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A social network analysis of trade-environment disputes in the WTO Dispute Settlement Body

Master's thesis

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Summary

The dilemma between trade liberalisation and environmental protection continues to persist. Sustainable development is a fundamental goal of the World Trade Organisation (WTO). Under WTO rules, states are allowed to implement measures directed to protect the environment, provided that certain conditions are upheld and international trade law is not violated. When a country (the complainant) considers an act of another country (the defendant) a violation of international trade law, they can litigate the defendant in the judicial system of the WTO: the dispute settlement body (DSB). The WTO DSB goal is to settle trade disputes among its members peacefully.

The complainants and defendants are seldom the only actors at play in the WTO DSB. Individuals, NGOs, and third parties may join a trade dispute as well. The individual characteristics of each actor can have an influence on the final ruling of the supranational court. This thesis focuses on the role of third parties in particular. Third parties are, similar to the complainant and defendant, countries. Through a social network analysis, the power derived from one's position in the network is investigated. The scope is limited to trade-environment disputes within the WTO DSB due to the ongoing dilemma between trade liberalisation and environmental protection.

The results show that developed economies, and states with high environmental norms are more likely to participate in trade-environment disputes within the WTO DSB. Moreover, the creators of the WTO have the most third party connections. Connections play an important role for creating social power. Lastly, the WTO DSB is more likely to rule in favour of the most powerful states in trade-environment disputes. Future research could take into account the multiplicity of group membership and other types of relations between countries when investigating states' participation in the WTO DSB.

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Abbreviations

AB	Appellate Body
CTE	Committee on Trade and Environment
DSB	Dispute Settlement Body
DSM	Dispute Settlement Mechanism
DSU	Dispute Settlement Understanding
EC	European Communities
EPI	Environmental Performance Index
EU	European Union
GATT	General Agreement on Tariffs and Trade
Hong Kong SAR	Hong Kong Special Administrative Region
IGOs	International governmental organisations
MEAs	Multilateral environmental agreements
NGOs	Non-governmental organisations
OECD	Organisation for Economic Cooperation and Development
RTAs	Regional Trade Agreements
U.S.	United States of America
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
WTO	World Trade Organisation

1. Introduction

It remains unclear how to balance enabling trade flows while also leaving room for environmental protection and preservation (Ravenhill, 2017). The Brundtland and World Commission on Environment and Development tried to address the issue already in the 1980s. They argued that trade liberalisation and environmental protection do not have to clash but can be compatible (Brundtland & World Commission on Environment and Development, 1987). The Brundtland Commission called for 'sustainable development'. This concept refers to economic development which fits the needs and aspiration of the present while taking into account the consequences it has for the future (Brundtland & World Commission on Environment and Development, 1987). Economic growth is the best way forward but it needs to be derived from sustainable growth. The transfer of environmental technologies, better education and food security in the South are examples of how to make development sustainable (Ravenhill, 2017). An example of a core cause of unsustainable growth is poverty (Ravenhill, 2017).

Sustainable development is a fundamental goal of the World Trade Organisation (WTO). The concept has been written down in the Marrakesh Agreement, which established the WTO in 1995, alongside the protection and preservation of the environment (WTO, n.d.e). The WTO is an international organisation which tries to establish transparency and predictability in the international trade system (Ravenhill, 2017). It is a member-driven organisation, implying that the 162 countries whom are members determine the agenda of the organisation (Ravenhill, 2017). The organisation works on a one country-one vote basis which should imply equality among its members. Nonetheless, not all members have the same power (Ravenhill, 2017). Members differ in permanent representation size in Geneva, where the headquarters are located. Moreover, three out of the five Directors-Generals of the WTO have come from developed countries (Ravenhill, 2017)[1].

The WTO has three roles. Firstly, international trade rules can be established between its members. Secondly, the WTO is a forum in which Member States can discuss international trade issues (Ravenhill, 2017). Thirdly, the WTO has the power to adjudicate trade disputes among its members (Ravenhill, 2017).

The latter is the main focus point of this paper because WTO members are allowed under WTO rules to implement measures in order to protect the environment. However, the environmental measures that affect trade need to adhere to certain conditions and should not violate trade law (e.g. environmental measures should not be implemented for protectionist ends) (WTO, n.d.e). Whenever a WTO member considers an act of another WTO member a violation of trade law, they can litigate the suspected violating WTO member to the judicial system of the WTO system; the WTO Dispute Settlement Body

[1] Two came from the European Communities, one from New Zealand, one from Thailand and one from Brazil.

(DSB). The first case under review within the WTO DSB concerned a trade-environment dispute (Tarasofsky & House, 2005)

1.1 The WTO Dispute Settlement Body

According to Berman (as cited in Petersmann, 2006) disputes have four characteristics. Firstly, a dispute concerns a disagreement on a fact, law, or policy. Secondly, this fact, law, or policy is drawn up between two or more parties. Within a dispute one party of the fact, law, or policy makes a claim or assertion which is denied or refused by another claim by the other party. This is the third characteristic. Lastly, the parties involved decide to settle their disagreement through a dispute settlement mechanism. The goal of the WTO DSB is to settle trade conflicts between countries peacefully. The WTO DSB is widely used among its members (Ravenhill, 2017). Consequently, the fear exists that the WTO DSB will get overburdened in the future if it fails to adapt itself (Ravenhill, 2017).

The WTO DSB follows a specific procedure. A WTO member (actor A) can raise a complaint against a policy implemented by another member of the WTO (actor B) if they think this is in violation with WTO law (Busch & Reinhardt, 2006). Actor A is called the complainant. Actor B is called the defendant. The first step is bilateral consultations. The majority of disputes are resolved in this phase (Ravenhill, 2017). 51% of all the cases are resolved in this round with the defendant agreeing in two-thirds of the cases (Busch & Reinhardt, 2006). An agreement in the consultation phase is preferred because nobody is officially assigned the blame (Busch & Reinhardt, 2000).

In case no agreement is found, the complainant, actor A, can request for a panel (Busch & Reinhardt, 2006). This panel provides a legal judgement of the dispute. By taking a case to court, the discussion moves from a political discussion into a technocratic one (Johns & Pelc, 2014). Prior to the ruling the two parties can still negotiate and find an agreement without a ruling. Two thirds of all disputes going to this stage find an agreement before the ruling (Busch & Reinhardt, 2006). Thus, only one third actually results in a legal verdict. The panel issues its final report which is binding unless rejected by consensus. The final report by the panel can be challenged in the Appellate Body (AB) through appeal. The AB consists of seven judges. Their decision, again, is binding unless rejected by consensus.

All these steps occur under strict timetables. This implies that specific times (e.g. number of days) are set for each step. For example, a panel can only be requested if consultations have failed to deliver a result within sixty days (Ravenhill, 2017). The proceeding of the AB should not exceed 90 days. Approximately it can take up to a year and three months for all steps to be taken; including appeal (WTO, n.d.a).

1.2 Other participants

Other parties besides the complainant and defendant can also align themselves with disputes within the WTO DSB. Complainants and defendants are seldom the only actors at play. Through *amicus curiae* an individual or group such as a non-governmental organisation (NGO) can join a dispute (Ravenhill, 2017). *Amicus curiae* is Latin for 'friend of the court'. The court themselves decides for every individual case if such individuals or groups are permitted to provide the court with additional information under *amicus curiae*. This information might influence the ruling of the court (Ravenhill, 2017). WTO members have expressed their concern about admitting *amicus curiae* to court (Paine, 2018).

Moreover, other WTO members are also able to join a dispute through applying either for co-complainant or as a third party. Third parties are defined by Johns and Pelc (2014) as: "nonlitigant countries that have an interest in the dispute" (p.665). WTO members can apply as a third party when they can show that they have a 'substantial trade interest, a 'systemic interest' or a 'substantial interest' in the dispute (Busch & Reinhardt, 2006). WTO's Dispute Settlement Understanding (DSU) Article 10, DSU Article 17, and DSU Article 4.11 are concerned with the rights and allowances of third parties. An advantage of third party participation is that other parties have the possibility to join a dispute rather than creating a new one (Petersmann, 2006).

1.3 Research objective

The focus of this thesis is the influence of third parties connections on the final ruling within the WTO DSB. According to Busch and Reinhardt (2006), Busch and Pelc (2010), and Davey (2005), third parties influence the WTO DSB process through their participation. The scope of this research is limited to trade-environment disputes. Trade-environment disputes are chosen because sustainable development remains on the agenda. The WTO DSB provides an opportunity for the international arena to settle conflicts which arise from the clash between trade and environment peacefully.

This thesis will be guided by the research question: *How do third parties connections affect the final ruling of trade-environment disputes in the WTO dispute settlement?* In order to answer the research question, a better understanding of the connections within WTO DSB trade-environment disputes is required. Which countries are most likely to file a complaint in the WTO DSB? Which countries are the subjects of those complaints? And who are the third parties? Therefore, the following sub question is formulated: *How are the third parties connected to the complainant or defendant in trade-environment disputes in the WTO dispute settlement body?* A social network analysis will be conducted to answer these questions. In short, this thesis will shed light on the participants of trade-environment disputes within the WTO DSB, and the effects of their participation on the final ruling of the court.

1.4 Societal relevance

This paper has the potential to reveal patterns of power in the WTO DSB which might contribute to understanding the current crisis in the AB. Due to consensus decision-making, every country can block new AB appointments (Paine, 2018). The current crisis is a result of the United States of America (U.S.) blocking new AB Members appointments (Walker, 2016; Paine, 2018). Consequently, there are not enough judges to hear new cases. In response to the crisis, the European Union (EU), China, and India have proposed amendments concerning the WTO DSB (WTO, 2018). Among other things, they proposed to increase the number of judges from seven to nine. Moreover, those judges will serve the DSB for six to eight years in contrast to the four year team currently in place. The judges will serve the AB as full-time employees (WTO, 2018). In addition, nine countries[2] joined the EU, China, and India in their request to address the issue of 90 days, issue of precedent, transitional rules for outgoing AB members, meaning of municipal law as an issue of fact, and the findings which are unnecessary for the resolution of a dispute (WTO, 2018). The proposal, however, did not gain support from the U.S. because it did not address the concerns raised by them (Miles, 2018).

This research will shed light on the participants of trade-environment disputes in the WTO DSB. Furthermore, this thesis will investigate the level of participants' power and their influence on the final outcome of the court. Through a better understanding of the WTO DSB, better reform proposals can be made by WTO members, which might help to solve the current AB crisis. Furthermore, NGOs, businesses, and civic societies (with trade or environmental interests) can lobby their national governments to be more (or less) involved in trade-environment disputes within the WTO DSB. According to Ravenhill (2017) non-state actors can persuade states to file a complaint at the judicial system of the WTO through lobbying.

1.5 Academic relevance

Previous literature has focussed on the role of complainants to accept or refuse states as third parties (Johns & Pelc, 2014). Third parties are involved in many disputes in the WTO DSB (Johns & Pelc, 2014; Petersmann, 2006). Moreover, the characteristics of third parties (e.g. economic interest and experience) have been investigated (Bagwell & Staiger, 2004; Bown, 2005; Busch & Reinhardt, 2006; Conti, 2010). Even though the role of third parties on the final stage of the dispute (e.g. consultation, panel or AB) has been examined too, no research has yet been conducted to whom the judges will rule in favour of as a result of third parties participation. Moreover, this research is focused on trade-environment disputes in particular, whereas other researchers have not made a distinction based on the topic of the dispute.

[2] Canada, Norway, New Zealand, Switzerland, Australia, Republic of Korea, Iceland, Singapore, and Mexico.

Furthermore, a social network analysis is chosen to conduct the research. Social network analysis has been conducted in a variety of disciplines such as physics, epidemiology, and social sciences (Borgatti & Halgin, 2011). However, no research has yet been conducted to investigate the social power of nodes derived from its network position within the WTO DSB and how that power influences the decision of the court. This thesis tries to fill the gap in the literature by performing a social network analysis on exactly that.

1.6 Reader's guide

The next chapter will shed light on the existing literature concerning the topic of this paper. In chapter 3, the theories which will underlie the assumptions made for the hypotheses will be expanded upon. Thereafter, the data and methods will be presented. The results will be discussed in chapter 5. Afterwards, the theoretical implications of the analysis will be discussed. Lastly, chapter 7 will summarize the paper, discuss the limitations, provide direction for the future research, and give practical implications.

2. Literature review

The literature review will provide an overview of the existing academic literature on trade versus environment, the role of environment within the WTO, the effectiveness of the WTO DSB and third parties. At the end, the gap in the literature is addressed.

2.1 Trade versus environment

Environmentalists are worried about the effects of trade liberalisation on the environment (Wold, 2010). Free trade may result in economic growth. More economic activity means more pollution and unsustainable consumption of natural resources (Meadows et al., 1972 and Daly, 1993 as cited in Esty, 2001). Moreover, environmental policies might not survive under globalisation. Hence, some environmentalists are opposed to free trade. Others may see globalisation as an opportunity for sustainable development (Esty, 2001). Esty (2001) did not find empirical evidence for reducing trade flows after implementing environmental provisions in trade agreements. Furthermore, the greenest trade pact, North American Free Trade Agreement, does not show a decrease in trade.

The report by Nordström and Vaughan (1999) investigates the political economic arguments for inadequate environmental taxes and regulations. Market failures are a cause for environmental degradation as a result of economic growth. In order to tackle environmental problems, the source needs to be addressed. Additionally, interlinkages between sectors and countries (also called general equilibrium effects) should not be forgotten. These linkages include composition, scale and technique effects (Nordström & Vaughan, 1999). Composition effect refers to the industrial restructuring of the market which results from its opening up to the world. Due to trade, pollution problems are transferred across countries. Scale effect refers to economic growth as a result of trade. Economic growth can be harmful for the environment in case the production cycle does not green up (innovate) (Nordström & Vaughan, 1999). The public plays a role as they can demand cleaner production. This is referred to as the 'technique effect' (Nordström & Vaughan, 1999).

Despite suggestions that trade liberalisation will result in a 'race to the bottom' which will harm the environment, Bhagwati (1995) conclude that there is no empirical evidence for it. Bhagwati and Hudec (1996) are against harmonisation of trade regulations. According to the authors, the diversity of standards is legitimate because there are crucial differences between countries. They argue that there is a North-South dimension within the WTO and criticise the influence of the Northern states within the organisation. The next section will therefore focus on the role of the environment within the WTO.

2.2 The WTO and the environment

Despite the WTO being a promoter freer trade, exceptions on trade do exist. A formal environmental exception does not exist within the WTO due to the fear of protectionism (Lang, 1997). Moreover, different environmental standards exists among countries. Hence, there is a divergence of interests on whether to include a formal environmental exception or not. Nevertheless, environment is not neglected in the international community (Lang, 1997). Article XX of the General Agreement on Tariffs and Trade (GATT) does contain general exceptions for trade agreements (Analytical Index of the GATT, n.d.). These will be elaborated upon in section 2.2.1. What is important here, is that although there is no formal exception, (environmental) exceptions may exist under certain conditions.

