CONSULTANCY PROJECT FOR ICANN

Internet Fragmentation

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Table of Contents

1. EXECUTIVE SUMMARY

Internet since its conception has been revolutionizing the way people think, do business and communicate (FCC, 2013). Hostility to the current multistakeholder Internet governance model in the geo-political environment has been a significant contributor to the reconfiguration of the Internet's openness. A potential result of these tensions is Internet fragmentation (Chadwick, 2009; BBC, 2005; Arthur, 2012).

Internet fragmentation is a rising concern globally mainly due to issues regarding the control of the Internet. This topic is being discussed at international summits and conferences, and a possible fragmentation of the Internet is becoming a reality. Governments, global businesses and other stakeholders have diverse and conflicting viewpoints on how the Internet should be governed.

The main governing body of the Internet, Internet Corporation for Assigned Names and Numbers (ICANN), has raised awareness of this issue in order to protect this open source of free flowing information. They have commissioned a team of students from the University of Greenwich in the MA/MBA International Business programme to conduct exploratory research to understand the potential impact of Internet fragmentation on the current structure of stakeholder authority.

This project consists of four parts:

1. *An analysis of the social and political effects of fragmentation*
2. *An analysis of the effects of fragmentation on international trade through blockmodeling*
3. *Internet Fragmentation and its influence on global trade through interpretive analysis*
4. *Assessing the impact of Internet fragmentation on international business operations.*

1.1. An analysis of the social and political effects of fragmentation

The analysis focuses on discourse data in social and political forums on the phenomenon of Internet governance, Internet security, censorship and digital inequality. The Internet is a network of connected networks and by removing links between those networks there is a distinct possibility that societies with less resources and knowledge will be the main losers. The findings show that to a certain degree everyone will lose from multiple Internets. However developed countries are more likely to create solutions around Internet fragmentation. With the Internet becoming more accessible to new users predominantly from the developing world their interest need to be considered with respect to Internet governance models.

1.2. An analysis of the effects of fragmentation on international trade through blockmodeling

Two different processes will be used to undertake the simulation. First, business network analysis will help to introduce and visualise the global offline trading networks between countries. Second, blockmodeling analysis will help in the grouping of countries with similar characteristics, providing a deeper insight into the trading patterns. Partition vectors will be used based on different criteria to create the simulation itself.

It can be concluded that the trading links among countries will not be affected. In the worst case scenario, the current trading patterns will stay the same or slightly reduce, but will not be eliminated totally. USA and Canada and the Eastern Asian countries are the main players in the network having trade relations with every other block, and their links will not have changed after applying the vectors. English, Chinese, Japanese and Hindi languages are central connections that link every other group of countries together. The findings show that more countries will trade with Russia after a possible fragmentation.

1.3. Internet Fragmentation and its influence on global trade through interpretive analysis

The data derived for this part of the project was from elite interviews from senior officers in eight governments. Emphasis was given to two parts: the countries' preparedness for a fragmented Internet and the influence of a new governance structure on global trade.

There are ongoing discussions regarding the change of the multistakeholder model among recognised key players of Internet governance, for example Brazil and China. However, data collected for this study shows that other governments feel that Internet fragmentation is unlikely to occur, particularly based on countries' inactions in preparation for a fragmentation. According to other government officials such 'inaction' could signal a de-facto approval of the current multistakeholder model.

However, a different story emerges with regard to global trade. Different views were expressed that seem to be linked to the country level of development. Developed countries felt that Internet fragmentation would not affect global trading links, because economic growth and global business would be prioritised differently. However, the developing countries felt that they would face increased challenges in creating and maintaining their trading image. Additional barriers would lead to increased bureaucracy among trading partners leading to higher cost. This provides additional support to maintaining the current multistakeholder approach.

1.4. Assessing the impact of Internet fragmentation on international business operations

This part of the study used a bottom-up approach to identify the relationship between subsidiaries and their parent companies based on a sample of FTSE100 companies. Building on the recently developed e-Friction Index (BCG, 2014), a new model was explored to understand the potential vulnerability companies would face should fragmentation occur. The model is comprised of a weighted average

calculated using a risk value associated with the subsidiaries' industries, their locations and the parent companies' industry. This study also tests the hypothesis developed from theoretical arguments that multinational companies incur greater risk if the Internet fragments due to their decentralised functionality and a high reliance on the parent company. The typologies considered here are international, multinational, global and transnational.

The findings suggest that global companies tend to work in highly complex networks and the effects of fragmentation have no particular relationship with the typology of the company. However, the nature of operations and the relationship between parent companies and their subsidiaries create unique vulnerabilities for companies should fragmentation occur.

2. INTRODUCTION

In October 1998 in California, US a new kind of international organisation was established. The Internet Corporation for the Assigned Numbers and Names (ICANN) had the command to organise and regulate 'the technical protocols of the Internet, the Internet address space, the Internet domain name system (DNS) and the Internet root server system'. With this action, an uncommon partnership was created between the business world, the Internet community (the top decision-making body) and governments (the consultative role) (Kleinwachter and Ringgade, 2000). The Internet required a new system of governance due to its international character. This led to a three-part effect: an information revolution that led to social evolution, and then a new quality of political life. This is despite the early opinion by the 'father' of the domain name system, that the Internet needed no formal policy (Jan Postel, as cited by Kleinwachter and Ringgade, 2000).

ICANN has come under increasing pressure to reform, due to governments wanting more power over the Internet and global stakeholders worrying about unilateral U.S. oversight (Mueller, 2005). The existing multistakeholder model of Internet governance aimed to bring together primary stakeholders to cooperate and participate in dialogue, and the decision-making and implementation processes to common problems or goals (ICANNWiki.com). Therefore, it became relatively important for the US to bow to international pressure for change and/or put forth sustainable ideas for the internationalization of Internet governance.

The Internet Society (2012) believes in the creation of appropriate policy frameworks that support constant growth and progress of the Internet for all. This allows nations to adapt the frameworks to their own circumstances. If the US and others do not take steps to redress some of the recent errors in governance, the global community could face a deterioration of the Internet's current structure, giving way to a fragmented Internet.

Considering the fact that the Internet currently facilitates most global trade, Meltzer (2012) argues that there is a need for governance interference for the

following reason: privacy, property right and copyright laws, violence restriction and pornography, but also political restrictions.

Having said this, by employing a variety of technical and legal tools to block websites and platforms and to remove online content, governments are not only changing the way users connect to and participate on the global Internet, but also the way Internet actually operates (Hill, 2012). When it comes to the movement of data across borders the question is raised as to what data to restrict and how to do so appropriately.

Considering these current issues regarding Internet governance, this research study aims to critically explore the impact of a possible Internet fragmentation on social, political and economic aspects. The study hopes to offer ICANN and the Internet community with exploratory research to attain a deeper understanding of the impact of Internet Fragmentation.

This study consists of four parts:

1) An analysis of the social and political effects of fragmentation (Janthira Engeset)

2) An analysis of the effects of fragmentation on international trade through blockmodeling (Agnes Kovatsova)

3) Internet Fragmentation and its influence on global trade through interpretive analysis (Ertina Dyrma)

4) Assessing the impact of Internet fragmentation on international business operations (Lakmal Liyanage)

3. INTELLEGENCE GATHERED

3.1 Internet and Power

Studies show that there have been two main changes occurred to the Internet: 1) it became vital to social and political communication in the real world and global profit-making market and 2) radical improvements in Internet censorship and control technologies (Riley, 2013). The Internet Society (2012) highlights some of the significant figures regarding Internet power such as over 600 Million websites and over $600 billion US dollars in annual e-commerce. This underlines the notion that we now live in a world where unprecedented amounts of information can be found with ease.

