Managing Global Transitions

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Transatlantic Conflict and Cooperation Concerning Trade Issues

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The United States and the European Union are major players in the global economy. Economic relations between them are both extensive and deep. They account for about 45 percent of world Gross Domestic Product, 30 percent of world foreign direct investment flows, and 70 percent of world FDI stocks. Given their importance in the world economy, and their importance to each other's economies, it is critical that they cooperate with each other and keep conflict to a minimum. Fortunately, their trade disputes have been relatively few and have for the most part been settled amicably. Attempts to attain deeper economic integration have met with mixed success. The current negotiations for a Transatlantic Trade and Investment Partnership have potential for deepening their economic relationship, but care should be taken not to push beyond what is politically feasible.

Key Words: transatlantic, trade disputes, trade negotiations, investment, regulations
JEL Classification: F1, F5

Introduction

Transatlantic relations have undergone significant changes within the past twenty-five years. During the Cold War era, the United States and Western Europe were bound together by a perceived common threat from the Soviet Union. Consequently, economic issues commanded less attention than security issues. After the Cold War ended, economic issues were thought to be the bond that would hold the transatlantic relationship together. Much attention was given for several years to fostering economic cooperation through the development of intergovernmental initiatives.

After the terrorist incidents of September 11, 2001 in the United States, and the subsequent wars in Iraq and Afghanistan, security issues again came to the forefront of the relationship. However, in contrast to the earlier era that was mainly characterized by close cooperation, disagreements between the United States and major countries of Western Europe about how to deal with the terrorist threat created severe strains in

the relationship. By 2003, the third year of the George W Bush adminis-
tration, transatlantic political relations had reached perhaps their lowest
point since World War II. They have gradually improved since then, but
with a significant setback from Wikileaks revelations, and even more se-
rious strains resulting from the revelations by Edward Snowden concern-
ing United States surveillance activities. Security issues have come to the
forefront also in connection with regional unrest in the Middle East, EU
nations' dependence on Russian oil and gas, and Russian intrusions into
Ukraine.

Fortunately, conflicts in the political arena seem to have had minimal
impact on the transatlantic economic relationship. Merchandise trade be-
tween the US and the EU has doubled in value since 2000, as has trade in
services. Given that the US and the EU account for about 45% of world
GDP in nominal terms and about 40% in purchasing power parity terms,[1]
and given their long history of trading relations, it is not surprising that
they are each other's most important markets. Together they account for
about 30% of world trade. Much of their economic interaction is driven by
transatlantic investment. Together the US and the EU account for about
29% of the flow of world foreign direct investments,[2] and for about 70% of
the stock of world foreign direct investments (United Nations Conference
on Trade and Development 2014). Since 2000, Europe has attracted 56%
of total US foreign direct investment, with almost 80% of it going to the
UK, Ireland and the Netherlands (Hamilton and Quinlan 2014). For 2012,
US direct investment flows into the EU were $150 billion, and EU direct
investment flows into the US were $105.9 billion. At the end of 2012, 50.3%
of all direct investments by US residents were in the EU, while 62.2% of
all direct investments by EU residents were in the US (Cooper 2014).

The aim of this paper is to emphasize and demonstrate the impor-
tance of maintaining a high degree of economic cooperation between the
United States and the European Union. These two giant trading entities
have provided leadership in the formation of international economic in-
stitutions, and will play a crucial role in how the global economy evolves
in the future. The paper looks at this issue from several different angles.

The paper is structured so as to consider in the first instance the the-
oretical case for cooperation. International trade theory predicts that co-
operation will yield benefits for both sides. While it may be possible for
one side to gain from uncooperative behavior, the paper explains why
that is unlikely. The most assured path to improved economic welfare
runs through cooperation by both sides.

The second section of the paper considers to what degree the United States and the European Union have practiced trade cooperation on both the multilateral and bilateral levels. A long list of bilateral initiatives have been launched, some more successfully than others. These initiatives are described in the second section. Also summarized in the second section is the experience of the United States and the European Union in using the dispute settlement mechanism of the World Trade Organization to deal with conflict concerning trade matters.

The third section of the paper focuses on the most recent attempt by the United States and the European Union to improve cooperation in trade matters. The Transatlantic Trade and Investment Partnership negotiations, if successful, would be a major step forward in transatlantic economic cooperation. The third section sets forth the aims of the negotiations, enumerates some of the more difficult issues in the negotiations, and provides an assessment of where progress is more and less likely.

In the fourth section, the estimated economic effects of a Transatlantic Trade and Investment Partnership are discussed. Computable general equilibrium simulations of the effects are seen to conform to the theoretical prediction that greater economic cooperation between the United States and the European Union would yield significant benefits for both. And a higher degree of cooperation yields greater benefits than would a lesser degree. The final section of the paper provides a conclusion, arguing for a pragmatic approach toward future cooperation in view of the complex and contentious issues involved.

This is a review paper, summarizing and synthesizing previous research. Therefore, it does not pose specific research questions to be resolved through empirical testing. Its intent is to provide an overview of the degree of cooperation between the United States and the European Union on economic matters, and to provide some assessment of recent and current efforts to improve that level of cooperation.

Theoretical Case for Cooperation

An article of faith among economists is that, in the absence of market imperfections, unrestricted international trade and investment are mutually beneficial to the trading countries and will maximize world production of goods and services. Economists also recognize, however, that a large country can potentially benefit by trade restriction at the expense of its trading partners through improvement in its terms of trade. Conversely, a large country does not necessarily benefit from unilateral trade liber-
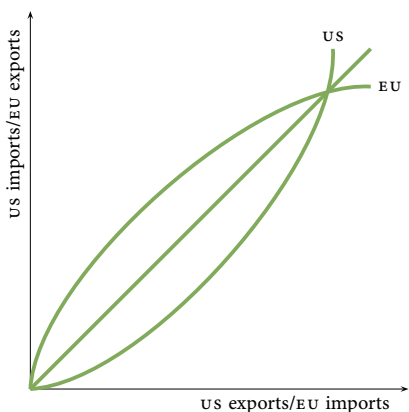
FIGURE 1   Trade Equilibrium before Trade Action
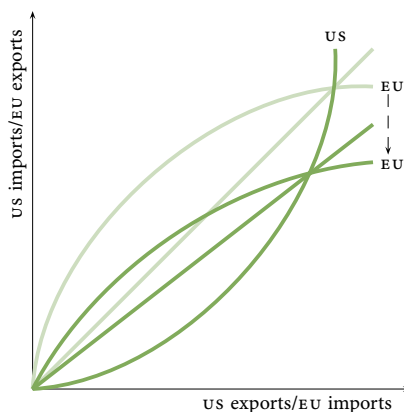
FIGURE 2   Trade Equilibrium after EU Violation

alization because of the terms of trade effect. The rationale for interna-
tional trade negotiations in which countries balance their trade liberal-
ization through reciprocity is that they can escape the 'prisoners dilemma'
whereby, while both countries could benefit if they liberalized their trade
simultaneously, if either does so unilaterally it will lose and its trading
partners will gain.[3]

This can be demonstrated using Marshallian offer curves in figures 1–
4. Let us assume as a baseline in figure 1 that trade between the United
States and the European Union is unrestricted. The free trade equilibrium
is where the US and EU offer curves intersect.

Figure 2 demonstrates the case where some trade restriction is imposed
by the EU on imports from the US. Because the European Union is a large
trading entity, as its offer curve is shifted down from EU to EU' by the
trade restriction its terms of trade improve.

If the United States retaliates with trade restrictions affecting an equiv-
alent volume of trade, its offer curve shifts (figure 3) from US to US',
restoring the original terms of trade.

However, the original EU trade violation and subsequent US retalia-
tion cause the volume of trade to shrink. Both countries will almost cer-
tainly be worse off (as indicated by their being on a lower trade indiffer-
ence curve (figure 4). Therefore, it is much preferable if, through either
trade negotiations or dispute settlement, the trade impediments can be
removed (returning to the situation depicted in figure 1), and the retalia-
tion avoided.
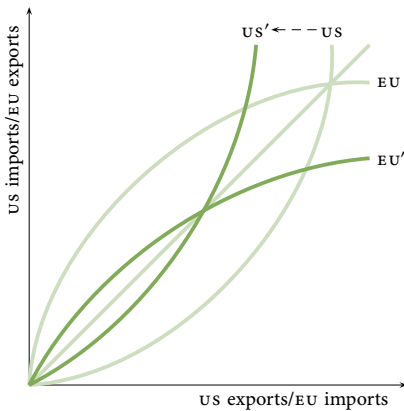
FIGURE 3 Trade Equilibrium after US Retaliation
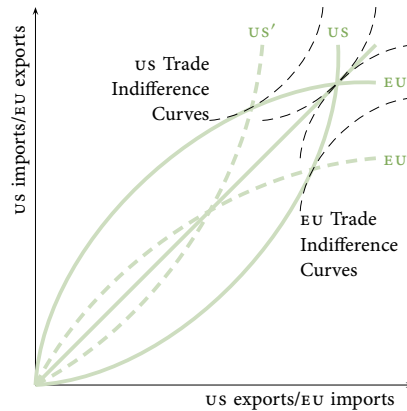
FIGURE 4 Trade Indifference Curves

Trade negotiations take place under conditions of uncertainty, however. Trade negotiators strike the best deal that they consider will be politically acceptable according to the imperfect information that they have at the time. But the world does not remain static. Shocks to the system occur because of unforeseen changes in economic conditions, or because the political situation has changed. What was a politically tenable situation before the shock may not remain so afterwards. Therefore, a major benefit of having a dispute settlement mechanism is that it provides an opportunity for renegotiation of the provisions of the trade agreement to take account of changed circumstances (Hauser and Roitinger 2002). If an opportunity for renegotiation through dispute settlement were not available, so that provisions of the trade agreement were rigidly applied, then negotiators (and legislators who must approve trade agreements) would be much more reluctant to engage in trade liberalization. Therefore, countries might remain stuck at a lower level of trade (figure 4) as opposed to moving through reciprocal trade liberalization to a higher level of trade with fewer restrictions (figure 1).

US-EU Trade Cooperation in Practice

The United States and the countries of the European Union have a strong record of cooperation in international trade matters since the end of World War II. Together they designed and implemented the world trade regime, beginning with the General Agreement on Tariffs and Trade in 1947 and continuing with the World Trade Organization in 1995. They

have been dominant players in multilateral trade negotiations from the first round in 1947 through the Uruguay Round in the 1990s. They have also attempted to address bilaterally issues that could not be adequately addressed in the multilateral arena. These efforts have included (Ahearn 2009; McKinney 2014):

- The Transatlantic Declaration of 1990 that began annual summits involving the President of the United States, the President of the European Council, and the President of the European Commission. These summits have helped to keep channels of communication open for the discussion at the highest levels of issues of mutual concern.

- A New Transatlantic Agenda adopted in 1995 that began regular consultations between interest groups: a Transatlantic Consumer Dialogue, a Transatlantic Labor Dialogue, a Transatlantic Environmental Dialogue, and a Transatlantic Business dialogue. Of these, the Transatlantic Business Dialogue has been the most active and has yielded the most substantive results.

- In 1998 a Transatlantic Economic Partnership agreement that focused primarily on trade relations. Among its goals were enhanced regulatory cooperation, improved consumer product safety, and mutual recognition of product standards. While some limited gains were made in these areas, the difficulty of the issues dealt with have in many cases made them intractable.

- In 1999, a joint statement on *Early Warning and Problem Prevention Mechanisms* that was designed to identify regulations that might inhibit trade before they were adopted. The increased transparency resulting from these mechanisms has no doubt been beneficial, but the overall efficacy of them is difficult to establish.

- In 2000, establishment of a *Consultative Forum on Biotechnology* intended to improve communication on biotechnology issues. While improved communication is always desirable, the trade problems arising from biotechnology issues have more to do with divergent attitudes on either side of the Atlantic concerning genetically modified organisms than they do with lack of communication.

- In 2002, adoption of *Guidelines for Regulatory Cooperation and Transparency* to improve cooperation by transatlantic regulatory agencies.

- In 2004, publication of a *Roadmap for EU-US Regulatory Coopera-tion and Transparency* aiming for more intensified regulatory coop-eration.

- In 2005, initiation of dialogues between the US Office of Manage-ment and Budget and the European Commission on transparency and risk assessment methodologies, and establishment of a *High-Level Regulatory Cooperation Forum* that brought in academics, business executives and high-level government officials to develop a joint regulatory work plan.

While these initiatives have been laudable in their intent, and while some trade liberalization has occurred as a result of them, their contri-butions beyond what had been agreed in the Uruguay Round has been limited. When dealing with behind the border measures that can distort trade but that often serve socially desirable purposes, such as product standards, health and safety regulations, data privacy, intellectual prop-erty protections, etc., the issues become complex and do not yield to easy solutions.

As seen in table 1, both the US and the EU have been frequent users of the dispute settlement procedures of the World Trade Organization. Of a total of 480 cases filed by all member nations, the US filed 20.8% and the EU 18.3%. Only 9 of the 100 cases filed by the US were against the EU, however, whereas 22 of 88 cases (25%) filed by the EU were filed against the US. Some of these cases have been resolved through negoti-ations arising from dispute settlement cases, such as amendment of the EU banana import regime, rescinding of the Byrd Amendment in the US concerning the payment of antidumping penalties to companies that had brought the cases, modification of the beef hormone ban by the EU, and lifting of steel safeguard measures by the US. Others, such as the dispute concerning airline subsidies and disagreements concerning food safety issues, have proved to be intractable. Fortunately, these trade disputes re-

TABLE 1   US-EU Dispute Settlement at WTO

Cases in which US complainant 100 (20.8% of total)	Cases in which EU complainant 88 (18.3% of total)
of which against EU, 9 (9% of US complaints)	of which against US, 22 (25% of EU complaints)

NOTES   From a total of 480 cases from all nations brought before WTO panels. Calcu-lated from World Trade Organization (2014).

late to only a relatively small amount of the total trade between the US and the EU (Škoba 2013).[4]

The TTIP Negotiations

The latest attempt to improve cooperation between the US and the EU in trade matters is the Transatlantic Trade and Investment Partnership (TTIP) negotiations. The first round on these negotiations took place in July 2013, with the sixth held in Washington in September 2014. These negotiations have an ambitious agenda that includes several sensitive and contentious issues that have previously failed to yield to liberalization efforts. In general terms, the aims of the negotiations are (Akhtar and Jones 2014, 8):

- elimination or reduction of market access barriers, including barriers related to trade in goods, services, and investment, including tariff and non-tariff barriers to trade;
- enhanced compatibility of regulations and standards; and
- cooperation for developing rules on global issues of common concern in areas such as intellectual property rights, the environment and labor, as well as in other globally relevant trade-related areas (e. g. state-owned enterprises, localization barriers to trade, trade facilitation, raw materials and energy, small- and medium-sized enterprises and transparency).

One of the easier subjects for negotiation should be the elimination of import tariffs. Tariffs on manufactured goods are already quite low, with a few exceptions. They are considerably higher for agricultural products. The average final bound rate on agricultural products for the US is 4.9%, but with significant tariff peaks for dairy products, sugars and confectionery, and beverages and tobacco. The average final bound rate of the EU on agricultural products is considerably higher at 13.8%, with very high peaks for animal products, sugars and confectionery, and dairy products (Grueff and Tangerman 2013). A long phase-in will be required for elimination of the agricultural tariffs, and for some manufactured goods, but with sufficiently long phase-in periods an agreement to eliminate tariffs should be possible.

Whether agricultural subsidies will be included in the negotiations is uncertain at this point. These subsidies certainly distort trade, more so in the US than in the EU. Even though EU subsidies are higher than those of the US, they have been structured to be less trade-distortive. To be

actionable under the WTO Agreement on Subsidies and Countervailing Measures, subsidies must distort trade. In the EU, a concerted effort has been made to assist farmers in ways that do not influence production (such as paying them for environmental improvements) and therefore do not distort trade. For various reasons, the US Congress has not chosen to do the same. Changing subsidy regimes in the context of the TTIP negotiations would be extremely difficult given the strength of the agricultural lobbies on both sides of the Atlantic, and reformation of subsidy regimes will probably have to wait for a breakthrough in multilateral trade negotiations.

Related to agriculture, sanitary and phytosanitary issues have been problematic for transatlantic trade relations for decades. Hormone-treated meats, genetically-modified organisms (GMOs), antimicrobial rinses for meats, etc., are contentious because of strong transatlantic differences concerning food safety. Consumers in the US have a high level of trust in the Food and Drug Administration (FDA) to protect food safety and therefore are not as concerned about the issue. The FDA was established in 1906 and over time has been able to instill a high level of confidence in the American public concerning food safety. A counterpart agency for the EU, the European Food Safety Authority, was not established until 2002 and has not had sufficient time to establish a track record that would build confidence. Complete resolution of differences concerning sanitary and phytosanitary issues through trade negotiations is extremely unlikely. When demand for trade restrictions arises from consumers rather than producers, this is a strong indication that cultural attitudes are at play which are unlikely to yield easily to commercial considerations.

Cultural differences also intrude into the area of technical barriers to trade. The WTO allows countries to impose whatever product standards they consider necessary to safeguard public health, safety, and the environment so long as there is a scientific basis for the standards. The WTO Agreement on Technical Barriers to Trade attempts to discipline product standards or regulations that are imposed for protectionist purposes. But even when product standards are not crafted to be protectionist, the fact that they differ from one trading area to another can impede trade by imposing unnecessary costs on producers. If common standards could be agreed, this would lower transactions costs and greatly facilitate trade. Harmonization of standards is extremely difficult, however, since standards-setting bodies often jealously guard their authority, and in the US regulatory agencies are many times found at the sub-national level.

In its attempt to complete the internal market under terms of the Single European Act, the countries of the EU discovered that harmonization of product standards was not possible even within the EU and instead settled for mutual recognition of each other's standards. Even mutual recognition of standards is difficult though, because regulatory bodies must answer to domestic legislators and are therefore reluctant to fully trust similar agencies in other countries (Ahearn 2009). Greater transparency and consultation/cooperation in the setting of new regulations and product standards may be the best than can be hoped for in the TTIP negotiations. While the effects of such cooperation would not be immediately apparent, over time it would have the potential to greatly facilitate trade.

Government procurement policies will also be an area of much discussion in the TTIP negotiations. Both the US and the EU subscribe to the WTO Agreement on Government Procurement, but its coverage is quite limited. The European Commission estimates that only 3.2% of the US government procurement market is open to foreign competition, as compared to 15% of the EU market (European Commission 2011). A problem for the US is that restrictions on government procurement often originate at the sub-federal level. The US Congress could exert considerable pressure on states and localities by requiring that these governments abide by nondiscriminatory purchasing practices on any products that involve expenditure of federal funds. Reportedly, both the US and the EU have agreed to a negative list for the TTIP negotiations, whereby government purchases of goods or services not on the list would be automatically open to foreign competition.[5] Nevertheless, outgoing EU trade commissioner, Karel de Gucht, sees US inability to liberalize government procurement as a potential stumbling block in the negotiations (Spiegel 2014).

Services trade will be an important part of the TTIP negotiations. Services account for an estimated 36% of US-EU trade in value terms (Slater 2013), and closer to 50% when trade is measured in value-added terms.[6] Since delivery of services often requires investment in the country, and because some service sectors such as transportation, communications, and banking are sensitive in national security terms, services trade negotiations tend to be complex. Reportedly, the US and the EU have agreed in principle to a negative list for the services negotiations as well as for the government procurement negotiations.[7] This should simplify matters since the US previously worked from a negative list and the EU from a positive list. The EU is pushing hard for inclusion of financial services in

the negotiations, while financial authorities in the US are strongly resisting their inclusion. While the financial sectors of the US and the EU are highly integrated, somewhat different sets of financial regulations have evolved on opposite sides of the Atlantic. In the wake of the global financial crisis, regulatory authorities in the US have had to fight valiantly against the intense lobbying of financial services firms to dilute the effectiveness of Dodd-Frank reforms as they were being implemented. They are reportedly apprehensive about opening up these matters again to possible dilution in the context of the TTIP negotiations.

Investment regulations will also be a contentious issue in the negotiations. To this point the US has had bilateral investment treaties with individual EU countries, but under terms of the Lisbon Treaty the European Commission has been given sole competency for this area. The Commission is working gradually toward an EU-wide investment treaty that would consolidate the bilateral treaties (Schott and Cimino 2013). Investor protections under investor-state dispute resolution provisions are being strongly resisted by civil society groups on both sides of the Atlantic who fear that such provisions could put at risk health or environmental policies. Under investor-state dispute resolution procedures (such as those of the North American Free Trade Agreement), foreign investors can bring suit against the federal government of the host country if they consider that the expected profits from operation of the business have been reduced by a change in state or local regulations, in effect giving foreign investors greater protections than domestic investors. German economics minister, Sigmar Gabriel, recently announced that Germany would block the inclusion of these procedures in the TTIP agreement, noting that they were not included in US agreements with Australia, Singapore and Israel (Wagstyl 2014). Since both the US and the EU have strong investor protections already in their legal systems, the focus in the TTIP negotiations should perhaps be on investment liberalization rather than protection. Investment liberalization will be challenging enough in sectors such as transportation, energy and communication.

The US and the EU have distinctly different positions concerning geographical indications of product origins. The EU has desired more expansive inclusion of products under geographical indication of origin than has the US. Generally, geographical indications have been included under copyright protections, in that the quality or reputation of certain products is said to depend upon the geographical location from which

they originate. The EU has a long list of such products, in such product categories as wines, hams, and cheeses. In the EU free trade agreement with South Korea, more than 160 products were included under geographical indication protections (Schott and Cimino 2013). Many of these products, for example cheeses such as feta, mozzarella, and parmesan, have for many years been produced and marketed by US firms as generic products and there will be stiff opposition to giving them the extended protections extended to wine and spirits under terms of the WTO TRIPS agreement.

Other issues that could be difficult if included in the negotiations are data privacy and protection of cultural industries. The privacy protection provisions on each side of the Atlantic are very different and are in a state of flux. The US does not have statutory recognition of a right to privacy, whereas in the EU Charter of Fundamental Rights there is an explicit Right to Privacy. The US has regulations concerning how data are collected and used by governments, but for the most part commercial data collection and use remain unregulated. The US government has attempted to get stakeholders to develop voluntary industry codes of practice concerning data privacy, but progress has been excruciatingly slow. The European Commission has proposed extensive reform of data privacy legislation to provide stronger protections, but how it will take shape has yet to be determined (TransAtlantic Consumer Dialogue 2013). With regard to protection of cultural industries, France almost blocked the beginning of the TTIP negotiations over this issue, and agreed to their start only after the issue was left off the negotiating agenda, at least for the time being.

Estimated Benefits of a TTIP Agreement

Economic effects of a TTIP Agreement have been extensively modeled by Joseph Francois, et al., of the Centre on Policy Research on behalf of the European Commission (Francois, et al. 2013), and by Fredrik Erixon and Matthias Bauer of the European Center for International Political Economy (Erixon and Bauer 2010), both employing the widely-used GTAP multi-sector computable general equilibrium model.

The ECIPE study specifies three scenarios: (1) full elimination of tariffs on goods, (2) full elimination of tariffs on goods accompanied by reduced trade facilitation costs equivalent to 3% of the value of trade and a 2% increase in labor productivity in goods sectors, and (3) full elimination of tariffs on goods accompanied by reduced trade facilitation costs equiva-

lent to 3% of the value of trade, a 3.5% increase in labor productivity in sectors having high levels of intra-industry trade, and a 2% increase in labor productivity in other goods sectors. The estimated GDP gains over five years for the EU-25 are projected to be 0.01% for Scenario 1; 0.32% for Scenario 2; and 0.47% for Scenario 3. Estimated GDP gains over five years are projected to be considerably larger for the US: 0.15% for Scenario 1; 0.99% for Scenario 2; and 1.33% for Scenario 3 (Erixon and Bauer 2010).

