WORLD TRADE ORGANIZATION

Council for Trade-Related Aspects of Intellectual Property Rights

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ITEM 11: INTELLECTUAL PROPERTY AND INNOVATION: SUMMARY OF THE 2018 THEME – THE SOCIETAL VALUE OF IP IN THE NEW ECONOMY, AND 2019 IP AND INNOVATION THEME: PUBLIC-PRIVATE COLLABORATIONS IN INNOVATION

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11 INTELLECTUAL PROPERTY AND INNOVATION: SUMMARY OF THE 2018 THEME – THE SOCIETAL VALUE OF IP IN THE NEW ECONOMY, AND 2019 IP AND INNOVATION THEME: PUBLIC-PRIVATE COLLABORATIONS IN INNOVATION

11.1 United States of America

184. The United States is pleased to co-sponsor this agenda item and contribute to the discussion of "Public-Private Collaborations in Innovation - Research and Development (R&D)."

185. The United States would like to thank the co-sponsors for this item.

186. Before providing the United States' experience with public-private collaborations in innovation, I would like to take a step back and summarize what we discussed last year under the theme - "The Societal Value of IP in the New Economy".

187. First, under the sub-theme - "IP Intensive Industries and their Economic Impact on Society" - a number of WTO Members provided empirical data from reports and case studies showing how intellectual property rights (IPRs) contribute to employment, gross domestic product (GDP), licensing revenue and trade. The discussions covered a broad range of IP-intensive industries, wherein the contributing Members offered examples of government resources available to support the IP-intensive sector generally, and, more specifically, new and emerging businesses, including micro, small and medium-sized enterprises (MSMEs). Members also identified ongoing and future studies to help improve their respective innovation landscapes, export strategies and IP policies.

188. Second, under the sub-theme - "IP and Improving Lives" - Members shared stories of how innovators and creators, including in partnership with governments, have used IP to address global challenges. Examples included healthcare products to provide faster diagnosis and better treatments; digital solutions to reform healthcare services; agricultural technology to help farmers significantly increase yields; and technology development projects either applied or developed in countries for which assistance is most needed, to name a few. Another key discussion point was the need to improve the awareness of, and accessibility to, IP systems to help a wider range of people harness the power of IP.

189. Third, under the sub-theme - "Intellectual Property and New Business" - Members stressed the importance of creating an IP environment in which SMEs and starts-ups can thrive by using the benefits afforded by trade secret, patent, trademark and copyright protections. Noting the significant impact SMEs and start-ups have on their economies, Members expressed the need to increase IP awareness and provide IP counselling at the early stages of business development and innovation.

Research and Development (R&D)

190. Turning now to this session's theme - "Public-Private Collaborations in Innovation - Research and Development (R&D)" - I intend to highlight the importance the United States places on research and development to solve today's challenges, as well as the funding levels and mechanisms that move innovation to commercialization for the benefit of the public.

191. The United States government spends upwards of USD 150 billion annually on funding research and development conducted by universities, government research institutions, private businesses and individuals.

192. The federal government funds roughly 50% of academic research in the United States, and universities are the second largest performer of US R&D, after the private sector.

193. University research is crucial for advancing science and for expanding the knowledge pool, not to mention the viability and sustainability of our economy.

194. In addition, the transfer of technology from universities and other research institutions, which is normally early-stage research, to industry for further development and commercialization, is vital for maximizing the benefits of publicly funded research.

195. Patenting of inventions is critically important for licensing, securing investment and forming partnerships that lead to the commercialization of inventions. In the absence of a strong patent system, most of these inventions will never see the light of day because of the significant costs associated with the transformation to marketable products. In the absence of strong patent protection, investment in early-stage inventions would be too risky for businesses.

196. In the United States, technology transfer from universities to the private sector is made possible in large part by legislation commonly known as the Bayh-Dole Act, which was enacted in 1980, and became effective on 1 July 1981. It represented a fundamental change in US government innovation policy.

197. Bayh-Dole gives universities and companies the option to own inventions they develop with federal funding, and to grant exclusive licenses on those inventions.

198. Prior to the enactment of Bayh-Dole, recipients of federal funding, including universities, generally could not own title to publicly funded inventions. Federal agencies that provided funding retained all IP rights and could only grant non-exclusive licenses to private companies. In fact, at the time Bayh-Dole was enacted, the federal government held title to approximately 28,000 patents, of which fewer than 5% were licensed to industry for development of commercial products. Companies were reluctant to invest in developing new products and markets, since competitors could later acquire licenses from the Government and then manufacture and sell the same products. This meant that American taxpayers were not getting the full benefit from the billions of dollars invested in cutting-edge research.

199. The Bayh-Dole Act clearly changed that landscape. Universities are now encouraged to collaborate with industry to translate research results into products that benefit the public. Because the funding for the research comes from US taxpayers, by policy, preference is given to small businesses and to those making products in the United States.

200. Under Bayh-Dole, any income that universities receive from licensing must be used for rewarding university scientists and supporting the cycle of innovation.

201. The objectives of Bayh-Dole are to encourage maximum participation of small businesses and non-profits in federally funded R&D efforts, to promote collaboration between businesses and non-profits, to ensure that the Government retains sufficient rights from federally funded inventions to meet its needs, and to encourage the use of inventions for public benefit.

202. Bayh-Dole also includes a number of safeguards designed to protect the public interest. They include:

a. Obligations to disclose each new invention to the federal funding agency, to make a decision whether or not to retain title to the invention and to file an initial patent application within a certain time period;

b. A government use license that confers a non-exclusive, non-transferable, irrevocable, paid-up right to practice or have practiced the invention on behalf of the US government throughout the world, and other important safeguards; and

c. Preference for SMEs for licensing purposes.

203. Robust university research, coupled with the enabling legal environment created by the Bayh-Dole Act, spawned entire new industries in the United States, such as biotechnology, where the United States continues to have a leadership role.

204. In the past 25 years, more than 11,000 start-ups have formed based on the results of university research. A majority of these were located in close physical proximity to universities, contributing to the local and state economy and development.

205. Let me provide a brief history of one of those start-ups.

206. The amount of information we are able to harness from the Internet seems limitless at times. In the mid-1990s, Stanford University doctoral candidates Sergey Brin and Larry Page were working on an algorithm that utilized all the links of different webpages to search and rank websites from the World Wide Web. At the time there were roughly 250,000 websites, compared to today where there are close to 2 billion. They initially called the engine Page Rank, but later changed it to the numeral "1" followed by 100 zeroes - or Google, as we know it today. This research was funded in part by a National Science Foundation grant.

207. Brin and Page were just a few of the many computer scientists that the National Science Foundation looked to for researching ways in which massive amounts of data could be managed for both government and commercial purposes. The federal government identified early on the benefits to national security of being able to manage such large databases; and we all know what became of Google. It currently has a market cap of USD 771 billion, and its revenue previous year was USD 136 billion.

208. Federally funded university research also ignited the innovative engines of Qualcomm, Symantec and Netscape, among many others.

209. In 2016 alone, 1024 start-ups were formed and 800 new products originating from university research were introduced to the marketplace by companies in the private sector. Over 200 new drugs and vaccines were developed through public-private partnerships since enactment of the Bayh-Dole Act.

210. Moreover, university technology transfer creates billions of dollars of direct benefits to the US economy and supports millions of jobs every year. One study found that between 1996 and 2013, academia-to-private sector patent licensing across all industries bolstered U.S. GDP by up to USD 518 billion and supported up to 3,824,000 U.S. jobs.

211. Additional legislation from the 1980s sought to achieve national technology transfer goals by requiring federal laboratories to have a formal technology transfer programme and to actively seek opportunities to transfer technology to industry, universities, and state and local governments.

212. Moreover, a collaborative mechanism was created to encourage federal agencies and laboratories to work with universities and companies toward a common goal. A Cooperative Research and Development Agreement, or CRADA, is an agreement between a Federal laboratory and a non-Federal party (US or foreign) to perform joint research and development in any area that is consistent with the Federal laboratory's mission.

213. Under a CRADA, a Federal laboratory may provide personnel, services, facilities, and equipment, but no funds, to the joint R&D effort. A non-Federal party may provide funds, in addition to personnel, services, facilities, and equipment.

214. A CRADA defines the tasks to be undertaken within an area of collaboration and grants the Federal government a government-purpose license and the non-Federal party a non-exclusive, paid-up, royalty-free license for internal use of any patents that result from the CRADA research.

215. The non-Federal party is also granted an option to negotiate either an exclusive or a nonexclusive commercial license within a field of use, subject to government-purpose rights. CRADAs also provide protection of proprietary information.

216. In practice, a federal agency - such as the National Institute of Standards and Technology - solicits the research community (universities, companies, and others) for collaboration in a particular area of research. A recent example of a solicitation involved tattoo recognition technology, which potentially has both government - law enforcement and national security - as well as commercial applications.

217. The United States' experience with collaborative research and development has been a good one. Important legislation such as the Bayh-Dole Act, the Federal Technology Transfer Act, and others allow federal agencies and laboratories, academia, and industry to work together on worthy causes - whether it is a vaccine, a diagnostic tool, or the technological seed that will grow into the next great start-up.