In recent years there has been a rise in WTO dispute settlement cases related to national climate policies (Dröge et al., 2018). This has transpired despite the diminishing role of the WTO due to the increasing importance of regional trade agreements (RTAs) (Baldwin & Carpenter, 2009). Those cases often concern renewable energy production which affects other members negatively. For instance, countries may have introduced allegedly unfair subsidies (Dröge et al., 2018). The subsidies which would support national climate policy targets, are allegedly in violation with international trade law (e.g. dumping) (Dröge et al., 2018). Other claims in the climate-related WTO DSB were based on the violation of the national treatment obligation (Dröge et al., 2018). Thus, disputes between states may arise when environmental protection measures are in conflict with international trade law such as the non-discrimination rule. Moreover, Dröge et al. argues that "the increasing number of WTO disputes over national renewable energy policy regulations points to the case-by-case nature of WTO rule application on the one hand, and to a more systemic conflict of national approaches with the WTO obligation of non-discrimination on the other" (2018, p.6). The next section will dive into Article XX in order to understand which general exceptions to trade exists.

2.2.1 Article XX

Within the WTO framework it is possible to implement environmental provision in trade deals as long as it is not used as a form of protectionism (WTO, n.d.e). Despite the trade focus of the organisation, it does take into account the environment. According to the WTO website: "Sustainable development and protection and preservation of the environment are fundamental goals of the WTO" (WTO, n.d.e, para. 1). Nevertheless, the WTO is established as a trade organisation, not an environmental one (Kulovesi, 2011). Nor does the WTO aspire to become an environmental organisation.

Article XX relates to general exceptions for trade agreements (Analytical Index of the GATT, n.d.). Exceptions to international trade rules are allowed when they comply with certain conditions. Article XX starts with the following precautious note:

"Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures" (Analytical Index of the GATT, n.d., p.562).

The WTO's Committee on Trade and Environment published a document in 2002 with all the disputes relating to GATT Article XX paragraphs (b), (d) and (g) (WTO, 2002). Especially paragraph (b) and (g) are often mentioned when environment-trade disputes are investigated. The two paragraphs are formulated as follows:

"(b) necessary to protect human, animal or plant life or health;" (Analytical Index of the GATT, n.d., p.562).

"(g) relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption;" (Analytical Index of the GATT, n.d., p.562).

Thus, policies which aim to protect the environment are allowed under Article XX, provided that they adhere to certain trade rules (e.g. no protectionism). The GATT DSB (the predecessor of the WTO) has never approved a case based on Article XX (Kulovesi, 2011). Interestingly, the first case ever heard by the WTO DSB involved an environmental dispute (Tarasofsky & House, 2005). This judicial system is preferred by Member States; the judicial systems of multilateral environmental agreements (MEAs) tend not to be used (Tarasofsky & House, 2005).

2.2.2 Committee on Trade and Environment

The WTO has a Committee on Trade and Environment (CTE). According to Tarasofsky (1999) the CTE has not yet been successful in solving the dilemma between trade and environment for multiple reasons. Firstly, it might be the result of a lack of political will. Secondly, the CTE does not cover the full spectrum of the dilemma (Tarasofsky, 1999). It only investigates the effect of environmental measures on trade and not the other way around. Thirdly, in line with Bhagwati and Hudec (1996), Tarasofksy (1999) argues that there exists a North-South political divide in the WTO. The North is more interested in MEAs whereas the South argues in favour of market access. Fourthly, the strength of the CTE within the WTO is unclear. "The only WTO body coming to real closure on some trade and environmental issues is the Dispute Settlement Body, in that recent panel and AB decisions have helped clarifying the interpretation of Article XX" (Tarasofsky, 1999, p.487). Therefore, it is better to scrutinize the DSB rather than the CTE when investigating the role of the WTO in the trade-environment debate.

2.2.3 WTO and climate

Climate and environment are closely related. Droege et al. (2016) argue that changing international institutional settings could enhance cooperation on climate-related issues. The United Nations Framework Convention on Climate Change (UNFCCC) Secretariat and the WTO members and institutions (e.g. CTE) already have an ongoing informal cooperation. The UNFCCC Secretariat has an observer status with the CTE (Droege et al., 2016). This relationship, however, could be further expanded. For instance, CTE could include climate change policies transforming it to the Committee on Trade, Environment and Climate Change (Dröge et al., 2018). Moreover, both institutional bodies (WTO and the UNFCCC) could increase their transparency (Droege et al., 2016).

In accordance, the WTO DSB could have more climate expertise in place (Droege et al., 2016). These experts can provide panels with more information and insights under current WTO law. Moreover, Droege et al. (2016) argue that a more authoritative interpretation of Article XX could facilitate the trade regime in supporting climate change actions. However, this would raise political opposition in the short-term. Nevertheless, it would send a strong signal to its members that the organisation is supportive of climate policies. Additionally, climate protection rules that have already been set up through trade agreements can be promoted within the WTO (Droege et al., 2016).

National climate policies put WTO agreements under pressure (Droege et al., 2016). Cases conducted within the WTO DSB framework show that the WTO rules against protectionist ways to support climate-friendly industrial strategies. “The WTO dispute settlement bodies have been sensitive to environmental issues, but they continue to encounter criticism from traditional trade interest. Thus, WTO members clearly signalling that dispute settlement must take climate protection seriously would benefit the panels and the AB” (Droege et al., 2016, p.260). In other words, the WTO DSB should be reformed. Criticism towards the WTO DSB is not unique. Hence, the following section will dive into some of the criticism the WTO DSB has received in academic literature.

2.3 Effectiveness of the WTO DSB

The WTO DSB has received criticism in multiple areas. Nevertheless, it still remains the most suitable international legal system to settle international trade-environment disputes peacefully.

2.3.1 Trade-environment disputes in the WTO DSB

Dunoff (1999) argues that the judicial system of the WTO is too political. Due to an increase of MEAs, there has been an increase of international rules which have not been drawn up by the WTO. Moreover, environmental law has been heavily influenced by non-governmental actors. Will the WTO incorporate those international rules when conducting a final verdict over trade-environment disputes? A fear exists, that when trade and environmental conflict, trade wins (Kulovesi, 2011). The WTO is

originally a trade-focused organisation without environmental or democratic credentials. Its aim is not to be an environmental protectionist organisation.

The Uruguay Round has blurred the line between trade and issues including environment, labour standards, and human rights – linkage issues (Kulovesi, 2011). This is referred to as the 'trade and' debate. The Biotech dispute showed that linkage issues can raise challenges for the legitimacy of the WTO dispute settlement system when the WTO DSB fails to address the relationship between WTO law and international environmental law (Kulovesi, 2011). Wold (2010) fears that trade rules might overrule both national and international environmental law. In the Biotech dispute, the European Community (EC) was brought to court by the U.S. for imposing restriction on genetically modified products. The EC was afraid that genetically modified products would cause environmental hazards for its citizens. The EC argued that they were acting in accordance with international environmental laws, but those were considered irrelevant by the panel (Kulovesi, 2011). In the end, the panel ruled in favour of the U.S. Therefore, Kulovesi (2011) argues that the WTO DSB has serious legitimacy challenges because it fails to address linkage issues and considers international environmental law as irrelevant.

Environmental disputes can challenge the legitimacy of the WTO DSB. According to Charnovitz (as cited in Kulovesi, 2011) the environment has become a mainstream trade issue. Trade and environment do not have to clash, they can be compatible (Epps & Green, 2010). Due to the increase of international (bilateral) agreements trade and environmental law is becoming increasingly specialised and fragmentised despite some overarching issues (Kulovesi, 2011). On the contrary, international trade law is centralised and therefore stronger than environmental law. Political tensions can create an additional tension layer (Kulovesi, 2011).

Since the tuna-dolphin ruling the WTO dispute settlement system has become more open to accepting barriers to trade that are designed to protect the environment (Colyer, 2011). When environmental protection is not correlated with increased trade barriers, parties mostly comply (Colyer, 2011). Additionally, strong scientific evidence can result in a fair hearing from the judicial system of the WTO. Therefore, Kulovesi (2011) argues that the WTO dispute settlement system is the most powerful (not necessarily ideal) for the legal settling of environment-trade disputes.

2.3.2 Politics in the WTO DSB

Kelemen (2001) investigates the political pressure influencing supranational courts. He investigated trade-environment disputes resolution within the GATT/WTO (until 1998) and the EU (until 1997). Environmental measures, which have the potential to produce discriminatory effects, may exist as long as they adhere to Article XX (Kelemen, 2001). Kelemen (2001) examines the political and legal pressure in supranational trade-environment cases. Both appeared to have influenced the decision-

making process. It was concluded that neither the GATT/WTO and EU supranational courts have "routinely ruled against national environmental standards in trade-environment disputes" (Kelemen, 2001, p.648). Courts might be purposely vague because they fear that important members might disregard the ruling and thereby undermine the entire system. For example, in the Biotech case the WTO DSB was hesitant to strongly condemn the EC because it would give rise to strong civil opposition which would further diminish the legitimacy of the WTO DSB (Kulovesi, 2011). Adjudication does not simply comply with political pressure; it also tries to maintain a neutral stance by complying with legal norms and case-law precedents.

2.3.3 Power

Walters (2011) investigates power dynamics in the WTO DSB. Every country is allowed to bring a case to the WTO DSB. This should equalize power dynamics. In his article, Walters (2011) conducts a case study (*United States vs. Brazil – Cotton*). In this dispute, Brazil requested for consultations with the U.S. because it was subsidizing its cotton exports (Ravenhill, 2017). Meanwhile, the Cotton 4 (Benin, Burkina Faso, Chad, and Mali) put the issue into question at the Trade Negotiations Committee and with the WTO Director-General. The panel ruled in favour of Brazil, but the U.S. failed to comply with the ruling. In the end, it was agreed upon that the U.S. would pay Brazil US$300 million in compensation alongside with Brazil refraining from further trade measures against the U.S. (Ravenhill, 2017).

Walters (2011) illustrates with the Cotton case that power dynamics still play a role within the WTO DSB despite efforts to neutralize this. There are three explanations why the WTO continues to fail to equalize power dynamics. Firstly, inequalities within the world economy result in the ability of the U.S. to subsidize its own cotton industry (Walters, 2011). Furthermore, these inequalities are transferred to the WTO DSB. Financial capacity is needed because bringing a case to the WTO is costly. Legal teams with specific knowledge on WTO law are needed. This would explain why the Cotton 4 did not apply as a co-complainant in the dispute. Lastly, the WTO DSB coercion mechanism fails. Therefore, the U.S. can continue its practice. Due to its large economic power, West African countries will not retaliate (Walters, 2011).

Furthermore, Garrett & Smith (2002) exposed that the success of the WTO legal system depends on the strategic behaviour of the U.S., EU and the AB. This shows that the WTO system fails to enforce compliance in high-stakes cases against powerful states. Ravenhill (2017) supports this view by arguing: "although the DSM has teeth, ultimately there is no way to force a country to change its trade regime" (p.132). This can, for example, be seen in the *Cotton case* in which both the panel and Brazil failed to force the U.S. into compliance (Ravenhill, 2017). Additionally, the U.S., EU and the AB all have a major influence in enforcing WTO rules (Garrett & Smith, 2002). Enforcement power is weak

in international environmental law (Jinnah & Morgera, 2013). NGOs are involved in monitoring and 'naming and shaming' (Jinnah & Morgera, 2013).

The WTO dispute settlement system is, despite its shortcomings, the most suitable legal system for settling environment-trade disputes. Moreover, it matters who is involved in the disputes. Therefore, the next section will focus on the different parties in the WTO dispute settlement system.

2.4 Third parties

Third parties need to show their interest in the case. They must be able to show that they have a 'substantial trade interest', a 'systemic interest' or a 'substantial interest' in the case. The multiplicity of reasons shows that members do not have to show pure economic interest per se. Politics can in itself, or in combination, also be used for joining a case as a third party. More than 60 percent of the disputes involve third parties (Johns & Pelc, 2014; Petersmann, 2006). Mostly, third parties already join the dispute during the consultation stage (Busch & Reinhardt, 2006). Moreover, Johns and Pelc (2014) find that third parties are becoming increasingly promoted in the WTO DSB. Interestingly, some countries advocate third parties participation whereas others remain sceptical (Johns & Pelc, 2014). Nevertheless, third party participation can be denied which further raises questions about WTO transparency and inequity.

2.4.1 Effects of third parties

Johns and Pelc (2014) argue that third parties participation is a result of an insurance game the complainant is playing which shows that countries act as rational, political actors. Moreover, third party participation can help the AB to increase compliance and gain information about how other members within the WTO receive the ruling (Smith as cited in Busch & Reinhardt, 2006).

Nevertheless, third parties can also have negative effects on disputes. Third parties make negotiations more difficult. Difficult cases do not attract more third parties by definition because third parties might not be as highly affected by the policy as the complainant (Busch & Reinhardt, 2006). Busch and Reinhardt (2006) found that third parties lower the prospects for early settlement, through an increase of bargaining costs in the negotiation stage. Consequently, third parties increase the likelihood that disputes get a legal verdict (Busch & Reinhardt, 2006). However, they did not find any significant results for the direction of the verdict. Moreover, more lawyers are participating during the negotiation phase (Davey, 2005). Additionally, more time is needed to brief cases. Busch and Reinhardt (2004) argue that third parties limit the chances of finding a settlement in the consultation phase. They suggest increasing the transparency of the negotiation phase so that members do not have to sign up as third parties. Increased transparency will ease the minds of other members within the WTO system because they can check if the results meet their interests.

Moreover, the WTO panel has the option to exercise judicial economy (Busch & Pelc, 2010). This refers to the possibility of judges to decide not to rule for certain litigants claims because they are unimportant for the disputes. By applying as third parties, countries have the possibility to alter the content of the ruling (Busch & Pelc, 2010). Busch and Pelc (2010) found out that mixed third-party submissions (third parties are neither pro-complainant nor pro-defendant) increase judicial economy by 68 percent. The WTO probably does so to politically appease the wider WTO community.

2.4.2 States influences

Complainants have an influence on the number of third parties. They can file cases under Article XXIII of the GATT or Article XXII of the GATT. Article XXII is believed to promote third parties with an average of 2.5 third parties joining the dispute whereas Article XXIII tries to prevent third parties joining the dispute with an average of 0.8 per case (Johns & Pelc, 2014). Article XXIII is more focused on bilateral dispute settlement. Johns and Pelc (2014) argue that third parties can act as insurance. Countries strategically choose to file a case under Article XXII or Article XXIII. When a complainant case is weak, they are more likely to file their dispute under Article XXII to promote third parties. Moreover, countries who file a dispute under Article XXII are more likely to reach a settlement in the negotiation phase because they are afraid to lose a ruling. When a complainant believes their case is strong, they are more likely to file their dispute under Article XXIII and win a ruling (Johns & Pelc, 2014).

Applying frequently to be a third party in a trade dispute gives states more experience which can alter the direction of future disputes (Conti, 2010). Experienced complainants will try to find a settlement while experienced defendants will not. Experienced defendants will try not to settle because it will encourage possible future complainants to file a case against them in the WTO DSB. Reputation can influence the course of future WTO disputes. States can already make behavioural assumptions based on previous experience, which shape identity. Even though the identity is purely symbolic, it alters the behaviour of the other party. States thus behave in a dynamic learning process (Conti, 2010). Those countries who often participate in disputes experience legal advantages. This highlights the importance of the social context between states in the WTO DSB. Or how Conti (2010) puts it: “Law happens outside the nation-state, is shaped by the parties using it, and thus creates the opportunity to extend sociolegal scholarship to international and global social context” (p.660).

