



## D. 3.5 – Discussion paper on Singapore

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Abstract: The discussion paper on Singapore provides inputs for a policy discussion on cluster cooperation and policy arrangements on clusters with Singapore. The report contains information on existing EU-Singapore cluster collaboration and good practices, which can be good practice examples for other clusters from Europe in their collaboration approach towards Singapore.

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# 1. Objective of the report

The aim of this discussion paper is to provide an overview on the existing European Union (EU)-Singapore cluster cooperation activities, highlight good practices/success stories and opportunities for future cluster-based exchange, including recommendations for a reinforced EU-Singapore cluster policy dialogue.

This discussion paper builds on the analysis and overview provided by the "Singapore Preparatory Briefing". The content is mainly based on desk research and targeted interviews with relevant local and European contact points.

# 2. Existing EU-Singapore cluster cooperation

Singapore is a City-State, high-income economy that provides one of the world's most business friendly-regulatory environments and is ranked among the world's most competitive economies<sup>1</sup>. The country has one of the most stable economies in the world, with no foreign debt<sup>2</sup>. Moreover, Singapore is characterized by its massive economic openness and interesting investment environment, which has been attracting high inflows of Foreign Direct Investment (FDI)<sup>3</sup>.

Singapore's economy is mainly driven by the manufacturing sector, which accounts for around 25% of the country's Gross Domestic Product (GDP)<sup>4</sup>. The impact of the manufacturing sector and the current industrial policies fostered the creation of important clusters in the sectors of electronics, health and medical, transport and storage (logistics), and information & communication technologies (ICT)<sup>5</sup>. Thus, Singapore's economic and political conditions provide important opportunities for cluster to cluster (C2C) cooperation between EU and Singaporean organisations.

The EU recognizes Singapore as an important trade and investment partner. The EU and Singapore have a long history of cooperation in a wide range of fields, such as trade and investment, defence, transportation, energy, climate change, science and technology, research and development (R&D), and health<sup>6</sup>. In recent years, the ties between the EU and Singapore have been strengthened by the negotiation of a trade and investment agreement, which is expected to promote further cooperation opportunities between the EU and Singapore. Singapore is also a country with a high level of openness to inward Foreign Direct Investment and with rather high economic infrastructure quality, efficiency of customs procedures and intellectual property protection as illustrated in OECD paper<sup>7</sup>.

Electronics, health and medical, transport and storage (logistics), and ICT are the industry sectors that present the most opportunities for technology, innovation and business cooperation between EU and

<sup>1</sup> <http://www.worldbank.org/en/country/singapore/overview>

<sup>2</sup> <https://www.guidemesingapore.com/business-guides/incorporation/why-singapore/singapore-economy---a-brief-introduction>

<sup>3</sup> <https://www.focus-economics.com/country-indicator/singapore/gdp>

<sup>4</sup> <https://www.focus-economics.com/country-indicator/singapore/gdp>

<sup>5</sup> <https://www.guidemesingapore.com/business-guides/incorporation/why-singapore/singapore-economy---a-brief-introduction>

<sup>6</sup> [https://www.mfa.gov.sg/content/mfa/countries\\_and\\_region/europe/singapores\\_relations\\_with\\_europe.html](https://www.mfa.gov.sg/content/mfa/countries_and_region/europe/singapores_relations_with_europe.html)

<sup>7</sup> <http://www.oecd.org/countries/singapore/Participation-Developing-Countries-GVCs-Summary-Paper-April-2015.pdf>

Singaporean clusters since both regions are highly interested in promoting the advancement of these sectors. More information about these four sectors is included in the Preparatory Briefing document by the ECCP, September 2018.

## 2.1. Policy dialogue on cluster cooperation

The Singaporean Government has been highly focused on developing industrial policies to increase the country's comparative advantage. In the early 1980's, these industrial policies lead to the emergence of strong industrial clusters focused on electronics, petrochemicals, components, and precision engineering. Furthermore, during the 2000's the Singaporean Government launched several programmes to develop new growth clusters grounded on innovative fields<sup>8</sup>.

Currently, Singapore's industrial policy is driven by the Industry Transformation Programme, which was ratified in 2016. The Industry Transformation Programme aims to integrate different restructuring efforts to develop an industry-focused approach that fosters partnerships between the Government, firms, industries, trade associations and chambers. Under this programme, were developed 23 Industry Transformation Maps (ITMs) for 23 strategic industries, which in total cover 80% of Singapore's GDP<sup>9</sup>. Each ITM identifies the main issues of a single selected industry. Furthermore, the ITMs have been grouped into six clusters in order to maximise cooperation opportunities. The six clusters are Built Environment, Essential Domestic Services, Lifestyle, Manufacturing, Modern Services, and Trade & Connectivity<sup>10</sup>.

In addition, Singapore plans to reinforce its position as a global node for technology and innovation and deepen its ties with key global players. In this context, Singapore aims to establish economic partnerships with other countries, build stronger relationships with international economic partners and promote bilateral and multilateral agreements focused on technology and innovation. Under this strategy, the EU continues to be seen as an example of an innovation hub and a key economic partner for Singapore<sup>11</sup>.