218. We look forward on hearing other Members on this topic.

11.2 Singapore

219. Singapore, on behalf of co-sponsors Australia; Canada; Chile; the European Union; Hong Kong, China; Japan; the Republic of Korea; New Zealand, Singapore; Switzerland; Chinese Taipei; and the United States of America, is pleased to introduce our paper on the 2019 IP and Innovation overarching theme on "Public-Private Collaborations in Innovation".

220. Collaborations harness different expertise and resources across various sectors to develop new innovation breakthroughs that may not be possible in solo endeavours. In particular, strong collaborations between the public and private sectors are important for effective innovation to help address global challenges. The public sector (e.g. public research and research-funding agencies) and the private sector (e.g. research and development (R&D), manufacturing, and marketing and distribution companies) possess different resources, expertise and risk profiles that can complement each other to create IP and deliver useful innovative solutions that benefit society.

221. TRIPS Council Members are invited to take part in a three-part exchange this year and to share success stories on how public-private collaborations in innovation helps to improve lives, build resilient communities and create good jobs. As per the paper, three subthemes will be discussed at each of the TRIPS Council sessions this year, namely a) R&D – collaboration frameworks / building capacity and engaging in R&D; b) Innovation in Creative Industries and Branding; and c) Commercialisation. The latter two topics will be expanded upon in the respective TRIPS Council sessions in June and November respectively.

Public-private collaborations in R&D

222. Focusing on the first theme, public-private collaborations in R&D can take various forms, depending on the specific situation.

223. One example from Singapore for illustration is Project Wolbachia, which is spearheaded by the Environmental Health Institute ("EHI") of our National Environment Agency ("NEA"). This project fights dengue in Singapore by developing technologies to control the Aedes aegypti mosquito population. Male Wolbachia-infected mosquitoes are released to mate with urban female Aedes aegypti mosquitoes, resulting in eggs that do not hatch. For this project, EHI is partnering a local start-up, Orinno Technology Pte. Ltd. ("Orinno"), and Verily, the life sciences and healthcare company of Alphabet Inc. EHI worked with Orinno to develop various automated devices to count the larvae and pupae of Wolbachia-infected mosquitoes. With Verily, artificial intelligence technologies were developed to sort and release the male Wolbachia-infected mosquitoes efficiently.

224. In this regard, the Singapore Government has developed a standard framework on IP management in public-private collaborations to guide such collaborations. We also have initiatives to help businesses, in particular the small- and medium-sized enterprises ("SMEs"), acquire R&D expertise.

Standard Framework on IP Management

225. How IP created from R&D can be used would invariably depend on the ownership of the underlying IP rights and terms of use. In determining the allocation of IP rights in public-private collaborations, various considerations have to be borne in mind. For example, the private sector is generally better placed to further develop and commercialise the IP to meet market needs.

226. Therefore, in April 2018, Singapore implemented the National IP Protocol for Publicly-Funded R&D. This is a standard framework for how IP generated from publicly-funded R&D should be owned, managed and exploited, so that the value of the IP can be fully exploited to benefit Singapore. This framework allows public agencies the flexibility to grant licences or assign IP to the industry, with the goal of facilitating IP commercialisation.

Helping Businesses Acquire Expertise

227. In some cases, businesses may not have the technical expertise to conduct further R&D to develop solutions to meet the needs in the industry or community, but such expertise can be found in public sector R&D agencies.

228. Singapore's public research agency, the Agency for Science Technology and Research ("A*STAR"), has a few programmes to help the private sector acquire and develop R&D expertise. One such programme is the Technology for Enterprise Capability Upgrading ("T-Up") Scheme, where A*STAR will second researchers to companies to help build up their in-house R&D capabilities. Since the launch of the scheme in 2003, over 678 SMEs have benefited. Another programme is Tech Access, where A*STAR helps SMEs access expert training. This enables enterprises to prototype new products and improve their manufacturing capability. Since the launch of this programme in 2017, over 30 companies have been supported.

Conclusion

229. Singapore values public-private collaborations in R&D. Done well, they deliver innovative solutions to benefit society and create good jobs.

230. We look forward to hearing from other Members on their experiences in facilitating public-private collaborations in R&D.

11.3 Australia

231. Australia has long recognized the value of collaboration between the public and private sectors in promoting innovation, and the Australian government has in place a number of programmes aimed at helping the two sectors work together.

232. One example is the Cooperative Research Centres Program, or CRC.

233. The CRC Program provides grants for up to ten years to support industry-led partnerships between industry and research bodies. It is organised along sectoral lines and is designed to address specific challenges identified by individual industries.

234. To qualify for funding, Cooperative Research Centres must include at least one Australian industrial entity and one Australian research organisation. There is no set funding limit for the Centres.

235. A second stream of the program, known as CRC-Projects (CRC-Ps), provides funding of up to AUD 3 million for a maximum of three years for industry-led collaborative research. CRC Projects must involve at least two Australian industry entities (including at least one SME) and one Australian research organisation.

236. The Australian Government has committed AUD 731 million to the CRC Program over the next four years, and there are currently 113 collaborative projects under way. Over the programme's lifetime, the government has provided AUD 4.6 billion in funding, while programme participants themselves have contributed a further AUD 14.1 billion, supporting a total of 316 projects.

237. The CRC Program has paid handsome dividends, with an independent evaluation conducted in 2012 concluding that it delivered a 3:1 return on investment.

238. Examples of the programme's more notable success stories include:

a. The development of longer-lasting insulated rail joints (devices used to monitor trains and detect damage to railway tracks) that have produced annual savings of AUD 30 million for the rail industry;

b. Productivity improvements of AUD 65.3 million resulting from the use of products developed by a cooperative research centre for polymers; and

c. Approximately AUD 120 million in additional earnings flowing to Australian hearing aid pioneer Cochlear, after it adopted new technology developed by yet another Cooperative Research Centre.

239. Another important programme is the Research and Development Tax Incentive. This programme lowers businesses' R&D costs by offering annual tax offsets of up to AUD 100 million for eligible R&D expenditure and providing eligible small and medium-sized enterprises with a cash refund if they make a loss.

240. The tax incentive programme seeks to address the obstacles that many Australian companies face in raising finance for R&D activities in an environment in which success is far from guaranteed, and innovation can inadvertently benefit competitors. It therefore sustains a range of productive R&D activities that would otherwise remain on the drawing board.

241. I would like to turn now to some of the specific issues identified by Singapore in its discussion paper which Australia has co-sponsored along with other delegations.

242. First, how do we balance our support for innovative businesses with accountability for the use of public funds? Australia employs a range of checks and balances to ensure that tax payers' money is spent responsibly. Industry support programmes are evaluated under the Department of Industry, Innovation and Science's Evaluation Strategy 2017 – 2021, which provides a framework to guide the evaluation and performance assessment of the Department's programmes and policies.

243. As already noted, applicants for funding under the CRC Program must meet strict eligibility criteria, while companies claiming the R&D tax offset must also meet certain requirements.

244. Second, how should we manage the IP that results from collaboration between the public and private sectors?

245. It goes without saying that collaborations of this kind can be quite challenging, due to the complex intersections between confidentiality, the use of pre-existing IP, the publication of research findings, commercialisation, and decision making around IP rights. Recognizing these complexities, Australia's IP Office, IP Australia, strongly advises would-be collaborators to give due consideration to IP management issues before embarking on joint research projects.

246. IP Australia has developed a variety of tools that are publicly available on its website, ranging from collaboration checklists, to model confidentiality agreements.

247. Finally, how can government agencies help the private sector capture and develop expertise in R&D, and acquire IP?

248. In recognition of its growing importance to the development of innovation frameworks, knowledge acquisition and promotion of entrepreneurship, IP Australia has introduced a number of initiatives aimed at supporting collaboration between research organisations and the business sector.

249. The Australian IP Toolkit for Collaboration (IP Toolkit) is a joint project between the Department of Industry, Innovation and Science and IP Australia, designed to facilitate collaboration between researchers and industry.

250. The IP Toolkit contains background information, guides and a range of tools –such as model contracts - that researchers and businesses can draw upon to help them manage IP arrangements in a collaborative setting.

251. Another initiative developed by IP Australia is Source IP, which connects businesses with Australian public sector research organisations seeking to license their patented technology. Source IP was launched in November 2015 and is particularly focused on making it easier for Australian businesses, including micro-, small- and medium-sized businesses, to access innovations and technology generated by the publicly funded research sector in Australia.

252. The Source IP site has generated a substantial amount of interest, attracting users from a number of countries and recording over 200 contact requests to date. While Source IP does not

currently list international patents, IP Australia has been discussing with overseas counterparts the possibility of expanding the platform by providing a link to their equivalent sites on Source IP or granting access to Source IP in their own jurisdictions.

253. Source IP has already made an impact. It was, for example, instrumental in the successful collaboration of a small Australian tech start-up called Forcite Helmet Systems with the University of New South Wales (UNSW).

254. Forcite is developing the world's first smart helmet, embedding communications systems into light recreational sports helmets and streamlining communications systems used by motorcycle emergency services.

255. Through Source IP, Forcite gained access to patents held by UNSW and has now integrated a UNSW patent into its helmet design.

