# Understanding the Future of Canada-UK Trade Relationships in a Circular Economy Context

CANADIAN PERSPECTIVE

Dr. Deborah de Lange and Dr. Philip Walsh, Ted Rogers School of Management, Ryerson University

UK PERSPECTIVE

Dr. Paul Sheeran, Winchester Business School, University of Winchester

November 30, 2018

# Table of Contents

# Executive Summary


## Background

The UK will develop new trading relationships after separating from the European Union (EU). Although the Comprehensive Economic and Trade Agreement (CETA) between Canada and the EU will remain in effect with the UK over a transition period post-Brexit, a new Canada-UK trade agreement could eventually replace it. Furthermore, any new international trade agreements are an opportunity for developing a worldwide circular economy, eliminating waste while supporting social justice. Thus, the new trade agreement between Canada and the UK could be precedent-setting in regards to engendering a worldwide circular economy.

## Objectives and Methodology

Through a literature review focusing on academic journal articles, this report investigates existing trade theory and trade agreements regarding circular economy principles to inform the design and implementation of future trade agreements between Canada and the UK, post-Brexit. This report identifies gaps in that knowledge base and recommends future research that may facilitate Canada-UK circular economy trade. A recent OECD report lays out a framework conceptualizing the potential usefulness of circular economy trade and calls for more research on the subject (Yamaguchi, 2018). The report proposes various linkages or interfaces along international value chains where circular economy dynamics could be facilitated by international trade. This coincidence of similar thought between the OECD and the researchers of this report implies the importance and relevance of research into the role trade may have as part of a global circular economy.

By primarily reviewing existing academic literature, we provide an overview of five themes consequential for the design and implementation of circular economy trade agreements including: 1) inputs to trade agreement design such as the experience with CETA, design elements of circular economy trade agreements in respect of 2) governance, 3) and tariffs and non-tariff barriers, and some outputs of circular economy trade as related to 4) technology and cross-border trade also leading to 5) sustainability and prosperity. A conceptual framework (See Figure 1) pictorially shows the linkages among this report's themes.

A literature review was conducted from both Canadian and UK perspectives. As well, researchers from both countries found experts across government, academia, and industry to validate and provide feedback on a draft version of the review. These experts, acknowledged in a list in an appendix, were asked to read self-selected sections based on their expertise. In some cases, the interviewees voluntarily read the entire draft. Their helpful and voluntary anonymous feedback has either been incorporated into the report as changes to the draft document or included as combined and summarized bullet point comments in an appendix. After finalizing the report as the main output of this endeavor, the researchers created a list of the key takeaways and gaps in literature important for moving ahead with UK-Canada circular economy trade post-Brexit. Some highlighted takeaways are mentioned in this executive summary and in the conclusions section. Because this work is extensive, the appendix holds a more comprehensive list of takeaways and research questions.

## Results and Key Messages

In regards to identifying key takeaways and gaps in the literature for the eventual development of a post-Brexit U.K.-Canada trade agreement that includes circular economy principles, this summary highlights key messages and suggestions for future research. Overall, we found recognition in the literature and in interviewee responses that a future UK-Canada trade agreement could support circular economy trade. Sustainable aspects of the Canada-Europe trade agreement (CETA) could represent a foundation. However, the CETA chapters regarding sustainability do not explicitly refer to the circular economy and any future trade agreement might review and revise sections to include circularity.

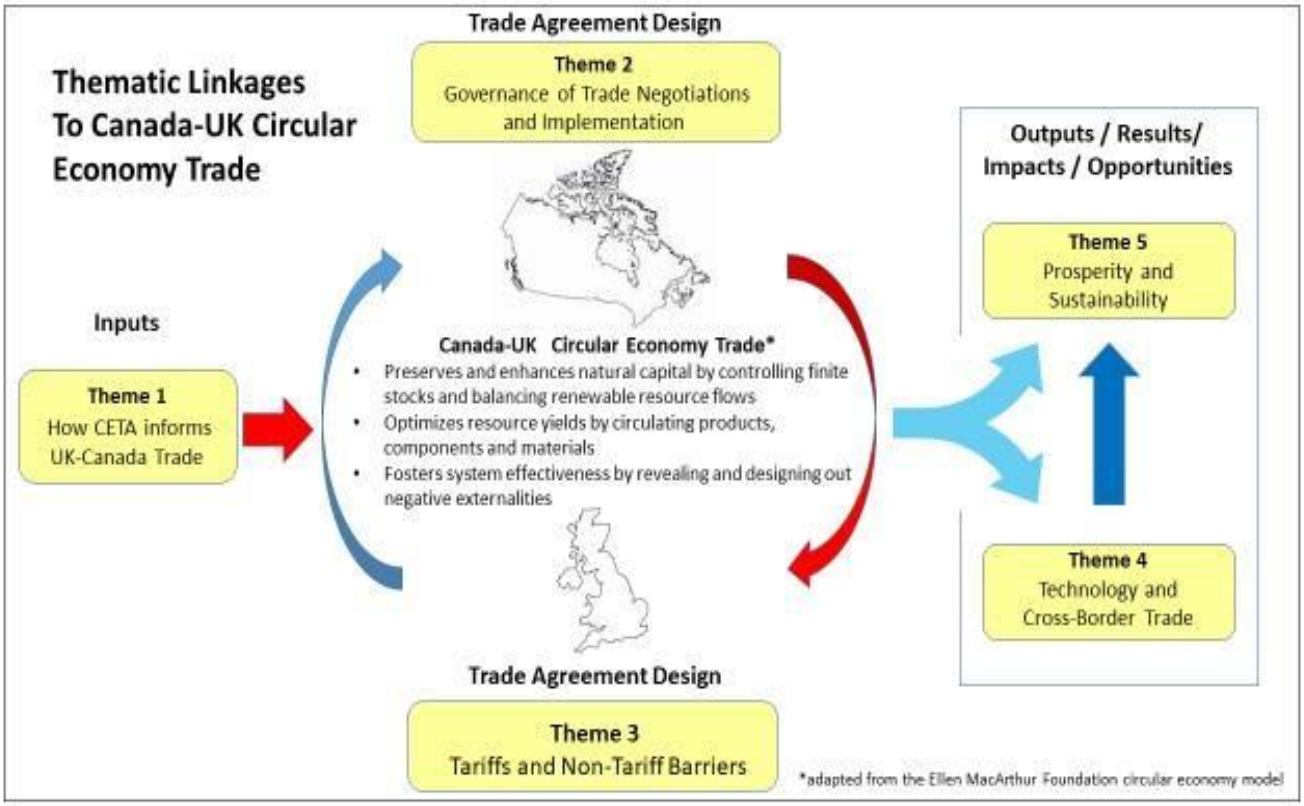
In a future bilateral trade agreement, additional consideration for resource and waste management, as well as design collaboration is required. Science-based case research could clarify the full cost environmental impact of activities such as resource and waste management in the context of trade. An evidence-based understanding of such activities in a global circular economy trade context is not readily available. Moreover, evidence for the gains from circular trade could be addressed in future research. This same research could first establish a baseline with an investigation of the existing dynamics between Canada, the U.K., and other countries and then investigate how a circular economy approach could be motivated.

Another suggested area of study is the examination of negotiating conditions for circular economy trade. For example, the structure of the working groups involved in the negotiations could facilitate or hinder increasingly complex negotiations. Also, stakeholder interests and representation in negotiations is an important area of consideration. This issue has arisen in the past as related to difficulties in the adoption of terms governed by subnational levels when they have not been satisfactorily represented in negotiations. Moreover, research could clarify which industries are most prepared to engage in circular economy trade to increase the likelihood of implementation. How the negotiations could best include industry representatives could be incorporated into stakeholder research. For example, advanced manufacturing may be of strategic interest to both nations and this industry influenced by ISO standards may embrace waste reduction and increased efficiencies and cost savings in processes. Negotiations should also focus on the clarity of the agreement and enforcement mechanisms. Terminology and transparency are crucial elements in future international trade agreements between the UK and Canada. For example, a common understanding of circularity must be consistently communicated and applied across industries and between countries. In addition, negotiations should take into account both a formal trade agreement and complementary non-trade treaties. Also, negotiators should be cognizant that well-structured trade agreements can lead to reduced trade volatility through tighter integration of the respective economies.

Furthermore, the complexity of issue linkage in trade agreements would likely increase when incorporating circularity across industry sectors and countries so this needs consideration. The clarity of the agreement and the ability to enforce it is also in tension with complex issue linkages. Ultimately, both sides will want to develop scenarios for how negotiation strategies could lead to gains from trade and foreign direct investment across sectors.

Finally, a common view discovered through the interviews is that countries do not typically add new terms to trade agreements unrelated to existing national agendas and activities. Thus, a circular economy trade agreement is unlikely unless all parties to the agreement are already on a path to waste reduction and sustainability. Such agreements may formally reinforce and normalize a global circular economy.

**Figure 1: Conceptual Framework**



## Background

The close cultural and economic links that exist between the United Kingdom and Canada provide a number of opportunities post-Brexit for the investigation into how the two countries may be able to expand their existing trade relationship. Future policies for expanding trade between both countries can benefit from the opportunity to consider a circular economy approach as part of a framework for UK-Canada trade and investment that considers the following themes:

- *UK-Canada trade relationships in the context of CETA and Brexit*
- *Governance*
- *Trade Barriers - From Tariffs and Regulatory Barriers to Non-Tariff Barriers*
- *Technological and digital transformations, cross-border trade in services, and geography*
- *Prosperity and sustainability: Inclusion, labour and environment*

According to the Ellen McArthur Foundation and others that have contributed to the development of the concept (McDonough and Braungart, 2013; Murray, Skene, and Haynes, 2017), a circular economy is one that avoids a linear or extractive economy model wherein the last step after production and use is disposal. Instead, waste is eliminated by restoring or regenerating it as part of biological and technical industrial cycles that draw upon system-wide innovation. Business models are altered, redefining products and services while minimizing negative impacts to the environment and people (Murray, Skene, and Haynes, 2017). A circular model relies on renewable energy to underpin the development of economic, natural and social capital (Coleman, 1988). This report summarizes the results of a review of the literature on the above-mentioned themes in order to better identify the gaps in our current knowledge of trading relationships and the impact of a circular economy approach.

## Objectives

The objectives of this project are to investigate five facets related to the design of a Canada-UK trade agreement that incorporates circular economy principles. The conceptual framework comprising five themes includes: 1) input knowledge and experience based on a recent key CETA agreement, 2) governance principles for trade agreements, 3) tariffs and non-tariff barriers, 4) technology and cross-border trade, and 5) prosperity and sustainability. Academic literature was searched for on these themes so as to facilitate thought about how circular economy trade may come to pass between Canada and the UK.

## Methods

The following section outlines the methodology employed in the project. Conducted in three phases, the first phase involved a review of the existing literature, the purpose of which was to undertake a synthesis of the literature that could assist in examining the state of knowledge for each respective theme within the context of a circular economy. Information in the literature was then assessed by the project researchers to determine where there may be gaps that require further work in this area or whether research existed that could inform future policies and practices related to Canadian-UK trade practices. The review process included the use of a variety of literature databases such as Google Scholar, ScienceDirect (Elsevier),

Emerald, JSTOR, and Web of Science. Searches of these databases involved the use of key words such as "Canada", "United Kingdom", "UK", "circular economy", "trade" and "case study, and more specifically other key words related to the thematic areas e.g. "trade relationships", "governance", "international trade" for the governance theme. A summary of the specific search strings used to identify literature for review is contained within the Appendix.

Relevant literature was then used to prepare a draft literature review for presentation to industry executives, government agency staff, elected officials, and representatives of other stakeholder groups for second phase of the project. During this phase, interviews were conducted with interviewees from Canada and the UK in a variety of public and private sectors so that trans-national and cross-sectoral stakeholder representation was assured. Prior to undertaking the interviews, research ethics protocols for both Ryerson University and the University of Winchester were completed. Interviewees were asked to read the literature review or parts of it and to be prepared to address two principal questions about themes they felt qualified to assess. The first question was specific to the theme(s) interviewees were prepared to comment on and the second question pertained to the entire review. They were:

**Q1:** What are your expert opinions on our thoroughness of the review and the analysis of the following theme of the report?

**Q2:** Do you see any gaps in the thoroughness of the review and the analysis presented in the report?

Fourteen interviews were conducted in total (see Appendix A) where the number of interviews was determined at the point where we found saturation had taken place (Saunders et al., 2018). At this point, interview responses had become repetitive relative to the themes being investigated. The third phase involved combining the findings from the literature synthesis together with analysis of the interview responses to provide insight into how trade between Canada and the UK post-Brexit could take place under a framework that promotes the principles of a circular economy. Gaps in the research were identified and summarized, with recommendations put forward as to what further research may be helpful to move a circular trade agenda forward between Canada and the UK.

## Results – Literature Review from a Canadian Perspective

### Theme 1: UK-Canada Trade Relationships in the Context of CETA and Brexit

The Canadian government, no matter the political stripe, has been working on free trade in international forums and bilaterally since the end of World War II (McKenzie, 2014). In 1976, it signed a bilateral framework agreement with the European Economic Community to encourage more business and investment (McKenzie, 2014). The recent trade agreement between Canada and the European Union (EU), the Comprehensive Economic and Trade Agreement (CETA), may be instructive for future agreements between Canada and the UK, post-Brexit (Office of the Parliamentary Budget Officer, 2017). CETA will apply to the UK-Canada relationship after Brexit (March 2019) over a transition period, but the two nations will need a revised trade agreement thereafter. CETA is considered a possible model, but the deal faced challenges from which learning could be derived for the Canada-UK deal (McKenzie, 2014; Watts, 2017). As always, political leaders predict gains from the trade agreements they enter into. CETA was no

different where bilateral Canada-EU trade was predicted by the Canadian prime minister to increase twenty-five percent with an additional $12B CAD added to the Canadian economy through the elimination of ninety-eight percent of tariffs (McKenzie, 2014). However, more recently, the Office of the Parliamentary Budget Officer (PBO, 2017) states in a prospective analysis that gains from CETA will be modest for Canada. Given that there are winners and losers with trade agreements, the expected Canadian winners according to literature speculating on this at the time, were beef producers who would export 50,000 tons more and pork producers who would export an additional 70,000 tons to the EU markets, resulting in 80,000 more Canadian jobs (McKenzie, 2014). On the other hand, the Canadian dairy and alcoholic beverage industries expected to be the losers with CETA (McKenzie, 2014). The recent PBO prospective analysis (2017) states that the trade balance with the EU will worsen for Canada by $2 billion as a result of CETA. Automobiles and transport, wheat, and non-ferrous metals could grow whereas textiles and some agricultural, dairy, manufactured, and machinery goods will suffer. CETA also extends patent protection to pharmaceutical drugs thus, Canada estimates it will pay more in royalties annually to the EU. Concurrently, Canada will experience net economic gains of $8 billion in economic output and increased investment (PBO, 2017). In addition, the PBO analysis estimates that trade to the EU will result in diversion away from trade with the US and other parts of the world.

Although trade-offs are difficult, CETA could be helpful in respect of moving a circular economy regime forward in a Canada-UK agreement. CETA has some building blocks already incorporated related to sustainable development, although not explicitly described as a circular economy framework. The following section will describe CETA and some applicable aspects of that agreement that may support the development of a precedent-setting circular economy framework for a Canada-UK trade agreement. First, it is important to understand how a trade agreement has historically developed in Canada prior to discussing the differences with the Comprehensive Economic and Trade Agreement (CETA). A Canadian trade deal passes through two main processes where the first is to conclude the treaty including negotiations, signing, and ratification and the second stage is implementation. The Canadian federal executive presides over the first stage and to support the second or implementation stage, there is a requirement to develop and adopt legislation to enact the treaty.

Depending on which jurisdictions are involved in the implementation stage, Canadian domestic laws may need to change relating to the corresponding federal and/or provincial legislative branches (Paquin, 2013). In Canada, it is laws rather than treaties that are implemented (Paquin, 2013). The North American Free Trade Agreement (NAFTA) covers three nations having different laws and Canadian laws had to change to align with NAFTA. When valid trade disputes occur, challenges to existing laws may arise again. Dispute settlement can result in additional legal changes and even the revocation of previous administrative decisions (Paquin, 2013).

Issues may also arise when provinces do not agree with federally negotiated treaties. Although provincial, territorial, or First Nations governments can be consequential to implementation, they are not necessarily part of the first stage negotiation process unless invited by the federal executive (Paquin, 2013). However, they have previously been invited to engage (Paquin, 2013). Other stakeholder input including from the Federation of Canadian Municipalities, non-governmental organizations, and citizens has been considered (Paquin, 2013). Instead of directly involving other actors such as provinces in the international negotiations, cross-jurisdictional negotiations between federal and provincial bureaucrats and/or ministers occur as unofficial consultations (Paquin, 2013). However, there is no general framework to govern these consultation processes or requirements, allowing for flexibility but also inconsistency and

a lack a clarity around expectations (Paquin, 2013). Quebec has expressed a preference for greater formalization of the consultation process and even direct participation in the negotiations (Paquin, 2013).