2.5 Gap in the literature

These studies highlight the role of third parties in WTO disputes. Moreover, Conti (2010) underlines the importance of previous relationships in court and how that affects states' behaviour. However, no research has yet been conducted to investigate who the third parties are and what their relationship to the complainant and the defendant is. Which states participate (as complainants, defendants and third parties) in WTO disputes and how are they connected to each other? Moreover, do those connections affect the final ruling? This research tries to fill in exactly this gap in the academic literature. Furthermore, it focuses on disputes which deal with the clash between trade and environment because of the ongoing dilemma. The research question, as previous formulated in the introduction, is:

RQ: How do third parties connections affect the final ruling of trade-environment disputes in the WTO dispute settlement body?

In order to answer the research question, the sub question needs to be answered first. The sub question is concerned with the connections formed between third parties and the complainant and defendant.

Sub question: How are the third parties connected to the complainant or defendant in trade-environment disputes in the WTO dispute settlement body?

The sub question is concerned with who the participants of trade-environment disputes in the WTO DSB are. In order to answer the sub question, the complainant and defendants of trade-environment disputes have to be identified first. Subsequently, third parties need to be identified. Thereafter, the connections between third parties and the complainant and defendant can be further investigated through using social network analysis. This makes it possible to answer the main research question which is concerned with how third party connections may influence the final ruling of the WTO DSB in trade-environment disputes.

3. Theoretical framework

This chapter will formulate hypotheses which enable the research question to be tested. Hypotheses propose relationships between the independent and dependent variable (Johnson, Reynolds & Mycoff, 2015). Theories support in understanding cause-effect mechanisms between variables (Gschwend & Schimmelfennig, 2007). The first five hypotheses will address the sub question by identifying the participants of trade-environment in the WTO DSB and their relationship. The last hypothesis focuses on the effect of third party connections on the final ruling of the WTO DSB. The hypotheses are based on previous literature, constructivism and realism.

3.1 Participants

Disputes are correlated with trade flows and export diversification (Sattler & Bernauer, 2011). Larger economies and large traders are targets of litigations. They are more likely to become involved in a dispute due to their market size and diverse economy (Sattler & Bernauer, 2011). This counts for both the complainant as well as the defendant. Because developed countries often have a larger market size and diverse economy, they are more likely to be involved in the dispute. This is not discriminatory but rather gravitation (Sattler & Bernauer, 2011). Small states will only bring those cases to the WTO DSB with economic importance to them (Guzman & Simmons, 2005). Moreover, developed countries have the ability to implement certain environmental policies due to their economic position (Grindle & Thomas, 1991).

The outcome of a dispute has economic consequences for the parties involved. Bechtel and Sattler's (2015) study shows that sectoral exports from complainant countries to defendant countries increase after the panel's final judgement. However, those who have actively filed a complaint (either as complainant or co-complainant) do not gain systematically more than less-active third parties (Bechtel & Sattler, 2015). Third parties that align with the complainant gain considerably more than those with a neutral stance.

Moreover, different authors have addressed the issue that not all countries have the same legal capacity at hand (Bechtel & Sattler, 2015; Bown, 2005). As mentioned earlier, Walters (2011) addresses the financial capacity needed to bring a case to the WTO DSB. Legal teams need to have specific knowledge on WTO law. Low developing countries have addressed this issue in the Doha round, asking for reforms (Elsig & Stucki, 2012). Elsig and Stucki (2012) are critical of the opportunity to provide these countries with extra-legal assistance arguing that the absence of cases filed by low developing countries is not as bad as one might suggest. Thus, developed countries have more capacity to litigate countries to court. Considering the above, the first two hypotheses are formulated as follows:

Hypothesis 1: Developed countries are more likely to be a complainant in trade-environment disputes.

Hypothesis 2: Developed countries are more likely to be the defendant in trade-environment disputes.

3.2 Constructivism

3.2.1 Core features

Constructivism is a social international relations theory which holds that actors behave accordingly to their relation to the object (Wendt, 1992). Power cannot only be expressed by military power but also through social understandings and practices (Weiss & Wilkinson, 2013). In constructivism actors have an identity (Wendt, 1992). These identities are stable but not fixed. Moreover they are role-specific and their behaviour is derived from role expectation (Wendt, 1992). An identity is intersubjective; it matters in which situation the actor is present. Actors do not have a clear set of intrinsic attributes, the type of relation influences which identities and interests rise to the surface. Relations are the basis of interests (Wendt, 1992). In other words, when a problem occurs actors interpret it according to their own view and act accordingly. A core principle of constructivism according to Wendt (1992) is: "that the meanings in terms of which action is organized arise out of interaction" (p.403). Thus, previous encounters matter and influence the course of action in the future.

International governmental organisations (IGOs) have the ability to change social reality (Weiss & Wilkinson, 2013). States can exert their ideas to an institutional level through their behaviour. Institutions are socially-constructed. They are stable rather than fixed. According to Wendt (1992) there are two explanations for this. Firstly, within a social system, actors encourage socially accepted behaviour and discourage other behaviours. For example, in the WTO, states can bring other states to court if they do not adhere to the (social) norms drafted in the WTO framework. Secondly, states prefer relatively stable role identities because it minimizes uncertainty (Wendt, 1992). As a result, unnecessary costs can be avoided and existing beliefs are confirmed. Thus, certain predictability in states behaviour can be expected.

According to Baldwin and Carpenter (2009) states cooperate in the WTO because it is the norm. Cooperation in institutions is possible when actors have similar interests. They can enhance their own objectives by forming allies with like-minded actors (Wendt, 1992). Because states are increasingly more connected due to globalisation, there is more interaction among states. This may result in more joint action because states see that it will create (joint) gains. However, it is important not to become the subject of exploitation. This means that states will only participate as third parties in trade-environment disputes if they gain more than they lose. States will behave in accordance with their shaped identity and interests (recall predictability).

Previous research has focused on the economic interest of third party participation (Bagwell & Staiger, 2004; Bown, 2005; Busch & Reinhardt, 2006). They argue that developed countries are more likely to participate in WTO disputes than developing countries for multiple reasons including dependency, power, and economic involvement. As constructivism highlights, the importance of norms plays a crucial role in the decision to apply for a third party. Because this thesis is not focused on trade per se but rather on the dilemma between trade liberalisation and environmental protection it is important to take those two into account. Therefore, the third and fourth hypothesis are formulated as follows:

Hypothesis 3: States with high environmental norms are more likely to apply as third parties in WTO trade-environment disputes.

Hypothesis 4: States who favour trade liberalisation are more likely to apply as third parties in WTO trade-environment disputes.

Connections matter because they can change the outcome of a conflict between two states. The next section therefore will focus on who the most connections has.

3.3 Realism

3.3.1 Core features

Members of the WTO are states. States, which are member of the WTO, can bring other states to the WTO DSB when they suspect a violation of international trade law. In realist theory, states are the main actors of the international system (Mearsheimer, 1994; Weiss & Wilkinson, 2013). NGOs can provide information to a case, under *amicus curiae*, but the main actors within the WTO DSB framework remain states. Moreover, states are rational actors (Weiss & Wilkinson, 2013). States think strategically about their actions (Mearsheimer, 1994). As Busch and Pelc (2010) and Johns and Pelc (2014) highlight, states deliberately choose to participate as third parties in WTO trade disputes. They think rationally about their action of joining a dispute.

Furthermore, WTO disputes clearly demonstrate the conflictual nature of the international system. Every state possesses military capabilities, which may be used (offensively or defensively) against another state (Mearsheimer, 1994). States are never completely certain about the intentions behind other states' behaviour. Consequently, states are constantly in fear of their survival, which is their ultimate driving force. Because of anarchy (the absence of a higher authority) states rely on themselves for survival. In order to remain in peace, it is important to have more power than others (relative power) (Mearsheimer, 1994). Hence, power is not an end in itself but rather supports the pursuit of survival.

Despite anarchy, international institutions do exist. In those institutions states have the possibility to cooperate. Hegemonic stability theory will explain how international institutions and cooperation are still possible in the international system without a higher authority.

3.3.2 Hegemonic stability theory

Due to the hierarchy of power, IGOs (like the WTO) have been created. According to the hegemonic stability theory, this is created by the most dominant power; the hegemon (Weiss & Wilkinson, 2013). A hegemon is defined by Jackson and Sørensen (2003) as "a dominant military and economic power" (p. 196). Institutions are a reflection of the distribution of power in the world and are created consciously through the rational behaviour of the most powerful states (Mearsheimer, 1994). Furthermore, institutions are created to maintain or increase the power of those who created them (Mearsheimer, 1994).

A multilateral institution like the WTO is favourable over multiple smaller, separate trade regimes because it allows powerful actors to cooperate (Baldwin & Carpenter, 2009). Cooperation in the international system is possible when states benefit from cooperation; when they gain relatively more power in the international system (Mearsheimer, 1994). Smaller, less powerful states would be willing to join the institution because they have commercial interests. By enhancing their economy, they gain more power. Thus, international institutions and cooperation within those institutions (e.g. third party participation in trade-environment disputes in the WTO DSB) can exist according to realists because it has the potential to increase the relative power of states.

Because IGOs are created by the most powerful state(s), they will serve its interests. States will support the IGO as long as the benefits outweigh the costs (Weiss & Wilkinson, 2013). As long as the creators remain in power the legitimacy of the organisation is guaranteed. The IGO (in this case the WTO) will serve the interest of the most powerful states because it is crucial for its survival. It needs to align with their interest in order to continue to exist. Because powerful states consciously and rationally create institutions, they make sure that the organisation works in their advantage. In other words, the rules and regulations of the WTO DSB will benefit the creators of the WTO. They will have the most connections in the organisation. Therefore, the fifth hypothesis is formulated as follows:

Hypothesis 5: the creators of the WTO have the most third party connections.

As above mentioned, (relative) power plays a crucial role in understanding how the world works according to realists. Power is not purely defined by the military capabilities of an actor, but also through a country's social power (Hafner-Burton, Kahler & Montgomery, 2009). Hence, the following section is concerned about the creation of social power of states and the influence on the final ruling of the WTO DSB.

3.3.3 Social power

Nowadays networks are important to define (global) power (Slaughter, 2009). In the future this will become even more important. Network connections bring both positive and negative effects but the positive effects will outweigh the negative (Slaughter, 2009). According to Slaughter (2009) inequities in the world will increase as a result of networks. In other words, it matters to be connected. The country with the most connections will be the agenda-setter. It is, therefore important to understand who is connected to whom and why. Networks are created consciously by the actor; "Networks are not directed and controlled as much as they are managed and orchestrated" (Slaughter, 2009, p.99). It is important for countries to maximise the number of valuable connections. Through connections (e.g. third parties), countries gain knowledge and skills which enable them to achieve their goals. Moreover, Slaughter (2009) claims that the U.S. has the ability to become the country with the most connections.

Power can be created in multiple ways. In exchange networks, for example, centrality plays a crucial role. In exchange networks, information (or resources) flows from one actor to another. Centrality plays a role in minimizing the number of interactions before information reaches its final destination. The provider and receiver of information prefer a low number of interactions because it will be the fastest. Moreover, due to the limited amount of actors involved, the information remains novel. In exchange networks, power is increased when one is connected to others who are weak, while being connected to strong actors makes one weaker (Borgatti & Halgin, 2011). Moreover, coordination and unionization have an influence on power (Borgatti & Halgin, 2011). Actors can increase their power through coordination and unionization.

Network power challenges the traditional view of power in international relations because states can gain power through access opportunities in networks (Hafner-Burton et al., 2009). Networks provide states with access to information or resources. States can possess high social power as a result of high connectivity. States can use their networks to increase power through enhancing and exploiting their network positions (Hafner-Burton et al., 2009).

Thus, connections play an important role in defining power. Through their connections, states have access to more information and resources which makes them powerful. This may help in their cause; the WTO DSB ruling in their favour. Hence, hypothesis 6 is formulated as follows:

Hypothesis 6: The more third party connections a state has, the more likely the WTO DSB will rule in the state's favour.

4 Research design and methods

This chapter will provide an overview of the decisions made to analyse the research question, sub question, and the hypotheses. It will expand on social network analysis as a methodological tool to answer the research question. Moreover, information about the constructed dataset is provided. Additionally, the variables are defined.

4.1 (Social) network analysis

Network analysis is chosen because it visually presents the (social) ties resulting from co-membership and co-participation (Borgatti & Halgin, 2011). In this case, the focus will lay on the ties made by states through their participation as third parties in trade-environment disputes in the WTO. Moreover, it is interesting to look at the position of states within the network because it has an influence on the timing and quality of the relationship between actors (Borgatti & Halgin, 2011).

Network analysis is used in many fields, including physics, epidemiology and social sciences (Borgatti & Halgin, 2011). Borgatti and Halgin (2011) define network theory as: "the mechanisms and processes that interact with network structures to yield certain outcomes for individuals and groups." (p.1168). For international relations it can give a better understanding of the social structures, and how these structures can affect a particular outcome.

Social network analysis is chosen specifically as a methodological toolbox to answer the research question because it looks at social life as the relationships between actors and the pattern that they form (Scott & Carrington, 2011). Behaviour is influenced by actors' social network. Through looking at social networks, macro-level patterns can be explained. In this thesis, social network analysis will reveal power dynamics as the result of states' position in the network.

4.1.1 Network concepts

A network is an abstract concept in which a variety of entities can be linked (Estrada & Knight, 2015). Examples of networks can be a physical link, geographical closeness, or social connections. The latter will be the focus in this paper. Nodes in networks of social connections are linked because they have a social tie (Estrada & Knight, 2015). This can be expressed in various ways such as a friendship or collaboration. Social networks are increasingly important because they can influence the outcome (Westaby, 2012).

There are different mechanisms for explaining the outcomes of social networks: transmission, adaptation, binding, and exclusion (Borgatti, Mehra, Brass, & Labianca, 2009). Third parties join a WTO disputes in order to gain access and/or provide information. This is most in line with the transmission mechanism. Transmission refers to either a physical or a mimetic transfer (Borgatti et al.,

2009). By joining as a third party, states can transmit information, and thus exert power over the final ruling of the dispute.

It is important to first identify the network members (nodes). Nodes refer to the unit of analysis (Scott & Carrington, 2011). According to Borgatti and Halgin (2011) the researcher defines a network. The nodes are the states who take part in trade-environment disputes in the WTO DSB. The first four hypotheses will identify the participants of the network (complainants, defendants, and third parties). Together they form a complex network of nodes which are tied together through their participation is trade-environment disputes. Social network theory is not only concerned about the relationship between two nodes, it looks at relationships as part of a broader network (Scott & Carrington, 2011). In other words, relationships between nodes are influenced by their nodes' own connections, but also the connections of other nodes. Thus, after identifying the network members, the relationship between the nodes must be clarified (Scott & Carrington, 2011).

Borgatti et al. (2009) mention four types of relations: similarities, social relations, interactions and flows. Third parties behave like flows because they can provide information to the panel. In this thesis the relationship is their connection regarding the disputes. There are three types of actors; the complainant, defendant and third parties. They have their membership of the WTO in common, and interact through documents and information flows in the relation to the dispute. The other types of relations will not be used.

According to Burt and Minor (1983) there are three approaches to addressing networks: position-based, event-based and relationship. The first one refers to formal positions such as members in organisations (the WTO). The second refers to participants in key events (the trade-environment disputes). The third refers to a small set of nodes which gradually expands to other nodes that have a relationship with the first set of nodes. These distinctions are not mutually exclusive, there can be an overlap. For this thesis, the latter approach will primarily be used. Implying that the first set of nodes will be the complainant and defendant in a dispute case, and the other nodes will be the third parties which attach themselves to the case.