The Francois et al. (2013) model is more comprehensive, estimating the effects of tariff removal, liberalization of nontariff barriers to trade, liberalization of services trade, and liberalization of government procurement restrictions. In each case, the projected course of the EU and US economies to 2027 with these liberalizations are compared to projections to 2027 in the absence of the liberalizations. Not surprisingly, according to the projections, the macroeconomic effects of a TTIP agreement will be importantly influenced by how comprehensive and ambitious the proposed agreement turns out to be. For example, average import levels for both the US and the EU are quite low, but there are tariff peaks for certain products, particularly for agricultural goods. Therefore, it makes a significant difference whether in the negotiations 98 percent of import tariffs would be removed (less ambitious scenario), or 100 percent (more ambitious scenario). In either case, however, both the US and the EU economies are projected to benefit. In contrast to the ECIFE model which, as mentioned above, projected considerably larger gains for the EU than for the US for tariff removal, the CEPR model projects much larger gains for the EU (0.11% of GDP) than for the US (0.04%) (Francois et al. 2013).

Liberalization of services trade alone is projected to be considerably less beneficial for the EU than tariff removal, but would be almost as beneficial for the US as tariff removal. Both the US and the EU would gain significantly from a 25% reduction of restrictions on government procurement, but the EU would gain several times as much, which is not surprising since the US government procurement market is more restricted than that of the EU. Again, not unsurprisingly, a more ambitious agreement (100% import tariff removal as opposed to 98%, elimination of 25 percent of nontariff trade barrier costs as opposed to 10 percent, and 50 percent reduction of the cost of procurement-related nontariff barriers as opposed to 25 percent) would yield significantly greater benefits for the EU (0.48% of GDP as opposed to 0.27%) and for the US (0.39% of GDP as

opposed to 0.21%) than would a less ambitious agreement (Francois et al. 2013). Certainly, if it were possible, a more ambitious agreement would be preferable to a less ambitious one. However, over-ambition that pushes the negotiations to the limits of what political systems in both sides of the Atlantic can tolerate would run the risk of preventing an agreement altogether.

One would expect that, given the current level of global economic integration, a TTIP agreement would have an impact on third countries also. The CEPR simulations do indicate that a limited agreement could have adverse effects on certain other countries, presumably because of trade diversion. However, the simulations indicate that a comprehensive agreement, given its stimulative effects upon growth, would have positive external effects across the board. Part of the projected benefits to third countries from a TTIP agreement arise from the presumed cost reductions to these countries arising from the harmonization of US and EU regulations. A further positive effect would be realized if other countries followed the lead of the US and the EU and adopted similar standards (Francois et al. 2013).

Conclusion

As the two largest economic entities in the world, the US and the EU play a crucial role in the global economy. That they cooperate concerning trade matters and keep conflict to a minimum is important. Fortunately, in the post-World War II period they have a commendable record in this regard. Trade and investment flow relatively freely across the Atlantic. In such a large and dynamic relationship, some conflicts inevitably emerge. The US and the EU have been frequent users of the WTO dispute settlement mechanism to sort out their differences, and a number of contentious issues have been resolved in this way. Others, however, have proved to be more intractable. Often these have been in areas such as food safety where the demand for protection comes primarily from consumers, reflecting cultural differences. Agriculture and tax/subsidy policies have also been problematic.

Potential exists in the TTIP negotiations for further cooperation in trade matters, with attendant economic benefits for both the US and the EU. However, the easier issues in the transatlantic economic relationship have, for the most part, already been dealt with. This means that the more complex and politically sensitive ones remain to be addressed in these negotiations. Both the US and the EU would be well advised to approach

the negotiations with pragmatism, realizing that there are limits to what may be accomplished in politically sensitive areas.

Notes

1 Calculated by the author from International Monetary Fund statistics.

2 This is down from 57% during 2007–2009, a reflection of the rise of Asia and other developing economies.

3 For the most completely developed theory of reciprocal trade negotiations see (Bagwell and Staiger 2002)

4 Some disputes involve broader issues such as climate change, but have commercial implications. A case in point is legislation by the US Congress prohibiting US airlines from participating in the EU Emissions Trading Scheme (Mix 2013).

5 Personal conversation with the Gary Hufbauer in Washington, DC, 11 June 2014.

6 See http://www.oecd.org/industry/ind/measuringtradeinvalue -addedanoecd-wtojointinitiative.htm

7 Personal conversation with the Gary Hufbauer in Washington, DC, 11 June 2014.

References

Ahearn, R. J. 2009. 'Transatlantic Regulatory Cooperation: Background and Analysis.' Congressional Report RL34717, Congressional Research Service, Washington DC. http://fas.org/sgp/crs/row/RL34717.pdf

Akhtar, S. I., and V. C. Jones. 2014. 'Transatlantic Trade and Investment Partnership (TTIP) negotiations.' Congressional Report R43387, Congressional Research Service, Washington, DC. http://fas.org/sgp/crs/ row/R43387.pdf

Bagwell, K., and R. Staiger. 2002. *The Economics of the World Trading System.* Cambridge, MA: MIT Press.

Cooper, W. H. 2014. 'EU-US Economic Ties: Framework, Scope, and Magnitude.' Congressional Report RL30608, Congressional Research Service, Washington DC. http://fas.org/sgp/crs/row/RL30608.pdf

Erixon, F., and M. Bauer. 2010. 'A TransAtlantic Zero Agreement: Estimating the Gains from Transatlantic Free Trade in Goods.' ECIPE Occasional Paper 4, European Centre for International Political Economy, Brusseles. http://www.ecipe.org/media/publication_pdfs/a -transatlantic-zero-agreement-estimating-the-gains-from -transatlantic-free-trade-in-goods.pdf

European Commission. 2011. 'Trade and Investment Barriers Report 2011.' COM(2011) 114, European Commission, Brussels. http://trade.ec .europa.eu/doclib/docs/2011/march/tradoc_147629.pdf

Francois, J., M. Manchin, H. Norberg, O. Pindyuk, and P. Tomberger. 2013. 'Reducing Transatlantic Barriers to Trade and Investment: An Economic Assessment.' Final report, Centre for Economic Policy Research (CEPR), London. http://trade.ec.europa.eu/doclib/docs/2013/march/tradoc_150737.pdf

Grueff, J., and S. Tangermann. 2013. 'Achieving a Successful Outcome for Agriculture in the EU-US Transatlantic Trade and Investment Partnership Agreement.' IPC Discussion paper, International Food and Agricultural Trade Policy Council, Washington, DC. http://www.agritrade.org/Publications/documents/FINAL_US_EU_FTA_fordistribution.pdf.

Hamilton, D. S., and J. P. Quinlan. 2014. 'The Transatlantic Economy 2014: Executive Summary.' Center for Transatlantic Relations, Johns Hopkins University, Washington, DC. http://transatlantic.sais-jhu.edu/publications/books/TA2014/TA2014_executive_Summary.pdf

Hauser, H., and A. Roitinger. 2002. 'A Renegotiation Perspective on Transatlantic Trade Disputes.' Discussion Paper 2002-09, University of St. Gallen, St. Gallen. http://www1.vwa.unisg.ch/RePEc/usg/dp2002/dp0209hauser_roitinger_ganz.pdf

McKinney, J. 2014. 'Challenges on the Way to a Transatlantic Trade and Investment Partnership.' In *The Transatlantic Trade and Investment Partnership between the European Union and the United States,* edited by J. Roy and R. Dominguez, 85–100. Miami, FL: Miami European Union Center. http://www.as.miami.edu/media/college-of-arts-and-sciences/content-assets/euc/docs/books/TTIP.pdf

Mix, D. E. 2013. 'The United States and Europe: Current Issues.' Congressional Report RS22163, Congressional Research Service, Washington, DC. http://fas.org/sgp/crs/row/RS22163.pdf

Schott, J. J., and C. Cimino. 2013. 'Crafting a Transatlantic Trade and Investment Partnership: What Can Be Done.' Policy Brief PB13-8, Peterson Institute for International Economics, Washington, DC. http://www.iie.com/publications/pb/pb13-8.pdf

Slater, G. S. 2013. 'US-EU Trade and Investment Partnership Negotiations.' Prepared statement on behalf of The Coalition of Services Industries and the Business Coalition for Transatlantic Trade. http://waysandmeans.house.gov/uploadedfiles/slater_testimony.pdf

Spiegel, P. 2014. 'EU Trade Chief Faults Washington and Berlin for Deal Stalemate'. *Financial Times,* 25 September. http://www.ft.com/intl/cms/s/0/55ff37cc-44ae-11e4-bce8-00144feabdc0.html#axzz3Ilz2keM7

Škoba, L. 2013. 'Principal EU-US Trade Disputes.' *Library Briefing,* 22 April. http://www.europarl.europa.eu/RegData/bibliotheque/briefing/2013/130518/LDM_BRI(2013)130518_REV1_EN.pdf

TransAtlantic Consumer Dialogue. 2013. 'Resolution on Data Flows in the TransAtlantic Trade and Investment Partnership.' Infosoc 50/13. http://www.consumersinternational.org/media/1396104/tacd -resolution-on-data-flows-in-the-transatlantic-trade-and-investmemt -partnership.pdf

United Nations Conference on Trade and Development. 2014. 'Global FDI Rose by 11%; Developed Economies are Trapped in a Historically Low Share.' *Global Investment Trends Monitor,* 28 January. http://unctad.org/ en/PublicationsLibrary/webdiaeia2014d1_en.pdf

Wagstyl, S. 2014. 'Germany to Block Investor Protection Rules.' *The Financial Times,* 26 September.

World Trade Organization. 2014. 'Chronological List of Disputes Cases.' http://www.wto.org/english/tratop_e/dispu_e/dispu_status_e.htm

CO_2 Emissions, Energy Consumption, Economic Growth and FDI in Vietnam

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This study examines the dynamic relationships between CO_2 emissions, energy consumption, FDI and economic growth for Vietnam in the period from 1980 to 2010 based on Environmental Kuznets Curve (EKC) approach, cointegration, and Granger causality tests. The empirical results do not support the EKC theory in Vietnam. However, the cointegration and Granger causality test results indicate a dynamic relationship among CO_2 emissions, energy consumption, FDI and economic growth. The short-run bidirectional relationship between Vietnam's income and FDI inflows implies that the increase in Vietnam's income will attract more capital from overseas. Inversely, FDI inflow is also driver of national income growth. The existence of bidirectional relationships in the long-run provides important policy implications. We recommend implementing a dual strategy of increasing investment in energy infrastructure and promulgating energy conservation policies to increase energy efficiency and reduce wastage of energy.

Key Words: EKC, Cointegration, Granger Causality, pollution heaven,
   Vietnam's CO_2 emissions, Vietnam's Energy consumption,
   FDI inflows, income
JEL Classification: C33, O44, O53

Introduction

Vietnam is one of the fastest growing emerging economies in Asia; averaging around 7.1% annual GDP growth from 2006 to 2009, 6.8% in 2010, and 6.0% in 2011.[1] However, rapid economic growth is usually accompanied by increased energy consumption and may cause unexpected effects on energy resources and the environment. Vietnam's energy consumption in 2010 was four times higher than its consumption in 1980, rising from 14.39 thousand kilotonnes (kt) oil equivalence (1980) to 58.91 thousand kt (2010). CO_2 emissions grew significantly faster than the growth of

energy consumption, from 16.82 thousand kt carbon dioxide emissions to 150.23 thousand kt; an increase of almost ten times for the same period.[2]

There are many reasons that may explain the rapid growth of Vietnam's economy, FDI inflows being one of the most important indicators. It has increased from US\$1.4 billion in 1980 to US\$1.65 billion in 1990; US\$20.6 billion in 2000 and US\$65.3 billion in 2010. The average FDI annual growth rates observed for three periods are: 16% for 1980–1990; 29.3% and 12.4% for 1991–2000 and 2001–2010, respectively. This growth in FDI can be attributed to Vietnam's political, social, and macroeconomic stability. Moreover, a country with 90 million people provides a huge potential consumer market. Its labor force offers young, skilled, and relatively well-educated workers, with labor costs that are competitive with other economies in the region. Its geographic location, abundant natural resources, and favorable policies are other factors that attract investments from many countries into Vietnam, propelling its economic development forward.

Many previous papers have investigated the contribution of FDI to economic development of different countries, such as those of Bende-Nabende et al. (2000), Alfaro et al. (2004), and Wang (2009). Vu (2008) and Anwar and Nguyen (2010) examined FDI's influence on Vietnam's economic growth. More recent literature studied the relationships among energy consumption, economic growth, and FDI. Acharyya (2009) and Pao and Tsai (2011) examined the multivariate Granger causality association among CO_2 emissions, energy consumption, FDI, and GDP for India and BRIC, respectively. Nguyen and Amin (2002) analyzed the effect of FDI on energy demand and environmental degradation in Hanoi, the capital city of Vietnam. However, the samples used by these studies are limited, focusing only on one city, one country or on developing countries. To the best of our knowledge, no empirical research has been undertaken yet about the relationships among CO_2 emissions, energy consumption, economic growth and FDI in Vietnam.

This paper investigates the causality relationships among environmental degradation – energy consumption – economic growth – FDI inflows in this country from 1980 to 2010. Investigating the causal nexuses between the above variables, the estimated results show that environmental pollutants are affected by the usage of energy, economic development and the changes in FDI within more than 30 years. Our findings will provide valuable policy implications for Vietnam and other developing countries.

The research is written as follows: the second section explains literature

review and hypotheses, the third section demonstrates methodology and empirical results, and the fourth section presents the conclusion.

Literature Review and Hypotheses

The causal relationship between energy consumption and economic growth has attracted much attention from economists and scholars because this relationship has significant policy implications. Kraft and Kraft (1978) discovered unidirectional causality from income to energy usage in the United States by using sample data for the period 1947–1974. This finding has continuously been supported by other studies. For instance, Chen et al. (2007) has detected the existence of co-movement between environmental productivity and income in China. Lee (2005; 2006) displayed that there have been long-run and short-run causalities from energy consumption to GDP, but did not show evidence of vice versa. This finding suggested that economic growth might have adverse effects on energy conservation, which may be a transitory or permanent trend in developing countries. The two-way directional causality has been represented in the case of the US, and one-way directional causality from energy consumption to income was found for other developed countries. However, the detrimental effects of economic growth to energy conservation are differentiated among these countries.

The relationship between economic growth and environmental pollutants has been analyzed by another pervasive approach known as the Environmental Kuznets Curve theory. The EKC theory claims that the environmental pollutants has increased at the early stages of economic growth but tends to reverse beyond a certain level of income per capita. This suggests that there is an inverted U-shaped relationship between environmental degradation and other economic variables. Grossman and Krueger (1991) measured income's potential environmental impacts within the North American free trade agreement (NAFTA). Managi and Jena (2008) applied EKC hypothesis and found the appearance of relationship between environmental productivity and income in India. Pao and Tsai (2011) employed EKC theory and recognized the causality relationships among CO_2 emission, energy consumption and GDP in BRIC countries, based on the time series dynamic characteristics of these indicators. This finding provides policy implications for developing countries, on how to qualify foreign investments so that they can mitigate its harmful effects on the environment. In addition, the study of Sari and Soyta (2007) found that energy consumption has a significant relation-

ship with economic development. Other authors such as Keppler and Mansanet-Bataller (2010), Narayan and Narayan (2010) and Pao and Tsai (2010) stated that economic growth and energy consumption are accompanied with environmental degradation in both developed and developing countries. These studies have generated an inverted U-shaped curve representing pollutant magnitude, but there is no inevitability about that. Coondoo and Dinda (2008) and Akbostanci et al. (2009) tested the EKC theory focusing on time series dynamics of income and CO_2 emissions. The relationship between CO_2 and income is revealed in the long-run based on time series analysis, but it also revealed an N-shaped relationship for two kinds of pollutants in Turkey.

The main contribution of this paper is it tests the EKC hypothesis and examines the causality relationships among CO_2 emissions – energy consumption – economic growth – FDI in Vietnam. We accordingly introduce two hypotheses as follows:

H1 *In Vietnam, CO_2 emissions increase in the early stages of economic growth, but tend to decrease beyond a certain level of income per capita. CO_2 emissions, energy consumption, and economic growth have causality relationships with each other and can be observed.*

In recent years, FDI is considered as an important driving force of economic development. Rapid FDI inflows have raised questions whether there is a relationship between FDI, energy consumption, and air pollution deterioration. The issue of FDI, economic growth, and environmental deterioration has been receiving increased attention since the last decade. Several studies have applied time series dynamic with Granger causality test and explored if there are significant nexuses among FDI, economic growth, energy intensity, and CO_2 emissions. Zang (2001) and Kim and Seo (2003) applied a vector autoregression model to present the dynamic correlations between FDI, domestic investment, and output. They found that economic growth has a statistically significant and highly persistent influence on FDI inflows. Li and Liu (2005) found a strong complementary connection between FDI and economic growth, not only in developed but also in developing countries. Chakraborty and Nunnenkamp (2008) discovered the spillover effects between FDI and India's economic output both in the short-run and long-run. Sadorsky (2010) showed evidence that net FDI has a statistically significant impact on energy demand from a sample of 22 emerging countries. Moreover, the relationship between FDI, energy usage, and pollutants has been men-

tioned in many studies. For examples, Mielnik and Goldemberg (2002) examined the linkage between FDI, energy consumption, and CO_2 emissions from a sample of 20 developing countries, and found that energy intensity declines as FDI increases. Pao and Tsai's (2011) findings support the EKC hypothesis with evidence from BRIC. The results showed strong bidirectional causality between emissions and FDI, and significant unidirectional relationship between output and FDI. For Southeast Asia, Chandran and Tang (2013) suggested the long-run association between FDI and CO_2 emissions within five ASEAN countries (excluding Vietnam).

Based on these studies' findings, we predict the relationship among FDI, economic growth, energy consumption and CO_2 emissions in Vietnam, and assume that:

H2 *FDI, economic growth, CO_2 emissions and energy consumption exhibit causal relationships with each other in Vietnam.*

Methodology and Empirical Results

DATA AND VARIABLE FORM

This study used annual GDP per capita, annual FDI inflows and stocks per capita measured by US Dollars at current prices and current exchange rates. All datasets were obtained from UNCTAD statistics database.[3] IN represents GDP per capital and FDI stands for inflows and stocks per capita. The energy consumption and CO_2 emissions were collected from the World Bank Indicator database.[4] The unit that measures energy consumption and CO_2 emissions is kt oil equivalence and kt CO_2 emissions, respectively. All variables are dated from 1980 to 2010, and all are annual data.

The standard EKC regression model has natural logarithmic form for both dependent and independent variables. The logarithmic quadratic form is also taken for independent variables. The new variables in natural logarithmic form are lnIN for IN, lnFDI for FDI, $lnCO_2$ for CO_2 emissions and lnEN for energy consumption.

MODEL

EKC theory implies that the environmental impact is an inverted U-shaped function of income (IN) and logarithm of the indicator is modeled as a quadratic function of the logarithm of IN. Based on the EKC hypothesis, a linear logarithm quadratic model is formed to perform the

TABLE 1   Unit Root Test Results

Test	Statistic		$\ln CO_2$	$\ln EN$	$\ln IN$	$\ln IN2$	$\ln FDI$
(1)	t-statistic	Level	−1.014	−4.239***	−1.096	−0.316	−1.409
		1st dif.	−4.738***	−3.438**	−4.837**	−4.418**	−3.372**
(2)	t-statistic	Level	−1.399	−0.448	−4.151***	−2.727	−1.654
		1st dif.	−5.209***	−5.495***	−3.737***	−3.658***	−4.674***

NOTES   Row headings are as follows: (1) ADF test, (2) Dickey-Fuller GLS test. ** and *** denotes 5% and 1% level of significance, respectively.

relationships between CO_2 emissions, energy consumption, economic growth and FDI as follows:

$$\ln CO_{2t} = \beta_0 + \beta_1 \ln EN_t + \beta_2 \ln IN_t + \beta_3 \ln IN_t^2 + \beta_4 \ln FDI_t + v_t, \qquad (1)$$

where $t = 1, \ldots, T$ denotes the time period, X_t is the vector of explanatory variables and v_t is the error term which is assumed to be serial uncorrelation. According to the EKC theory, this study expects the signs of $\ln EN_t$, $\ln IN_t$ are positive because the higher ratio in energy consumption and income, the greater CO_2 emissions. In contrast, we expect that $\ln IN_t^2$ will have a negative sign.

UNIT ROOT TEST

As can be seen, table 1 shows the Augmented Dickey-Fuller and Dickey-Fuller GLS unit root tests which are selected to test all series with trend and intercept. The null hypothesis assumed that the data series has a unit root. The results exhibit that all variables are stationary at the first difference at 1% and 5% significance levels, this means that the null hypothesis of a unit root is rejected. Hence, all data series are integrated of order 1 (I(1)) and appropriate for further testing.

Furthermore, assuming that vector Z_t includes $\ln CO_{2t}$ and all other variables in model (2). From the unit root test results, all components of the vector Z_t are I(1), or the first difference $\Delta Z_t = (1 - L)Z_t$ is integrated of order zero; where L is the lag operator of Z_t and $(1 - L)$ is the first difference. Thus, cointegration test should be applied to find the causality relationships among these components.

COINTEGRATION TEST

Johansen (1991) cointegration test is employed to examine whether the series are cointegrated. For example, Gonzalo (1994) pointed out that Jo-

TABLE 2 Results of the Johansen Cointegration Test

Trace test			Maximum eigenvalue test		
(1)	(2)	(3)	(1)	(2)	(3)
$r = 0$	$r \geq 1$	161.273***	$r = 0$	$r = 1$	65.412***
$r \leq 1$	$r \geq 2$	95.862***	$r = 1$	$r = 2$	61.347***
$r \leq 2$	$r \geq 3$	34.514**	$r = 2$	$r = 3$	27.132***
$r \leq 3$	$r \geq 4$	6.848	$r = 3$	$r = 4$	14.265
$r \leq 4$	$r \geq 5$	0.930	$r = 4$	$r = 5$	3.841

NOTES Column headings are as follows: (1) null hypothesis, (2) alternative hypothesis, (3) trace statistic. Trace and max-eigen statistics calculated at 5% level; ** and *** denotes 1% and 5% level of significance, respectively. Probabilities are computed by using asymptotic Chi-square distribution, and r is the number of cointegration equations. SIC criteria is used to choose the lag length, maximum lag lengths are seven.

hansen test is the optimal one when error terms are not normally distributed. Maddala and Wu (1999) suggested the implication of Johansen-Fisher test which allowed some relationships to be cointegrated. Because all variables are integrated in the same order, this paper has applied Johansen test in the term of vector autoregressive model. Johansen cointegration test uses trace and maximum eigenvalue tests to determine the number of cointegration relationships. Table 2 shows the results of Johansen cointegration test with null and alternative hypotheses.

The trace and maximum eigenvalue statistic indicate that there is a difference in significant level of each cointegration equation. The maximum eigenvalue test is carried out with separate tests on each eigenvalue and has the sharper alternative hypothesis. Its results should be used in choosing the number of cointegrated relationships. Based on max-eigen statistic, there are three significant cointegrating vectors at 1% and 5% levels. The findings indicate he existence of long-run relationship among variables and the spurious regression is avoided. The existence of cointegration among model (2) variables suggests that the ordinary least square (OLS) estimation is the best estimator in accordance with the findings of Alves and Bueno (2003).

