

Pascha, Werner

**Working Paper**

## The potential of deeper economic integration between the Republic of Korea and the EU, exemplified with respect to E-Mobility

Duisburg Working Papers on East Asian Studies, No. 98/2014

**Provided in Cooperation with:**

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*Suggested Citation:* Pascha, Werner (2014) : The potential of deeper economic integration between the Republic of Korea and the EU, exemplified with respect to E-Mobility, Duisburg Working Papers on East Asian Studies, No. 98/2014, University of Duisburg-Essen, Institute of East Asian Studies (IN-EAST), Duisburg

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No. **98** 2014

Werner PASCHA

# **The Potential of Deeper Economic Integration between the Republic of Korea and the EU, Exemplified with Respect to E-Mobility**





Title:

**The Potential of Deeper Economic Integration between the Republic of Korea and the EU, Exemplified with Respect to E-Mobility**

Author:

**Werner Pascha**

Prof. Dr. Werner Pascha holds the Chair “East Asian Economic Studies/Japan and Korea” at the Institute of East Asian Studies resp. the Mercator School of Management of the University of Duisburg-Essen  
E-mail: [werner.pascha@uni-due.de](mailto:werner.pascha@uni-due.de)

This final draft has been co-funded with the support of the European Union. It is part of a joint project on Public Diplomacy Issues between the EU and the Republic of Korea (Free University of Brussels / EU-Korea Policy Centre – EKI (Lead partner); Asia Centre, Paris; Business Europe, Brussels; Korea University, Seoul; University of Duisburg-Essen). The manuscript was finished in November 2013.

**Series:**

Duisburg Working Papers on East Asian Studies / Duisburger Arbeitspapiere Ostasienwissenschaften  
No. 98/2014

Printed version: ISSN 1865-8571

Internet version: ISSN 1865-858X

**Abstract:**

The paper deals with how to enhance economic integration between Korea and the EU, particularly in the field of electric mobility. Taking note of the Framework Agreement (FA), the free trade agreement (FTA) and the first two years of the agreement in action, potentials and challenges for further cooperation are discussed. The competitive strengths of Korean automobile makers and parts suppliers in E-mobility serve as a basis to derive the European interest in closer cooperation, also considering how the EU and its members already act in the policy sphere of E-mobility. Three areas for an intensified cooperation are suggested: Carefully observing trade and FDI access, following up on the FTA agreement, standardization efforts as part of the multilateral efforts to reform the harmonization of regulation, and supporting cooperation among multi-level actors within the EU and Korea.

**Keywords:**

European Union, (South) Korea, Free Trade Agreement, Electric mobility, E-mobility, Industrial cooperation, Standardization, Harmonization, Regulation, Subsidies

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Forsthausweg  
47057 Duisburg

**Institut für Ostasienwissenschaften / Institute of East Asian Studies**

Universität Duisburg-Essen  
Campus Duisburg  
Forsthausweg

47057 Duisburg, Germany

Tel.: +49 203 379-4191

Fax: +49 203 379-4157

E-mail: [in-east@uni-due.de](mailto:in-east@uni-due.de)

ISSN 1865-8571 (Printed version)

ISSN 1865-858X (Internet version)

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October 2014

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# 1 Introduction / Overview

In recent years, the Republic of Korea (here: Korea) has developed into a newly advanced economy that contributes significantly to reshaping the global landscape of important industries like consumer electronics and automobiles. For the EU and its industries, developing cooperative relations through foreign direct investment (FDI) and enhanced economic integration will be an important cornerstone for developing its own industrial competitiveness and fitting into a world that is increasingly shaped by aspiring newly advanced and emerging economies. In addition, the Korean economy is set to become a key intermediary between the Chinese and Japanese economies; closer relations with Korea will therefore facilitate access to the Northeast Asian growth cone of economic development and innovation. Moreover, in some industrial areas there are compatibilities and synergetic for closer cooperation: this includes electric mobility (E-mobility) and other advanced mobility concepts like fuel cells, in which Korea with its comparatively limited domestic market but significant technological competence in industry is a strong natural candidate for filling the concept of a strategic alliance with the EU. The basis for making progress in this direction is the Free Trade Agreement, which is a new-generation FTA (NG-FTA) encompassing much wider issues than trade. In this context, the EU-Korea FTA can be an important “experimental lab” and showcase for such new-type agreements, which the EU is currently considering with other major partners as well, including the USA and Japan.

The groundwork for intensified economic and business relations between the ROK and the EU has been laid with the Framework Agreement (FA) and particularly the FTA, starting in 2011.<sup>1</sup> The abolition of barriers for economic interchange will not be enough to raise the full potential of enhanced economic and business relations. In this paper, we will discuss the prospect for such an intensified cooperation and for the need of public policy measures on the EU level to support it. Such measures may go well beyond the traditional instruments of foreign economic policy in terms of trade and investment liberalization and facilitation. For instance, the role of standardization has become increasingly important in a world of fast-moving technological innovation and new goods and services propositions.

Such issues are highly idiosyncratic. They depend on the dynamics and structural properties of the industrial sector under investigation. In this paper, we will take the case of E-mobility as an example, i.e. the sub-industry of electric vehicles in automobile industry including its major components, focussing on the critical role of batteries. Related and to some extent competing emerging technologies like fuel-cells will be considered where appropriate. Emobility is particularly interesting for various reasons. While EU companies possess a traditionally strong role in automobile innovation and production, the future shape of automobile industry will be very much driven by demand in emerging economic regions (see Table 1). It will be important for EU industry to develop closer links with the emerging economies and with rising Asia in particular.

**Table 1: New car registrations in 2011, including 2020 and 2030 forecasts**

	2011	2020 F	2030 F
Germany	3,400,000	3,000,000	2,700,000
France	2,600,000	2,200,000	2,170,000
United Kingdom	2,200,000	2,100,000	2,000,000
Spain	910,000	1,200,000	1,200,000
Italy	1,900,000	1,700,000	1,500,000
Rest of EU	3,690,000	4,600,000	5,230,000
EU 27 (total)	14,700,000	14,800,000	14,800,000
Japan	3,800,000	3,500,000	2,700,000
Korea	1,400,000	1,400,000	1,500,000
China	18,500,000	21,900,000	28,900,000
United States	12,700,000	14,800,000	14,300,000
Rest of World	21,400,000	30,000,000	37,000,000
Global Registrations	72,500,000	86,400,000	99,200,000

Source: Center for Automotive Management, University of Duisburg-Essen, 2012

<sup>1</sup> For more background information, see Cho 2013.



Due to limited fossil energy supplies and global warming, automobile industry is expected to undergo a sea change in forthcoming years with respect to the introduction of new technologies, particularly in terms of new engine modes. European and Korean industries with their competitive and innovative strength are set to play a leading role in this development. In addition, industrial supply chain linkages across national boundaries are particularly prominent in car production, due to the character of auto production encompassing a wide array of individual components. This also holds for E-mobility, with the need for long-range, efficient and cheap batteries and an accommodating architecture of new car designs as the most striking example.

Finally, E-mobility is not only relevant for road traffic. Through its connection to energy supply issues for the economy at large (electric grids etc.), it is connected to a fundamental reshaping of global economies in the forthcoming decades. Changing energy provision will not leave living and working patterns untouched, so E-mobility is a central part of the emerging spatial reconfiguration of social and economic patterns of advanced nations, the role of cities, new housing, etc. While these wider implications cannot be pursued further in this paper, they provide further evidence for the pivotal role of E-mobility as a case study for international economic relations and bilateral EU-Korea relations in particular.