The EU and Singapore have developed a longstanding cooperation in trade and investment, as well as in science, technology and innovation (STI). The two regions have established important bilateral cooperation agreements. In 2010, the establishment of the Partnership and Cooperation Agreement (PCA) between the EU and Singapore reinforced the cooperation between the two parties in strategic fields, such as non-proliferation, security, energy, maritime transport, air services, and science and technology<sup>12</sup>. Furthermore, the ties between the EU and Singapore have been strengthened by the EU-Singapore Free Trade Agreement (EUSFTA), which is considered a key new generation bilateral agreement. This agreement has been negotiated since 2010<sup>13</sup>. When ratified, EUSFTA will represent an important step to eliminate customs duties, facilitate regional and global value chains, remove

<sup>8</sup> <http://www.mas.gov.sg/News-and-Publications/Speeches-and-Monetary-Policy-Statements/Speeches/2015/An-Economic-History-of-Singapore.aspx>

<sup>9</sup> <https://www.mti.gov.sg/MTIInsights/SiteAssets/Pages/ITM/Images/Fact%20sheet%20on%20Industry%20Transformation%20Maps%20-%20revised%20as%20of%2031%20Mar%202017.pdf>

<sup>10</sup> <https://www.mti.gov.sg/MTIInsights/Pages/ITM.aspx>

<sup>11</sup> [https://www.gov.sg/~media/cfe/downloads/mtis\\_full%20report.pdf](https://www.gov.sg/~media/cfe/downloads/mtis_full%20report.pdf)

<sup>12</sup> <http://bilaterals.org/?eu-singapore-agree-on-partnership&lang=fr>

<sup>13</sup> <http://trade.ec.europa.eu/doclib/press/index.cfm?id=961>

technical and non-tariff barriers to trade in goods (including electronics, motor vehicles, pharmaceuticals, equipment for renewable energy, and processed products of animal and plant), and facilitate trade through enhanced customs cooperation<sup>14</sup>. Moreover, EUSFTA will promote comprehensive cooperation on intellectual property rights, trade and sustainable development, setting high standards for labour, and consumer protection. Thus, this agreement will represent an opportunity to promote Cluster-to-Cluster cooperation between EU and Singaporean clusters.

## 2.2. Overview of EU-Singapore Cluster to cluster cooperation

Singapore is EU's largest ASEAN trade and investment partner<sup>15</sup>. The EU has a strategic interest in cooperating with Singapore since the country is considered a hub for technology, innovation and enterprise in Asia. In recent years, the EU-Singapore cooperation has been growing in numerous fields, which demonstrates the importance that both regions give to the establishment of international partnerships.

Despite the abovementioned cooperation potential between the EU and Singapore, it should be considered that Singapore's cluster policy is still very recent and the definition of cluster does not match the European definition. In this regard, there are a few examples of cooperation between the EU and Singapore involving clusters from both regions.

The Sondermaschinen- und Anlagenbau SMAB (Germany) is an example of a European cluster organisation that has been cooperating with a Singaporean organisation. The Germany cluster has been developing international cooperation activities with the Advanced Remanufacturing and Technology Centre (ARTC), which is considered a leading Singaporean research centre in advanced manufacturing<sup>16</sup>.

The IVAM Microtechnology Network, which is an international association with members in the fields of microtechnology, nanotechnology, advanced materials, MEMS and photonics is another example of EU-Singapore cluster cooperation. Currently, the Singapore Precision Engineering and Tooling Association (SPETA) is a member of the IVAM Microtechnology Network, which illustrates the network's goal of developing international cooperation activities with Singaporean organisations<sup>17, 18</sup>.

Along the same line, the Software Cluster (Germany) has been very active in promoting cooperation activities with Singaporean organisations. In this context, the German cluster has been cooperating with Fraunhofer IDM@NTU, LDR Technology and Meiban in order to promote the development of smart digital services for Industry 4.0, using a highly mobile IT infrastructure. This cooperation is supported by the German Federal Ministry of Education through a programme that aims to promote the internationalisation of Leading-Edge Clusters<sup>19</sup>.

<sup>14</sup> <http://trade.ec.europa.eu/doclib/press/index.cfm?id=1827>

<sup>15</sup> <http://trade.ec.europa.eu/doclib/press/index.cfm?id=1827>

<sup>16</sup> <https://www.clustercollaboration.eu/cluster-organisations/sondermaschinen-und-anlagenbau-smab>

<sup>17</sup> <https://www.ivam.de/members/speta>

<sup>18</sup> <https://www.clustercollaboration.eu/cluster-organisations/ivam-microtechnology-network>

<sup>19</sup> [https://www.clustercollaboration.eu/sites/default/files/profile-article/flyer\\_singapur.pdf](https://www.clustercollaboration.eu/sites/default/files/profile-article/flyer_singapur.pdf)

The Composite Cluster Singapore (CCS) is a Singaporean-based cluster that includes European companies, such as Munich Composites (Germany), iNDTact (Germany), Componeering (Finland) and AFPT (Germany). The CCS is focused on consulting, engineering, manufacturing and training for advanced composites, providing the full spectrum of composite solutions, from early-stage feasibility assessments to components manufacturing<sup>20</sup>.