The end-to-end principle, which allows the end-user on the edges of the network to connect to other end-user, creates networks that are flexible. This means that every end-user has the power and freedom to exchange and distribute information and organise actions over the entire network, without any intervention, discrimination or authorisations from anyone when the project is under development and before it reaches other users (Bertola, 2010). This principle had economic effects on the innovation, and might be the reason why the Internet succeeded as a medium and a platform.

The greatest innovation on the network has changed how people communicate, shop and live, was invented by young Internet users and even small businesses (Bertola, 2010). These innovations were often invented as a tool to make life easier. In comparison, the network operator was the one who could innovate on the telecommunication networks. Nonetheless, the Internet has not only changed the technological and economic landscape, but also society has been transformed by the adaptation and the changes it has brought (Bertola, 2010).

It can also be said that the Internet has (re)distributed power to their users by giving the freedom and ability to do and write what they want without any rules that imposed by society. Bertola (2010) also argues that the end-to-end principle for innovation can also be extended to the social level. Immediate and low-cost access to media across the world has

increased the diversity of information and the opportunities for free expression enjoyed by global citizens.

Online businesses have thrived nowadays. Mostly recognised for its power of capturing the intelligence of users, the global Internet and its movement of data across borders are due to the aggregation of the significant volume of data (Meltzer, 2012).

One of Internet's biggest impacts is seen in developing countries, (Meltzer, 2012), where most of the 2.5 billion Internet users are based. Meltzer (2012) argues that the Internet can be seen as an input of data, which comes to help the businesses. It reduces cost in internationalising.

Jones and Gapper (2014) state that the Internet is under hazard from loss of trust by its users and from increasing state control. Therefore, they urge for the possibility of crafting a new set of international laws to protect human rights online and ensure Internet stability. On the other hand, Mueller (2013) argues that it is right for Brazil, Russia, India, China and South Africa to be concerned with the extent to which an increasingly important sector of the postmodern economy seems suddenly exempt from the classical model of national control, but it should not be seen as an excuse for the sovereignty. This 'cold war' calls attention to the great powers' scope of traditional arguments about control and expansion of their terrain/sovereignty and their commercial and hi-tech interdependence.

The UK's Guardian Newspaper (2013) argues that Internet fragmentation will bring about an inconsistent de-globalisation of the world, as 'roads' within state boundaries become gradually restricted, particularly among governmental bodies and large domestic firms. Two active interest groups, among others, argue the following on the topic of Internet governance: the one who support governmental bodies to play a bigger and more direct role in managing Internet activity and the other who fear the change of the Internet as it is. Therefore, it is important to understand these bodies role in the intricate system of Internet governance in framework, not in segregation (Riley, 2013).

3.2 Geopolitics

Geopolitics plays a key role in the determination of the Internet governance future. Geopolitics refers to the condition of a region or government determined by the combination of geographical and

politics factors (Brzeziński, 1986) with an emphasis of geography on politics. Badkar (2012) writes about issues related to geopolitics which are gaining awareness globally. The open Internet is at risk of fragmentation as some governments and organisations are pushing towards regional governance. This will ultimately result in a highly restricted Internet based on user location. The Internet will then be even more influenced by certain geopolitical objections.

To have a proper debate on how much governments should be able to see of communities online behaviour, it is important to notice that many things are legal for private parties but not for the government; for example it is acceptable for Google to contract browser ads based on user information, but not to pass that information on to third party (The Economist, 2013).

Users of the Internet are inherently affected by some level of censorship (Schmidt and Cohen, 2013) due to geopolitical reasons, ranging from national security to economy to the country's culture (Deibert, 2009). An extreme scenario is the *Chinese firewall* which essentially only permits government authorised websites to be visited when connecting from inside of China. In China, all dataflow on the Internet is monitored, censored and manipulated in accordance to government needs.

While the western world attempts to distribute the authority and control of the World Wide Web and move towards a multistakeholder approach, there have been occasions where governments have decided to completely take countries off the Internet map. For example, Egypt was a country that completely controlled access to all of its population through the Internet (Dibbell, 2012). Even though the top level of Internet governance follows the multistakeholder approach, given the geo-political pressures and government laws within countries the Internet is under severe risk of fragmentation. National governments possess the right to block and remove content, which is hosted within the boundaries of their country (Schroeder, 2009). If the webpage is hosted outside the country then access to those websites is blocked through the DNS resolution process (DeNardis, 2014).

Google, Yahoo, Microsoft and Facebook are among the few companies to disclose *government* requests to remove content with the use of *transparency reports*

(Ackerman, 2014). They contain detailed information on the details of request from various governments, copyright owners to remove content as well as information request about users (Kahn, 2014; Galperin and York, 2013)

In the process of Internet governance, there is a need for a multistakeholder approach or what DeNardis and Raymond (2013) simply calls multistakeholderism as well as centralised governing. As an example, the DNS resolution is carried out through a centralised body in order to ensure global uniqueness of web addresses and sovereignty of the Internet. Discussions regarding technical standardisation and inter-operability should be carried out through a multistakeholder model. Hence, global coordination is essential for continuity and a 'global' operation of the Internet.

This concept of multistakeholder could also be used to prevent the ongoing battle of state vs the Internet (Travis, 2013). However, repressive governments can also use this as a scapegoat in order to gain additional power by the limiting the participation of non-governmental actors in formal debates and not allowing them any meaningful power. DeNardis and Raymond (2013) suggest that this method advocates a more top-down formalised multilateral approach rather than one of multistakeholderism.

3.2.1 Internet Governance

'Internet governance is the development and application by Governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programs that shape the evolution and use of the Internet.'

- Working Group of Internet Governance as cited by Drake, 2005

The Internet governance rests upon multiple key layers which are not visible to the end users. The key players in this activity include organisations such as ICANN (Internet Corporation for Assigned Names and Numbers), IANA (Internet Assigned Numbers Authority), IETF (Internet Engineering Task Force), IGF (Internet Governance Forum), ISOC (Internet Society) and IRTF (Internet Research Task Force) and W3C (World Wide Web Consortium). These organisations were initiated in the US as a direct result of the need for governance. The primary aim of these organisations was to keep the Internet open and free. Due to the facilitative nature of these organisations they are hidden from the general online population. However due to popularity of the Internet globally and the events that have occurred in the recent past there has been heavy scrutiny over

the US centric nature of Internet governance and organisations related to governance (Traynor, 2014). Hence the transition to a more realistic multistakeholder approach has been taken and the US government has released its control over IANA functions allowing ICANN 18 months to devise a smooth transition for a multistakeholder approach.

The Internet is currently governed by a multistakeholder agreement managed by ICANN, based in the USA. The policymaking process is currently taking place as an open to all the participants of the Internet method. However, the US government enjoys a unique influence on the governance of the Internet by shaping ICANN's activities though the National Telecommunications and Information Administration (NTIA) (Kruger, 2013).

All governmentsaim for Internet power either for political or economic motives. However, recently (2013) a potential debate is taking over most of the countries for Internet governance, potentially leading to one thing: Internet balkanisation. Meinrath (2013) stated that the U.S. government using Internet control power to conduct surveillance on the Brazilian president Rousseff's email and 'spying' on the country's national oil company has created complications for the governance of the Internet.

Other authors suggest that United States intervention in to governing of the Internet has raised issues over that recent past. This is one reason that countries like Russia and China have demanded for their own closed Internet.