The estimated equation of model 2 using OLS is presented in table 3. The results from equation (3) illustrate that the estimated coefficient of lnEN present the same sign as expected at 1% level of significance. The estimated signs of lnIN and lnIN2 follow the expectation of hypothesis 1, which indicate that CO_2 emissions increase in the early stages of economic growth, but tend to reverse beyond certain levels of income per

TABLE 3   Estimated Equation of Model 2 Using OLS

$\ln CO_2 =$	-8.955	$+1.954\ln EN$	$+0.016\ln IN$	$-0.010\ln IN_2$	$-0.008\ln FDI$	(3)
SE	(3.3406)	(0.3096)	(0.2888)	(0.0360)	(0.0078)	
t-stat	-2.6808^{**}	6.3116^{***}	0.0566	-0.2781	-0.7684	

NOTES   ** and *** denote 5% and 1% level of significance, respectively.

capita. However, the estimated coefficients of $\ln IN$ and $\ln IN2$ are statistically insignificant. As a result, we cannot conclude that EKC hypothesis is supported by the correlation between CO_2 emissions and income in Vietnam during the period 1980 to 2010. Furthermore, the estimated results emphasize that CO_2 emissions is elastic with energy consumption, in which a 1% increase in energy consumption will increase CO_2 emissions by 1.954%, or expressed differently, a one-unit increase in energy consumption increases CO_2 emissions by 1.954% percentage points. The estimated coefficients magnitude of $\ln FDI$ has a negative (-0.008) sign. Although this magnitude is very small but the negative sign suggests that FDI can still effect to reduce environment degradation. However, this estimated coefficient of $\ln FDI$ is insignificant, meaning that there is no evidence which shows FDI is inelastic in reducing CO_2 emissions.

GRANGER CAUSALITY TEST

The cointegration test has performed the existence of long–run equilibrium relationships among CO_2 emissions, energy consumption, economic growth and FDI. Granger causality test in the term of vector error-correction model (VECM) will reveal whether historical value of one variable might affect the current value of other variables. These results detect the directions of causal relationships among variables in model (2). The Granger causality test in the term of VECM framework is described as follows:

$$\Delta Y_t = \alpha_{10} + \alpha_{11}(Y_{t-1} - X_{t-1}) + \sigma_{11}\Delta Y_{t-p} + \sigma_{12}\Delta X_{t-p}$$
$$+ \beta_1 \Delta z_{t-p} + \varepsilon_t$$
$$\Delta X_t = \alpha_{20} + \alpha_{21}(Y_{t-1} - X_{t-1}) + \sigma 21\Delta Y_{t-p} + \sigma_{22}\Delta X_{t-p}$$
$$+ \beta_2 \Delta z_{t-p} + \nu_t \tag{2}$$

where $t = 1, \ldots, T$ denotes the time period, Δ represents change operator, Y_t and X_t is a pair of endogenous variables, z is the vector of other variables; $\beta 1$ and $\beta 2$ are vectors of its parameters in each equation; ε_t, ν_t are two error terms; and $(Y_{t-1} - X_{t-1})$ is the error correction term (ECT). α_{11}

and α_{21} are the parameters that show the speed of adjustment to the long-run equilibrium which might confirm the long-run relationship among variables.

In this article, the pairs of (X_t, Y_t) include (lnCO$_2$, lnEN), (lnCO$_2$, lnIN and lnIN2), (lnCO$_2$, lnFDI), and other pairs are combinations of each variable with one or two other variables such as lnEN with lnIN and lnIN2 or with lnFDI and so forth.

Table 4 represents short-run Granger causality results with the null hypothesis that there is no causal relationship in each pair of variables. The results support hypothesis 2, indicating the existence of short-run relationships among variables. There are two bidirectional causality relationships between Vietnam's income and FDI inflows and between Vietnam's energy consumption and FDI inflows, which can be interpreted as follows: the rapid development of Vietnamese economy over the last three decades has been driven by the increase in FDI inflows. The higher income in turn attracts more foreign investors. Moreover, increasing economic activity brought about by FDI inflows requires more energy, and the sufficient energy supply in turn attracts more foreign investment. Thus, the effects of FDI vary widely across sectors. FDI has risen up considerably since recent decades, and has close relationships with nation's income and energy consumption. The findings are in line with the previous studies of Zang (2001) and Kim and Seo (2003). The short-run relationships between FDI and output are also implied in the research of Li and Liu (2005) for developed and developing countries and Chakraborty and Nunnenkamp (2008) in study of Indian economy. On the other hand, the unidirectional causations are found from CO$_2$ emissions to FDI; income to CO$_2$ emissions and income to energy consumption. These support the investigations of Sadorsky (2010) and Mielnik and Goldemberg (2002), which stated that environmental pollutant has unidirectional effects on promoting FDI inflows.

The significance of the estimated coefficients of ECTs from model (4) expresses long-run causal nexus among data series, which supports hypotheses 1 and 2. Table 5 has exploited four bidirectional causality relationships between: CO$_2$ emissions and income; energy consumption and income; energy consumption and FDI; income and FDI. These findings are consistent with those of Chen et al. (2007), which found an association between environment and income in China, and Pao and Tsai (2011) in their study of the same phenomenon in BRIC. The relationship between energy consumption and income is also in accordance with the

TABLE 4   Results of Short-Run Granger Causality Test

	D(lnCO$_2$)	D(lnEN)	D(lnIN)†	D(lnFDI)
D(lnCO$_2$)→		1.3720	0.8970	29.2203***
D(lnEN)→	1.7469		3.2152	9.0040**
D(lnIN)→	4.6505*	6.3530**		8.2071**
D(lnIN2)→	5.3027*	9.3525***		6.9215**
D(lnFDI)→	4.4345	4.6127*	6.9215**	

NOTES   † and D(lnIN2); *, ** and *** denote 10%, 5% and 1% level of significance, respectively; → presents causality direction from *X* to *Y*; ↔ detects bidirectional relationship between *X* and *Y*.

findings of Keppler and Mansanet-Bataller (2010), Narayan and Narayan (2010) and Pao and Tsai (2010). On the other hand, the results indicate one unidirectional causality relationship from CO$_2$ emissions to FDI inflows, which implies that the relatively lower environmental standard has attracted FDI. The bidirectional causality between economic growth and energy usage implies that these variables are jointly determined and affect each other simultaneously. Furthermore, the bidirectional causalities between CO$_2$ emissions and energy consumption with income imply that Vietnam has been developing its economy through increasing its energy consumption. With the weakness in environmental protection regulations, the entry of inefficient energy technologies might lead to energy wastage and environmental pollution.

Conclusion

This paper tests the EKC theory in Vietnam's economy. Based on the empirical results, we find that when income per capita is at 0.8 (in logarithms) or 2,226 US dollars, CO$_2$ emissions begin to decline. However, this estimated result is statistically insignificant. This means that the data does not provide enough evidence to conclude that EKC hypothesis is confirmed in Vietnam's economy.

Second, this study investigates the dynamic relationship between CO$_2$ emissions, energy consumption, FDI and economic growth in Vietnam for the period 1980 to 2010. By using the Granger causality test in the context of VECM, this paper found two short-run bidirectional relationships between FDI inflows with Vietnam's income and energy consumption. We also found four bidirectional causality relationships in the long-run between: CO$_2$ and income; energy consumption and income; energy con-

TABLE 5 Long-Run Causality Test

(1)	(2)	(1)	(2)	(3)
$\Delta lnCO_2 \rightarrow \Delta lnEN$	0.1964	$\Delta lnEN \rightarrow \Delta lnCO_2$	1.1893	No Causality
$\Delta lnCO_2 \rightarrow \Delta lnIN$	–8.1572***	$\Delta lnIN\dagger \rightarrow \Delta lnCO_2$	–2.3680**	$CO_2 \leftrightarrow$ Income
$\Delta lnCO_2 \rightarrow \Delta lnIN2$	–9.5787***			
$\Delta lnCO_2 \rightarrow \Delta lnFDI$	–3.4668**	$\Delta lnFDI \rightarrow \Delta lnCO_2$	–1.3689	$CO_2 \leftrightarrow FDI$
$\Delta lnEN \rightarrow \Delta lnIN$	–7.8726***	$\Delta lnIN\dagger \rightarrow \Delta lnEN$	–2.2482**	En. use $\leftrightarrow$ Income
$\Delta lnEN \rightarrow \Delta lnIN2$	9.1352***			
$\Delta lnEN \rightarrow \Delta lnFDI$	3.3017***	$\Delta lnFDI \rightarrow \Delta lnEN$	–3.1646***	FDI $\leftrightarrow$ Energy use
$\Delta lnIN\dagger \rightarrow \Delta lnFDI$	–3.2590***	$\Delta lnFDI \rightarrow \Delta lnIN$	11.2817***	Income $\leftrightarrow$ FDI
		$\Delta lnFDI \rightarrow \Delta lnIN2$	–9.3014***	

NOTES Column headings are as follows: (1) causal direction, (2) ECT *t*-stat, (3) conclusion direction. † and lnIN2; *, ** and *** denote 10%, 5% and 1% level of significance, respectively; → presents causality direction from *X* to *Y*.

sumption and FDI; and income and FDI. Both the short-run and long-run bidirectional causality relationships between income and FDI suggest that the increase in Vietnamese income will attract more capital from overseas. In contrast, FDI inflows promote to expand and increase the national income.

Finally, the long-run bidirectional causality between FDI inflows and energy consumption as well as the unidirectional causality from CO_2 emissions to FDI inflows imply the close relationships among FDI, energy consumption and environmental degradation. In these relationships, energy consumption increases as FDI increase in host countries. The findings support the pollution haven hypothesis. Less stringent environmental regulations will attract FDI inflows, which will intensify environmental pollution.[5] Regarding environmental protection and economic development, the existence of long-run causality among CO_2 emissions – energy consumption – economic growth – FDI points out important challenges to Vietnam's policy-makers. It appears that Vietnam focuses on enhancing economic growth but does not implement the necessary measures to protect the environment. These results should be considered as a precaution to policy makers that insufficient environmental laws would accelerate their country's environmental degradation. In order to reduce CO_2 emissions and to avoid an unexpected effect on the economic growth, Vietnam should implement a dual strategy of increasing investment in energy infrastructure and promulgating energy

conservation policies to increase energy efficiency and reduce wastage of energy. Implementation of more stringent laws that require the usage of energy-efficient technologies should reduce CO_2 emissions in the pursuit of economic growth.

Notes

1 These numbers are calculated by the authors from UNCTAD Statistics, 2013. Growth rates are based on GDP constant 2005 US dollars. For the good explanation, the reader is referred to http://unctadstat.unctad.org/TableViewer/summary.aspx

2 These numbers are calculated by the authors based on World Bank database. Available at http://data.worldbank.org/indicator

3 The data is used at current prices due to the lack of data of Vietnam's inflation and GDP deflation for many years; UNCTAD database is available online from http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx

4 This database is available online from http://data.worldbank.org/indicator

5 The pollution haven hypothesis is the idea that for given levels of environmental policy, polluting industries will relocate to countries with weaker environmental regulation.

References

Acharyya, J. 2009. 'FDI, Growth and the Environment: Evidence from India on CO_2 Emission during the Last Two Decades.' *Journal of Economic Development* 34 (1): 43–58.

Akbostanci, E., S. Turut-Asik, and G. L. Tunc. 2009. 'The Relationship between Income and Environment in Turkey: Is There an Environmental Kuznets Curve?' *Energy Policy* 37:861–7

Alfaro, L., A. Chanda, S. Kalemli-Ozcan, and S. Sayek. 2004. 'FDI and Economic Growth: The Role of Local Financial Markets.' *Journal of International Economics* 64 (1): 89–112.

Alves, D. C. O., and R. D. Bueno. 2003. 'Short-Run, Long-Run and Cross Elasticities of Gasoline Demand in Brazil.' *Energy Economics* 25:191–209.

Anwar, S., and L. P. Nguyen. 2010. 'Foreign Direct Investment and Economic Growth in Vietnam.' *Asia Pacific Business Review* 16:183–202.

Bende-Nabende, A., J. L. Ford, S. Sen, and J. Slater. 2000. 'Long-Run Dynamics of FDI and Its Spillovers Onto Output: Evidence from the Asia-Pacific Economic Cooperation Region.' Discussion Papers 00-10, University of Birmingham, Birmingham.

Chakraborty, C., and P. Nunnenkamp. 2008. 'Economic Reforms, FDI, and Economic Growth in India: A Sector Level Analysis.' *World Development* 36:1192–212.

Chandran, V. G. R., and C. F. Tang. 2013. 'The Impacts of Transport Energy Consumption, Foreign Direct Investment and Income on CO_2 Emissions in ASEAN-5 Economies.' *Renewable and Sustainable Energy Review* 24:445–53.

Chen, W. Y., Z. X. Wu, J. K. He, P. F. Gao, and S. F. Xu. 2007. 'Carbon Emission Control Strategies for China: A Comparative Study with Partial and General Equilibrium Versions of the China MARKAL Model.' *Energy* 32:59–72.

Coondoo, D., and S. Dinda. 2008. 'The Carbon Dioxide Emissions and Income: A Temporal Analysis of Cross-Country Distributional Patterns.' *Ecological Economics* 65:375–85.

Gonzalo, J. 1994. 'Five Alternative Methods of Estimating Long-Run Equilibrium Relationships.' *Journal of Econometrics* 60:203–33.

Grossman, G. M., and A. B. Krueger. 1991. 'Environmental Impact of a North American Free Trade Agreement.' NBER Working Paper 3914, National Bureau of Economic Research, Cambridge, MA.

Johansen, S. 1991. 'Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models.' *Econometrica* 59: 1551–80.

Keppler, J. H., and M. Mansanet-Bataller. 2010. 'Causalities between CO_2, Electricity, and Other Energy Variables during Phase 1 and Phase 2 of the EU ETS.' *Energy Policy* 38:3329–41.

Kim, D. D., and J. S. Seo. 2003. 'Does FDI Inflow Crowd out DI in Korea Quest.' *Journal of Economic Studies* 30:605–22.

Kraft, J., and A. Kraft. 1978. 'Note and Comments: On the Relationship between Energy and GNP.' *The Journal of Energy and Development* 3: 401–3.

Lee, C. C. 2005. 'Energy Consumption and GDP in Developing Countries: A Cointegrated Panel Analysis.' *Energy Economics* 27:415–27.

———. 'The Causality Relationship between Energy Consumption and GDP in G-11 Countries.' *Energy Policy* 34:1086–93.

Li, X., and X. Liu. 2005. 'Foreign Direct Investment and Economic Growth: An Increasingly Endogenous Relationship.' *World Development* 33:393–407.

Maddala, G. S., and S. Wu. 1999. 'A Comparative Study of Unit Root Tests with Panel Data and a New Simple Test.' *Oxford Bulletin of Economics and Statistics* 61:631–52.

Managi, S., and P. R. Jena. 2008. 'Environmental Productivity and Kuznets Curve in India, Ecological Economics.' 65:432–40.

Mielnik, O., and J. Goldemberg. 2002. 'Foreign Direct Investment and Decoupling between Energy and Gross Domestic Product in Developing Countries.' *Energy Policy* 30:87–9.

Narayan, P. K., and S. Narayan. 2010. 'Carbon Dioxide Emissions and Economic Growth: Panel Data Evidence from Developing Countries.' *Energy Policy* 38:661–6.

Nguyen, T. B. M., and A. M. Amin. 2002. 'The Role of Foreign Direct Investment in Urban Environmental Management: Some Evidence from Hanoi, Vietnam.' *Environment, Development and Sustainability* 4 (3): 279–97.

Pao, H. T., and C. M. Tsai. 2010. 'CO_2 Emissions, Energy Consumption and Economic Growth in BRIC Countries.' *Energy Policy* 38:7850–60.

———. 2011. 'Multivariate Granger Causality between CO_2 Emissions, Energy Consumption, FDI (Foreign Direct Investment) and GDP (Gross Domestic Product): Evidence from a Panel of BRIC (Brazil, Russian Federation, India, and China) Countries.' *Energy* 36:685–93.

Sadorsky, P. 2010. 'The Impact of Financial Development to Energy Consumption in Emerging Economies.' *Energy Policy* 38:2528–35.

Sari, R., and U. Soytas. 2007. 'The Growth of Income and Energy Consumption in Six Developing Countries.' *Energy Policy* 35:889–98.

Vu, T. B. 2008. 'Foreign Direct Investment and Endogenous Growth in Vietnam.' *Applied Economics* 40 (9): 1165–73.

Wang, M. 2009. 'Manufacturing FDI and Economic Growth: Evidence from Asian Economies.' *Applied Economics* 41 (8): 991–1002.

Zang, K. H. 2001. 'Does Foreign Direct Investment Promote Economic Growth Quest: Evidence from East Asia and Latin America.' *Contemporary Economic Policy* 19:175–85.

Efficient Institutions and External Trade Policy Management Can Increase the Influence of a Small Country on the International Stage

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The paper focuses on a country's external trade policy management in relation to the processes within its sub national entities. Its main goal is to identify an optimal approach to realizing the national interests of a small EU member state at the international/sub national level. We argue that influence on certain decisions does not necessarily solely depend on the power (i. e., size) of a country, but also depends on other factors, such as the country's goals and ability to form alliances. We confirm that institutions are of key importance for efficient external trade policy management – *small countries in particular can increase their influence at the international level substantially if they are capable of efficient process management and forming alliances with sub national actors.* After analysing the systems in selected EU member states, we make proposals for enhancing the trade policy management process in Slovenia.

Key Words: international economic co-operation, external trade policy,
    external trade theories, economic diplomacy
JEL Classification: F13, F14

Introduction

Globalization has had a seminal impact on patterns of global economic co-operation and trade. Global economic integration is deepening, and more countries than ever are seizing the opportunities presented by globalization. Industrialization through joining global value chains became a new development paradigm (Baldwin 2012). While in the second half of the twentieth century OECD countries – especially Japan, the United States and those in Europe – drove the global economy, they are being joined in the first half of the 21st century by new economic powers such as Brazil, Russia, India and China (BRIC countries), and others (European Commission 2006). In 1980, developing economies only accounted for 34 per cent of world exports but by 2011, this figure had risen to 47 per cent. At the same time, the share of developed economies dropped from 66 per cent to 53 per cent (World Trade Organization 2013, 5).

In a global environment, intensified interdependency in international production through global value chains (GVCS) inevitably implies greater mutual policy dependency (Elms and Low 2013; OECD 2013). External trade policy has become increasingly interconnected with other policies (e. g., competitiveness, energy, the environment and sustainable development policies) and the number of actors involved in trade negotiations conducted at different levels (bilateral, plurilateral, multilateral) has also risen. *In our opinion it is therefore crucial that a coordination model is introduced that would enable a small European Union member state to implement efficient trade policy (process) management in order to realize its national interests at the sub national/international level and increase its influence/power.* We argue that institutions play a key role in efficient external trade policy management.

At the outset of this paper, reference is made to the economic theories in relation to the (changed) role of the state/institutions, and the actors in economic diplomacy (state and non-state) in external trade policy management. The role played by the state and institutions is then analyzed for different historical periods.

The focus then turns to the European Union's external trade policy process of coordination, the role of national and sub national (state and non-state) actors, and the extent to which the external trade policy is linked with other national policies. The complexity of the process of interactions between different actors, negotiating levels, and policies is revealed by using the World Trade Organization Doha Development Agenda case (WTO DDA), and the negotiation process within one of the negotiating groups is described (i. e., the European Union in relation to the WTO DDA). In our opinion, knowledge of these complex processes (the actors and levels involved) is an important precondition for proposing a coordination model that would enable a small EU member state to have more efficient (and effective) trade policy (process) management in order to realize its national interests at the sub national/international level and increase its influence/power.

The focus of the research then turns to the external trade management practices (processes) in five EU member states. The case studies include Germany, Ireland, France, Poland and Slovenia. Our goal is to discover whether, *in spite of the differences in size, economic structure and trade orientation of the countries analyzed,* there are some common characteristics that should be taken into account when making proposals to improve trade policy process management in Slovenia. This paper will attempt to

provide empirical evidence that institutions and efficient process management increase the influence of a country at the international level.

The information published on the web pages of the relevant institutions engaged in external trade management (state and non-state) is examined, and four structured interviews with high ranking officials are carried out: the directors general responsible for trade policy of Germany, France, Ireland and Poland (and the EU Trade Policy Committee – full members). For Slovenia, the participant observation method is used (the author chaired the EU Trade Policy Committee – full members in the first half of 2008). The research questions in this paper are as follows: Are there strategic goals set on a national level? Which ministry is primarily responsible for trade policy? Are there regular (formal and/or informal) trade policy coordination procedures (provide a description)? Which (state and/or non-state actors) are involved? Does the coordination procedure include other economic policies?

Based on a critical review of the literature, analyses conducted, case studies, and a synthesis of the findings, this paper presents a proposal for an external trade policy management model (to be implemented in Slovenia, a small EU member state) in order to increase the country's influence/power at the sub national/international level.

Theoretical Background

External trade policy is an important element in industrial and (strategic) development policy. Therefore, for the purposes of the analysis herein, the strategic economic policy approach is relevant. This approach acknowledges the main role of the market (for the effective allocation of production factors), but at the same time stresses the importance of the government, its institutions and its systems of process management (Strašek and Jagrič 2004). The analytical concept formulated by Esser et al. (1996), stresses that dynamic economic development is not based solely on functioning markets and individual entrepreneurship, but also on a supportive environment for business development. Therefore, it is crucial to analyze not only the micro and macro levels (i. e., the markets and macro-economic conditions), but two additional levels should also be taken into consideration: *the meso and the meta levels.* The *meso level* addresses specific policies (such as technology policy, industrial policy, regional policy, etc.) and the institutional and organizational environment, which supports firms. The *meta level* addresses the capability of actors at the local, national or even supra-national level to create favourable

conditions for industrial dynamism (i. e., strategies and coalitions). Inter-action between factors at all four levels is crucial (including interaction between the different policies referred to at the meso level).

Since the aim of this paper is to identify an optimal approach to re-alizing the national interests of a small EU member state at the interna-tional/sub national level, specific focus is devoted to the various different theories referring to small countries. The most relevant theory for the purposes of this study is the finding of Baille (1998) who created a model for a small country's influence in the European Union. Baille argued that there were three explanatory variables for a small country's influence in the EU. First, a small country's influence is directly related to its partic-ular historical context. Second, the level of the small country's influence depends on its institutional frameworks (the rules, procedures, norms, and principles) that facilitate the defence of its interests. Third, the nego-tiation behaviour of the small country, which is geared towards conflict-avoidance, has an impact on its political influence. Within the solutions as to how a small country can increase its influence, which are based on the Barston's study (1973) on nine small countries and how their foreign policy objectives are framed and what organizational structures they cre-ate, the forging of coalitions and the use of international organizations to generate support for their policies is relevant in this study.

In *The Competitive Advantage of Nations,* Porter (1990) stressed the importance of institutional mechanisms for national competitive success, but at the same time neglected the role of micro-economic policies and that of the state. Udovič and Svetličič (2007), who have analyzed in detail the international economic theories related to small countries, discov-ered that although no direct reference is made to them, there is no doubt that, in most cases, they stand to gain from international trade. Small countries may improve their international competitiveness by forming al-liances and replacing mass production by investing in production process (lean and just-in-time production) in order to lower costs. Small coun-tries are more dependent on international markets and their regimes, but they can achieve economies of scale through internationalization and economic policy measures that make their markets more attractive to for-eign investors. Specializations and market niches are of great importance for small countries too.