Also, many stakeholders were concerned by CETA's implications, likely because the consultation process was inadequate (McKenzie, 2014). The Trade Justice Network was concerned that national institutions such as health care and the democratic political system would be at risk. The Canadian Health Coalition was similarly concerned regarding public health policy and higher drug prices (McKenzie, 2014). The Council of Canadians expected increased vulnerability for local culture and Canadian sovereignty by European domination. Trade unions disliked the lack of transparency, typical in secretive trade negotiations, because they feared that corporate interests would take precedence over those of labour (McKenzie, 2014). Labour negotiations eventually arose where public sector labour groups from both sides built a common agenda and were thereby paid attention (Healy, 2014). These events led to delays in the implementation of CETA but conflict resolution processes led to a positive outcome (Healy, 2014). The International Trade Union Confederation (ITUC) is an illustration of international labour coordination developing as a result of concerns like these related to globalization and the changing landscape for labour (Gumbrell-McCormick, R. (2013).

In future Canada-UK negotiations, greater anticipation of and consideration for a variety of stakeholder reactions would be prudent. A higher level of stakeholder engagement would also align with the intentions of a circular economy framework. A circular economy inherently requires a higher level of inclusiveness as it considers the integration of many more industrial, social and environmental factors together with the internalization of externalities into industrial systems. Moreover, transparent engagement of stakeholders allows them to make visible impacts and feel a sense of ownership over outcomes. This way, opposition related to a loss of a distinctive local identity as linked to perceptions of globalization and corporatization may be ameliorated. Future research could further advise on how to improve stakeholder engagement for Canada-UK negotiations.

A significant change on the Canadian side of negotiations over the Comprehensive Economic and Trade Agreement (CETA), as compared to the Canada–United States Free Trade Agreement (CUSFTA) or the North America Free Trade Agreement (NAFTA), was that the provinces were directly involved in the CETA negotiations (Paquin, 2013). No precedent has been set in trade negotiations for opening up provincial procurement contracts, as CUSFTA and NAFTA did not address them and could not do so without provincial involvement. The European Union required the provinces' participation because the Europeans wanted access to provincial procurement contracts (Paquin, 2013). In addition, labour issues could not be considered without provincial involvement (Paquin, 2013). The 1937 Labour Conventions decision effectively puts provinces in power over this field of jurisdiction (Paquin, 2013). Although in the Canadian constitution and in court rulings, the federal executive has decision making authority over international treaties, the EU was persuasive in this situation (Paquin, 2013).

As related to circular economy issues, some experience from NAFTA has suggested that provinces needed to be involved in CETA and will need to be involved directly in Canada-UK negotiations. NAFTA had two side agreements on labour and the environment negotiated solely by the federal government even though many provinces desired involvement (Paquin, 2013). As a consequence, the side agreements were largely ignored as many provinces did not implement them (Paquin, 2013). Labour is the exclusive jurisdiction of provinces and the environment is a shared federal-provincial responsibility (Paquin, 2013). Four provinces accepted the labour agreement: Alberta, Manitoba, Quebec, and Prince Edward Island and three provinces accepted the environment agreement: Alberta, Quebec, and Manitoba (Paquin, 2013).

Overall, the adoption of environmental and labour considerations in NAFTA has not been widely successful.

Another point of learning from previous Canadian negotiations is the approach taken to negotiate several issues for a single agreement. A circular economy agenda would add more topics and complication so, the structure and organization of the negotiations will be important design considerations. The previous structure for negotiations included ten negotiation groups for: antidumping and countervailing duties, agriculture. competition policy, dispute settlement, government procurement, intellectual property rights, investments subsidies, market access, services, and subsidies (Paquin, 2013). In CETA negotiations, topic groups were also set up and the provinces were involved in some topics and not others. The provinces and territories were involved in discussions on labour, investment, government procurement, monopolies, and state-owned enterprises, services, sustainable development, and technical barriers to trade (Paquin, 2013). The federal government discussed the following topics without the provinces and territories directly involved: agriculture, customs, intellectual property rights, phytosanitary measures, and other trade governance matters (Paquin, 2013). Noting that sustainable development was part of CETA, there has been progress in Canada's trade agreements implying that Canada and the UK could be ready for the next step, that being incorporation of a circular economy regime, thus changing the industrial structure. The interrelatedness of elements in a circular economy as compared to a linear one may lead to additional innovation in trade negotiations frameworks so, this is suggested future research.

CETA led to some specific results and consequences for Canadian markets. The agreement required that Canada trade off openness in some markets so as to increase access to others in Europe. Research states that through CETA, the Canadian government offered stronger intellectual property protection, reduced tariffs on processed agricultural products such as wine, more access to government procurement contracts, and more openness to European services in finance, telecommunications, energy, and transportation, thus forcing the Canadian service suppliers to become more competitive (McKenzie, 2014). While some Canadians may have been concerned about a loss of jobs in these service industries, the concessions in services were not necessarily problematic for Canadian consumers facing national oligopolies and high prices.

Trade in agriculture is usually a disquieting subject no matter the treaty or nation. Thus, it has been no different in Canada and Europe where the terms of trade in CETA touched agricultural topics and raised objections in both regions (McKenzie, 2014; Viju and Kerr, 2011). CETA increased quotas for Canadian beef and pork exports, but also allowed more European wine and dairy products such as cheese, milk and butter to compete with Canadian products. When trade terms hurt individual producers, a well-established historical practice is for governments to offer compensatory subsidies (McKenzie, 2014). However, in principle, subsidies defeat the purpose of free trade. Markets do not become more competitive so, suppliers are not challenged to improve, and then consumers do not benefit from lower prices and/or higher quality and more variety, had the producers at home been put under more pressure (McKenzie, 2014). A caveat on this latter statement is that for a variety of reasons free trade agreements do not always result in lower prices and the expected chain of economic events such as those related to the restructuring of employment, increased productivity, and prosperity through gains from trade (McKenzie, 2014). The reasons are both known, such as varying consumer sentiment and no real price movements, and unknown.

Another topic that may be of interest to the UK post-Brexit is energy, as it was for the EU in CETA, because Canada is a democratic ally with a stable government. Few other fossil fuel producers are stable allies except Norway. However, if the goal for both parties becomes a circular economy which is

synonymous with the installation of renewable energy (EllenMacArthur, 2013), then pressure from the UK side could productively motivate Canada to convert to renewable energy in the interest of its Paris Agreement commitments and the diversification of its economy. This would be issue linkage on the part of the UK (Davis, 2009). The UK has demonstrated an ability to install renewable energy systems and this momentum toward greater national energy security, to become independent of fossil fuels and the problems associated with them, could influence the trade discussions (Deign, 2018). The UK has renewable energy goals that include positioning itself as a leader in battery technology for energy storage, already in development (Deign, 2018). However, as the UK transitions, it may prefer to turn to a Canadian supply of energy resources over the short term.

Other products of interest between the UK and Canada may include machinery, transport equipment and chemicals as Canada is an exporter of these products and they were of interest for the EU in CETA (Viju and Kerr, 2011). In a circular economy trade framework, it would be of interest to explore how the industry players would propose designing circular systems in a traded system. Thus, an inclusive stakeholder approach, where the relevant industry players propose specific circular economy supply chain and trade systems applicable to their products as policy design inputs to future Canada-UK negotiations could prove useful. Industry representatives would be motivated to think in circular terms because increased business would be associated with such a trade agreement.

Understanding that Canada has always had close ties with Europe, for example, in support during the two great European wars, the CETA is more than a trade agreement. The treaty signals intentions to maintain long term international relationships. Moreover, trade agreements between Canada and the EU or the UK after Brexit serve to bolster North American and European leverage in a world of rising Asian powers such as China and India (Viju and Kerr, 2011). Treaties demonstrate an effort and desire to define a conception of national interest that is inclusive of other parties' interests with a long term view to cooperate over commitments, principles, and international law (McKenzie, 2014). In addition to these signals and friendly intentions, the increased economic interdependence which is encouraged by trade agreements promotes cooperation and peace (Martin, Mayer, and Thoenig, 2012; McKenzie, 2014). Thus, a future agreement between Canada and the UK, post Brexit would have these elements so as to signal a continuance of existing bonds and commitment between the two countries even though the UK is no longer part of the EU. By developing a precedent-setting agreement incorporating a circular economy framework which actually works in the best interests of the world, not just the two countries, this would be an outstanding way to punctuate the special relationship between Canada and the UK.

## Theme 2: Governance

This section discusses the theme of governance as is applicable to the Canada-UK trade relationship and the international trading environment for advanced nations since Canada and the UK fall into this category. Based on existing research, this section touches on several topics related to international trade governance and potential future developments. Starting with a general view, the section then discusses: 1) the design of circular economy trade agendas and 2) the management of agreements including dispute resolution with an illustration relevant to a circular economy trade agenda.

### *General Views on International Trade Governance*

Before discussing the design of trade agreements with circular economy principles, an understanding of the purpose of governance as related to the goals of the trade agreements is required.

Recognizing the advantages of free trade over protection, economists discuss Ricardo's (1817) principle of comparative advantage (Mansfield and Reinhardt, 2008; Rodrik, 2018). Assuming the immobility of capital and other stylized facts, by specializing in the trade of goods that countries are comparatively better at producing, they expand the overall gains from trade for all countries involved (Ricardo, 1817). Countries have reasons to resist specialization, for example for food, energy and national security and for developing infant industries anticipated as important for international competitive advantage (Melitz, 2005). Also, they naturally trade across overlapping and similar industries in direct competition with each other, such as in agriculture (McKenzie, 2014; Panizzon, 2010). However, they still write trade agreements. Although we often associate economic growth with free trade agreements, it is not as straightforward as sometimes discussed, thus the careful design of agreements including their governance is critical for realizing the benefits from trade together with other goals intertwined in the agreements (Rodrik, 2018).

Recent research has explained that the goals of trade agreements have changed over time to become much broader than simply opening up markets. Opening markets means to eliminate restrictions on trade such as import tariffs and quotas to increase bilateral trade volumes (Rodrik, 2018). However, the resulting economic integration has other consequences. For example, the EU arose to increase economic integration with greater aims to reduce conflict given a history of violent world wars centered in Europe (Martin, Mayer and Thoenig, 2012; McKenzie, 2014). The complex set of goals in trade agreements and in the associated linked agreements means varying consequences for a variety of stakeholders (Reed, 2009; Rodrik, 2018). The evolving nature of modern trade suggests that trade agreements could become inclusive of circular economy orientated provisions. Already, research outlines a laundry list of considerations in trade agreements such that they result in extensive integration of countries, including: regulatory standards, banking and finance, investment issues such as free capital mobility, intellectual property rights protection, health and safety, labour, environmental protection, and many other topics (Limão 2016; Rodik, 2018). Overall, trade agreements include sections on: harmonization of regulatory standards, trade-related intellectual property rights, investor-state dispute settlement procedures, and rules about international capital flows (Rodrik, 2018). By considering the governance of circular economy trade agreements which would further increase integration, well-designed deals in the future would inherently improve the governance of all trade related topics.

No matter the trade deal, many multilateral and regional international trade institutions have arisen to liberalize and increase the flow of international commerce while reducing volatility in trade policy and trade flows (Limão and Maggi, 2015; Mansfield and Reinhardt, 2008). Through involvement in international institutions, national policies converge such as in monetary, trade, and defense (Martin and Simmons; Mansfield and Reinhardt, 2008). As a minimum, existing policies are secured so that they are locked in place to a status quo level, but they also may be negotiated to be improved (Mansfield and Reinhardt, 2008). Policy and economic integration reduce volatility and lead to increased foreign direct investment over arm's length trade because investors gain confidence in a stable environment where assets are not at risk, also reducing their motivation to switch to lower cost locations (Mansfield and Reinhardt, 2008). Governments have been known to change terms of trade to the detriment of importing nations and their firms, but they have a harder time doing so under the influence and monitoring of multilateral institutions such as the World Trade Organization (WTO). In addition, institutions safeguard firms by providing information about trade policy and government behavior (Mansfield and Reinhardt, 2008). Research states that the WTO together with preferential trading agreements (PTAs) reduce volatility

(Mansfield and Reinhardt, 2008). Reducing volatility in trade increases trade flows through three complementary mechanisms: 1) enforcement of agreements and deterrence of protectionism, 2) increasing transparency and policy convergence, and 3) restructuring market transactions to increase long-term predictability (Mansfield and Reinhardt, 2008).

A circular economy oriented trade agreement between Canada and the UK would be an integrative PTA also overseen by the WTO because both nations are members. Such a PTA would demonstrate how to increase integration as overseas partners rather than regional partners relying on proximity. Given the WTO exposure to nations interested in promulgating productive trade, such a Canada-UK trade agreement would be precedent setting and potentially influential among WTO members. Our aim with the UK could be to reduce trade volatility which would increase exports, according to research (Mansfield and Reinhardt, 2008). By developing a circular economy type of regime that inherently increases integration through common policies and the tighter linkages among firms, volatility would be expected to decrease. Our two nations' trade would be very tightly integrated thus potentially increasing both trade and foreign direct investment, possibly even more so than a standard RTA. The latter statements, in regards to the effects of circular economy regimes, could be testable propositions for future research. Previous research already calls for more research into how variations in trade agreements including: the institutions involved and their dispute settlement regimes, organizational development, types of membership, and the extent of market access concessions change trade volatility (Mansfield and Reinhardt, 2008).

***Design of Circular Economy Trade Agendas***

Scholars have already anticipated that trade agreements could result in a global race-to-the-top through the widespread upgrading of regulations and standards for labour and the environment (Rodrik, 2018). A circular economy trade regime would integrate these goals into industrial processes. However, prior to discussing the development of a more involved circular economy trade agreement, where such a thing does not yet explicitly exist, the concept of a circular economy needs clarification. According to the Ellen McArthur Foundation and others who have contributed to the development of the concept (McDonough and Braungart, 2013; Murray, Skene, and Haynes, 2017), a circular economy is one that avoids a linear or extractive economy model wherein the last step after production and use is disposal. Instead, waste is eliminated by restoring or regenerating it as part of biological and technical industrial cycles that draw upon system-wide innovation. Business models are altered, redefining products and services while minimizing negative impacts to the environment and people (Murray, Skene, and Haynes, 2017). A circular model relies on renewable energy to underpin the development of economic, natural and social capital (Coleman, 1988). In addition, many standard principles that strengthen trade agreements today should be incorporated into a circular economy type of trade agreement. Thus, the following discussion outlines the applicable previous research.

In terms of integrating sustainability into trade agreements, Fukunaga's (2012) research describes efforts to address climate change within treaties including trade agreements, given the United Nations Framework Convention on Climate Change (UNFCCC) and a multitude of international organizations, including the WTO that have a mandate to reduce fossil fuel use. Although circular economy principles have not yet been designed into agreements in their totality and no academic literature has been found that discusses this conceptual integration, many sustainability related building blocks have been incorporated into agreements, at least partly through the influence of the overlapping interests of many international organizations (Fukunaga, 2012).

Additional learning that could apply to strengthen a circular economy trade agreement comes from negotiations of Canada-US trade agreements. The Canada-US Free Trade Agreement (CUSFTA) which preceded the North American Free Trade Agreement (NAFTA) used ten negotiation groups for: 1) agriculture, 2) antidumping and countervailing duties, 3) competition policy, 4) dispute settlement on institutional issues, 5) government procurement, 6) intellectual property rights, 7) investments, 8) market access, 9) subsidies, and 10) services (Paquin, 2013). If a circular economy trade agreement is more complicated, then a negotiating structure with more groups may be necessary, such as for industry collaboration and new circular business models, waste elimination, renewable energy development, collaboration on scientific development for new materials, labour health and safety, human rights, and more (Paquin, 2013).

Moreover, the Canadians negotiated NAFTA without the provinces involved, although many wanted to engage directly. The result was that the two side agreements on the environment and labour had to be optional because the provinces control policy on these issues (Paquin, 2013). The environment is a shared issue between the federal and provincial governments whereas labour is exclusively a provincial jurisdiction (Paquin, 2013). Because of this experience of only a few provinces signing on to the side agreements (Paquin, 2013), if a circular economy regime is to be adopted and effective in the future, all provinces will need to be involved in the negotiations of such a trade agreement. In addition, interprovincial trade demands that the provinces work on a level playing field with each other or else there is "leakage" of business to similar neighbouring industries where costs of operation are lower (Datla, 2016). British Columbia led for a time on a carbon tax but stopped increasing the tax because other provinces (and US states) were not following suit (Datla, 2016). This was affecting competitiveness of some industries, although the tax was a positive influence on the BC economy overall (Datla, 2016).

Given that trade agreements, in their quest to open markets and reduce market volatility, must deal with a multitude of issues, transparency is understood to facilitate goals (Mansfield and Reinhardt, 2008). For example, during North American Free Trade Agreement (NAFTA) negotiations, Canada required that the rules of origin regarding automobiles and auto parts be made more precise (Mansfield and Reinhardt, 2008). This avoided later reinterpretation by the U.S. government which deterred foreign direct investment in Canada for producing finished goods aimed at the US market (Mansfield and Reinhardt, 2008). Thus, clarity in agreements and dispute resolution mechanisms that support trade terms intended to increase transparency must be part of a circular economy agreement. In consequence, many experts together with industry collaboration will be required to craft the language of these more complicated agreements.

