European Commission

Roadmap for EU - New Zealand S&T cooperation

1. NEW ZEALAND as a partner of the EU

With a population of 4.56 million (2016), a GDP of $173 billion and a GDP per capita of $36982[1], New Zealand stands as one of the most economically developed countries. Economic growth has been faster in New Zealand than in most other OECD countries in recent years and the country has been recognised as offering one of the most business friendly environments in the world.

The EU remains an important goods market for New Zealand, particularly for high-value agricultural goods. New Zealand ranked as the 49th largest trade in goods partner of the EU in 2016 while the EU represented New Zealand's second largest trading partner after Australia. Total trade in goods amounted to €8.1 bn. New Zealand's exports to the EU are largely dominated by agricultural products while EU's exports to New Zealand have been much more focused on manufactured goods. New Zealand depends on international trade. The country is a member of APEC and is a party to the Trans-Pacific Partnership (TPP) and the Regional Comprehensive Economic Partnership (RCEP) negotiations. While the EU remains an important trading partner for New Zealand, New Zealand's trade focus is increasingly on the countries of the Asia-Pacific rim. Total trade in commercial services between EU and New Zealand in 2015 amounted to €4.3bn.

In 2017 the EU and New Zealand entered into a Partnership Agreement (PARC)[2] which contains a number of economic and trade cooperation rules. The EU and New Zealand ended preparatory work in March 2017 for potential trade negotiations of a Free Trade Agreement (FTA). The European Commission has now recommended that the EU begin negotiations for a trade agreement with New Zealand.

The science and innovation relationship of New Zealand and EU is supported by the 2009 Science and Technology Cooperation Agreement[3] which has been instrumental in creating stronger links with New Zealand. A review of the Science and Technology Cooperation Agreement by two independent experts in 2013 concluded to a mature successful relationship[4]. The reviewers put into light 'niches of excellence' in the NZ research system and underline success stories for example in the field of research infrastructures, bioengineering in medicine, optimisation in industry and services (OptAli) and Antarctic Research.

New Zealand Research & Development intensity has increased over the past twenty years, from 1.06% in 1997 to 1.27% in 2015, while 40% of R&D is financed by the business sector. The government views business R&D as a driver of a thriving independent research sector that can act as a major pillar of the New Zealand science system. The New Zealand government is investing in science and innovation through the Innovative New Zealand

[1] Based on purchasing power-parity, current international dollar. Data for 2015 from UNESCO Institute for Statistics (retrieved 9/10/2017).
[2] https://eeas.europa.eu/sites/eeas/files/eu_new_zealand_partnership_agreement_on_relations_and_cooperation.pdf
[3] http://ec.europa.eu/research/iscp/pdf/policy/newzealand-agreement.pdf#view=fit&pagemode=none
[4] https://ec.europa.eu/research/iscp/pdf/policy/eu-nz_report2013.pdf