On October 2010 during the Plenipotentiary Conference hosted by the United Nations International Telecommunication Union, most countries suggested for a system regulated by international law and not the law of California (Negron, 2012). ITU proposed the creation of an IP-address-registry within the ITU, but it was rejected by some western industrial countries who preferred the ICANN Governmental Advisory Committee (GAC). The lack of a united governance scheme for the DNS and the voiced divergence between some of the major Internet stakeholders open the opportunity for changes in the Internet governance structure (Negron, 2012).

There are two predominant issues: security and financial preparations. Also, it is difficult to manage a borderless Internet without international co-operation and

agreement. Conversely, consensus for the Internet as a paradigm for free and open communications could be built through international co-operation and agreement (Hill, 2014). Considering this, some stakeholders call for the ITU to take responsibilities and establish balance between its members.

3.2.2 Democracy

From a socio-technological perspective, the Internet is perhaps the innovation that has been most extensively associated with democracy (Dutton, 2013). In other words, the Internet has open up new channels and new ways of delivering the message, as well as political participation and collective action. Margetts (2013) argues that evidence have suggested that use of the Internet for 'non-political purposes is actually generating new forms of political participation'. These channels have made it easier to engage and reshape the ecology of interest groups as well as creating new organisational forms. Even though, this might be ideal and make more difference in the authoritarian regimes.

> *'We use Facebook to schedule the protests, Twitter to coordinate, and YouTube to tell the world'*
>
> - Anonymous Cairo Activist Chebib and Sohail, 2011

As an example, The Arab Spring uprising in 2011, where several mass demonstrations broke out in numerous regimes, started with the Tunisian uprising in December 2010, and proliferated across the region, leading to similar revolts in other Arab nations such as Libya, Egypt, Yemen, Syria and Bahrain. Allaguli and Kuebler (2011) have looked into the revolutions of Tunisia and Egypt, due to the fact that both revolutions happened nearly simultaneously, and found that both shared similarities regarding the communication technologies when shaping the outcome of the uprisings. During the uprising in Tunisia and Egypt the world witnessed a new genre of revolution. The revolution was organised with technology, networks and particularly social networks, which played an important informational and organisational role (Allagui and Kuebler, 2011). Therefore the revolutions in both Tunisia and Egypt demonstrated the power of networks Allagui and Kuebler (2011). The Jasmine Revolution in Tunisia lasted for 28 days, while the Egyptian Revolution lasted for 18 days (Chebib and Sohail, 2011). The power that social media had during this time was incredible and helped the revolution to succeed in a shorter time

period then it would have twenty years ago.

As Gladwell (2010) argues, social media could not be considered as necessary or a cause for revolution to take place, but it does play a major role, because it extends the social networks and makes them more significant. The social media was not created with intentions to start revolutions and ousting dictators, but their products have been important tools of Green Movements. The Arab Spring shows how important the Internet is for democracy and the development of society.

3.3 Digital Divide/ Inequality

After the diffusion of Internet users and the network itself, research shows that the unequal coverage of the Internet has suggested a more complicated picture about who is most likely to benefit from the mediums diffusion (Dutton, 2013, p. 129). It is therefore essential to point out the digital inequality, and how important it is to consider the implications of differentiated use for people's social status and mobility. Manuel Castells (2001, p. 248) defines digital divide as 'Inequality of access to the Internet'. Moreover, access to the Internet can be 'a requisite for overcoming inequality in a society whose dominant functions and social groups are increasingly organized around the Internet' (Castells, 2001, p. 248). Pippa Norris describes it as 'any and every disparity within the online community' (Norris, 2001, p. 4).

A diversity of opinions can be made for network neutrality, highly including the claim that the transparency of the Internet enables innovation (Solum, 2009), coordinated with government regulation of network neutrality at the national level. In addition, because of the costs of a loss of global Internet transparency are invisible and difficult to estimate, the prospects for an international agreement that guarantees the future transparency of the global Internet seem dim at best.

According to Anderson (1995) social scientists and policy makers started to worry about the inequality of Internet access as early as in 1995, even though, only three per cent of the American's had barely used the World Wide Web

(DiMaggio et al., 2004). As the technology developed and spread, observers noted some people used more Internet than others, as well as those with higher Internet access also had better access to education, income and resources (Hoffman and Novak, 1998). The concern about the new technology might make inequality worse rather than improve it. The term 'Digital Divide' was then created.

Former Secretary-General of the United Nations Kofi Annan has referred to 'Digital Divide' as: 'The new information and communications technologies are among the driving forces of globalization. They are bringing people together, and bringing decision makers unprecedented new tools for development. At the same time, however, the gap between information 'haves' and 'have-nots' is widening, and there is a real danger that the world's poor will be excluded from the emerging knowledge-based global economy' (Annan, 2002).

According to Hargattai and Hsieh (2013), researchers started noticing that international inequality had spread already in the early 1990s, as well as finding out that the developed nations were achieving higher rates of diffusion than less-developed nations (Guillén and Suárez, 2005).

In 1999, The United Nation Development program published a report arguing that the productivity gained from information technologies might enlarge the gap between the developed nations and the less-developed nations, which has less skills, infrastructure and resources to invest in the new technology and information society:

'The network society is creating parallel communication systems: one for those with income, education and literally connections, giving plentiful information at low cost and high speed; the other for those without connections blocked by high barriers of time, cost and uncertainty and dependent upon information' (Norris, 2001, p. 5; UNDP, 1999, p. 63).

While Guillén and Suárez (2005) argue that 'democratic political regimes enable a faster growth of the Internet than authoritarian or totalitarian regimes, controlling for economic development and income.'

Clearly 'Digital Divide' is still an important topic in 2014, as in 1995 when it started. Jan van Dijk argues in his book that 'most likely, the digital divide within developing countries and between them and the

development world will continue to rise' (van Dijk, 2005, p. 185). However, this might be true if the current unequal economic and social development of global society continues (Fuchs, 2011, p. 219).

3.4 Multistakeholder Model

The 'multistakeholder model' is a unique model for the Internet; it engages technologists, the private sector and the civil society 'in a bottom-up, consensus driven approach to standards settings, Internet development, and management (Shipman Wentworth, 2013). 'In other words, a ''multistakeholder model' can be describes as an organisational framework or structure, which is adopting the multistakeholder process of governance/policy making. According to Weber (2009) ICANN is a truly multistakeholder, primary because the participants represent different interest groups.

Shipman Wentworth (2013) argues that this approach has been confirmed to be effective when it comes to stability, security and the availability of the global infrastructure of the Internet. However, the sovereign nations still has the opportunity and the flexibility to develop their own Internet policies inside their borders. On the contrary, overall level the multistakeholder model is not truly democratic (Hill, 2013). Richard Hill (2014), argues that the multistakeholder model 'gives more weight to the relatively less democratic components, such as private companies, as opposed to the components who are supposed to be relatively more democratic'. As well as giving more weight to the interests of developed countries (Hill, 2014).

3.5 DNS Fragmentation

Fragmentation can happen on different levels, can be technical and social, physical and virtual, and on the domain name system (DNS) level. The DNS is fundamentally a system for planning, assigning, and recording domain names, by ensuring that the same responses to the same demands issued from any place on the Internet (Bygrave and Bing, 2009). The purpose of the DNS is to guarantee that every mass computer leads to an exclusive IP address, the failure of which leads to instability (Lenard and White, 2011).

Domain name system (DNS) level fragmentation or in other words logical layer Internet fragmentation is one of the

most influential forms of Internet fragmentation, consisting of breaking up the Internet in terms of top-level domain names (.com, .gov, etc.) (Hill, 2012). If different 'translating' systems would operate, it might cause disruptions in the flow of information, therefore in the flow of trade data as well by having unilateral root servers (non-English alphabetic general top level domains).