***Management of Trade Agreements - Dispute Resolution Mechanisms***

Trade agreements have to be designed in the first place to establish processes for dispute resolution and ideally in the future, greater stakeholder inclusion while not allowing special interests, often represented by powerful corporations, to have undue influence through lobbying efforts (Rodrik, 2018). This is a difficult balance. Some special interests have more resources to expend on influencing trade negotiations than do other stakeholders who may represent the general public's interest on specific topics, yet may not be heard (Freeman and Hasnaoui, 2011; Muchlinski, 2011; Reed, 2009). The following section begins by reviewing literature on dispute resolution and then covers some implications of international trade intervention using Ontario's Feed-in Tariff Program (FIT) program as an illustration.

When violations of trade agreements occur, nations may not easily resolve these issues. Thus, international organizations have been useful for facilitating resolutions when member-states bring

grievances against trade partners that violate treaty obligations (Mansfield and Reinhardt, 2008). The WTO uses a highly legalized set of dispute settlement procedures viewed as the highest standard approach, but most PTAs also contain dispute resolution mechanisms (Mansfield and Reinhardt, 2008). Member states can collect damages in response to protectionism through these processes. Even private actors can find recourse against protectionist regulations (Mansfield and Reinhardt, 2008).

When trade deals are secretly negotiated, the terms of trade can later filter down to affect provincial and municipal laws and administrative decisions, as has been the case in Canada (Paquin, 2013; Rodrik, 2018). The Canadian government maintains that ratification of international treaties is the sole prerogative of the federal executive, not requiring consent from federal or provincial legislatures, but this can create problems when disputes arise affecting other jurisdictions (Paquin, 2013).

An example case where an international trade dispute affected a Canadian provincial program is the WTO dispute brought by Japan and the EU over 2010-11 regarding the Province of Ontario's Feed-in Tariff Program (FIT Program) (Fukunaga, 2012). Also, arbitration was initiated by a US renewable energy development company operating in Ontario under Chapter 11 of the North American Free Trade Agreement (NAFTA) against Canada regarding the same FIT Program in Ontario. FIT began to support Ontario's renewable energy industry in 2009 (Fukunaga, 2012). The Japanese initiated WTO complaint started with consultations which turned into more formal panel meetings. Japan focused on solar and wind power provisions. Like many similar plans in other countries, a solar or wind power producer could receive a power supply contract with a fixed electricity rate higher than the market price for electricity over a fixed period (Fukunaga, 2012). Under dispute and different from programs in other countries was that Ontario required a solar or wind power producer to meet the domestic content requirement to receive the fixed rate contract (Fukunaga, 2012). A solar or wind power producer had to use equipment or services from Ontario in its energy generation operations (Fukunaga, 2012). China has also faced many legal actions from the United States for subsidizing its renewable energy sector. Ultimately, these types of trade actions have unnecessarily damaged the global renewable energy industry at the expense of mitigating climate change while other industries continue to be subsidized and go unchallenged (Fukunaga, 2012). If Canada and the UK aim to develop a circular economy trade regime, they may be up against worldwide linear economy set of norms, implicitly built into our international trading system. Thus, future research must consider global trading norms and rules to consider how they may affect a circular economy trade PTA between Canada and the UK. Both are trading nations that must consider the wider international implications of their agreement, but through determination, strategy, and policy innovation, this should not hamper their leadership in a race-to-the-top.

## Theme 3: Trade Barriers - From Tariffs and Regulatory Barriers to Non-Tariff Barriers

### *Overview of the Literature on Tariffs and Non-Tariff Barriers*

This section will first introduce international trading principles focused on tariffs and non-tariff barriers. Following this, regulatory barriers, procurement policies, and future opportunities for trade agreements including compliance and measures will be reviewed. First, the World Trade Organization (WTO) defines much of free trade policy including tariffs while attempting to delineate non-tariff barriers. However, some aspects on which the WTO advocates may seem counterintuitive because although the organization espouses free trade, meaning no barriers to trade, it allows preferential trade agreements (PTAs) under Article 24 of the General Agreement on Tariffs and Trade (GATT) (Viju and Kerr, 2011). According to the GATT, a free-trade area includes two or more countries where duties and other restrictive regulations

of commerce are eliminated (Viju and Kerr, 2011). If these agreements are to exist, GATT says they must cover most trade and any existing external tariffs are allowed to continue but not to increase (Viju and Kerr, 2011).

Literature tells us that while tariffs and explicit barriers to trade have been widely addressed and removed, trade agreements have become more complicated (Hochman, 2008; Rodrik, 2018). Aside from reducing duties to zero, economists have difficulty evaluating many other types of trade and economic development related legislation (Rodrik, 2018). Whereas domestic regulations and product standards can be enacted for valid sustainable development reasons related to environmental protection, public health, and labour standards, at the same time, the rules may serve protectionist purposes by creating barriers for import competition (Rodrik, 2018). For example, European Union food safety regulations may be in the interests of European consumers' health and preferences, but the regulations could also favour local interests at the expense of external competitors (Rodrik, 2018). Davis (2009) explains that scientific experts, alongside countless lawyers, supply scientific evidence for both sides in WTO disputes such as the EU ban against meat treated with growth hormones. It is a difficult balance to evaluate various types of rules as trade barriers, for example, in regards to strengthening intellectual property and consumer protections, while recognizing that the priorities of trade deals do not generally include policy development in any nation's interest (Davis, 2009; Rodrik, 2018). The terms of trade normally have a singular priority which is to reduce non-tariff barriers (Rodrik, 2018).

Rodrik (2018) states that harmonization of regulatory standards is at the heart of trade negotiations today. Research suggests that the difficult challenge of separating valuable policy from protectionism can be rectified through harmonization (Hochman, 2008). Linkages are made when trade concessions are conditional on cooperation on non-trade issues where the latter types of cooperation may occur across institutions (Davis, 2009; Hochman, 2008). Thus, by linking the terms of trade to conditions in non-trade agreements such as higher standards and regulations that are preferably strategic complements to trade, the playing field is leveled within the PTA area to produce a situation of non-discrimination (Hochman, 2008; Rodrik, 2018). Another benefit of linkages to non-trade issues is increased cooperation that supports across-the-board enforcement of all terms, whether trade or non-trade related in accordance with the linked policies (Hochman, 2008). Research states that several mechanisms are available to trading parties having aims to reduce trade barriers created by regulations including: regulatory cooperation, harmonization, and mutual recognition and equivalency, where an equivalence assessment is made (Couvreur, 2015).

In regards to developing a circular economy trade regime, the previous research may be instructive. A circular economy regime would rely on harmonization where countries do not have the option to reduce certain crucial standards on their own. Further consideration is needed to investigate and develop innovative policy mechanisms to enable complex, but implementable arrangements that would further integrate nations. In addition, provisions facilitative of the circular economy could be either directly incorporated into the PTA terms of trade, or additional linked non-trade treaties that are complementary to trade objectives could be written. A combination of the two could be also be considered in future research.

### *Dealing with Regulatory Barriers*

As suggested above, attempting to implant conditions directly into trade agreements does not always lead to enforcement and higher standards because trade deals' objectives are to reduce transaction costs (Rodrik, 2018; Staiger and Sykes, 2011). Whether various conditions are necessary or protectionist barriers can be put to debate. Economists recognize that regulatory standards are public goods that will be

diverse due to varying national tolerances of risk in regards to public health and safety, environmental degradation, and contrasting views on corporate responsibility to stakeholders such as consumers, employees, suppliers, and local communities (Rodrik, 2018). If this confusion exists now, any developments for a circular economy trade framework must be wary of these tensions.

In fact, some literature states that there is an overall race-to-the-bottom evidenced by WTO disputes focused on removing regulations that may or may not be viewed as overly stringent, given the aforementioned varying perspectives (Staiger and Sykes, 2011). It may be surprising to some that the larger nations could be guiltiest of playing product standards games against smaller importers (Staiger and Sykes, 2011). Even when regulatory discrimination is prohibited and considered as non-tariff barriers, overly stringent standards and consumption taxes may be enacted that undo the "free" market access established in a PTA (Rodrik, 2018; Staiger and Sykes, 2011). This regulatory cost shifting can lead to a two-sided strategy where standards are both increased for imports and are lowered for domestic products. The national treatment measure in GATT Article III (4), prohibiting discrimination in "laws, regulations, and requirements" affecting the internal sale of like domestic and foreign goods may address some of this regulatory cost shifting (Staiger and Sykes, 2011).

As mentioned, standards may be reduced to the advantage of the domestic market. Reportedly, trading partners may open market access to each other via trade agreements but then undermine market access commitments by relaxing standards rather than raising them (Staiger and Sykes, 2011). Foreign partners may adhere to higher standards at home that are unobservable advantages from a consumer standpoint. Consumers would need full information to motivate them to pay a higher price. As an illustration, paying for proper disposal rather than polluting would be an unobservable and cost adding advantage. Importers may have to reduce prices in foreign markets where lower standards result in lower prices i.e., the local firms are polluting and not paying for proper disposal because environmental standards do not exist, are weak, or are not enforced. Thus, the importing competitors have to absorb the costs of their higher standard products in the short term and may reduce the standards over the long term, depending on whether they can lobby for and obtain concessions on environmental standards at home. Research states that international agreements relating to national regulatory policies support the race-to-the-bottom (Staiger and Sykes, 2011). Trade agreements prevent the imposition of regulations on importers and at the same time, do not prevent the enactment of lower regulatory standards for domestic industries (Staiger and Sykes, 2011). Agreements that sanction this policy include the GATT Article III "national treatment" (nondiscrimination) principle, the WTO Agreement on Sanitary and Phytosanitary Measures (SPS), and the WTO Agreement on Technical Barriers to Trade (TBT) (Staiger and Sykes, 2011). In defense of these organizations, the TBT and SPS committees often require scientific justification to support positions on a particular barrier (Davis, 2009). Also, issue linkage occurs across organizations such that WTO commitments are linked to international standards, such as for food safety, including hygiene and additives, and labeling regulations, set in other international realms like the TBT and SPS (Davis, 2009).

***Procurement Policies***

Overall, Canada has been resistant to liberalizing government procurement policies. The CUSFTA and NAFTA did not address this issue partly because provinces, who hold jurisdiction on a great deal of procurement, have not been permitted at the trading table by the federal government (Paquin, 2013). As discussed in Theme 1 which focuses on CETA, some of this changed in Canada-EU negotiations possibly

setting a precedent for future negotiations and agreements where subnational parties need to be involved. Trade implications such as those related to labour and the environment reach into other jurisdictions (Paquin, 2013). Future research could examine the trade-offs for Canada as a circular economy regime would impose changes in provincial and possibly municipal jurisdictions, including setting circular standards for procurement contracts.

The procurement issue in Canada is related to the question of how many parties should be at a negotiations table. Inviting a variety of stakeholders to engage, such as provinces and territories, is attractive from the point of view of incorporating many considerations into and gaining acceptance for a deal. This could facilitate avoidance of future trade disputes. Also, when provinces open up their procurement contracts to more competition, this can be a positive step for provincial budgets given baseline standards. However, inviting so many parties to a negotiation table does not only add confusion and time, but it can also compromise the negotiations. It is difficult to keep negotiations secret and unadulterated by interfering parties with varying self-satisfying intentions, not necessarily concerned with the best interests of Canada in a broad sense. Negotiators understand that careful trade-offs are required given so many important competing interests, but they also know that it is not the best strategy to give your hand away. Multi-level consultations across stakeholders can be effective for addressing their interests while, more strategically, keeping a single bargaining representative at the table. At the same time, when stakeholder interests are represented by others, the danger is that the interests are ignored, downplayed, misunderstood, and/or filtered in unexpected and inaccurate ways. This difficult balance, even more important in a complicated circular economy context, could be addressed by future research.

***Future Opportunities, Compliance and Measures***

The circular economy is focused on, among other things, eliminating waste so any trade agreement or linked agreement must consider principles and/or regulations around waste and its reduction or complete elimination, ideally. The development of such principles and/or rules and how they would be incorporated into trade, including measures which have not been developed in academic research as of yet is for future research and consideration by policy makers and negotiators. From a compliance perspective, some previous literature around the circular economy, waste recycling and elimination, and intellectual property is reviewed here as a basis for future trade and policy consideration.

First, Ellen MacArthur (2013) has estimated that an early transition version of the circular economy in Europe could lead to estimated material savings of 340 to 380 USD billion per year. Thus, the circular economy represents business opportunities. Competitive advantages would be developed in: 1) core competencies in circular design, 2) business model innovation, 3) collective capacity for the reverse cycle, 4) markets for transformed goods, 5) new incentive systems, 6) innovation, entrepreneurship, and higher educational standards, and 7) aligned international environmental rules (EllenMacArthur, 2013). Given that firms are at the heart of this innovation together with their stronger interlinkages in supply chains, international trade likely has a role to play in reinforcing much of this especially through inter-organizational interaction.

Initial challenges for trade negotiations will likely be related to lobbying by firms ingrained in a linear economy mindset because production, contracts, and regulation are designed for linear production and consumption. For firms locked-in to that mindset, change may be troubling because reuse of products and products transformed into services in new business models would replace demand, thus upsetting sales and profit expectations (EllenMacArthur, 2013). However, a confluence of factors including

resource scarcity, tighter environmental standards, information technology capabilities, and changes in consumer preferences will enable circular economy disruption (EllenMacArthur, 2013). Calculations show the benefits of circularity in five areas: 1) material inputs; 2) labour inputs; 3) energy inputs; 4) carbon emissions; and 5) the balance of trade (EllenMacArthur, 2013). Thus, trade is an inherent factor of the circular economy and the top product candidates that trade agreements might consider initially are: mobile phones, smartphones, light commercial vehicles, and washing machines (EllenMacArthur, 2013).

If international trade is to motivate a circular economy, research such as that by Lepawsky and Billah (2011) focusing on post-consumption activity for the capture and creation of value from waste in the global economy could be insightful. Their research examines the capture and creation of value in global value chains (GVCs) and global production networks (GPNs) including waste disposal and recycling for electronics, which is aligned with the focus of EllenMacArthur (2013) from the point of view of aiming efforts at industries offering the greatest near term opportunities. The setting of Lepawsky and Billah's (2011) research is in Bangladesh, a different type of economy than that of Canada's or the UK's. However, in global supply chains, the latter developed countries may jointly consider the consequences that their linear economies may have on developing nations. A circular economy perspective might seek to alter and improve circumstances so that negative externalities wrought by developed nations onto developing nations are avoided.

In fact, Lepawsky and McNabb (2010) map international trade in electronic waste (e-waste), a rapidly rising phenomenon and another aspect of linearity that could be considered in a circular model in trade (Khetriwal, Kraeuchi, and Widmer, 2009). As a specific example for rectifying the e-waste cycle, previous research has examined Switzerland's circular approach related to the concept of "extended producer responsibility" (EPR) applied for almost two decades (Khetriwal, Kraeuchi, and Widmer, 2009). EPR suggests that the end-of-life management of electronic and electrical equipment (EEE) belongs to producers and thus, this type of issue could be integrated into international trade agreements to increase compliance. Research states that the main issues of EPR systems include: 1) starting them up, 2) financing a self-sustaining system, 3) developing a logistics network for the collection of e-waste, 4) enforcing compliance within the system, and 5) preventing monopolistic practices (Khetriwal, Kraeuchi, and Widmer, 2009). Trade and/or linked agreements could deal with the latter two issues on this list. The EPR principle could be adopted by the WTO as explicitly required in all trade agreements, as a point of harmonization, for all industries and this would facilitate a global race-to-the top.

Other issues for compliance that will be important for a circular economy include how intellectual property is handled in FTAs and defended in dispute resolution. A circular economy ultimately involves new innovations, both scientific and commercial, that will be incorporated into new business models, likely leading to even more partnerships and increased integration of global supply chains. With the added international complications, who has the rights to innovations and products could become less clear when multiple countries and firms are circularly linked by their markets and products (McKenzie, 2018).

### Theme 4: Technological and Digital Transformations, Cross-Border Trade in Services, and Geography

In this section, we address how Canada and the UK's international trade agreements foster their country's respective economic growth agendas in priority sectors within a circular economy framework (i.e., clean technology, digital infrastructure, environment, financial services industries). First, is a description of the

current state of technological and digital transformations of economies and following that is a more detailed discussion regarding global trade in related services.

Economic development is closely related to the ability of an economy to embrace the advance and use of technologies with slower progress associated with a lack of technological capacity (Gosens et al., 2015). The role of technology and digitization has accelerated economic growth in developed economies by reducing communication and co-ordination costs and providing for increased efficiencies and productivity within industry and institutions. Not only has economic growth been directly attributed to the expansion of industries that design and develop technology but also indirectly in those industries that use technology assets in producing products or services (Erumban and Das, 2016). The enablement of a circular economy by applying technology and digitization can be seen with the creation of disruptive digital innovations such as internet platforms and apps. Such innovations assist in the optimization of the movement of material flows, both forward and reverse, and enable product/service streams to be environmentally benign (Pagoropoulos et al. 2017).

Archarya and Keller (2009) found that the transfer of technology across borders typically leads to greater productivity than that found domestically, especially with higher-technology industries, and that it is the trading of goods that represent the dominant transfer channel. The same authors acknowledge that a contributor to technology transfer through trade for Canada is the United States, given its proximity and economic size. However, they did find that countries such as Japan and Germany were significant contributors of technology transfer to Canada. Trade and investment with the U.K. was found to be less significant on this dimension.