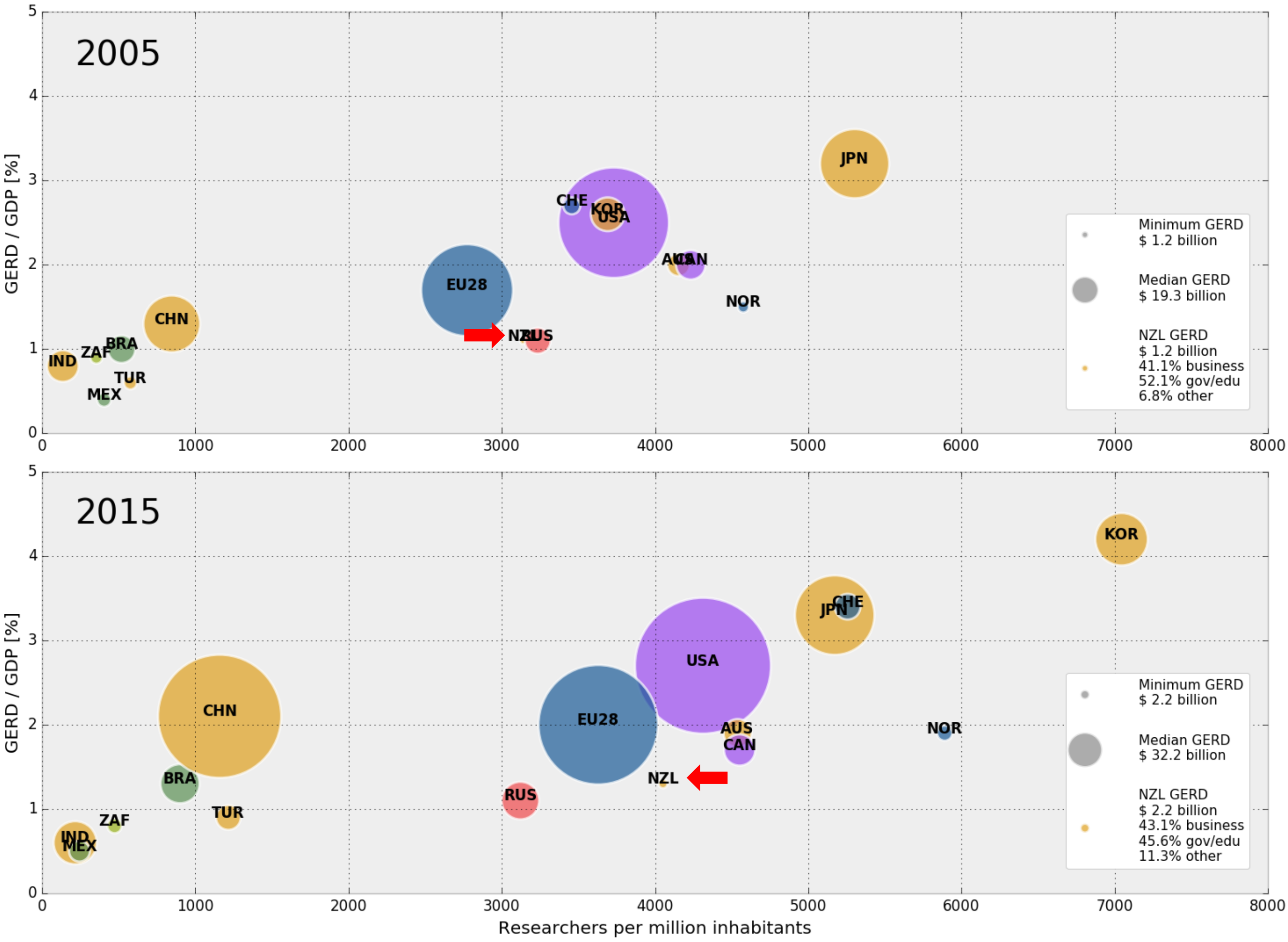
package ($411 million for science and innovation, taking annual investment in science to $1.6 billion by 2020.) This is one of the largest single investments in science and innovation in New Zealand's history. New Zealand benefits from a very high R&D intensive employment market, with 4009 researchers per million inhabitants in 2013[5].

The EU is the most significant regional science and innovation partner of New Zealand with more than half of New Zealand's researchers having an active collaboration with a European partner[6]. There are particularly strong links with the UK, Germany and France and also Italy, the Netherlands and Switzerland. New Zealand's public science system is based on universities and sectorally focused Crown Research Institutes (CRIs). New Zealand is very strong in university and public research, with 4 universities ranked in ARWU Top-500 Universities' list for 2017. Furthermore, the country's publications output in top scientific areas in terms of citation impact of the publications is higher than the average of EU28 in economics, econometrics and finance, general medicine or biochemistry.[7]

The vast majority of New Zealand's industries are SMEs. New Zealand decided to stress innovation and cooperation with industry, and in particular SMEs. In this context the launch of the Callaghan Innovation[8] as a one-stop shop providing R&D grants, testing services and access to facilities and networking services, is important to mention with the general aim to boost a business friendly environment. Based on PCT patents, compared to the EU28 there is a stronger specialisation of New Zealand in technologies such as nanotechnology, medical technology, pharmaceuticals or biotechnology[9].

