instability, the future of fishery and other evolutionary studies¹⁰.

Recently, the world's poorest regions (Africa, South Asia, Southeast Asia) face extremely high rainfall and spill variability, so today it is a serious water overcoming. The complexity of this hydrology is greatly added to the challenges of sustainable economic growth in poor countries that need innovative development paths. At the same time, these paths are necessary to avoid high prices of ecosystem damage, where possible, the wealthiest countries paid for growth paths. Exploration for water security is a struggle in the history of mankind. The outflow from these influences is now spreading to the interconnected world. While it is clear that most of the impact of climate change on society is transmitted by water, its rapidly changing economy, population and climate will apply world class science to solve the challenge on fresh water flux that has its unique skills, data sets, policy link and reputation.

Applying analysis of the water problems in the world it is necessary to examine the root cause, alternative development path, and future outcomes for government policy initiatives in complex situations. This variability and complexity of investment are necessary for application to highly variable and fragile hydrological system and for the water projects infrastructure.

The Japan-EU Science and Technology Research.

Japan's Industrial Technology Research Institute (AIST) and JRC formally established cooperation in the field of nanotechnology, measurement, standardisation, and solar power generation through research framework agreed upon at the at future policy dialogue meetings to promote cooperation activities between Japan and Europe. This way may expand promoting opportunities to increase co-financing and promoting Japanese science and technology for Europe.

Japan has developed a stronger political cooperation with the EU and is working closely with Europe on key issues including regional security/5 (Ukraine, Iran, North Korea, South China Sea) and sustainable development goals (especially cooperation with Africa).

In the area of crisis management, there are complementary skills between the EU and Japanese practitioners, research centres and industry. EU-Japanese 2050 initiatives cooperation with Japan may have strong possibility of mutual benefit through exchange of research and development in the areas as money laundering, cyber security or new technologies. Japanese partners participating in a successful EU-Japanese 2050 initiatives and projects may receive funding from the Japan Science and Technology Agency (JST).

The possibility of a new level of EU-Japanese cooperation stays on pilots as a mutual foreign direct investment; common initiatives in trans continental transport corridors and logistics; the technical barriers of trade harmonisation. In addition, the importance of expanding partnership and covering regular consultation and coordination

concerning science and technology's major policy issues is recognized.

The 2050 Bridges' transformation synergies will target to achieve sustainable development goals of EU-Japanese projects for the purpose of contributing policy planning in common science and research policy coordination/10. It will be the ongoing policy between experts and modelling team to achieve the environmental, social and economic implementation of initiatives with various EU-Japanese research institutes strategy to deepen the future cooperation of research on issues of global nature.

Conclusion

The expected Dynamics of EU-Japanese 2050 initiatives will be regarded as a representative of all sustainable development goals, identifying appropriate indicators should follow internally consistent framework. EU-Japanese 2050 initiatives will involve experts and stakeholders in related fields as Integrated Solutions for water, energy, and land, arctic future initiative, tropical initiative, New Silk Road economic integration, to achieve sustainable development goals.

Current large and complex management of Brussels will be replaced by peer-to-peer solutions, direct financing and control mechanisms. The increasing speed and complexity of global change means that the Japan-EU strategic cooperation will become more intense.

The framework of the research and investment cooperation with Japan is expected as one of the most scientific bases in the world. As a member of the WTO and the OECD, Japan and the EU provide a predictable legal framework for research and investment cooperation activities. It is important to increase the research potential.

The agreement between the European Commission and the Japan Society for the Promotion of Science (JSPS) provides opportunities for Japanese researchers to cooperate with European researchers.

The vision of EU-Japanese 2050 initiatives differs from Horizon 2020 because it includes the Silk Road Countries including India in the plan of the future Japan-EU cooperation. Less bureaucracy will be supported by the cloud, online communication and block chain solutions. The contribution from different cultures and different perspectives in EU-Japanese 2050 initiatives will bring a deeper recognition and cooperation among EU and Japanese research communities to support the successful implementation of the sustainable development issues. The common target of EU-Japanese cooperation will try to solve the serious problem how to deal with several issues including poverty, health, economic growth, new technologies and the environment in New Silk Road Belt. That will help to answer such questions, how to provide science and factual knowledge for sustainable change and to support policy processes and to evaluate transformational synergies and to provide a possible path for integrated approach to challenges.

The EU-Japanese 2050 initiatives and projects will be interdependent and not completely constrained by political or national self-interests. with many joint research activities. This will facilitate the mutual comparison of the results and their communication with policy makers. Various approaches to define and to identify key indicators or achieve sustainability.

Japan has a relatively difficult market for foreign investment. The European companies in Japan are still likely to encounter non-tariff barriers in the form of public procurement, lack of competition, and limitations related to licensing fees. EPA focuses on eliminating non-tariff barriers and opening

public procurement in Japan to EU companies. The closer harmonisation of the standards required in the EU-Japan business round table and discussed in the connection with EPA, will be beneficial to both parties.

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