256. Another initiative helping Australian businesses bolster their R&D expertise is the Entrepreneurs Program, which consists of two strands, Accelerating Commercialisation and Innovation Connections:

a. Accelerating Commercialisation helps eligible entrepreneurs, start-ups, small to medium-sized businesses and researchers to commercialise their novel product, process or service. By providing expert guidance, connections and financial support, it helps to bring fresh innovations to market as quickly as possible, increasing their prospects for success; and

b. Innovation Connections is a facilitation service that provides expert advice and solutions on knowledge-related issues, and a brokering service to connect businesses with knowledge providers and research organisations. This may include a matched funding grant that assists with direct access to research facilities.

11.4 Switzerland

257. Switzerland would like to thank Singapore for proposing and introducing this TRIPS Council agenda item. We are pleased to co-sponsor both the agenda item and submission IP/C/W/652.

258. We welcome the opportunity to exchange national experiences and hear about different approaches in the highly relevant area of public-private collaboration in innovation.

259. The question is: How can the public and private sectors interact to establish an innovative environment? The role of intellectual property rights is of particular importance to this kind of collaboration: A well-regulated and balanced distribution of rights and obligations significantly enhances cooperation and innovation. The aim is to ensure that public sector research complements rather than substitutes private sector research. Such collaboration should result in an enhancement of the social value of IP and the patent: innovation and technology are developed into marketable and socially useful products.

260. My delegation would like to present how Switzerland establishes interfaces between the public and private sector and point out the role that intellectual property plays in this collaboration for the development of new products and services.

261. The Swiss Constitution instructs the Confederation to promote innovation. It is for the federal authorities and the parliament to put in place the legal framework, without taking control over the direction of research chosen by private actors. Federal bodies may support start-ups with advice, to a limited extent with seed-funding, or may make available certain infrastructure which can facilitate young entrepreneurs' activities and endeavours, for example in the form of technology parks.

262. Platforms of public-private collaboration facilitate the exchange of knowledge and generate synergies. They enable innovation and access to technology across the society. Technology is transferred from academia and researchers to applied research and industry and from there to the consumers. Building the bridge between basic and applied research, public-private partnerships enable social and economic investment in R&D and allow for economic growth.

263. In the following, I will present two types of public-private cooperation practiced in Switzerland. The first type of partnership arises when a private actor has a patentable invention but lacks the means to develop the idea into a marketable product. This is where the public sector can come in as a facilitator. Let me illustrate such a collaboration with an example of the development and market launch of an innovative food preservation technology.

264. Writing her doctorate, Olga Dubey, a young biologist, discovered a natural substance that can be used to combat pathogenic fungi which infest fruit and vegetable. She knew that up to that day there was no efficient, cost-effective organic treatment against moulds on the market. As Ms Dubey became aware of the market potential of her discovery, it was also clear that she needed help in the form of advice and funding in order to develop her scientific discovery into a marketable product. She decided to apply for participation in the federal programme called "BRIDGE". Literally functioning as a bridge between research and practice, the programme was initiated in December 2016 by the Swiss National Science Foundation and Innosuisse, the federal innovation promotion agency. Today, more than 40 projects benefit from the collaboration platform. By means of enhancing knowledge transfer between research and entrepreneurship, BRIDGE supports researchers in developing their discoveries into concrete applications and marketable products that can be used for the benefit of society.

265. Thanks to BRIDGE's support, Ms Dubey ventured the step from science into her own business. The collaboration platform allowed her to go through the process of filing for a patent and setting up her own start-up, AgroSustain SA, while further enhancing her research activities. The young company developed a liquid which can be sprayed or fogged on crop yields, extending their shelf-life.

266. The post-harvest application of AgroSustain's liquid in food and plant storage facilities enables a significant reduction of waste. This also means a major reduction of greenhouse gases, an additional effect of less food spoiling along the supply chain. AgroSustain's product is going to be offered to major agricultural companies and retailers like Migros in Switzerland or Walmart in the US. Without the guidance, coaching and funding support obtained, Olga Dubey would have been forced to continue keeping herself busy in the university laboratory – and the product would not be made available to society today.

267. Now, let us turn to the second type of public-private collaboration: In the following example, it was a public sector actor that applied for a patent, but was not able to commercialise the invention. It is an example which shows how the help of private actors can come in for the successful completion of a project initiated by a public institution.

268. The success story of the present case is the result of a partnership between EMPA, the Swiss Federal Laboratories for Materials Science and Technology, and Flisom Ltd, a Swiss developer and manufacturer of photovoltaic solar cells. In 2011, EMPA succeeded in the development of flexible solar cells. The thin film cells showed an energy efficiency similar to that of conventional solar cells. Although the patented technology had great economic potential, the research team would not have been able to set up a production plant and launch the product on the market without the help of an industrial partner. Against this backdrop, EMPA started cooperating with Flisom. Using EMPA's patented technology, the research team, combining scientists and industrial experts from EMPA and Flisom, improved the energy efficiency to a level equal to some of the most efficient solar cells in the world.

269. In 2015, Flisom was eventually able to produce a prototype of the first solar module based on this technology. The ultra-thin solar cells are printed on a web of flexible foils which allows for a very space-saving and cost-effective production. The company designed a special industrial manufacturing technology for a so-called "roll-to-roll production" of the flexible solar modules. The manufacturing procedure makes use of the material's characteristic. Compared to traditional large-scale solar panel windows, the new foil can easily be unwound, processed and finally rewound. Only one year later, in 2016, Flisom put its pilot production line into operation and started to install the new product on buildings, use it as an energy source for means of transport and integrate it in off-grid installations.

270. This example shows how important private sector actors can be in transforming an invention into a marketable commodity, for the benefit of society. As important as private investors are for the development of market-ready products, as in some areas of technology such development

requires massive investments in time and resources. For small start-ups or young researchers, it is often difficult to raise enough money for the commercialization of their invention. At this point, a private or public partner can come in and act as decisive support, so that the momentum gained in early-stage research and development is not lost.

271. There are many other BRIDGE and EMPA projects which can serve as examples of effective cooperation and mutual support, where public-private partnerships turned ideas and work into marketable products suitable for mass production. The registration and management of patent, trademark and design rights supports such public-private ventures by putting their collaboration on a safe legal base. They help ensure that each partner receives a fair share of what each of them contributed along the innovation process, and if a commercial success results, of the profits made.

272. Oscar Wild once said: "The world is divided into two classes, those who believe the incredible, and those who do the improbable." Public-private collaboration in innovation can bring those two groups together, supporting the innovation process for the benefit of technological progress and economic development.

11.5 New Zealand

273. New Zealand is pleased to be a co-sponsor of the Intellectual Property and Innovation 2019 Paper.

274. New Zealand recognizes the importance of maintaining collaborative synergies between the public and private sectors in order to promote innovation and creativity for the benefit of society.

275. To this end, the New Zealand Government has committed to raising New Zealand's research and development expenditure to 2% of our GDP over the span of ten years.

276. New Zealand has two devoted government agencies committed to improving innovation and to supporting private sector businesses in establishing and maintaining sustainable growth.

277. The first of these agencies is Callaghan Innovation. Callaghan Innovation has a domestic focus and offers a range of services and tailored programmes to businesses, including:

a. Access to experts;
b. Technology and product development;
c. Innovation skills;
d. Business collaborations; and
e. Research and development grants.

278. Furthermore, New Zealand Trade and Enterprise is an international business development agency whose purpose is to help New Zealand businesses to grow internationally. It offers a range of services and tailored programmes to assist businesses to export and expand into new markets. It also promotes New Zealand to foreign businesses and investors, as well as helping businesses and investors to make international connections and mutually collaborate across international borders.

279. We look forward to hearing other Members' experiences on public-private collaborations in innovation.

11.6 Chinese Taipei

280. As the co-sponsor of this proposal, we would very much like take this opportunity to share with you our own particular thoughts and experiences on this subject.

281. In this age of the "knowledge-based economy", innovation and application are the keys to strengthening national competitiveness and economic growth. Both the public and the private sectors possess different resources and expertise, which, when combined, can complement each other and create market-oriented IP. This has become a crucial issue as WTO Members strive more and more to develop innovative technologies.

282. With a view to getting colleges, universities and academic institutions to conduct R&D programmes together, we launched in 2013 the PIONEER Grants for AIC (Academia-Industry Collaboration) project. Through providing grants for research and development, this project has been able, at the same time, to encourage local businesses and academic/research institutions to develop forward-looking technologies together. And, the operative word here is "together". Businesses take the initiative to form alliances, decide on the topics for the research and invite academic and research institutions to build teams to carry it out. In doing so, it is hoped that they will acquire the ability to expand their key patent portfolios, establish new standards for the industries and integrate the different systems.

283. Since the launch of the PIONEER Grants for the AIC Project, industry has invested up till now TWD 2.16 billion (that is about USD 72 million) of R&D funds and filed as many as 515 patent applications. A total of 3,170 doctoral students have been trained, with 900 people obtaining new jobs.

284. In addition, in few years ago, we also launched the A+ Industrial Innovation R&D Program, subsidizing companies that are devoted to high-level R&D work. This includes a sub-programme on forward-looking technologies, which encourages companies and research institutions to develop leading technologies together. Our aim here has been to greatly increase industry's profit and competitiveness in the global market.

285. For example, the Garmin Corporation, which is a well-known tech company in GPS product, was awarded the project's subsidy for its "3D City Navigation System Development and Integration" plan. It was therefore able to compile a high-quality 3D city map for in-car navigation systems. Since then, the value of Garmin Corporation's production has reached TWD 1.4 billion (or USD 45 million).