[5] Counted in Full Time Equivalent. Data from UNESCO Institute for Statistics (retrieved 9/10/2017)
[6] Based on a survey commissioned by the New Zealand government in 2003.
[7] Data from Elsevier/SciVal, extraction of data in February 2016. See figure 3 of Annex.
[8] http://www.callaghaninnovation.govt.nz/
[9] See figure 4 of Annex.

Figure 1: Expenditures in Research & Development and researchers per million inhabitants



Note: GERD in current PPP; Top chart: Data for CHE from 2004. Bottom chart: Data on researchers per million inhabitants for BRA from 2014, for CAN from 2014, for MEX from 2013 and for AUS from 2010.
Source: DG RTD - International Cooperation
Data: UIS, OECD, EUROSTAT; extraction date: 11/10/2018

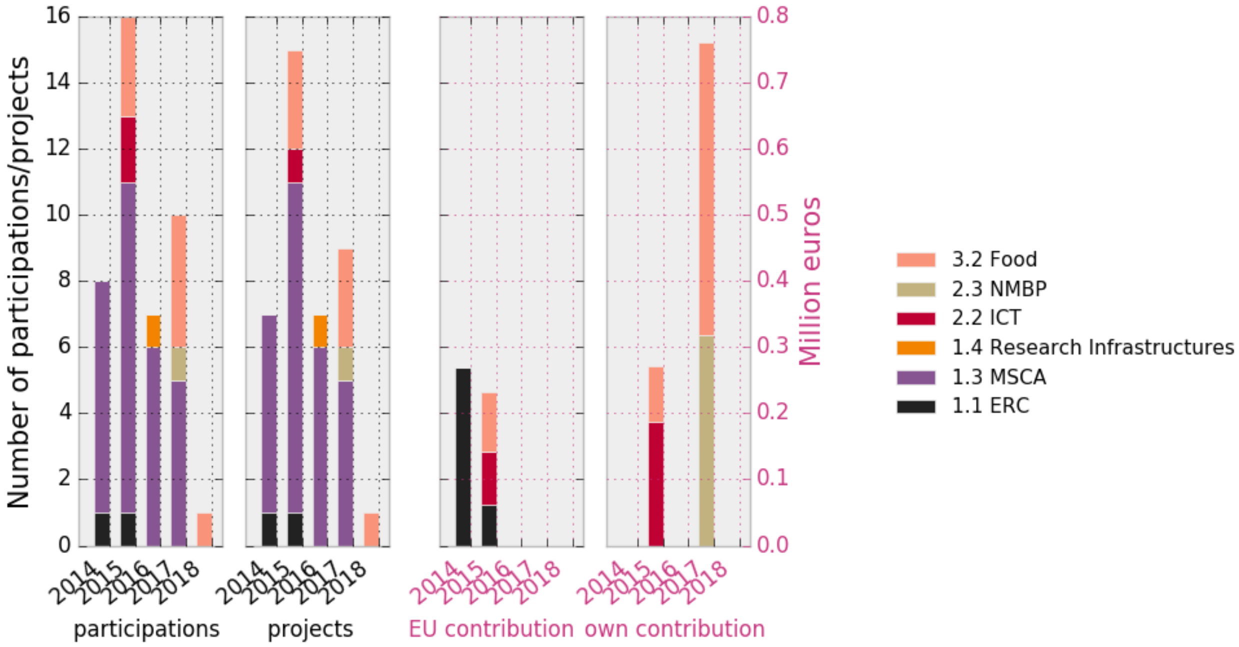
2. State of play of EU-NEW ZEALAND S&T cooperation