***Clean technology***

The literature does not suggest that developing economies such as India or China should engage in the development of renewable energy industries that would competitively challenge similar industries in developed economies. Instead, literature suggests that the worldwide diffusion of cleantech industries participating under global trade agreements can provide the best solution to dealing with global emission issues (Mathews, 2017). Free trade agreements would initially support the use of local consumption requirements for cleantech industries in developing economies. Once cleantech industries have been established worldwide, then their products can be traded restriction-free. Unfortunately, efforts to pursue this and other similar approaches have lacked supranational endorsement although moving towards such a policy goal that could promote green energy and cleantech industry diffusion would arguably help battle climate change and therefore be in the global public interest (Mathews, 2017).

Canada is a significant player in the clean-tech sector having been ranked 4$^{th}$ in the 2017 Global Cleantech Innovation Index (Cleantech, 2017). However, its cleantech industry remains reliant on federal and provincial support through policy initiatives that provide operating and financial incentives. Governmental policy objectives towards cleantech initiatives are generally unpredictable (the introduction and then repeal of the Province of Ontario's Green Energy Act as an example) and the price of green energy can be expensive relative to existing energy costs (including existing hydroelectric). Cleantech startups must compete in principally regulated provincial energy markets with large incumbent municipally-owned electricity distributors who have established supply arrangements with provincially-owned electricity generators. Canada does not have the same high density of key cleantech-oriented institutions and actors, as compared to other jurisdictions such as the U.S. and Germany. Furthermore, Canada is behind in existing and emerging cleantech-specific innovation drivers needed to encourage

market adoption and the emergence and early-stage progress of innovation within those industries (Webb et al., 2017). Following suggestions by Mathews (2017), Canada's cleantech industry could benefit from future trade agreements with other countries who have leading national cleantech industries.

***Digital infrastructure***

A wider scale adoption of digital infrastructure is seen by environmental futurists as the enabler for global business to establish the network and alliances required to operate a circular economy as it allows for a shift towards regeneration, sharing, optimization, looping, virtualizing and exchanging (Hobson and Lynch, 2016). Not only can the contribution that a digital infrastructure provides to a circular economy be found in the service it provides but also in its ability to be re-used and recycled as a product. Among the services, virtualization represents a significant channel for the shift to a circular economy as firms can utilize digital infrastructure to market and deliver a virtualized value proposition in the form of a virtual product. It also allows for virtual communication with customers pre and post-sale. Circular sourcing is another attribute of digitalization where customers can be directed towards closed material loops for their required products or materials (Lewandowski, 2016). The electronics behind the digital infrastructure provide the foundation for the contribution to generating a circular economy in the form of refurbishing and recycling digital devices.

Another significant contribution can be found in the ability to generate data useful to understanding the impact of a circular economy. Reuter (2016) puts forward the first-principles models of process engineering as a means to quantify a circular economy's resource efficiency, and the use of digitalization allows for all stakeholders to connect within that economy. These stakeholders include suppliers, consumers, regulators, environmentalists etc. and the data can include important aspects such as product supply and demand, capital and operational expenditures, and other details that allow for the assessment of the opportunities and limitations of the circular economy.

Yet there remains a limited knowledge about how certain technologies and capabilities such as the Internet of Things and Big Data can be used to promote a move to a circular economy even though there appears in the literature to be agreement that digital technologies are required to make the transition (Pagoropolous et al., 2017). Pagoropolous et al (2017) point out however that it is less about the importance argument and more about concerns regarding whether digital technologies are at a stage sufficient for large scale implementation of a circular economy including important aspects such as material tracking and recycling. They single out gaps in the literature related to business and economic perspectives however noting that it should be recognized that literature related to the cross-over of digital technologies and the circular economy remains limited. This observation is further supported by the work of Nobre and Tavares (2017) who found in a bibliometric literature review that there were only 70 papers out of over 30,000 circular economy papers and 32,000 big data/internet of things articles that were found to cross-over. This limitation extends to understanding, in a Canadian context, the role that digital infrastructure can have in supporting a circular economy here in Canada. In an exhaustive search of the literature we found no research specific to the role of digital technologies and the circular economy within Canada.

When it comes to the subject of trade and digital services, and our assumption of the importance of both to the development of a circular economy, then the WTO's General Agreement on Trade and Services (GATS) rules give protection for cross-border trade in services including those contained within the growing digital economy. However, such protection remains subject to commitment by the WTO

members, many who are committed to free trade in digital services but where there is still a need for more members to be onside in order to insure the security of digital business in global markets (Crosby, 2016).

***Environment***

We touched on cleantech earlier but in this sub-section we seek to review the impact of a circular economy approach to specific environmental areas such as produced waste and emissions. In regards to produced waste, Gregson and Crang (2015) in their study of the trade of waste between the Global North (developed economies) and the Global South (developing economies) found that, with economic growth, the developing economies see resource reclamation of discarded goods as becoming more important. Furthermore, waste produced in Europe is also now seen as a secondary resource for local manufacturing and has resulted in a re-thinking of third world trade in waste. Rapidly developing economies like China and India have begun to exploit their waste as a source of secondary resources essential to promoting further economic development. Accordingly, an expansion of global waste management businesses has occurred which has injected capital and technology transfer into the business of recycling in developing economies (Gregson and Crang, 2015) suggesting that future trade in this sector will be more focused on the technology associated with waste management than the actual waste itself.

From a Canadian perspective, waste has also been traded from Canada to poorer countries where the processing of that waste is done typically under hazardous conditions for both the workers and the local environment. Even though the North American Free Trade Agreement (NAFTA) had encouraged trade relationships between Canada, the U.S. and Mexico, a dynamic in terms of trading in waste or other pollutants does not appear to exist between them (it remains to be seen if the recently completed United States-Mexico-Canada Agreement or USMCA will change matters) although Canada remains as one of the largest exporters of electronic waste to the U.S., and Mexico, which is the poorer of the three countries, continues to be the larger importer of global e-waste (Lepawsky, 2015).

When addressing emissions, typically the greatest level of pollution associated with a product is found at the production stage where emissions are associated with fossil fuel consumption. Emissions are either directly a part of the production process or indirectly a part through related supply chain activities. Higher levels of emissions can hinder competitiveness for countries trading dirtier products when trade agreements require a certain level of binding emission cuts. Under those circumstances it may be beneficial for their economies with pollution intensive industries to invest in alternative renewable energy technology (Peters and Hertwich, 2008) or in a carbon market mechanism such as cap and trade. In Canada, the Provinces of Quebec and Ontario have participated along with California in a tri-party cap and trade program with limited participation from industry emitters. However, a recent change in government in Ontario has resulted in the withdrawal of the province from that program highlighting the complex nature of establishing emission trading relationships within and outside of the country – the downside to the constitutional right of Provinces to manage their own energy industries and the limiting of Federal authority in this area.

***Financial services***

The role of the financial services sector in a circular economy is conceptually an important one as industry stakeholders would need capital and financial management services to fund their circular economy activities (Geng et al. 2009). Certainly, banks and financial institutions can participate in a circular economy setting by reducing, re-using and recycling as part of their operation but the purpose of this sub-

section is to examine what is currently offered by the financial services sector including some identification of the trading of those services. There is some discussion of the potential for involvement as part of a Product Service System (PSS) of which a financial PSS would be a way to assist in financing new business models within the circular economy (Scheepens et al. 2016). An example would be the leasing of assets related to recycling or renewable energy technology instead of buying. However, the literature is sparse in terms of providing specific examples of where financial services exist or are provided in the context of a circular economy. In China, financing of activities is undertaken by the government but in other parts of the world there remains a need for financial innovation to provide the required capital to support eco-industrial initiatives (Mathews and Tan, 2011). In Canada, the financial services sector remains regulated to a great degree which limits their involvement outside of the country. A significant gap remains in terms of study into what role this sector could play in stimulating a circular economy and trade related to it.

We previously addressed the cap and trade programs associated with mitigating emissions and it is worth mentioning that should a liquid market for carbon credits ever develop then it is likely that the financial services sector would be able to contribute to the trading of credits and credit derivatives. However, in Canada, it is unlikely that a meaningful national strategy for carbon trading will develop given the constitutional complexity of jurisdiction over energy matters (the principal emitter of carbon in the country) and therefore it is just as unlikely that an opportunity for involvement by the financial services sector in this country will emerge.

## Theme 5: Prosperity and Sustainability: Inclusion, Labour and the Environment

### *The Global Trade Agenda*

Globally integrated markets have led to trade agreements between nations with the intent of increasing the economic prosperity of each party by encouraging trade activities between them. In this section we address the question of how trade agendas, in the context of economic growth and social well-being within a Circular Economy framework, address income inequality and environmental protection. It has been argued that with economic growth the consumer segment begins to demand a higher level of environmental quality associated with the production of outputs (Moon, 2011). In much the same way that trade deals can encourage integration of economies and the sharing of innovation and efficiencies, they also have the potential to advance shared concepts for sustainable development. Yet certain trade deals see their core fundamental principles or standards that promote sustainable activities diluted by national actors or institutions whose commercial interest outweigh the desire to contribute to the environmental and social wellbeing of the nations involved (Doherty et al., 2013). Chen, Ngniatedema, & Li (2018) in their study of 486 Global Top 500 (by revenue) companies operating in 34 countries have identified developed economies (UK, France, Germany, Switzerland, Canada) where home companies with sustainable practices and performance are prevalent but they also noted that generally firms from other developed economies (U.S., Japan) or large developing economies (China, India) continue to lag behind. Integrating markets involving more sustainable economies, where circular economy activities such as industrial symbiosis may be more actively pursued, with less sustainable economies can stimulate movement away from linear trade markets to more circular economies (Ghisellini, Cialani, & Ulgiati, 2016). As circular economies are being developed, integrating markets through trade can disseminate concepts of efficiency, create economic value with lower negative social and environmental impacts, provide consistency in replacing unsustainable materials with materials that are renewable or natural, and

spark the realization that sufficiency within the supply chain can result in the elimination of the unnecessary (Schaltegger & Burritt, 2014).

***Environmental protection***

The origination of the circular economy concept comes from the field of environmental economics and industrial ecology where the traditional linear model for economic development involving resource extraction, product manufacturing, use, and disposal has begun to negatively impact the natural environment and the future survival of species including mankind (Ghisellini et al 2016). Instead, a move towards a circular economy that reduces, reuses and recycles produced products can have a significant positive impact on the natural environment by limiting natural resource extraction and avoiding waste disposal. In the EU, certain examples provide support for this notion including the realization that their economy, despite aggressive waste management policies, loses approximately 600 million tonnes of materials each year and that increasing resource productivity by 30% will generate over 2 million additional jobs by the year 2030 (Bonciu, 2014). In the Canadian context, participation in circular economy activities that protect the environment are undertaken principally by municipal governments in the form of waste management and recycling activities. Canada, like many of the EU countries, have established eco-industrial parks where waste and emissions of the participating facilities are minimized with the difference being that Canadian eco-industrial parks are generally designed and planned for that purpose while the European model is driven more by firms seeking to participate together within the park as an industrial eco-system (Ghisellini et al 2016).

A driver for adopting a circular economy approach in order to promote environmental protection is the idea of implementing green evaluation mechanisms that adjust the value of an economy's gross domestic product by deducting the costs associated with the depletion and/or protection of environmental resources. This can encourage greater rationalization of resource-use leading to more economically efficient production of materials. Unfortunately, evidence as recently as 2013 indicates that a global consensus on what constitutes the measures to be used under such an evaluation system has not been reached (Qiao&Qiao2013).

***Social well-being and income inequality***

Unlike the positive potential a circular economy can have in protecting and preserving the environment, it remains to be seen if it will contribute to improving social well-being and income inequality. Murray et al. (2017) suggest that societal concerns such as inter and intra-generational equity and equality of gender, race and opportunity are not explicitly dealt with in the circular economy conceptual framework. They point to a requirement for further identification of societal needs that can be integrated into this framework before it can provide the balance needed to adequately address the required harmony of the economic, environmental and social sustainability pillars. Similar findings are put forward by Moreau et al. (2017) who stipulate that there should be some social rationality of circular economy activities. They point to nontechnical, institutional, and social dimensions as key to the continual development of a circular economy because they contribute to societal buy-in to the concepts of reduce, re-use and recycle.

***Policy consistency***

Circular economy development can be driven by industries where significant use of energy and raw materials can lead to higher costs associated with depletion and therefore provide economic incentive to reduce, reuse and recycle. However, consistency in governmental and institutional policy remains a significant driver. Because of globalization, actors and institutions have become more inter-connected and inter-dependent. This has led to increased complexity in implementing long term solutions to environmental and social well-being issues arising from economic growth in multiple jurisdictions and in multiple industries. An obvious example was found with the EU's move to stronger environment protection regulations that resulted in large companies simply relocating to countries with less stringent environmental protection policies. One solution is global governance and regulation but this is likely not to be forthcoming in the near term (Bonciu 2014). Complicating matters further is the lack of understanding by national and international policy makers that socio-ecological systems undergo constant change meaning one-fits-all solutions for desired outcomes are less effective than a focus on change management. This would include the recognition that allocating resources towards a circular economy is dependent on the response of local social actors (Moore, 2015).

Nevertheless, examples exist where trade agreements can stimulate consistency in policy development. The EU establishes sustainable development (specifically environmental protections and labour rights) and human rights conditionality in their trade agreement negotiations that can present obstacles to agreement but that has resulted in concessions by their trading partners that will lead to more sustainable economies (McKenzie, 2018). This is seen specifically within CETA where the sustainable development section has influenced changes to how fish is transported within Canada's Atlantic coast fisheries industry (Sabau and Boksh, 2017). Even in the world's largest developing economy, China, there has been an aggressive push for policies supportive of a circular economy from an economic, environmental and social welfare perspective. Beginning as early as 2005, China's National Development and Reform Committee (NDRC) put forward a series of circular economy initiatives that involved the primary, secondary and tertiary stages of production, consumption and waste management. Sustainable practices associated with these initiatives are encouraged not only at the individual firm level but also at aggregated levels that involve industrial symbiosis and regional networks of eco-industrial parks (Su et al. 2013). The Chinese recognize that there has been a recent move in international trade to integrating environmental standards and regulations into the trade agreements between countries which can present themselves as barriers that can hinder the potential trade revenue of developing economies. Moving towards a circular economy is seen by China as the resolution to deal with these barriers and to improve their ability to be competitive in international trade (Su et al. 2013). However, unlike the EU where the circular economy concept maintains an economic/environmental balance focused on boosting competitiveness through resource efficiency, the Chinese approach to a circular economy is concerned more with the environmental challenges emerging from their economic growth and mass industrialization (McDowall et al. 2017). An example is China's strategy of promoting new policies to stimulate development of eco-industrial parks and a circular economy as a means to achieving both economic and environmental sustainability. In comparison to the EU and China, Canada has not incorporated similar policies (Liu et al. 2018). These differences have implications for trade negotiations that seek to encourage the combination of economic prosperity and sustainable development because the interchangeability of policy lessons related to the development of a circular economy may not be a simple one.

***The role of the sharing economy***

Although not specifically a trade-related observation, one consideration that needs exploring is the impact that the sharing economy will have on the goal of creating a circular economy. The sharing economy itself has led to substantial change in the way in which we produce and consume goods and services but for which questions remain in terms of whether it has moved the economy towards greater savings of resources and an improvement in social equity and cohesion (Hobson & Lynch, 2016). Daunoriene et al. (2015) have identified that the sharing concept involves more bottoms-up self-regulating processes that lead to a more sustainable use of resources and the production of lower priced goods that more specifically meet the needs of customers. They further point out that there are social benefits as well in terms of more flexible options for contractors employed in providing these goods and services. The sharing economy has become a new consumption culture and its importance to developing a circular economy cannot be underestimated. The idea of user groups and communities that choose to share products or pass on products can improve efficiency of resource consumption. Leasing or renting products, employing vendor take-back strategies or reverse logistics can encourage sharing with the overall goal of optimizing the efficient use of existing materials thereby reducing resource inputs and energy consumption.

## Canadian Knowledge Mobilization Activities

The final report is available electronically to the general public on the Ted Rogers School of Management websites. Hard copy reports are also offered on request for nominal cost recovery of printing and delivery charges. In order to prompt discussion of the report and think further about the possibilities for circular economy trade, a mixed audience of interested researchers, trade officials, trade experts, and other governmental agency representatives will be invited to sponsored breakfast or evening series events in 2019. The Canada United Kingdom Chamber of Commerce and the Toronto Board of Trade (for which the Ted Rogers School of Management is a principal event sponsor) may be interested in jointly held events. CPA Canada may also take an interest as Dr. de Lange is a CPA. In addition, the researchers will seek to present this work at conferences such as those related to the Centre for Brexit Studies Annual Conference, UK Trade & Export Finance Conference, or the Canadian National Fair Trade Conference. Also, Dr. Philip Walsh is Co-Chair of a bi-annual symposium on Corporate Responsibility and Sustainable Development so he may discuss this work at this upcoming 2019 conference. Additional SSHRC funding such as from Connections grants may support these knowledge mobilization efforts in Canada during 2019.

We have also posted our report on academic research outlets including ResearchGate and the Social Science Research Network (SSRN). An academic journal article to develop research that furthers this basic literature review will be worked on, possibly with the support of an internal TRSM grant. Also, two EEPRN grants were applied for in October 2018 to support further related policy research papers.

Dr, de Lange and Dr. Walsh will propose a co-authored contribution to *The Conversation* based on the report. *The Conversation* is an online news outlet specifically intended for disseminating academic knowledge to research users and Dr. de Lange has previously published here. Other news outlets often republish from *The Conversation* for wider dissemination.