When analyzing international trade it is important to focus on *inter-est groups, international structures and ideas.* Kennedy (2007) emphasizes the importance of interest groups and their efforts to exert influence on

the international trade policy of a country. International trade is essential especially for small countries – i.e., small in a geographical sense. Shafaeddin (2003) stresses the importance of a liberal trade policy for developing countries – they have to implement economic policy and trade policy with clear goals (which are adapted to the development stage and industrial structure).

What is the Role of Economic Diplomacy in Relation to Trade?

This section utilizes the framework of analysis developed by Bayne and Woolcock (2003) in their book, The New Economic Diplomacy. According to the authors, the main groups of economic diplomacy actors engaged in negotiations are national/sub national state actors, non-state actors and transnational actors (international organizations, non-governmental organizations, etc.) They seek to reconcile three tensions: those between economics and politics, domestic and external pressures, and between government and other forces. This is important because these activities involve efforts to overcome political obstacles to international economic co-operation, and they require domestically agreed positions, their deployment in international negotiations and the engagement of different actors in economic relations (Bayne 2012).

Rana (2002) argues that economic diplomacy has become the centre of diplomatic activities, and proposes four main pillars for these, i.e. international trade promotion, investments promotion, attracting FDI (technology), and the management of the power/influence of a country. On the other hand, Sanner and Yiu (2003) claim the main task of economic diplomacy is representation and to influence decisions made within international organizations (e.g., WTO – World Trade Organization, UNCTAD – United Nations Conference on Trade and Development, UNIDO – United Nations Industrial Development Organization, etc.), at the same time making efforts to influence the policies and positions of other countries engaged in economic diplomacy tasks. The authors also differentiate between multilateral and bilateral levels of negotiation.

In recent years, scholars of diplomatic studies have debated extensively on the ways in which diplomacy has changed in response to a series of factors that have been occurring since the mid-twentieth century. From this debate, a new paradigm of sorts has emerged in diplomacy scholarship with regard to analyzing and understanding contemporary diplomacy (Pigman and Vickers 2012). Whereas a century ago diplomacy was conducted primarily between the representatives of nation-state govern-

ments, non-state actors are increasingly becoming involved. Many multi-national companies negotiate regularly with governments or multilateral institutions. 'Postmodern diplomacy' involves increasingly complex patterns of interaction between the state and a shifting range of other actors in both public and private arenas. The roles played by diplomats have moved to coordinating state based actions and facilitators in the construction and operation of multi-actor policy coalitions (Batora and Hocking 2007).

Bayne and Woolcock (2003) define economic diplomacy under three main categories: actors, instruments, and market influence. Successful diplomacy manages contacts efficiently and forms alliances with government and non-government actors. External economic policy (and international trade policy) is performed based on the influence exerted by interest groups. In short, *the actors in economic diplomacy play a significant role in trade policy issues* (on national and sub national levels), in international trade and investment promotion, negotiations, in terms of representation and in relation to influencing decisions made within international organizations, forging alliances, etc.

European Union External Trade Policy Coordination Process: Interactions between Different Actors, Negotiating Levels and Policies

This section will describe the process of coordination within the European Union – including in relation to the case of the World Trade Organization Doha Development Agenda (wto dda). The goal is to identify all key (state and non-state) actors at a national and sub national level and their interactions in the process of negotiations (bilateral, plurilateral, multilateral). The focus of this section is the coordination process within the eu, and an analysis is carried out on the role of different eu actors within the wto dda negotiations (at the July 2008 Ministerial Meeting in Geneva). The analysis is conducted on the basis of information published on the web pages of the European Commission, the wto, etc., and the participant observation method.

The negotiation process within the wto was extremely complex (with negotiations performed at different levels – multilateral, plurilateral, bilateral) as the institution reaches decisions in accordance with the principle of consensus among all of its members. This process of trying to come to a consensus could be described as negotiating in concentric circles, where the *tnc – Trade Negotiating Committee* coordinated the work of
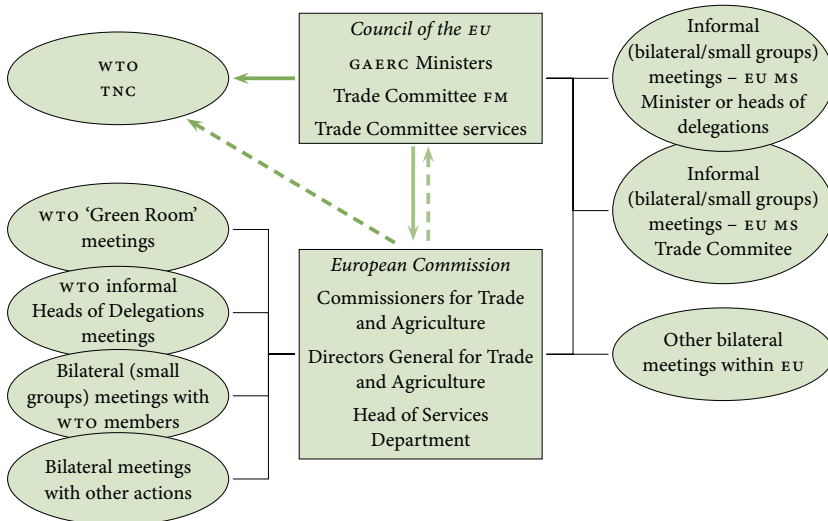
FIGURE 1   EU Coordination Procedure During the July 2008
            Ministerial Meeting in Geneva

→ Guidelines, confirmations of positions   ⇢ Reporting and proposals
→ Participation   ⇢ Presentation of EU proposals

the nine working groups. A small group of countries attempted to reach agreement before bringing the position/proposal to progressively larger groups of countries – and then finally presenting it to the entire membership at the TNC meeting (see the WTO web page http://www.wto.org for more details). The European Union (EU) represented one of the negotiating groups within the WTO DDA. However, it should be noted that the process of coordination within the integration was also complex – it involved many (state and non-state) actors with different interests.

In terms of trade policy, the Commission, which is mandated by the Council, is responsible for negotiating and managing trade agreements involving tariff amendments, customs and trade provisions, and protective measures in consultation with the 'Trade Policy Committee,' a Council committee of high-level trade officials. Within the WTO, the Commission negotiates on behalf of the Union. In the interests of continuity for EU Council business, the six-monthly presidencies work together closely in groups of three. These three-presidency teams draw up a joint program of Council work over an 18-month period.

The EU negotiating format for the 2008 WTO Ministerial meeting is presented in figure 1.

The European Commission (EC) was negotiating at the WTO on behalf of EU member states. The guidelines for negotiations and the mandate to the European Commission were given by the Council of the EU (GAERC – General Affairs and External Relations Council, now the FAC – Foreign Affairs Council) and in consultation with the Trade Policy Committee (figure 1). Numerous meetings were held at different levels and in different formats, comprising formal meetings (Trade Committee meetings and GAERC meetings) as well as informal meetings among 'like-minded' members of the EU, and meetings with non-EU member states with similar interests. At the WTO TNC meetings, the position of the EU member states was presented by the European Commission. The Commission also held several formal and informal meetings with other non-EU actors (WTO 'Green Room meetings,' WTO Heads of Delegation meetings, bilateral WTO members meetings, and others).

In addition, the structure of each member state's delegation should be also considered. Member states (MS) were represented by ministers/high officials from their respective capitals and from a variety of ministries (however, mainly those responsible for economy/trade and agriculture), representatives of permanent representations in Brussels and representatives to the WTO in Geneva. Before becoming involved in international negotiations, the position should be discussed and agreed internally. The complexity of internal coordination procedures will be shown in a case study on some EU member states in the following chapter.

External trade policy is not isolated, but is instead interconnected with several other policies (competition, energy, environment and sustainable development policies). Therefore, the need for co-operation and consistency among a high number of actors is gaining increasing relevance. We have already identified key actors in the formal process of creating EU external trade policy (i. e., the Council of the EU, European Parliament, European Commission, state actors in member states and several non-state actors at the (sub) national level. Within the European Commission, DG Trade is officially responsible for external trade policy but, owing to interconnections with several other policies, the external trade policy is drafted by seven additional directorates (DG for Agriculture and Rural Development (AGRI), Climate Action (CLIMA), Competition (COMP), Enterprise and Industry (ENTR), Environment (ENV), Europe Aid Development & Cooperation (DEVCO) and Taxation and Customs Union (TAXUD). The role of the European Parliament with regard to external trade gained importance after the Lisbon Treaty had entered into force.
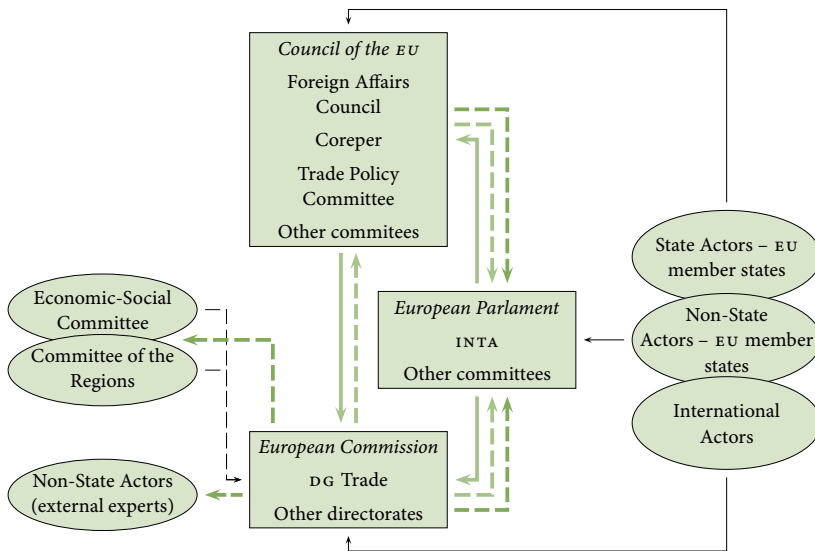
FIGURE 2   Actors in the Formal Process of Negotiations within the EU

⟶ Influence on formal process   – → Opinion   ⇢ Information

⇢ Proposals   ⟶ Confirmations

Now the agreement/confirmation of the EP is required for all trade negotiations – another actor to be considered.

Non-governmental organizations have gradually become more active. To name just a few within the EU: UNICE – Union of Industrial and Employees Confederations, Eurochambers, ERT – European Roundtable of Industrialists, AMCHAM EU – American Chamber of Commerce to the European Union, several sectoral associations, etc. Not only do they present their positions in non-formal processes, they are often members of advisory committees within the EC. The Commission can, however, influence them by financing certain activities (Bomberg and Stubb 2003).

In the formal process of negotiations within the EU, four groups of actors can be defined (figure 2):

1. EU Institutions and Bodies: European Commission, European Parliament, Council of the EU, European Economic and Social Committee, and Committee of the Regions);

2. EU member state governments;

3. Different interest groups, organized at the EU or member state level;

4. Non-EU actors.

According to the Rules of Procedure, the EC negotiates on behalf of 28 member states based on the mandate given by the Council of the EU. Only key formal decisions (approving the mandate to negotiate and the final text at the end of negotiations) are approved by FAC. After the Lisbon Treaty entered into force in 2009, the European Parliament (i. e., INTA Committee) also became part of the formal process (Deckwirth 2005).

The external process begins with the EC's proposal for commencing the negotiations. The Council of the EU then authorizes the EC to start negotiations (and gives the institution relevant guidelines). Based on consultations with the Trade Committee, the EC can thus begin the process of negotiating with external partners. When agreement is reached, the EC presents the draft text to the Council of the EU for approval. The approval of the EP is also required. The opinion is often also presented to the European Commission by the European Economic and Social Committee and Committee of the Regions.

As the analysis has shown, the EU and its member states (as a collective external trade policy actor) operate alongside, across from and in tandem with one another. The associated patterns of diplomacy reflect the complexity of communication within the integration and in relation to the WTO. The interaction between national diplomatic systems and the regional and global diplomatic networks are a reflection of the changes in the environment. The EU comprises a complex diplomatic environment in which multilateralism and bilateralism are intertwined. At the same time, much of the inter-governmental communication between member states is increasingly conducted directly between different levels of national public administration. These facts will be taken into account when the proposals are made.

Analysis of the External Trade Policy Management (Process) in Some EU Member States

After analyzing the decision making process at the EU level (also in relation to the WTO in the WTO DDA case), the focus of this paper will now shift to the practices of external trade management in the EU member states selected (Germany, France, Ireland, Poland, and Slovenia).

The main research questions are whether there are strategic goals set on the national level and whether defined (and implemented) formal and informal co-ordination procedures for external trade policy management exist and, if so, which actors are involved in the process. In addition, the question as to whether there is a co-ordination procedure with other rel-

evant policies will be investigated. Our case study is based on analysing the systems in five different countries – different in terms of size, external trade orientation (mainly liberal or protectionist trade policies), industry structure, and time of EU accession. The aim is to define potential common characteristics that these countries should take into account in their external trade policy co-ordination models (irrespective of their size, external trade orientation or industry structure). In addition, empirical evidence will be provided to confirm that institutions and efficient process management increase the influence of a country on the international stage.

The key findings of our analysis, which are based on four structured interviews with high-ranking officials – the directors general responsible for the trade policy of Germany, France, Ireland and Poland (and the EU Trade Policy Committee – full members) and the participant observation method for Slovenia as well as information published on the web pages of relevant institutions (the European Commission, ministries of the economy, the World Trade Organization, etc.), engaged in external trade management in the countries analyzed (for more details see Koleša 2012) are as follows:

- Ireland, France, Germany and Poland have economic and trade policies with clear objectives in order to achieve their goals at the international level. The importance of these is also stressed in theory (Shafaeddin 2003).

- Ireland, Germany and Slovenia have a mainly liberal external trade orientation, while France and Poland are mainly protectionist oriented. Based on the information gathered in the interviews, we discovered that trade policy orientation does not have a direct impact on the coordination system.

- The external trade policy is coordinated by ministries responsible for the economy in all the systems analyzed. The process also involves the Ministry of Foreign Affairs and other ministries responsible for strategic policies (Ministry of Agriculture, Ministry of Finance, etc.). Empirical evidence confirms the theoretical arguments put forward by Hocking and Spence (2005) that the importance of the role of ministries of foreign affairs is decreasing, while the importance of the role of other ministries (responsible for strategic policies) is increasingly on the rise.

- All the analyzed countries have implemented a coordination model

(with some specifics according to the institutional structure of each national system), where all the relevant ministries (responsible for external trade and other relevant policies) are involved in the process, and the permanent representations in Brussels and Geneva also play an important role. They serve as a 'bridge' between the national and sub-national actors. They are required to possess knowledge of national interests and priorities as they influence the decisions of the European Commission. On the other hand, they act as an information channel for national capitals – informing government actors of the policy proposals of EU institutions and the positions of other member states. In Slovenia, however, we noticed some deviations (e. g. a lack of horizontal coordination and analytical studies, often changes of experts, etc.)

- According to the information gathered by the interviews, informal coordination with different non-state actors is also important. This enables countries to take a consistent national position within different working bodies in Brussels and form national and sub-national alliances based on national interests and priorities.

- Ireland, a small country in terms of geographic size, significantly increased its international power after liberalizing its external trade in 1950 and after acceding to the EU. An important role was played by the government in this transition in terms of its strategic orientation as well as the co-ordination among the different policies and relevant actors. Empirical evidence confirms the theoretical arguments put forward that institutions play a key role in the economic performance of a country (Barston 1973; Baille 1998; North 1990; Strašek and Jagrič 2004).

- Based on the information published on the web pages of relevant state actors (the ministries responsible for trade policies) and from the interviews, the key weaknesses in Slovenia's current coordination system can be identified (partly due to constant reorganizations and changes in the responsibilities of state actors) when compared with other analyzed countries (Ireland, France, Germany, and Poland). They are as follows: a lack of horizontal coordination and synchronization of policies (between different working groups); some of the relevant actors are not included in the formal process; there are insufficient analyses used as a basis for decision making; informal communication with different (state and non-state, national

and sub national) actors with a view to forming alliances is weak, and investment in knowledge and skills is also insufficient. There is no direct proof of negative economic performance owing to the above listed weaknesses but, according to theory and the interviews, the coordination of actors and policies is (perceived to be) the main pre-condition for efficient external trade policy management. Efficient and effective institutions are a key element in achieving competitive advantages (Porter 1990; Esser et al. 1996; Barston 1973, etc.).

Key elements of our analysis are shown in table 1.

Proposals

Based on a critical review of the literature, analyses conducted, case studies of the selected EU member states, and a synthesis of findings, this paper presents a proposal for an external trade policy management model. The model, which is based on the good practices of the EU member states analyzed, suggests incorporating all key (state and non-state) actors in the formal and informal co-ordination processes.

When drafting a model for a country, we should take the following into account: institutions and their key role in the economic performance of a country (North 1990; Esser et al. 1996); external trade policy measures, relevant other policies and their influence (at the EU and member state level); the principle of policy consistency (horizontal and vertical) at the EU and national levels; formal structures and processes within the EU and at the national level; and the good practices of other countries.

Our proposal for the drafting of an external trade policy management model (for developing a dynamic comparative advantage for the economy) is as follows (fugure 4):

- As the influence exerted on certain decisions does not necessarily depend on the power of the state, but also on other factors, such as the country's goals, focus and ability to form alliances (Barston 1973; Baille 1998; Udovič and Svetličič 2007, etc.) we suggest *drafting a document with national policy priorities (a strategy) and clearly defining the (offensive and defensive) goals of the external trade policy (on the basis of a national strategy, and the structure and interests of industry) and implementing a formal system of horizontal and vertical coordination* (upgrading the processes, if required) in order to consistently present positions and forge relevant coalitions (forming alliances). The *tasks, responsibilities and procedures should be clearly*

TABLE 1 Key Elements of Our Analysis in Some EU MS

Elements	Ireland	Germany	France	Poland	Slovenia
Size of the country	Small	Large	Large	Large	Small
External trade policy orientation (mainly)	Liberal	Liberal	Protectionist	Protectionist	Liberal
Coordination of EU policies	Ministry of Foreign Affairs	Ministry of Foreign Affairs, and Ministry of Economy	Special EU co-ordination Body	Committee for EU Affairs	Ministry of Foreign Affairs
Coordination of External trade policy	Ministry of Economy	Ministry of Economy	Ministry of Economy	Ministry of Economy	Ministry of Economy
Key actors involved	State, non-state, inter-national	State, non-state, inter-national	State, non-state, inter-national	State, non-state, inter-national	State, non-state, inter-national
Key activities within the coordination process	Coordination meetings, analyses and interests of industry as a basis for decision making	Coordination meetings, analyses and interests of industry as a basis for decision making, reporting to parliament and industry	Coordination meetings, analyses and interests of industry as a basis for decision making, reporting to parliament and industry, negotiation, delegation structure depends on the issue discussed	Coordination meetings, sharing information and coordination of positions	Coordination meetings, main information channel web pages of the ministry responsible for external trade

NOTES   Adapted from European Commission (2006) and Koleša (2012).

defined and a list of relevant contacts made in order to achieve the country's goals and increase its international influence.

- According to the theoretical arguments (Hocking and Spence 2005) and empirical evidence (interviews with high-ranking officials in EU member states), we also suggest *implementing a system of infor-*

mal coordination (not only within a country but also on a sub national level).

- The Permanent Representations in Brussels and in Geneva should have good contacts with the EC, other member states and other (state and non-state) actors and support capitals with the provision of relevant information.

Based on the good practices of the EU member states analyzed (information gathered by interviews) we also suggest:

- Establishing a relevant analytical basis for decision making;
- Constant investment in the knowledge and skills of personnel (including mentoring);
- Setting up a (regularly updated) portal/database, accessible to all relevant actors;
- Providing information and the promotion of activities (internet, round tables, etc.)

We are of the view that a co-ordination system such as this, which incorporates all the key (state and non-state) actors and policies, would be more transparent and enable the country to effectively and efficiently manage its external trade policy (in connection with other policies and in line with its strategic goals and industry interests). We also stress the importance of the individuals involved in the formal external trade policy management process possessing adequate knowledge and skills, the importance of the relevance of two-way communication channels, and that the essence of the decision making process is based on analytical studies conducted in co-operation with external experts. The proposal includes vertical and horizontal connections/interactions between actors and policies, two-way communication channels, defined national priorities and external trade interests (offensive and defensive), which should be based on the proposals and interests of the business sector as well as empirical analyses.

Conclusion

In the global economic environment, a country can gain a competitive advantage through efficient and effective government institutions. This is especially important for small countries as they can compensate for their size by establishing efficient institutions. Innovative institutions are a precondition for successful economic development and increased international competitiveness (Svetličič 2005; Senjur 2002; Kuznets 1955). The
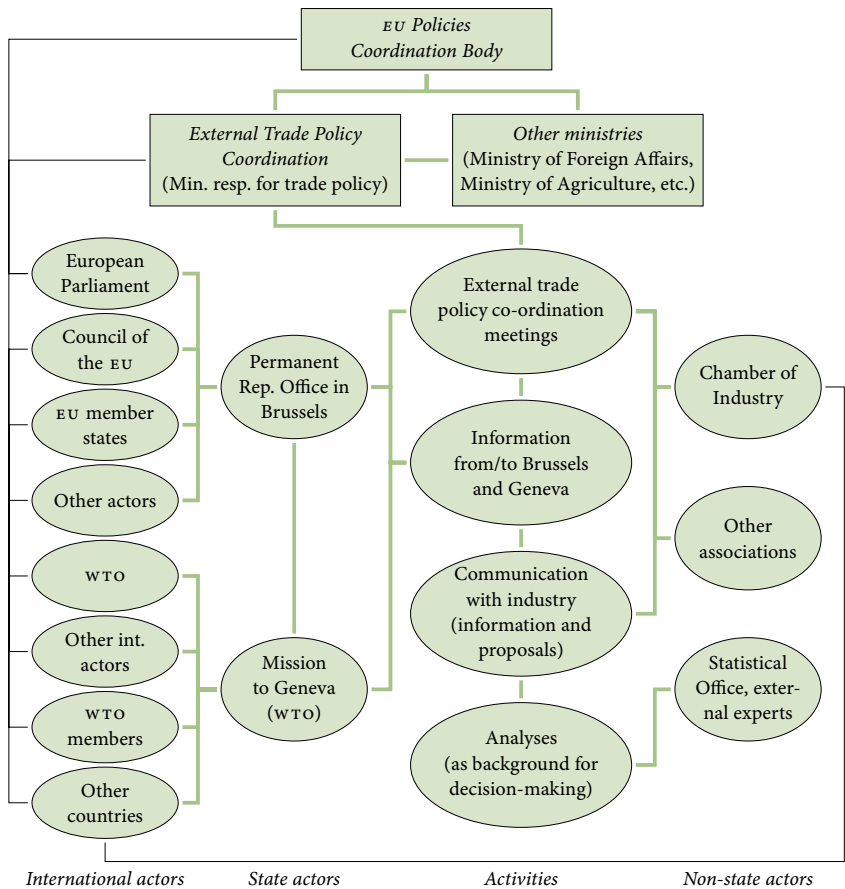
FIGURE 3   Proposal of an External Trade Policy Management Model

—— Two-way communication

importance of institutions is stressed by institutional theory (North 1990 and Esser et al. 1996). The World Economic Forum (2010) and IMD also define the business environment and institutions as key determinants of competitiveness. Liberal trade supports the innovativeness and competitiveness of a country, but at the same time, it is important that countries have defined national priorities and external trade interests (offensive and defensive) based on the proposals and interests of the business sector and analyses conducted. External trade policy should also be coordinated with other national policies. In addition, the coordination and synchronization of policies at the EU level are necessary. After analysing the coordination systems in the selected EU member states, we can conclude

there is *no unique model of coordination.* The processes in EU member states depend on their institutional structure. Nevertheless, we can define some common characteristics (based on the interviews and information published on web pages): in all cases, countries have strategic goals set on a national level, with the main coordinators defined and formal procedures set. Building coalitions on a sub national level also plays a key role (Barston 1973; Baille 1998). Ireland is a good empirical example of a small country that has managed to increase its international power/influence by introducing a clear strategy, focus, and by forming alliances. On the other hand, we see the potential for Slovenia to enhance its external trade policy management model and increase its influence on the international stage.