Hill (2012) comprehensively explains fragmentation by giving three different matrixes, and also analysing the different layers at which fragmentation might happen. Out of these layers, trade flow is also affected, but it is not clear to what extent. For instance, the exhaustion of the IPv4 numbers, and the growing demand towards the IPv6 numbers in the Asian and Pacific region is clearly dividing the Internet not only in technical terms but also, in terms of speed of access. This could lead to the disruption in the flow of trading.

Financial Times (2013) state that the major fear the NSA (National Security Agency in US) is facing the balkanisation of the Internet. Brazil has already announced plans to promote its own networking technology and the EU is considering establishing its own data cloud. At the same time, the risk that the US faces is that the unconstrained power of the agency will eventually damage America's Internet companies (Financial Times, 2013).

In the last decade, people interested in this topic made suggestions and noted different ways in which the Internet will be divided into different parts, threatening online trade among others. Levels of fragmentation can also happen on the social level, and as discussed above, filtering and censorship might also indirectly affect the flow of trade. However, to what degree fragmentation will occur in the future, or change the interoperability of the Internet is hard to predict.

3.6 Trade/Social Capital

International trade between countries acts as ties or relations, like relations between two individuals therefore social capital can be explored in this context. Social capital is seen as resources through connections whether it is reputation, wealth or even power. This concept has been widely explored by scholars, which can also be transferred and applied to the trading network of countries. The exploration of strong and weak ties between two trading partners, that are importing/exporting to

and from each other, can give a fairly good reflection about the whole trading network of the world in terms of offline trade. There are trading ties, for instance between USA and Canada or USA and China, that are very strong (measured by the import trade data). However, ties do exist where trade is not significant and carry only a low marginal value, for instance trade between European countries and African countries (Sweden-Togo for instance). These ties are affected and influenced by fragmentation, the same as multinational corporations, societies and the end users. It will be interesting to see how fragmentation can change the way countries trade, as trading might be divided, giving space for 'structural holes'. These holes, identified by Burt in 1992, have the potential to be filled in, either by individuals or by countries, by simply starting new trade relationships, therefore creating a different structural network (Burt, 1995).

3.7 Online Trade

Meltzer (2013) writes about the fact that governments are restricting the access of Internet so that customers have limited access to businesses and entrepreneurs. In some cases, restrictions may target foreign business in order for domestic businesses to benefit from these restrictions.

Yewkes and Yar (2010) argue to different reasons on why Internet is important in trading including the ability on global scale, high degree of flexibility, and holds massive potential for businesses to communicate with and collect information regarding their customers and products. McKinsey Global Institute (2011, as cited by NASDAQ, 2012) demonstrates that, at the country level, U.S. saw that an increase of both import and export resulted in a decrease of the national deficit from $43.0 billion in September to $40.6 billion in October 2013 (U.S. Department of Commerce, 2013), proving once more the big influence Internet has upon economic development as well.

Multinational companies are creating trading facilities for their customers, such as Commerce 3.0 roadmap by eBay, which equips consumers and merchants through the Internet and technology shrinking the world for them by lowering trade costs (eBay, 2012). This enables small firms to enter international market and establish international trade by making existing cross-border trade more efficient. However, in order for this roadmap to function, it is important to take consideration of efficient shipping and

border mechanisms; global payment systems; and technological platforms (Ebay, 2012).

Moreover, information found on the Internet can help businesses grow and internationalise, by approaching new techniques and innovative ideas. UNCTAD (2004) suggests that the Internet is useful to: '(a) communicate more effectively and at lower costs and (b) obtain information that facilitates transactions'.

Meltzer (2014a) argues that the Internet creates the opportunity for SMEs and for businesses in developing countries to participate in the global economy. However, he does not underestimate the hidden barriers: limits on Internet access (30% developing countries and 80% developed countries); cross-border data flow related barriers; market access restrictions on selling goods and services online and delivering goods purchased online associated with rising prices; etc.

The impact of the Internet on global trade is significant through the promotion of innovation and productivity growth by reducing transactions costs (Meltzer, 2014a). it also enables SMEs to compete in international market. In this context, a survey of 4,800 SMEs in 12 countries finds that SMEs utilizing the Internet for business functions grew at twice the rate of those that did not use Internet as platform in their business (Meltzer, 2014).

This fast-paced environment has shifted away from the traditional way of doing business to a technological revolution by only trading goods that include services; leading to trade globalization due to the significance of innovation and global economic growth (Bailey, 2000).

Overall, results showed that developing countries and emerging economies are no longer just users of e-commerce services but are also starting to act as providers of such services and related e-business models. The Internet helps motivate exports from poor countries to rich countries and it explains some of the recent growth in trade. Rather than creating new trade, Internet growth simply redirects trade toward a given country; if the country improves its access to the Internet, exports will increase (Clarke and Wallsten, 2005).

3.8 MNE Typology

A multinational enterprise (MNE) is a corporation that owns and/or controls production and holds facilities and other assets in one or more countries other than the home country (Pitelis and Sugden, 2000). Such companies have offices and/or factories in different countries and usually have a centralized head office where they co-ordinate global management.

The key to understanding such corporations is to recognise and evaluate the organisational strategies underpinning the business itself/ structure employed.

The most recent and extensive typology of MNEs was first proposed by Bartlett and Ghoshal in the late 1980s and then later revised (Bartlett and Ghoshal, 2002), dividing MNEs into global, multinational, international, and transnational corporations.

Table 1- Bartlett and Goshal's Typology

Typology	Attributes	Centralisation
International	Import/Export Oriented	Centralised only core Functions
Global	Invested in many countries, Synchronised brand image Minimal local responsiveness	Centralised Functions
Multinational	Local Operations adopting their product to the local market	Decentralised Functionality
Transnational	Global Approach And efficiency	Global Approach (Most Decentralised)

International companies are primarily importers and exporters; that is they hold no investment outside of their home country. Such companies are based in one country but trade to others. They centralise its core functions and decentralise others, adapts its strategies to take account of local differences and diffuses knowledge to its foreign divisions (Harrison, 2013).

Global companies maintain a presence and investments in many countries. They promote products through the use of a coordinated/synchronised brand image in all markets. Generally speaking, there is one corporate office that is responsible for global strategy thereby resulting in high global efficiency (Sambharyaa et al., 2005). This centralized strategy results in a higher degree of interdependence among subsidiaries, with minimal local responsiveness; that is the company makes few to no adjustments to their products or services in accordance with local culture and needs (Sambharyaa et al., 2005). The main focus of a global company is to maintain the management of cost through volume and efficiency. They have a tendency to be more centralised by retaining knowledge and power at the company headquarters (Harrison, 2013).

In both Global and International companies, the main market would be set at home. Extension to other geographical locations would be made only to those markets that exhibited similar characteristics to that of the company's home (Mead and Andrews, 2009). To contrast these two strategies, the management of the subsidiary's and marketing policy is controlled more by the headquarters in a global company.

Multinational companies invest in other countries but do not coordinate their products in each country. Instead, they focus on adapting their products or service to the individual local market. (e.g. McDonald's/Coca-Cola) In doing so, multinational companies manage their subsidiaries with a view to local responsiveness by making adjustments to their products or services to account for local differences (Sambharyaa et al., 2005). This results in the company operating with a number of decentralised subsidiaries, each operating in its own area and retaining knowledge largely within its own business unit, thereby taking advantage of differences in markets around the world (Harrison, 2013).