According to Scott and Carrington (2011), two decisions have to be made when conducting a social network analysis. Those decisions concern choosing whole or ego networks and one-mode or two-mode networks. Whole networks focus on all nodes whereas egocentric networks are focused around a single node (Scott & Carrington, 2011). One-mode refers to the possibility of a node to be connected to any other node. Within a two-mode network this is not possible. Image a research that is conducted including person, an event, and an organisation. A person can be linked to an event or an organisation but not to another person. This is an example of a two-mode network. All in all, this thesis focuses on

a whole, one-mode network because it takes into account all the nodes in the network, and these nodes can all be connected to each other.

Moreover, Scott and Carrington (2011) argue that two other distinctions have to be made. Relationships between nodes can be directed or undirected as well as binary or valued. Directed relationships refer to ties that go from one node to another whereas undirected relationships do not specify direction. Moreover, the relationship can either be distinguished between existing or non-existing (binary) or another value can be attached to existing relationships (valued). In this thesis, third parties will be linked to the complainant and defendant. A direction going on. Third parties can choose, with the acceptance of the complainant and defendant, to join a dispute. By joining a dispute they are able to share valuable information which may alter the final ruling. Within the social network analysis a distinction will be made between strong and weak ties based on how often a combination of nodes is linked together but not on the value of each connection. Thus, the relationship will be directional and binary.

4.1.2 Network statistics

4.1.2.1 Degree centrality

Degree centralization refers to the sum of the values of all the ties a node has in the network. The value of a tie between two nodes in a binary network can either be 1 (existing) or 0 (non-existing). Degree centrality shows how much access a node has (Hafner-Burton et al., 2009).

With directed data it is possible to distinguish in-degree centrality and out-degree centrality. A high level of in-degree centrality indicates importance whereas a high out-degree reflects influence (Scott & Carrington, 2011). As said before, it is possible to look at the direction because third parties join disputes to provide additionally information. So, third parties gain influence by exchanging information (out-degree). The complainant and defendant have high importance because they receive information (in-degree).

4.1.2.2 Strength of the ties

According to Hafner-Burton et al. (2009) the strength of the tie is a combination between the magnitude of the relationship between two nodes and the frequency of the interactions. Because the network is binary, the magnitude of all existing ties is 1. Hence, the strength of the tie depends on the frequency of interaction. The strength of the tie will show if states frequently have interactions within trade-environment disputes in the WTO DSB. A strong tie will imply that states have multiple interactions with each other. This will give information about the strength of existing relationships.

However, because both strong and weak ties are strongly defined by the frequency states take part in disputes, it will not form the bases of the analysis. In case a country has only been the subject of a

dispute once, third parties only have one opportunity to form a tie between them. Strong ties can only be established if the receiving node has been a complainant or defendant in a trade-environment dispute in the WTO DSB frequently. Hence, the strength of the tie will not be able to answer one of the hypotheses specifically. Nevertheless, it might still give valuable insights to existing partnerships (relationship between third parties and complainant/defendant). If it would be the case that a number of states frequently file a complaint at the WTO DSB, or are the subject of the complaint, it would be interesting to investigate which third parties frequently align with them. Therefore, it will still be shortly addressed.

4.1.2.3 Betweenness centrality

Betweenness centrality refers to the dependency of a network on a single node in order to stay connected (Hafner-Burton et al., 2009). Every node needs to be at least connected to one other node (which is in turn connected to other nodes) to be part of the network. As argued previously, the most powerful actor is not purely defined by military power but also through their connections. Connections give an actor social power. Power in this paper is reflected in states' access to information. According to the social capital metaphor, the most connected actors do better (Burt, 2017). Through third parties, complainants and defendants receive more knowledge they would not have had otherwise. Thus, connections matter because they provide additional information to the disputes.

The betweenness centrality can be calculated through Gephi (more information about Gephi will be provided in section 4.2.4). This will disclose information about the dependency between nodes. It will reveal who the most powerful actors in the network are. The node with the highest betweenness centrality (the most unique third party connections) has the most power and hence are most likely to influence the ruling of the court in their favour. In order to test hypothesis 6, the final ruling of the court need be considered too. This will be checked by looking at the final rulings of the judges per article per dispute.

To summarize, examination of the dataset will reveal information about which countries are complainants and which countries are defendants (hypotheses 1 and 2). The out-degree centrality gives information about which countries apply as third parties (hypotheses 3 and 4). This will identify the participants of trade-environment disputes in the WTO DSB. Furthermore, the economic situation of the complainant and defendants will be checked to test hypotheses 1 and 2. Tie strength will give insights into existing partnerships. Thereafter, the number of out-degree centrality per country is set off against their environmental norms and being in favour of trade liberalisation, to investigate if the predicted positive relationship holds (hypotheses 3 and 4). Furthermore, in-degree centrality scores will reveal if the creators of the WTO are the ones with the most third party connections (hypothesis 5). Moreover, betweenness centrality will indicate which countries have the most power derived from

third parties which is required to test hypotheses 6. For hypothesis 6, the final ruling of the judges per article per dispute also needs to be investigated to establish who the judges ruled in favour of.

The following sections will give insights to the construction of the dataset and the variables under study. This is necessary to ensure reliability. Reliability refers to the ability of other researchers to replicate the research and draw the same conclusions (Kellstedt & Whitten, 2013). In order for a research to be replicated, the researcher needs to ensure transparency about its procedures and make sure that they are consistent and repeatable (Kellstedt & Whitten, 2013). Moreover, the data used is publicly available. Additionally, it is important to ensure validity. The hypotheses are based on previous literature and theory to ensure internal validity. Previous literature and theories support in establishing a causal relationship (Gschwend & Schimmelfennig, 2007). Lastly, the results of the analysis are only generalisable to trade-environment disputes in the WTO DSB (external validity).

4.2 Dataset

The data for the analysis will be provided by the website of the WTO (n.d.d) and Das and Bandyopadhyay (2016). The datasets will be transformed and combined to establish one dataset which can be put into Gephi. More information about Gephi will be provided below. The WTO website provides information about nine trade-environmental disputes within GATT/WTO. Six of those are performed within the GATT framework (WTO, n.d.d). Three are part of the WTO dispute settlement system and will be included in the dataset for this thesis. Additionally, Das and Bandyopadhyay (2016) provide an overview of 11 trade-climate disputes within the WTO framework. Because Dröge et al. (2018) argued that the CTE should expanded to include climate change policies; it can be argued that climate and environment are closely related. Therefore, both datasets are included in the dataset. Fourteen disputes are under review in total.

Because both datasets slightly differ from each other in terms of information provided, the data is supplemented and combined with Hoekman et al. (2016) WTO Dispute Settlement dataset 1995-2015 version 4.0. This data set covers 507 disputes from the beginning of the WTO dispute settlement system until May 2016. Third party participation is double checked with the information derived from Das and Bandyopadhyay (2016) and the WTO (n.d.d). The data overlapped. Therefore, the missing data was supplemented with information retrieved from Hoekman et al. (2016) dataset.

4.2.1 Complainant and defendant

The information about the complainant and defendant is provided by Hoekman et al. (2016) dataset. The variable *ConReqComp* is used to examine the complainant in the disputes. The variable *ConReqResp* is used to examine the defendant in the disputes. The case *'United States – Standards for Reformulated and Conventional Gasoline'* (DS2) is a special case because Venezuela brought the case to the WTO DSB. Brazil lodged its own complaint in April 1996 (DS4). The panel considered both

cases as one. Therefore, the data of these two cases are combined. Moreover, the *'United States – Import Prohibition of Certain Shrimp and Shrimp Products'* (DS58 and DS61) is combined. The four complainants (India, Malaysia, Pakistan, and Thailand) are, just as Venezuela and Brazil, combined to one node as they form one alliance and act as one.

4.2.2 Third parties

The variable *PanThirdResMemb* by Hoekman et al. (2016) provides information about states which are formally assigned as third parties. The definition of this variable is: "Identity of WTO Member(s) which reserve(s) right to participate as third party to a panel" (Hoekman et al., 2016, p.14). Only for the last dispute *'United States – Certain Measures Relating to the Renewable Energy Sector'* the information for the third parties was retrieved from the WTO website because this dispute was not included in the Hoekman et al. (2016) dataset. Recall that Hoekman et al. (2016) contained information until May 2016, this particular dispute was initiated in September 2016.

In addition to formal third party status in the panel and/or AB, it is also important to consider informal third parties in the consultation stage (Busch & Reinhardt, 2006). Under DSU Article 4.11 it is possible to join a dispute at the consultation stage. According to Busch and Reinhardt (2006) it is important to take informal third parties into account because of three reasons. Firstly, in the consultation stage a lot of the disputes are resolved. Secondly, formal third parties almost always try to intervene at the consultation stage. Thirdly, there is often no distinction made between informal and formal third parties (Busch & Reinhardt, 2006). All in all, this highlights the importance of informal parties. Therefore, the request for joining the consultations is also taken into account. This information is provided on the case specific pages on the WTO website.

4.2.3 WTO DSB outcomes

It should be noted that a conflict between the complainant and defendant can be settled at multiple stages. The first stage is the consultation stage. In general, finding an agreement in the consultation stage is preferred (Busch & Reinhardt, 2000). If no agreement is found, the case is brought to the panel. The last stage is the AB where the ruling of the panel can be appealed. The outcome which shall be considered is the latest outcome. In other words, first the AB ruling will be considered. If the case has not been brought to the AB, the panel ruling will be considered. As mentioned before, no information is made available of the outcome of the consultation stage; no one is assigned official blame (Busch & Reinhardt, 2000). The (four) cases which were resolved in the consultation stage will therefore be excluded when investigating hypothesis 6.

Complainants must cite the article(s) the defendants allegedly violates. Hoekman et al. (2016) dataset provides information about six of the outcome of the disputes. From Hoekman et al. (2016) dataset the variables *ABAppellantCompClaim(#no.)AgrArt* and *ABAppellantCompClaim(#no.)Outcome* are taken.

The coding has been transferred. 1 implies that the claim is accepted, 2 means claim rejected and 3 means other (judicial economy for example). The outcomes of the other disputes, which were ruled after May 2016, have been coded similarly by using the one-page summaries per disputes on the WTO website. Moreover, the case specific web pages on the WTO website provide additional background information as well as any missing data (e.g. for the case *'United States – Certain Measures Relating to the Renewable Energy Sector'*). This will provide information about which articles have been accepted, rejected or have not received a ruling.

Judges do not decide to rule in favour of the complainant or defendant in general. Instead they rule on the article(s) cited by the complainant individually. This thesis will decide who the judges ruled in favour of per dispute based on the number of articles judges ruled in favour of them. For example, when the complainant cites five articles which the defendant allegedly violates and the judges accepts three of these claims, the judges rule in favour of the complainant. If the judges would reject three out of the five claims, the WTO DSB will rule in favour of the defendant. When the judges rule 'other' of an article, it is unclear to whom this is in favour of. In case there is a tie (e.g. six articles are cited in which three are accepted and three are rejected or the majority of articles are ruled as 'other'), it is unknown who the judges rule in favour of. The mode (most commonly observed value) of every dispute is calculated to establish to whom the judges ruled in favour of.

All the articles and their rulings are taken from the complainants' appellant point of view. In case the complainants' appellee point of view would be considered too, the rulings need to be recoded. An 'accepted' to a complainants' appellant is different than a 'accepted' to an appellant claim who was originally a respondent. Whereas the first is in favour of the complainant, the latter is in favour of the defendant. Moreover, judges' ruling on DSU Article 11 in DS412 *'Canada – Certain Measures Affecting the Renewable Energy Generation Sector'* show that it has rejected the article from the complainants' appellant point of view, but has received 'other' from the defendants' appellant point of view. This example shows that it is difficult to recode the variables and merge it into one. Therefore, only the complainants' appellant point of view is considered in the analysis.

4.2.4 Gephi

Gephi is visualisation and exploration software which can create graphs and networks (Gephi, n.d.). Through Gephi patterns, trends, networks and data properties can be discovered. Gephi will be used to calculate in-degree centrality, out-degree centrality, strength of the ties, and betweenness centrality. For the analysis Gephi version 0.9.2 is used.

4.3 Definition variables

4.3.1 Developed countries

The first and second hypotheses are concerned with the economic state of country of the complainants and defendants. Can the defendants and complainants be categorized as developed or developing countries? To differentiate between developed and developing countries the country classification provided by the United Nations (2019) is used. Countries are categorised in three groups: developed economies, economies in transition, and developing economies. The classification was prepared by the Economic Analysis and Policy Division of the Department of Economic and Social Affairs of the United Nations Secretariat. Data has been derived from multiple sources including the International Monetary Fund, the World Bank, the Organisation for Economic Cooperation and Development (OECD), and multiple United Nations agencies (United Nations, 2019). The classification can be found in Appendix A to C. The categories are mutually exclusive and reflect basic economic country conditions (United Nations, 2019). For research purposes, they have been alphabetically ordered and removed of geographical location. Moreover, when conducting the analysis, the relative percentages of developed economies, economies in transition, and developing economies is considered to account for the difference in the amount of countries that exist per category.

It is important to note that the European Union acts as a block within the WTO. Individual EU Member States do not act as a complainant, defendant or third party in the WTO DSB; rather they are united as one (the EU). In the analysis, the EU includes 28 countries including the United Kingdom (UK). The UK is considered to be a part of the EU because the consultations for the disputes were requested between 1995 and 2016. From 1973 until 2020 the UK was part of the EU. The countries joining the EU between 1995 and 2016 are also taken into account. Even though the classification provided by the United Nations (2019) involves country specific information, it is still possible to group the EU in one of the three mutually exclusive categories. All EU countries are namely classified as developed economies. Therefore, the EU can be classified as a developed economy.

4.3.2 Environmental norms

The third hypothesis is concerned about the environmental norms of third parties. States' environmental norms will be reflected in their Environmental Performance Index (EPI). This index measures environmental performance on 24 performance indicators across 180 countries (Wendling et al., 2018). The scale ranges from 0 to 100. The higher the score, the better the environmental performance. It provides information about the extent countries meet environmental policy goals. States with high environmental norms will act accordingly. So, the higher the environmental norm in a country, the higher they will score on the EPI. According to Wendling et al. (2018), the EPI shows which countries are the leaders and which countries are the laggards in environmental performance.

Environmental policymaking is important in international sustainability targets such as the United Nations Sustainable Development Goals. Environmental performance is measured over two dimensions: ecosystem vitality and environmental health (Wendling et al., 2018). The data is from 2018.

Similar to the previous variable, the EPI provides country specific information. However, this index does not categorize countries. Instead, the EPI provides a score to each country individually. The median of all European Union countries scores is used to calculate an EU score. The median of all EU countries' EPI score is 74.53.

4.3.3 Trade liberalisation

The fourth hypothesis is concerned about states' preference of trade liberalisation. According to neoliberal economical theory, trade liberalisation benefits all parties due to comparative advantage (Krueger, 1980). Measures and requirements aiming to protect the environment may negatively affect the competiveness and market access opportunities for organisations located in developing countries (Lang, 1997). Even though there is weak empirical evidence that trade liberalisation is a good development strategy on its own, international institutions still promote trade liberalisation in developing countries (Siddique, 2015). Hence, this thesis argues that developing countries are the ones in favour of trade liberalisation. The classification by the United Nations (2019), which has been expanded upon in section 4.3.1, will be used to identify the developing countries.