The model, which is based on the good practices of EU member states, suggests incorporating all key (state and non-state) actors in the formal and informal co-ordination process, which also requires enhancement and increased transparency. This requires the vertical and horizontal connections of actors and policies, two-way communication channels, clearly defining national priorities and external trade interests (offensive and defensive), based on the proposals and interests of the business sector and empirical analyses. We also stress the importance of adequate knowledge and skills possessed by the individuals involved in the formal trade policy management process, the relevance of two-way communication channels and the essence of decision-making process to be based on analytical studies conducted in co-operation with external experts.

We are of course aware that we cannot generalize the findings simply by analysing the systems in four countries. Further comparative analyses should be carried out among small EU member states. A comparison of the processes within other small countries, which are not members of the EU, could provide further insight into the research. In our opinion, the model is relevant as it takes into account different levels, different policies, and the role of economic diplomacy with regard to external trade policy and the views of institutional theory, the key role played by government/institutions, policy co-ordination, and the forging of alliances. In our view, this is vital for countries that are small in terms of geographical size and which rely heavily on international markets.

References

Baille, S. 1998. 'A Theory of Small State Influence in the European Union.' *Journal of International Relations and Development* 1 (3–4): 195–219.

Baldwin, R. 2012. 'Global Supply Chains: Why They Emerged? Why They Matter? And Where They Are Going?' CTEI Working Papers 2012-13, The Graduate Institute, Geneva.

Barston, R. P. 1973. *The Other Powers: Studies in the Foreign Policies of Small States.* London: Allen & Unwin.

Batora, J., and B. Hocking. 2007. 'Bilateral Diplomacy in the European Union: Towards Post Modern Patterns?' Paper presented at the Pan European Conference, Turin, September 2007.

Bayne, N. 2012. 'The Economic Diplomacy of Sovereign Debt Crises: Latin America and the Euro Zone Compared.' *International Journal of Diplomacy and Economy* 1 (1): 4–18.

Bayne, N., and S. Woolcock. 2003. *The New Economic Diplomacy: Decision making and Negotiation in International Economic Relations.* Aldershot and Burlington: Ashgate.

Bomberg, E., and A. Stubb. 2003. *The European Union: How Does It Work?* Oxford: Oxford University Press.

Deckwirth, C. 2005. *The EU Corporate Trade Agenda: The Role and the Interests of Corporations and Their Lobby Groups in Trade Policy-Making in the European Union.* Brusseles and Berlin: Seattle to Brussels Network.

European Commission. 2006. 'Global Europe: Competing in the World; A Contribution to the EU's Growth and Jobs Strategy.' European Commission, Brussels.

Elms, D. K., and P. Low. 2013. *Global Value Chains in a Changing World.* Geneva: WTO.

Esser, K., W. Hillebrand, D. Messner and J. Meyer-Stamer. 1996. *Systemic Competitiveness.* Berlin: German Development Institute.

Hocking, B., and D. Spence. 2005. *Foreign Ministries in the European Union.* New York: Palgrave Macmillan.

Kennedy, R. 2007. 'Fragments of Economic Accountability and Trade Policy.' *Foreign Trade Analysis* 3 (2): 145–169.

Koleša, S. 2012. 'Model učinkovitega upravljanja zunanjetrgovinske politike Slovenije.' PhD dissertation, University of Maribor.

Kuznets, S. 1955. 'Economic Growth and Income Inequality.' *The American Economic Review* 45 (1): 1–28.

North, D. C. 1990. *Institutions, Institutional Change and Economic Performance.* Cambridge: Cambridge University Press.

OECD. 2013. 'Global Value Chains, Development and Competitiveness.' Discussion Paper presented at the OECD meeting, Paris, March 19.

Pigman, G. A., and B. Vickers. 2012. 'Old Habits Die Hard? Diplomacy at the World Trade Organization and the New Diplomatic Studies

Paradigm.' International Journal of Diplomacy and Economy 1 (1): 19–41.

Porter, M. E. 1990. 'The Competitive Advantage of Nations.' *Harvard Business Review* 68 (2): 73–91.

Rana, K. S. 2002. *Inside Diplomacy.* New Delhi: Manas.

Sanner, R., and L. Yiu. 2003. 'International Economic Diplomacy: Mutations in Post-Modern Times.' Discussion Paper, Netherlands Institute of International Relations Clingendael, The Hague.

Senjur, M. 2002. *Razvojna ekonomika – teorije in politike gospodarske rasti in razvoja.* Ljubljana: Ekonomska fakulteta.

Shafaeddin, M. 2003. 'Free Trade or Fair Trade? How Conductive is the Present International Trade System to Development?' Discussion Paper 153, United Nations Conference on Trade and Development, Geneva.

Strašek, S., and T. Jagrič. 2004. *Sektorska ekonomika.* Maribor: Ekonomsko-poslovna fakulteta.

Svetličič, M. 2005. 'Male države v krempljih ali na krilih globalizacije?' *ib revija* 39 (1–2): 68–80.

Udovič, B., and M. Svetličič. 2007. 'Majhne države v novih teorijah mednarodne trgovine.' *Teorija in praksa* 44 (1–2): 29–48.

World Economic Forum. 2010. *The Global Competitiveness Report 2010–2011.* Geneva: World Economic Forum.

World Trade Organization. 2013. *World Trade Report 2013: Factors Shaping the Future of Trade.* Geneva: World Trade Organization.

The Electric Vehicles Ecosystem Model: Construct, Analysis and Identification of Key Challenges

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This paper builds a conceptual model of electric vehicles' (EV) ecosystem and value chain build-up. Based on the literature, the research distinguishes the most critical challenges that are on the way of mobility systems' electrification. Consumers still have some questions that call for answers before they are ready to adopt EVs. With regard to technical aspects, some challenges are coming from vehicles, charging infrastructure, battery technology, and standardization. The use of battery in EVs will bring in additional environmental challenges, coming from the battery life cycle for used battery, the manufacturing, and from some materials used and treated in the manufacturing process. The policy aspects include mostly taxation strategies. For most part, established market conditions are still lacking and there are a number of unresolved challenges on both supply and demand side of the EV market.

Key Words: electric vehicles, ecosystem, mobility, policy, environment
JEL Classification: L22, L62, O18, Q01, R41

Introduction and Scope

A vast number of studies on electric vehicles (EVs) have been issued up to date and the reasons for this are obvious, as the movement towards electrification of mobility is gaining strength as part of greening the transportation systems. This paper introduces a conceptual model of the EV

ecosystem – the relevant stakeholders and actors – and identifies the key challenges of EV market penetration. EVs have potential to change the nature of the whole vehicle manufacturing business and the ecosystem around current fuel-powered vehicles (cf. Petrie 2012). EVs use one or more electric motors as their power sources either directly powered from external power station, or powered by an on-board electrical generator. EVs include plug-in electric cars, hybrid electric cars, hydrogen vehicles, electric trains, electric lorries, and electric motorcycles/scooters.

Many countries are considering what electrification of their mobility system in fact means. Furthermore, these countries are not completely aware of their current industrial structure and how EV industry will complement the existing industry architecture. EV industry needs an ecosystem that is able to deliver necessary technologies, services and processes that facilitate EVs to penetrate the market. The ecosystem consists of both public and private actors, but the ex-ante presumption is that private actors are more dominant in the making of EV ecosystem works. Tax and energy policies are not the least of these issues, but are consciously framed outside the analysis. In addition, trade policy issues remain visible in the background context.

The policy of the European Union has been to promote electrification of the mobility system, although the related directive on the promotion of clean and energy-efficient road transport vehicles leaves much room for member states to apply (European Commission 2009). A particular emphasis is put on public procurement of vehicles, which puts weight on public transport vehicles, e. g. buses or some other vehicle fleets in public service. On taxation or other promoting measures, the directive speaks only little, and stays only on promotional level. If the policies are to be efficient, specific and targeted measures need to be taken in order to make EVs more lucrative for both consumers and producers.

This paper draws from the existing body of literature some of the key challenges on the way of electric mobility. The structuring of the challenges summarizes existing research and points out whether the challenges are mainly arising from the market, policy or business, or whether they have more of a technical or societal (environmental) nature. Literature base and systems modelling are used as research approaches to main research questions that are stated as follows:

1. What are the key challenges of EVs' wider acceptance by the market and consumers and how these challenges can be categorized?

2. What is the current electric vehicle ecosystem (or cluster) looking like and how do the main challenges relate to the ecosystem?

3. Can we identify prospective development paths that would pave the way for EVs and speed up the electrification of the mobility system?

In order to answer the above research questions, the study focuses on the ecosystem level view that comprises set of companies or industries with their functions, roles, and dynamics. Firm level analysis is excluded as it would require higher resolution focus on firms' business models. The research process was divided into four steps:

1. Reviewing and clustering of the literature and disaggregating the clustered themes into major challenges regarding EV markets based on the researchers' perception derived from the literature.

2. Identification of relevant actors and stakeholders and constructing a generic EV ecosystem description.

3. Reflecting the major (but disaggregated) challenges against generic electric vehicles ecosystem (EVE) and 'mapping' the challenges in the EVE architecture.

4. Concluding and presenting some of the relevant steps to overcome the identified and mapped challenges.

Methodologically, reviewing of the literature and extracting the relevant key challenges that are on the way of mobility systems' electrification and building visual representative models can be regarded as heuristic modelling of the phenomenon (EV ecosystem), i. e. problem solving or increasing the understanding of the problem (Frigg and Hartmann 2012). The tree-like hierarchy of challenges built around clusters (i. e. themes) are a logical continuation of this method. The devising of the ecosystem description is constructive research by nature. We construct the ecosystem model in order to scale-down complex reality. In some countries, the ecosystem model finds empirical objects that correspond to the elements of the construct, but in some countries, the ecosystems are undeveloped or unconscious of the needed actions to be taken. Thus the research process consists of exploratory part (literature review) and constructive parts, which are partly heuristic (modelling of ecosystem and challenges) and partly empirical (ecosystem description and analytics).

The authors gathered literature on EV from year 2009 onwards. The catch was about 50 articles altogether published in peer-reviewed journals or other well-established references, from which the authors selected the

prominent ones. The key selection criteria were (i) good quality journals, (ii) preference for holistic rather than focused theme and/or approach, (iii) exclusion of explicitly vehicle technology-focused material.

After the initial phase of the literature review, the source material was clustered in four main categories of research: (1) consumer aspirations and preferences, (2) EV policy deployment, (3) business models in EV ecosystem, (4) environmental issues associated with EVs. After reviewing the references, the authors mapped conceptually the key challenges that seem to be posing on wide-scale deployment and market penetration of EVs. For the ecosystem description, a typical systems analysis and system modelling was adopted. One can refer to 'a model,' 'architecture' or 'a design,' but in essence, the result is a visual illustration of the EV ecosystem stakeholders and how they build the value chain for EV market. We call this the EVE (Electric Vehicles Ecosystem) model. The model is also a morphological approach in order to give shape and structure to a complex socio-technical system (Ritchey 2002).

The work was performed as part of Finland's EVs national test site programme that comprises several small-scale test sites in different parts of the country (see http://www.tekes.fi).

Literature Brief

WHAT ARE (BUSINESS) ECOSYSTEMS?

Business ecosystems address business opportunities that require a diverse set of capabilities to meet customer needs that are beyond the capability of any single company (Carbone 2009). Compared to a single company, a business ecosystem can invest more resources and tolerate higher risk through cost sharing, integrate broader set of diversified capabilities and develop broader set of products (Iansiti and Levien 2004). Business ecosystems work for incorporating the next round of innovations by (Moore 1993) bringing synergies of different companies and public actors together towards a common innovation. The ecosystem perspective emphasises actors' co-evolving relationships and dynamic nature of business networks (Hearn and Pace 2006). There is a shared fate of the involved actors and need to understand organization's own role in the ecosystem. The most relevant and strong actors or stakeholders could have three alternative roles within the ecosystems: *a keystone* who improves overall health of the ecosystem, *a classic dominator* who leaves little opportunity for emergence of a meaningful ecosystem, or *a value dominator* who captures most value for itself leaving a starved and unstable ecosystem

around it (Iansiti and Levien 2004). Actors' competitive and cooperative interactions advance the ecosystem coming up with new offerings and satisfying customer needs (Moore 1993). Thus, actors in a co-evolutionary relationship activate selective pressure towards others and influence consequently each other's evolution (Corallo 2007). In an ideal ecosystem, actors share resources, knowledge and technologies across the ecosystem providing basis for holistic value creation via the ecosystem (Hearn and Pace 2006). Each organisation adds its distinct aspects of offering to the value generated by the ecosystem and share the total value created by the ecosystem (Camarinha-Matos et al. 2009). Productivity of the ecosystems can be measured by networks' ability to consistently lower costs and launch new products.

In emerging ecosystems, such as the EV ecosystem, central companies typically focus on working together with essential stakeholders, such as lead customers, key suppliers and channels, to: (1) define new customer value propositions based on innovation; (2) determine how to deliver and implement the customer value propositions; and (3) design business that serves the potential market (Moore 1993). EV ecosystem has been competing against fuel-powered vehicle ecosystem for a while without significant global success, and most likely much due to the dominance of key stakeholder, i. e. the vehicle manufacturing industry. For other stakeholders, the market and negotiation power is significantly lower. Thus, the EV ecosystem is not yet providing good enough business cases for the most of the customers and, consequently, cannot capitalize its market potential (e. g. Petrie 2012). The grand challenge of the EV ecosystem in this competition is to change this status quo by creating compelling customer value propositions, which, by itself, facilitate the emergence and growth of thriving global business ecosystem. At next, challenges related to EV ecosystem performance are studied based on the literature to facilitate the EV ecosystem description and analysis.

SELECTED EVS STUDIES AND IDENTIFIED CHALLENGES

A number of studies on consumer views of EVs will cover several aspects i. e. consumer willingness to pay, attitude and behaviour, awareness, and preferences that seem to be crucial to push EVs into the market. Hidrue et al.(2011), Skippon and Garwood (2011), Axsen, Kurani and Burke (2010), Lieven et al. (2011), Zhang, Yu and Zou (2011), and Zulkarnain et al. (2012) have taken part in some studies in term of consumer aspirations and preferences of the EV.

Hidrue et al. (2011) point out that in the US the consumers are concerned with EVs' driving range and vehicles' availability because of the needed charging time. In addition, the consumers seem to be uncertain on the potential fuel savings, which is one of the obvious arguments for EVs. Without subsidies, the battery costs are also considered too high. The same concerns were expressed by the consumers in the UK: driving range, cost savings and charging options (Skippon and Garwood 2011). Axsen, Kurani and Burke (2010) particularly raise the question on battery technology's maturity and whether that meets the consumers' expectations – their results point out these expectations will not be met in the near future at least. In Germany, a study by Lieven et al (2011) concluded that about 5% of the potential consumers would be ready to choose EV as their primary car. Hence, the total volume of the market was not that significant, as the 5% share would be divided by several manufacturers. However, it must be noted that these figures might quickly change over short period. In China, the consumers' awareness of EV options is still limited, as reported by Zhang, Yu and Zou (2011). This indicates that the emerging markets might not be ready for larger scale EV penetration, in particular if the market potential for conventional vehicles is still far from unsaturated and the level of motorization still low. Zulkarnain et al. (2012) point out that the EV industry is in its infancy, but possesses great potential according to market surveys and business intelligence reports. The test sites are already emerging around the globe. Once the market penetration starts to take place seriously, the early actors are in the best competitive position, if they have been able to successfully pilot their own concepts.

Perujo and Ciuffo (2010), Kang and Recker (2009), Camus, Fariau and Esteves (2011), Schill (2011), Hong et al. (2012) and Crist (2012) have studied EV policy needs and options. The charging of EVs will not have any significant effect on annual energy consumption according to Perujo and Ciuffo (2010), but the daily and hourly electricity demand in turn might require some regulation or at least demand-based pricing in order to even out demand peaks. Camus, Farias and Esteves (2011) reached about the same conclusion regarding on-peak and off-peak pricing, as well as did Schill (2011). Peak-time demand will reduce the consumer surplus of EVs from purely economic point of view, either through pricing or increased need of supply capacity. Both, Perujo and Ciuffo (2010) and Camus, Farias and Esteves (2011) point out positive impacts on CO_2 emissions. Despite of possible reduced economic gains due to sharper peak-time demand

of electricity and/or demand-based pricing, the public subsidies can still pay-off from the societal perspective. Hong et al (2012) claimed that in South-Korea with 1 trillion won government subsidy to services for grid-to-vehicle would result in almost 2 trillion won of social welfares and additional 2 trillion increased profits for service operators' profits. In their analyses, they included in social welfare: (i) expansion of charging infrastructure, (ii) increase in peak time electricity sales, (iii) fuel cost savings. The last mentioned was actually the most explicit benefit from the macroeconomic viewpoint (as Korea is an importer of oil). They also included externalities (CO, CO_2 and NO_x) but did not price them. The most efficient way of maximizing the social welfare was tax incentives. Crist (2012) analyses the differences between BEVs and internal combustion engine (ICE) vehicles and finds out that under the French tax regime and subsidy system the government revenues over the life cycle of the vehicles are not very far from each other but still favouring ICEs over BEVs. Furthermore, the comparison result is highly dependable on how and where the initial electricity is produced.

Recent studies on EV industry and business are presented by Kley, Lerch and Dallinger (2011), San Roman et al. (2011), and Andersen, Mathews and Rask (2009). Kley, Lerch and Dallinger (2011) identified three sub-ecosystems or components for the EV ecosystem and devised an approximate descriptive model for the ecosystem. San Roman et al (2011) identified two roles or functions in the ecosystem that were needed for efficient market structure, whereas Andersen, Mathews and Rask (2009) showed that EVs could be used as distributed electricity storages when not in use. This in term would call for intelligent electricity grid. The scarcity of this literature is obvious but understandable as so many technical issues remain to be solved and regulated. The ecosystem in itself starts to be visible, even if some new roles or functions could be needed in the future.

Browne, Allen and Leonardi (2011), Thomas (2012), Zackrisson, Avellán and Orlenius (2010), and Lucas, Silva and Neto (2012) have conducted their own research regarding to environmental issues of the EV. At the same when EVs have great potential to reduce CO_2 emissions (Browne, Allen and Leonardi 2011, Thomas 2012), Lucas, Silva and Neto (2012) suggest that EV energy supply infrastructures are more energy consuming than those of conventional vehicles,' when looking at the whole life cycle of infrastructures. Furthermore, the batteries' life cycle analysis is still somewhat open, but more than 50% of the batteries' carbon footprint
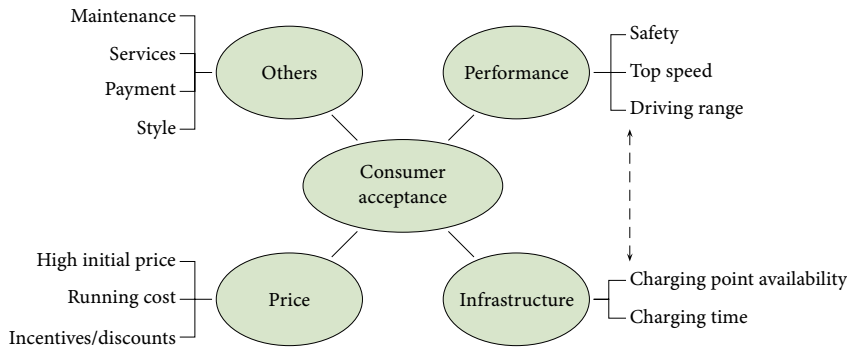
FIGURE 1   Consumer Acceptance Challenges

is generated by their manufacturing (Zackrisson, Avellán and Orlenius 2010). The recycling issues have not been yet thoroughly addressed.

The summary of reviewed literature on EVs is presented in table 1.

Building the Hierarchy of the Challenges

CONSUMER ACCEPTANCE

In this early stage of EVs development, consumer acceptance is one of critical aspects that need to be paid attention. A number of consumer surveys show a promising market for EVs when there is a group of people, called EVs adopters, who have willingness to buy EVs as next generation vehicles. However, some challenges coming from the consumer perspectives are still present. Consumers still have some questions that call for answers before they are ready to adopt EVs. These questions relate to the price, performance, and infrastructure, among others (figure 1).

As to price aspects, the high initial price to buy an electric vehicle still becomes one of the major inhibitors. This is mainly caused by high battery costs – 48% of total price (MEC Intelligence 2011). Moreover, the running cost for the EVs are still uncharted. Incentives provided by governments have been brought forth in several countries, for instances in EU environmental zones (e. g. London, Berlin and Stockholm) that offer attractive incentives for EV drivers such as: free public parking, allowed to use bus lanes, no road taxes and free ferry transport. However, some studies indicated that the government incentives' impact on the adoption of EVs is still relatively low (e. g. Diamond 2009 and Jenn, Azevedo and Ferreira 2013).