The *transnational company* evolved in the 1980s in response to the demands for global efficiency, national responsiveness, and worldwide learning (Bartlett and Ghoshal, 2002). Transnational companies are not identifiable through one particular home country. Although they maintain a central corporate facility, they allow each foreign market to uphold power on decision-making processes, research and development R&D and marketing functions. By extending their operations in several countries, transnational companies thereby sustain a high level of local inclusiveness (Harrison, 2013). (eg Nestlé/Unilever) This type of company designs a product to be globally competitive, and is differentiated and adapted to local subsidiaries to meet local market demands. Therefore, the

transnational strategy places simultaneous emphasis on both global efficiency and local responsiveness.

A key aspect between multinational and transnational companies is that the former company retains strong national identifications even though they operate around the world (e.g., Dell/Honda) (Schermerhorn, 2011). On the other hand, transnational companies operate worldwide, therefore without being identified with one national home. Such transnational companies view the world market as its domain for acquiring resources, locating production facilities, marketing goods and services, and establishing brand image. They seek total integration of global operations, make decisions from a global perspective and employ senior executives from many different countries (Schermerhorn, 2011). An example of a transnational company is Nestlé who employ senior executives from many countries and try to make decisions from a global perspective rather than from one centralized headquarters.

While the multinational company is responsive to change at the local level, the global company is more efficient at the global level, the international company is able to influence and disseminate knowledge to its local divisions, and the transnational company achieves global flexibility and competitiveness. Bartlett and Ghoshal clearly see the transnational company as the most appropriate type of MNE in an increasingly globalising world (Harrison, 2013).

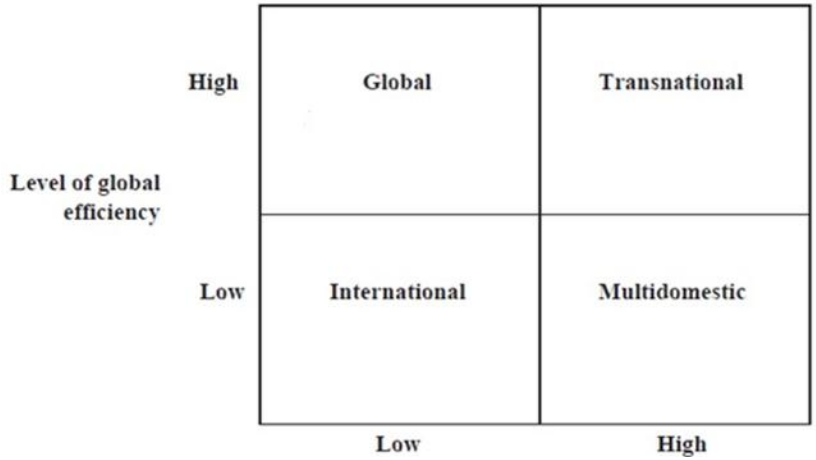


Figure 1- Company Strategy according to global and local presence

4. ANALYSIS OF THE FINDINGS

4.1 An analysis of the social and political effects of fragmentation (*Janthira Engeset*)

4.1.1 Internet governance

The growth of the Internet, the risks, and the rewards it brings has brought the Internet governance and cyber security to public consciousness. The debate over 'who should govern the Internet', and 'should it be governed' is currently a topic many countries are focusing on. How the Internet is controlled can interfere with civil liberties, such as freedom of expressions and the right to privacy. These are again entangled with national security and might also affect global innovation policy.

In the recent years there have been several incidents that shocked the world, which have created several debates regarding privacy. There are two very public situations related to security and privacy issues. The first started in 2006, when WikiLeaks released sensitive diplomatic information. The second situation took place in 2013, when American Edward Snowden released numerous NSA documents to two journalists. Some of these documents uncovered the existence of numerous global surveillance programs, which lead to huge debates in Europe and elsewhere. Snowden is still leaking important confidential documents. These incidents have trigged nation-states to consider a shift in the Internet control.

'Our fundamental freedoms and human rights are not negotiable and they must be protected online. We want to officially anchor the Internet governance on principles of freedom'

- Neelie Kroes, 2014

Kroes, the EU's digital agenda commissioner argues against government control of the Internet. In February 2014, Kroes presented a strategy move calling for a 'clear timeline of the globalisation of ICANN'. However, the fact that the EU wants ICANN to be more open in order to decrease US control is not new, but has however been strengthened after the disclosure of the illegal US spying activities. Kroes claims that the EU move comes at a time of 'broken trust' caused in part by 'large-scale Internet surveillance scandals', and describes the 'new globalised ICANN' as: 'we want to make sure that everyone has a voice in the debate' (Daniela, 2014).

On the other hand, Dr. Laura DeNardis engages with the question regarding who should govern the Internet, is it Google, the U.S government or the United Nations? At a conference at the Carnegie Council for Ethics in International affairs, DeNardis argues that there is no simple answer to that question due to numerous 'layers of design, administration, and distribution and coordination issues.'

China and Russia have been lobbied for stronger control of the Internet and its users for a long time. These two nations have been working towards shifting the Internet control from ICANN to the United Nations, where both of the nations has a strong position, as well as permanent members of the Security Council.

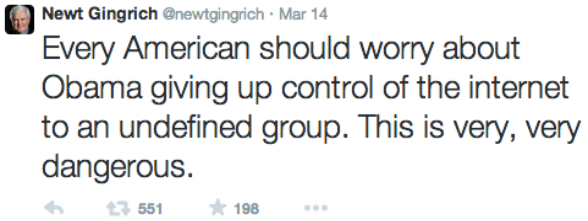
However, the main reason for the EU wish to change the structure of Internet control is because these nations have had a hard time trusting the US government. China and Russia on the other hand wish to shift the Internet control from ICANN to the UN to get a tighter control on cybercrime, but there is reason to believe that the aim is also to 'tame' dissidents who increasingly make their anti-establishment voices heard through social networks. However, Kroes underlined in her speech that the European Commission '*rejects a United Nations or governmental takeover of the Internet governance', as suggested by China and Russia*' (Daniela, 2014). The outcome of such move could be what many experts call 'a balkanisation of the Internet, where the Web could lose its global nature and would be divided into several regional nets, each following different rules' (Daniela, 2014). At this prediction, Kroes claims that '*we cannot allow the Internet to unravel into a series of regional and national networks*'. In other words, the EU digital agenda commissioner is against Internet fragmentation.

The Obama administration has '*announced that the U.S government would relinquish its role overseeing Internet addresses in favour of a to-be-determined global body*'; which would allow the Internet to be heavily influenced by foreign governments or controlled by the United Nations ("U.S. to Give Up Key Internet Governance Role," 2014). The former President Bill Clinton is more sceptical of the Obama administration's plan to relinquish Internet oversight authority. At a panel discussion sponsored by the Clinton Global Initiative, Bill Clinton expressed his concern regarding the change of control as:

'I understand in theory why we would like to have a multistakeholder process. I favor that, I just know that a lot of these so-called multistakeholders are really governments that want to gag people and restrict access to the Internet.'

Furthermore he says that by giving the authority to someone else might work against its purpose, and it might rather be 'cracking down on Internet freedom and limiting it and having governments protect their backsides instead of empowering their people.' ("Bill Clinton Would Prefer U.S. Oversight of the Internet," 2014).

Former Republican House Speaker Newt Gingrich, commented on Twitter saying:



However, other interest parties feel more positive regarding the Obama administrations announcement:

'We are inviting governments, the private sector, civil society, and other Internet organisations from the whole world to join us in developing this transition process'

-Fadi Chehadé
The president and CEO of ICANN

The fact that the U.S government is the one who ultimately 'controls' the Internet is something many organisations and nations find misplaced, as the Internet is a global phenomenon, which many nations' economy has become increasingly dependent on, the Internet needs to be governed by a different organisational body. These findings shows that other nations wish to shift Internet control, while former President and a former Republican House speaker of the US are more skeptical to the change of power, due to the fact that government will get more control over their Internet users, and what information they can access. However, the President and CEO of ICANN and former member of ICANN's board is far more positive for the change. Vint Cerf, Googles Chief Internet Evangelist and former member of ICANN's board, believes that moving 'toward a more multistakeholder model of governance creates an opportunity to preserve its security, stability and openness'; the opposite of the former Presidents' concern.