## Results - Literature Review from a UK Perspective

This section of the report provides background information and context to the findings identified in the synthesis of the literature reviewed from a UK perspective. The sample overall reveals the broad-based nature of the circular economy literature. The method adopted in the literature review separates the material into five key themes.

The 'Stern Review on the Economics of Climate Change' released by the UK Treasury on the 30 October 2006 highlighted the negative impact on the environment and climate change from business as usual practices.[1] The Paris Agreement 2015 facilitated through the UN Framework Convention on Climate Change recognised the United Nations General Assembly Resolution A/RES/70/1 'Transforming our world: the 2030 Agenda for Sustainable Development', which included the 17 Sustainable Development Goals (SDGs) and promoted a common cause in limiting a global temperature below 2 degrees Celsius[2]. The Conference of the Parties (COP23) held in Bonn in 2017 continued the development of a 'rulebook' that would bind parties to a climate agreement. In 2018, the sixth assessment report from the Intergovernmental Panel on Climate Change (IPCC) presented a target figure of 1.5 degrees C to reduce the impact on climate change on the planet.[3] The International Trade Centre (ITC) Sustainability Map and the World Economic Forum New York Environmental Stewardship Conference (September 2018)[4] make clear the relationship between international trade, the environment and the sustainable development goals. The impact from global issues such as climate change, resource scarcity, population growth, expanding markets and digital globalization complicate the operation of trade theories such as gravity theory, which is based on the size of the economy and distance. Therefore, the potential for models in the circular economy to encourage sustainable international trade and services are increasingly being represented in trade literature and practice.

The on-going challenge of securing long term sustainable growth appears compromised by several factors: political discord throughout the international community, trade wars, apathy, resource scarcity, ignorance, geological and meteorological disruption. As well as the aforementioned challenges, global trade activity is being influenced by policies promoting carbon legislation and responsible supply side activities. Evidence from the literature infers a gradual shift from linear to circular models.

The wide ranging and open-ended regulatory and compliance challenges facing commercial and public organizations in using materials and resources in the UK are evolving exponentially. It is unlikely that regulatory demands stemming from environment protection will be reversed by the UK's departure from the membership of the European Union. Incentive based models are mentioned in the literature, but they are not widely used in practice. The work by Nobel Prize winner Richard Thaler on 'nudge theory' (subtle policy shifts that encourage people to make decisions that are in their broad self -interest) potentially offers techniques in encouraging an engagement with the circular economy. In a complex open economy trade flows are not without impediments: trade between countries is conditional on legislation, permits, custom requirements, patents, import and export documentation, insurance, classification, registration and reporting. Sustainability strategies, policies and regulation that successfully limit the

[1] http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm

[2] https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

[3] http://www.ipcc.ch

[4] https://www.weforum.org/events/sustainable-development-impact-summit#

exploitation and destruction of natural capital are conditional on establishing well-considered trade agreements.[5]

Whilst there is unevenness in the degree of adoption of policies related to the circular economy, organisations of all types and sizes are increasingly dedicating expertise, funds and resources to mitigate exposure to penalties, reputational risk and waste. The circular economy literature particularly recognises the need to implement policies and embed more sustainable practices in reducing costs, eliminating waste and enhancing responsible operational models that meet production necessities and consumer/stakeholder expectations. Organizations, public and private, are recognising, measuring and mitigating the sweep of environmental requirements and restrictions through the tools available in the circular economy. The recycle, reuse and redesign models being most obvious. The extensive report material identified in the literature infers the circular economy model also offers credible benefits in championing sustainability, reducing reputational risk and overcoming negative externalities in the countries and markets.

The literature identifies knowledge of the circular economy in the UK is being driven by key entities such as the Ellen MacArthur Foundation, the Department of Environment, Food and Agriculture (DEFRA) and the nexus of public and private organisations, associations and think-tanks and stakeholders who recognise the social and economic benefits in reusing, redesigning and recycling goods and materials to limit the current and future challenges by balancing the challenge of depleting resources with increasing demand.

The potential to include the full cost of economic activity to improve responses to the real cost of production and consumption is increasingly available through big data, analytics and accounting. Current EU policy on the circular economy is substantive and sophisticated. The post- Brexit position within the UK requires knowledge, experience and skills in trade diplomacy and the environment to promote the circular economy in future international trade agreements. Input on the circular economy from Wales, Scotland and Northern Ireland is recognised as a necessity in realising a cohesive UK public position. At an organisational level, the introduction of BS 8001 from the BSI Group is an important step in the standardization of the circular economy and resource management. Providing a usable, credible and transparent circular economy standard is an important anchoring mechanism in shaping a sustainable future for a UK-Canada trade agreement.

**Theme: 1: UK-Canada CETA and Brexit**

The Comprehensive Economic and Free Trade Agreement (CETA) between Canada and the European Union was signed in 2016. Scrutiny in the several EU countries has delayed the full implementation of the agreement, approval in the UK being examined by the Regulatory Policy Committee, Parliament and the Department of International Trade. Beyond the UK departure from the European Union in March 2019 a new trade agreement will be negotiated. New trade agreements may facilitate stronger circular economies of scale (Dhingra et al., 2018; Healy, 2014; Owen et al., 2017).

The environmental impact of the CETA agreement is noted in the literature. Increased international trade between the UK and Canada would generate a more substantive impact on the environment. In examining future possibilities of the economic benefits of trade between the UK and Canada a full-scale assessment using science-based models might be undertaken to better understand the impact of international trade on sustainable growth and the environment. The report by Owen et al. (2017) from the

[5] https://naturalcapitalcoalition.org

think tank Institute of Government sets out the benefits of a regulatory partnership. An incentive model deriving from a circular economy follows a similar exercise, but potentially offers immediate benefits in supporting sustainable practice.

The circular economy literature offers a range of practical factors that could be incorporated into a post-CETA trade agreement. This is based on several key theories: cradle to cradle, performance economy, biomimicry, industrial ecology, natural economy and the blue economy each offering solutions to key environmental challenges. The key report setting out the relevance of a circular economy to international trade, the environment and the global economy is 'Delivering the Circular Economy: A Toolkit for Policymakers' produced by the Ellen MacArthur Foundation. The series of 'toolkits' is widely referenced in various fields and disciplines.[6] The toolkit might form a central part in a future UK-Canada Free Trade Agreement.

Will the UK continue with the EU's Circular Economy commitment or will it amend, enhance or reject legislation Post-Brexit? The opportunity to re-draft a bilateral trade agreement that includes a fully worked appraisal of the circular economy could be developed from the existing CETA documentation, specifically Chapters 22-24. These chapters cover sustainability and the environment in a general sense. The specific contribution of a circular economy to an international trade agreement would be a shift from a linear model (take, make, waste) to a circular model (make, use, return).

CETA is referred to in the literature review, but an extensive in-depth analysis of the agreement in academic and practical terms will not however become available until the agreement is fully implemented in all EU countries. Brexit complicates this analysis. Media sources and political groups claim that the CETA agreement is not without criticism. It should be recognised that existing trade agreements within the EU do not operate without elements of technical and practical impediments. Green activists and MEPs representing various political parties are critical of the CETA agreement on the basis that it favours the interests of big business to the detriment of the environment. In an early assessment, Deblock & Rioux (2010) suggest that considering the economic and socio-political dimensions of integration, Canada and Europe could place environmental, public health, and human rights concerns in a more balanced position with the interests of corporations. This debate continues.

**Theme 2: Governance**

The literature makes clear that The Department of Environment, Food and Agriculture (DEFRA) has been the central UK public body promoting sustainable policies and practice. The department has championed sustainable policies for a number of years and promotes 3 key goals in its strategic literature: 1) A Just Society; 2) A healthy environment and 3) a productive economy. Scotland has been a particularly creative agent in introducing sustainable policies. Wales and Northern Ireland are also addressing challenges raised by a range of environmental challenges from climate change, waste management and sustainability. The UK does not have a dedicated pubic body responsible for coordinating, implementing and monitoring a circular economy. DEFRA promotes better environmental decision-making and policies that address waste, inefficiency and related sustainable practices. It also works with numerous agencies to promote good environmental practice through programmes and projects. Whist DEFRA is an important organisation influencing environmental protection in the UK it does not explicitly provide strategic

[6]https://www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation_PolicymakerToolkit.pdf

leadership on the circular economy. Numerous public and private institutions and stakeholders are promoting sustainable policies and practice – these are increasingly focused on a circular economy perspective. It is unlikely that a separate public department will be established in the UK to promote the circular economy in the short term. Therefore, it is likely that DEFRA will continue to be the Government's representative agency shaping and influencing sustainable policy. The degree to which it will initiate fully the circular economy as in a full-scale environment protection policy is uncertain. Government policy on procurement might be used to encourage an alignment with the circular economy through incentives in public contracts. This may encourage organizations unable or unwilling to adopt a circular economy model to reconsider the over-reliance on familiar practices and change behaviour.

The European Academies Science Advisory Council (EASAC) set out in a special commentary titled 'Circular economy: a commentary from the perspectives of the natural and social science' highlighted the benefits of linking the circular economy to EU policy – the points below potentially being transferable and valuable to a post-Brexit trade agreement between the UK and Canada:

1. Increased competitiveness with reduced use of raw materials, energy and subsequent savings
2. Increased security of material supply and control on material prices
3. A greater reduction in greenhouse gas emissions
4. Greater employment opportunities
5. Reduced environmental impact of resource extraction and waste disposal
6. Additional revenue sources

(Huhtala, 2015)

Crucially, the circular economy must not be a vehicle to generate impediments to trade through non-tariffs and other subtle forms of interference. Trade policy should ensure that transparency is promoted and protected to secure consistent efficiency and accountability. A future UK-Canada Trade Agreement offers the potential to establish a single trade window that co-ordinates a circular economy perspective to sustainable trade relations.

In the private sector, trading facilities such as FTSE for Good promote responsible business, encourage reputational risk protection and sustainability.[7] The linking of finance to a range of material environmental, social and governance issues (ESG) is expanding to other areas of sustainable finance. Insurers, underwriters and risk assessors are increasingly attributing high risk to organisations that are environmentally reckless. The success of the exchange has encouraged good corporate governance and smart growth. Internationally, the move to a global circular economy is still in its early stages, but global policies amongst International Governmental Organisations and agencies within the United Nations System are initiating structural changes to require multi-national companies to improve procurement and global supply chain strategies to meet sustainability indicators and policies. For example, commercial

[7] https://www.lseg.com/sites/default/files/content/images/Green_Finance/ESG/2018/February/LSEG_ESG_report_January_2018.pdf

entities such as Unilever and Patagonia have been proactive in embedding sustainable policies in business models, strategically and operationally.

**Theme 3: Trade Barriers**

Trade restrictions, protectionism, tariffs, non-tariffs, custom unions and trade impediments operate throughout the international trading system. Whilst the World Trade Organization seeks to promote free trade, the trade in goods and services is not free of political interferences, technical impediments, reciprocal disincentives, complex documentation and uneven representation.

Economists such as John Galbraith and David Pearce have previously warned of the depletion of natural resources and the impact on human society from non-sustainable trade and consumption. Economics and the environment cannot be separated in the long term. Papers in the literature illustrate the relationship between trade, the environment and legislation. For example, in vivo studies on the impact of transportation on biological entities through forensic analysis is increasing environmental awareness. The empirical focus that underpinned The UK's Ship Recycling Strategy is an example of how biological studies and industry analysis is changing business models. Of the closed-loop archetypes (closed regional and local loops, closed global supply loops, geographically open cascades, etc.), the ones that are organized locally rather than globally should in theory, exhibit superior economics. Typically, the greater the distance, the more the transport and indirect costs will be. But this is not always the case. Global trade volumes are increasingly containerized, and empty containers need filling to offset the structural imbalance of trade flows (Ellen MacArthur Foundation, 2014). Logistics supports the closing of loops, but it fails to do so fully despite the technological innovations. This is due to the lack of market actors that are willing to entirely embrace the full remit of circular economy principles (Fanneman *et al*, 2018).

A deep understanding of the construction of markets and the resource use related to them shows the importance of undertaking investigations and implementing sustainable solutions as a market device to the economization of recycling (Gregson, Watkins, & Calestani, 2013). This process is generating an awareness in mitigating environmental negatives and capturing value from waste in the global economy.

Emphasis within the literature is placed on approaches that engage with the sustainability of global value chains (GVCs) and global production networks (GPNs), which Canada and the UK should be participating in to allow for higher levels of long term returned investment (Lepawsky & Billah, 2011). This signals a shift away from beginnings and endings in the production process to recognise the pre- and post- environmental costs. Moving beyond approaches that are concerned with boundaries and edges could end the linearity of these markets (Lepawsky & Mather, 2011). Shifts that are conducive to a circular economy perspective.

In a post-Brexit environment, international trade might be shaped on the basis of intelligence and sustainability – a trade model that provides solutions to barriers and impediments and is fully aware of the long term as well as the immediate short-term economic opportunities. The literature makes clear that trade diplomacy is not the exclusive tool of diplomats, it is used by public and private entities in forming and executing trade contracts, navigating the labyrinth of custom papers, completing compliance regulations and facilitating the complex network of trading activity. Trade agreements may provide the promise of zero tariffs, but the challenge of sustainable trade and non-tariffs continue to cause frustrations and animosity. Several mechanisms are available to trade delegations aiming to reduce trade barriers created by regulations: harmonization, mutual recognition and equivalency, and regulatory co-operation are among the main ones (Couvreu, 2015). Where disputes in the terms of trade appear intractable,

alternatives drawn from the circular economy may provide solutions to issues of resource scarcity, sustainable trade and environmental protection.

### Theme 4: Technology and Digital Transformation

The digital revolution is generating enormous potential for the circular economy to be integrated into the world economy. The importance of understanding the role of intellectual property rights in formulating successful international trade agreements is crucial – this is a key element in the global digital sharing economy. Development in the digital sharing economy is expanding exponentially and is generating numerous possibilities in sustainability, conservation and mapping technology. Big data provides possibilities in identifying future demand trajectories and identifying immediately the full costs in extraction, refinement, production and consumption. With the right incentives, innovation will deliver more sustainable materials – plastics, for example, would increasingly be derived from plants rather than fossil fuels. Nanotechnology and biotechnology have the potential to deliver materials with increased strength, reduced weight and other useful properties. At the end of the product's life these materials would biodegrade or could be easily separated so that they could be re-used (Preston, 2012).

Technology is one of the drivers of a circular economy. New production technologies, digitization, Industry 4.0, the Internet of Things, disruptive technological innovations notable in internet platforms, apps, machine-to-machine communication, track and trace of containers can enable a more circular and sustainable economy (Fenneman et al. 2018; Lacy et al., 2014). The literature infers how technology and digital transformation impacts on national and international infrastructure. These on-going structural revolutions potentially offer a further and rapid shift from linear to circular economies.

Innovation in key areas such as information technology and advanced materials have opened up avenues that were previously unavailable, including the ability to track and optimize the use of resources along global supply chains (Preston, 2012). Further research into the full scope of the circular economy and technological change platforms to inform environmental impact studies, redesign projects that include entire cities (eco-neighbourhoods) and the general impact of technology facilitating sustainable futures offer numerous possibilities to trade and trade agreements. Disruptive Digital Festival (DIF) from the Ellen MacArthur Foundation is a prolific and cutting-edge advocate of technological change and digital transformation in the circular economy.[8]

### Theme 5: Prosperity and Sustainability

The literature capture on prosperity and sustainability illustrates the relationship between growth and the cost of growth to prosperity and sustainability from a circular economy perspective. Gross Domestic Product (GDP) provides a guide to the expansion or contraction of an economy, but it is limited in recognising the full costs of growth, primarily in failing to measure and account for the impact on natural resources. The circular economy promotes a sustainable valuation system that measures the value of GDP after deducting the costs of environmental resources and the cost of environmental resources protection. Such accounting and evaluation methods can promote an enlightened model in measuring the use of the

[8] https://www.ellenmacarthurfoundation.org/our-work/activities/dif

resources in growth and long-term economic efficiency. However, currently a consensus has not been reached on the system for calculating green GDP across the globe (Qiao & Qiao, 2013).

Capturing accurately the full cost of negative externalities is an important element in undertaking informed decisions in international trade and sustainable economic growth. Whilst other measures such as Human Development Index are useful in measuring indicators such as a long and healthy life, knowledge and a decent standard of living, the full economic opportunities and challenges being generated by international trade from its basic tangible form to the connected digital global economy have not been fully researched or understood. This is particularly notable in the digital sharing economy, intellectual property rights and the wider impacts of 3d printing.

A range of surveys on Millennial and Post-Millennial attitudes to the environment have heightened concerns about sustainability in all parts of life. Generational expectations concerning corporate social responsibility (CSR) and responsible consumption are increasingly influencing policy in public and private organisations. Credit Suisse 2017 Global Investor Survey illustrated the role of millennials driving sustainability in a range of sectors.[9] Sustainable prosperity for the future will require new cultural forms because it will require social innovation that begins from a reconceptualization of aims and means, outcomes and processes. This will involve new kinds of public debate, based on a diversity of voices (Moore, 2015).