According to the ECCP, there are 28 European cluster organisations interested in developing international activities with Singaporean clusters or organisations<sup>21</sup>. These clusters are mainly focused on Advanced Packaging, Automotive, Biopharmaceuticals, Digital Industries, Environmental Industries, and ICT sectors. Furthermore, there are four second generation COSME-supported cluster partnerships going international (European Strategic Cluster Partnerships for internationalisation ESCP-4i) interested in collaborating with Singapore, namely COSMENERG-4i (Environmental Services)<sup>22</sup>, ESCT Go Global (Information Technology and Analytical Instruments)<sup>23</sup>, LASER-GO GLOBAL (Photonics)<sup>24</sup>, and MobiGoIn-Action (Transportation and Logistics)<sup>25</sup>. This demonstrates that EU clusters have a strategic interest in promoting C2C cooperation with Singaporean clusters in order to foster international partnerships and take advantage of Singapore's leading position.

Furthermore, the organisation of workshops and business missions has been an important tool to promote EU-Singapore cluster cooperation. In 2017, 22 Spanish Catalan clusters participated in a study visit to Singapore organized by the Catalan Government<sup>26</sup>. This visit aimed to foster the establishment of strategic partnerships, as well as catalyse the development of inter-cluster projects between participants. During the mission, the Catalan clusters met with several high-level representatives from the Singaporean Government, including the Ministry of Trade and Industry, the National Research Foundation, the Agency for Science, Technology and Research (A\* Star), the Economic Development Board, as well as the Intellectual Property Intermediary. The Catalan clusters also visited several European companies, who are present in Singapore, and attended trainings on how to do business in ASEAN countries.

In 2018, the SmartCityTech partnership, under the ESCT Go Global project, organized a trade mission to Singapore, which included a visit to the World Cities Summit fair, as well as meetings with local stakeholders and visits to local companies<sup>27</sup>. Moreover, The EU Gateway | Business Avenues Programme organised a few business missions to Singapore for European clusters, such as the ICT Business Mission to Singapore and Thailand 2018 that included iTech Transilvania Cluster by ARIES T<sup>28</sup>.

In summary, the EU-Singapore cluster cooperation is still very recent and there are only a few examples of events, visits and partnership agreements between clusters from both regions. Thus, considering the fact that several EU clusters have already expressed interest in cooperating with Singaporean

<sup>20</sup> <http://www.compositecluster.com/technologies>

<sup>21</sup> <https://www.clustercollaboration.eu/cluster-list>

<sup>22</sup> <https://www.clustercollaboration.eu/escp-profiles/cosmenerg-4i>

<sup>23</sup> <https://www.clustercollaboration.eu/escp-profiles/escct-go-global>

<sup>24</sup> <https://www.clustercollaboration.eu/escp-profiles/laser-go-global>

<sup>25</sup> <https://www.clustercollaboration.eu/escp-profiles/mobigo-in-action>

<sup>26</sup> <https://www.clustercollaboration.eu/news/22-catalan-clusters-participating-benchmark-visit-singapore-organized>

<sup>27</sup> <https://www.clustercollaboration.eu/profile-articles/we-are-preparing-our-trade-mission-singapore>

<sup>28</sup> <https://www.clustercollaboration.eu/profile-articles/itech-transilvania-cluster-connectechasia-2018-singapore>

organisations, it is important to promote initiatives and events that foster cooperation between clusters from both regions.

### 3. Good practices and success stories related to EU-Singapore RDI and industrial cooperation




As mentioned in the previous section, the EU and Singapore have been trying to strengthen their collaboration in numerous strategic fields. Thus, three success stories of international cooperation established between EU clusters and Singapore organisations are presented below. These success stories aim to provide an example of fruitful bilateral Cluster-to-Cluster (C2C) cooperation, as well as help other clusters to develop similar agreements.

The three success stories presented below include details on the: sector and stakeholders concerned, the process that has led to cooperation, policy support, common activities, and an indication of the main outcomes of the cooperation to date. The information has been collected through a literature review and interviews with the relevant organisations.

The good practices and success stories are the following:

- Cooperation between CLEAN, Singapore Business Federation, and Global Compact Network Singapore;
- Cooperation between AQUA-VALLEY, Singapore Public Utilities Board and Singapore Water Association; and
- Cooperation between LASER-GO and Singapore Economic Development Board.