The Internet, however, has reached the point where it can be described as a 'living organism', where everyone can access, produce and change the content. How a future Internet governance structure has to take the development and the nature of the Internet into consideration. As a network of connected networks, a changed structure achieved by removing the links between those networks might defeat the whole concept of having an Internet. Any new establishment of Internet control must not suppress the innovation and the free and open Internet.

4.1.2 Open and free Internet and censorship

The ability to broadly distribute information and ideas has been one of the strengths of the Internet, and is also one reason why the Internet is so important. Internet however, has been one of the greatest tools for freedom since the printing press. The free flow of information and the ability to share ideas over the Internet have helped many nations to develop. Some dictatorships might not have fallen had the social media tools such as Twitter and Facebook not existed. Take the Arab spring for instance, how fast the ideas and thoughts of the democracy spread with help of the Internet, and how people in Egypt and Libya got in contact with each other to get inspiration and advice (and planning).

Internet censorship comes in many forms, the government can filter and block certain websites to block the dissemination of political opinion, blacklist pornography or pirate websites.

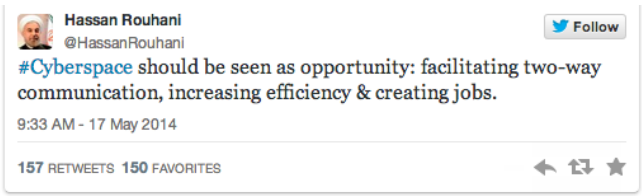
'Giving up control of ICANN will allow countries like China and Russia, that don't place the same value in freedom of speech, to better define how the Internet looks and operates.'

-One member of US Congress

Governments are increasingly establishing mechanisms to block what they consider to be undesirable information. Many governments use censorship to target content involving child pornography, copyright infringement, illegal gambling or the incitement of violence. However, the number of governments that block access to information related to politics, human rights and social issues is increasing. From the report of Freedom of the Internet 2013, it shows that out of 60 countries evaluated, '29 have used blocking to suppress certain types of political and social content'.

Countries like China, Iran and Saudi Arabia possess some of the most comprehensive blocking and filtering competences and are disabling access to thousands of websites. Even democratic countries such as South Korea and India have blocked numbers of websites of a political nature.

China, Iran and Cuba are among one of the most restrictive countries in the world when it comes to Internet Freedom. China developed technological devices and techniques to systematically censor the information on the Internet, as well as increasing offline pressure and arrests to prevent stimulation of free expression online. In Iran social media is banned and text messages are under surveillance, even though a few government officials such as the President Hassan Rouhani and the Foreign Minister Javad Zarif in Iran embrace social media, and use it to connect with the West without using traditional media outlets. The tweet below however is the President's way of supporting open dialogue over the web. The party officials and those who work in specific professions in Cuba are the only group of people, who are granted the permit and trust to access the global Internet.



'More users are being arrested, prosecuted, or imprisoned for their post on social networks, blogs, and websites.'

-Kelly et.al. 2013
(Freedom on the Net)

Furthermore, instead of simply blocking and filtering information that is considered undesirable, the numbers of countries that are developing new laws that criminalise a certain type of political, social and religious speech is increasing. Thus, more Internet users are being arrested for their post in social media. The Freedom of the Internet 2013 report, states that 'some governments may prefer to institute strict punishments for people who post offending content rather than actually blocking it, as this allows officials to maintain the appearance of a free and open Internet while imposing a strong incentive for users to practice self-censorship' (Kelley et al., 2013, p. 4)

'Over the past year, the global number of censored websites has increased, while Internet users in various countries have been arrested, tortured, and killed over the information they posted online'

-Kelly et.al. 2013
(Freedom on the Net)

Out of 60 countries *Freedom of the Net 2013* has exanimated, *'the government has either obtained more sophisticated technology to conduct surveillance, increased the scope and number of people monitored, or passed a new law giving it greater monitoring authority. There is a strong suspicion that many of the remaining 25 countries' also 'stepped up their surveillance activities, though some may be better than others at covering their tracks.'*

A free and open Internet helps to promote innovation and entrepreneurship as well as spreading ideas a cross the world. Furthermore, it protects the freedom of speech and the democracy. Without an open and free Internet, governments or big cooperation's would have tight control over how people access the global Internet.

Freedom of information and access to information is important for the citizens in every country, and everyone should have the same right. The right to access, share, create and distribute information on the Internet. If a potential Internet fragmentation happens there are reasons to believe that the above mentioned nations will step up their level of censorship and punishment against free speech. However, there should be laws and regulations implemented as a guideline, and which respect and promote economic growth, creativity, innovation and entrepreneurship and free flow of information.

4.1.3 Digital Divide and Inequality

The development of the Internet has increased the Digital Divide, by leaving the developing countries behind and the developed countries rapidly in front. The English language dominates the Web, and the West dominates innovation, the impact of the digital gap is growing. The digital divide is a global issue, just like other economic or social problems, and has to be taken into treated just as other economic and social problems.

The Internet has affected the economy differently than the traditional businesses have in the past. Compared to a traditional business, where the facility, machines and employers had to be based in a physical location, the Internet has reduced the barriers of people moving around. However, by using the Internet as a channel to promote and sell, it forces the businesses to face an increased global competition, and it makes it more difficult for bricks-retailers to compete with online retailers.

'Building an open, empowering information society is a social, economic and, ultimately, political challenge'

-Kofi Annan, 2003

By looking at the examples of Sweden and Greece, the former with a highly educated population and the latter with lower income and education levels, only 12% of the population of Sweden is offline, compared to 56.5% in Greece ("World wakes up to digital divide," 2010). According to ITU analyst, Vanessa Gray, 'The scale of a country's digital divide reflects the condition of its economy' ("World wakes up to digital divide," 2010). As Kofi Annan expressed, the challenge of building an information society requires political attention, which

again requires that the country has the economy to do so. The digital divide may therefore be higher in developing world where:

'200 million more men have access to the Internet than women'

-ITU, 2013

The digital divide in the developing world not only concerns economic and social differences, but also an 'Internet gender gap'. For example, in developing countries the concept of cybercafés have been more popular with men than with women, due to the fact that men have more freedom and the ability to spend money on it than women ("Women and ICT in Africa," 2014).

'Women face a variety of barriers to full and equal access, including cost, lack of digital literacy, lack of awareness of the Internet's potential, and end entrenched cultural and gender norms that limit them from forming independent connections outside their home or community'

-Mind the digital gender gap, 2014

According to the World Pulse statistics, only 25 percent or less of the online population in West Africa and South Asia are women. The gap between male and female Internet users is relatively small in OECD countries compared to the developing world, where computers often are reserved for men. As a report done by the Broadband commission shows, in the sub-Saharan African countries only half the numbers of women are connected than men (broadbandcommission, 2013). In the same report, it is estimated that 60 million women and girls were online in India, compared to 80 million male Internet users in mid-2013. This supports the argument that men in developing countries have more freedom and ability to spend money on cybercafés than have women. Additionally, women in many countries in the developing world are already facing barriers such as illiteracy, poverty and discrimination while getting education. However, these groups of women are ignored in many African societies.