2.1. On-going FP7 and Horizon 2020 cooperation

New Zealand entities have participated 123 times to 107 grants of collaborative, ERC and MC actions of FP7, receiving 4.3 million euros from the EU while 7.2 million euros is the non-EU budget. Regarding collaborative actions, New Zealand applicants were involved 148 times to 139 eligible proposals, leading to 40 funded projects that involved 49 New Zealand participations. New Zealand participants have received 3.9 million euros from EU. Regarding Marie-Curie (MC) actions of FP7, New Zealand entities have participated 72 times to signed MC actions. Also, a total of 368 researchers of New Zealand nationality have participated in MC actions.

Furthermore, the bilateral policy dialogue platform (2013-2016) called 'FRIENZ' between the European Commission and the New Zealand Ministry of Business, Innovation and Employment (MBIE) facilitated strategic research, science and innovation partnerships between Europe and New Zealand.

Figure 2: Participation of New Zealand in Horizon 2020



Note: Participations of beneficiaries, third-parties and partner-organisations.
Source: DG Research and Innovation - International Cooperation
Data: CORDA (JRC, EIT and art.185 not included); extraction date: 15/10/2018

Under Horizon 2020, up to October 2018, New Zealand entities have participated 42 times to 39 signed grants of collaborative, MSCA and ERC actions of Horizon 2020, receiving 0.5 million euros of direct EU contribution while 1.1 million euros is the non-EU budget of New Zealand beneficiaries. In the collaborative actions of

Horizon 2020 New Zealand entities have 12 participations in 10 signed grants. Furthermore, New Zealand entities have participated 28 times in MSCA actions, and a total of 39 researchers of New Zealand nationality have participated in MSCA actions. New Zealand entities have participated twice in signed ERC grants, and a total of 10 New Zealand nationals have acquired and ERC grant.

2.2. Current framework conditions for EU-New Zealand S&T cooperation

During the last Joint Science and Technology Cooperation Committee (JSTCC) meeting (December 2014), the framework conditions for cooperation in research and innovation were discussed. The two parties noted the general openness of their respective programmes, and the absence of any significant barriers to co-operation. They also welcomed the action-oriented approach taken by the New Zealand funders and research communities towards financially supporting New Zealand researchers' participation in Horizon 2020[10].

Over the past years, New Zealand developed 11 new National Science Challenge (NSC) platforms to address societal challenges. The NSCs are long-term strategic investments which are well-aligned with the Societal Challenge pillar of Horizon 2020. During the same period, New Zealand has commenced engagement with the EU's Joint Programming Initiatives (JPIs) in several of the areas which overlap with its National Science Challenges. New Zealand has become a full member of the JPI "A Healthy Diet for a Healthy Life", and the first non-European associate member of the JPI "Agriculture, Food Security and Climate Change". Prospective involvement in several pilot actions of the JPI Healthy and Productive Seas and Oceans is also under discussion.

Building innovation linkages have been also pointed out as a priority as New Zealand has developed an advanced ecosystem geared to ease creation of businesses. New Zealand, through Callaghan Innovation, has become a full member of the Enterprise Europe business Network (EEN)[11].

3. Priorities for the future in S&T cooperation

3.1. Areas of future S&T cooperation agreed at latest Joint Committee/High Level Dialogues

At the 2014 EU-NZ JSTCC meeting the two sides emphasized the need to deepen, scale and open up cooperation in many areas:

- In Bio-economy, the transformation of the Knowledge-Based Bio-economy Forum (involving Australia, Canada, EU and New Zealand) into a wider International Bioeconomy Forum (IBF) was discussed. This new forum will discuss and implement research and innovation actions in areas of common interest and on key domains for developing the bioeconomy. In parallel, there are also opportunities for connections and collaborations between the New Zealand National Science Challenges the European Joint Programming Initiatives relevant for the bioeconomy area (e.g. Agriculture, Food Security and Climate Change (FACCE-JPI).