In recent months (writing in late 2013), optimism about the future role of E-mobility has been somewhat toned down.<sup>2</sup> There have been several setbacks about realising production and market penetration goals. However, this only shows that E-mobility like all innovative sectors encompasses considerable risks and uncertainties. This very character of newly emerging industrial sectors is one of the major reasons why such activities are not simply left to evolving market allocation, but may be a case for public activities. Apart, there is no doubt that innovative propulsion technologies will play a growing role in the car industry, that E-mobility will be part of it, and that the EU as well as Korea with its private enterprises and public support will be key players. Despite the recent gloom, for example, in mid-2013 the German chancellor has reaffirmed her determination to reach the target of one million electric cars in Germany by 2020.<sup>3</sup>

The paper is organized as follows. First, the issue of enhanced economic integration between Korea and the EU will be framed in the context of the Framework Agreement (FA) and the free trade agreement (FTA). Taking note of the first two years of the agreement in action, potentials and challenges for further cooperation will be discussed. Afterwards, the report turns to identifying potentials and challenges on the basis of idiosyncratic features of one area in particular, the competitive strengths of Korean automobile makers and parts suppliers in electric mobility. This will serve as a basis to derive the European interest in closer cooperation. A further step will be to look at how the EU and its members act in the policy sphere of E-mobility, in order to identify desiderata. Such policy suggestions for the EU will constitute the final part of this paper, followed by the conclusions.

## **2 The bilateral FTA and the Framework Agreement as fundamentals for establishing closer economic and business relations**

### **a) The first two years**

In 2010, a new Framework Agreement (FA), and a free trade agreement (FTA) between the EU and the Republic of South Korea have been signed. On July 1st, 2011, the FTA between South Korea and the EU came into effect. It is the first trade agreement that the EU has negotiated and ratified with an Asian country and is regarded as the most aspiring of all trade deals of the EU so far. It is not only expected to boost bilateral trade, but to have a much wider impact beyond South Korea-relations, as Karel De Gucht, European Commissioner for Trade, has pointed out.<sup>4</sup> Five years after its step-by-step implementation, 99 % of bilateral trade between the two parties will be duty free. Including trade barriers for services

<sup>2</sup> E.g., Roland Berger 22.5.2013.

<sup>3</sup> Reuters, 27.5.2013.

<sup>4</sup> See Karel De Gucht's speech: The European Union – Republic of Korea Free Trade Agreement: One Year After Its Entry into Force, at a European Parliament Workshop, Brussels 16 October 2012 ([http://europa.eu/rapid/press-release\\_SPEECH-12-736\\_en.htm?locale=en](http://europa.eu/rapid/press-release_SPEECH-12-736_en.htm?locale=en)).

and also encompassing investment barriers in the agreement has been an important element in this context. Furthermore, the handling of intellectual property, regulation in sectors like automobiles and pharmaceuticals, and public procurement for public contracts are covered in the FTA agreement.

More than two years into its implementation, positive effects of the FTA are particularly visible with respect to EU exports to Korea. Compared to the twelve months-period before the introduction of the FTA, EU exports during the first twelve months after the implementation have increased by 12 per cent, and during the second year (July 2012 to June 2013) by another 8 per cent (see Table 2). This export growth is several points stronger than for most other trading partners, including EU exports to East Asian neighbours China, Japan or Taiwan.

**Table 2: EU 27\* exports (in billion EUR), selected countries, 12 month periods around the introduction of the FTA**

	July 2010–June 2011	July 2011–June 2012	Change in %	July 2012–June 2013	Change in %
South Korea	30.6	35.3	15.4 %	38.1	7.8 %
PR of China	125.8	143.4	14.0 %	142.5	–0.6 %
Japan	46.5	52.7	13.5 %	54.9	4.0 %
Taiwan	16.3	15.6	–4.6 %	16.0	2.4 %
India	39.1	39.2	0.3 %	38.0	–3.1 %
United States	258.9	279.3	7.9 %	289.5	3.7 %
EU 27 extra (total)	1,484.1	1,635.1	10.2 %	1,733.5	6.0 %

\* EU 27 instead of EU 28 for reasons of comparability

Source: European Commission (2013), Eurostat, Statistics, International trade detailed data, <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>

There are substantial differences among industries: Very strong growth of North Sea oil exports, for example, and strong dynamism for car exports, particularly with respect to luxury brands like BMW, Mercedes or Audi. According to European Commission (EC) analysis of the trade data, it is verifiable that trade growth is particularly strong in the product groups which were liberalized in July 2011, thus supporting a link between the FTA and trade performance.<sup>5</sup> It is noteworthy that export growth to Korea has not been limited to a few European economies, but that also economies hit by debt problems could raise their exports to Korea significantly during the first two years (Table 3). Despite the well-reported successes of German auto manufacturers in Korea, countries like Italy, Spain or the UK experienced similar or even stronger trade growth, albeit from significantly lower levels (Table 3).

**Table 3: Exports to South Korea (in billion EUR), selected EU countries, 12 month periods around the introduction of the FTA**

	July 2010–June 2011	July 2011–June 2012	Change in %	July 2012–June 2013	Change in %
Germany	11.2	12.4	10.1 %	14.0	13.1 %
Spain	0.7	0.9	19.3 %	1.0	16.9 %
France	3.9	3.6	–7.0 %	4.1	12.2 %
United Kingdom	2.5	4.5	83.5 %	5.3	16.7 %
Italy	2.6	3.2	25.1 %	3.6	10.5 %

Source: European Commission (2013), Eurostat, Statistics, International trade detailed data, <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>

As for Korean exports to the EU, trade has actually contracted by some percentage points during the first two years of implementation, and this trend has not abated during the second year (Table 4). In comparison with other East Asian economies like Japan, Taiwan and even China, this trend is not particularly strong, which offers at least anecdotal evidence that slacking imports of the EU are related to some wider issues of European import performance. Among those reasons are the recession in several European economies and the devaluation of the Euro in comparison to the Won, also related to the European debt

<sup>5</sup> See EC 25.2.2013.

crisis. The EC compares the imports from Korea during the period after the commencement of the FTA to the average of the four preceding years in order to somewhat neutralize the impact of the crisis. On such a basis, imports from Korea have only marginally increased by 1 per cent in the year from July 2011, which does not change the general impression.<sup>6</sup>

**Table 4: EU 27\* imports (in billion EUR), selected countries, 12 month periods around the introduction of the FTA**

	July 2010–June 2011	July 2011–June 2012	Change in %	July 2012–June 2013	Change in %
South Korea	38.0	37.8	–0.5 %	35.7	–5.6 %
PR of China	298.5	293.4	–1.7 %	282.1	–3.8 %
Japan	69.3	68.4	–1.2 %	58.8	–14.1 %
Taiwan	25.8	23.3	–9.9 %	21.4	–8.2 %
India	37.8	37.5	–0.7 %	37.9	0.9 %
United States	185.5	200.0	7.8 %	199.7	–0.2 %
EU 27 extra (total)	1,662.3	1,767.2	6.3 %	1,738.1	–1.6 %

\* EU 27 instead of EU 28 for reasons of comparability

Source: European Commission (2013), Eurostat, Statistics, International trade detailed data, <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>

There are significant differences among industries (Table 5), some of them actually realizing no decline. Other major Korean exports to the EU, like ships, experienced a very strong negative impact. It may thus be concluded that the strong reliance of Korean exports on few selected industries and the risks this involves has contributed to the lacklustre performance.

**Table 5: EU 27\* imports from South Korea (in billion EUR), 12 month periods around the introduction of the FTA**

	July 2010–June 2011	July 2011–June 2012	Change in %	July 2012–June 2013	Change in %
Mobile phones	2.7	1.7	–37.9 %	2.3	39.1 %
Cars	2.6	4.0	53.2 %	4.0	0.1 %
Car parts	1.5	1.9	27.7 %	1.8	–3.7 %
Ships	5.8	3.7	–36.3 %	2.7	–27.4 %
LCDs	1.4	1.8	26.2 %	1.7	–5.6 %

\* EU 27 instead of EU 28 for reasons of comparability

Source: European Commission (2013), Eurostat, Statistics, International trade detailed data, <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>