### 3.1. Success story 1: CLEAN, Singapore Business Federation, and Global Compact Network Singapore cooperation on cleantech

Cooperation between CLEAN, Singapore Business Federation, and Global Compact Network Singapore	
<p><b>Partners:</b></p> <ul style="list-style-type: none"> <li>• CLEAN (Various MS, EU)<sup>29</sup></li> <li>• Global Compact Network Singapore<sup>30</sup></li> <li>• Singapore Business Federation<sup>31</sup></li> </ul>	  Network Singapore 
<p><b>Sectors and subsectors concerned:</b></p> <ul style="list-style-type: none"> <li>• Environmental Services             <ul style="list-style-type: none"> <li>○ Cleantech</li> </ul> </li> </ul>	
<p><b>Context:</b></p> <ul style="list-style-type: none"> <li>• CLEAN is a Danish Gold Label cluster organisation that aims to develop projects within cleantech, including energy efficiency, waste, water, and green building.</li> <li>• Global Compact Network Singapore, which is part of the United Nations Global Compact (UNGC) network, aims to promote collaboration between Corporate Social Responsibility stakeholders in businesses, government and civil society in order to promote Singapore's sustainability.</li> <li>• Singapore Business Federation is an apex business chamber focused on representing the interests of the Singapore business community in the areas of trade, investment and industrial relations.</li> </ul>	
<p><b>Type of cooperation:</b> <u>Knowledge and Business Sharing</u></p> <ul style="list-style-type: none"> <li>• Develop the necessary business conditions to promote cleantech research, development and project implementation.</li> <li>• Support the organisation of activities between EU and Singapore organisations in order to develop future innovative business partnerships and research and development collaborations.</li> </ul>	

<sup>29</sup> <https://www.clustercollaboration.eu/cluster-organisations/clean>

<sup>30</sup> <http://www.csrsgsingapore.org/c/>

<sup>31</sup> <http://www.sbf.org.sg/>



- Provide holistic solutions to help EU and Singapore organizations to achieve the necessary levels of environment and energy efficiency<sup>32</sup>.

**Objective:**

- The main aim of this cooperation is to ensure knowledge and business exchange between the EU (especially Denmark) and Singapore in regards to the development of cleantech solutions.

**Policy support:**

- CLEAN is part of the European Strategic Cluster Partnership Go International Energy in Water initiative (EnW) funded by the EU, which is an example of a high-level trans-national cooperation and coordination action between cross-sectoral research-driven clusters and members. The EnW targets third countries such as Singapore in order to identify common trans-national thematic priorities of the water-energy sector and create an integrated hub for innovation<sup>33</sup>.

**Results/outcomes:**

- Global Compact Network Singapore and CLEAN organised a workshop and networking session that brought together EU companies and Sustainability Leaders in Singapore.
- During the workshop and networking session, the EU and Singapore entities cooperated in order to develop innovative holistic solutions to address challenges faced by companies in Singapore in areas such as energy in water, water supply, water quality, reducing urban water losses, climate adaptation and flood planning, wastewater, energy efficiency in WWTP, water savings, and water resources.




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<sup>32</sup> <https://www.clustercollaboration.eu/event-calendar/eu-singapore-water-solutions-exclusive-workshop-and-networking>

<sup>33</sup> <https://www.clustercollaboration.eu/escp-profiles/enw>

## 3.2. Success story 2: AQUA-VALLEY, Singapore Public Utilities Board and Singapore Water Association cooperation on water management

Cooperation between AQUA-VALLEY, Singapore Public Utilities Board and Singapore Water Association	
<p><b>Partners:</b></p> <ul style="list-style-type: none"> <li>• AQUA-VALLEY (Various MS, EU)<sup>34</sup></li> <li>• Public Utilities Board (PUB) (Singapore)<sup>35</sup></li> <li>• Singapore Water Association (SWA) (Singapore)<sup>36</sup></li> </ul>	  
<p><b>Sectors and subsectors concerned:</b></p> <ul style="list-style-type: none"> <li>• Water <ul style="list-style-type: none"> <li>◦ Water management</li> </ul> </li> </ul>	
<p><b>Context:</b></p> <ul style="list-style-type: none"> <li>• AQUA-VALLEY is a French Competitiveness Water Cluster funded by the French government and regional authorities. It aims to promote partnerships through collaborative projects between businesses and academics in order to support innovation and international development in the water sector. Since 2013, the cluster has been promoting the development of France Water Team, an international partnership that brings together several organisations worldwide<sup>37</sup>.</li> <li>• PUB is Singapore's national water agency, which manages water supply, water catchment and water usage. PUB has launched several programmes and initiatives that involve the participation of numerous stakeholders and ensure water sustainability.</li> <li>• SWA is a Singaporean association that brings together private sector players focused on promoting the growth of the country's water industry. SWA acts as an interface between its members and the international water community. In this context, the association has signed MoUs with several Asian countries.</li> </ul>	

<sup>34</sup> <https://www.clustercollaboration.eu/cluster-organisations/pole-eau-french-water-cluster>

<sup>35</sup> <https://www.pub.gov.sg/>

<sup>36</sup> <https://www.swa.org.sg/>

<sup>37</sup> <http://www.pole-eau.com/en/The-Pole/Presentation>



**Type of cooperation:**

- A MoU between AQUA-VALLEY, PUB and SWA was signed in September 2014.
- The terms of the agreement focus on fostering business and research cooperation between the parties in order to ensure water management efficiency.