'Many States are not yet proactive in implementing broadband development and policies that promote the coordination of efforts among the public sector, businesses and civil society'

-APC Woman's Rights Programme

Access to the Internet is therefore an important tool for women to overcome these barriers. Becoming more technologically skilled can help women improve their education, income and their role in the society. Knowledge on how to use technology effectively and safely would help empowering women in the developing world. With an increase in African youth, the competition for jobs and better opportunities have also increased., By not suppressing these issues women's employability and financial independence in African countries can be improved ("Women and ICT in Africa," 2014).

'Men in West Africa tended to feel threatened when women used cell phones and accessed the Internet, seeing it as destabilizing to relationships and viewed such unsupervised activity by woman as inappropriate'

-Nancy Hafkin, 2014

By closing the gap, it is possible to create new global opportunities in low and middle-income countries. By giving the half a billion women and girls access to the Internet, millions would improve their ability to generate income, improve their education,

and feel they had greater freedom as a result of being online (*Women on the web*, 2012).

4.2 An analysis of the effects of fragmentation on international trade through blockmodeling (Agnes Kovatsova)

4.2.1 Introduction

This part will include the results and findings from the blockmodeling analysis with the use of partition vectors. The section will include tables, graphs and images to indicate how the results from the blockmodeling analysis can help visualise how fragmentation could affect global trade. An explanation will also be given to describe the results and to make assumptions. A comparison will be given based on the partition vectors to illustrate the differences among the trading blocks. In order to provide a better visual representation of the NETDRAW networks, Prezi has been used to provide visual images along with the world map so that the exact names appear instead of numbers. In the Appendix, hyperlinks and whole images are included.

4.2.2 Geographical classification analysis-methodology

Through this analysis, 12 blocks of countries have been used, in other words, 12 geographical locations have been identified. This can be seen in Table 2. These blocks encompass a mixture of standard classification of countries into groups according to their geographical location, together with a more detailed grouping where, for instance USA and Canada is taken as one block, according to their location. To group the countries, a standard classification was used by the United Nations' classification system (United Nations, 2012).

Table 2 - Geographical classification of countries

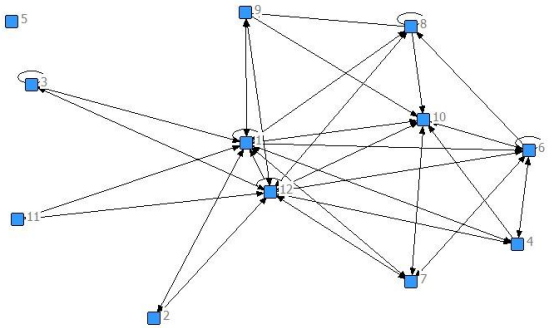
1	USA and Canada
2	Central America
3	South America
4	North Africa
5	Sub-Saharan Africa
6	EU
7	Europe
8	South East Asia
9	Western Asia/Middle East

10	North Asia (Russia and Mongolia)
11	Australia (New Zealand, New Caledonia)
12	Eastern Asia

After the analysis was done, using the UCINET software, a txt. file was created with the blocks. In the txt. file, are reports of the densities (in values based on the import trade) within and between the blocks and it is possible to compare these values with the average value. If the values are higher than the average, then the blocks are trading with each other. If the value is lower than the average, then the blocks are not trading with each other. Having done the 1/0 matrix in Excel, the final image matrix was drawn using the NETDRAW software. This image matrix can be found in Figure 2.

As it is seen, block number 1,3,6,8 and 12 remains trading within themselves, which is shown by the loop above the numbers, but also trades with other trading blocks. The USA and Canada remain trading partners at all times, but also stay in contact with every other trading block, except block number 5, which is the Sub-Sahara African countries. To give exact figures, the USA's top three trading partners include China, Canada and

Figure 2- Image matrix geographical location



Mexico respectively, which is unlikely to change for a possible Internet fragmentation.

Table 3 - USA top trading partners, in '000 dollars

United_States	**Germany**	**110602811,950**
United_States	Japan	150401123,350
United_States	Mexico	280017205,620
United_States	Canada	327482229,980
United_States	China	444407150,080

Trading block number 3, South America will trade among their countries, but also remains in trade with USA and Canada, and Eastern Asia. Countries in the South American region mostly trade with the USA and China, reporting the highest trading values for these countries.

From the network perspective, number 1 and number 12 have the highest betweenness centrality measure, which means that these two blocks are the most central players in the network. If we look at the trading values of the USA, it is understandable that this country trades the highest among all the other countries. Trading block number 10, which includes Russia, has a high degree, which means that block number 10 has a high number of connections in the network, making Russia a key player in the network, similarly to USA and Canada.

It has also been found out, that the Sub Sahara African countries have the lowest trading values and this block can be considered as an isolate in the network. In

other words, Sub-Saharan Africa countries will not affect fragmentation, and fragmentation will affect these countries positively by increasing their trade with other blocks.

4.2.3 Trading Organisations Analysis

The second partition vector used is based on trading organisation that are global and include countries from all around the world. Table 4 has all the organisations and the different variations. Number 2, 3 and 4 do not contain any countries as there is no single country that belongs only to the G20, APEC and the NAFTA organisation only. Countries that belong to one of the mentioned organisations belong to other trade organisation(s) as well, therefore the following groups are the only possible variations. Apart from the organisations, it has been found out that some countries are not part of any of the stated organisation in Table 4. These have been labelled as Not Applicable.

Table 4 - Trade organisations – possible variations among countries

1	WTO
2	G20
3	APEC
4	NAFTA
5	G20, WTO
6	WTO, APEC
7	EU, WTO
8	NAFTA, WTO, APEC
9	G20, WTO, APEC
10	NAFTA, G20, WTO, APEC
11	N/A

In Figure 3, the network shows how trade would be fragmented according to the trade organisations. Similarly to the previous figure, loops are existent in the network, which means that if the Internet fragments, then trade will remain or increase in the blocks where the loop is visible and these are block number 5, 6, 7, 8 and 9 (Table 5). Countries belonging to these blocks can be seen in Table 4. As it is seen, trading blocks in this network is highly connected, where the blocks, or groups of countries are connected to nearly every other group of countries.

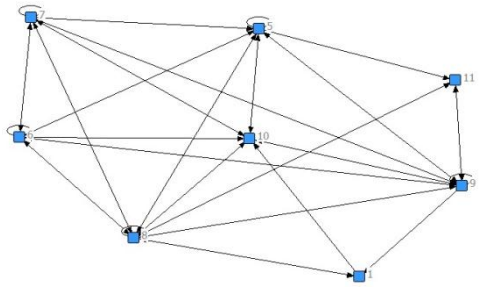


Figure 3- Image matrix trade organisations

Table 5 - Blocks with loops (trading inside the block)

No. of block	Countries	Trading organisation
5	Argentina Bolivia Brazil Cuba Egypt_Arab_Rep. Guatemala India Nigeria Pakistan Paraguay South_Africa Tanzania Uruguay Venezuela Zimbabwe	G20, WTO
6	Australia Brunei Hong_Kong_China Japan Korea_Rep. Malaysia New_Zealand Papua_New_Guinea Peru Russian_Federation Singapore Vietnam	WTO, APEC
7	Austria Belgium Bulgaria Croatia Cyprus Czech_Republic Denmark Estonia Finland France Germany Greece Hungary Ireland Italy Latvia Lithuania Luxembourg Malta Netherlands Poland Portugal Romania Slovak_Republic Slovenia Spain Sweden United_Kingdom	EU, WTO
8	Canada United_States	NAFTA, WTO, APEC
9	Chile China Indonesia Philippines Thailand	G20, WTO, APEC

The most central blocks are number 8 and 9, in other words Canada and the USA and Chile, China, Indonesia, the Philippines and Thailand. Based on the calculations and trade organisations partition vector, it can be seen that after fragmentation, the two blocks are very likely to trade with each other and within the trading block itself. Being the most central blocks in the network, connecting to every other block makes the above mentioned countries crucial in trading.