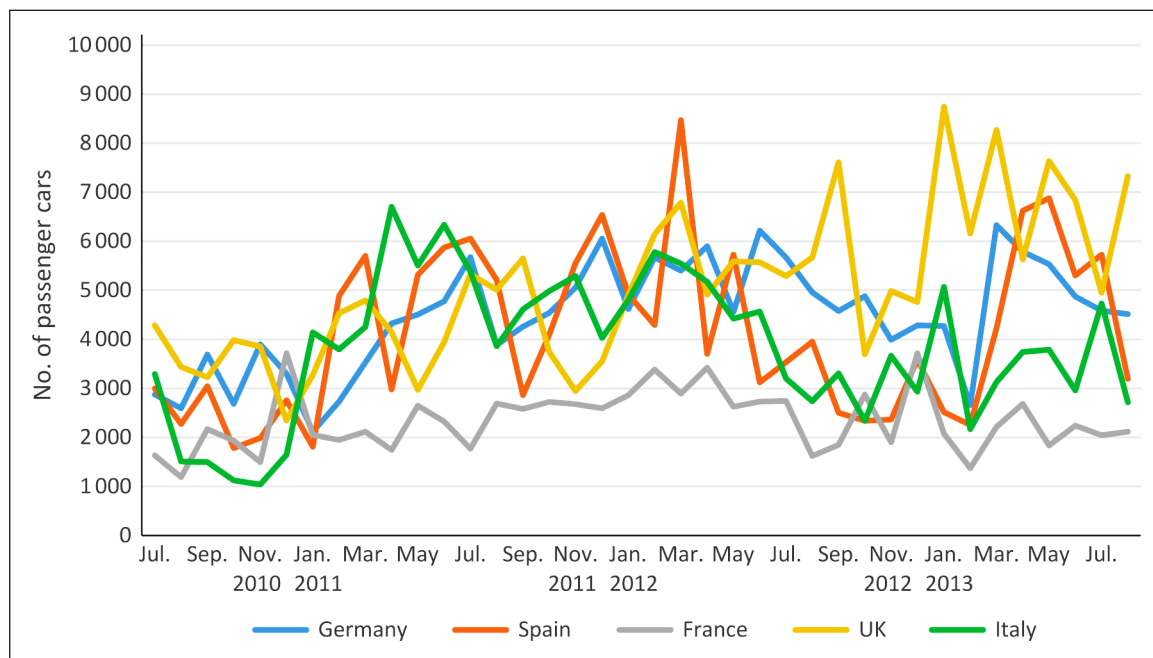
In accordance with these developments, the reaction to the first experiences with the EU-Korea FTA in Europe has been largely positive.<sup>7</sup>

Some opposition against parts of the agreement materialized even before the document was signed and still has to be reckoned with. Objection came from representatives of the automobile, textile and apparel industry, who argued that the time frame for the abolition of protective tariffs is too short, the access to the Korean market could prove to be rather limited despite the agreement and that there is a considerable imbalance between Korean sales in the EU and the turnover of European enterprises in Korea. About one year after the implementation of the FTA, on August 3rd 2012, France requested the European Commission to monitor car imports from Korea to protect domestic auto producers. This appeal was turned down by the Commission on October 22<sup>nd</sup>, 2012, based on the finding that no “increase in imports concentrated in one or more Member State could be established”.<sup>8</sup> Apart from the technicalities of the matter, laid out in Article 6(2) of Regulation (EU) No 511/2011, a rough-and-ready view of the development of Korean car imports after July 2011 shows that an alarming increase of Korean car imports is not apparent in any of the major EU economies (Figure 1).

<sup>6</sup> EC 25.2.2013: 2–3.

<sup>7</sup> E.g., EC 25.2.2013, EC 1.7.2013.

<sup>8</sup> EC 25.2.2013: 9, see also Bloomberg News 2012.

**Figure 1: Major EU 27 member economies imports of Korean passenger cars, mid-2010 to mid-2013**

Source: Source: European Commission (2013), Eurostat, Statistics, International Trade detailed data, <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>

Apart from the possible invocation of safeguard measures just discussed, the EC is monitoring the development of bilateral trade in certain sensitive sectors, based on Articles 3 and 11 of Regulation (EU) No 511/2011. This includes the car sector, textiles, and electronics. Some information is made publicly available via the EC website.<sup>9</sup>

After the FTA came into effect, the affected parties – i. e. politicians and private sector representatives – are still monitoring the initial effects of the agreement, which also included abolishing barriers for investment into manufacturing as well as services. The French government's attempt to prompt a surveillance of car imports by the European Commission was the first official move towards adjusting the process. Companies and administrations need to adapt to the new circumstances by reorganizing their channels for distribution, establish new business contacts, explore their possibilities in the new market, etc. More and extended experiences with the agreement will be necessary to determine which aspects need an enhancement or even correction. New or additional demands will be formulated on the basis of a sound evaluation of the whole implementation process when data is available and businesses have made first-hand experiences in practice.

As for Korea, the reception of the early experience, based on the disappointing trade data, has been more subdued.<sup>10</sup> Ironically, early Korean experience with the Korea-US FTA (KORUS) was better than with KOREU, despite more initial opposition with respect to the first. Korean consumers are particularly concerned about expected price reduction effects, which in some cases have not yet materialised as expected.

## b) Lessons from the early experiences

What can be learned from these early experiences? If the full potential of the FTA is to be realized, actors cannot simply wait for the benign effects of bilateral trade liberalization to be felt and trickle down, as some disturbances and unbalanced effects always have the potential to disrupt an otherwise amicable process. Moreover, the EU-Korea FTA has to be seen in the wider context of EU and Korean international economic relations strategies. Making the EU-Korea FTA a success story can have repercussions

<sup>9</sup> Data up to January 2013 accessible in early November 2013; <http://ec.europa.eu/trade/policy/countries-and-regions/countries/south-korea/>.

<sup>10</sup> E. g., Bae 2013.

on other new generation trade agreements currently being considered, for instance the EU negotiations with the US and Japan, as well as Korean considerations to deepen their partnership with the US and other Pacific economies as part of the Trans-Pacific Partnership Initiative (TPP) and/or in the trilateral context of East Asia (China, Japan).<sup>11</sup>

The Korean government is aware that the reasons for lacklustre EU imports and also for declining foreign direct investment from Europe are mainly due to exogenous factors, the financial crisis in Europe and recessionary tendencies in several member economies (as pointed out by Kim Jae-hong, Vice Minister for Industry and Technology<sup>12</sup>). Observers in Korea realize that Korea in today's world cannot simply focus on maximizing its export potential, but should increase technological cooperation as part of using and revitalizing trade agreements with advanced economies to increase productivity and international competitiveness.<sup>13</sup>

From a European perspective, such a position creates a window of opportunity to fill the idea of a new generation of FTA with life. Having both designated each other as a Strategic Partner, the EU and Korea could venture on a path to develop deeper technological cooperation in partnership of public and private interests and within the framework of the 2011 FTA.

There has been some concern whether the commitment to a "strategic partnership" might be merely a declamatory one, as the two entities, South Korea and the European Union, are rather different and are, arguably, not very relevant for each other's security concerns.<sup>14</sup> In the field of economic and technological cooperation, there is an option to combine strategic interests of both parties and from an EU perspective to create value added for their member countries, which might also be interested in such cooperation but lack the institutional framework of a new generation FTA to solidify and back up their activities.

Such win-win situations cannot necessarily be expected in all industrial and service sectors. In the following, it will be argued that E-mobility fulfils such a condition.

Under the EU-Korea FTA, pro-active cooperation in E-mobility can be subsumed under the heading of "new technologies", which are not incorporated in current vehicles and parts that are already covered by the FTA. According to Article 6 of Annex 2-C ("Motor Vehicles and Parts"), the access to new products shall not be prevented or unduly delayed. An unattended development of such new products encompassing aspects of electric mobility could lead to considerable issues of unbalanced market penetration later on and deserves action in the context of the FTA. Such activities are facilitated through Article 1 (e) of the already mentioned Annex 2-C, which explicitly proposes "enhancing cooperation to foster continued mutually beneficial development in trade".

Can the Framework Agreement play a specific role in this context as well? The FA addresses rather general topics (i. e. security, politics, etc.) and does not have a strict timeline in which to implement certain agreements; the first action with reference to the FA was doubling the number of EU-Centres in South Korea to four in 2011. The FA mentions a number of topics earmarked for further cooperation, however. They include in its Title IV on Cooperation in the Area of Economic Development, among other issues, business cooperation, in particular when relevant for small and medium enterprises (SME) (Article 11), science and technology (Article 16), energy (Article 17) and transport (Article 18). Thus, E-mobility is positioned at the intersection of four major topics of the bilateral FA. The FA, in combination with Annex 2-C of the FTA, both constitute a viable mandate and rationale for bilateral cooperation in the development of E-mobility and the involvement of EU authorities.