Other challenges are coming from EVs' performance, i. e. safety issue,

TABLE 1 Summary of Reviewed Literature on EVs

Category	Description	Reference	Method
Consumer and market views to EVs	WTP for EV and their attributes: (1) Driving range, charging time and fuel cost saving; (2) Significantly drop battery cost is required to attain competitive market without subsidy.	Hidrue et al. (2011)	Stated preference, choice experiment, internet based survey
	Responses to battery electric vehicles (BEV): UK consumer attitudes and attributions of symbolic meaning following direct experience to reduce psychological distance. (1) Would consider BEV as a main car if it has 150 miles range and as a second car for 100 miles range; (2) Willing to buy BEV over conventional vehicle for equivalent 3 years running cost saving; (3) Prefer credit/debit card and electricity bill as payment.	Skippon and Garwood (2011)	Direct experience, questionnaire, vignette exercise
	Who will buy electric cars (Germany case study): 5% of total buyer will choose EV as their main car.	Lieven et al. (2011)	Stated preference, online survey
	Market potential is still projected to be significant, but the real growth has not yet taken place; test sites are active around the globe.	Zulkarnain et al. (2012)	Review of market surveys, business intelligence reports and test sites
	Battery technology is not meeting the consumers' expectations concerning the costs, power, longevity and safety.	Axsen, Kurani and Burke (2010)	Consumer survey, analysis on battery technology
	Analysing public awareness and acceptance of alternative fuel vehicles (EV) in China. (1) Factors influencing consumers' purchase willingness: purchase time and purchase price; (2) Limited acquaintance of EVs in China- different influences on consumer behaviour.	Zhang, Yu and Zou (2011)	Questionnaire
EV policy deployment and impacts	Impact of EVs recharging activities on the electric supply system in Milan for 2030 time horizon: (1) In the future, with high market penetration the impact on annual energy consumption will quite negligible; (2) For daily electric power request, appropriate regulation is needed (e. g. smart grid)	Perujo and Ciuffo (2010)	Forecasting and simulation

Continued on the next page

TABLE 1   *Continued from the previous page*

Potential energy profile impact on PHEVs deployment in the US: (1) Circuit upgrades bring faster charging time and less charging time difference between PHEV20 and PHEV60; (2) Home charging and public charging benefits to serve travel distance and mileage conversion to electricity.	Kang and Recker (2009)	Activity-based modelling, simulation
Impact EVs penetration on load profiles, electricity prices, and emission for scenario 2020 in Portugal: (1) Electricity prices of 20 cents/kWh for high hydro production and peak hours scenario with 2 million EVs, and energy costs of 5.6 cents/kWh for low hydro production and off-peak hour scenario; (2) Up to 10% CO_2 emission reduction are obtained.	Camus, Farias and Esteves (2011)	Simulation
The effects on price, welfare, and electricity generation: (1) Uncontrolled vehicle recharging could increase evening peak loads and prices; (2) Arbitrage capability of unused battery will smooth electricity price and increase consumer surplus; 3) Increased utilization of generating technologies because of controlled loading of EVs.	Schill (2011)	Game theoretic model
Comparison of BEVs and ICEs show no great differences in government total revenues when analysed under French tax regime; the life-cycle emissions between BEV and ICE are slightly in favour of BEVs.	Crist (2012)	Socio-economic cost analysis
Ex-ante evaluation of profitability and government's subsidy policy on V2G system in Korea: (1) The maximum profit for a V2G service provider will be 1.27 trillion Korean won/year with an annual subscription fee of 0.65 million Korean won; (2) The government subsidy of 1 trillion Korean won, given annually, will increase social welfare by 1.94 trillion won and also boost the profit of vehicle-to-grid service provider to 1.98 trillion won.	Hong, Jeong and Lee (2012)	Conjoint analysis and simulation

Business models and regulatory framework	A new business model for electric cars – a holistic approach. Three components were considered: the vehicle including the battery, infrastructure and system services	Kley, Lerch and Dallinger (2011)	Morphological box
	Regulatory framework and business models for charging plug-in EVs: (1) Two new agents: EV charging manager, and EV aggregator were introduced; (2) Main charging modes: home charging, public street, dedicated charging stations; (3) V2G services regulatory framework was also presented.	San Roman et al. (2011)	Constructive approach
	Overview of Electric Recharge Grid Operator (ERGO) business models – intelligent charging grids for EVs: ERGO business models could solve problems of power grid utilization and fluctuating supply, and CO_2 emissions problem, by transforming EVs into distributed storage devices for electricity.	Andersen, Mathews and Rask (2009)	Exploratory
Environmental issues related to EVs	Evaluating the use of an urban consolidation centre and EVs in Central London: (1) Total distance travelled decreases by 20%; (2) CO_2 emissions reduction of 54%.	Browne, Allen and Leonardi (2011)	Trial evaluation
	How green are EVs? At most 25% GHG reduction and less than 67% oil consumption reduction resulted in replacing all vehicles with BEVs or PHEVs.	Thomas (2012)	Argonne National Laboratory GREET model
	Life cycle assessment of Lithium-ion batteries for PHEVs: (1) Energy use in battery manufacturing dominate the global warming impacts (>50%), followed by electronics (30%) and cathode (10%); (2) There will be decreasing production phase environmental impacts due to improvement of recent battery technology.	Zackrisson, Avellán and Orlenius (2010)	ISO 14044 environmental management & the International Environmental Product Declaration EPD® system
	Life cycle analysis of energy supply infrastructure for conventional and EVs: EV supply infrastructures (construction, maintenance, decommissioning) are seen to be more carbon and energetic intensive than conventional vehicles' energy supply infrastructures.	Lucas, Silva and Neto (2012)	Global warming potential and cumulative energy demand calculation; Monte Carlo

top speed limitation, and the driving range. The latter one still becomes key challenge for many consumers especially for those who need long range mobility (see e. g. Franke and Krems 2013). Besides the battery performance, the availability of charging infrastructure is somewhat associated with the driving range performance. If there were more charging points available, this would extend the driving range. Other aspects also exist, such as the top speed limitation and safety issue. However, the challenges do not end here. Long charging time is still considered as the matter by consumers.

Other aspects related to user experience, method of payment (mainly charging), style of vehicle (e. g. design, existentialism) and maintenance services (accessibility, quality, etc.) are likely found too, but these are not on the top list, at least yet.

TECHNICAL ASPECTS: INFRASTRUCTURES

With regard to technical aspects, some challenges are coming from vehicles, charging infrastructure, battery technology, and standardization (figure 2). Vehicles' challenges are in the designing of EVs to meet the consumers' requirements properly. The design deals with the performance, style, etc. that calls for new types of industry value chains compared to the old automotive industry structure. Several new cooperation contexts are needed, e. g. between OEM and battery manufacturers or charging manufacturers, to deliver their products and services. Besides, the impact of EV deployments to the electricity consumption has also been a concern of the stakeholders, i. e. how to manage the distribution of power, especially in peak hour period. Smart grid/intelligent solutions are currently believed to be one of the answers to this challenge. Vehicle-to-Grid (V2G) technologies have been also in development focus, for the same reasons. V2G technologies are enabling EVs to communicate with the smart grid to either delivering electricity into the grid or to throttle back their charging rate.

According to most experts, even if there are challenges concerning infrastructure, the most profound problem or bottle neck for EVs is the battery. This is mostly because of the battery costs. Production costs of electric vehicle today are about 2.5 times higher than of one with combustion engine (Koskue and Talka 2010). Several battery technology challenges must be solved, such as reduction in weight, volume, charging times, dependence on operating temperature, and the use and treatment of toxic components. The latter will pose an issue when disposing the
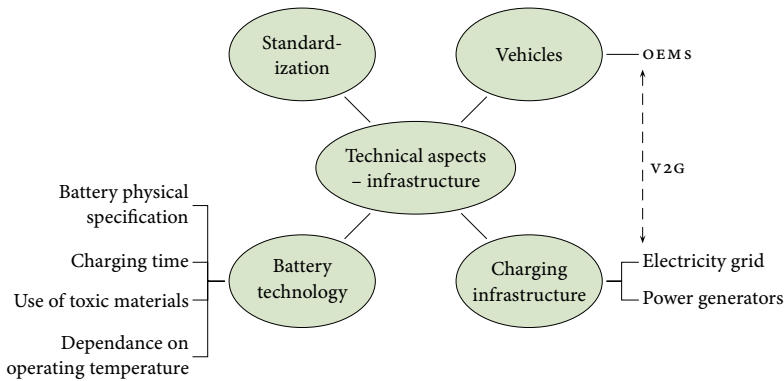
FIGURE 2 Technical Challenges

batteries. The disposal system needs to be established and financed in the end.

Standardization and regulation issues are also imperative. Standards and technical norms have to be created to ensure that the vehicles can be easily connected to the power network in order to recharge the energy storage system. The goal should be of course global standards in order to avoid technological islands to achieve economies of scale. For the EU, these questions are of relevance in order to avoid a fragmented pattern of locally competing and incompatible solutions.

ENVIRONMENTAL CHALLENGES AND POLICY/ REGULATORY ISSUES

Electric vehicles (EVs) are believed to be more environmentally accepted than conventional vehicles and they could reduce the fuel oil dependency. The latter is seen partly as a climate change challenge but also as a trade policy issue. However, a closer examination will bring in other critical questions to be answered, e. g. concerning the battery and power supply infrastructure (figure 3). Environmental aspects are, as said, tightly associated with tax policies and other incentives for wider adoption of EVs. Carbon based taxes have been introduced in many countries across the globe.

The use of battery in EVs will bring in additional environmental challenges, coming from the battery life cycle for used battery, the manufacturing, and from some materials used and treated in the manufacturing process. The disposal system for used batteries needs to be established and financed in the end. Moreover, power supply infrastructure has also
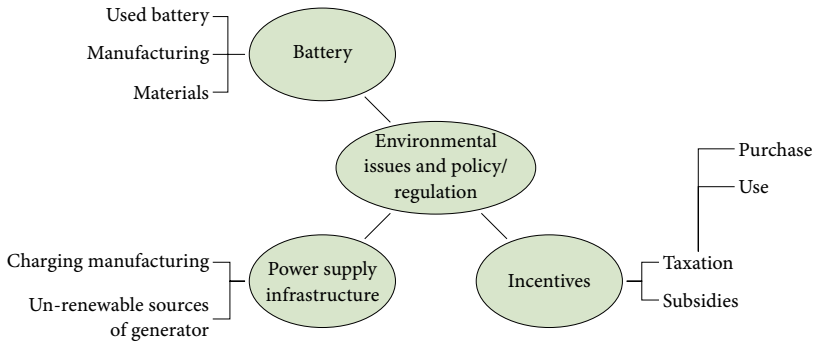
FIGURE 3   Environmental Challenges

potential environmental problems that might be caused by the increasing use of un-renewable sources of electricity generation. If renewable sources for production are used, the problem is solved, however. The last probable challenge is coming from manufacturing of charging infrastructure, though this issue still needs further investigation.

Electric Vehicles Ecosystem (EVE) Model

EV STAKEHOLDERS IDENTIFICATION

Giannoutakis and Li (2011) conducted a stakeholder analysis for Intelligent Transport Systems (ITS). They identified government and policy makers, funding bodies, transport group and organizations, ITS designer and manufacturers, automobile suppliers, key shareholders, energy sector, environmentalists, local authorities and users. This list was applied to large extent to map relevant EVs stakeholders. The EVs ecosystem (EVE) model is constructed by mapping the EVs stakeholders within the ecosystem and defining the relationship among the actors (figure 4). The EVE model includes the following main players:

- EVs end users: the key consumers who use EVs for their mobility. They comprise consumers, corporate customers, and public sector. Customer acceptance challenges apply for the EVs end users and determine the critical success factor for EVs deployment.
- Power utilities and infrastructures (PUI): the EVs-enabler facilities, i. e. charging points, power network providers, electricity producers, fuel suppliers (for hybrid-type of EVs), including their upstream value chain actors.

- EVs manufacturers (EVM): the key motor in EVE that contains EVs manufacturers (OEM), EVs suppliers, component suppliers and their related services providers (e. g. mobility/telematics service providers and EVs rental service providers).
- Battery suppliers (BS): including battery manufacturers, component suppliers, and related R&D. Together with power utilities/infrastructures and EVs manufacturers, they deal with identified technical aspect challenges.
- Regulators and external actors (REA): Policy makers/regulators from any levels of governments, e. g. inter-governmental bodies, regional, member states, municipalities and local authorities; EVs-related industry association, academic research and development, and environmentalists as 'catalysts' for EVs policy deployment.
- EVs aggregators/integrators (EVAI): a system integrator that is proposed to be a key operator for the ecosystem. The integrator can be one of the existing players, an entirely new one or a combination of both (e. g. a joint venture). This new player was introduced by e. g. in San Roman et al. (2011). A real-world corresponding example of this actor was BetterPlace, which after implementing the first modern commercial deployment of the battery swapping model in Israel and Denmark, later filed bankruptcy in Israel (SmartGridToday 2013). The EVs aggregator/integrator is driven by regulators and integrating/coordinating the roles of the main actors in EVE.

The value chains of each main layer include the actors that have a stake in EVE. The value adding flows obviously represent product/service offerings, cash flows (the opposite direction), contractual relationships or some other type of interaction of relevance. This 'multilayer stakeholder mapping' not only shows the ecosystem but also the interactive links between ecosystem stakeholders and the value creation process of the ecosystem. Furthermore, the colouring of the map shows which of the stakeholders are in key position as cornerstones, classic dominators or value dominators. It is not always clear yet how these roles will be in the end and the casting could well change from country to country, or even locally.

EV ECOSYSTEM ANALYSIS

The identified key challenges of electro-mobility system are reflected in EVs ecosystem model (figure 4). The consumers' acceptance challenges
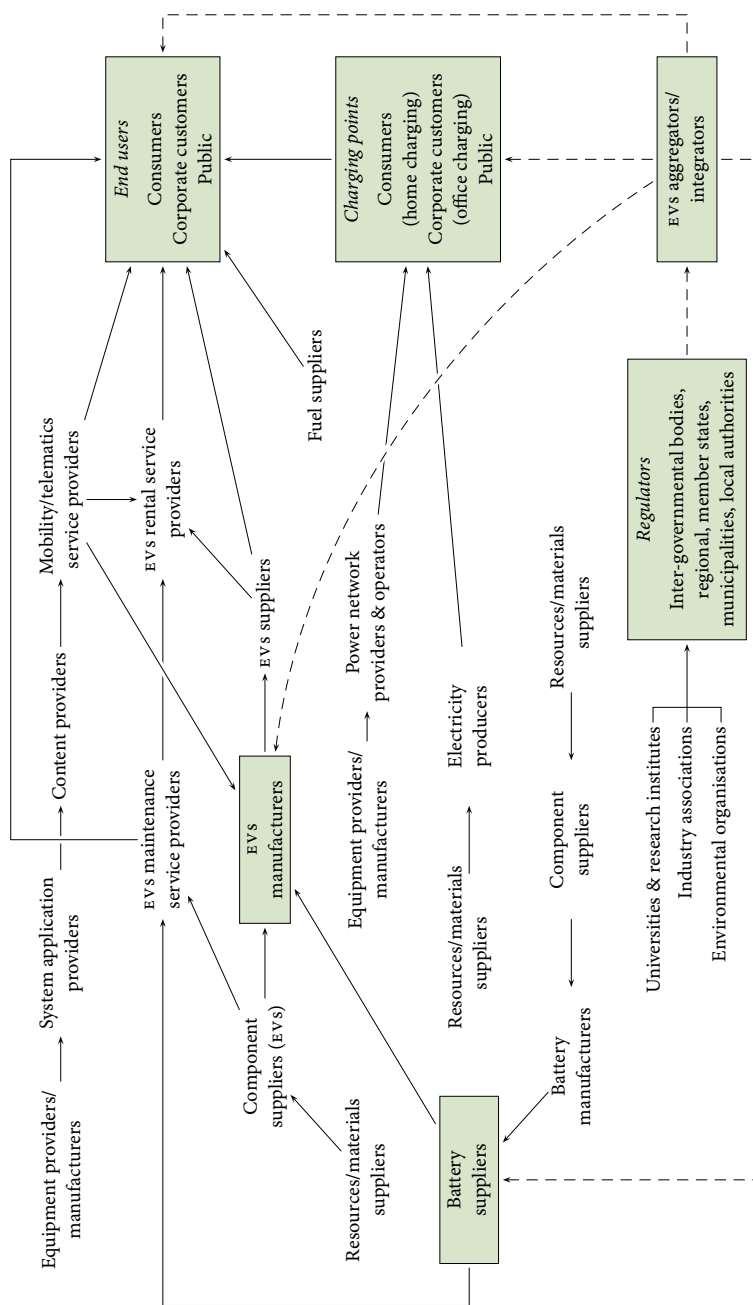
FIGURE 4   Electric Vehicles Ecosystem (EVE) Model (solid – current offerings/actors, dashed – future offerings/actors)

form perhaps the gravest obstacle from the demand side concerning EVs' market penetration. But this demand side challenge is not independent but intertwined with supply side impediments: price, performance, and infrastructure readiness and other related services are considered by the users prior the prospective purchase of an EV. The technical aspect challenges (supply-side as well) concern the EVs manufacturers' ability to meet some of the consumer demands, the battery producers' sustainable, durable and available (e. g. replacing) solutions. The electricity infrastructure providers are clearly in a decisive role as enablers of EVs market penetration and having the power to pull one critical obstacle from the way. How dominant exactly this position is, remains to be seen and depends on policies that pave the way over the critical period of time when demand of electricity for EVs does not yet solve the investment equation for the utilities and power infrastructure companies. All the aforementioned challenges are crucial, but their inter-dependencies will make both business and policy planning an exercise, where very careful pacing is called for. Technology immaturity is the main reason behind the high EVs price, whereas insufficient performance and infrastructure readiness are the factors that concern the customers. For long run, the environmental issues related to the manufacturing process of the vehicles, life-cycle treatment of batteries and the sources of energy need to be tackled as well. Failure to do so will undermine the arguments for EVs, not matter how sound they might appear from the surface. For example, the battery recycle problem and the rising use of fuel for generating electricity are believed to have the opposite effect on decarbonizing targets. The master driver for EVs seems to be the automotive industry, which is not a surprise. They have the cornerstone role without which the ecosystem shall not exist. Two other evident keen actors are the battery suppliers and energy utilities, particularly those who own their networks and not only the production facilities. Battery suppliers seem to fit to the role of value adding dominator, since their technology will to large extent dictate the fate of EVE, but their dominance potential – at least so far – looks restricted. They enter the ecosystem with their technology only unless they come up with innovative service ideas that enable radical expansion of the EVs market. The rest of the actors are undoubtedly contributors to EVE but their dominance potential is minimal.

Both the automotive sector and the utilities have a strategic expansion potential in the value network of EVs and they equally can have dominating roles. Both have prospects to lower customer acceptance chal-

lenges. Table 2 highlights the principle B2B dynamics between ecosystem's stakeholders.

It is obvious, that along with the EV manufacturing industry the regulators are in the key position. With the support of the two, the ecosystem can exist, and without it, the ecosystem will die, if emerged at all. The case of BetterPlace serves as a good example. A modern business case of EV aggregator/integrator that had been grown promisingly and believed in by many market analysts, considered as a great innovation on accelerating the EV market acceptance. However, it was the lack of support from the keystone actor in EV ecosystem, the vehicle manufacturers, that was believed to be as the main reason to the bankruptcy of BetterPlace. Apparently, only 950 cars fitted with Better Place's replaceable battery technology were sold since 2012 and the only carmaker to sign on with Better Place was Renault. According to some views (e. g. Lunden 2013), creating a breakthrough technology that relies on industrial-scale overhaul is capital intensive to start with, and further there is the question of critical mass for electric car technology. This could be regarded as a preliminary indication that strengthens our hypothesis – as well as the inevitable observation – on automotive industry's key role.

The integrators, whoever they could be, seem to have a good position to address the technical challenges by being in the centre of the stakeholder group that are facing them. Therefore, a proactive role from their side might have a good boosting effect on EVE's growth and flourishing in business sense. Nevertheless, if they are moving too early and the EV manufacturers are not ready for up-scaling EV business, the manufacturers can easily block these efforts. The more time passes and technologies mature, however, the lesser role the manufacturers could have. In time, the batteries' prices will be falling, more environmental taxes will likely be levied on transport that will favour the mobility system's electrification, and the infrastructures are developed to facilitate EVs on a larger scale. Therefore, and in our opinion, it is in the EV manufacturers' interest to move in fact rapidly towards electrification as they still have most of the strategic advantages on their side.

The new potential actor in the EV ecosystem is mobility services/digital information services provider. This actor provides in-vehicle system services for e. g. information of charging station location, charging status, and payment services for vehicle charging. These features will ease the EV drivers in operating their cars and increase customer convenience. This potential could expand the business ecosystem of EV since it will in-

TABLE 2 EVE Stakeholders' Relationship Matrix

	(1) EV manufacturers (EVM)	(2) Battery suppliers (BS)	(3) Power utilities & infrastructures (PUI)	(4) Regulators & external actors (REA)	(5) EV aggregator/integrator (EVAI)
(1)		EVM provide the main customer base	EVM provide significant new market segment and increased demand	EVM are a subject of regulation, yet with substantial negotiating power	EVM provide the main collaborator for prospective EVAI, but may also through their market power pursue the role of EVAI
(2)	BS provide key technology without which the ecosystem would not exist		BS provide potential new collaborators but also an alternative supply source which can mean competition as well in some situations	BS are a subject of regulation especially when considering the life cycle treatment of batteries	BS could be a valuable collaborator or the two roles could be integrated easily when battery rental business models are considered
(3)	PUI provide technical framework under which EVM must operate and that will frame the market conditions as well	PUI provide also here both the market and technical restrictions which will affect BS		PUI are a subject of regulation but with substantial negotiation power; however, the PUI are not the primary subject of REA	PUI provide also here both the market and technical restrictions which will affect EVAI
(4)	Provide guidelines, regulation and policy framework	Provide guidelines, regulation and policy framework	Provide guidelines, regulation and policy framework		Provide guidelines, regulation and policy framework
(5)	Build B2B contractual relationship with EVM or directly with consumers in the rental schemes; hence they might have either positive or negative impact on EVM and BS, depending on what the latters' strategy is		Build B2B contractual relationship regarding e.g. charging stations	EVAI are a subject of regulation, with no substantial negotiation power unless they are aligned with e.g. PUI; however, EVAI are not likely the primary subject of REA	

volve a number of industries – called ITS (Intelligent Transportation System) industry – that comprises equipment provider, content/application provider, and service provider (see Zulkarnain and Leviäkangas 2012). Furthermore, there are still some other relevant actors that might be considered as part of the EV ecosystem. They are battery recycling companies, vehicle testing services providers, used car dealers, telecommunication service providers, insurance companies and investment/finance institutions. The latter will play any important roles e. g. in the procurement and purchasing of new EVs, loan and leasing, and rental systems. However, to reduce the complexity of the EVE model, we decide to exclude them and their value chain on our existing model.

Conclusion and Policy Implications

The most important issues or challenges regarding the market penetration of the EVs are associated with infrastructure questions (the supply grid), maturity of technologies (EVs and their power sources) and consumer aspirations (mainly price). If one attempts to rank these in the order of necessary appearance, i. e. which of these must be solved first and which are then to follow; the likely vote goes to technology issues. Technologies must still mature to have the right price for EVs so that they provide a viable alternative to consumers. Public innovation policy in terms of research funding for technology developers, be they private or public, is essential. Through public research funding, the scale-up of technological leads is probably swifter. Once this challenge is overcome the demand is likely to boost and create need to develop the infrastructure fast. The latter mentioned will obviously be the next bottleneck.

It is hence the automotive industry that will have to take the necessary first steps, but obviously, government policies that support the development and maturing of these technologies will have a substantial relevance. Tax issues in addition to R&D support are one of the tools for governments. The governments of the countries where the automotive industry is strong have apparently the greatest motivation. In Europe, for example, Germany and France have a clear stake, even though the industries no longer are that tightly connected to particular member states. Globally taken, also US, Japan and South Korea must deal with the issues. Whereas some countries, like Finland, have adopted carbon and emissions based vehicle taxation system, it only brings the purchasing and operating costs of EVs to a more acceptable level, and indeed such policies can have a positive impact on emissions (OECD 2011; OECD 2013). In Finland for

example, the Ministry of Transport and Communications lists climate change mitigation as one of its primary policy targets (Liikenne- ja viestintäministeriö 2013). Electrification of the mobility system obviously is one of the key policy action lines of such strategies. The Finnish tax regime for transport is already based on emissions and carbon footprint, but identified necessary additional measures include road user charges and varying means of favouring of low-emission technologies across the modes. However, deploying carbon based tax system also throughout the production chain could actually pose an additional challenge to EVs' market penetration.

Many energy utilities and grid companies are closely associated with public owners. These have the second largest stake in the new ecosystem. EVs penetration has a profound impact on these companies' cash flow projections, and they must be ready when the time comes for EVs to really enter the mobility market. Supporting their efforts to prepare the infrastructure for EVs could be one successful national and pan-national line of policy. The role of governments to stimulate the development of the charging infrastructure could take many forms: tax incentives, investment grants, etc.

Questions that are more general can be raised regarding the true life cycle sustainability of EVs considering both the energy consumption of the whole ecosystem and evident need to treat the used batteries appropriately. The first question is still somewhat unanswered but the first results from scientific references do not give a straight green light to EV ecosystems. The second question is yet to be solved and a part from technical issues, also financed. If the financing of battery disposal is rolled over to battery manufacturers, which is the first obvious option, the price of EVs (including the batteries) will be slightly higher and slow down the penetration. It might be also here where governments' policies can have an impact.