286. Back in 1999, we launched the Small Business Innovation Research (SBIR) Project, to provide subsidies to SMEs for conducting R&D projects. The Project's main aims were to promote the research and development of industry technologies, products and services among SMEs, and to guide SME investment in R&D activities in the electronics, data communications, machinery, services, consumer goods/chemical, biotechnology/pharmaceutical, digital content, and design industries. In addition to applying for subsidies individually, SMEs are themselves encouraged to form R&D alliances together with universities and research institutions. The Project aims to cultivate R&D talent among SMEs in order to accumulate R&D capabilities, and to elevate the technological level of SMEs in order to increase the competitiveness of their businesses. It helps traditional industries to transform and advance as well.

287. By 2018, on the basis of the SBIR programme, 241 projects had received a total of TWD 310 million (or USD 10 million) in subsidies, and this had led to TWD 520 million (USD 16.7 million) worth of R&D investment by our SMEs.

288. One such project worth mentioning here, just as an example, was for the research and development of decorative flame products. Before implementing the SBIR subsidized project, it was only the companies that possessed the innovative technologies for flame products. But, upon forming technological alliances, the companies were finally able to develop advanced decorative flame products and have since obtained more than 30 patents in Europe, the USA, Mainland China and in our own territory. They have also built their own brands and made their way into the international market.

289. So, it goes without saying that IP and innovation are critical to any WTO Member's economic growth. It is, therefore, a crucial task of the government to assist their public and private sectors in developing innovative technologies, based on their own resources and through comprehensive strategies.

290. I hope this has given you some useful examples of what can be achieved by encouraging the different sectors and elements in our economies to work together on the crucial issues of innovation and technology facing us all in the future.

291. We look forward to hearing from other Members about their own related experiences and measures taken in similar fields.

11.7 Chile

292. We thank the co proponents of this document and agenda item for providing us with the opportunity to share our country's successful experiences. The Government of Chile has prioritized public-private partnerships as a tool to promote innovation.

293. The Chilean Economic Development Agency (CORFO) is a government agency with the legal mandate to support entrepreneurship, innovation and competitiveness. In order to fulfil this mandate, CORFO has developed strategic support plans for scientific industrial consortia.

294. Lastly, we would like to point out that these initiatives have highlighted the importance of ensuring that intellectual property management strategies are consistent with the business models of companies participating in such projects. The success of these public-private partnerships has been possible thanks to dialogue between the parties concerned, which ensures that the particular needs of each project are understood and that the capacities generated are beneficial to the country's innovative ecosystem.[1]

11.8 South Africa

295. During 2018 the co-sponsors discussed the topic of 'Societal Value of IP in the New Economy'. South Africa actively participated and expressed its views on several sub-topics of this theme as introduced by the co-sponsors.

296. In respect of IP-intensive industries and their impact on society, co-sponsors presented "evidence" that IPRs contribute to employment, gross domestic product, licensing revenue and trade. However, a closer look at the statistics indicate that a purely economic approach to IPRs may be misleading given that co-sponsors focus on the societal benefit of technological innovation.

297. The effect of IPRs on economic growth in different countries depends upon their various stages of development (being measured in terms of per capita GDP growth and/or human-capital development); innovative capability and imitative activities; technological development; and factor endowments, etc. In general, due to different R&D activities, most the innovations are produced in high income countries. Furthermore, economic literature on the impact of IPRs is rather inconclusive. It remains ambivalent as to whether the social benefits of IPRs exceed their economic costs, even in relation to the developed world. The basic argument in favour of IPRs is that they are necessary to stimulate invention and new technologies. The main critique against IPRs is that they increase the cost of patented commodities which reduces welfare. This problem is exacerbated in developing countries because they are net importers of technology. Indeed, innovative activities are concentrated in a handful of developed country Members with the top ten countries accounting for 84% of global R&D activity.[2]

298. As already noted, many developing countries are large technology importers and developing countries that strengthened their IPRs protection (mainly in the 1990s) have significant negative balances on the royalty and license fees account. A 2016 study[3] concludes that IPRs tend to raise income inequality by generating a more skewed distribution of wages. Stronger IPRs increase the demand for skilled labour force as it raises the return on R&D activities. This causes a relative increase in skilled labour wages, creating a wage bias in favour of skilled labour against unskilled labour, thus aggravating income inequality within a developing country. Moreover, the effect on inequality is more pronounced for developing countries that are experiencing higher per capita GDP growth rates.

299. Proponents also advanced the argument that in respect of education and training, a range of intellectual property rich materials foster social and economic contributions to society. South Africa pointed out that a fundamental component of the right to education is access to high quality text books and other learning materials. Yet in many developing countries, access to such resources can

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[1] The PowerPoint presentation is available in Room Document RD/IP/31.

[2] See Auriol, Baincini & Paillacar "*Intellectual Property Rights Protection in Developing Countries*." July 2012 at p.2.

[3] Swati Saini & Meeta K Mehra "*Impact of strengthening Intellectual Property Rights Regime on income inequality: An econometric analysis centre for international trade and development.*" https://mpra.ub.uni-muenchen.de/75456/ MPRA Paper No. 75456, posted 10 December 2016.

be prohibitive since textbook scarcity is a serious challenge affecting the quality of education. We cited the example of an African country, where there is approximately one reading textbook available for every 12 grade-two students and one mathematics text book per 14 students.

300. Co-sponsors argue that as more and more learning is facilitated through computer access and the internet, both students and teachers are able to log onto fast amounts of information. Unfortunately, access to these technologies are both inadequately and unequally distributed between the developed and least developed regions in the world. The disparities experienced in the physical world, we pointed out, is often exacerbated in the online environment. The UNCTAD *World Development Report of 2018*, indicates that there are still-large gaps between developed and developing countries: the active broadband subscription in the developed world (at 97%) is more than double that in the developing world (48%); in Africa, only 22% of individuals use the Internet, as compared with 80% in Europe.[4]

301. While there is no doubt that IP may be valuable and may contribute to economic development and growth, there are many factors that determine whether IP protection may create appropriate conditions that enable MSMEs to effectively exploit IP.

302. In conclusion, South Africa has also indicated that we are reviewing our IP Policy, ensuring that appropriate balances are struck in providing protection for innovation and ensuring that benefits are shared equitably in society.

11.9 South Africa

303. We thank the co-sponsors for introducing the item of public-private collaborations in innovation.

304. South Africa followed a global trend in the popularity of Public-Private Partnerships (PPPs) by establishing a formal PPP structure within the National Treasury in 1999. Although there were PPPs prior to this date, these arrangements did not follow a standardised process or receive formal recognition as PPPs within the Nation Treasury Department of South Africa.[5] South Africa has implemented a regulatory framework for PPPs which came into effect in the early 2000s, enabled through the Public Finance Management Act of 1999 (PFMA). The National Treasury of South Africa developed a standardised procedure for such an entity, which it defined as a "contract between a government institution and a private party, where the private party performs an institutional function and/or uses state property in terms of output specifications; substantial project risk (financial, technical, operational) is transferred to the private party; and the private party benefits through unitary payments from government budgets and/or user fees".

305. According to standard economic criteria, South Africa is a high-income country with a well-developed infrastructure, with nearly 70% of the population urbanised and deep and liquid capital markets. However, it is also one of the most unequal economies in the world with a post-tax Gini-coefficient of 0.7, with unusually high levels of structural unemployment (around 36%) and poverty (around 50%).

306. Initial PPP projects were undertaken between 1997 to 2000 by the South African National Roads Agency for the N3 and N4 toll roads (national roads), the departments of Public Works and Correctional Services for two maximum security prisons, two municipalities for water services, and by South African National Parks for tourism concessions. Using lessons from these projects, together with international experience, a strategic framework was adopted by government in December 1999 and in April 2000 in accordance with Treasury Regulations for PPPs issued in terms of the PFMA.

Examples of PPP collaborations

307. It is often said that vaccines are lauded as one of the most successful public health interventions, providing universal prophylaxis at a fraction of the cost that would otherwise be incurred following the widespread outbreak of an infectious disease. In the case of South Africa, an

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[4] UNCTAD *World Development Report of 2018*, p.VIII.

[5] Walwyn and Nkolele "An evaluation of South Africa's public–private partnership for the localization of vaccine research, manufacture and distribution." Health Research Policy and Systems (2018) 16:30 p.3.

extensive vaccination programme, known as the Expanded Programme for Immunisation (EPI) forms part of a health strategy adopted by the National Department of Health (NDoH). Implementation of the EPI requires the procurement of approximately 46 million vaccine doses annually, at a cost of roughly ZAR 1.5 billion per annum (2015 values). Prior to 2003, vaccine procurement was an internal function of the NDoH; the department issued tenders on behalf of the provinces and secured the necessary supply from successful bidders. However, since 2004, vaccine procurement and distribution has been undertaken by a public–private partnership (PPP), known as the Biovac Institute (BI).[6]

308. Over the period 2010 to 2014, BI successfully procured and distributed vaccines and received an income of USD 86 million, equivalent to an average cost premium of 12%, as per the terms of its supply agreement with the NDoH. Moreover, it became increasingly able to supply vaccines to the public health system at globally competitive prices and undertook local R&D, the latter in one case leading to a novel conjugate vaccine that has been licensed to two international companies and for which the institute receives royalty revenue.[7]

11.10 Hong Kong, China

309. Hong Kong would like to thank the United States and Singapore for introducing the papers under this agenda item which we are pleased to be a co-sponsor. I am also thankful to previous speakers sharing their experiences.