Before discussing potential activity further, the relevant industries of both the EU and of Korea have to be sketched.

<sup>11</sup> For an introduction to such issues, see Pape 2013: 282–283.

<sup>12</sup> See Bae 2013.

<sup>13</sup> Kang 2013: 3.

<sup>14</sup> Kelly 2012.

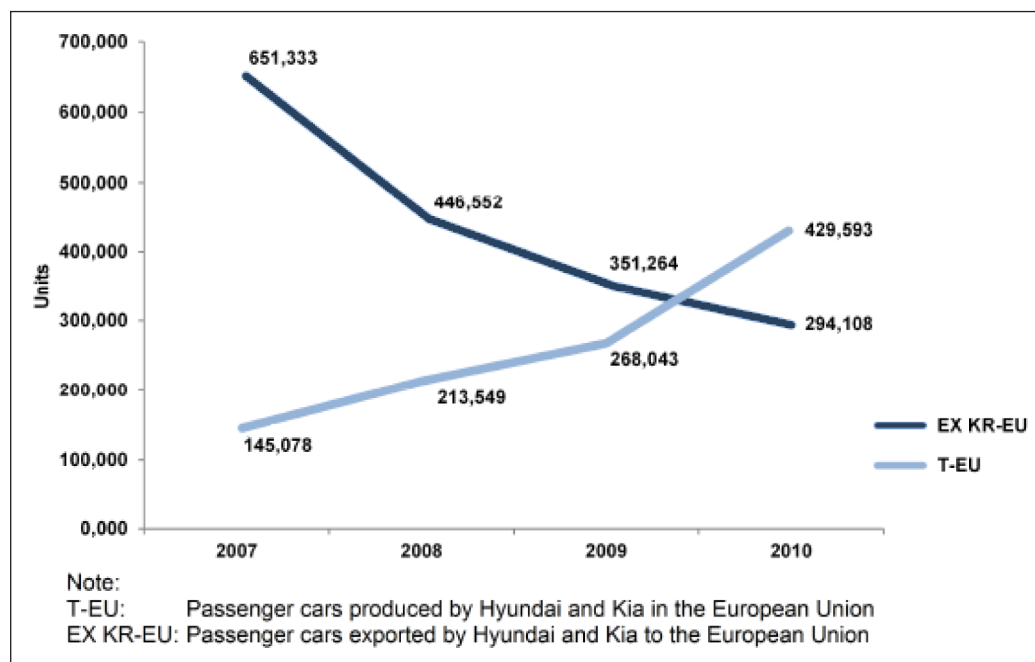


### 3 The competitive strengths of Korean auto industry in E-mobility<sup>15</sup>

Korea has a fairly young history of building automobiles. The first original development was Hyundai's "Pony", which entered production in 1976. Hyundai, still the leading firm, turned to the European market in 1978. Today, Korea's auto industry ranks as the fifth largest worldwide and as the sixth largest exporter. Korea is one of the leading global producers of automobiles mostly due to Hyundai-Kia's high volume of passenger cars. The strengths of this company are considered to be good quality including reliability, combined with unusually long warranty periods, affordable prices, an efficient after sales network and, more recently, an increased focus on exterior design. There is still a weakness in terms of a technologically capable domestic supplier base, while the automobile industry normally has to rely on layers of efficient parts suppliers. This problem is a legacy of the weakness of SMEs in Korea in general, in comparison to the overwhelming role of the industrial conglomerates ("chaebol" groups).

Hence, there is considerable scope for cooperation between EU manufacturers and Korean auto companies, also in the emerging field of E-mobility. Chances for mutually fruitful interchanges also exist the other way round. While Korea still may have the image of "flooding" the European market with exports, there is a strong tendency towards localizing production on the regional level. This is clearly visible from statistical data on Korean auto sales in Europe (Figure 2). This is to some extent based on the mentioned weaknesses of Korean parts suppliers, but also on other factors like developing design more closely in line with regional preferences. (It is still too early to judge whether such ratios can be extrapolated to where Korean electric vehicles earmarked for the European market would be produced).

**Figure 2: Hyundai and Kia sales in the EU originating from (Korean) exports and European production facilities**



Source: Data from ACEA (ed.) 2011

Despite the general issue of weaknesses in parts supply, Korea's leading enterprises have moved fast in terms of developing new technologies, and Korea is particularly strong in electric and hybrid vehicle technologies, where it can now be ranked as a global leader next to Japan's industry. According to Table 6, Hyundai-Kia now ranks as no. 6 in terms of patent applications, and the recent dynamics in terms of 2011 data is particularly impressive.

<sup>15</sup> For more details and sources, see Horak/Pascha 2012.

**Table 6: Patent applications of the 15 largest auto makers in E-mobility (electro and hybrid vehicles)**

	2006	2007	2008	2009	2010	2011	Total
Toyota	208	352	466	613	627	322	2,588
Nissan	164	169	133	139	236	99	940
Honda	189	132	123	83	113	87	727
Ford	79	53	62	67	107	87	455
Mitsubishi	31	43	56	64	86	86	366
Hyundai/Kia	9	31	24	60	41	118	283
Daimler	4	1	18	37	66	79	205
General Motors	28	35	16	32	42	29	182
PSA	13	11	40	23	38	51	176
Volkswagen	23	15	8	27	29	46	148
Mazda	3	10	37	23	39	34	146
BMW	1	5	17	32	33	46	134
Suzuki	23	9	5	3	2	38	80
Chrysler	4	2	4	5	4	27	46
Fiat Group	3	1	3	4	3	2	16

Source: Grünecker, 2011

Note: Based on patent data bank delphion.com. Search: hybrid vehicle OR electric vehicle OR Hybridfahrzeug OR Elektrofahrzeug. Recherchierte Schutzrechte: DE, EP, US, WO, JP.

As for vehicle parts, despite the mentioned technological weaknesses among Korean parts suppliers, Korea now accounts for a global market share of 38.5 % in 2011<sup>16</sup>, roughly the same as Japan's. The five major players in Korea's rechargeable battery industry are LG Chem, Samsung SDI, SK Energy, SK Innovation/Continental and SB Limotive. Informally, Panasonic, LG Chem and Samsung SDI are often mentioned as leaders in Li-ion technology. Given Japan's traditional strength in NiMH battery technology, originating from an earlier generation of electric home devices, Korea's battery producers have followed a strategy of leap-frogging and moving into the promising field of lithium-ion batteries with their superior properties. Electronics makers have profited from these capabilities in smartphone applications and other mobile IT devices. These uses have also shaped the trajectory of lithium-ion battery development, and it is still a challenge to transfer this know-how successfully to inexpensive, long-during and reliable auto batteries. The challenge of developing appropriate batteries will be of utmost strategic importance for the eventual market success of electric vehicles. While Korea is in a very good starting position, it is by no means certain that by "going it alone", i. e. a home bias in technology development and production, Korean producers can develop and maintain a leading global market position in electric vehicles. More recently, Korean companies have started to engage in noteworthy international cooperation, so there is a basis for develop such contacts further. New commitments involving European partners in 2013 include: Renault and LG Chem have been reported in early November 2013 to team up to build a new high-speed electric vehicle, and SK Innovation and German Continental have started a joint venture in early 2013 to develop, produce and sell lithium-ion-based batteries.<sup>17</sup>

Compared to the Korean situation, the comparative advantages of European auto industry are a well-developed, highly productive and innovative parts supplier network, well-established know-how in auto technology and design, and access to a major global market, opening considerable opportunities for fruitful cooperation.

Another important framework factor is government action. When explaining the strong position of Korean battery makers, usually three points are mentioned in particular: The comparatively strong experience with lithium-ion batteries (notebooks, mobile phones, etc.), the creation of strategic industries by government through subsidies et al., and finally the strategic guidance (government–industry) and

<sup>16</sup> Data according to Chosun Ilbo 2011.

<sup>17</sup> Kim Tae-gyu 2013, Rauwald 2012.

cooperative agreements (conglomerates - suppliers). It is therefore important to take a closer look at Korean public policies.