In the UK Ipsos Mori have established a Sustainable Development Research Centre to capture data on the economy and environmental impacts.[10] Generational change and a range of targeted education initiatives in higher education are shaping a professional awareness of sustainability, SDGs and the Principles of Responsible Management (PRME). This is being noted by Personnel Departments and Human Resource Management Agencies. The growing impact on decision-making that stems from intelligence gleaned from multiple surveys and data analysis on a range of environmental impacts appears to be influencing a consideration of models related to the circular economy, responsible trade and sustainable growth. On the operations side, the circular economy provides the potential for intellectual engagement with innovators, engineers and inventors in dealing with a range of global challenges.

## UK Knowledge Mobilization Activities

The final report is available electronically to the general public on the University of Winchester website. Hard copy reports are also offered on request for nominal cost recovery of printing and delivery charges. In order to prompt discussion of the report and think further about the possibilities for circular economy trade, a mixed audience of interested researchers, trade officials, trade experts, and other governmental agency representatives will be invited to sponsored breakfast or evening series events in 2019. Additional ESRC funding may support these knowledge mobilization efforts in the United Kingdom during 2019. The report will be posted on academic research outlets including ResearchGate and the Social Science Research Network (SSRN). An academic journal article to develop research that furthers this basic literature review will be worked on collaboratively between the researchers for presentation at relevant circularity and trade conferences. A follow-up industry collaboration will be pursued by Dr. Paul Sheeran

[9] https://www.credit-suisse.com/corporate/en/articles/news-and-expertise/millennials-drive-sustainability-201702.html

[10] https://www.ipsos.com/ipsos-mori/en-uk/understanding-society-putting-people-picture - includes data on Understanding Society: Putting People in the Picture.

and Dr. Philip Walsh with companies active within both Canada and the U.K. with particular emphasis on resource extraction industries.

## Implications and Conclusions

A number of implications arise from our review of the literature and our observations from the expert interviews. First, we should consider the realistic possibilities for circular economy trade today. We have an international consensus embodied in the Paris Agreement that the world must reduce carbon emissions and reduction in waste becomes intrinsic to this focus. In fact, a circular economy provides a positive vision as we face changes related to climate change mitigation. By instantiating a circular economy into trade agreements, we mutually reinforce economic commitments to internalize externalities. So, does CETA represent the best model for a bi-lateral trade agreement or may Canada and the U.K. negotiate an improved version? Will the UK without the EU be stronger or weaker on its current commitment to a low carbon and circular economy and will Canada negotiate to reinforce or lower standards rather than raise them? What are the current dynamics in both countries that support circular economy trade? Also, could the external influence of other large powers that are moving forward on a circular economy agenda, such as China, become additional reasons for building circular economy principles into UK-Canada trade?

Furthermore, we may ask under what negotiating conditions are we more likely to develop circular economy trade. Does adding more stakeholders at the table help or hinder this agenda? Whereas more parties at the table could add complexity, the increased representation could also increase the legitimacy of the final agreement and the likelihood of its viability. Therefore, further study of how the negotiation processes will be designed including the working group structure and relationships among the working groups is likely critical for success.

Incentives in free trade agreements (FTAs) and government procurement contracts require further consideration. Circularity in procurement policies needs to be transparent and should be supported with evidence of the benefits of sustainable performance. Moreover, increased transparency might overcome resistance that could develop based on perceptions of anti-competitive or protectionist intentions, prompting the imposition of trade barriers. If well-designed, circular economy commitments in FTAs potentially promote and facilitate best sustainable practice and might be incorporated into future multi-lateral trade agreements.

Increased science-based evidence is required on the links between international trade and climate-change, marine and aviation transportation (marine litter, fuel pollution and damage to eco-systems and atmosphere; the global commons and the blue economy) through data collection and analysis to improve long-term trade transparency and knowledge exchange. In the face of potential local, sub-national, regional, and international legislation which may trigger prohibitive environmental tariffs, non-tariff barriers, and related restrictions, circular strategies and operations could serve to overturn trade impediments (for example, manufacturing sectors currently incurring waste fines and recycling costs could find that circular strategies mitigate these costs). Further research on the impact of a circular economy approach on transport costs of international trade, including transportation, storage and logistics would be useful in recognising the full opportunities of circularity.

An important consideration within a framework of change management, where small wins in initial stages are crucial, is determining which industries will be most amenable to adopting circular economy trade processes. For example, advanced manufacturing may be of strategic interest to both nations.

Moreover, such an industry influenced by ISO standards may embrace a circular economy approach because it means reduction of waste and increased efficiencies and cost savings in processes.

Furthermore, issue linkage strategy in relation to circular economy principles applied across sectors is a complicated topic that needs intensive study. The clarity of the agreement and the ability to enforce it is also in tension with complex issue linkages. Ultimately, both sides will want to develop scenarios for how negotiation strategies could lead to gains from trade and foreign direct investment across sectors. These future scenarios become more complex when adding the sectoral return cycles of a circular economy. New technologies such as artificial intelligence could be facilitative of scenario analyses.

Technology is already facilitative of a circular economy and research could further investigate the role that the digital economy plays in promoting circularity. Research could examine the long-term benefits of circular economy applications where technology is core such as in the sharing economy, in knowledge collaboration, and in electronic data interchange (EDI) systems supporting international trade. EDI may facilitate registering, designing, protecting, facilitating, transporting and delivering global goods and services. Overall, the development and application of digital technology for international trade and circularity is a recurring theme. Gaps in understanding are notable in tech dominated sectors where live-streaming, big data, and 3D printing are impacting productivity and international trade.

Finally, interviews suggested that countries do not typically add terms to trade agreements unless they relate to current policy, local activities, or accepted rhetoric. Thus, the inclusion of trade terms related to a circular economy is unlikely unless all parties to an agreement are already on the political or actualized path to waste reduction and sustainability. Therefore, circular economy trade formally reinforces what is already happening in the negotiating parties' nations. Only when the circular economy concept is normalized as a standard in trade agreements will it become internationalized and embedded in the world economy.

For Canada and the U.K., CETA provides a starting point for a circular economy trade agreement. The two countries are in a good position to move forward as compared with other partners not having a CETA-like beginning, although more complexity could be unwieldy. If increased complexity is undesirable, circular economy provisions could instead be part of additional complementary and linked non-trade treaties. Alternatively, a combination of a trade agreement together with a non-trade treaty could be considered. The goal is to increase economic integration and decrease trade volatility. Previous research already calls for more inquiry into how variations in trade agreements can change trade volatility. Furthermore, tighter integration can potentially increase both trade and foreign direct investment. However, a caveat to a bilateral circular economy trade agreement is that global trading norms and rules may intervene. On the other hand, a Canada-UK trade agreement could be precedent-setting and potentially influential among WTO members. Ultimately, the potential positive implications of global circular economy trade could motivate leadership by Canada and the UK in a race-to-the-top.

## References

Archarya, R. C., & Keller, W. (2009). Technology Transfer Through Imports. *Canadian Journal of Economics*, 42(4), 161–175.

Bonciu, F. (2014). The European economy: From a linear to a circular economy. *Romanian Journal of European Affairs*, *14*(4), 78–91.

Chen, F., Ngniatedema, T., & Li, S. (2018). A cross-country comparison of green initiatives, green performance and financial performance. *Management Decision*, *56*(5), 1008–1032. https://doi.org/10.1108/MD-08-2017-0761

Cleantech (2017). The Global Cleantech Innovation Index http://info.cleantech.com/WWF-Index-2017_WWF-Index-2017-Download.html?aliId=76658882 Accessed on Oct. 3rd, 2018.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, *94*, S95-S120.

Couvreur, A. (2015). New generation regional trade agreements and the precautionary principle: Focus on the comprehensive economic and trade agreement (CETA) between Canada and the European Union. *Asper Review of International Business and Trade Law*, 15(2), 311–356.

Crosby, D. (2016). Analysis of Data Localization Measures Under WTO Services Trade Rules and Commitments. by International Centre for Trade and Sustainable Development (ICTSD) 7 Chemin de Balexert, 1219 Geneva, Switzerland.

Datla, A. (2016). Pricing Carbon: The Birth of British Columbia's Carbon Tax. Harvard Kennedy School, April 14th.

Davis, C. L. (2009). Overlapping institutions in trade policy. *Perspectives on Politics*, 7(1), 25-31.

Deblock, C., & Rioux, M. (2011). From economic dialogue to CETA: Canada's trade relations with the European Union. *International Journal*, *66*(1), 39-56.

Deign, J. (2018). The UK Could Install 12 Gigawatts of Energy Storage by 2021. Greentech Media https://www.greentechmedia.com/articles/read/the-uk-could-install-12-gigawatts-of-energy-storage-by-2021.

Dhingra, S., Ottaviano, G., Rappoport, V., Sampson, T., & Thomas, C. (2018). UK trade and FDI: A post-Brexit perspective. *Papers in Regional Science*, *97*(1), 9-24.

Doherty, B., Davies, I. A., & Tranchell, S. (2013). Where now for fair trade?. *Business History*, *55*(2), 161-189.

Ellen MacArthur Foundation. (2013). 'Towards a circular economy: Economic and business rationale for an accelerated transition', Vol.1. http://www.ellenmacarthurfoundation.org/business/reports/ce2012

Ellen MacArthur Foundation. (2014). Towards a circular economy: Accelerating the scale-up across global supply chains. https://www.ellenmacarthurfoundation.org/publications

Ellen MacArthur Foundation. (2018). https://www.ellenmacarthurfoundation.org/circular-economy

Erumban, A. A., & Das, D. K. (2016). Information and communication technology and economic growth in India. *Telecommunications Policy*, *40*(5), 412-431.

Fennemann, V., Hohaus, C. & Kopka, J. (2018). Moving in Circles: Logistics as Key Enabler for a Circular Economy, Fraunhofer Institute for Material Flow and Logistics, http://publica.fraunhofer.de/documents/N-502288.html

Franquesa, D., Navarro, L., & Bustamante, X. (2016, June). A circular commons for digital devices: tools and services in ereuse. org. In *Proceedings of the Second Workshop on Computing within Limits* (p. 3). ACM.

Freeman, I., & Hasnaoui, A. (2011). The meaning of corporate social responsibility: The vision of four nations. *Journal of Business Ethics*, 100(3), 419-443.

Fukunaga, Y. (2012). Renewable Energy Trade and Governance. In Proceedings of the ASIL Annual Meeting (Vol. 106, pp. 381-385). Cambridge University Press.

Geng, Y., Zhu, Q., Doberstein, B., & Fujita, T. (2009). Implementing China's circular economy concept at the regional level: A review of progress in Dalian, China. *Waste Management*, *29*(2), 996-1002.

Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner production*, *114*, 11-32.

Gosens, J., Lu, Y., & Coenen, L. (2015). The role of transnational dimensions in emerging economy 'Technological Innovation Systems' for clean-tech. *Journal of Cleaner Production*, *86*, 378-388.

Gregson, N., & Crang, M. (2015). From waste to resource: the trade in wastes and global recycling economies. *Annual Review of Environment and Resources*, *40*, 151-176.

Gregson, N., Watkins, H., & Calestani, M. (2013). Political markets: recycling, economization and marketization. *Economy and Society*, *42*(1), 1-25.

Gumbrell-McCormick, R. (2013). The International Trade Union Confederation: from two (or more?) identities to one. *British Journal of Industrial Relations*, 51(2), 240-263.

Healy, T. (2014). Canadian and European Unions and the Canada—EU CETA negotiations. *Globalizations*, 11(1), 59-70.

Hobson, K., & Lynch, N. (2016). Diversifying and de-growing the circular economy: Radical socia transformation in a resource-scare world. *Elsevier, Futures* (82), 15–25.

Hochman, G. (2008). Trade negotiations, domestic policies, and the Most Favored Nation clause. *Canadian Journal of Economics/Revue Canadienne D'économique*, 41(3), 781-795.

Huhtala, A. (2015). European Academies Science Advisory Council (EASAC): Circular economy: A commentary from the perspectives of the natural and social sciences.

Khetriwal, D. S., Kraeuchi, P., & Widmer, R. (2009). Producer responsibility for e-waste management: key issues for consideration–learning from the Swiss experience. *Journal of Environmental Management*, *90*(1), 153-165.

Lacy, P., Keeble, J., McNamara, R., Rutqvist, J., Eckerle, K., Haglund, T., Buddemeier, P., Cui, M., Sharma, A., Cooper, A., Senior, T. and Pettersson, C. 2014. Accenture Strategy: Innovative Business Models and Technologies to Create Value in a World without Limits to Growth. Accenture. Accessed May 23, 2015. https://www.accenture.com/cr-en/insight-circular-advantage-innovative-business-models-value-growth

Lepawsky, J. (2015). The changing geography of global trade in electronic discards: time to rethink the e-waste problem. *The Geographical Journal*, *181*(2), 147-159.

Lepawsky, J., & Billah, M. (2011). Making chains that (un) make things: waste–value relations and the Bangladeshi rubbish electronics industry. Geografiska Annaler: Series B, *Human Geography*, 93(2), 121-139.

Lepawsky, J., & Mather, C. (2011). From beginnings and endings to boundaries and edges: rethinking circulation and exchange through electronic waste. *Area*, *43*(3), 242-249.

Lepawsky, J., & McNabb, C. (2010). Mapping international flows of electronic waste. *The Canadian Geographer/Le Géographe Canadien*, 54(2), 177-195.

Lewandowski, M. (2016). Designing the business models for circular economy—Towards the conceptual framework. *Sustainability*, *8*(1), 43.

Limão, N. (2016). Preferential trade agreements. In Handbook of commercial policy (Vol. 1, pp. 279-367). North-Holland.

Limão, N., & Maggi, G. (2015). Uncertainty and trade agreements. American Economic Journal: Microeconomics, 7(4), 1-42.

Liu, Z., Adams, M., Cote, R. P., Geng, Y., & Li, Y. (2018). Comparative study on the pathways of industrial parks towards sustainable development between China and Canada. *Resources, Conservation and Recycling*, *128*, 417-425.

Mansfield, E. D. and Reinhardt, E. (2008). International institutions and the volatility of international trade. *International Organization*, 62 (4), 621-652.

Martin, P., Mayer, T., & Thoenig, M. (2012). The geography of conflicts and regional trade agreements. *American Economic Journal: Macroeconomics*, 4(4), 1-35.

Martin, L. L., & Simmons, B. A. (1998). Theories and empirical studies of international institutions. *International Organization*, 52(4), 729-757.

Mathews, J. A. (2017). Global trade and promotion of cleantech industry: a post-Paris agenda. *Climate Policy*, *17*(1), 102-110.

Mathews, J. A., & Tan, H. (2011). Progress toward a circular economy in China: The drivers (and inhibitors) of eco-industrial initiative. *Journal of Industrial Ecology*, *15*(3), 435-457.

McDonough, W., & Braungart, M. (2013). The upcycle: Beyond sustainability--designing for abundance. Macmillan.

McKenzie, F. (2014). Faith, fear, and free trade. *International Journal*, 69(2), 233-245.

McKenzie, L. (2018). Overcoming legacies of foreign policy (dis)interests in the negotiation of the European Union–Australia free trade agreement*. *Australian Journal of International Affairs*, 72(3), 255–271.

Melitz, M. J. (2005). When and how should infant industries be protected? *Journal of International Economics*, 66(1), 177-196.

Moon, W. (2011). Is agriculture compatible with free trade? *Ecological Economics, 71*(1), 13–24.

Moore, H. L. (2015). Global prosperity and sustainable development goals. *Journal of International Development*, *27*(6), 801-815.

Moreau, V., Sahakian, M., Van Griethuysen, P., & Vuille, F. (2017). Coming full circle: why social and institutional dimensions matter for the circular economy. *Journal of Industrial Ecology*, *21*(3), 497-506.

Muchlinski, P. (2011). The changing face of transnational business governance: Private corporate law liability and accountability of transnational groups in a post-financial crisis world. *Indiana Journal of Global Legal Studies*, 18(2), 665-705.

Murray, A., Skene, K., & Haynes, K. (2017). The circular economy: An interdisciplinary exploration of the concept and application in a global context. *Journal of Business Ethics*, 140(3), 369-380.

Nobre, G. C., & Tavares, E. (2017). Scientific literature analysis on big data and internet of things applications on circular economy: a bibliometric study. *Scientometrics*, *111*(1), 463-492.

Office of the Parliamentary Budget Officer (PBO). (2017). The Canada-EU Comprehensive Economic and Trade Agreement, A Prospective Analysis. Ottawa, Canada, May 2nd

Owen J. et al. (2017) IFGJ5896-Brexit-Report-171214, https://www.instituteforgovernment.org.uk/sites/default/files/publications/IFGJ5896-Brexit-Report-171214-final_0.pdf , accessed on October 14th, 2018.

Pagoropoulos, A., Pigosso, D. C., & McAloone, T. C. (2017). The emergent role of digital technologies in the Circular Economy: A review. *Procedia CIRP*, *64*, 19-24.

Panizzon, M. (2010). Temporary Movement of Workers and Human Rights Protection: Interfacing the "Mode 4" of GATS with Non-Trade Bilateral Migration Agreements. In Proceedings of the ASIL Annual Meeting (Vol. 104, pp. 131-139). Cambridge University Press.

Park, J., Sarkis, J., & Wu, Z. (2010). Creating integrated business and environmental value within the context of China's circular economy and ecological modernization. *Journal of Cleaner Production*, *18*(15), 1494-1501.