What is obvious from the literature that EVs in operation will significantly reduce carbon releases of road transport and therefore have a positive contribution to climate change mitigation. The whole ecosystem of EVs and life cycle of ecosystem components could, however, have an opposite effect.

The role of integrators is crucial but in the light of our analysis, it seems that new entrants adopting the integrator role may not be successful unless backed up by key stakeholders, and mainly by the vehicle manufacturers. In order to have some control over the market, the EV man-

ufacturers are likely to pursue this integrator role themselves. The situation might change, however, if manufacturers are able to come up with a model that benefits them all. A jointly owned integrator is one of the obvious answers and it remains to be seen whether EV manufacturers are able to join their efforts to mould the ground of EV business in their favour.

The dynamics between the firms within the ecosystem calls for further analysis. Business model compatibility among ecosystem players is obviously a prerequisite to bring synergies and to pave the way towards a common market platform. Since business models are firm-specific as well as industry-specific, a higher resolution research must be conducted.

Hence, the overall picture remains unclear and it is difficult to see an easy solution to the deadlock of inter-depending challenges. What is clear for certain is that technological development should be supported further in order to remove some of the technical obstacles. The continuum of carbon-reducing policies is equally important, but these must have tangible embodiments affecting the prices of EVs and supply of working infrastructures.

References

Andersen, P. H., J. A. Mathews, and M. Rask. 2009. 'Integrating Private Transport into Renewable Energy Policy: The Strategy of Creating Intelligent Recharging Grids for Electric Vehicles.' *Energy Policy* 37 (7): 2481–2486.

Axsen, J., K. S. Kurani and A. Burke. 2010. 'Are Batteries Ready for Plug-in Hybrid Buyers?' *Transport Policy* 17 (3): 173–182.

Browne, M., J. Allen, and J. Leonardi. 2011. 'Evaluating the Use of an Urban Consolidation Centre and Electric Vehicles in Central London.' *IATSS Research* 35 (1): 1–6.

Camarinha-Matos, L. M, H. Afsarmanesh, N. Galeano, and A. Molina. 2009. 'Collaborative Networked Organizations – Concepts and Practice in Manufacturing Enterprises.' *Computers & Industrial Engineering* 57 (1): 46–60.

Camus, C., T. Farias, and J. Esteves. 2011. 'Potential Impacts Assessment of Plug-in Electric Vehicles on the Portuguese Energy Market.' *Energy Policy* 39 (10): 5883–5897.

Carbone, P. 2009. 'The Emerging Promise of Business EcoSystems.' *Technology Innovation Management Review,* February. http://timreview.ca/article/227

Crist, P. 2012. 'Electric Vehicles Revisited: Costs, Subsidies and Prospects.' Discussion Paper 2012-03, International Transport Forum, Paris.

Corallo, A. 2007. 'The Business Ecosystem as a Multiple Dynamic Network.' In *The Digital Business Ecosystem,* edited by A. Corallo, G. Passiante, and A. Prencipe, 11–32. Cheltenham: Edward Elgar.

Diamond, D. 2009. 'The Impact of Government Incentives for Hybrid-Electric Vehicles: Evidence from us.' *Energy Policy* 37 (3): 972–83.

European Commission. 2009. 'Directive 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the Promotion of Clean and Energy-Efficient Road Transport Vehicles.' *Official Journal of the European Union,* L 120/5.

Giannoutakis, K. N., and F. Li. 2011. 'Developing Sustainable e-Business Models for Intelligent Transportation Systems (ITS).' In *Building the e-World Ecosystem,* edited by T. Skersys, R. Butleris, L. Nemuraite, and R. Suomi, 200–11. Berlin and Heidelberg: Springer.

Frigg, R., and S. Hartmann. 2012. 'Models in Science.' In *The Stanford Encyclopedia of Philosophy,* edited by E. N. Zalta. http://plato.stanford.edu/entries/models-science/

Franke, T., and J. F. Krems. 2013. 'What Drives Range Preferences in Electric Vehicle Users?' *Transport Policy* 30:56–62.

Hearn, G., and C. Pace. 2006. 'Value Creating Ecologies: Understanding Next Generation Business Systems.' *Foresight* 8 (1): 55–65.

Hidrue, M. K., G. R. Parsons, W. Kempton, and M. P. Gardner. 2011. 'Willingness to Pay for Electric Vehicles and their Attributes.' *Resource and Energy Economics* 33 (3): 686–705.

Hong, J., Y. Koo, G. Jeong, and J. Lee. 2012. 'Ex-Ante Evaluation of Profitability and Government's Subsidy Policy on Vehicle-to-Grid System.' *Energy Policy* 42:95–104.

Iansiti, M., and R. Levien. 2004. 'Strategy as Ecology.' *Harvard Business Review* 82 (3): 68–78.

Jenn, A., I. L. Azevedo, and P. Ferreira. 2013. 'The Impact of Federal Incentives on the Adoption of Hybrid Electric Vehicles in the United States.' *Energy Economics* 40:936–942.

Kang, J. E., and W. W. Recker. 2009. 'An Activity-Based Assessment of the Potential Impacts of Plug-in Hybrid Electric Vehicles on Energy and Emissions Using 1-day Travel Data.' *Transportation Research Part D: Transport and Environment* 14 (8): 541–556.

Kley, F., C. Lerch, and D. Dallinger. 2011. 'New Business Models for Electric Cars: A Holistic Approach.' *Energy Policy* 39:3392–3403.

Koskue, M., and M. Talka. 2010. 'Electric Vehicles.' http://www.finpro.fi/documents/10304/5e7905ce-e27f-49ba-be1b-c35094d46a38

Lieven, T., S. Mühlmeier, S. Henkel, and J. F. Waller. 2011. 'Who will Buy Electric Cars? An Empirical Study in Germany.' Transportation Research Part D: Transport and Environment 16 (3): 236–243.

Liikenne- ja viestintäministeriö. 2013. 'Liikenteen ympäristöstrategia 2013–2020.' http://www.lvm.fi/julkaisu/4373390/liikenteen-ymparistostrategia-2013-2020

Lucas, A., C. A. Silva, and R. C. Neto. 2012. 'Life Cycle Analysis of Energy Supply Infrastructure for Conventional and Electric Vehicles.' *Energy Policy* 41:537–547.

Lunden, I. 2013. 'A New Place for Better Place, as Bankrupt $800M+ Backed Electric Car Startup Sold for $12M.' TechCrunch, 12th July 2013. http://techcrunch.com/2013/07/12/a-new-place-for-better-place-as-bankrupt-800m-backed-electric-car-startup-sold-for-12m/

MEC Intelligence. 2011. 'Drivers and Inhibitors of Electric Vehicles: Based on Data from a Live Test Fleet of Electric Vehicles.' http://e-mobility-nsr.eu/fileadmin/user_upload/downloads/info-pool/MEC_Intelligence_Report_-_Drivers___Inhibitors_of_EVs_Adoption.pdf

Moore, J. F. 1993. 'Predators and Prey: A New Ecology of Competition.' *Harvard Business Review* 71 (3): 75–86.

OECD. 2011. 'Environmental Taxation: A Guide for Policy Makers.' http://www.oecd.org/env/tools-evaluation/48164926.pdf

———. 2013. 'Climate and Carbon: Aligning Prices and Policies.' OECD Environment Policy Paper 1, OECD, Paris.

Perujo, A., and B. Ciuffo. 2010. 'The Introduction of Electric Vehicles in the Private Fleet: Potential Impact on the Electric Supply System and on the Environment; A Case Study for the Province of Milan, Italy.' *Energy Policy* 38:4549–4561.

Petrie, C. 2012. 'Changing the World.' *IEEE Internet Computing* 16 (1): 87–89.

Ritchey, T. 2002. 'Modelling Complex Socio-Technical Systems Using Morphological Analysis: Adapted from an Address to the Swedish Parliamentary IT Commission, Stockholm, December.' http://www.swemorph.com/pdf/it-webart.pdf

San Román, T. G., I. Momber, M. R. Abbad, and A. S. Miralles. 2011. 'Regulatory Framework and Business Models for Charging Plug-in Electric Vehicles: Infrastructure, Agents, and Commercial Relationships.' *Energy Policy* 39:6360–6375.

Schill, W.-P. 2011. 'Electric Vehicles in Imperfect Electricity Markets: The Case of Germany.' *Energy Policy* 39:6178–6189.

Skippon, S., and M. Garwood. 2011. 'Responses to Battery Electric Vehi-

cles: ᴜᴋ Consumer Attitudes and Attributions of Symbolic Meaning Following Direct Experience to Reduce Psychological Distance.' *Transportation Research Part D: Transport and Environment* 16 (7): 525–531.

SmartGridToday. 2013. 'ᴇᴠ Battery Swapping Firm Better Place Goes Bankrupt.' SmartGridToday, 31 May. http://www.smartgridtoday.com/ext/resources/pdf/sgt/2013/05/SGT130531.pdf

Thomas, C. E. 2012. 'How Green are Electric Vehicles?' *International Journal of Hydrogen Energy* 37 (7): 6053–6062.

Zackrisson, M., L. Avellán, and J. Orlenius. 2010. 'Life Cycle Assessment of Lithium-ion Batteries for Plug-in Hybrid Electric Vehicles: Critical Issues.' *Journal of Cleaner Production* 18 (15): 1519–1529.

Zhang, Y., Y. Yu, and B. Zou. 2011. 'Analyzing Public Awareness and Acceptance of Alternative Fuel Vehicles in China: The Case of ᴇᴠ.' *Energy Policy* 39:7015–7024.

Zulkarnain and P. Leviäkangas. 2012. 'The Size, Structure and Characteristics of Finland's ɪᴛs Industry.' *Technology & Investment* 3 (3): 158–167.

Zulkarnain, P. Leviäkangas, M. Tarkiainen, and T. Kivento. 2012. 'Electric Vehicles Market Outlook.' *International Journal of Technology* 3 (2): 156–168.

Comparative Advantage of Value-Added Services: The Case of South Africa

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Global supply chains have changed the way in which products are produced internationally. The inputs into a final product include both intermediate goods and services, which adds value to the final product. Gross trade data is misleading and includes some double counting. This study questions whether traditional revealed comparative advantage (RCA) calculations for gross exports of services would offer different results from value-added services. RCA calculation was done for South Africa and the BRIC countries for both gross exports and value added services. The analysis showed that some countries performed stronger in terms of gross exports than in value added terms for some sectors, but others showed higher comparative advantage in value added terms. For South Africa, most services had a higher comparative advantage in terms of value added than for gross exports. The results indicated the importance of including value added data in international trade data analysis.

Key Words: services trade, comparative advantage, value added, South Africa, BRIC
JEL Classification: F100, F140

Introduction

World trade in services have expanded rapidly in the past few decades, mostly due to technological changes that enables services firms to supply their services to consumers in different markets without physically moving into that market. However, services that are exported directly are only a small part of the role that services play internationally.

The rise in global supply chains have changed the way in which companies operate, and the way in which products and services are produced and distributed internationally (Johnson 2014). Many companies now have different business activities in different parts of the world. The design of a product, production of components, assembly and marketing of products occur in different parts of the world. The World Trade Organisation (2014) refers to this phenomenon as 'made in the world,' meaning that a product is not only being made in one country, the different inputs

to a product now originate in many different countries. Declining costs of trade, transport and communication have allowed companies to splinter their production lines geographically across countries (Hoekman 2013).

However, the different inputs into a final product offering do not stop at the various intermediate products that are used to produce the final product, but also incorporate many services. Manufacturing firms make use of services to enhance their competitive advantage in the market. The use of services adds value to a firm's product, assists to cut operational costs, and contributes to the overall productivity of the firm (Banga and Bishwanath 2013).

In the past international trade theorists have used the well-known Revealed Comparative Advantage (RCA) calculation. The calculation uses gross export data for a specific sector relative to the total exports of that sector by all countries in the world (Balassa 1965). The results of the RCA would provide an indication if a country has a specific competitive edge or advantage in the exports of that specific sector. The RCA is usually calculated based on gross export data. However, the new phenomenon of global value chains have given rise to the argument that gross export data may include a vast amount of double counting as intermediate goods are imported and re-exported for production purposes of the final product, as is discussed further in the second section. Thus, it may be possible that the RCA results calculated on this data is not a true reflection of a country's performance.

Because services can be traded directly, but can also form part of the value chain, this study questions whether traditional RCA calculations for gross exports of services are very different from value-added services (or services as part of the value chain). Therefore, the aim of this study is to apply the concept of RCA to data on value-added services specifically to determine if there is a difference in the results of the calculation.

Therefore, this conceptual study wants to establish if a country has a high RCA in a specific services sector based on gross exports, whether the same sector will also have a high RCA when the service is used as part of the value chain of a product. For some sectors, it may even be that the direct or gross exports of a services sector do not indicate a significant comparative advantage, but the same services show greater comparative advantage as part of the value chain of other sectors.

If this is true, it would mean that a country's policies can be shaped accordingly, either promoting the direct exports of a specific service when it shows a high level of RCA based on gross exports, or assisting these

services to expand domestically in order to form part of a greater value chain, when it shows a high level of RCA in the value added data. The results will also be valuable to understand the importance of services within the value chain of products, as well as the importance of services within the domestic economy. The calculations, as discussed in the fourth section, will be done for South Africa, as well as for the BRIC countries, in order to compare the role of value-added services in some of the emerging economies. However, the implications are relevant for all countries around the world.

The following section will discuss trade in value-added in more detail, as well as the Koopman et al. (2010) study that forms the background to this conceptual study. Thereafter the services sector in South Africa is discussed in more detail, referring to the role it plays in the domestic economy. The section that follows will perform the empirical calculations of RCA on direct exports of services in South Africa as well as the BRIC countries. The same calculation will also be done on services value added data for the same economies. The aim is to determine if there is a vast difference in revealed comparative advantage in services directly exported versus value-added services. The results can contribute greatly to both the understanding of trade in services as well as interpretation of services trade data.

Trade in Value Added

Services are very diverse and in general classified as intangible goods. For that reason, the idea of services trade has been a daunting subject for many countries and researchers in the past and thus mostly avoided in international trade (Jones and Kierzkowski 2000). Fortunately, over the past three decades, technology has advanced and liberalisation came about due to the work done by institutions like the World Trade Organisation, resulting in astonishing growth in the services trade sector globally (van Rensburg 2000). It is becoming clearer that services are now also used in the global value chain in the form of outsourcing and/or offshoring. The quality of services are now becoming more and more critical as part of the total value chain of the final product. In many instances, the products offered by different producers are very alike but their competitive advantage is found in the associated services that assist to decrease costs as well as improve the speed and quality of the production process.

Francois and Manchin (2011) examined the value-added linkages between services and products, and found that the most exports in services

are embodied in exports of goods in a value added basis. Also in most countries, the forward and backward linkages between services and other economic activities have increased significantly. Banga and Bishwanath (2013) indicate for example that in the Indian economy, the contribution of services input to output and productivity growth in manufacturing has increased substantially since the 1990s. Which in turn have vast policy implications.

This has led to a debate regarding the statistical value of traditional trade data on gross exports and imports, as the export value of a product from one country, may incorporate many imported inputs from different countries around the world. Thus, the traditional gross import and export data includes a vast amount of double counting and would therefore in many cases completely overstate the true value of exports (Johnson 2014).

Maurer (2011) indicates that traditional trade statistics double-count the trade in intermediates because it does not allow distinction between intermediate and final goods. The same is true for services trade data. Several services can be exported directly whilst certain services also accompany a product indirectly through its value chain, resulting in double counting when determining the real value of imports of a country (Ahmad 2013). Timmer, Erumban, Los, Stehrer and de Vries (2014) further raises the complication that even though a product is 'completed' in one country does not necessarily mean that the domestic firm is in charge of the global value chain. They use the example of the iPod where Apple manages the production network from the us but the final product is completed in China.

This poses a challenge to the analysis of international trade flows of products and services. Several research papers investigate the sources of value added in supply chains by using Input-Output (10) tables in order to find better quality data on trade flows. These studies aim to determine the true value of trade reflecting all intermediate trade flows. Koopman et al. (2010) provide a conceptual framework to decompose a country's gross exports into value-added components. They indicate that more decomposed trade data may reveal many implications for research and policy questions. One of the issues they address is the traditional measurement of revealed comparative advantage (RCA), as proposed by Balassa (1965), that indicates whether a country has a comparative advantage in a certain product or service.

Koopman et al. (2010) indicate that measuring RCA based on official gross trade statistics could be misleading as it incorporates a lot of the

double counting of trade data. They suggest that RCA should rather be calculated based on their domestic value-added data. They calculated RCA for some manufacturing sectors based on gross exports as well as domestic value added data. The findings proved to be very interesting and for some countries like China and India where a sector's gross exports may have indicated a comparative advantage, the domestic value added RCA figures indicated that they had a comparative disadvantage in the same sectors. For some other sectors, however, a country's gross exports did not indicate a revealed comparative advantage, but when RCA was calculated based on domestic value added in exports, the data suddenly indicated a distinct comparative advantage in that sector. Their study illustrated that our understanding of trade patterns and revealed comparative advantage could be adjusted substantially once we have the right data on domestic value added in exports.

This is now possible due to a new joint database that the OECD and WTO have published, 'Trade in Value Added' (Organisation for Economic Cooperation and Development 2014). This is the first database that indicates trade in value added by industry and by country. It is derived from OECD input-output tables and aims to better track global production networks and supply chains. This database makes it possible to do a variety of calculations, including RCA, on more realistic trade data. This database will be used in the empirical section of this study.

The Koopman et al. (2010) study only calculated RCA for some manufacturing industries for several countries, including South Africa. It indicated that in most of the manufacturing sectors South Africa had a higher RCA value when calculated for gross exports, than when it was calculated based on domestic value-added data. Therefore, this indicated that these sectors had a lower comparative advantage when the double counting of intermediate goods was taken out of the equation. This finding was already a very valuable contribution to the field of trade in value added, but the paper did not address the services sector as part of the value chain.

Because services can be traded directly, but can also form part of the value chain, this paper questions whether RCA calculations for gross exports of services are very much different from value-added services (or services as part of the value chain). Therefore, this study wants to establish if a country has a high RCA in a specific services sector based on gross exports, whether the same sector will also have a high RCA when the service is used as part of the value chain of a product. For some sectors, it may even be that the direct or gross exports of a services sector do not

indicate a significant comparative advantage, but the same services show greater comparative advantage as part of the value chain of other sectors. Timmer et al. (2014) indicate that the international fragmentation of production can expand the opportunities for countries to specialise according to their comparative advantage and therefore gain from trade more extensively.

If this is true, it would mean that a country's policies can be shaped accordingly, either promoting the direct exports of a specific service when it shows a high level of RCA based on gross exports, or assisting these services to expand domestically in order to form part of a greater value chain, when it shows a high level of RCA in the value added data. The results will also be valuable to understand the importance of services within the value chain of products, as well as the importance of services within the domestic economy. The calculations, as discussed in the fourth section, will be done for South Africa, as well as for the BRIC countries, in order to compare the role of value-added services in some of the emerging economies.

Services in South Africa

The importance of the services sector in the South African economy has grown considerably in recent years. It has played an important role as support input to the manufacturing sector and is also becoming one of South Africa's significant export sectors (Steuart and Cassim 2005). South Africa has shown a real economic growth rate of between 3 and 5 per cent over the last decade (South African Reserve Bank 2010). Services have also made a significant contribution to South Africa's GDP. The services sectors, which is reflected in the national account data as the 'tertiary sector,' has on average amounted to 66% of total gross value added (GVA) between 2005 and 2010 (South African Reserve Bank 2013). Employment data also indicate that almost 80% of workers were employed in the services sector in 2010 (Statistics South Africa 2010).

However, during the same period of 2005 to 2010, the direct service sectors' exports were on average only 18% of South Africa's total exports (International Trade Centre 2013). The sector breakdown of South Africa's services exports below in table 1, indicate that exports were mostly concentrated in the travel (tourism) sector (on average 63% of total services exports from South Africa), and the transportation sector (12% of total services exports). Much smaller proportions were allocated to the remaining services sectors such as business services, financial services,

TABLE 1   South Africa's Services Exports per Main Sector

Sector	(1)	(2)	(3)	(4)
Total services exports	11 300 100	14 003 500	0.24	0.16
Travel	7 516 130	9 085 040	0.21	
Transportation	1 533 220	1 615 190	0.05	
Other business services	837 120	1 115 380	0.33	
Financial services	534 350	827 260	0.55	
Government services, not indicated elsewhere	258 910	386 970	0.49	
Insurance services	124 310	273 050	1.20	
Computer and information services	109 390	290 020	1.65	
Communications services	193 000	221 750	0.15	
Personal, cultural and recreational services	113 820	66 830	−0.41	
Royalties and license fees	45 300	59 190	0.31	
Construction services	34 550	62 820	0.82	
Total product exports	46 991 047	71 484 309	0.52	0.84
Total exports of products and services	58 291 147	85 487 809	0.47	

NOTES   Column headings are as follows: (1) exported value in 2005 (in US$ thousands), (2) exported value in 2010 (in US$ thousands), (3) percentage change from 2005 to 2010, (4) percentage of total products and services exports (2010). Adapted from International Trade Centre (2013).

insurance, communications and construction (International Trade Centre 2013).

The table also shows a vast increase in services exports between 2005 and 2010 in most sectors, however the total services exports were only 16% of total exports from South Africa in 2010 and products contributed 84% to total exports in 2010. Therefore, until 2010, the South African economy was still mainly driven by products, and the exports of services did not play a major role in South Africa's exports.

After the global financial crisis in 2008/2009, most developing countries have faced significant challenges to improve their economic performance, and generate sustainable economic growth. South Africa also have faced the same challenges, together with high unemployment and increasing levels of poverty. Therefore, many government initiatives in South Africa have been created to stimulate the economy and specifically to create a more focused export drive.

One of the sectors that have been identified as a thriving sector with potential for growth within the South African economy has been the ser-

vices sector. One of the objectives of the Department of Trade and Industry (DTI) in South Africa's Industrial Policy Action Plan (IPAP) is: 'To promote diversification beyond the economy's current reliance on traditional and non-tradable services via the promotion of value-addition characterised particularly by the movement into non-traditional tradable goods and services that can compete effectively in export markets and against imports' (Industrial Policy Action Plan 2013). The same notions are made in the New Growth Path as well as the National Development Plan of South Africa to move more focus to the exports of certain services industries over the next few years in order to assist in boosting economic growth.

Therefore, the government in South Africa recognises the importance of services as an engine of growth for the economy. However, the contribution of services lies in different areas. On the one hand, the government can focus on increasing direct exports of services for South Africa. This will mean assisting more services firms to enter the international trade arena and developing markets abroad. This process could be viewed as more longer term as many of the services firms are not necessarily ready to enter foreign markets in their current stance. They may need some intense development on the domestic side before they would be able to enter foreign markets on their own.

On the other hand, the South African government can also drive the participation of services firms in the global value chain arena. Many of the services firms, for instance financial institutions and logistics providers, as well as IT-related services, may already be involved in some form in a global value chain and are performing services to firms within the South African market, and these in turn are part of a larger global value chain. Therefore, they already play a role and need not develop that much more extensively. They may however need assistance to be introduced into potential new global value chains, and this is also relevant for services firms that have until now only served the domestic market and had no interaction in the global value chain arena.