The South Korean government has strongly supported the development of E-mobility. According to the recent strategy, by 2015 Korea intends to be the fourth largest market for electric vehicles (EV). The yearly production goal for 2020 is one million EV p.a., of which 700,000 units are to be exported. The EV share is reckoned to be up to 10 % of compact and medium size passenger cars in Korea. The plans translate into a 10 % share of the global EV market. In the so-called “Green New Deal” programme of 2009-2012, the Korean government established a number of policies to strengthen the economy over the longer run. 1.4 bill. Euros were earmarked for the support of low carbon vehicles. The Ministry of Knowledge Economy is in charge of executing the respective policies. A “Green Car Forum” was launched jointly by academia and private interests to speed up the commercialization of low carbon cars. Related traffic laws were introduced, so electric vehicles can for instance drive on designated roads. R&D support focusses on battery technology and related systems. Lithium-ion battery development is supported with some EUR 270 Mill. (until 2014). In addition, financial support is given to public entities and localities for using electric vehicles for public transport, two-wheelers, etc. Heavy investments into smart grid projects are foreseen, which will also have a strong impact on electricity-related innovation.

The support thus extends well into infrastructure-related activities. According to very ambitious goals, 2.2 mill. charging points are envisioned until 2020. Government has earmarked a budget of ca. 111 Mill. Euro for this according to the 2011 roadmap<sup>18</sup>. Nine exemplary cities with 16 charging stations have already been put in place, while the enormous difference between installed and prospective charging stations leaves room for considerable disappointment on the way towards realising the possibly over-zealous ambitions. Until 2030, expenses of 16 bill. Euro are expected for infrastructure, of which 10 % are to be committed by the government. On the Southern island of Jeju, a test of a smart grid is in place since 2009.

For customers purchasing electric vehicles, considerable discounts were already introduced: a 5 % reduction of the consumption tax and a 7 % reduction of the additional acquisition tax. In absolute terms, savings of 800 to 3000 Euro could be realized. Given the high price of electric vehicles, this is still only a fraction of the price difference to a conventional car with a comparable performance. Accordingly, it is difficult to trace actual purchases of electric cars by households in Korea. The lacking infrastructure, the small number of available charging stations and the still small range of purely electrically driven cars also play a role.

More recently, a setback has occurred during the final months of the Lee Myung-bak-led presidency, as the Finance Ministry has declined a request from the Environmental Ministry to provide more significant subsidies for private purchases.<sup>19</sup> It should be noted that other major players, including the German government, also have doubts whether purchase subsidies to private households make much sense to effectively and efficiently support E-mobility, so this should not be considered as a setback for E-mobility per se.

On another level, Korea industry and government are increasingly looking at fuel cell technologies, for which a number of optimistic demand forecasts have been published recently. Korea so far is a leader in this field, particularly with respect to light-duty vehicle commercialization<sup>20</sup>, with Hyundai's ix 35 already available on the market. While there is no space here to elaborate on this alternative approach to a new combustion technologies for future mobility, it has to be noticed that E-mobility cannot be seen and treated as a separate field of technological and industrial advance, but is interrelated with competing and to some extent complementary areas.

In international comparison, Korea enjoys one of the top ranks in technology, particularly because of its battery know-how, but lacks a significant home base beyond its not negligible domestic market. While in terms of industry development it ranks third place, ahead of any European economy, it still falls

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<sup>18</sup> See Virtanen/Lee 2010.

<sup>19</sup> Choi 2012.

<sup>20</sup> See Sunderland 2012; also Green Car Congress 2013 on a report by Navigant Research, for example.



considerably behind the US and particularly Japan (Table 7). In terms of government support, national R&D funding based on figures up to 2012 have one of the highest ratios in comparison to economic size, measured by GDP, although in absolute terms it is lower than several other advanced economies, including Germany and France. Such figures and ranks are not particularly robust though. Korea's national funding/GDP rank including 2013 figures is considerably lower<sup>21</sup>, probably because of the change in the presidency and slow policy recalibration.

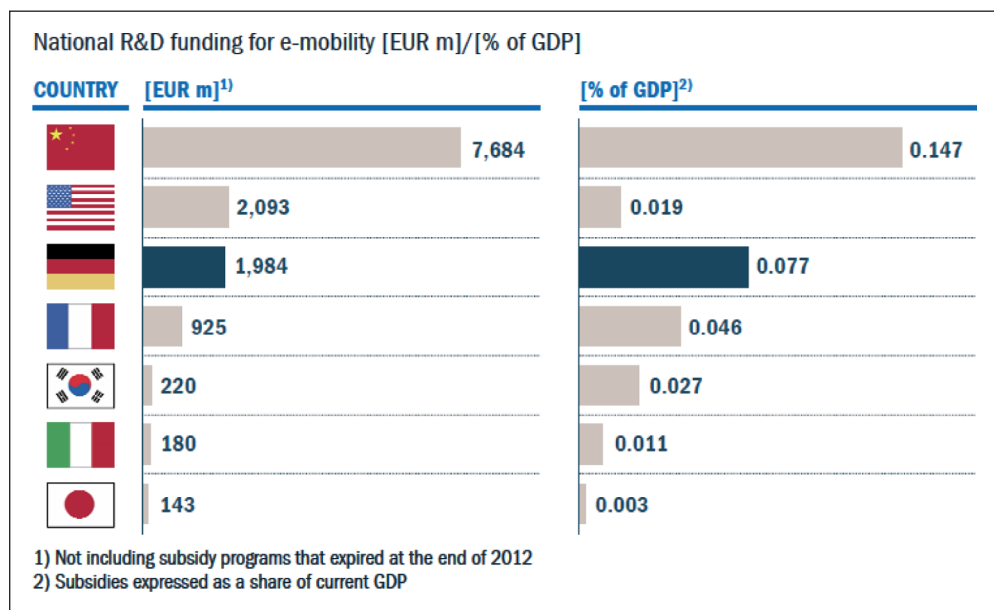
**Table 7: fka/Roland Berger E-mobility Index for Q3/2013: Ranking of seven major economies by indicator**

Rank	Industry	Technology	Market
1	Japan 3.1	Germany 3.4	USA 5.0
2	USA 1.8	Korea 3.4	France 5.0
3	Korea 1.2	France 2.7	Japan 3.1
4	Germany 0.7	China 2.3	Germany 1.8
5	France 0.7	Japan 2.0	Korea 0.6
6	China 0.6	USA 0.8	China 0.4
7	Italy 0.0	Italy 0.2	Italy 0.5

Source: Adapted from fka/Berger 2013b: 8

Note: Maximum value of 5 for each indicator

**Figure 3: Government R & D funding for seven major economies, as of Q1/2013**



Source: fka/Berger 2013a: 6

Summing up, market success even in an innovation-friendly environment like Korea is still behind the horizon, and the recent disappointments about realizing ambitious sales figures – not only among Korean makers but on a global scale – have been a foreseeable consequence. The most important Korean government measures are therefore still to organize strategic guidance based on a long-term vision, to support the extremely costly development of infrastructure, and to subsidize research and development of strategically important components and products. While Korea currently has a strong position in E-mobility, it lacks a sufficient market as well as a truly sizable industrial basis, despite household names like Hyundai or established battery makers. In order not to be outpaced when more countries among the global heavy-weight enter this field in a serious manner, it can be expected to be interested in more industrial cooperation, for which the FA and the NG-FTA with the EU could be a ready-made institutional basis.

21 See fka/Roland Berger 2013b: 9.

## 4 Current activities of the EU and its member states in the public policy sphere of E-mobility

Before discussing how to approach the opportunities for closer cooperation between the EU and Korea on E-mobility, it is meaningful to take a closer look at current European approaches towards E-mobility. The first aspect to note in this context is the extremely diverse situation in the EU, which makes it difficult to sketch the general situation and to draw conclusions for the EU as a whole. An example can illustrate this problem: Car sharing is widely seen as an important potential market for electric vehicles, particularly in the early phase in which it will still be difficult to attract private customers. While there are currently more than 150,000 cars under such schemes in Germany or the UK, there are less than 30,000 in France. Thus, supporting car sharing schemes will have very divergent effects on different European regions, and this may also hold for policies or measures meant to support EU-Korea cooperation.