Paquin, S. (2013). Federalism and the governance of international trade negotiations in Canada: Comparing CUSFTA with CETA. *International Journal*, 68(4), 545-552.

Preston, F. (2012). *A global redesign?: Shaping the circular economy*. London: Chatham House.

Qiao, F. & Qiao, N. (2013). Circular economy: An ethical and sustainable economic development model. *Prakseologia*, (154), 253–272.

Reed, D. (2009). What do corporations have to do with fair trade? Positive and normative analysis from a value chain perspective. *Journal of Business Ethics*, 86(1), 3-26.

Reuter, M. A. (2016). Digitalizing the Circular Economy. *Metallurgical and Materials transactions B*, *47*(6), 3194-3220.

Ricardo, D. (1817). The Principles of Political Economy and Taxation. Reprint. Londong Dent.

Rodrik, D. (2018). What Do Trade Agreements Really Do?. *Journal of Economic Perspectives*, 32(2), 73-90.

Sabau, G., & Boksh, F. I. M. M. (2017). Fish Trade Liberalization Under 21st Century Trade Agreements: The CETA and Newfoundland and Labrador Fish and Seafood Industry. *Ecological Economics*, 141, 222–233. https://doi.org/10.1016/j.ecolecon.2017.04.025

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., Burroughs, H., & Jinks, C. (2018). Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality & Quantity*, *52*(4), 1893-1907.

Schaltegger, S., & Burritt, R. (2014). Measuring and managing sustainability performance of supply chains: Review and sustainability supply chain management framework. *Supply Chain Management*, *19*(3), 232–241. https://doi.org/10.1108/SCM-02-2014-0061

Staiger, R. W., & Sykes, A. O. (2011). International trade, national treatment, and domestic regulation. *Journal of Legal Studies*, 40(1), 149-203.

Stanford, J. (2014). CETA and Canada's Auto Industry.

Viju, C., & Kerr, W. A. (2011). Agriculture in the Canada-EU economic and trade agreement. *International Journal*, 66(3), 677-694.

Watts, J. (2017). CETA: EU-Canada trade deal to kick in next week amid claims it could increase inequality. Independent, September 14th.

Webb, K., Cruz, R., & Walsh, P. R. (2017). A comparative review of the role of markets and institutions in sustaining innovation in cleantech: a critical mass approach. *International Journal of Innovation and Sustainable Development*, *11*(2-3), 149-169.

Yamaguchi, S. (2018). International Trade and the Transition to a More Resource Efficient and Circular Economy: A Concept Paper", OECD Trade and Environment Working Papers, 2018/03, OECD Publishing, Paris.

# Appendix A – Anonymous Reviewer Comments

**Theme 1: UK-Canada Trade Relationships in the Context of CETA and Brexit**

Anonymous Reviewer Comments:

- A seamless transition from CETA to post-Brexit is expected with the status quo maintained until the end of 2020. The UK would accept a CETA model trade agreement and UK officials are currently informally discussing this with Canadian officials.
- Manufacturing could be more complicated post-Brexit than financial services because most financial services will remain in the UK and some additional service locations may be needed in the EU. The UK takes an interest in transatlantic advanced manufacturing.
- Building trust in a trade relationship is key and these agreements are beneficial for global competitiveness
- Canada and the UK are not necessarily ready for circular economy trade. Why is Canada-UK trade particularly promising for applying circular economy principles? Why would these partners lead on this? We need more functional examples demonstrating that the circular economy is taking root and is working on a regional scale. The UK is progressive on climate change and the environment. Examples may be found in the UK and China.
- What does a circular economy mean in a global sense?
- Industries may be motivated by the competitive advantage of circular systems, but this needs substantiation.
- Consider chapters 15, 16, 22, and 24 of the CETA agreement as implicit encouragement of a circular economy with respect to environmental standards and e-commerce.
- Consider that post-Brexit and without the larger EU behind it, the UK could turn away from environmental sustainability as it may feel pressure from other large trade partners to decrease standards. However, conflicting views are that the UK will want to take environmental sustainability further in a future trade agreement with Canada.
- When I read "circular economy trade agreement", my first thinking is that the circular economy is a rather broad umbrella concept, and like you explain there is no extensive research on how it could be adapted to a free trade agreement context. However, you do for example list the ten categories used in NAFTA, so it would have been interesting to in a sort of conclusion hear what categories you see as most pertinent from a circular economy agenda, where particular emphasis ought to be put.
- More research on governmental change and the circular economy: is the new/old split in generational terms too simplistic; e.g. millennials – what are the generational factors influencing and shaping technology and circularity in networks and communications? How might this be understood/captured in trade agreements?

**Theme 2: Governance**

Anonymous Reviewer Comments:

- When one jurisdiction leads on institutional and policy development then other jurisdictions have the opportunity to apply that learning for consistent cross-jurisdictional treatment, such as where British Columbia led on carbon pricing. Another example came out of the 2009 Green Energy Act in Ontario where power purchase agreements (PPAs) were considered the main asset for foreign lenders.
- Provide examples of the building blocks for circular economy trade. What would the integration of the circular economy look like, potentially? (This question is addressed by the recent OECD conceptual report (Yamaguchi, 2018) so, the current report references that report at the beginning and does not reiterate the contents.)
- Whether an Investor-State Dispute Settlement mechanism which was part of CETA, but phased out in USMCA, will be discussed for the Canada-UK agreement is unclear.
- The federal government has compensated provinces for clauses in trade agreements as a precedent (re: lengthier pharmaceutical patent protection in CETA) where, for example, the federal government could compensate provinces for the consequences of a "producer pays" clause.
- Trade adjustment assistance could be considered for Canadian labour and in consideration of different social welfare systems. However, Canada and the UK have more equally supportive labour laws and systems so this may not be as much of a concern as when dealing with other nations.
- When Canada negotiates with the UK, Canada will be in a stronger negotiation position than when negotiating with a larger EU, as in the case of CETA. However, as a number one priority, the UK will want to remain aligned with the EU for its own benefit, but the UK will face a tension as it will also have to negotiate with many other countries.
- In Canada-UK negotiations, given the CETA precedent where provinces were invited to the table, it is likely that provinces will be formally part of the negotiations again (now considered best practices).
- The UK Department of International Trade will lead the UK negotiations. They will keep the UK public informed nation-wide, solicit the public's views, and develop a trade negotiations administration. Ministries from Scotland, Wales and Northern Ireland will be represented at the negotiations.
- The UK strategy on trade is aligned to multi-lateral strategic thinking
- FTA – Free Trade Agreements – benefits from sustainability need to be evidenced and measured
- There is a realisation of international trade shifts acknowledging the impact of trade on the environment – the lead organization being OECD – more awareness of sustainability and the increased importance of intellectual property rights and non-tariffs are important areas of discussion

**Theme 3: Trade Barriers - From Tariffs and Regulatory Barriers to Non-Tariff Barriers**

Anonymous Reviewer Comments:

- Canada would be fine with a duplicate CETA-like agreement with the UK post-Brexit.
- Consistent carbon pricing across borders could be facilitated by border adjustments and clearer treatment in trade agreements.
- As part of remaining aligned with the EU, the UK will likely want a CETA like agreement with Canada as a status quo and "gold standard" in respect of social justice and the environment. However, an agreement that considers the circular economy beyond CETA is unlikely because neither the UK nor Canada are more progressive than the EU. Canada might consider going further on labour issues but on the environment, it is unclear.
- When countries are in relatively equal bargaining positions (neither is hegemonic), they both have to be doing something internally first before building it into a trade agreement e.g., The UK has enacted some gender equality laws and Canada has positive rhetoric on gender equality so, both countries may be amenable to advancing gender equality in a trade agreement. Carbon pricing is a potential area of mutual interest as well.
- Canada will want temporary entry for highly-skilled professionals into the UK, but the UK will not likely want immigration issues as part of trade negotiations.
- What are the influences on the materials/services that cross the border and what impacts the competitiveness of that 'stuff' crossing the border?
- The costs of re-cycling may not outweigh benefits. We need to consider this on a case-by case basis in commercial decision-making and there is a need to think in conditional terms – not everything in the recycle/circular economy is appropriate in every situation.
- Consider the costs of decommissioning in the energy sector (oil and gas) and the need to generate more sustainable practice –improve efficiencies and reduce decommissioning costs.
- There is awareness of circularity in extractive industries (steel and concrete) and re-use models applied.
- Sustainability is often not being communicated and cynicism and sustainability are often linked; sustainability can be too ambiguous in industry.
- The traditional business model is resistant to change – there is a 'gap' in changing 'mind sets' – we may promote circularity through incentives.

**Theme 4: Technological and Digital Transformations, Cross-Border Trade in Services, and Geography**

Anonymous Reviewer Comments:

- The one thing that was missing: Digital transformation and the discussions around impacts. Digital transformation is not only a tech approach, it is a mind set and social change.
- What is the link between digital infrastructure and circular economy trade?
- Why is it that we need trade agreements to support a circular economy? Would other domestic policy approaches and activities support a circular economy instead such as trade diversification, promoting trade in clean technology and/or subsidizing it, applying export taxes, and avoiding activities that do not contribute to a clean economy?
- Describe the relationship between cross-border trade and a circular economy in practical terms to be more clearly applied in a trade agreement.
- Circular economy trade implies a cyclic nature to trade across borders rather than isolated one-way transactions so, how will this change to the pattern of trade be managed? There was no discussion of things cycling multiple times.
- Waste is typically traded uni-directionally from developed to developing countries, so trade in waste is not expected to be a focus for Canada-UK trade, but the technology developed for this type of trade in waste could mutually developed and traded.
- Renewable energy is a focus of a circular economy concept, but this ignores the fact that non-renewable resources are still needed for the operation of the economy, for example, as materials used in products. How non-renewable materials will be managed in circular economy trade needs to be considered.
- Within the technology space and of strategic importance are manufacturing and agricultural technologies for system optimization.
- The information that green energy is more expensive is dated. In fact, solar or solar plus storage is less expensive today than natural gas.
- Clean technology is a broad category and it is better to consider the separate categories such as wind, solar, geothermal, storage, energy efficiency, etc.
- Consider dematerialization as an enabler of the circular economy, for example, where a gas peaker plant is replaced by software controlled demand response and energy storage devices.
- Harmonization of e-waste standards, such as WEEE and ROHS, could be facilitated by UK-Canada trade.
- Through government circular procurement requirements in RFPs, a global shift to a circular economy can be motivated through vendor participation. Put the onus on vendors to prove that they have met circular contract requirements.
- Environment and technology – technology sections very interesting - more research linked to the possibilities of technology, networks and circularity would address a notable gap.
- I think the connection you make between circular economy and digital technology is really valuable. I'm not surprised that you find that the coverage is limited, but it is an area that is super-important to deliver a circular economy. For instance, Ken Webster dedicated a whole chapter to this topic in his book A Wealth

of Flows. It is a really important gap that you point at here. We pointed at this in our latest landscape research of CE learning offerings in higher education.

- Business incubation and development of ideas/projects/global trade requires an unrestrictive environment, this is why digital hubs and shared business spaces are popular – universities, public institutions and companies are locked in traditional business models that are too bureaucratic, – too many rules and restrictions – for contemporary markets and conditions.
- Opportunities for renewing trade are conditional on innovation, ideas and execution – trading intellectual capital is the key – this needs to be better understood in a circularity context.
- Millennials are thinking differently – it is a contentious term, but there is definitely a different way of thinking about trade and growth emerging amongst this generation that is more aware and committed to the wider environment and issues of over-consumption – changes in trade are being driven by this generation in terms of consumer behaviour, purchasing, and start-ups
- Traditional methods in academia and professional training providers appear to be producing graduates and clients with narrow thinking and skills for careers that are no longer there – more needs to be understood in terms of learning a new language for the digital/tech economy – this is a gap in the research – it is related to circularity – mind-sets and practice in all forms of tech trading actually.

**Theme 5: Prosperity and Sustainability: Inclusion, Labour and the Environment**

Anonymous Reviewer Comments:

- Describe the relationship between cross-border trade and a circular economy in practical terms to be more clearly applied in a trade agreement.
- Trade agreements could consider the wider umbrella of the United Nations Sustainable Development Goals as pervasive throughout an agreement rather than only circular economy principles which would apply to certain parts.
- Both prime ministers of the UK and Canada are aligned on progressive trade including consideration of gender equality and on the environment so as to transition to a low carbon economy. Both nations have launched bilateral (e.g., energy storage challenge) and global initiatives (e.g., reduction of plastics).
- More on well-being and inclusion which are important elements of some progressive trade agreements.
- You can use a trade deal to cement something that is already happening in the country, but not initiate new aspects and provinces or places like Scotland or Wales need to be consulted and informed, even if not formally at the table. What is the role of regions within a country's trade strategy development and implementation?
- The consolidation and harmonization for standards of electronic waste. WEEE, ROHS standards, Extended producer responsibility, helps to facilitate circular economy, harmonization of standards makes it easier to recycle devices within a trade area.
- On labour and the environment, will trade relations be influenced by existing agreements with other jurisdictions that may be more protective of these areas or do new trade relationships allow for less protection. Does it necessarily mean that will happen?

- Emerging countries and community development in particular require currency conservation and the opportunity to re-use and re-cycle is considered where possible – it is desirable that it is pursued strategically/operationally and at community levels.
- Re-use is becoming more important, but it needs to be framed in realistic terms.
- Incentives tend to work best – as mentioned – but some regulation is required of course – more incentives in promoting circularity in contracts would be worthwhile.
- As I said, our core values are linked to sustainability, but it might be that sustainability has been too successful and it is taken for granted – has there been too much success in sustainability that it isn't really considered an issue – is this accurate? Where does circularity fit in with sustainability – circularity isn't a dedicated area yet – is circularity understood and are the benefits grasped? This is a gap and more clarity is required.
- Developing countries tend not to be too big on sustainability – it requires human capital and resources – ironically, sustainability is sometimes at odds with the need to survive.
- Sustainability is a luxury – it might expand – but it must be aligned with efficient growth.

# Appendix B - Key Takeaways and Future Research Questions

In regards to identified gaps in the literature, and in terms of integrating circular economy concepts into a post-Brexit trade agreement between Canada and the U.K., the following is a categorized list of key takeaways and related questions that merit further research.

Previous Experience and Consultation

1. Does CETA represent the best model for a bi-lateral trade agreement or may Canada and the U.K. negotiate an improved version? What is Europe's expected influence on UK preferences?
2. We need to investigate how to improve stakeholder engagement as part of integrating circular economy concepts into trade agreements. It is a challenge to balance various interests when representation is limited at the bargaining table.
3. What is the necessity, the roles, potential consequences and outcomes of subnational actors' involvement in bi-lateral negotiations for a circular economy trade agreement? Should the Canadian provinces and U.K. member states be directly involved in negotiations or should they be separately consulted in advance of negotiations? Does their involvement add more complexity or is it more important to ensure agreements are enforceable through their involvement and prior agreement?

Negotiations Process

4. What are the design considerations for the structure and organization of future negotiations given the added topics and complications associated with a circular economy agenda? How should the working groups be organized?
5. Will sector-specific issues and/or impacts arise (e.g. agriculture, energy, machinery, transport equipment, and chemicals) as related to a circular trade framework? Are the various sectors idiosyncratic and complex enough that they each merit separate negotiations or can some circular economy trade principles, once worked out for one sector, be applied across sectors? Could issue linkage across sectors be desirable for one or both negotiating parties? If so, how could trade-offs and attempted linkages across sectors create issues for the negotiations?
6. How would a circular economy approach to trade impact the clarity of a trade agreement? How could the anticipated complexities of a circular economy design be dealt with in both negotiation processes and in regards to the content of the agreement?

Governance

7. How would a circular economy approach to trade influence the design of dispute resolution mechanisms?
8. What does an Investor-State Dispute Settlement (ISDS) mechanism look like in a circular economy trade agreement?
9. How is intellectual property handled in a circular economy trade agreement and defended in dispute resolutions?

Circular Economy Trade Possibilities

10. Are Canada and the UK ready for circular economy trade? What aspects of circular economy trade are likely to be of particular interest to either country and of common interest to both nations, and for which industries?
11. Does a circular economy-driven trade agreement lead to greater integration of markets?
12. Does a circular economy-driven trade agreement lead to increased trade and foreign direct investment?
13. What innovative policy mechanisms could encourage the development of a circular economy trade agreement and what complementary preferential trade agreements or non-trade treaties could be written?
14. Do and how do the prevailing linear economy norms in the global trading system have an impact on the ability to enter into a bilateral circular economy trade agreement?
15. Can government circular procurement requirements embedded in a Canada-UK trade agreement promote a shift to a circular economy within both countries?
16. How will the sharing economy be linked to promoting a circular economy and if the links are deemed relevant, how could this be incorporated into a Canada-UK trade agreement?

Technology

17. What are the barriers to technology transfer between Canada and the UK and how might these existing barriers prevent circular economy trade? How might these barriers be overcome?
18. To what extent can a future trade agreement between Canada and the UK stimulate cleantech industry growth in both countries?
19. What is the role of digital technologies in promoting a circular economy and how would a bilateral trade agreement between Canada and UK encourage digital technology transfer?
20. How will non-renewable materials used in renewable energy technology products be managed in circular economy trade?
21. Can trade in waste management technology play a role in a Canada-UK trade agreement?
22. How can a Canada-UK trade agreement facilitate harmonization of e-waste standards?