**Objective:**

- The overall aim of the agreement is to promote scientific, technological and economic collaborations under the framework conditions of Languedoc-Roussillon's Regional Strategy of Intelligent Specialization (3S).

**Policy support:**

- AQUA-VALLEY has 63 collaborative R&D projects funded by French national and regional agencies, such as Agence Nationale de la Recherche (ANR), Fonds Unique Interministériel (FUI), and Agence de l'eau Adour-Garonne<sup>38</sup>.

**Results/outcomes:**

- AQUA-VALLEY was present at the Singapore International Water Week (SIWW) 2015 and participated in the session "Financing Full-Cycle Innovation"<sup>39</sup>.
- PUB has been conducting research and cooperation activities with AQUA-VALLEY.



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<sup>38</sup> <http://www.pole-eau.com/Les-Projets/Projets-innovation-finances>

<sup>39</sup> <http://www.pole-eau.com/Communication/Actualites/Le-Pole-en-action/Seminaire-de-preparation-de-la-Singapore-International-Water-Week-Flashbacks>

### 3.3. Success story 3: LASER-GO and Singapore Economic Development Board cooperation on Photonics

Cooperation between LASER-GO and Singapore Economic Development Board	
<p><b>Partners:</b></p> <ul style="list-style-type: none"> <li>• LASER-GO (Various MS, EU)<sup>40</sup></li> <li>• Singapore Economic Development Board (Singapore)<sup>41</sup></li> </ul>	 
<p><b>Sectors and subsectors concerned:</b></p> <ul style="list-style-type: none"> <li>• Photonics <ul style="list-style-type: none"> <li>○ Health technology products</li> </ul> </li> </ul>	
<p><b>Context:</b></p> <ul style="list-style-type: none"> <li>• The European Strategic Cluster Partnership of Photonics for Health (ESCP-4i LASER-GO) aims to establish links with other clusters able to increase the cross-sectorial scope of the consortium and open up access to new value chains in the fields of mobility, smart cities, and active and assisted living. Moreover, LASER-GO is focused on planning visits and activities overseas and promoting strategies to support initiatives in its target markets (e.g. Singapore).</li> <li>• The Singapore Economic Development Board (EDB) is a government agency under the Ministry of Trade and Industry, which is responsible for developing strategies that enhance Singapore's position as a business and innovation hub.</li> </ul>	
<p><b>Type of cooperation:</b> <u>Knowledge and Business Sharing</u></p> <ul style="list-style-type: none"> <li>• Representatives of the Singapore Economic Development Board visited various EU countries and regions with a high-tech potential.</li> <li>• Conversely, a team from LITEK<sup>42</sup> – coordinator of LASER-GO – organised a cluster mission to Singapore aiming to meet leading actors in the fields of photonics, trade and investment<sup>43</sup>. A follow-up mission was organized in 2018 by the LASER-GO partner MEDICEN Paris Region.</li> </ul>	
<p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>• The aim of the cooperation is to explore the market opportunities for EU and Singapore cluster companies (including the conditions for setting up businesses in Singapore), but also to understand how the high-tech products offered by Singapore could complement the ones offered by European companies in order to come up with win-win solutions.</li> </ul>	

<sup>40</sup> <https://www.clustercollaboration.eu/escp-profiles/laser-go>

<sup>41</sup> <https://www.edb.gov.sg/>

<sup>42</sup> <https://www.clustercollaboration.eu/cluster-organisations/litek>

<sup>43</sup> <https://www.clustercollaboration.eu/news/laser-go-visiting-singapore>

**Policy support:**

- LASER-GO is a European Strategic Cluster Partnership Go International (ESCP-4i) supported by COSME (the EU programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises administered by the Executive Agency for Small and Medium-sized Enterprises set up by the European Commission) and as such, its main objective is to implement its internationalisation strategy.

**Results/outcomes:**

- LITEK team met with public officials in charge of economic and trade relations, as well as with representatives from the Lux Photonics Consortium, a joint initiative by Nanyang Technology University (NTU) and the National University of Singapore, supported by the National Research Foundation and Prime Minister's Office in Singapore.
- The LITEK team visited the Photonics Institute at Nanyang Technology University (NTU).
- LITEK participated in the tradeshow Manufacturing Technologies Asia 2017, which hosted the Optics and Photonics Innovation Hub, and the trade exhibition Asia Health.
- During the mission, the organisations gained knowledge about the existing barriers for the trade in high-tech products between Singapore and Europe.
- The mission started a discussion on potential strategies for high-tech companies to cooperate.
- The follow-up mission assisted by the EDB staff in Europe was carried out by the LASER-GO partner MEDICEN Paris Region which participated at the trade exhibition Asia Health 2018 and established the leads for the business-to-business contacts for the cluster companies.