Accordingly, there are considerable differences between the national approaches towards E-mobility within the EU, as exemplified by a comparison of major French and German policy measures (Table 8): France offers a considerable rebate for customers purchasing an electric vehicle, for example, while Germany has not introduced such a scheme, and is quite opposed to such an idea, possibly influenced by its market economy-oriented policy principles.<sup>22</sup>

**Table 8: Heterogeneity in public policy frameworks within the EU: The cases of France and Germany**

Item	Germany	France
Financial incentives & taxation	No buyers' premium 2009–2011: EUR 500 million provided to promote electro-mobility Vehicle tax walver Taxation disadvantages for EV company cars will be abolished	Consumers receive a EUR 5,000 check Coordinated delivery of 50,000 electric vehicles to 20 large private and public companies No company car tax applies for EVs and Hybrids
Research financing	Additional R & D funds of EUR 1 billion	ca. EUR 107 million (2009–2010) Loans for innovative R & D projects
Infrastructure	Eight metropolitan model regions Support R & D activities for inductive and quick charging technologies and encourages local authorities to establish charging infrastructure	Short-term plan: 1250 public charging stations to be installed by 2012 in 20 cities. Investments: EUR 60 million Local administrations increasing the EV share of their fleets and initiating car-sharing projects
State aid	National Platform for Electric Mobility (NPE) The Government plans to buy EVs for their official fleet Close cooperation with the Chinese government in the area of norms and standardization	Subsidizes buying EVs, sets legal standards, and formulates technical recommendations for infrastructures
Consumer perception	Majority can imagine buying an EV, natural gas or fuel cell powered vehicle in the future at a price of conventional vehicles Most favor recharging at home	Approx. 30 % of French consumers show interest and consider purchasing an electric or hybrid vehicle Every fifth states lower running cost as purchase motivation The willingness to pay a premium is low

Source: Collected by Werner Pascha and Sven Horak from various national sources

Major EU-level activities have been informed by the European strategy on clean and efficient vehicles<sup>23</sup> and can be summarized under four major headlines:

<sup>22</sup> For empirically-based scepticism with respect to the importance of purchase subsidies, see for example Chandra et al. 2010.

<sup>23</sup> EC 28.4.2010.

- Support for research and development under various mechanisms available to the Commission (see Table 9),
- Regulatory measures, in line with the multilateral framework set by the UNECE Agreements as administered through WP.29<sup>24</sup>,
- Pilot projects,
- Developing a vision on E-mobility as part of the future of European auto industry, promoted through the CARS 21 High Level Group (2010–12).

**Table 9: Selected R & D support schemes of the European Union for E-mobility**

Projects	European Union	
7th Framework Program for Research and Technological Development (FP7)	EE-VERT	<b>Energy Efficient Vehicles for Road Transport.</b> Goal: Strategy development for the reduction of fuel consumption and emissions in conventional and hybrid vehicles to 120 g CO <sub>2</sub> /km by 2012 and emission reduction of 40 % for light passenger vehicles by 2020. Project duration: 3 years from January 2009.
	POLYZION	<b>Fast rechargeable zinc-polymer battery based on ionic liquids.</b> Goal: Development of low-cost fast chargeable zinc-polymer batteries with minimal environmental impact to be used in hybrid and small EVs. Project duration: 3 years from August 2008.
	VIETA	<b>Vehicle Independent Electric Transmission Architectures.</b> Goal: Development of a vehicle-independent electric transmission architecture system for urban EVs and commercial vehicles. Project duration: 3 years from September 2009.
	HySaST	Hydrogen Safety for Storage and Transport
European Commission Joint Research Centre projects	ETEA	Energy and Transport Techno-Economic Assessment
	SYSTEM	Energy Systems Technology Modelling
	TransTech	Transport Technologies and Emissions
	AIRMODE	Air Quality and Transport Modelling
	OVERSEE	Open vehicular secure platform
	G4V	Grid for vehicles
European Green Car Initiative	EUR 500 million out of the FP7 to support R & D activities for green drive technology in the frame of a public-private partnership. Private firms are expected to contribute an equal sum for R & D activities. The European Investment Bank provides a loan of EUR 4 billion. Duration: 2009–2013.	

Source: Collected by Werner Pascha and Sven Horak from various sources

Major points of the CARS 21 report that was passed in June 2012 and has eventually been the basis for the CARS 2020 Action Plan passed in November 2012 include the following<sup>25</sup>:

- Emphasis on improving environmental performance of European auto manufacturing.
- A portfolio of alternative fuels, and develop an alternative infrastructure (e. g. for E-mobility) in line with technological progress.
- Need for recharging infrastructure at home and work places.
- Need for standardization on the European level to achieve interoperability.
- Further significant support for R & D on the EU level as part of the forthcoming Horizon 2020 initiative (within its proposed overall budget of EUR 80 billion).
- Reform of the 1958 UNECE Agreement on regulatory harmonization of vehicle registrations, to make it more attractive for adoption on non-European markets as well.
- Bilateral regulatory cooperation, in addition to multilateral cooperation, with the US and Japan explicitly mentioned as possible “examples” in the summarizing Memo.

<sup>24</sup> More on this below in the chapter on policy suggestions.

<sup>25</sup> CARS 21 Group 2011 and 2012, EC 8. 11. 2012. See also Renders 2013.

- The EU-Korea FTA is mentioned approvingly, as it is “to a large extent” (Interim Report, p. 28) in accordance with UNECE regulations.

Among this list, three aspects are particularly noteworthy: The emphasis given to newly emerging propulsion technologies, while not focusing exclusively on E-mobility and keeping other options as important alternatives, the emphasis on standardization and harmonization, and finally the role assigned to bilateral regulatory cooperation.

While member states of the EU develop and follow their individual policy agendas on E-mobility, the EU offers its own value proposition for international partners and for its own population: As an actor in extra-regional relations, it gives global partners additional scope for access and cooperation with the European area, for instance in the context of (bilateral) trade agreements.

## 5 Developing policy suggestions for the EU

Possible policy action to strengthen trade and investment relations between Korea and the EU, based on the FA and the FTA, will be discussed in one specific area: E-mobility. This is based on the argument that such support should be targeted in order not to be diluted, and focussed on areas in which significant synergies are conceivable. In the case at hand, Korea enjoys a strong technological position but needs to embrace the biggest global markets, whereas the EU with its huge domestic market, while enjoying technological strengths in several relevant fields, could profit from Korean complementarities, for instance with respect to battery capabilities. Cooperation in standardization may create important synergies within the respective regions and on the global level.

When developing suggestions for public diplomacy initiatives for the bilateral relationship between the EU and Korea on matters of E-mobility, one has to bear in mind that such activities will only be part of more encompassing policies to support European E-mobility. The alternatives include:

- Measures of EU industry support, e.g. R&D subsidies or rebates for electric vehicle purchases, and identifying an appropriate division of labour between general and industry-specific, E-mobility-related measures,
- Measures on the level of EU member states below the community level, and identifying an appropriate division of labour between the community level and member states,
- Measures of private industry and industry associations, while aspiring to an appropriate demarcation between public and private spheres of action in terms of the subsidiarity principle.

In the following, the focus will be on the more limited role of the bilateral policy sphere between the government of the ROK and the relevant EU authorities. Based on the arguments discussed and in consideration of the final report of the CARS 21 Group as well as the CARS 2020 Action Plan, the following three areas seem particularly relevant<sup>26</sup>:

- a) Observing trade and FDI access, following up on the FTA agreement,
- b) Standardization efforts,
- c) Supporting cooperation among public and – wherever feasible – private partners.

### a) Observing trade and FDI access

The continuous and circumspect observation of the progress of the bilateral FTA is an important area even beyond the limited formal principle of “monitoring” discussed above. A bilateral Working Group on Motor Vehicle and Parts has already been set up through the FTA Agreement (Article 9), and it is thus a going concern for the European Commission to consider and address issues of facilitation and access. In the given context of E-mobility, experiences made through the EU-Korea FTA with conventional vehicles will give important insights into upcoming issues and can pre-empt potential problems with E-mobility.

<sup>26</sup> For a wider context, see Pape 2013.