310. Hong Kong was glad to participate in the discussion of societal value of IP in the new economy in 2018. I hope our sharing in particular on how IP improves life did give Members some food for thoughts in promoting IP and innovation.

311. On the Public-Private Collaborations in Innovation, Hong Kong recognizes that R&D is essential in promoting innovation, new technology and intellectual property. All these are drivers for economic growth and the key to enhancing competitiveness of our industries. Our Government has therefore put in place a comprehensive framework of policies and institutions to promote R&D using the collaborative efforts of public and private sectors.

312. A key aspect is the provision of infrastructure that forms an enabling environment for R&D and an essential part of a strong innovation eco-system. We establish a publicly-funded statutory corporation, the Hong Kong Science and Technology Parks ("Science Park"), offering one-stop infrastructural support to technology-based companies and activities. It provides a comprehensive range of services to cater the needs of industry at various stages, ranging from nurturing technology start-ups through incubation programme, providing physical space and services for R&D activities, and to offering industrial lands for production.

313. As an example of public-private collaboration, the Hong Kong Government allocated about USD 1.3 billion to establish two research clusters - one on healthcare technologies, and another on artificial intelligence and robotics technologies - in the Science Park, in order to attract the world's top universities, research institutes and technology companies in the relevant fields to conduct collaborative research in Hong Kong. Numerous top-notch institutions e.g. Institute Pasteur of France, Harvard Medical School, Stanford University School of Medicine, and University College London, have already expressed interests in joining the clusters. It is expected that the first batch of scientific research institutions will be set up later this year.

314. We also have set up five publicly-funded R&D centres to drive and co-ordinate applied R&D in five focus areas, i.e. automotive parts; information and communications technologies; logistics and supply chain; nanotechnology and advanced materials; as well as textiles and clothing. The centres have been working closely with the industries in conducting industry-oriented R&D and promoting commercialisation of the R&D results. These R&D centres are core initiatives to upgrade the technological level of our industries and stimulate the growth of technology-based industries.

315. Hong Kong also strives to provide adequate funding to promote R&D in a direct and impactful manner. In particular, there are funding schemes to provide incentives for public and private

[6] Ibid.
[7] Welwyn & Nkolele p.15.

collaboration. Just last month, we established a Partnership Research Programme by consolidating two existing funding programmes to provide matching-fund support for R&D projects undertaken by private companies in collaboration with public research institutions. To ensure sufficient participation from both public and private sectors, the public research institutions are required to be the lead applicant, while the private companies are required to provide at least 50% of the project cost (or at least 30% with exceptional approval from the Government). The companies are required to spend the funds in R&D only, but not in business development or operating expenses.

316. To encourage private companies to undertake more R&D projects, all IPR arising from the project will be solely owned by the companies having contributed at least 50% of the project cost. In case of exceptional collaborative projects involving less than 50% company contribution, the relevant R&D Centre should retain the IP ownership, and the company partner should only be granted an exclusive licence or exclusive right to use the R&D results for a limited period. With a view to boosting private companies' contribution, the R&D Centre would encourage its partner to raise the level of its contribution to at least 50% within a reasonable timeframe, say nine months, so that the latter could own the IPR.

317. We also launched another programme, the Cash Rebate Scheme, in 2010 to encourage private companies to establish stronger partnership with public research institutions. Under the scheme, a company will receive a cash rebate equivalent to 40% of its expenditure in projects under a major Government fund or other R&D projects funded by the companies and undertaken by public research institutions. As at end November 2018, around 1,200 companies have been granted cash rebate of more than USD 50 million.

318. While Hong Kong has a low profit tax rate (which is no higher than 16.5%), we provide enhanced tax deduction for private companies' expenditure on R&D activities which includes payments made to designated local research institutions. The deduction will be 300% for the first USD 250 000 of expenditure, and 200% for the remaining amount. There is no limit on the amount of enhanced tax deduction. We believe that this will encourage private enterprises to conduct R&D in collaboration with research institutions in Hong Kong.

319. In addition to funding, the private sector would look to talent to drive R&D activities. Hence our government is committed to supporting private companies in recruiting R&D talent. We rolled out the Technology Talent Admission Scheme in 2018. It provides a fast-track arrangement for admitting technology talent from overseas and Mainland China to undertake R&D work in Hong Kong. To balance the development and opportunity of local talent, we would require such companies to employ a certain number of local employees and interns in technology-related work.

320. We also launched a Technology Talent Scheme to pool together and nurture more technology talent for technology companies and institutions. It comprises a Postdoctoral Hub programme that subsidises government fund recipients and incubatees or tenants of Science Park to recruit up to two postdoctoral talent. Besides, there is another programme that subsidises local companies to train their staff in advanced technologies.

321. To assist private companies to acquire IP of their innovations, we launched an "IP Manager Scheme" in 2015. The scheme assists Hong Kong companies to build up their IP manpower capacity and to increase competitiveness through IP management. The scheme encourages enterprises to appoint a staff Member in a managerial position as their in-house "IP Manager". This IP manager is responsible for overseeing the compliance, management, exploitation and commercialisation of IP assets. The Hong Kong government would provide training and resources for those IP Managers.

322. To conclude, promoting innovation and technology is one of Hong Kong's top policy agenda. Our goal is to develop Hong Kong into an international innovation and technology hub. Knowing that the public and private sectors have different edge, we will keep devoting resources to facilitate public-private collaborations. We would also welcome collaborations with institutions from other Members.

11.11 Canada

323. Canada is pleased to co-sponsor the "IP and Innovation" theme of "Public-Private Collaborations in Innovation", and the accompanying communication on this topic. We would like to

thank Singapore for drafting the paper for discussion under document IP/C/W/652, as well as the co-sponsors of this discussion and other Members that have shared their national experiences and insights on public-private collaborations in innovation so far.

324. Before sharing some of our own recent experiences on this topic, Canada would also like to thank the United States and the co-sponsors of the summary paper on our recent discussions under the theme "The Societal Value of IP in the New Economy" (document IP/C/W/650). Canada was pleased to participate in the wide-ranging discussions under this theme during the three TRIPS Council meetings in 2018 and benefited from the constructive and insightful sharing of experiences by Members on issues such as IP-intensive industries, IP improving lives, and IP and new business.

325. On the Public-Private Collaborations in Innovation topic, Canada would like to take the opportunity to present an overview of Canada's recently-launched "Innovation Superclusters Initiative", a new funding initiative by the Government of Canada that has been designed to help strengthen Canada's most promising clusters and accelerate economic growth in highly innovative industries.[8]

326. In the Government of Canada's Budget 2017, the Government put forward the "Innovation and Skills Plan", an agenda to spark growth and help Canada realize its potential as a global leader in innovation. As part of this agenda, in May 2017, the Government launched the "Innovation Superclusters Initiative" to accelerate innovation through superclusters. Budget 2017 proposed to invest up to CAD 950 million (or approximately USD 725.51 million), to be provided over five years on a competitive basis in support of a small number of business-led innovation superclusters that have the greatest potential to accelerate economic growth. Under this initiative, industry partners match the Government of Canada's programme contributions dollar-for-dollar.

327. This initiative is a first of its kind for Canada, fostering connections between participants, from start-ups, small and medium-sized enterprises (SMEs) and large anchor firms, to post-secondary institutions, research and government partners. Through a small number of high-value, strategic investments, this initiative is co-investing with industry to strengthen Canada's most promising clusters and build superclusters at scale. The initiative is a "made in Canada" approach. Working through a business-led partnership model, the initiative works to align the efforts of diverse industries, researchers, and intermediary institutions, and build ecosystem-level advantages in regions across Canada.

328. Supercluster strategies under the initiative are structured around five themes of activity, which are eligible for co-investment. These activities include:

- **Technology leadership**, such as by way of collaborative projects that directly enhance Member firm productivity, performance and competitiveness (for instance, through collaborative R&D projects and private-sector-led commercialization projects).
- **Partnerships for scale**, which refers to activities serving a target group of cluster firms, such as linking start-ups with strategic partners, and supply chain development to cluster SMEs with anchor firms;
- **Diverse and skilled talent pools**, such as by way of activities that enhance regional labour force skills and capabilities;
- **Access to innovation**, which refers to investment in and providing access to assets, services or resources that benefit a range of cluster firms, such as the acquisition and assertion of jointly-held IP; and finally
- **Global advantage**, which refers to activities that position the cluster as world-leading, enabling firms to seize market opportunities, and attract international investments and partnerships.

329. One of the key objectives of Canada's Innovation Superclusters Initiative is to deepen existing strengths where Canada is already globally-competitive. This includes strategies to enhance Canada's capabilities, competitive advantage and leadership in commercialization. As well, the

[8] The PowerPoint presentation is available in Room Document RD/IP/32.

initiative is aimed at supporting industry-led collaborative R&D, particularly with respect to platform technologies, and to strengthen public-private collaboration, including with academia, to align innovative ecosystems.

330. In fostering a critical mass of growth-oriented firms, the initiative aims to develop five "superclusters", namely innovation hotbeds that benefit from strong connections between firms and research talent, competitive advantage, global brand recognition, and a contribution to job creation and economic growth.