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## 4. Opportunities/potential for further EU-Singapore cluster cooperation: thematic focus

Singapore has a great potential to attract foreign investors due to its wide variety of economic sectors, natural resources, and favourable geographical position. The Singaporean government has also been very supportive of business development through the attribution of governmental grants and the establishment of trade agreements concerning several sectors. The following section provides insight into opportunities and potential for cooperation related to four sectors as identified by the Preparatory Briefing developed by the ECCP (September 2018).

### 4.1. Electronics sector

Electronics is a key industry for the Singaporean economy. In 2017, the output of the electronics cluster grew by around 30% when compared to 2016. This growth was supported by strong advances in the semiconductors segment, which accounted for approximately 60% of the electronics manufacturing GDP<sup>44</sup>. In 2017, the Singaporean electronics manufacturers also accounted for 11% of the world's market share of semiconductor wafer foundry output and 25% of the world's market share for printers<sup>45</sup>. In addition, the growth of Singapore's electronics clusters is mainly driven by external demand for electronics and advanced machinery, which had a positive impact on Singapore's GDP in 2017<sup>46</sup>.

In 2017, the Minister for Trade and Industry launched the Electronics Industry Transformation Map, which maps the strategies that will be implemented to promote the development of the electronics industry in Singapore. Through these strategies, Singapore's electronics industry is expected to achieve a manufacturing value-add of €18.6 billion and create 2,100 new jobs by 2020<sup>47</sup>. In order to achieve this goal, the Singaporean Government will foster collaborative projects between governmental agencies, SMEs and startups, which may represent an important opportunity for EU clusters to cooperate with Singaporean organisations<sup>48</sup>.

The EU Gateway | Business Avenues offers an opportunity for the EU and Singapore to cooperate in the electronics sector. This EU funded initiative aims to support European companies to establish long-lasting business collaborations with Asian countries, including Singapore. In this context, Clean Technologies and Green Energy Technologies are two of the sectors that include opportunities for EU companies related to electronics.

<sup>44</sup> <https://www.channelnewsasia.com/news/business/singapore-semiconductor-growth-to-ease-in-2018-industry-group-10002690>

<sup>45</sup> <https://www.export.gov/article?id=Singapore-Semiconductors>

<sup>46</sup> <https://www2.deloitte.com/insights/us/en/economy/asia-pacific/singapore-economic-outlook.html>

<sup>47</sup> Oanda, 1 US \$ = 0.84 euro, 31st of August 2018

<sup>48</sup> [http://www.ssg-wsg.gov.sg/new-and-announcements/20\\_Sep\\_2017.html](http://www.ssg-wsg.gov.sg/new-and-announcements/20_Sep_2017.html)

Currently, there are four European Electronics clusters registered on the ECCP that target Singapore for the development of international activities, such as missions, events, study visits and fairs<sup>49</sup>. This reveals that there are important opportunities for the development of EU-Singapore C2C cooperation activities in the electronics sector.

As previously mentioned, the EUSFTA will foster the development of bilateral trade relations between EU and Singapore in electronics through the elimination of technical and non-tariff barriers to trade in goods. In this context, the EU and Singapore also agreed to base their standards, technical regulations and conformity assessment procedures on relevant international standards, which will facilitate trade between both regions<sup>50</sup>. Thus, when ratified, the EUSFTA is expected to foster opportunities for cooperation between EU and Singapore electronics clusters.

## 4.2. Health and Medical clusters

According to the World Health Organization (WHO), Singapore's healthcare system ranked 6<sup>th</sup> globally and provided the 4<sup>th</sup> best healthcare infrastructure in the world in 2015<sup>51</sup>. Singapore is also considered a leading country in biomedical sciences manufacturing and R&D activities. Singapore's healthcare system provides several opportunities for private enterprises to partner with its public-sector research institutes, clinical-research units in hospitals, as well as with international research organisations<sup>52</sup>.

In 2017, the Healthcare Industry Transformation Map was launched by Singapore's Ministry for Health. The Healthcare ITM defines three strategies that aim to enhance jobs and skills, raise productivity, and catalyse innovation in Singapore's healthcare sector<sup>53</sup>. In this context, Singapore aims to become a hub and centre for healthcare excellence, which can lead to future EU-Singapore C2C cooperation opportunities.

In 2016, Singapore became an Associate Member State of the Engineering in Medicine and Biology Society (EMBC) following an agreement signed by the Government of Singapore, the European Molecular Biology Organization (EMBO) and the European Molecular Biology Conference (EMBC). This agreement aims to promote collaborative research between Singapore and Europe. Singapore was the first non-European country to become an EMBC Associate Member State, which illustrates the importance of developing EU-Singapore cooperation activities in the biomedical sector<sup>54</sup>.