A key issue about market access of electric vehicles including major components will in the future be safety concerns. Batteries store considerable energy, which can result in dangerous calamities. This could potentially become a future trade barrier. Article 6 of the FTA Agreement, which is meant to ensure market access for new technologies, explicitly names “a risk for human health, safety or the environment” as a possible case for exceptions. Article 7 also explicitly legitimizes “regulatory measures” in such cases. Time will show to what extent both sides of the Agreement will honour the spirit behind these stipulations. An amiable dialogue on how to apply Annex 2-C in the motor industry will be important to enable a smooth incorporation of E-mobility into the existing framework of liberalizing bilateral trade and investment.

It might be advisable to ask the Working Group on Motor Vehicles and Parts (based on Article 9 of Annex 2-C) to make potential issues of new technologies, including E-mobility, a regular part of the agenda of the meetings. Such meetings are to be scheduled (at least) once a year. During the first year of the FTA, the Working Group on Motor Vehicles and parts has met once, on 26–27 August 2012, to discuss the implementation of the FTA and “in particular regulatory aspects referring to product acceptance”, including an information exchange on existing and new regulatory initiatives.<sup>27</sup> A specialized sub-group, possibly with more external participation from industry, might meet more frequently to handle emergent technology issues.

## **b) Standardization efforts**

For new technologies, it is well understood that standardization is one of the most important mechanisms to define the framework of an emerging industry, with considerable consequences for how fast companies from various countries can enter the new market and develop competitiveness.<sup>28</sup> This holds for auto industry in particular, with its vast number of parts that have to complement each other. The EU has some issues with Korean auto regulations, as documented for instance in the communications of the Automotive Committee of the former European Union Chamber of Commerce in Korea (EUCCK).<sup>29</sup>

With respect to E-mobility in an EU-Korea context, two issues in particular deserve closer attention: First, efforts to redesign the 1958, 1997 and 1998 Agreements on vehicle regulation by the United Nations Economic Commission for Europe (“UNECE”), and second, efforts to develop a universal standard for battery charging.

The UNECE agreements are administered by a working party, the World Forum for Harmonization of Vehicle Regulations (WP.29), in which any UN member country can participate. Despite its European origin, WP.29 has become the focal institution for vehicle-related international agreements on the global level. For changing regulations or for accommodating new technological developments like E-mobility, subsidiary working parties are set up, also known as Groups of Rapporteurs (GRs). It is understood that the UNECE set of agreements is in need of a thorough revision, and it will be important to what extent the different states will feel part of this process. Currently, the ROK is a contracting party for only a handful of UNECE regulations, which is a low number for an advanced economy with a large auto industry<sup>30</sup>; in addition, Korea has agreed to several more UNECE regulations in the EU-Korea FTA Agreement. Nevertheless, it seems fair to point out that while the EU is at the centre of any major effort to redesign the UNECE agreements, often engaging with the US and Japan in such initiatives, Korea is not so much in the limelight.

An Informal Working Group was set up that was asked to make proposals for reviewing and updating the UNECE agreements. The Working Group has submitted a roadmap that was endorsed in 2011. The Group is chaired by the EU and Japan, while it has recently been decided that China, India and Korea should be invited to participate more actively in WP.29 affairs.<sup>31</sup> It has always been more difficult to engage the US in this process, though the US is reported to have approached the EU and Japan “about

27 EC 25.2.2013: 6.

28 Matutes/Regibeau 1996.

29 See also Decreux et al. 2010.

30 See the map at <http://www.unece.org/trans/maps/number-of-un-transport-conventions-and-agreements-per-country.html>. Moreover, see EU Commission 23.3.2012.

31 See EU Commission 23.3.2012: 5.



discussing international harmonisation on electric vehicles”; based on this initiative, the EU, US, Japan and China have started work on these matters<sup>32</sup>.

Taking the notion of a Strategic Partnership between the EU and Korea seriously, it is suggested that the EU makes sincere efforts to include the Republic of Korea in the core groups of such deliberations, hopefully based on a common understanding of mutually shared objectives. Given Korea’s role as a pivotal moderator between Japan and China in the Northeast Asian area, such an alignment between EU and Korean efforts can help to develop mutually beneficial common regulations between the whole region and the EU, hopefully of course also encompassing the US and other important economies like India or the ASEAN group.

Joint seminars of experts and decision makers can help to develop common perspectives. In May 2012, for example, representatives of the European Commission and Japan met for discussing “Enhancing International Harmonisation of Technical Regulations for Motor Vehicles: Review of the UNECE 1958 Agreement”.<sup>33</sup> This could serve as a prototype for similar EU-Korean ventures. There are also other initiatives that may be considered: For instance, German Ministry of Economics and Technology has supported a German-Chinese subcommittee working on issues of standardization in E-mobility.<sup>34</sup> As a step towards developing joint EU and Korean perspectives on such matters, it is suggested to organize a seminar on harmonization of regulations in the auto industry in the bilateral EU-Korea context, possibly focussing on E-mobility. This could, in the context of filling the notion of a Strategic Partnership with life, eventually develop into a yearly EU-Korea Roundtable on Future Mobility, involving leading industry representatives and other stakeholders as well.

An alternative to consider carefully is to position such a dialogue forum, if the counterparts agree, in the context of the Trilateral Secretariat, an office set up by China, Japan and Korea in Seoul in late 2011 to promote international cooperation among the three Northeast Asian states. The Korean government is very interested to support this Secretariat, as it can contribute to improved and mutually beneficial relations in the region. An EU engagement with the Trilateral Secretariat in a specific context, here E-mobility, could support this process and involve the EU in a promising attempt of region-building. The context of Northeast Asia would be particularly adequate, because all three countries share a considerable interest and capacity in E-mobility. A consideration to be weighed carefully is how other players would view such a bi-regional dialogue.

The second aspect to be discussed with respect to standardization efforts are charging systems for electric vehicles, particularly the plugs used in this context. While this is only one example of what issues are involved on the operational level of reaching international harmonisation – below the more institutional issues of how to handle the UNECE reforms –, it is of particular importance for E-mobility and has therefore raised considerable attention in recent months and years.

The major solution for charging electric vehicles is having a battery on board of the car and recharging it at home or at designated places by the roadside.<sup>35</sup> For the necessary plugs involved, there is a basic decision between using AC or DC type. Moreover, different number and arrangement of connections can be installed. Leaving the technical aspects aside, the US and Japan have been using a so-called one-phase slow charging system (type 1), whereas many European makers have turned to a three-phase system of type 2. Based on the 2011 policy position of European industry (EUCCK), the Automotive Committee hoped Korea to adopt charging stations not discriminating against type 2.<sup>36</sup>

In the meantime, eight major German and US auto makers have agreed in early 2012 on a so-called “Combined Charging System”. The CCS has several merits due to its “combo plug” architecture, while looking somewhat bulky. It works as a one-phase AC plug, as a three-phase AC fast charger, and it can also be used for DC charging at home and for ultra-fast DC-charging at public stations. The Euro-

32 Based on March 2012 information from an EU-supported seminar in Tokyo. See EU-Japan Centre for Industrial Cooperation 2012: 5.

33 See EU-Japan Centre for Industrial Cooperation 2012.

34 See DIN 2012.

35 This holds for plug-in hybrids, range extenders and of course battery-electric vehicles.

36 Based on information from the now defunct website of the EUCCK, accessed in April 2012 (“Market Access 2011”, Automotive).

pean Automobile Manufacturers Association (ACEA) has selected CCS for new cars in Europe as from 2017.<sup>37</sup> SAE International, a US-based organization formerly known as the Society of Automotive Engineers, has finally authorized and announced the detailed specifications of CCS in mid-October 2012. One disadvantage is that it seems incompatible with the evolving Japanese standard, developed by CHAdeMO, an association of Japanese companies interested in E-mobility. While the CHAdeMO system has its merits, including being used by some 30,000 vehicles and 900 public chargers in Europe, organising the interest association as a mainly Japanese network may have been heavy-handed in the first place. Recently, after a draft document of the European Parliament seemed to suggest a phase-out of the CHAdeMO standard, the association issued a strongly worded objection against such ideas in September 2013.<sup>38</sup> Strengthening exchanges with Korea, there could be a chance to work towards a more diplomatic and nuanced development of common perspectives with the East Asian region, including the viability of introducing CCS.