[10] https://ec.europa.eu/research/iscp/pdf/policy/eu_nz_communique.pdf
[11] http://een.ec.euopa.eu/

- Regarding Health research, it was noted that New Zealand and the Union cooperate in multilateral initiatives aimed at addressing global health challenges.

3.1. Potential new areas of future S&T cooperation proposed at latest Joint Committee/High Level Dialogue, through SFIC, or by thematic services

Further areas of EU – New Zealand collaboration may include:

- *Administrative big data and precision agriculture:* Further to preliminary contacts in 2015, the EU (with the involvement of the Joint Research Centre) and New Zealand are discussing possible Research and Innovation actions into two key areas: administrative big data and precision agriculture.

- *Sustainable energy:* In the context of the COP21 conference, New Zealand decided to become a member of the Global Geothermal Alliance[12] as the country is advanced in the field of geothermal energy[13]. New Zealand's development strategy relies on an assessed geothermal-power resource potential, which is from conventional convecting systems hosted at depths of up to 3.5 km, mostly within the Taupo Volcanic Zone.

- *Earthquake research:* New Zealand has strong expertise in earthquake research, also due to its geographical disposition to earthquakes. This is an area of collaboration with Europe that could bring strong added value.

- *Health research:* Cooperation between the EU and New Zealand takes place primarily at funding agencies level. New Zealand is one of the members of the Human Frontier Science Programme (www.hfsp.org). More recently, New Zealand (Health Research Council) joined the Global Alliance for Chronic Diseases. The EU encouraged New Zealand to join the Global Research Collaboration on Infectious Diseases Preparedness[14]

- *Industrial innovation:* Greater efforts should be made to support the involvement of New Zealand and European industry partners in bilateral research projects, also building on Callaghan Innovation's successful application to join the Enterprise Europe Network.

3.2. Improvements in framework conditions agreed at latest Joint Committee/High Level Dialogue and additional framework conditions to be addressed at future policy dialogue meetings

New Zealand places high priority on international science connections, and Europe is seen as a key partner. Collaboration with international science partners is supported across New Zealand's domestic science funding programmes. The Catalyst Fund is a tactical fund which specifically supports activities that initiate, develop, and foster international science collaborations for New Zealand[15].

[12] http://www.irena.org/News/Description.aspx?NType=A&mnu=cat&PriMenuID=16&CatID=84&News_ID=438
[13] http://iea-gia.org/about-us/members/
[14] www.glopid-r.org
[15] http://www.mbie.govt.nz/info-services/science-innovation/investment-funding/current-funding/funding-for-international-partnerships

ANNEX:

HORIZON 2020 WORK PROGRAMME 2018-20 TOPICS EXPLICITLY ENCOURAGING COOPERATION WITH NEW ZEALAND

	Topic identifier	Topic title
2018	INFRAIA-01-2018-2019	Integrating Activities for Advanced Communities
	SC5-17-2018	Towards operational forecasting of earthquakes and early warning capacity for more resilient societies (closed by now)
2019	LC-CLA-07-2019	The changing cryosphere: uncertainties, risks and opportunities

All Work Programme 2018-2020 topics in Horizon 2020 are open to the participation of New Zealand!.

Figure 3: New Zealand – Top scientific areas compared to EU28 in terms of citation impact of publications