331. The Minister of Innovation, Science and Economic Development announced Canada's five selected superclusters in February 2018. Following the national announcement, the negotiation of contribution agreements began between the Government of Canada and the five industry-led consortia selected to execute Canada's superclusters. Contribution agreements between the Government of Canada and all five Superclusters have been signed as of December 2018, and the superclusters are currently finalizing their five-year strategies, with project funding expected to begin before the end of the fiscal year (31 March 2019).

332. Now for a bit of a geography lesson, from West to East in Canada, the superclusters are:

- The *Digital Technology Supercluster* (based in British Columbia, with a key focus on technologies such as augmented reality; cloud computing and machine learning; data collection and analytics; and quantum computing);
- The *Protein Industries Supercluster* (based in Canada's Prairie provinces, this supercluster will use plant genomics and novel processing technologies to increase the value of key Canadian crops, such as canola, wheat and pulses, as well as plant-based meat alternatives and new food products);
- The *Advanced Manufacturing Supercluster* (based in Ontario, this supercluster is focused on building next-generation manufacturing capabilities, for instance, through the development of technologies like advanced robotics and 3D printing);
- The *SCALE.AI Supercluster* (based in the Québec-Windsor corridor, this supercluster focuses on artificial intelligence and robotics, with a view to helping Canadian SMEs scale up and become a globally competitive export leader), and
- The *Ocean Supercluster* (based in Atlantic Canada, this supercluster focuses on industries like marine renewable energy, fisheries, aquaculture, oil and gas, shipbuilding, and transportation, through the development of technologies such as digital sensors and monitoring, autonomous marine vehicles, energy generation, and marine biotechnology and engineering technologies).

333. Together, these five superclusters represent more than 450 businesses, 60 academic institutions, and 180 partners in Canada's five key regions.

334. Under Innovation Supercluster Initiative, funding is provided to industry-led consortia (which include large firms, as well as SMEs, and other organizations such as academic and research institutions). Under these arrangements, funding is provided to Entities with strategic plans to: build a shared competitive advantage for their cluster and attract research, investment, and talent; increase business expenditures on R&D and advance business led-innovation and technology leadership; generate new companies and commercialize new products, processes and services; and foster a critical mass of growth-oriented firms and strengthen public-private-academic collaboration.

335. These strategic plans are built on a shared private sector commitment, demonstrated through matched, dollar-for-dollar industry funding, to leverage strengths, address gaps, and bring innovation ecosystem players together to work more strategically. In doing so, it is expected that superclusters will engage in collaborative projects and activities that advance their respective goals, and develop innovative new technologies that address ecosystem gaps.

336. As part of its strategic plan, each Entity also submits an IP Strategy, which sets out its role in achieving programme objectives through IP-related activities. In particular, each Entity's IP strategy sets out how protection for Entity-supported IP will be obtained, how rights will be owned and managed, and by whom. This also includes how background IP will be treated; if and how

non-Entity-supported IP will be acquired; and how royalties on Entity-supported IP will be managed. The IP Strategy also sets out how the IP ownership and management structures furthers each Entity's objectives.

337. In addition, the IP Strategy sets out the policies for Members' access to Entity-supported IP, and how Members will be supported and mentored in respect of their IP needs. One of the key objectives in this regard is to provide that Entities proactively engage their Members and provide access to independent expertise and mentorship concerning IP-related issues, particularly in respect of start-ups and SMEs. This includes assistance with IP development, registration, acquisition, management, ownership, royalties, and assertion of legal rights.

338. In developing the Innovation Superclusters Initiative, the five superclusters are not only expected to contribute to economic growth in Canada, but also represent strong links in global value chains, which deliver high-quality Canadian products and solutions. Multinational enterprises that are incorporated and active in Canada are eligible to collaborate and partner with existing supercluster organizations, with a view to accessing Canadian innovation and technical expertise, with a number of global firms already involved.

339. With that in mind, we would be pleased to provide further information regarding the Innovation Superclusters Initiative upon request, as well as by directing questions to our experts at Canada's Department of Innovation, Science and Economic Development.

340. To conclude, Canada would like to once again thank Members for sharing their national experiences in respect of public-private collaborations on innovation with TRIPS Council, and for the opportunity to present an overview of this initiative.

11.12 Japan

341. First of all, this delegation would like to thank the distinguished delegation from US for summarizing the discussion in the previous year. And this delegation would like to review that discussion briefly as well. Throughout 2018, we shared each experience and national or international policies, and not only developed country Members but also developing countries provided empirical data and case studies showing positive impact of IP on innovation. As we have seen in the discussion, to certain extent, we have the common perception that IP contributes to improving the quality of life and creates essential condition for SMEs and start-up to succeed. This delegation believes that recognizing common experiences and views helps us to properly understand the role of IP system and to find appropriate direction of its future development.

342. This delegation would like to share our experience and national policies regarding public-private collaboration in innovation. Especially, we would like to focus on ownership of patents in the collaborative R&D project funded by government and show you some survey results in Japan.[9]

343. First, we will show you the collaboration framework in R&D project funded by government in Japan. In general, it is said that private sector tends not to invest sufficiently under the high uncertainty situation. This delegation believes that public sector can play a key role in encouraging and supporting private sectors in such a case. Japanese government implements commissioned R&D projects in order to complement underinvestment on the R&D projects by using public fund. And commissioned R&D projects involve private companies so as to achieve the maximum use of outcomes of R&D projects.

344. In this projects, ownership of patent rights should be considered with the view to promote effective utilization of the results of such a R&D project. Who should own patents obtained through commissioned R&D projects? Article 19 of Industrial Technology Enhancement Act in Japan stipulates that the national government may decide not to accept patent right pertaining to the result of R&D entrusted by the government from that entrusted party.

345. Therefore, government may decide whether government owns patents or trustees' own patents.

[9] The PowerPoint presentation is available in Room Document RD/IP/30.

346. In this slide, this delegation briefly shows you two different scenarios regarding to commercialization process.

347. First, in case where trustees' own patents, trustees will engage in the commissioned R&D projects and conduct continuous R&D after projects with expectation of return of R&D investment and secure profit by exclusive implementation.

348. On the other hand, in case where government owns patents, trustees will engage in the commissioned R&D projects in expectation of obtaining know-how and first-mover advantage, and after the project, not only trustees but also third parties will consider pros and cons to challenge the commercialization of the outcomes. And each company exerts their respective strengths to utilize the outcomes of the project in diverse form of applied products and services. Competition among companies will provide inexpensive products and services as well.

349. In both scenarios, outcomes of R&D project will be returned to the whole society through supplying products and services based on the technologies established in the commissioned R&D projects.

350. According to the survey, utilization rate of patents owned by trustees are larger than that of patents owned by government. It reveals only 2.5% of patents owned by government are utilized, while 20.4% of patents owned by trustees are utilized. And even definition of term "utilized" in case where trustees' own patents includes present and future self-implementation and license, 8.0% out of 20.4% patents are utilized in "present" self-implements or license.

351. Therefore, the survey indicates clearly that the mechanism of making it possible to own patents foster utilization of patents of the industrial commissioned R&D project.

352. Finally, this delegation would like to show you main factors affecting the utilization rate of patents.

353. In case where trustees' own patents, possibility of owning patents incentivizes trustees to deeply engages in the commissioned R&D project and enhances an trustees' incentive for acquiring patents with a view of commercialization and ensures an incentive for commercialization after the end of commissioned project. In addition, trustees who own patents are likely to utilize the outcomes of R&D project efficiently, that is partly because they are able to streamline technology transfer by licensing patents in along with relevant know-how and technical guidance.

354. On the other hand, in case where government owns patents, patent applications are likely to be filed without a view of commercialization, and when government license patents, usually relevant know-how and technical guidance are not available for licensees.

355. In summary, this delegation would like to emphasize again that the mechanism of making it possible to own patents incentivizes trustees to engage in R&D project funded by government and to commercialize with continuous investment by themselves, and it improves the utilization rate of patents and promotes commercialization of outcomes from commissioned R&D projects. This delegation hopes that its information helps other delegations create their own domestic policies. And this delegation looks forward to hearing your active inputs on this agenda item.

11.13 Mexico

356. Mexico would like to thank Australia, Canada, Chile, Hong Kong, Japan, Korea, New Zealand, Singapore, Switzerland, Chinese Taipei and the United States for proposing that this item be included on the agenda of the meeting; we also thank the other speakers who have already taken the floor.

357. Innovation is currently one of the most important issues in the field of intellectual property. The Mexican Industrial Property Institute (IMPI) promotes innovation, while also ensuring the protection of inventions and trademarks.

358. In May 2010, Mexico created the Sectoral Innovation Fund (FINNOVA), which is administered by the Ministry of the Economy and the National Science and Technology Council (CONACYT).

359. FINNOVA's objective is to promote innovation in the country through mechanisms that help to convert ideas into business projects (business incubators), and to foster the linkage between universities, research centres and companies.

360. Through FINNOVA, the Ministry of the Economy and CONACYT, in partnership with IMPI, have developed a systemic strategy to enhance the protection and exploitation of innovation. This strategy includes the strengthening of patenting centres (CePat).