In addition, considering Singapore's leading position in the biomedical manufacturing industry, GlaxoSmithKline (United Kingdom) and Singapore Economic Development Board made a joint commitment to improve manufacturing efficiency in pharmaceutical and chemical manufacturing in Singapore. This partnership aims to build a strong capability in Singapore and enhance cooperation

<sup>49</sup> <https://www.clustercollaboration.eu/cluster-list>

<sup>50</sup> [http://europa.eu/rapid/press-release\\_MEMO-18-3327\\_en.htm](http://europa.eu/rapid/press-release_MEMO-18-3327_en.htm)

<sup>51</sup> [http://files.export.gov/x\\_5985.pdf](http://files.export.gov/x_5985.pdf)

<sup>52</sup> <https://www.biospectrumasia.com/analysis/25/10531/singapore-a-strong-growing-healthcare-industry.html>

<sup>53</sup> [https://www.moh.gov.sg/content/moh\\_web/home/pressRoom/pressRoomItemRelease/2017/healthcare-industry-transformation-map-for-a-future-ready-health.html](https://www.moh.gov.sg/content/moh_web/home/pressRoom/pressRoomItemRelease/2017/healthcare-industry-transformation-map-for-a-future-ready-health.html)

<sup>54</sup> <http://embo.org/about-embo/global-activities/cooperation-with-singapore>

between universities, institutes, and local companies through interdisciplinary research. This may represent an opportunity for EU pharmaceutical clusters to cooperate with Singapore<sup>55</sup>.

As previously mentioned, LASER-GO, a second generation ESCP-4i focused on the health and medical sector, is also developing international cooperation activities with the Singapore Economic Development Board. This cooperation is mainly focused on the development of health technology products and can pave the way for future C2C cooperation opportunities within the health and medical sector.

The EU Gateway | Business Avenues promoted a business mission to the Philippines and Singapore focused on healthcare and medical technologies. This mission aimed to bring together European companies with Singaporean leading players in the field, which may lead to future C2C cooperation opportunities<sup>56</sup>.

Taking into account the interest of the EU cluster community as shown by the ESCP-4i and other existing agreements/ initiatives that promote cooperation between European and Singapore organisations, European clusters can find several opportunities to cooperate with Singapore, especially in the pharmaceutical and biomedical subsectors.

### 4.3. Transportation and Storage (Logistics) sector

Singapore is facing several challenges related with the development of its urban transport infrastructure. In order to overcome these challenges, the Singaporean Ministry of Transport and the Land Transport Authority of Singapore are currently investing in the advancement of connected and autonomous vehicles (C&AV) technologies. In December 2017, these entities announced that by 2022 a limited area of Singapore will be served by autonomous buses and on-demand shuttles.<sup>57</sup> This pilot project is expected to deliver important insights on how the deployment of C&AVs can be scaled up across Singapore.

At the same time, there is a growing interest from the EU, specifically the Director-General for Mobility and Transport, on the development of C&AV technologies. The EC is currently developing policies, communications, roadmaps, and strategies in close collaboration with multiple stakeholders in order to promote the advancement of C&AV technologies. In addition, the EC created mechanisms, calls and grants for RDI activities involving C&AV technologies, including a Horizon 2020 programme and an infrastructure pilot<sup>58</sup>.

Considering the EU and Singapore interest in smart mobility, the EU Delegation to Singapore, together with Singapore's Ministry of Transport, organised a seminar on *Climate Change: Innovation and Land Transport*. This seminar was mainly focused on addressing innovative solutions on clean urban mobility

<sup>55</sup> <http://www.ace.gsk.com/GSM/Background.aspx>

<sup>56</sup> <https://www.clustercollaboration.eu/event-calendar/opportunity-leading-european-healthcare-medical-technologies>

<sup>57</sup> <https://www.opengovasia.com/articles/singapore-moves-ahead-on-smart-mobility-autonomous-scheduled-and-on-demand-public-transport-by-2022-first-av-test-centre-opened>

<sup>58</sup> [https://ec.europa.eu/transport/sites/transport/files/3rd-mobility-pack/com20180283\\_en.pdf](https://ec.europa.eu/transport/sites/transport/files/3rd-mobility-pack/com20180283_en.pdf)



from a government and industry perspective<sup>59</sup>. The seminar set a precedent for future EU-Singapore collaborations on the smart mobility agenda.

The shared concern on smart mobility is also represented in the establishment of Mobility Goes International (MobiGoIn), which is a second generation ESCP-4i with an internationalisation strategy towards targeted third countries, including Singapore. MobigoIn aims to develop a cross-sectoral approach focusing on the theme of urban mobility to promote the development and adoption of intelligent and cooperative transport, intermodal and sustainable mobility for the citizens, as well as sustainable urban freight logistics. In this context, MobiGoIn aims to bring together EU Member States with targeted countries, such as Singapore, which can contribute to achieving the cluster goals<sup>60</sup>.

## 4.4. Information & Communication sector

Singapore is considered an ICT regional hub. In 2016, Singapore was ranked the world's most digitally connected country, which has been attracting several global technology firms to the country<sup>61</sup>. The advanced development of Singapore's ICT sector has also been fostered by the country's strong activities in e-commerce and smart mobility<sup>62</sup>.