	Scientific Area	Share in world output	Share of international co-publications	Citation Impact: Difference with EU28	Citation Impact: 8-year trend
High publication output	Economics, Econometrics and Finance: General	0,8%	51%	+1.0	–
	Medicine: General Medicine	0,6%	44%	+0.92	⬆
	Environmental Science: General Environmental Science	0,6%	60%	+0.7	⬆
	Arts and Humanities: Language and Linguistics	0,8%	31%	+0.68	–
	Medicine: Surgery	0,3%	38%	+0.67	⬆
	Biochemistry, Genetics and Molecular Biology: Genetics	0,8%	67%	+0.64	⬆
	Business, Management & Accounting: General	0,8%	52%	+0.63	⬆
	Medicine: Cardiology and Cardiovascular Medicine	0,4%	56%	+0.62	–
	Physics and Astronomy: General Physics and Astronomy	0,2%	70%	+0.62	⬆
	Social Sciences: Linguistics and Language	0,8%	32%	+0.59	–
Low publication output	Arts and Humanities: Archeology (arts and humanities)	0,7%	74%	+6.05	–
	Earth and Planetary Sciences: General Earth and Planetary Sciences	0,7%	60%	+2.34	⬆
	Social Sciences: Archeology	0,8%	74%	+2.07	⬆
	Energy: General Energy	0,2%	42%	+1.94	–
	Energy: Fuel Technology	0,2%	50%	+1.93	–
	Mathematics: Mathematical Physics	0,3%	71%	+1.59	⬆
	Medicine: Hepatology	0,4%	53%	+1.17	–
	Environmental Science: Ecological Modeling	1,3%	69%	+1.16	–
	Energy: Energy Engineering and Power Technology	0,2%	45%	+1.0	⬆
	Medicine: Anatomy	0,7%	49%	+0.86	⬆

Source: DG Research and Innovation – International Cooperation
Data: Elsevier SciVal; extraction date: 6/8/2017; publications' window: 2011-2013; citations' window: 3 years
Note: These tables show scientific areas in which the country's academic publications have a higher citation impact than EU28, and whether this difference has decreased, increased or remained the same in the past 8 years. They are grouped in two tables. The top table focuses on areas with high share of publications in the country's total output of publications and the bottom table on those with low share of publications. Scientific areas are based on Elsevier 'All Science Journal Classification'. For each area, the country's share in the world output of publications and the share of international co-publications are also shown.

Figure 4: New Zealand – Specialisation compared to EU28 in selected technologies based on PCT patents

	Technology	2014 PCT patents	2014 PCT patents of EU28	2014 Specialisation compared to EU28	8-year trend
OECD classification	Nanotechnology	4	137	4,29	–
	Medical technology	88	3.879	3,33	⬆
	Pharmaceuticals	19	2.524	1,11	⬆
	Biotechnology	20	2.745	1,09	⬇
	Selected environment-related technologies	23	3.663	0,92	–
	ICT	64	14.579	0,65	–
WIPO classification	Medical technology	60	2.801	3,22	⬆
	Food chemistry	9	484	2,80	⬇
	Furniture, games	16	952	2,53	⬇
	IT methods for management	6	425	2,12	⬇
	Electrical machinery, apparatus, energy	40	3.101	1,94	⬆
	Civil engineering	20	1.632	1,84	⬇
	Pharmaceuticals	16	1.581	1,52	⬆
	Other special machines	17	1.692	1,51	⬇
	Biotechnology	14	1.400	1,50	⬇
	Handling	10	1.447	1,04	⬇
	Chemical engineering	9	1.315	1,03	⬆
	Computer technology	11	1.762	0,94	⬆
	Other consumer goods	7	1.238	0,85	⬇

Source: DG Research and Innovation – International Cooperation
Data: OECD (top table) WIPO (bottom table); extraction date: 6/8/2017
Note: The top table shows the relative specialisation of the 2014 PCT patent output of the country with respect to EU28, calculated as (# of patents of country in technology X / # of patents of country in all technologies) / (# of patents of EU28 in technology X / # of patents of EU28 in all technologies). It also shows whether the relative specialisation has increased, decreased or remained the same in the past 8 years. The selected technologies are classified based on the OECD database. The bottom table shows the same information for the top-13 technologies with the highest specialisation index with respect to EU28 - this time the technology classification is based on the WIPO database. Both tables also show the country's and EU28 total number of PCT patents under each technology in 2014.