### c) Supporting other types of cooperation

A final area of potential bilateral EU-Korea activities is supporting cooperation of other, including private actors within the EU and Korea context. Three issues deserve attention: Cooperation among private enterprises, including strategic alliances, support for setting up E-mobility-related investment in the EU, and support for (European) small and medium enterprises to profit from the opportunities of E-mobility in a bilateral context.

As for bilateral B2B cooperation, the respective comparative advantages of Korean and European companies in E-mobility offer significant chances for joint efforts. The most well-known example is arguably SB Limotive, a joint venture (50/50) between Samsung SDI and Bosch, a major auto parts manufacturer based in Germany. Samsung contributed li-ion battery know-how, primarily derived from its expertise in electronic devices like smartphones, while Bosch made use of its auto electrification know-how to jointly develop advanced battery solutions for cars. The joint venture started in 2008, acquired a US battery producer in due course, and took up production in Ulsan/ROK, with ca. 850 employees. SB Limotive has become a major player on the global level, sharing some 9 % of world market. Serious problems surfaced in 2012, however: The market estimation for batteries has been too optimistic, and differences of opinion occurred about how to react. In this situation, divergent views about the future vision seem to have surfaced: Should the JV focus on auto-related technologies; should it rather put battery know-how at its core? Possibly, there may also have been a trust issue in the background, but this is difficult to verify. Eventually, in September 2012 it was announced that the joint venture will be disbanded. Bosch will refocus its battery strategy, strengthen lithium-ion capabilities, including work on the battery management system in Germany, and hopes to “set up a European specialist network”. It is also argued that Bosch wants to be more independent and emphasize the European market more strongly. Relations with Samsung will remain: current project obligations will be fulfilled and an exchange of patents has been agreed.<sup>39</sup>

While this is not an entirely successful example of European-Korean private sector cooperation in E-mobility, other initiatives are forcefully moving forward. In July 2012, for example, a joint venture between SK Innovation and Continental AG, another German auto parts supplier was agreed and started in early 2013. The joint company is based in Berlin. SK Innovation, with a 51 % stake, will contribute its battery cells know-how, while Continental (49 %) will bring its battery system know-how into the company.<sup>40</sup>

While there are encouraging signals, a major question is what a public sector actor like the European Commission should – in terms of subsidiarity – or indeed could – in terms of suitable policy instruments – do on such matters. The EU’s major contribution could be to work on an amicable, high-trust environment for E-mobility, in which both European and Korean enterprises feel positively escorted when

37 The following website collects valuable information on the development of the various plug systems: <http://greentransportation.info/ev-fast-charging-whether-standardized-or-not>.

38 Morris 2013.

39 See Bosch Media Service 2012.

40 See Rauwald 2012.

engaging in joint activities. As suggested above, joint seminars on important issues like standardization could contribute to such an atmosphere.

A second area of interest could be support for setting up E-mobility-related investment in the EU. As discussed elsewhere (Figure 2 above), there is a remarkable trend in the Korean auto industry to set up auto production abroad, including production facilities in Europe. It is still early to develop an informed opinion on whether this is a tendency that will repeat itself in terms of locating production of electric vehicles, including production of major parts like batteries. Under the current circumstances of a more subdued optimism regarding the market size for E-mobility in forthcoming years, one has to be careful about offering premature judgments. However, currently there are no indications that Korean companies will depart from their location strategies in the case of E-mobility related investment. On the contrary, there may be some technical reasons why localized production of electric vehicles and batteries may play an even more important role than in conventional auto production: Batteries store considerable electrical energy and are therefore difficult to handle. For instance, as batteries should never be fully discharged, there are still issues about how to safely send batteries from one global production site to a car assembly plant elsewhere. It may therefore be more economical in the future to locate battery production close to assembly plants, and both of them close to major markets. This would give a major market like the EU considerable advantages to attract investment from Korea. National or even subnational governments within the EU will probably be the most important contact points on such issues, but the EU could help to set up appropriate dialogue mechanisms to facilitate the options of setting up E-mobility-related investment in the EU.

Finally, a third area of activity could be related to supporting (European) small and medium enterprises (SME) to profit from the opportunities of E-mobility in a bilateral context. As noted above, a special concern for SMEs is contained in the bilateral Framework Agreement. On the one hand, SME engagement seems particularly fruitful in the case of E-mobility, while on the other hand, it has to be pointed out that how to engage SMEs in international business and how to support such an engagement through public policy instruments is notoriously difficult.

As for the first point, SMEs play an important role in the wide-spread supply chains of the auto industry. Because of the introduction of E-mobility, many auto parts will have to be adjusted and reconfigured, including taking care of different safety concerns. There will be considerable scope for capable, innovative smaller parts suppliers to create lucrative business opportunities. Such issues are also particularly interesting in the Korean and European context. For Korea, how to support a lagging SME sector is a major point of interest for the new South Korean government, given concerns about the overwhelming strength of the chaebol conglomerates, distribution of income and wealth, and “economic democratization” concerns. Strengthening SMEs is a central part of the efforts of the Park-led government to foster a “creative economy”.<sup>41</sup> If the EU can offer effective cooperation on supporting SME development in a strategically important sector, this can be an important argument for a Korean government, which will seek support for its major policy interests, to actively support closer bilateral relations.

From the perspective of the EU, SMEs are a major part of the industrial system of most, if not all member economies, while capable and globally strong auto manufacturers and large-size parts suppliers are concentrated in a few strong EU member states. Focussing on SME support in E-mobility could help to spread the benign effects of emerging E-mobility-related business activities to more EU regions.

Possible activities include seminars in various EU regions to introduce the potential of E-mobility-related business with Korean partners. More ambitious proposals might include traineeship periods for promising younger SME employees, possibly in line with the EU Gateway Programme. In order to develop a clearly focussed and feasible programme, it may be sensible to develop closer links with the Korea-Europe Premium Autoparts Partnership (KEPAP), an initiative of the Korea Trade-Investment Promotion Agency (KOTRA), which has the task of bringing together Korean autoparts manufacturers with European companies.<sup>42</sup>

41 E.g., Connell 2013.

42 KEPAP held an event in Frankfurt, Germany, on 28-29 November 2012, in which some 50 Korean auto parts manufacturers were represented. See [http://bayern-innovativ.de/ib/site/documents/media/11125345-7465-faa6-4528-7db669c8a70a.pdf/Korea\\_neu.pdf](http://bayern-innovativ.de/ib/site/documents/media/11125345-7465-faa6-4528-7db669c8a70a.pdf/Korea_neu.pdf).



## 6 Summary and major conclusions

In this paper, E-mobility was introduced as an important area of action to intensify the evolving EU-Korea relationship in terms of FDI and economic integration, based on the options established through the Framework Agreement and the Free Trade Agreement. Surveying the competitive situation of Korean auto industry, it was found that it both has strengths and remaining weaknesses that could be the basis for further industrial cooperation with the EU: Korea's internationally successful auto industry is particularly strong in building affordable cars, while in battery technology, Korea shares global leadership; other auto parts suppliers, particularly SMEs, are still technologically weak. In Korean companies have made efforts to localize production close to final markets through FDI, and this tendency could be even more pronounced for E-mobility. Korea makes significant government efforts to develop the industry, while some plans may be over-optimistic and have been curbed. Looking at EU public policies on the community level, while noting the diversity of the approaches of member states, three areas could be highlighted: R&D support, regulatory measures, developing a common vision. Based on this analysis, three areas for an intensified cooperation between the EU and the Republic of Korea were suggested: Carefully observing trade and FDI access, following up on the FTA agreement, standardization efforts as part of the multilateral efforts to reform the harmonization of regulation, and supporting cooperation among actors within the EU and Korea.

The desired positive effects for the EU go well beyond strengthening an industrial sector, as important over the long term as it may be: Filling a new generation-FTA with life will give important insights into how to design other NG-FTAs currently under consideration. A successful NG-FTA and FA between Korea and the EU can serve as a lighthouse in their respective regions and beyond, supporting their status as intellectual leaders in successful international cooperation.<sup>43</sup>

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