4.3.4 Creators of the WTO

It is important to understand who the creators of the WTO are to be able to test hypothesis 5. The WTO was established in 1995 as the successor of the GATT (Hoekman & Kostecki, 2009). The GATT was, unlike the WTO, not drafted as an organisation but as an agreement in 1947 (Irwin et al., 2008). The GATT would not have existed without the involvement of the U.S. Despite U.S.'s large economic power, it would have not been able to create the GATT on its own (Irwin et al., 2008). Due to the UK, the U.S. considered to establish a multilateral agreement rather than a bilateral one (Irwin et al., 2008). Moreover, due to Canada, fourteen 'nuclear states'[3] negotiated tariff reductions in smaller groups (Irwin et al., 2008). The GATT was based on a compromise of all accompanied parties (Ravenhill, 2017; Irwin et al., 2008) This is in line with Mearsheimer (1994), who said that institutions are created rationally by the most powerful states in order to maintain and/or increase the position of the most powerful. The U.S., UK, and Canada all played an important role in the creation of the GATT.

[3] Australia, Belgium, Brazil, Canada, China, Cuba, Czechoslovakia, France, India, Luxembourg, the Netherlands, New Zealand, South Africa, and the United Kingdom.

The idea to establish a single institutional framework for global trade (the WTO) came from Canada in 1990 (Hoekman & Kostecki, 2009). The EU quickly after supported its idea. The U.S. originally was opposed to the idea, but supported it after negotiations (Hoekman & Kostecki, 2009). The WTO builds on the GATT. So, similar to the GATT, the WTO has been established through the cooperation of great economic powers. Moreover, similar actors were involved, the only difference being the EU involved rather than the UK. Other (developing) states also joined the WTO because the GATT would soon cease to exist and they had commercial interest in joining the WTO. Because the UK is part of the EU in the analysis, this thesis will take into account the creators of the WTO rather than the GATT. The creators of the WTO are: Canada, the EU, and the U.S. Together, they consciously established the WTO.

5 Analysis

This chapter will reveal the results derived from the network analysis. Firstly, general information about the network will be given. Thereafter, the analysis will provided answers to the proposed hypotheses.

5.1 The network

A visualisation of the complete network can be found in Figure 1. The nodes represent the states who participate in trade-environment disputes within the WTO DSB. Those can be complainants, defendants, third parties or a mix of those three options. The edges represent the tie between the nodes. Through those edges, information can flow from one node to another (e.g. between one state to another state). In the graph, the ties are directed. This implies that the direction of the information flow is known. The size and colour corresponds to the level of in-degree centrality of nodes. The bigger, and greener a node is, the higher the level of in-degree centrality. The nodes with high in-degree centrality receive the most information (the ties are directed to them). These nodes are the complainants and the defendants of the disputes.

The whole network has a network density of 0.121. Network density refers to the actual numbers of ties divided by the possible number of ties (Scott & Carrington, 2011). A network density of 1 refers to all ties being connected with each other. The closer the number is to 0, the lesser connections between nodes exists (Scott & Carrington, 2011). In the following sections, the network is analysed in order to test the hypotheses.

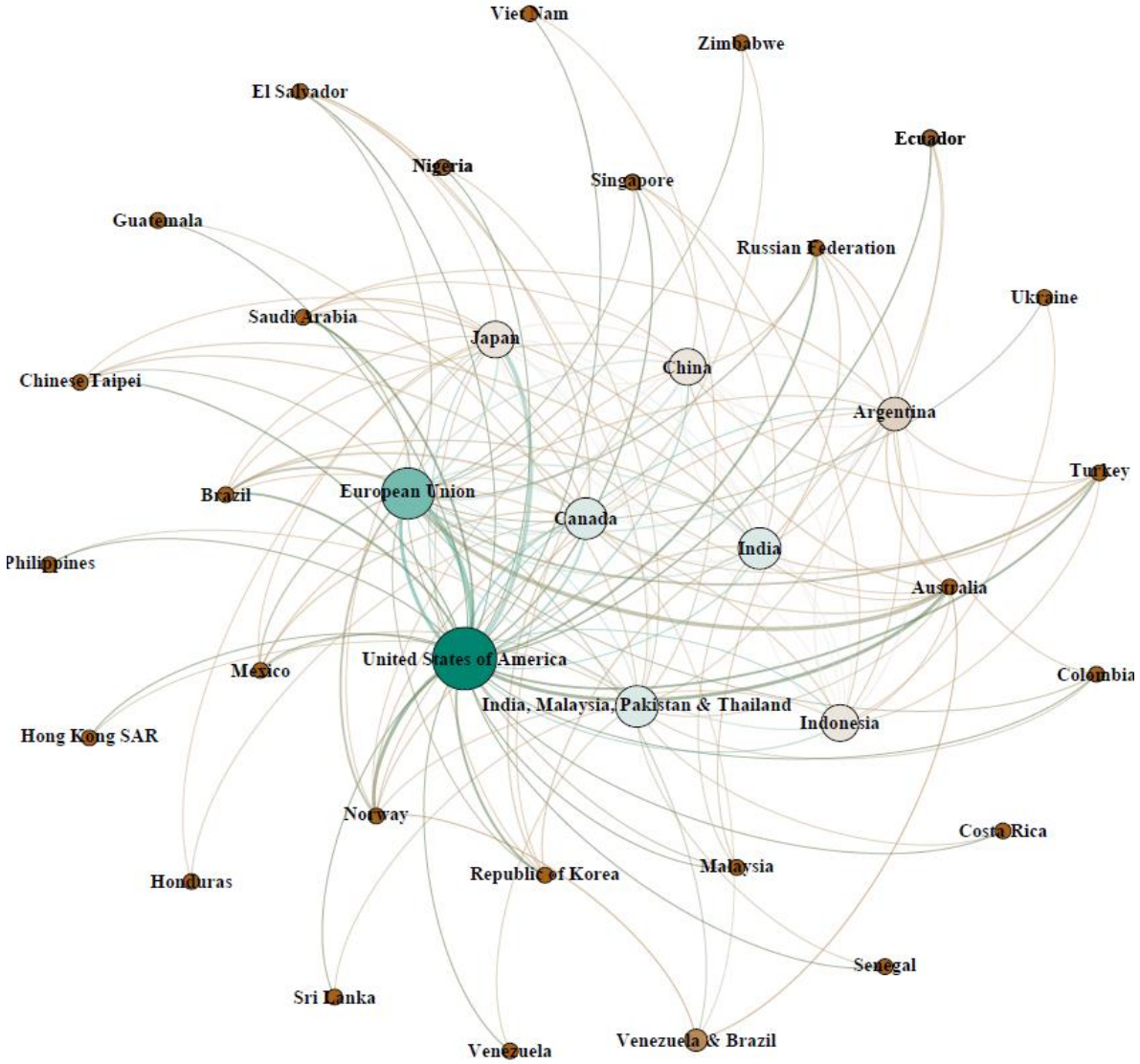

Figure 1. Whole network

5.2 Complainants

The first hypothesis is concerned with the complainants of trade-environment disputes. It was argued that developed countries are more likely to be the complainant. The combined dataset was analysed in order to establish whom the complainant in trade-environment disputes in the WTO DSB are. Table 1 contains information about the complainants in trade-environment disputes and their economic status. Ten different states (or combination of states) have filed complaints in the WTO DSB regarding trade-environment disputes. Two disputes involved a grouping of complainants (co-complainants). The co-complainants are represented in a single node in Figure 1 because the states want to increase their power through an alliance. In the two cases which involved an alliance, all complainants had the same economic status. Hence, the disputes which involved multiple complainants can also be classified as

either developed economies, economies in transition, or developed countries as specified by the United Nations (2019).

From Table 1 it becomes apparent that four complainants are developed economies, and six are developing economies. Thus, more developing economies are complainants in trade-environment disputes in the WTO DSB than developed economies. From this finding, one can conclude that the first hypothesis is not supported.

Table 1. Complainants' economic status

Complainant	Economic status
Argentina	Developing economy
Canada	Developed economy
China	Developing economy
European Union	Developed economy
India	Developing economy
India, Malaysia, Pakistan & Thailand	Developing economies
Indonesia	Developing economy
Japan	Developed economy
United States of America	Developed economy
Venezuela & Brazil	Developing economies

However, this would not be fair. There are more developing economies than developed economies. Therefore, chances are higher that developing economies file a complaint at the WTO DSB. In order to take this into consideration, a percentage is calculated. The relative number is taken instead of the absolute number. Taking into account that the EU acts as one actor within the WTO, there are only nine developed countries compared to 126 developing countries. So, 44% of the developed countries filed a complaint in the WTO. In contrast, 8% of the developing countries filed a complaint in the WTO. This is when taking into account the complainants separately (e.g. Venezuela and Brazil are considered as two countries)[4]. These percentages are visualised in Figure 2. Looking at the relative numbers, one can argue that the first hypothesis is supported. In relative terms, developed countries are more likely to be a complainant in trade-environment disputes in the WTO DSB. Thus, hypothesis 1 is supported. Developed countries are more likely to participate in trade-environment disputes as complainants.

[4] If the co-complainants would be taken as one, the percentage of developing countries filing a complaint in trade-environment disputes in the WTO DSB would drop to 5%.

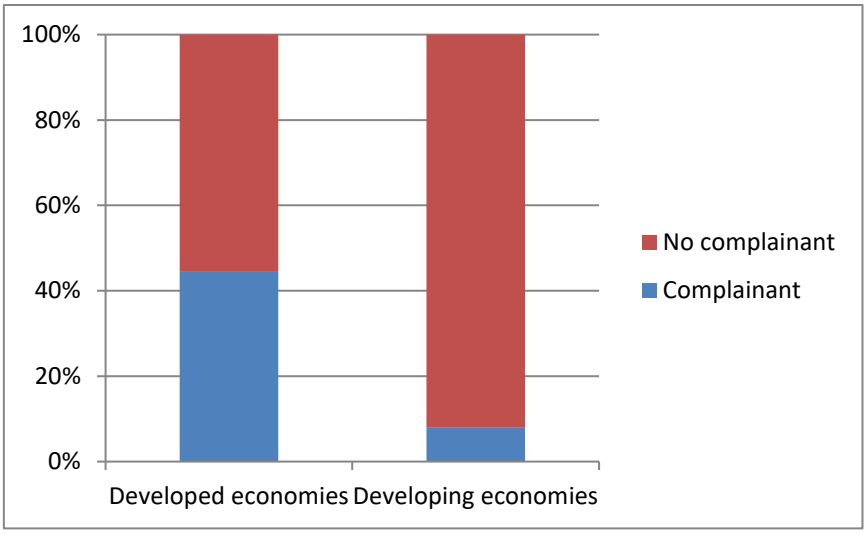

Figure 2. Complainants' percentage

5.3 Defendants

Whereas the first hypothesis focuses on the complainants, the second hypothesis focuses on the defendants in trade-environment disputes in the WTO DSB. Similar to complainants, it was argued that defendants are most likely to be developed countries. The same procedure took place as in section 5.2. In Table 2, the defendants of trade-environment disputes can be found alongside their economic status.

Table 2. Defendants' economic status

Defendant	Economic status
Canada	Developed economy
China	Developing economy
European Union	Developed economy
India	Developing economy
United States of America	Developed economy

Similar statistics that have previously been used for complainants are now used for the defendants. In absolute numbers, developed economies form the majority of the defendants (three out of five). Relatively, one third of the developed economies have been the subject of trade-environment disputes within the WTO DSB. On the contrary, less than 2% of the developing economies have been the subject of a trade-environment dispute. This is visualised in Figure 3.

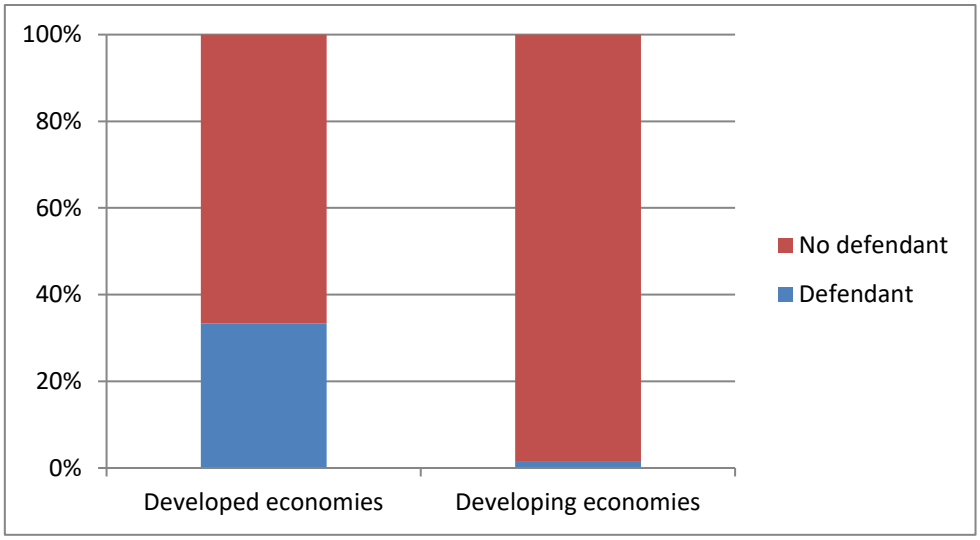

Figure 3. Defendants' percentages

Thus, hypothesis 2 is supported. Developed economies are more likely to be the defendants in trade-environment disputes in the WTO DSB. Now that it has become clear which countries raise a complaint to the WTO DSB and which countries are the subjects of these complaints, it is time to turn to the third parties.

5.4 Third parties

Third parties are measured by their out-degree centrality. Out-degree centrality represents the frequency of information flows from one node to another node. In contrast to in-degree centrality, out-degree centrality refers to information flowing out of the node; the node gives information instead of receiving it. States can have access to information that the defendant and/or complainant does not hold. By applying as a third party to environment-trade disputes, the information held by states can be transmitted to the complainant and defendant.

Hypothesis 3 argued that countries with high environmental norms are more likely to apply as third parties. Hypothesis 4 argued that countries who favour trade liberalisation are more likely to apply as third parties in trade-environment disputes in the WTO DSB. In Figure 4, all participants (complainants, defendants, and third parties) are displayed in the network. The lines between nodes represent a relationship between them. The ticker the line, the more frequent the relationship. Two nodes represent a grouping of countries. These two nodes are grouped because they brought a complaint to the WTO DSB together and/or their complaint was ruled as one in the WTO DSB. These two groupings can also be found in section 5.2, where the first hypothesis (regarding complainants) was analysed.

Previously, the size and colour of the nodes represented their in-degree centrality. This time the size and colour represent the out-degree centrality. The more often a country serves as a third party in disputes, the bigger and greener the node. The highest observed out-degree level is 10. This number belongs to Australia. Australia is most often a third party in trade-environment disputes within the WTO DSB.