361. A patenting centre is an office that carries out activities relating to intellectual property rights management. Such activities range from identifying projects eligible for protection, providing advice on conducting prior art searches, and preparing patent applications for inventors (industrial property), authors (copyright) and breeders (plant varieties), to providing support for completing the necessary formalities before the relevant authorities. All of this is done to increase the number of national patent applications, the commercialization of patents granted through the licensing of rights and the transfer of technology, as well as to help build an industrial property portfolio. The main activities of patenting centres also include the organization of intellectual property-related promotional events, workshops, courses and seminars, the training and updating of human resources, and the preparation of promotional materials.

362. Patenting centres have been promoted by IMPI with a view to building the capacities needed to develop the country's patent system and to enhancing the tools and skills required by research centres to better protect their intellectual property.

363. In recent years, new patenting centres have been set up throughout the Republic. There are currently 106 centres in Mexico (46 of which are operational and 60 of which are at the start up stage).

364. In 2018, patenting centres filed 341 patent applications and 285 trademark applications and were granted 106 patents and 223 trademark registrations.

11.14 European Union

365. The EU would like to thank the United States and Singapore for introducing the two respective papers for this agenda point to which we are a co-sponsor.

366. Intellectual property rights are the main commercialisation tool of R&D activities and can be seen as the value R&D creates. The commercialisation of R&D is fundamental in creating economic growth. Two-thirds of economic growth in Europe from 1995 to 2007 derived from R&D.

367. The main umbrella programme enabling public-private research collaboration in the EU aiming at leveraging R&D is the Horizon 2020 programme. Horizon 2020 is delivering scientific impacts through the reinforcement of research and innovation capabilities, scientific excellence and through the integration of research and innovation with as well as supporting private sector participants in their efforts in commercialisation. Horizon 2020 projects have the potential to generate a large number of scientific breakthroughs; researchers have already contributed to major discoveries like exoplanets, the Higgs boson and gravitational waves. At least 17 Nobel Prize research got support from Horizon 2020 prior or after the award.

368. Horizon 2020 builds cross-sectoral, inter-disciplinary, intra- and extra-European networks. The Horizon 2020 programme is successful in attracting and involving the private sector (33.2%), a necessary precondition for the achievement of innovation and economic impact. In particular, Horizon 2020 attracts and involves many SMEs, the backbone of the European economy. Horizon 2020 is creating networks between businesses, and between the business sector, universities and research institutions, also allowing them to make better use of the IP system, which is of huge importance to bringing knowledge quickly to market. Horizon 2020 provides companies, and in particular SMEs, with access to risk finance to carry out their innovation projects. 5,700 organisations have been funded under the Access to Risk Finance programme part (EUR 13 billion of private funds leveraged; EUR 29.6 billion of investments mobilised via debt financing); numerous SMEs are taking part in the SME Instrument until end-2016 secured a total of EUR 481 million of venture capital during or after the project, also with the intellectual property rights they developed.

369. Horizon 2020 generates large numbers of high quality, commercially valuable patents and other intellectual property rights, so far mainly from the SME Instrument. Horizon 2020 also generates proofs of concept and demonstrators and supports the deployment of innovative solutions supporting the commercialisation and diffusion of innovation, including hundreds of prototypes and testing activities, as well as numerous clinical trials.

370. Horizon 2020 projects produce new knowledge, strengthen capabilities, and generate a wide range of innovation outputs including new technologies, products, services and the related intellectual rights: 563 firms have been introducing innovations new to the market (56% SMEs) and more than half of SME Instrument Phase 2 beneficiaries have already reached the market.

371. Every euro invested under Horizon 2020 brings an estimated GDP increase of EUR 6 to 8.5. This means EUR 400 to EUR 600 billion by 2030.

372. Many of the Horizon 2020 supported projects demonstrate potential in terms of generating breakthrough, market creating innovation. A quarter of the ongoing Innovation Actions are regarded as having breakthrough, market creating potential. Let me therefore finish with two concrete examples that show the positive global impact of the Horizon 2020 programmes also beyond Europe:

373. The first Horizon 2020 project is producing bioethanol from steelmaking process emissions. The project STEELANOL demonstrates the industrial production of bioethanol from emissions of the steelmaking process, which has the potential to significantly reduce greenhouse gas emissions compared to oil-derived fuels. A demonstration plant of approximately 25,000 tons/ethanol per year will be built in Belgium; the largest facility built to date utilizing this technology globally. This high-risk/high-impact project is expected to contribute to achieving the targets of the Paris Agreement on climate and advancing the circular economy.

374. The second project is on public-private partnership in the pharma sector. The outbreak of Ebola in West Africa was one of the international health emergencies of the past few years. EUR 24.4 million from Horizon 2020 were urgently mobilised. In parallel, the IMI-Ebola+ public-private partnership call was launched in record time. This Horizon 2020 research response, very significant in scale, with a total of EUR 140 million, in turn, leveraged a further EUR 101 million from the pharmaceutical industry. Without the possibility to use IP, such additional private funds would have been very unlikely to have been mobilised. These joint efforts are already delivering, with trials on the ground in West Africa and with the first indication of results.

375. We therefore would like to conclude that in the EU public-private partnerships in R&D play a fundamental role in support of innovation and allowing the development of intellectual property rights, ultimately necessary for the successful commercialisation of private innovation. Only when all forces, public and private alike, are mobilised, can we fully leverage the global innovation capacities needed for the desired outcome of economic development and the tackling of our joint global challenges.

11.15 Korea, Republic of

376. As a co-sponsor of the agenda item on IP & Innovation, Korea would like to join previous speakers in emphasizing the importance of the private and public collaboration in promoting IP, particularly R&D. The value of Private and Public Partnership is bigger for the small and medium size enterprises, which often lack the necessary capital and know-how in building IP. Recognizing this, Korean government has been carrying out various projects in collaboration with the private sector to help SMEs establish and promote IP.

377. Korea Intellectual Property Office (KIPO) provides SMES with various training opportunities that will help them build IP in cooperation with business associations. Through these opportunities, entrepreneurs or executive managers of those SMEs could learn how to better carry out R&D, and how to commercialize their IPs in the real market.

378. Close partnership between business and academia has been promoted as well by government-initiated projects. KIPO has been providing a platform for collaboration between prestigious tech colleges and SMEs and supporting for innovative ideas brought up by tech colleges to serve as valuable input for R&D projects of SMEs.

379. Public-private partnership has a crucial role to play in maximizing the potential of developing IPs and in further promoting innovation and creativity. In this sense, Korea hopes that Members of the Council will continue to share their national experiences of promoting IPs through close cooperation between public sector and private sector under this agenda item throughout 2019.

11.16 Brazil

380. We would like to thank the co-sponsors for presenting the topic "Public-Private collaborations in Innovation" under the item on IP and Innovation.

381. Brazil's new administration has a clear vision of the key role IP can play in the economy and important strides will be made to improve our IP institutional framework so as to further increase the level of innovation of our economy.

382. In our view, innovation is the main driver of a country's competitiveness and economic growth in the medium-long term.

383. IPRs help create conditions that permit and encourage individuals and businesses to experiment new approaches and solutions, which benefit society as a whole.

384. The idea of advancing knowledge and technology has been recognized from the start as a core goal of the intellectual property system. Indeed, the TRIPS Agreement, in its preamble, recognizes "the underlying public policy objectives of national systems for the protection of intellectual property, including developmental and technological objectives".

385. In order to be sustainable, however, we have to ensure that the fruits of human ingenuity are enjoyed as widely as possible worldwide while preserving proper incentives and rewards for innovators and creators. This is of utmost importance to the credibility and legitimacy of the IP system.

386. Brazil welcomes the issue of public-private collaborations in innovation. We believe there are a number of important dimensions to explore in this topic. We are convinced theses type of collaborations contribute to boost R&D expenditures.

387. The latest data available, provided by the World Bank, shows that R&D expenditure in Brazil as proportion of GDP reached 1.28% in 2015, by far the highest amount in Latin America, and higher than several OECD countries.

388. Notwithstanding the fact that the levels of R&D spending are an important proxy to innovation, we know they are not synonymous. Given our levels of R&D expenditures, we should be a much more innovative economy. As we all know, however, an ecosystem that fosters innovation depends on a variety of factors.

389. Our new administration intends to put in place a number of structural reforms that will not only improve the business environment in Brazil but will also deeply integrate the country in the world economy. As a result, Brazil expects to develop a much more effective IP system to convert innovation and creativity into tradable commercial assets.

390. We believe a closer, balanced and fine-tuned partnership between the public and private sector can contribute to create such an outcome. Brazil has been implementing a number of measures to strengthen this collaboration to develop a dynamic and innovative ecosystem.

391. Brazil's IP office has established a broad array of partnerships with different institutions, public and private, that are part of the Brazilian innovation system: National Confederation of Industry, Brazilian Development Bank (BNDES), the Brazilian Trade and Investment Promotion Agency (Apex), the Micro and Small Business Support Service (SEBRAE), the Brazilian Industrial Development Agency (ABDI), the Brazilian Agency for Industrial Research and Innovation (EMBRAPII), the antitrust agency (CADE), the Association of Brazilian Technological Parks, and with some world class Brazilian universities, among others.

392. These partnerships will be benefit from the recently approved New Innovation Law (Law nº 13.243/2016 and Decree nº 9.283/2018). One of main goals of the new Law is to stimulate the cooperation and interaction between public and private sectors; to boost innovation in companies and science and technology institutions (STIs); and, mainly, to simplify procedures for the management of science, technology and innovation projects and the adoption of performance monitoring.