Social Justice

23. How can a Canada-UK trade agreement include terms that may result in improvements for social well-being and reduced income inequality? (without violating WTO rules related to subsidies and other widely disallowed trade barriers)
24. Could the UN SDGs be used as a broader more all-encompassing framework for promoting international sustainability through trade agreements or is a circular economy approach already enough of a challenge to integrate into a trade agreement? Are efforts at embedding circular economy principles into a trade agreement a step beyond CETA, yet also in the direction of more ambitiously incorporating UN SDGs in future agreements beyond the Canada-UK agreement?

# Appendix C - Acknowledgements

The research team would like to thank SSHRC and ESRC for funding this research. Also, the following are lists to acknowledge our volunteer expert interviewees and funded research assistants.

**List of Expert Interviewees**

We thank our expert interviewees, listed below in alphabetical order by last name, who provided valuable feedback freely of their own accord for the improvement of this report. Any errors or omissions in this report are purely the responsibility of the authors.

Richard Corley, Partner, Goodmans LLP

Tom Forslund, Research Analyst, Ellen MacArthur Foundation

Karima-Catherine Goundiam, Vice President of the British Canada Chamber of Trade and Commerce

Elie Howe, Head of Sustainability Trade Policy, U.K. Department of International Trade

Dr. Achim Hurrelmann, Associate Professor of Political Science, Carleton University

Gordon Jolly

Trevor Kennedy, Policy Associate at Business Council of Canada

Suzette Lang, Head of Environment, ENI U.K.

Meredith Lilly, Simon Reisman Chair in International Affairs and Associate Professor of International Affairs, The Norman Paterson School of International Affairs, Carleton University

Kevin McGurgan, HM Consul General and Director-General for UK Trade and Investment in Toronto

Steven Northam, Creator and Director – SN Technologies Limited Group and the The IncuHive Group Limited

Dr. Daniel M. Shapiro, Professor of Global Business Strategy at the Beedie School of Business, Simon Fraser University

Jo-Anne St. Godard, Executive Director at Recycling Council of Ontario

Joey Tucker, ExxonMobil, International Project Manager

**Research Assistants** (Listed in alphabetical order by last name and funded by SSHRC and ESRC)

Marianna Cappucci - Research Assistant 2
Pallavi Roy - Research Assistant 3
Christopher Scarpone - Research Assistant 1

# Appendix D – Search Methodology

**Chris** (Research Assistant 1)

1. Using google scholar and the following key words:
    a. Canada UK Circular Economy
    b. Canada Circular Economy
    c. Canada Case Study Circular Economy
2. Using google scholar and the following key words for theme 1:
    a. Canada UK trade relationships – search 2008 to 2010

3. Using Literature Review articles to identify themes, ideas, articles that mention Canada or the UK and other articles

**Databases**

**Web of Science:**

1. "Canada UK Trade"
2. "Canada UK Governance"
3. "Canada Prosperity" AND "Canada Sustainability" AND "Canada Environmental Sustainability"
4. "Canada Waste" AND "Canada Recycle" AND "Canada E-Waste" and "Canada Procurement"

* All Searches were "refined" to the years of 2008 to 2018.

*Suggested articles were also considered when using Web of Science, this may have produced some articles that were outside of the 2008 to 2018 threshold*

**Marianna (**Research Assistant 2)

1. Using google scholar and the following key words:
    a. UK Canada Circular Economy
    b. "UK trade agreements" AND "Circular Economy"
    c. "EU trade agreements" AND "Circular Economy"
2. Using google scholar and the following key words for theme 5:
    a. "UK trade agreements" AND "clean technology" – search 2008 to 2010
    b. " closed loops" AND "Circular Economy"
    c. "digital infrastructure" AND "Circular Economy"
3. Using ScienceDirect (Elsevier) and the following key words:

a. “UK” and “trade agreements” AND “Circular Economy”
b. “Trade agreements” AND “Circular Economy”

4. Using Emerald and the following key words:
a.”UK” AND “procurement” AND “Circular Economy”
b. “Sustainability indicators” AND “trade”

4. Using Literature Review articles to identify themes, ideas and articles. The bibliographies of the most recently selected studies were examined to find other relevant studies

**Deborah de Lange** (September 21, 2018)

Searches for Themes 2 (Governance) and 3 (Trade Barriers)
Take top 5 most relevant, non-repeated peer-reviewed articles from each of the following searches.
JSTOR (Years 2008-2018) – Business, Legal, and Economics Journals

**Theme 2: Governance (20 articles)**

Search 1: ((((trade agreements) AND (governance)) AND (Canada)) AND (international trade)) AND la:(eng OR en)

Results of Search 1:

1. Paquin, S. (2013). Federalism and the governance of international trade negotiations in Canada: Comparing CUSFTA with CETA. International Journal, 68(4), 545-552.

2. Rodrik, D. (2018). What Do Trade Agreements Really Do?. Journal of Economic Perspectives, 32(2), 73-90. (Found in Search 1 for Theme 4 also).

3. Fukunaga, Y. (2012). Renewable Energy Trade and Governance. In Proceedings of the ASIL Annual Meeting (Vol. 106, pp. 381-385). Cambridge University Press.

4. Mansfield, E. D. and Reinhardt, E. (2008). International Institutions and the Volatility of International Trade. International Organization, 62 (4), 621-652. (Repeated in Search 2)

5. McKenzie, F. (2014). Faith, fear, and free trade. International Journal, 69(2), 233-245.

Search 2: (((((trade agreements) AND (dispute resolution)) AND la:(eng OR en)) AND (Canada)) AND (international trade)

Results of Search 2:

1. Jo, H., & Namgung, H. (2012). Dispute settlement mechanisms in preferential trade agreements: Democracy, boilerplates, and the multilateral trade regime. Journal of Conflict Resolution, 56(6), 1041-1068.

2. Davis, C. L. (2009). Overlapping institutions in trade policy. Perspectives on Politics, 7(1), 25-31.

3. Meyer, T. (2018). Free Trade, Fair Trade, and Selective Enforcement. Columbia Law Review, 118(2), 491-566. (Repeated in Search 3)

4. Martin, P., Mayer, T., & Thoenig, M. (2012). The geography of conflicts and regional trade agreements. American Economic Journal: Macroeconomics, 4(4), 1-35.

5. Staiger, R. W., & Sykes, A. O. (2011). International trade, national treatment, and domestic regulation. The Journal of Legal Studies, 40(1), 149-203.

Search 3: (((((trade agreements) AND (governance)) AND la:(eng OR en)) AND (Canada)) AND (international trade) AND (sustainability)

Results of Search 3:

1. Francois, J., & Hoekman, B. (2010). Services trade and policy. Journal of Economic Literature, 48(3), 642-92.

2. Winchester, N. B. (2009). Emerging global environmental governance. Ind. J. Global Legal Stud., 16, 7.

3. Reed, D. (2009). What do corporations have to do with fair trade? Positive and normative analysis from a value chain perspective. Journal of Business Ethics, 86(1), 3-26.

4. Gendron, C., Bisaillon, V., & Rance, A. I. O. (2009). The institutionalization of fair trade: More than just a degraded form of social action. Journal of Business Ethics, 86(1), 63-79.

5. Muchlinski, P. (2011). The changing face of transnational business governance: Private corporate law liability and accountability of transnational groups in a post-financial crisis world. Indiana Journal of Global Legal Studies, 18(2), 665-705.

Search 4: ((((trade agreements) AND (governance)) AND la:(eng OR en)) AND (Canada)) AND (international trade) AND (circular economy)

Results of Search 4:

1. Panizzon, M. (2010). Temporary Movement of Workers and Human Rights Protection: Interfacing the "Mode 4" of GATS with Non-Trade Bilateral Migration Agreements. In Proceedings of the ASIL Annual Meeting (Vol. 104, pp. 131-139). Cambridge University Press.
2. Tena-Junguito, A., Lampe, M., & Fernandes, F. T. (2012). How much trade liberalization was there in the world before and after Cobden-Chevalier?. The Journal of Economic History, 72(3), 708-740.

3. Flores, R., Aguilera, R. V., Mahdian, A., & Vaaler, P. M. (2013). How well do supranational regional grouping schemes fit international business research models?. Journal of International Business Studies, 44(5), 451-474.

4. Freeman, I., & Hasnaoui, A. (2011). The meaning of corporate social responsibility: The vision of four nations. Journal of Business Ethics, 100(3), 419-443.

5. Dhir, A. A. (2012). Shareholder engagement in the embedded business corporation: Investment activism, human rights, and TWAIL discourse. Business Ethics Quarterly, 22(1), 99-118.

**Theme 3: Trade Tariffs and Barriers**

Search 1: ((((((trade agreements) AND (barriers)) AND la:(eng OR en)) AND (tariffs)) AND (international trade)))

Results of Search 1:

1. Ossa, R. (2014). Trade wars and trade talks with data. American Economic Review, 104(12), 4104-46. (Also in Search 2)

2. Rodrik, D. (2018). What Do Trade Agreements Really Do?. Journal of Economic Perspectives, 32(2), 73-90. (Found in Search for Theme 2 also; Also in Search 2)).

3. Chowdhury, S. (2011). The Discriminatory Nature of Specific Tariffs. the world bank economic review, 26(1), 147-163. (Also in Search 2)

4. Limão, N., & Maggi, G. (2015). Uncertainty and trade agreements. American Economic Journal: Microeconomics, 7(4), 1-42.

5. Estevadeordal, A., Freund, C., & Ornelas, E. (2008). Does regionalism affect trade liberalization toward nonmembers?. The Quarterly Journal of Economics, 123(4), 1531-1575.

Search 2: (((((((trade agreements) AND (barriers)) AND la:(eng OR en)) AND (tariffs)) AND (international trade)))) AND (Canada)

Results of Search 2:

1. Kono, D. Y. (2008). Democracy and trade discrimination. The Journal of Politics, 70(4), 942-955.

2. Sun, L., & Reed, M. R. (2010). Impacts of free trade agreements on agricultural trade creation and trade diversion. American Journal of Agricultural Economics, 92(5), 1351-1363.

3. Hochman, G. (2008). Trade negotiations, domestic policies, and the Most Favored Nation clause. Canadian Journal of Economics/Revue canadienne d'économique, 41(3), 781-795.

4. Baldwin, R. (2016). The World Trade Organization and the future of multilateralism. Journal of Economic Perspectives, 30(1), 95-116.

5. Viju, C., & Kerr, W. A. (2011). Agriculture in the Canada-EU economic and trade agreement. International Journal, 66(3), 677-694.

Search 3: (((((((trade agreements) AND (barriers)) AND la:(eng OR en)) AND (tariffs)) AND (international trade)))) AND (Canada)) AND (circular economy)

Results of Search 3:

1. Hathaway, O. A. (2007). Treaties' end: The past, present, and future of international lawmaking in the United States. Yale LJ, 117, 1236.

Note: many of the same articles as above come up in this search

Search 4: (((((((trade agreements) AND (barriers)) AND (Canada)) AND la:(eng OR en)) AND (tariffs)) AND (international trade))) AND (sustainability)

Results of Search 4:

1. Mengesha, E. (2008). Rethinking the rules and principles of the international trade regime: Feminist perspectives. Agenda, 22(78), 13-26.

2. Sampson, T. (2017). Brexit: the economics of international disintegration. Journal of Economic Perspectives, 31(4), 163-84.

3. Dluhosch, B., & Horgos, D. (2013). Trading up the happiness ladder. Social indicators research, 113(3), 973-990.

4. Wood, D. E., & Verdun, A. (2011). Canada and the European Union: A review of the literature from 1982 to 2010. International Journal, 66(1), 9-21.

5. Johnson, R. C. (2014). Five facts about value-added exports and implications for macroeconomics and trade research. Journal of Economic Perspectives, 28(2), 119-42.

**Philip Walsh** (Searches conducted September 26th to October 3rd, 2018)

Searches for Themes 4 (Prosperity and Sustainability) and 5 (Technological and Digital Transformation) involved using Google Scholar and the Ryerson University Library online journal search engine to identify the most relevant, non-repeated peer-reviewed articles using search strings containing a variety of combinations of the following key words:

*trade; economic prosperity; sustainability; circular economy; Canada; environmental protection; social well-being; income inequality; policy; sharing economy; technology; digital infrastructure; clean technology; emissions; waste; financial services; UK*

Search results: Theme 3 (Prosperity and Sustainability)

Chen, F., Ngniatedema, T., & Li, S. (2018). A cross-country comparison of green initiatives, green performance and financial performance. *Management Decision*, *56*(5), 1008–1032. https://doi.org/10.1108/MD-08-2017-0761

Doherty, B., Davies, I. A., & Tranchell, S. (2013). Where now for fair trade?. *Business history*, *55*(2), 161-189.

Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm? *Journal of Cleaner Production*, *143*, 757–768. https://doi.org/10.1016/j.jclepro.2016.12.048

Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner production*, *114*, 11-32.

Khetriwal, D. S., Kraeuchi, P., & Widmer, R. (2009). Producer responsibility for e-waste management: key issues for consideration–learning from the Swiss experience. Journal of Environmental Management, 90(1), 153-165.

Korhonen, J., Honkasalo, A., & Seppälä, J. (2018). Circular economy: the concept and its limitations. *Ecological economics*, *143*, 37-46.

Liu, Z., Adams, M., Cote, R. P., Geng, Y., & Li, Y. (2018). Comparative study on the pathways of industrial parks towards sustainable development between China and Canada. *Resources, Conservation and Recycling*, *128*, 417-425.

McKenzie, L. (2018). Overcoming legacies of foreign policy (dis)interests in the negotiation of the European Union–Australia free trade agreement*. Australian Journal of International Affairs, 72(3), 255–271.

Moreau, V., Sahakian, M., Van Griethuysen, P., & Vuille, F. (2017). Coming full circle: why social and institutional dimensions matter for the circular economy. *Journal of Industrial Ecology*, *21*(3), 497-506.

Park, J., Sarkis, J., & Wu, Z. (2010). Creating integrated business and environmental value within the context of China's circular economy and ecological modernization. *Journal of Cleaner Production*, *18*(15), 1494-1501.

Sabau, G., & Boksh, F. M. (2017). Fish Trade Liberalization Under 21st Century Trade Agreements: The CETA and Newfoundland and Labrador Fish and Seafood Industry. *Ecological economics*, *141*, 222-233.

Schaltegger, S., & Burritt, R. (2014). Measuring and managing sustainability performance of supply chains: Review and sustainability supply chain management framework. *Supply Chain Management*, *19*(3), 232–241. https://doi.org/10.1108/SCM-02-2014-0061

Wanki Moon, W. (2011). Is agriculture compatible with free trade? *Ecological Economics*, *71*(1), 13–24.

Search results: Theme 5: Technological and Digital Transformation

Charnovitz, S., & Fischer, C. (2015). Canada–renewable energy: Implications for WTO law on green and not-so-green subsidies. *World Trade Review*, *14*(2), 177-210.

Erumban, A. A., & Das, D. K. (2016). Information and communication technology and economic growth in India. *Telecommunications Policy*, *40*(5), 412-431.

Geng, Y., Zhu, Q., Doberstein, B., & Fujita, T. (2009). Implementing China's circular economy concept at the regional level: A review of progress in Dalian, China. *Waste Management*, *29*(2), 996-1002.

Gosens, J., Lu, Y., & Coenen, L. (2015). The role of transnational dimensions in emerging economy 'Technological Innovation Systems' for clean-tech. *Journal of Cleaner Production*, *86*, 378-388.

Gregson, N., & Crang, M. (2015). From waste to resource: the trade in wastes and global recycling economies. *Annual Review of Environment and Resources*, *40*, 151-176.

Hobson, K., & Lynch, N. (2016). Diversifying and de-growing the circular economy: Radical social transformation in a resource-scarce world. *Futures*, *82*, 15-25.

Lepawsky, J. (2015). The changing geography of global trade in electronic discards: time to rethink the e-waste problem. *The Geographical Journal*, *181*(2), 147-159.

Lewandowski, M. (2016). Designing the business models for circular economy—Towards the conceptual framework. *Sustainability*, *8*(1), 43

Mathews, J. A. (2017). Global trade and promotion of cleantech industry: a post-Paris agenda. *Climate Policy*, *17*(1), 102-110.

Mathews, J. A., & Tan, H. (2011). Progress toward a circular economy in China: The drivers (and inhibitors) of eco-industrial initiative. *Journal of industrial ecology*, *15*(3), 435-457.

Nobre, G. C., & Tavares, E. (2017). Scientific literature analysis on big data and internet of things applications on circular economy: a bibliometric study. *Scientometrics*, *111*(1), 463-492.

Pagoropoulos, A., Pigosso, D. C., & McAloone, T. C. (2017). The emergent role of digital technologies in the Circular Economy: A review. *Procedia CIRP*, *64*, 19-24.

Scheepens, A. E., Vogtländer, J. G., & Brezet, J. C. (2016). Two life cycle assessment (LCA) based methods to analyse and design complex (regional) circular economy systems. Case: Making water tourism more sustainable. *Journal of Cleaner Production*, *114*, 257-268.

Terzi, N. (2011). The impact of e-commerce on international trade and employment. *Procedia-Social and Behavioral Sciences*, *24*, 745-753.

Witjes, S., & Lozano, R. (2016). Towards a more Circular Economy: Proposing a framework linking sustainable public procurement and sustainable business models. *Resources, Conservation and Recycling*, *112*, 37-44.