In 2014, Singapore launched the Smart Nation programme, which aims to support the advancement of ICT, networks and big data in order to create tech-enabled solutions to transform Singapore into an economically competitive global city<sup>63</sup>. This initiative facilitates innovations both from the public and the private sectors and encourages the adoption of new ideas in several sectors including open data, living laboratory, cybersecurity and data privacy<sup>64</sup>. Thus, the Smart Nation programme may represent an opportunity for the development of EU-Singapore C2C cooperation activities in the ICT sector.

Taking into account the importance of the ICT sector for both the EU and Singapore, there are several opportunities for C2C among these regions. The European SmartCityTech Go Global (ESCT Go Global), which is a second generation ESCP-4i, aims to increase EU companies' competitiveness by supporting the development of digitally enabled solutions for resilient urban areas through the implementation of a joint cooperation agenda<sup>65</sup>. In line with this objective, ESCT Go Global supports European SMEs working on smart cities solutions to meet stakeholders and target markets from third countries, including Singapore. In this context, ESCT Go Global organised a trade mission to Singapore in July 2018. This trade mission included the participation in the World Cities Summit Fair, as well as B2B meetings with Singaporean firms<sup>66</sup>.

The EU Gateway | Business Avenues Programme is also an example of an initiative that promotes EU-Singapore cooperation. In 2017, this initiative promoted a business mission to Singapore and Thailand

<sup>59</sup> [https://eeas.europa.eu/delegations/fiji/28438/eu-seminar-climate-change-innovation-and-land-transport\\_pt](https://eeas.europa.eu/delegations/fiji/28438/eu-seminar-climate-change-innovation-and-land-transport_pt)

<sup>60</sup> [www.clustercollaboration.eu/escp-profiles/mobigoln](http://www.clustercollaboration.eu/escp-profiles/mobigoln)

<sup>61</sup> <https://www.edb.gov.sg/en/our-industries/information-and-communications-technology.html>

<sup>62</sup> [https://www.researchgate.net/publication/237451841\\_Singapore\\_A\\_Regional\\_Hub\\_in\\_ICT](https://www.researchgate.net/publication/237451841_Singapore_A_Regional_Hub_in_ICT)

<sup>63</sup> <https://www.smartnation.sg/about/Smart-Nation#sthash.FdQwGTMq.dpuf>

<sup>64</sup> <https://www.smartnation.sg/>

<sup>65</sup> [http://www.smartcitytech.eu/gestor/recursos/uploads/imagenes/news/Singapore%20Trade%20Mission/Trade%20Mission%20Singapore\\_ESCT%20Go%20Global.pdf](http://www.smartcitytech.eu/gestor/recursos/uploads/imagenes/news/Singapore%20Trade%20Mission/Trade%20Mission%20Singapore_ESCT%20Go%20Global.pdf)

<sup>66</sup> <https://www.clustercollaboration.eu/profile-articles/we-are-preparing-our-trade-mission-singapore>

focused on the ICT sector. During this mission the EU companies had the chance to meet with Singaporean companies, which may lead to future C2C cooperation activities<sup>67</sup>.

Moreover, the European-Pacific Partnership for ICT (EPIC) is a Horizon 2020 project that promotes ICT cooperation between the EU and Singapore. In 2018, the project organised an EU-Singapore IT Research Cooperation Workshop focused on the fields of AI, IoT, cybersecurity, ICT in Transport and Spatial Intelligence, which may pave the way for future cooperation opportunities<sup>68</sup>.

## 5. ESCP initiatives enhancing cluster cooperation with Singapore

Currently, there are four second generation ESCP-4i's, representing 21 EU clusters and 4,877 EU SMEs, interested in planning activities with Singaporean organisations. Table 1 includes details of those ESCP-4i activities dedicated to promoting and strengthening cooperation between EU clusters/SMEs and Singaporean clusters/SMEs<sup>69</sup>.

Table 1 – ESCP-4is interested in strengthening cooperation with Singapore

ESCP-4i	Number of EU clusters	Number of EU SMEs	Planned activities
COSMENERG-4i	3	350	<ul style="list-style-type: none"> <li>Development of an action plan for Singapore.</li> </ul>
ESCT Go Global	6	3017	<ul style="list-style-type: none"> <li>Organised a trade mission to Singapore in July 2018.</li> </ul>
LASER-GO GLOBAL	8	240	<ul style="list-style-type: none"> <li>Organisation of innovation mission to Singapore.</li> </ul>
MobiGoln-Action	4	1270	<ul style="list-style-type: none"> <li>Building a Cooperation Partnership with international stakeholders in Singapore.</li> </ul>

<sup>67</sup> <https://www.clustercollaboration.eu/event-calendar/ict-business-mission-singapore-thailand>

<sup>68</sup> <https://euraxess.ec.europa.eu/worldwide/asean/epic-eu-singapore-it-research-cooperation-workshop>

<sup>69</sup> [www.clustercollaboration.eu/sites/default/files/escp-4i\\_survey\\_analysis.pdf](http://www.clustercollaboration.eu/sites/default/files/escp-4i_survey_analysis.pdf)