Therefore, this avenue of 'exports' of services, or also termed 'trade in value added,' may be a more short- to medium term development possibility for services firms in South Africa. The following table, extracted from the 'Trade in Value Added' database of the OECD-WTO (Organisation for Economic Cooperation and Development 2014), indicates the role services as value added play in exports. The data is available for all OECD countries as well as a few emerging markets. For the purpose of

TABLE 2   Services Value Added in Gross Exports by Source (2009, in us$ millions)

Country	(1)	(2)	(3)	(4)
Brazil	176 562	17 115	41 746	30
China	1 283 964	62 577	165 706	3 721
India	255 032	59 453	50 313	133
Russian Federation	331 375	24 240	68 526	99
South Africa	74 111	6 244	17 404	4

NOTES   Column headings are as follows: (1) gross exports, (2) direct domestic service industry value added content of gross exports, (3) indirect domestic services content of gross exports (originating from domestic intermediates), (4) re-imported domestic services value added content of gross exports. Adapted from Organisation for Economic Cooperation and Development (2014).

this study, the table indicates only the figures for the BRICS countries in order to compare South Africa with similar developing economies.

The first column in table 2 indicates the gross exports of services in the specified country. The second column indicates the direct services value-added made by an industry in producing a good or service for export (Organisation for Economic Cooperation and Development 2014). In this case, China and India seems to be far ahead of the rest of the BRICS countries in terms of services that are directly involved in the value-added cycle of producing a final product or final service for exports.

The third column indicates the indirect contribution of domestic service suppliers made through domestic transactions, for exports. So these are services firms that sell services to other domestic firms (both producers of goods and services), who then in turn are part of the global value chain in producing a final product or services. Here South Africa's firms seem to make the largest contribution and this indicates that most services firms in South Africa are still only present in the domestic economy.

The fourth column indicates the re-imported domestic services value added content of gross exports, in other words the domestic services value-added that was exported in goods and services used to produce the intermediate imports of goods and services used by the industry in question (Organisation for Economic Cooperation and Development 2014). Here it appears South African services firms are not really playing any role.

The figures in tables 1 and 2 indicate that South African firms are not currently playing a large role internationally as direct exports or as part of the value-added of other products or services. If the South African

government wishes to extend the role of services in the economy as they state in the, it will be necessary to evaluate properly which services sectors really has the potential to export more, either in terms of direct exports, or in terms of the global value chain approach.

This concept is tested in the fourth section, where the RCA for South Africa is measured two-fold: firstly based on gross exports, and secondly based on the value-added data that is available from the OECD database (Organisation for Economic Cooperation and Development 2014). The results will give an indication of which services can potentially play a larger role in terms of direct exports as well as in a global value chain scenario.

Measuring Revealed Comparative Advantage for South Africa and the BRIC Countries

The Revealed Comparative Advantage (RCA) index, as developed by Balassa (1965), calculates how specialised a country is internationally in a specific sector. As explained in the previous sections, this study will use this method to calculate both RCA for direct/gross exports of services from South Africa, as well as for value-added services. The RCA index of each services sector is calculated as a ratio of South Africa's services exports of that sector to its total services exports, divided by the ratio of the world's services exports of that sector to its total services exports. An index that is larger than 1 implies that South Africa is relatively more specialised that the world average, and thus shows a comparative advantage in that services sector (Balassa 1965).

Table 3 shows the RCA calculation for South Africa's services sector based on gross exports. It is firstly calculated relative to the total services exports (RCA 1), and then it is also calculated relative to total exports of goods and services (RCA 2).

Table 3 indicates that if RCA is calculated based on gross exports relative to total services exports, South Africa has a comparative advantage in two sector groupings, first wholesale and retail trade, hotels and restaurants (ISIC 50–55), and secondly transport and storage, post and communication (ISIC 60–64). These are the only two sector groupings for which South Africa has an RCA value above 1.

The RCA 2 value, where the RCA is calculated for gross exports of services relative to exports of all goods and services, is even lower for all sectors and in this case, South Africa only has an RCA value above 1 for one sector, namely wholesale and retail trade, hotels and restaurants (ISIC

TABLE 3   RCA for Gross Exports of South Africa's Services (2009, USD millions)

ISIC*	Services sector	South Africa	World	RCA 1	RCA 2
45	Construction	49.6	32903.8	0.42	0.28
50–55	Wholesale and retail trade; hotels and restaurants	5908.6	853831.7	1.91	1.28
60–64	Transport and storage, post and communication	4018.1	906912	1.22	0.82
65–67	Finance and insurance	911.8	461223.5	0.54	0.37
70–74	Real estate, renting and business services	364.9	784086.1	0.13	0.09
75–95	Community, social and personal services	465.9	189325.9	0.68	0.46
	Total (services)	11719	3228283		
	Gross exports of all sectors	74111	13718518		

NOTES   * Rev. 3 sector code. Adapted from Organisation for Economic Cooperation and Development (2014).

50–55). These calculations indicate that South Africa is not very competitive internationally when exporting services. However, because services also form part of the value chain it is possible that the data includes a lot of double counting and therefore the RCA values are not a true indication of South Africa's competitive position.

Therefore using the available value added data from the OECD, the same calculation was done based on services value-added embodied in final demand. The RCA was once again calculated relative to total services exports (RCA 1), and relative to total goods and services exports (RCA 2).

Based on the calculations in this table South Africa now seems to have a much higher revealed comparative advantage figure for most of the services sectors, based both on total services exports as well as total of goods and services. Now South Africa seems to have a RCA value higher than 1 for almost all the sectors.

This could indicate that South Africa has many services that could play a much larger role as part of the value chain of products and other services, both directly and indirectly, even if they are not exported directly to foreign markets as much as one would expect. They still are very competitive domestically and perform a significant role in the economy.

In order to compare these results with other emerging economies, the same calculations were done for the BRIC countries, and the results for these countries each have interesting results. Table 5 below indicates the

TABLE 4   RCA for South Africa's Value-Added Services

ISIC*	Services sector	South Africa	World	RCA 1	RCA 2
45	Construction	392.6	77634.2	0.94	0.83
50–55	Wholesale and retail trade; hotels and restaurants	7122.4	1165035.1	1.14	1.00
60–64	Transport and storage, post and communication	6968.9	880299.4	1.47	1.30
65–67	Finance and insurance	3792.3	587791.9	1.20	1.06
70–74	Real estate, renting and business services	3566.5	1380693.3	0.48	0.42
75–95	Community, social and personal services	1782.7	300370.7	1.10	0.97
	Total (services)	23625	4391825		
	Total of all sectors	61805.4	10129840		

NOTES   * Rev. 3 sector code. Adapted from Organisation for Economic Cooperation and Development (2014).

TABLE 5   RCA for Gross Exports of Services in the BRIC Countries (2009)

ISIC*	Brazil		Russia		India		China	
	RCA 1	RCA 2	RCA 1	RCA 2	RCA 1	RCA 2	RCA 1	RCA 2
45	5.67	3.81	1.13	0.76	0.00	0.00	19.21	12.91
50–55	2.85	1.91	5.87	3.94	5.74	3.86	23.55	15.83
60–64	2.48	1.66	6.58	4.42	3.89	2.61	5.77	3.88
65–67	0.57	0.38	0.01	0.01	2.80	1.88	0.45	0.30
70–74	2.01	1.35	0.14	0.09	18.11	12.17	7.26	4.88
75–95	3.96	2.66	0.24	0.16	11.46	7.70	10.85	7.29

NOTES   * Rev. 3 sector code. Adapted from Organisation for Economic Cooperation and Development (2014).

RCA for all the BRIC countries' services in terms of gross exports. RCA 1 was again calculated as the specific services sector's comparative advantage in terms of total services exports, where RCA 2 was calculated as the services sector's comparative advantage in terms of total exports of both products and services. A value above 1 indicates a comparative advantage in that sector.

The results in table 5 indicate that Brazil has a very high RCA in the gross/direct exports of most services sectors, besides the sector finance and insurance (ISIC code 65–67). As was the case for South Africa, the

TABLE 6 RCA for Services Value Added in the BRIC Countries (2009)

ISIC*	Brazil		Russia		India		China	
	RCA 1	RCA 2	RCA 1	RCA 2	RCA 1	RCA 2	RCA 1	RCA 2
45	2.37	2.09	3.08	2.72	5.18	4.57	2.33	2.06
50–55	3.80	3.35	6.49	5.72	4.23	3.73	15.13	13.34
60–64	2.75	2.43	6.01	5.30	3.62	3.19	6.64	5.86
65–67	1.52	1.34	1.15	1.01	4.44	3.92	12.81	11.30
70–74	1.49	1.31	1.66	1.46	5.36	4.72	5.35	4.71
75–95	2.99	2.64	3.52	3.10	5.87	5.18	10.77	9.49

NOTES *Rev. 3 sector code. Adapted from Organisation for Economic Cooperation and Development (2014).

RCA value is much higher when calculated in terms of total services exports (RCA 1) than it is in terms of total exports of products and services (RCA 2). Russia shows a lower comparative advantage in construction, finance and insurance, real estate and community services than Brazil, but outperforms in the wholesale and retail trade services (ISIC code 50–55) as well as transport and storage and communication (ISIC code 60–64).

India shows a very high RCA level for almost all services sectors but has a specific comparative advantage in the real estate sector (ISIC code 70–74) as well as community services (ISIC code 75–95), and outperforms the other countries in these sectors. China has the highest RCA level in construction (ISIC code 45) as well as wholesale and retail trade (ISIC code 50–55).

When comparing the results for BRIC to the results for South Africa in table 3, it is clear that South Africa does not fair very well in terms of comparative advantage in comparison with the other BRIC countries. The RCA levels in terms of gross exports from South Africa are much lower in most sectors than in the BRIC countries.

Table 6 indicates the RCA 1 and RCA 2 calculations for the BRIC countries, in terms of value added data for services, as was done for South Africa in table 4.

Table 6 indicates that some countries perform much better in terms of value added services than in terms of gross exports for certain sectors, for example Brazil performs better in value added terms for transport and storage and communication (ISIC code 60–64), as well as finance and insurance (ISIC code 65–67). Russia also has a much higher comparative advantage in finance and insurance (ISIC code 65–67), real estate

(ISIC code 70–74) and community and personal services (ISIC code 75–95). India performs better in terms of finance and insurance (ISIC code 65–67), but not in any of the other sectors. China performs better in terms of wholesale and retail trade (ISIC code 50–55), as well as finance and insurance (ISIC code 65–67). However, in the other sectors these countries performed better in comparative advantage terms when calculated based on gross exports.

The results indicate that for each country, there is a different pattern and for one country, there might be a comparative advantage in the gross exports of a service that is higher than in value added terms, however, for another country, the same sector could have a higher comparative advantage when calculated in value added terms.

These results therefore indicates that each country should not only evaluate their current and potential exports in services based on gross exports, but that it is important to also evaluate it from a value added perspective. The results highlight the importance of including value added data in international trade data analysis as well as country performance analysis, and in policymaking.

For South Africa most sectors such as construction (ISIC code 45), transport and storage and communication (ISIC code 60–64), finance and insurance (ISIC code 65–67) real estate (ISIC code 70–74) as well as community and personal services (ISIC code 75–95), had a much higher comparative advantage in terms of value added. Therefore in South Africa's case the services firms are currently not very strong in terms of direct exports but could have a potentially large role to play as value added in the global value chain of products and services. This is an important issue to be highlighted in future policies and decision making of the South African government.

Conclusion

The rise in global supply chains have changed the way in which companies operate and the way products and services produced and distributed internationally. The design of a product, production of components, assembly and marketing of products occur in different parts of the world. The different inputs into a final product offering do not stop at the various intermediate products that are used to produce the final product, but also incorporate many services during the process. The use of services adds value to a firm's product and services are playing a much more integrated role in the global value chain.

The study focused on South Africa and the third section showed that South Africa's services sector underperforms in terms of gross exports as well as part of the value chain in current trade figures. The government's drive to increase exports in manufactured products and services needs to be very well planned to take into account the current state of the services industry. Their focus should be based on a proper analysis of the services sector in South Africa, both in terms of current gross exports as well as services in the global value chain.

This study questioned whether traditional revealed comparative advantage calculations for gross exports of services would offer different results from value-added services. If this is true, it would mean that a country's policies can be shaped accordingly, either promoting the direct exports of a specific service when it shows a high level of RCA based on gross exports, or assisting these services to expand domestically in order to form part of a greater value chain, when it shows a high level of RCA in the value added data. The RCA calculation was done for South Africa as well as the BRIC countries based on gross exports of services as well as services as a value added to other products and services.

The results indicated that for each country, there is a different pattern and for one country, there might be a comparative advantage in the gross exports of a service that is higher than in value added terms, however, for another country, the same sector could have a higher comparative advantage when calculated in value added terms.

These results therefore implicates that each country should not only evaluate their current and potential exports in services based on gross exports, but that it is important to also evaluate it from a value added perspective. The results also indicate the importance of including value added data in international trade data analysis as well as country performance analysis.

For South Africa most sectors such as construction (ISIC code 45), transport and storage and communication (ISIC code 60–64), finance and insurance (ISIC code 65–67) real estate (ISIC code 70–74) as well as community and personal services (ISIC code 75–95), had a much higher comparative advantage in terms of value added. Therefore in South Africa's case the services firms are currently not very strong in terms of direct exports but could have a potentially large role to play as value added in the global value chain of products and services. This is an important issue to be highlighted in future policies and decision making of the South African government.

References

Ahmad, N. 2013. 'Measuring Trade in Value Added, and Beyond.' Paper presented at the Conference on Measuring the Effects of Globalization, Washington DC, February 28–1 March.

Balassa, B. 1965. *Trade Liberalisation and Revealed Comparative Advantage.* New Haven, CT: Yale University Economic Growth Centre.

Banga, R., and G. Bishwanath. 2013. 'Contribution of Services to Output Growth and Productivity in Indian Manufacturing: Pre- and Post-Reform.' *Economic and Political Weekly* 42 (26): 2769–77.

Francois, J., and M. Manchin. 2011. 'Services Linkages and the Value Added Content of Trade.' http://siteresources.worldbank.org/ INTRANETTRADE/Resources/Internal-Training/287823 -1256848879189/6526508-1283456658475/7370147-1308070299728/ 7997263-1308070314933/PAPER_7_Francois_Manchin.pdf.

Hoekman, B. 2013. 'Adding value.' *Finance and Development* 50 (4): 22–4.

Industrial Policy Action Plan. 2013. *Industrial Policy Action Plan: Economic Sectors & Employment Cluster; IPAP 2013/14-2015/16.* Pretoria: The Department of Trade and Industry.

International Trade Centre. 2013. 'Trade Map: Existing and Potential Trade.' http://www.trademap.org

Johnson, R. C. 2014. 'Five facts about Value-Added Exports and The Implications for Macroeconomics and Trade Research.' *Journal of Economic Perspectives* 28 (2): 119–42.

Jones, R. W., and H. Kierkowski. 2000. 'A Framework for Fragmentation.' In *Fragmentation and International Trade: IIFET 2000 Proceedings,* edited by S. Arndt and H. Kierzkowski, 1–9. Oxford: Oxford University Press.

Koopman, R., W. Powers, Z. Wang, and S. J. Wei. 2010. 'Give Credit Where Credit is Due: Tracing Value Added in Global Production Chains.' NBER Working Paper 16426, National Bureau of Economic Research, Cambridge, MA. http://www.nber.org/papers/w16426.

Maurer, A. 2011. 'Trade in Value Added: What is the Country of Origin in an Interconnected World?' http://www.wto.org/english/res_e/statis _e/miwi_e/background_paper_e.htm

Organisation for Economic Cooperation and Development. 2014. 'OECD-WTO Trade in Value Added.' http://stats.oecd.org/Index.aspx ?DataSetCode=TIVA_OECD_WTO

South African Reserve Bank. 2013. 'National Accounts.' *Quarterly Bulletin,* 257.

Statistics South Africa. 2010. *Quarterly Labour Force Survey,* Quarter 3. http://www.statssa.gov.za/publications/P0211/P02113rdQuarter2010 .pdf

Steuart, I., and R. Cassim. 2005. *Opportunities and Risks of Liberalising Trade in Services: Country Study on South Africa.* Geneva: ICTSD. http://ictsd.org/downloads/2008/04/ip_services_02.pdf

Timmer, M. P., A. A. Erumban, B. Los, R. Stehrer, and G. J. de Vries. 2014. 'Slicing up Global Value Chains.' *Journal of Economic Perspectives* 28 (2): 99–118.

van Rensburg, A. M. J. 2000. 'The Role of Transport Costs and Logistics in South Africa's Competitiveness.' M.Com. Thesis, Potchefstroom University for Christian Higher Education, Potchefstroom.

World Trade Organisation. 2014. 'Made in the World.' http://www.wto.org/english/res_e/statis_e/miwi_e/miwi_e.htm

Čezatlantski spor in sodelovanje v zvezi s trgovinskimi vprašanji
Joseph A. McKinney

Združene države Amerike in Evropska unija sta glavni akterki v globalnem gospodarstvu. Gospodarski odnosi med njima so tako obsežni kot globoki. Predstavljata okoli 45 odstotkov svetovnega bruto domačega proizvoda, 30 odstotkov tokov svetovnih neposrednih tujih naložb in 70 odstotkov delnic svetovnih neposrednih tujih naložb. Glede na njun pomen v svetovnem gospodarstvu in v gospodarstvu druga druge je pomembno, da med seboj sodelujeta in ohranjata minimalno raven konfliktnosti. Na srečo je bilo njunih trgovinskih sporov razmeroma malo in so bili večinoma rešeni po mirni poti. Poskusi doseči tesnejše gospodarsko povezovanje so želi mešani uspeh. Trenutna pogajanja za čezatlantsko trgovino in investicijsko partnerstvo imajo možnost poglobiti njune gospodarske odnose, vendar je treba paziti, da ne bi prestopili meje politično izvedljivega.

Razmerja med emisijami CO_2, porabo energije, gospodarsko rastjo in neposrednimi tujimi naložbami v Vietnamu
Dinh Hong Linh in Shih-Mo Lin

Študija obravnava dinamične odnose med emisijami CO_2, porabo energije, neposrednimi tujimi naložbami in gospodarsko rastjo v Vietnamu med letoma 1980 in 2010 in temelji na pristopu okoljske Kuznetsove krivulje (EKC), sointegraciji in testih vzročnosti Granger. Empirični rezultati ne podpirajo bistveno hipoteze, da Vietnam doživlja podporo za teorijo okoljske Kuznetsove krivulje (EKC). Vendar sointegracija in rezultati testa vzročnosti Granger kažejo na dinamično razmerje med emisijami CO_2, porabo energije, neposrednimi tujimi naložbami in gospodarsko rastjo. Kratkoročni dvosmerni odnos med prihodki Vietnama in prilivi neposrednih tujih naložb kaže, da bo povečanje vietnamskega dohodka pritegnilo več kapitala iz tujine. Obratno, prilivi neposrednih tujih naložb spodbujajo razširitev in povečanje nacionalnega dohodka. Obstoj dvosmernega odnosa torej dolgoročno ponuja

številne pomembne posledice za oblikovalce politike. Vietnam bi torej moral izvajati dvojno strategijo povečevanja naložb v energetsko infrastrukturo in razglasiti politike za varčevanje z energijo, da bi izkoristil energetsko učinkovitost in zmanjšal izgubo energije.

Ključne besede: okoljska Kuznetsova krivulja (екс), Grangerjeva vzročnost, onesnaževanje, emisije CO_2, poraba energije, prilivi neposrednih tujih naložb, dohodek, Vietnam

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Učinkovite institucije in upravljanje zunanjetrgovinske politike lahko povečajo vpliv majhne države v mednarodnem merilu
Sabina Koleša

Predmet raziskave je upravljanje zunanjetrgovinske politike države ob upoštevanju delovanja nadnacionalnih entitet, pri čemer je osrednji cilj identificirati optimalen način realizacije nacionalnih interesov majhne države v okviru nadnacionalne entitete (tj. Evropske unije). Trdimo, da vpliv na odločitve ni odvisen le od tradicionalno opredeljene moči države, ampak tudi od strategije, organiziranosti ter sposobnosti oblikovanja zavezništev glede na nacionalne prioritete. Dokažemo, da je za učinkovito upravljanje zunanjetrgovinske politike (ztp) ključna vloga institucij – zlasti za majhne države, ki lahko z dobro organiziranostjo procesov in oblikovanjem zavezništev bistveno povečajo svojo moč oz. vpliv v mednarodnem merilu. Na osnovi analiz: teorij mednarodne menjave, teorije institucij, vloge države, ekonomske diplomacije, vsebin in procesov oblikovanja ztp eu ter modelov upravljanja zunanjetrgovinske politike v izbranih državah članicah eu, predlagamo nadgradnjo oz. prenovo sistema upravljanja zunanjetrgovinske politike v Sloveniji.

Ključne besede: mednarodno poslovanje, zunanja trgovina, teorije mednarodne menjave, ekonomska diplomacija

Klasifikacija JEL: f13, f14

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Model ekosistema električnih vozil: sestava, analiza in določitev ključnih izzivov
Zulkarnain, Pekka Leviäkangas, Tuomo Kinnunen in Pekka Kess

Članek gradi konceptualni model ekosistema električnih vozil in kopičenja vrednostne verige. Na osnovi literature, raziskava loči najbolj kritične izzive, ki so na poti elektrifikacije sistemov mobilnosti. Potrošniki

imajo še vedno nekaj vprašanj, ki zahtevajo odgovore, preden bodo pripravljeni sprejeti električna vozila. S tehničnega vidika se nekateri izzivi nanašajo na vozila, polnilno infrastrukturo, akumulatorsko tehnologijo in standardizacijo. Uporaba akumulatorjev v električnih vozilih bo prinesla dodatne okoljske izzive, ki se bodo nanašali na življenjski ciklus rabljene baterije, proizvodnjo in na nekatere uporabljene in obdelane materiale v postopku proizvodnje. Vidiki politik vključujejo predvsem davčne strategije. Večinoma še vedno primanjkujejo vzpostavljeni tržni pogoji in obstajajo še številni nerešeni izzivi tako na strani ponudbe kot povpraševanja na trgu električnih vozil.

Ključne besede: električna vozila, ekosistem, mobilnost, politika, okolje
Klasifikacija JEL: L22, L62, O18, Q01, R41
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Primerjalna prednost storitev z dodano vrednostjo: primer Južne Afrike
Sonja Grater

Globalne dobavne verige so spremenile način mednarodne proizvodnje. Vložek v končni izdelek vključuje tako vmesno blago kot storitve, kar dodaja vrednost končnemu izdelku. Bruto podatki trgovanja so zavajajoči in vključujejo dvojno štetje. Študija postavlja vprašanje, ali bi tradicionalni izračuni za izkazano primerjalno prednost (RCA) za bruto izvoz storitev ponudili drugačne rezultate od storitev z dodano vrednostjo. Naredili smo izračun RCA za Južno Afriko in države BRIC, tako za bruto izvoz blaga kot storitve z dodano vrednostjo. Analiza je pokazala, da so nekatere države v določenih sektorjih bile močnejše v bruto izvozu kot v dodani vrednosti, medtem ko so druge pokazale večjo primerjalno prednost na slednjem področju. V primeru Južne Afrike je večina storitev imela večjo primerjalno prednost pri dodani vrednosti kot pa bruto izvozu. Rezultati kažejo na pomembnost vključitve podatkov o dodani vrednosti v analizo podatkov mednarodne trgovine.

Ključne besede: trgovina s storitvami, primerjalna prednost, dodana vrednost, Južna Afrika, države BRIC
Klasifikacija JEL: F100, F140
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Managing Global Transitions
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Jackson, R. 1979. 'Running Down the Up-Escalator: Regional Inequality in Papua New Guinea.' *Australian Geographer* 14 (5): 175–84.

Lynd, R., and H. Lynd. 1929. *Middletown: A study in American Culture.* New York: Harcourt, Brace and World.

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