393. The New Legal Framework has broadened significantly SEBRAE's scope of action to support innovation. For those not familiar with SEBRAE, our Micro and Small Business Support Service, it plays a major role in articulating and promoting small business access to innovation and technological services. SEBRAE invests at least 20% of its annual budget in innovation and technology.

394. Another example of a successful partnership is the agreement signed between SEBRAE and our IP office, which created a fast track for the analysis of pending patent applications for SMES. 36% of all small businesses that have used the programme have already had their patents granted.

395. Another success story in promoting IP and innovation in Brazil is EMBRAPII, the Brazilian Agency for Industrial Research and Innovation, a Social Organization connected to the Ministry of Science, Technology, Innovations and Communications (MCTIC) and to the Ministry of Education (MEC). The agency finances innovation projects in partnership with research centres (EMBRAPII Units) to increase competitiveness of the productive sector. Brazil has 42 EMBRAPII Research Centers spread around the country. EMBRAPII has already supported 650 projects, 460 companies and technologies developed have generated 140 patent applications (42% of medium enterprises, 41% of micro and small e 17% of big companies). These patents were filed in the field of advanced manufacturing, biotechnology, chemistry and IoT technologies.

396. Some examples of projects developed by EMBRAPII:

- Smarter city manager - the innovation, developed by the EMBRAPII Inatel Unit and the Ericsson company, integrates different areas of interest of public agents, such as Public Safety, Intelligent Transportation Systems, Intelligent Lighting, in a single platform. This integration allows efficiency gains, faster responses and improves the quality of services provided to the community.

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- Nanoencapsulation technology - Four large competing companies, Boticário, Yamá, TheraSkin Farmacêutica and Natura, joined EMBRAPII Unit to share the production of a new nanoencapsulation technique. The innovation allows active principles to be delivered to the innermost layers of the skin, where products such as creams or ointments cannot reach.

- Vegetal Biostimulants-Biofertilizers produced from macroalgae and cyanobacteria extract from the Brazilian biodiversity using 100% national technology. The project, developed by the EMBRAPI Agroenergy Unit and the Dimiagro company, will bring more productivity to the crops and savings to producers.

397. On the issue of public funds and commercialization of IP, EMBRAPII and SEBRAE have developed the *Disruptive innovation Fund in 2017*: the programme is intended to bridge the gap between SMEs, large companies and Science, Technology and Innovation (STI) Institutes. In this model, 1/3 of every project receives EMBRAPII resources, up to 1/3 from EMBRAPII-accredited Technological Institutes and the rest from participating companies. SEBRAE subsidizes up to 80% of the small company's contribution to the project. Through this agreement, small companies have access to top laboratories and researchers in the country. Four innovation funding programmes have been launched so far, reaching companies from 20 different technological areas in 19 Brazilian states. Up to October 2018, SEBRAE committed USD 3 million in projects of 74 companies, which were leveraged up 4.2 times, amounting to USD 13.5 million.

398. Universities still play an important role in the development of innovation in Brazil, thus we would like to mention the case of UNICAMP, a public university from the state of Sao Paulo. Some relevant data about UNICAMP:

- Number one Brazilian university in number of patents;
- Second position in the Latin America´s top ten universities rank (the first one the Brazilian USP);
- Ninth position among BRIC universities.

399. UNICAMP has its own Technology Transfer Office (TTO), which is called INOVA UNICAMP. Inova promotes interaction between the University and companies through the offer and the licensing of technologies developed at UNICAMP and the negotiation and monitoring of collaborative research contracts. The university interacts with companies of all sizes. Innovative small companies can benefit from the proximity to the university in collaborative projects and by being incubated at INCAMP, UNICAMP's Technology Based Incubator. Medium and large companies rely on Inova to assist them in identifying new technologies and research groups for technological development partnerships and have the option of being hosted in an innovation laboratory within UNICAMP's Science and Technology Park.

400. Inova UNICAMP in numbers (2017):

- Over 100 licensed technologies; Annual income of more than USD 325.000;
- Over 70 partner companies;
- Average of 70 patents filed per year in Brazil; 81 patent applications filed in 2017;
- 485 UNICAMP-born companies active in the market with revenue of USD 750 million, generating more than 28.000 direct jobs.

401. Some examples of licensed technologies in 2018:

- Sugar-cane productivity monitoring system (patent number BR0502658-0; UNICAMP/Agricef) – the system is attached to harvesters and enables collection of productivity data. The data is used for productivity maps and production management. The monitoring system uses load cells and sensors, such as accelerometers and GPS, which communicate with the on-board computer of the harvester via a CAN network.

- Facial analysis method for device control (BR 102016027065; PCT/BR2017/000136; BR5120160013729; UNICAMP/Hoobox Robotics) – Using face analysis, the system translates commands and controls electronic and mechanical devices. The technology, implemented in wheelchair by the licensed company, works like a 3D camera that captures expressions, classifies them and carries out the desired command.

- Unique identity method in virtual environments (patent number BR 1020120057956) – Method developed in partnership between UNICAMP and Kryptus, licensed in 2012, that creates a unique identity for each computing device in which it is implemented, providing more security for user data and information. The technology is being used in the financial sector, with application in virtual environments such as internet banking.

- Microencapsulated crystals as an alternative to trans-fat (patent number BR 1020140279997; Noviga/Unicamp) – a method to nanoencapsulate trans-free fat crystals, which are similar in terms of structure, consistency, appearance and taste to trans-fat products. The technology provides a possible substitute to trans-fat in the food industry, without harm to consumer health. The new process is advantageous in terms of logistics, costs and final product stability.

402. Brazil remains deeply committed to encouraging, rewarding and disseminating innovation in the economy and society through public-private partnerships.

403. These are some of the examples we chose to share with you. We hope we have the opportunity to learn from other Members' experiences as well.

11.17 China

404. China thanks Members to add this item into agenda and submit these documents. In 2018, the Societal Values of IP in New Economics has been discussed and positive results have been achieved. China also joined the discussion and shared our practices.

405. China pays great attention on the important role of innovation and IP protection in new economies. In order to encourage innovation and creativity, on one hand, the legal system of IP protection has been improved. Based on Patent Law, Trademark Law and Copyright Law, China has set up modern regulation and law system on IP protection. Currently, China is working on amending the Patent Law and the Copyright Law. Besides, China continuously strengthens law enforcement on IPR protection. China has set up three IPR courts in Beijing, Shanghai and Guangzhou, and special judicial organs at 15 intermediate courts in Nanjing, Suzhou and other cities to handle cross-regional IPR cases, including those related to patents. China has also strengthened administrative enforcement and launched special campaigns.

406. China has taken great efforts and made great achievements on IP protection and innovation promotion. In 2017, China received 1.382 million invention patent applications, ranking the first in the world for the seventh consecutive year. Nearly 10% of the applicants were foreign entities and individuals. Invention patent applications filed by foreign entities and individuals in China reached 136,000. According to the World Intellectual Property Organization, 51,000 patent applications filed from China through the Patent Cooperation Treaty were accepted in 2017, second only to the US. Besides, new technologies are also in the fields as high-speed trains, nuclear energy, new generation telecommunication, aerospace and etc.

407. Meanwhile, it should be noted that most of the Patents in China are patents for utility models and design patents, patents for invention are not as much as others. According to the statistics by World Bank, China collected USD 4.7 billion patent fees, amount to 1.3% of world total, while paid USD 28.6 billion patent fees, with USD 23.8 billion deficit.

408. Therefore, China hopes to draw Member's attention to the following facts. Firstly, it is agreed that for generation and development of new business, besides innovation and IPR protection, capital, human resources and other elements are also essential, for developing Members, capital and human resources play an even more important role. Secondly, innovation cannot be achieved in one day. It needs huge amount of investment and primitive accumulation. Compared to the developed country Members, developing country Members suffer deficiency in primitive accumulation. Currently, there still exists wide gap between developed and developing country Members on the level and ability of innovation. We hope that Members can realize this and explore effective solutions.

11.18 India

409. India would like to reiterate its statements on this issue made in earlier meeting. India is of the view that while IPRs may provide an incentive to innovate, they are neither necessary nor a sufficient condition and could only be effective in certain contexts.

410. Though, India realizes importance of innovation and keeping that in view, India has taken many steps to improve the innovation eco system-whether it is through the quality of the human resource or the research and development activities or strengthening of academia industry linkages and availability of capital. As a result, India has moved up on the Global Innovation Index from a rank of 76 in 2014 to 57 in 2018. During the same period India has made substantial progress in improving its ease of doing business ranking, reaching to rank of 77 out of 190 counties surveyed, making it the only country to rank among the top ten improvers for the second consecutive year. Since 2014, India's ranking improved 65 places from 142nd in 2014 to 77th in 2018.

11.19 Dominican Republic

411. By means of Decree No. 453-18, the President of the Dominican Republic, Danilo Medina, has declared 2019 as the Year of Innovation and Competitiveness. Similarly, in January 2019, the Roundtable on Competitiveness, which is chaired by the honourable President of the Republic and which brings together the country's leading entrepreneurs, discussed the need to develop a strategy and schedule for the formation of public-private partnerships for innovation in the country. In this

regard, my country is very interested in seeing what WTO Members can offer in terms of support and technical cooperation, and we request that the submissions made today under this agenda item be circulated.