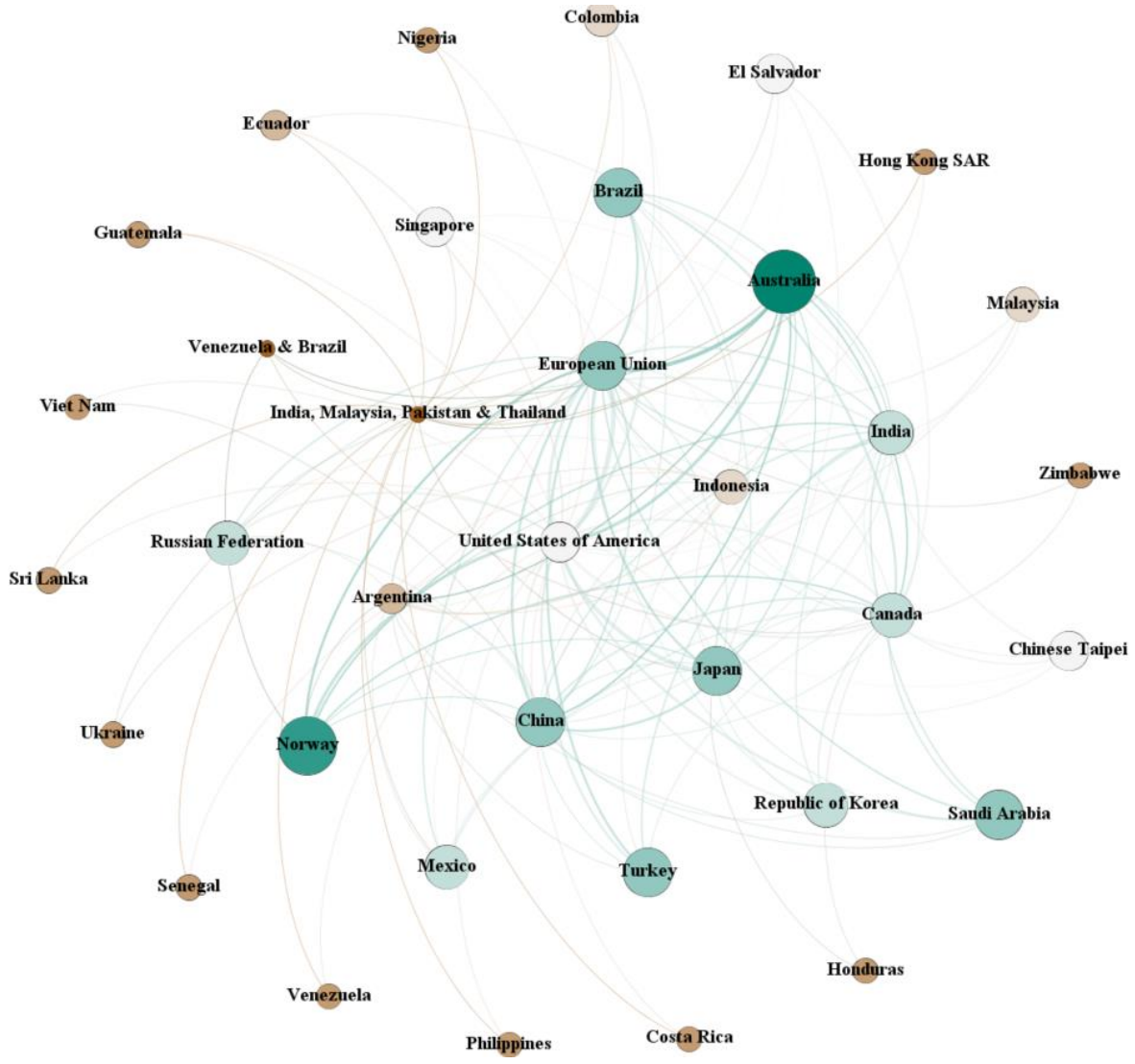

Figure 4. Third parties' network

5.4.1 Environmental norms

Subsequently, third-party countries are linked with their EPI score. In other words, the states and their frequency of participation as third parties in trade-environment disputes are being linked to their environmental norms which are reflected in their environment performance scores. The data can be found in Appendix D. Appendix D is descending based on the number of observations of them being listed as a third party. Because a third party is linked to the complainant and defendant, the minimum out-degree centrality observation is 2. Hong Kong Special Administrative Region (SAR) and Chinese Taipei do not have an EPI score. A possible explanation is the status of both territories. Both Hong Kong SAR and Chinese Taipei (also known as Taiwan) are disputed regions (Copper, 2019; Huang & Li, 2010; Lam, Lui, & Wong, 2012). Despite independence movements, China considers them part of their territory.

The frequency of countries applying as a third party in trade-environment disputes and countries' EPI score have a significant correlation of .435 ($\alpha = 0.05$; 2-tailed). This implies that there is a positive relationship between the two variables which is statistically significant. When a state has high environmental norms, they are more likely to apply as a third party in a trade-environment dispute within the WTO DSB. Moreover, the R^2 Linear is 0.189 which implies that 18.9% of the difference in outcome is explained by the model. A scatter plot visualising the correlation can be found in Figure 5. The x-axis represents the independent variable 'EPI score' whereas the y-axis represents the dependent variable 'frequency of applying as third parties'. The red line represents the correlation between the two variables. Thus, the third hypothesis, which suggests that countries with higher environmental norms are more likely to participate in trade-environment disputes in the WTO DSB as third parties, is supported.

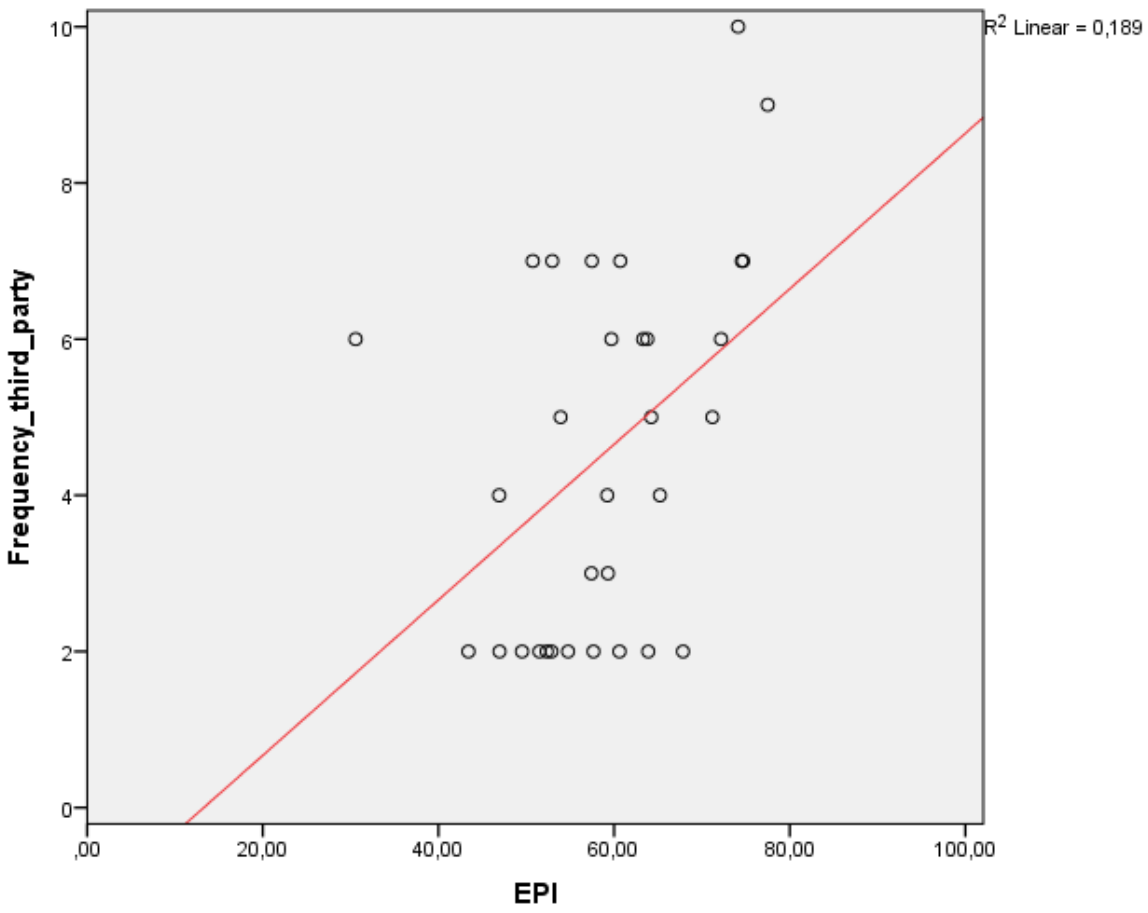

Figure 5: Correlation EPI score and third party participation

5.4.2 Trade liberalisation

The fourth hypothesis was argued that countries that are in favour of trade liberalisation are more likely to participate in trade-environment disputes as third parties. In section 4.3.3 the countries which are in favour of trade liberalisation were identified as developing countries. The classification by the United Nations (2019) was used. The economic status per third party can be found in Appendix E. The numbers within the parentheses represent the out-degree centrality. In total, six third parties came from developed economies, two from economies in transition, and 26 from developing economies. In absolute numbers, the majority of third-party countries are from developing economies, in line with hypothesis 4. Similar to hypotheses 1 and 2, the percentages per economic status is calculated to take into account the relative number rather than the absolute. The percentages are visualised in Figure 6.

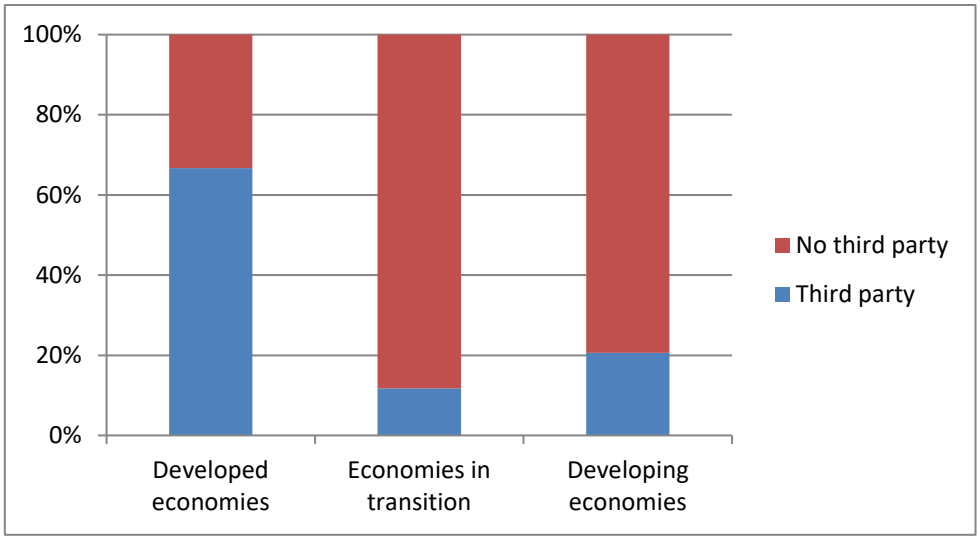

Figure 6: Third parties' percentage

Developed economies are relatively more presented as third parties than economies in transition or developing economies. Two thirds of the developed countries have participated in trade-environment disputes in the WTO DSB as third parties at least once. In contrast, 21% of the developing economies have participated as third parties in trade-environment disputes in the WTO DSB. Economies in transition score relatively the lowest with 12% participating in trade-environment disputes as third parties.

In addition, developed economies score have high out-degree centrality scores. Developed economies do not only score relatively high in being a third party in trade-environment disputes in the WTO DSB, they also apply frequently in the trade-environment disputes. It can be concluded that the fourth hypothesis, is rejected. Developed countries, not developing countries who are mostly more in favour of trade liberalisation, seem to be the most likely to participate as third parties in trade-environment disputes.

5.4.3 Third party connections

Recall that the strength of the tie reflects the number of interactions between states. By looking at tie strength, frequent interactions between states will prevail. As noted earlier, a strong tie is only possible if one of the two states is a complainant or defendant multiple times. The EU is seven times a complainant or defendant in trade-environment disputes in the WTO DSB. The U.S. six times.

The five strongest directed ties, together with their tie strength, can be found in Table 3. The numbers reflect how strong the directed relationship between two states is. This is also visualised in the thickness of the tie in Figure 4. A directed tie indicates that information flows from one node to another node. In this paper, it reflects the information third parties provide to the complainant or defendant.

The EU is often a third party when a dispute involves the U.S. (either as a complainant or defendant), more than any other state. Japan also joins disputes where the U.S. is either the complainant or defendant but not as often as the EU. Taking other defendants and/or complaints into account, Australia often applies as a third party in trade-environment disputes in which the EU is involved. This could imply that these countries are strategic allies or have another type of relationship with each other which influence their decision to apply as third parties.

Table 3. Directed tie strength

From	To
European Union (6)	United States of America
Australia (5)	European Union
Japan (5)	United States of America
Australia (4)	United States of America
Norway (4)	United States of America

The fifth hypothesis was concerned with the creators of the WTO. It was argued that the creators of the WTO have the most third party connections. In order to investigate which nodes have the most third party connections, the level of in-degree centrality is taken into account. In total, the number of countries (or bloc of countries) having an in-degree centrality score is ten. Countries can either be grouped because they act as a united bloc in the WTO (the EU) or because they filed a complainant together (e.g. India, Malaysia, Pakistan and Thailand). These are the countries which are a complainant, defendant or both. Sections 5.2 and 5.3 have discussed who the complainant and defendants are. Figure 1 presents a visualisation of the whole network, with nodes size and colour representing their in-degree centrality levels.

Table 4 Countries' in-degree centrality score

Country	In-degree centrality
United States of America	29
European Union	22
Canada	16
India	16
India, Malaysia, Pakistan & Thailand	16
China	13
Indonesia	13
Japan	13
Argentina	11
Venezuela & Brazil	4

Table 4 presents the in-degree centrality levels per node. The U.S. scores the highest, with an in-degree centrality score of 29 followed by the EU with an in-degree centrality score of 22. The third place is shared by Canada, India and the co-complainants India, Malaysia, Pakistan and Thailand with an in-degree centrality score of 16. Venezuela and Brazil score the lowest with an in-degree centrality score of 4.

The U.S., EU, and Canada all played an important role in the creation of the WTO, the successor of the GATT (Hoekman & Kostecki, 2009). For the GATT, the U.S., UK, and Canada played an important role (Irwin et al., 2008). Because the EU functions as a bloc within the WTO it is impossible to investigate third party connections to the UK specifically. From the analysis it becomes clear that the U.S. has the most third party connections followed by the EU. Canada shares its third place with India and the co-complainants India, Malaysia, Pakistan and Thailand. Hence, it can be concluded that the creators of the WTO have the most third party connections. Thus, hypothesis 5 is supported.

5.5 WTO DSB outcomes

The final hypothesis was concerned with third party connections influencing the final ruling of the court. In section 3.3.3 it was argued that through third party connections, state's gain social power. This underlying assumption will first be checked. Power within a network can be calculated through running the betweenness centrality of nodes. Betweenness centrality refers to the dependency of one node to stay connected. Actors are dependent on the node with the highest betweenness centrality to channel their information through. In short, the country with the highest betweenness centrality has the most power. Third parties rely on them to stay connected.

In Gephi, the network diameter is calculated. This gives a number of 3. The network diameter implies that the shortest path between the two most distant nodes has a length of 3. Information channels to a maximum of 3 nodes before the two furthest nodes in the network reach each other. All nodes have to go through a defendant or complainant before they are able to reach another node. Complainants and defendants, therefore, are the most important actors in the network.

The betweenness centrality per country is calculated through Gephi. The higher the value, the more social power the node has within the network. Power is derived from the ability to connect nodes to the network. Other nodes depend on nodes with high betweenness centrality levels to stay connected. The more nodes are dependent on a single node, the higher betweenness centrality that single node has. The betweenness centrality values per country can be found in the Table 5. The countries excluded from this table have a betweenness centrality of 0.

Table 5. Betweenness centrality

Country	Betweenness centrality
United States of America	82.80
European Union	51.73
Canada	25.50
Japan	15.90
China	10.80
India	9.07
Indonesia	7.28
Argentina	4.92

According to betweenness centrality, the three most powerful countries are the U.S., the EU, and Canada. Many nodes are dependent on them to stay connected to trade-environment disputes within the WTO DSB. This comes as no surprise; the U.S., the EU and Canada were all in the top three of most third party connections. Hence, the more third party connections, the more power (which is represented in their betweenness centrality).

Nevertheless, the sixth hypothesis is not concerned with the (social) power of individual states but rather with how that power influences the final ruling of trade-environment disputes in the WTO DSB. Social power, as elaborated above, is the explanatory factor of how third party connections may influence the court to rule in their favour. The next step is to examine the final outcomes of the trade-environment disputes.

All but one of the disputes has been settled at present. DS510 '*United States – Certain Measures Relating to the Renewable Energy Sector'* has requested the AB for an appeal. However, until today no ruling by the AB has taken place due to a queue of appeals pending (WTO, n.d.c). Therefore, the panel ruling is taken as its final ruling.

The final rulings as the mode of the articles per disputes are displayed in Table 6. The mode of all article rulings is calculated to establish to whom the judges rule in favour of and to whom they rule against. In case a dispute's mode was 3 (meaning other), a different approach was used. In those cases, the final ruling was coded as unknown when the judges ruled 3 (other) on more than half of the articles. This implies that it is unclear to whom the judges ruled in favour of. In case the majority of the articles were either rejected or accepted but the mode was still 3, the judges' ruling was based on the next in line (e.g. articles that were either rejected or accepted). A complete overview per ruling per article can be found in Appendix F. The mode of all article rulings, which is based on the final ruling per article, can be found in Appendix E. The final ruling per article is seen from the complainants' point of view (e.g. a claim accepted is in favour of the complainant). The adjudication by the judges on the overall outcome of trade-environment disputes within the WTO DSB can be found in Table 6.

Table 6. Claims adjudicated

Dispute	Ruling in favour of	Ruling against
DS2 & DS4	United States of America	Venezuela & Brazil
DS58 & DS61	United States of America	India, Malaysia, Pakistan & Thailand
DS135	European Union	Canada
DS412	Canada	Japan
DS426	European Union	Canada
DS437	China	United States of America
DS456	United States of America	India
DS473	European Union	Argentina
DS480	Indonesia	European Union
DS510	Unknown	Unknown

The last dispute, DS510 '*United States – Certain Measures Relating to the Renewable Energy Sector'* is the only dispute in which the judges did not clearly rule in favour of the complainant or defendant. The mode of the articles of this dispute was 3, which implied 'other'. Therefore, it remains unclear to

whom the judges ruled in favour of in the panel stage. As previously mentioned, this case is still waiting for an appeal in the AB (WTO, n.d.c).

Moreover, the U.S. and the EU have won the most cases. Both won three cases, while also losing one. The U.S. and the EU were the most powerful states within the network by looking at their betweenness centrality (respectively 82.80 for the U.S. and 51.73 for the EU). Surprisingly, both China and Indonesia have managed to win a case against these two powerful states despite their relatively low power derived from their position in the network. China scores a 10.80 on betweenness centrality. Indonesia scores even lower with a 7.28 for betweenness centrality. Thus, the results show that in all but two cases, the country with the highest betweenness centrality prevailed in trade-environment disputes within the WTO DSB. Interestingly, the two disputes in which countries with a lower betweenness centrality won appeared later in time.

To conclude, the WTO DSB has ruled mostly in favour of the nodes with the most third party connections (the U.S. and the EU). This is in line with the expectations derived from hypothesis 6. It seems that the more third party connections a state, the more power a state has, and the more likely it is that the WTO DSB rules in the state's favour. Therefore, hypothesis 6 is supported. The next section will discuss to the theoretical implications of the findings.

6 Discussion of findings

The aim of this study is to investigate the role of third parties in trade-environment disputes in the WTO DSB. In order to understand the influence of third parties on the disputes, the actors and their connections were first investigated before turning to the final ruling of the disputes. All but one of the hypotheses gain support. This chapter will expand on the theoretical implications of the findings.

6.1 Theoretical implications

6.1.1 Participants

The first two hypotheses focused on the economic status of the complainant and the defendant. It was argued that large economies are more likely to be involved in WTO disputes because of their market size as well as diverse economy (Sattler & Bernauer, 2011). Sattler and Bernauer (2011) argued that this is a result of gravitation. In other words, because of their market size and diverse economies, developed countries are more often the subject of litigation. The analysis performed in this paper is in line with the expectations derived from these previous papers. Developed economies are more likely to be involved in trade-environment disputes in the WTO DSB, be it either as a complainant or a defendant. In addition, China and India have both been identified as complainants and defendants. Despite being categorised as developing countries by the United Nations (2019), both countries have become major economic actors in the global market due to rapid economic growth (Paul & Mas, 2016). Hence, China and India being participants in trade-environment disputes is still in line with the expectations derived from previous literature due to their market size.

Moreover, Bechtel and Sattler (2015) and Bown (2005) argued that countries have different legal capacities. Financial capacity and teams with specific WTO law knowledge is required to take a case to court (Walters, 2011). Thus, it would be more likely for developed countries to bring a case to the WTO DSB. The findings support this. Despite the absolute numbers being in favour of developing countries litigating countries to court, the relative numbers show that developed countries are more likely to bring a case to the WTO DSB. Furthermore, two cases show a grouping of developing countries litigating the U.S. at the WTO DSB. Despite Brazil lodging its own complaint, the court decided to rule Venezuela's and Brazil's claim as one. In the other case, India, Malaysia, Pakistan and Thailand grouped together to file a violation of the law towards the U.S. It could be the case that this was a result of financial and legal constraints. According to Borgatti and Halgin (2011) unionization of actors increases their power. Through unionization, the developing countries would have sufficient capacity to litigate the U.S. to court. Nevertheless, the power derived from the unionization was not enough to compel the judges to rule in their favour. Power is also derived from other factors such as states position in the network.

6.1.2 Third parties

The third and fourth hypotheses focused on the strategic behaviour of third parties. States only participate as third parties after thoughtful consideration, which results in a deliberate choice to participate or not (Busch & Pelc, 2010; Johns & Pelc, 2014). Constructivism holds that states act according to their norms. The disputes in the WTO concern trade norms. However, the disputes under review do not solely focus on trade; they focus on the clash between trade and environment. Consequently, hypothesis 3 argued that states with high environmental norms are more likely to apply as third parties in trade-environment disputes in the WTO DSB. In contrast, hypothesis 4 argued that states who favour trade liberalisation are more likely to apply as third parties in WTO trade-environment disputes.

Busch and Reinhardt (2006) argued that third parties in the WTO DSB were often the three economic superpowers (U.S., EU, and Japan). These three countries have also applied as third parties in trade-environment disputes. However, despite scoring relatively high compared to others, they were not the countries with the most third party applications. The EU and Japan shared their third place with Brazil, China, Saudi Arabia, and Turkey. The U.S. in contrast, shared the 14th place with El Salvador, Chinese Taipei, and Singapore. This can be explained due to the high participation rate of the U.S. as either complainant or defendant in trade-environment disputes in the WTO DSB. The U.S. cannot be a third party to their own dispute. Nevertheless, the analysis showed that third parties are relatively often developed economies in trade-environment disputes. This is contrary to what was expected. It was expected that developing economies would be more likely to apply as third parties because they are in favour of trade liberalisation. A possible explanation could be that trade liberalisation is not beneficial to developing countries per se. Rodrik (2001) criticizes the causal effect between trade liberalisation and economic growth. Trade liberalisation does not automatically lead to economic growth, other measures need to be implemented too.

Moreover, Busch and Reinhardt (2006) found that Canada, India, Australia, Mexico, Korea, Norway, Chile, and Switzerland often serve as third parties. Interestingly, Chile and Switzerland both did not once participate as a third party in any of the trade-environment disputes. The others did and scored relatively high. Australia scored the highest, followed by Norway. All the others scored lower but still in the top range. In other words, trade-environment disputes do not differ significantly from other disputes within the WTO DSB regarding the countries that participate as third party with the exception of Chile and Switzerland. This is interesting because Switzerland did score highest on environmental performance with an EPI score of 87.42. The analysis showed that state's environmental performance scores are positively correlated with the frequency of states' participation as third parties in trade-environment disputes. Therefore, you would expect Switzerland to apply as a third party in trade-environment disputes in the WTO DSB. However, Switzerland did not. Chile, on the contrary, ended

up in the middle with an EPI score of 57.49. Moreover, despite increasing importance of environmental and labour issues in Chile due to trade agreements, environmental and labour issues are not actively promoted (Bull, 2007). Hence, it is not that surprisingly that Chile did not participate as a third party in trade-environment disputes in the WTO.

Furthermore, the analysis showed that some countries have strong ties (e.g. high number of interactions between states). The EU is most often the complainant or defendant in a dispute. Despite the EU being ranked the number one complainant/defendant, the analysis showed that the strongest relationships were those in which the U.S. is involved. A possible explanation could be the phase in which the dispute ends. Even though Busch and Reinhardt (2006) argue that third parties already join at the consultation stage, two disputes in which the EU was involved settled at the consultation stage with no third parties involved.

The fifth hypothesis was focused on third party connections and the creators of the WTO. According to realists, institutions reflect the distribution of power in the world (Mearsheimer, 1994). Powerful states create institutions strategically. Because institutions are created by the powerful to maintain and/or increase their position in the world, institutions will be beneficial to powerful actors. Based on this reasoning, the creators of the WTO (U.S., EU, and Canada) would have the most third party connections.

The analysis showed that the U.S. had the most third party connections in trade-environment disputes, followed by the EU. Canada shared its third place with India and the co-complainants India, Malaysia, Pakistan & Thailand. These findings support Slaughter (2009) who argued that the U.S. has the potential to become the country with the most connections. Moreover, the findings support the hegemonic stability theory by revealing that the creators of the WTO have the most third party connections in trade-environment disputes in the WTO DSB.

Even though this thesis has focused on third party connections in trade-environment disputse in particular, it should be noted that non-state actors are also able to submit information under *amicus curiae* submissions. Under DS58 and DS61 '*United States – Import Prohibition of Certain Shrimp and Shrimp Products'* NGOs were allowed to submit *amicus curiae* briefs (Ravenhill, 2017). However, the acceptance of *amicus curiae* briefs in court is not self-evident. In DS135 *''European Communities – Measures Affecting Asbestos and Products Containing Asbestos'* the AB refused 17 applications to an *amicus curiae* submission. Moreover, the AB also refused the 14 unsolicited submissions from non-governmental organisations (WTO, n.d.b).

6.1.3 WTO DSB outcomes

The analysis shows that the U.S., the EU, and Canada are the three most powerful actors in WTO DSB trade-environment disputes based on their position in the network. Other nodes depend on them to stay connected. Earlier, it had become clear that the U.S., EU, and Canada (the last one sharing its thirds place) have the most third party connections. It therefore becomes apparently that states with a high number of third party connections, have the most social power. Moreover, the analysis revealed that the WTO DSB often rules in favour of the most powerful.

Nevertheless, the trend shows that regarding trade-environment disputes, the WTO DSB is slowly becoming less in favour of the most powerful. Out of the last five disputes, China and Indonesia won two disputes at the expense of the U.S. and the EU. In the last dispute, the judges did not rule in favour of any of the parties. Previous research has highlighted criticism towards the WTO DSB which has questioned the legitimacy of the organisation (Garrett & Smith, 2002; Jinnah & Morgera, 2013; Kulovesi, 2011; Walters, 2011). Thus, judges do not rule in favour of the most connected country per se.

In line with this trend, Sweeney (2014) argues that the hegemonic position of the U.S. is in danger. Its power is decreasing. This is problematic because the WTO DSB legitimacy depends on the power of those who created them or the support of a central hegemon. According to Carter and Mol (2006) China plays an increasingly important role in global environmental politics. Moreover, China is a hegemon in-the-making. If they will, they will alter (environmental) politics and governance in the world. According to Baldwin and Carpenter (2009) the power of three main trading powers EU, U.S., and Japan is decreasing due to the rise of emerging economics. Both aspects will further undermine the legitimacy of the WTO DSB in the future.

6.1.4 Research question

The research question presented in this paper was: *How do third parties connections affect the final ruling of trade-environment disputes in the WTO dispute settlement body?* In order to answer this research question, the participating states and their connections needed to be investigated first. Therefore, the sub question was formulated as follows: *How are the third parties connected to the complainant or defendant in trade-environment disputes in the WTO dispute settlement body?*

From the analysis it can be concluded that relatively many developed economies are involved either as a complainant, defendant or third party in trade-environment disputes in the WTO DSB. Furthermore, countries with high environmental norms deliberately chose to participate in these disputes by applying as third parties. In other words, third parties are connected to trade-environment disputes in the WTO DSB out of a strategic decision which is derived from their environmental norms. Moreover,

the creators of the WTO have the most third party connections in trade-environment disputes in the WTO DSB.

These connections matter for social power. States social power is derived from the position they have within the network. Through third parties, complainants and defendants receive information that would otherwise be unavailable to them. The analysis shows that states which have the most unique connections have the most social power. Through these unique connections, novel information flows. The creators of the WTO are the ones with the most social power. Judges are more likely to rule in favour of the powerful in trade-environment disputes.

To conclude, connections matter because of information exchange. States' economic and institutional power plays an important role in creating and strengthening social relations. Due to their economic power, powerful states have the ability to create an international institution. International institutions enhance their power. Through these institutions they establish stronger connections. Third party connections have a positive effect on the final ruling of the WTO DSB in trade-environment disputes. The final ruling is mostly in favour of the party with the most third party connections. So, third party connections affect the final ruling of the WTO DSB in trade-environment disputes through enhancing the social power of the complainant/defendant. The WTO DSB is more likely to rule in favour of the party with the most third party connections.

7 Conclusions

This chapter will summarise the findings of the thesis. Moreover, it will provide an overview of the limitations of this study and provide guidance for future research. Furthermore, the practical implications of this study will be addressed.

7.1 Summary

All but one of the hypotheses gain support. Developed economies are most likely to be a complainant, defendant and third party in a trade-environment dispute in the WTO DSB. Furthermore, third parties that are involved tend to have high environmental norms. Moreover, the creators of the WTO have the most third party connections. This enhances their social power. The WTO DSB is more likely to rule in favour of the country with the most social power.

7.2 Limitations and future research

A number of limitations need to be addressed. First of all, third parties are linked to the disputes. By applying as third party they tie themselves both to the complainant and the defendant. They are present to provide additional information and therefore have the possibility to alter the ruling (Busch & Pelc, 2010). However, the information provided by third parties might not give equal power to the complainants and defendants. In this thesis, third parties were connected to both the complainant and defendant, increasing both complainants' and defendants' powers. According to Bechtel and Sattler (2015), third parties that align with the complainant gain considerably more than those with a neutral stance. It would therefore be possible that third parties do not give equal power to both the complainant and defendant. Third parties that are aligned to the complainant will probably provide information that is beneficial to the complainant, not the defendant. Hence, the complainant will gain considerably more from the third party than the defendant. Future research could investigate the relationship of each third party and the defendant and complainant individually to gain a better understanding of the stance of the third party. This will give a more nuanced view of the network as a whole.

Furthermore, the unit of analysis (nodes) in this thesis were states. Those states must be part of the WTO in order to participate in trade-environment disputes in the WTO DSB. However, the complainants' network has shown that states can be grouped. Either states file a complaint together (India, Malaysia, Pakistan, and Thailand), or the judge may decide to rule two cases as one (which resulted in Venezuela and Brazil being co-complainants). As a result, not all nodes in the network represented a single state. Two nodes showed a grouping of states. This approach was chosen because it would otherwise affect the level of out-degree of third parties. E.g. Nigeria is linked once in the network of trade-environment disputes in the WTO DSB through DS58 & DS61 (which are considered as one ruling). Therefore, Nigeria has an out-degree centrality of 2; one tie connects

Nigeria to the defendant, the other tie to the complainant. However, if the states that united themselves as complainants would be split, the out-degree centrality of Nigeria would rise to 5; one tie to the defendant, and four ties to the co-complainants. This would greatly distort the results. Moreover, Borgatti and Halgin (2011) argued that states could increase their power through coordination and unionization. Therefore, this approach was chosen. Future research could take this into consideration. For example, future researchers could investigate what the effect is of splitting the complainants so that every node represents a single state. In addition, they could look into the possibility of adding weights to the ties.

Thirdly, this paper has focused on the behaviour of states within the WTO framework. However, being a unit of a particular group or network does not exclude membership to other groups or networks (Scott & Carrington, 2011). Different levels of group membership exist as well as cross-cutting ties between groups. In other words, even though states are tied together within the WTO framework, this does not withhold them of being connected to each other in different ways. Think for example of RTAs or MEAs. Ties created through these agreements may influence the ties within the WTO network and vice versa. Bown (2005) argues that states are less likely to participate as co-applicants or third parties when a country is reliant on the other country for bilateral assistance or when a PTA exists among them. This highlights that multiple layers of relationships exists between countries which affect their behaviour within the WTO DSB. According to Monteiro (2016), RTAs involving environmental provisions are increasing. Therefore, it is possible that the effect of RTAs on the WTO DSB will be stronger in the future. Future research should take into account the multiplicity of group membership and other types of relations between countries when investigating states' participation in the WTO DSB.

7.3 Practical implications

The dilemma between trade and environment has recently been focused on climate-related issues. Whereas the first cases in the dataset involved environment-related disputes, the latter are focused on climate specific disputes. Therefore, it comes to no surprise that Dröge et al. (2018) argues to expand the Committee of Trade and Environment to include climate change policies. Moreover, the WTO DSB could improve itself by having more climate expertise in place (Droege et al., 2016). Experts can provide panels with more information and insights on climate in trade-environment disputes.

Furthermore, the majority of disputes are settled in the consultation stage (Busch & Reinhardt, 2006; Ravenhill, 2017). Trade-environment disputes differ on this matter. Only four out of the fourteen disputes were settled in the consultation phase. All others were resolved in either the panel or the AB. This is an interesting observation because mostly states prefer to settle a dispute in the consultation phase (Busch & Reinhardt, 2006; Ravenhill, 2017). States prefer to settle a dispute in the consultation

stage because nobody is assigned official blame (Busch & Reinhardt, 2000). Apparently, there is something unique about trade-environment disputes which distinguishes them from the rest of the disputes handled in the WTO DSB. This thesis addresses the importance of making distinctions between disputes based on the topic that they cover.

Through network analysis power dynamics in trade-environment disputes within the WTO DSB have been disclosed. Judges mostly rule in favour of the most powerful. The most powerful are the developed countries that have established the WTO. This is in line with the criticism the WTO DSB receives. Critics argue that it mainly serves the interests of the most powerful. The WTO DSB fails to adequately punish those in power (Walters, 2011). Instead of being neutral arbitrators, WTO DSB judges are influenced by politics (Dunoff, 1999; Kelemen, 2001). Through establishing an international institution like the WTO, powerful countries increase their power by positioning themselves well within the organisation which strengthens and/or creates new social relations.

Notably, the trend is becoming less in favour of the most powerful. The less powerful states are able to win some disputes (or no clear winner is being detected). This could be an underlying reason why the U.S. is blocking the appointments of new AB judges, consequently paralysing the WTO DSB (Walker, 2019). No disputes can be settled in the AB anymore due to the lack of judges. Despite the powerful position of the U.S. in the network, they did recently lose a case against China and had one case undecided (against India). The U.S. is not only facing difficulties maintaining their powerful position within the WTO DSB but also in general (Sweeney, 2014).

As the current COVID-19 crisis hits most parts of the world, a bigger call for sustainable development arises (Gallagher, Kring & Ocampo, 2020; Gurría, 2020). The dilemma between trade liberalisation and environmental protection is therefore even more pressing today. A quote from OECD Secretary General Angel Gurría (2020): “Stimulus packages need to be aligned with ambitious policies to tackle climate change and environmental damage. Only such an approach can deliver win-win-win policies for people, planet and prosperity” (para. 2). However, policies created by national governments to protect the environment can encounter resistance in the international community. As a result, more cases could be brought to the WTO DSB.

In a world that’s getting more and more integrated due to globalisation, power derived from relations has gained momentum. Therefore, it is important to create (valuable) connections. In order to win, one needs to position themselves favourably in the web.

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9 Appendices

Appendix A. Developed economies

Developed economies		
Australia	**Germany**	**New Zealand**
Austria	**Greece**	**Norway**
Belgium	**Hungary**	**Poland**
Bulgaria	**Iceland**	**Portugal**
Canada	**Ireland**	**Romania**
Croatia	**Italy**	**Slovakia**
Cyprus	**Japan**	**Slovenia**
Czech Republic	**Latvia**	**Spain**
Denmark	**Lithuania**	**Sweden**
Estonia	**Luxembourg**	**Switzerland**
Finland	**Malta**	**United Kingdom**
France	**Netherlands**	**United States of America**

United Nations (2019)

Appendix B. Transition economies

Transition economies		
Albania	**Kazakhstan**	**Tajikistan**
Armenia	**Kyrgyzstan**	**Turkmenistan**
Azerbaijan	**Montenegro**	**The former Yugoslav Republic of Macedonia**
Belarus	**Republic of Moldova**	**Ukraine**
Bosnia and Herzegovina	**Russian Federation**	**Uzbekistan**
Georgia	**Serbia**	

United Nations (2019)

Appendix C. Developing economies

Developing economies		
Afghanistan	**Gabon**	**Oman**
Algeria	**Gambia (Islamic Republic of the)**	**Pakistan**
Angola	**Ghana**	**Panama**
Argentina	**Guatemala**	**Papua New Guinea**
Bahamas	**Guinea**	**Paraguay**
Bahrain	**Guinea-Bissau**	**Peru**
Bangladesh	**Guyana**	**Philippines**
Barbados	**Haiti**	**Qatar**
Belize	**Honduras**	**Republic of Korea**
Benin	**Hong Kong SAR**	**Rwanda**
Bhutan	**India**	**Samoa**
Bolivia (Plurinational State of)	**Indonesia**	**Sao Tome and Principe**
Botswana	**Iran (Islamic Republic of)**	**Saudi Arabia**
Brazil	**Iraq**	**Senegal**
Brunei Darussalam	**Israel**	**Sierra Leone**
Burkina Faso	**Jamaica**	**Singapore**
Burundi	**Jordan**	**Solomon Island**
Cabo Verde	**Kenya**	**Somalia**
Cambodia	**Kiribati**	**South Africa**
Cameroon	**Kuwait**	**South Sudan**
Central African Republic	**Lao People's Democratic Republic**	**Sri Lanka**
Chad	**Lebanon**	**State of Palestine**
Chile	**Lesotho**	**Sudan**
China	**Liberia**	**Suriname**
Colombia	**Libya**	**Syria Arab Republic**
Comoros	**Madagascar**	**Taiwan Province of China**

United Nations (2019)

Appendix C. Developing economies (Continued)

Developing economies		
Congo	**Malaysia**	**Thailand**
Costa Rica	**Maldives**	**Timor-Leste**
Côte d'Ivoire	**Mali**	**Togo**
Cuba	**Mauritania**	**Trinidad and Tobago**
Democratic People's Republic of Korea	**Mauritius**	**Tunisia**
Democratic Republic of the Congo	**Melawi**	**Turkey**
Djibouti	**Mexico**	**Uganda**
Dominican Republic	**Mongolia**	**United Arab Emirates**
Ecuador	**Morocco**	**United Republic of Tanzania**
Egypt	**Mozambique**	**Uruguay**
El Salvador	**Myanmar**	**Vanuatu**
Equatorial Guinea	**Namibia**	**Venezuela (Bolivarian Republic of)**
Eritrea	**Nepal**	**Viet Nam**
Eswatini	**Nicaragua**	**Yemen**
Ethiopia	**Niger**	**Zambia**
Fiji	**Nigeria**	**Zimbabwe**

United Nations (2019)

Appendix D. Environmental Performance Index (EPI)

Country	EPI
Australia (10)	74.12
Norway (9)	77.49
Brazil (7)	60.70
China (7)	50.74
European Union (7)	74.53
Japan (7)	74.69
Saudi Arabia (7)	57.47
Turkey (7)	52.96
Canada (6)	72.18
India (6)	30.57
Mexico (6)	59.69
Republic of Korea (6)	63.30
Russian Federation (6)	63.79
El Salvador (5)	53.91
Chinese Taipei (5)	-
Singapore (5)	64.23
United States of America (5)	71.19
Colombia (4)	65.22
Indonesia (4)	46.92
Malaysia (4)	59.22
Argentina (3)	59.30
Ecuador (3)	57.42
Costa Rica (2)	67.85
Guatemala (2)	52.33
Honduras (2)	51.51

Appendix D. Environmental Performance Index (EPI) (Continued)

Country	EPI
Hong Kong SAR (2)	-
Nigeria (2)	54.76
Philippines (2)	57.65
Senegal (2)	49.52
Sri Lanka (2)	60.61
Ukraine (2)	52.87
Venezuela (2)	63.89
Viet Nam (2)	46.96
Zimbabwe (2)	43.41

Appendix E. Economic status third parties

Country	Economic status
Australia (10)	Developed country
Norway (9)	Developed country
Brazil (7)	Developing country
China (7)	Developing country
European Union (7)	Developed country
Japan (7)	Developed country
Saudi Arabia (7)	Developing country
Turkey (7)	Developing country
Canada (6)	Developed country
India (6)	Developing country
Mexico (6)	Developing country
Republic of Korea (6)	Developing country
Russian Federation (6)	Transition country
El Salvador (5)	Developing country
Chinese Taipei (5)	Developing country
Singapore (5)	Developing country
United States of America (5)	Developed country
Colombia (4)	Developing country
Indonesia (4)	Developing country
Malaysia (4)	Developing country
Argentina (3)	Developing country
Ecuador (3)	Developing country
Costa Rica (2)	Developing country
Guatemala (2)	Developing country
Honduras (2)	Developing country

Appendix E. Economic status third parties (Continued)

Country	Economic status
Hong Kong SAR (2)	Developing country
Nigeria (2)	Developing country
Philippines (2)	Developing country
Senegal (2)	Developing country
Sri Lanka (2)	Developing country
Ukraine (2)	Transition country
Venezuela (2)	Developing country
Viet Nam (2)	Developing country
Zimbabwe (2)	Developing country

Appendix F. Final ruling per article

Disputes	Article 1	Outcome1	Article 2	Outcome2	Article 3	Outcome3	Article 4	Outcome4	Article 5	Outcome5	Article 6	Outcome6	Article 7	Outcome7	Article 8	Outcome8
DS2 & DS4	GATT: XX(g)	2[5]	GATT :XX	2	TBT	2										
DS58 & DS61	DSU:21.5	2	GATT :XX	2												
DS135	GATT: XX(b)	2	GATT :XXIII.1(b)	2												
DS412	GATT: III.8(a)	1	GATT :III.8(a)	3	GATT:III.8(a)	3	DSU:11	2	SCM :1.1(a)	1	SCM: 1.1(a)(iii)	2	SCM:1.1(a)(1)(i)	2	DSU :11	2
DS426	TRIMs :IL.1(a)	2	GATT :III.8(a)	1	GATT:III.8(a)	1	SCM: 1.1(b)	1	DSU :11	3	SCM: 1.1(b)	3	SCM:3.1(b)	3	SCM :3.2	3

[5] 1= claim accepted
2= claim rejected
3= other (judicial economy for example)

Appendix F. Final ruling per article (Continued)

Disputes	Article 1	Outcome1	Article 2	Outcome2	Article 3	Outcome3	Article 4	Outcome4	Article 5	Outcome5	Article 6	Outcome6	Article 7	Outcome7	Article 8	Outcome8
DS437	SCM:14(d)	1	DSU:11	3	SCM:1.1(b)	1	SCM: 14(d)	1	SCM :14(d)	1	SCM: 1.1(b)	1	SCM:10	1	SCM :32.1	1
DS456	GATT: III.4	1	TRIMS: 2.1	1	GATT:III.8(a)	1	GATT :XX(d)	1	GATT:XX(j)	1						
DS473	ADA: 2.2.1.1	2	ADA: 2.2	2	GATT: VI(b)(ii)	2	DSU: 11	2	ADA : 2.2.1.1	1	ADA: 2.2	1	GATT: VI:1(b)(ii)	1	ADA : 2.2	2
DS480	ADA: 2.2.1.1	1	ADA: 2.2	1	GATT: VI(b)(ii)	1	ADA: 2.2	1	ADA : 2.2.2 (iii)	2	ADA: 2.3	1	ADA: 3.1	1*	ADA : 3.2	1*
DS510	GATT: III.4	1	TRIMS: 2.1	3	TRIMS: 2.2	3	SCM: 3.1(b)	3	SCM : 3.2	3						

*Panel upheld in part Indonesia's claim

Appendix F. Final ruling per article (Continued)

Disputes	Article 9	Outcome 9	Article 10	Outcome 10	Article 11	Outcome 11	Article 12	Outcome 12	Article 13	Outcome 13	Article 14	Outcome14	Article 15	Outcome 15	Article 16	Outcome16
DS2 & DS4																
DS58 & DS61																
DS135																
DS412	SCM: 1.1(a)(2)	3	SCM:1.1(b)	1	DSU:11	3	SCM: 1.1(b)	3	SCM:3.1(b)	3	SCM:3.2	3				
DS426																
DS437	SCM: 2.1	2	SCM:2.1(c)	3	SCM:2.1	3	DSU:11	1	SCM:12.7	3						
DS456																
DS473	ADA: 2.2.2(iii)	2	ADA: 2.4	2	ADA: 9.3	1	GATT: VI:2	1	ADA: 3.1	2	ADA: 3.4	2	ADA: 3.1	2	ADA: 3.5	2

Appendix F. Final ruling per article (Continued)

Disputes	Article 9	Outcome 9	Article 10	Outcome 10	Article 11	Outcome 11	Article 12	Outcome 12	Article 13	Outcome 13	Article 14	Outcome14	Article 15	Outcome 15	Article 16	Outcome16
DS480	ADA: 9.3	1	GATT: VI:2	1	ADA: 7	2	ADA: 9	2								
DS510																

Appendix E. Mode of all articles per disputes

Dispute	Mode
DS2 & DS4	2
DS58 & DS61	2
DS135	2
DS412	3 (less than half of the articles. Hence, the next in line is used which is 2)
DS426	3 (less than half of the articles. Hence, the next in line is used which is 1)
DS437	1
DS456	1
DS473	2
DS480	1
DS510	3 (more than half of the articles)