The second highest central blocks are number 5 and 10. Block number 10 includes only one country, Mexico, as this is the only nation that belongs to four trading organisations: NAFTA, G20, WTO, APEC. Having a rather active role in the network by connecting to six other blocks will only make Mexico's role more important.

Block number 5 includes countries like India, Brazil and South Africa and are also considered to have an important role in the trading network. On the other hand,

numerous countries are not part of any trade organisation and these have been labelled as N/A (Not Applicable), and which is block number 11 As it is seen in Figure 3, ties (or connections) are going out both ways, from 11 to 8 and 9 and vice versa. In other words, countries with no trading organisations are having a bilateral trade with countries belonging to block number 8 and 9 (USA and Canada; Chile, China, Indonesia, Philippines and Thailand), showing an increased trading pattern. There is a third connection going towards block 11, from block 5 (South American countries), but it is not a bilateral trade, as countries in block number 11 are only exporting to the South American countries. This means that this link is at risk after a possible fragmentation.

4.2.4 Languages Analysis

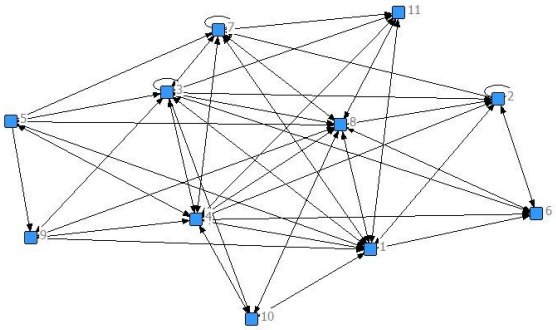
The third partition vector that has been used is language. A total of 11 groups have been created according to the ten most widely used languages on the world, and in addition, these languages are the official languages used in a specific country. For instance, English language is an official language in India, but not the primary one. This is why only the official and primary languages used in countries have been included. Otherwise, a group of 'Others' has been included to indicate languages that are not in the ten identified ones. By including a language partition vector, it will be seen how language can affect the whole trading pattern, illustrating how countries would trade between each other based on language differences. As having debates over the different generic top level domain names, introducing Cyrillic, Chinese and Arabic letters, the language partition vector corresponds with this debate.

Table 6 - Ten most widely used languages on the world

1	Chinese
2	Spanish
3	English
4	Hindi
5	Arabic
6	Portuguese
7	Russian
8	Japanese
9	Javanese
10	Bengali
11	Others

In Figure 4, the network of languages is shown. Quite interesting to see that the network is highly connected, with Chinese (1), English (3), Hindi (4) and Japanese (8) as the main four languages that are the most central in the network. Countries belonging to these groups are: Australia, Canada, China, India, Japan, New Zealand, United Kingdom and United States. On the other hand, only three blocks, Spanish (2), English (3), and Russian (7) are the only ones that will remain trading partners with themselves and will trade within the block itself. Although Russia is the only country in the block, its geographical area is significant enough to consider the country trading with itself, similarly to that of China.

Figure 4 - Image matrix languages



4.2.5 Discussion

Eugene Kaspersy, the CEO of KasperskyLab, have already stated some possible scenarios that might happen in the future. He notes that

'What may prove to be the ultimate game-changer is the fragmentation of the Internet. A number of countries, (…) are considering carving out their own sectors of the Internet, or may even have already started the process. If the trend spreads, which is likely, such fragmentation will bring about the creation of parallel networks as governments the world over try to isolate their critically important communications. Such networks with no physical connection to the Internet are already widely used for military communications.'

-Kaspersky, 2013

As he says, parallel networks are one possibility that might happen, not only in the military communications, but among governments, nations and countries. Even though the end user might not see any changes, if fragmentation happens on the governments and nation levels, but there is the possibility that this might not be the case. It might be that fragmentation will happen at such an extent, that the end user will face access restrictions. It might be that countries will introduce their own DNS system in their own language so that only English, French, Spanish or Chinese speaking users will be able to access content. Another possibility is that the so called borderless Internet will become 'non-borderless', operating with borders, and those borders might happen according to geographical borders, or language borders – where people speak the same language.

There is also an ongoing debate about Internet Service Providers (ISP). ISPs have the ability to control the available data that an end user can use. What is interesting to note here is the fact that ISPs are already thinking of having a standard plan for a set price, and when the user would like to access any other content that is not in the plan, will be charged at a higher price. This is also resulting in the restriction of data flow and making the Internet fragmented.

Regarding this issue, Kaspersky (2013) also notes the following:

'In some countries, for example Brazil, *there's talk about forcing global giants such as Google and Facebook to locate their data centres locally to process local communications. If this trend gains worldwide momentum, it will be a disaster for global IT giants and pose a threat of full-blown* Balkanisation *of the Internet. The process would probably foster the creation of local search engines; email systems, social networks and so on – an intimidating prospect for publicly listed companies.'*

If this happens, the Internet will not remain a universal platform that is freely accessible to everyone.

4.2.6 Comparison of Networks

After the blockmodelling analysis, comparison can be made among the three partition vectors, taking the geographical

classification as the base network. As a starting point, it can be said that if fragmentation happens, different countries, pairs of countries or a country will trade within a defined block. The most salient pair of countries are the USA and Canada. Their trading relationship will remain at all costs, as they use the same language and they are also part of the same trade organisations. In addition, it has been found out that the USA and Canada, and Eastern Asia trade with every other blocks in the network making these two groups the most central in the whole trading network. Only one exception is made which is the Sub Sahara African block. From the analysis, this region is not trading significantly with any other block. Central and South America and the Australian bocks are only trading with Eastern Asia which includes China, and with North America. There is a clear bilateral trade between the EU countries and those countries that are in Europe but not part of the EU. In addition, the EU block also trades with South East Asia, North Asia (Russia) and North Africa, thanks to the geographical closeness of each block.

Again, based on language, countries in block number 8 (Chile, China, Indonesia, the Philippines, and Thailand) remains trading partners with each other, and based on geographical classification, China will remain a connection between Chile and the rest of the countries mentioned. As these countries are in three different geographical locations, we can see that South America and South East Asia will not trade with each other, only with the help of China, as China is connected to both blocks. What is seen here is that the Japanese, Chinese, English and Hindi languages are the ones being the most central in the network, having the role of brokers who connects every other group (languages) together. Although English would be the only language trading with itself, which means that if fragmentation happens then countries with English as the official language will trade with each other.

The trading patterns of African countries have not been significant, compared to the trading values of European or Asian countries. Based on the geographical location, South Africa in particular will have lost trading links with its partners. After fragmentation, it is seen that African countries only trade with the USA and Canada, and the South East Asian blocks. Also, based on language, African countries will import and export goods from Russian, English, Japanese, Chinese, Hindi and Javanese speaking countries.

European Union countries are trading with six different blocks, these are: South East Asia, North Asia, USA and Canada, Eastern Asia, Europe (including states that are not members of the EU) and North Africa countries. After the analysis with the trading organisation partition vector, European Union countries will stay in trade with all the blocks identified in Table 4. In other words, trading will not change after fragmentation. In addition, language would not be a crucial indicator either.

Image 1 Visual representation of countries belonging to groups based on geographical classification (World Bank, 2013)

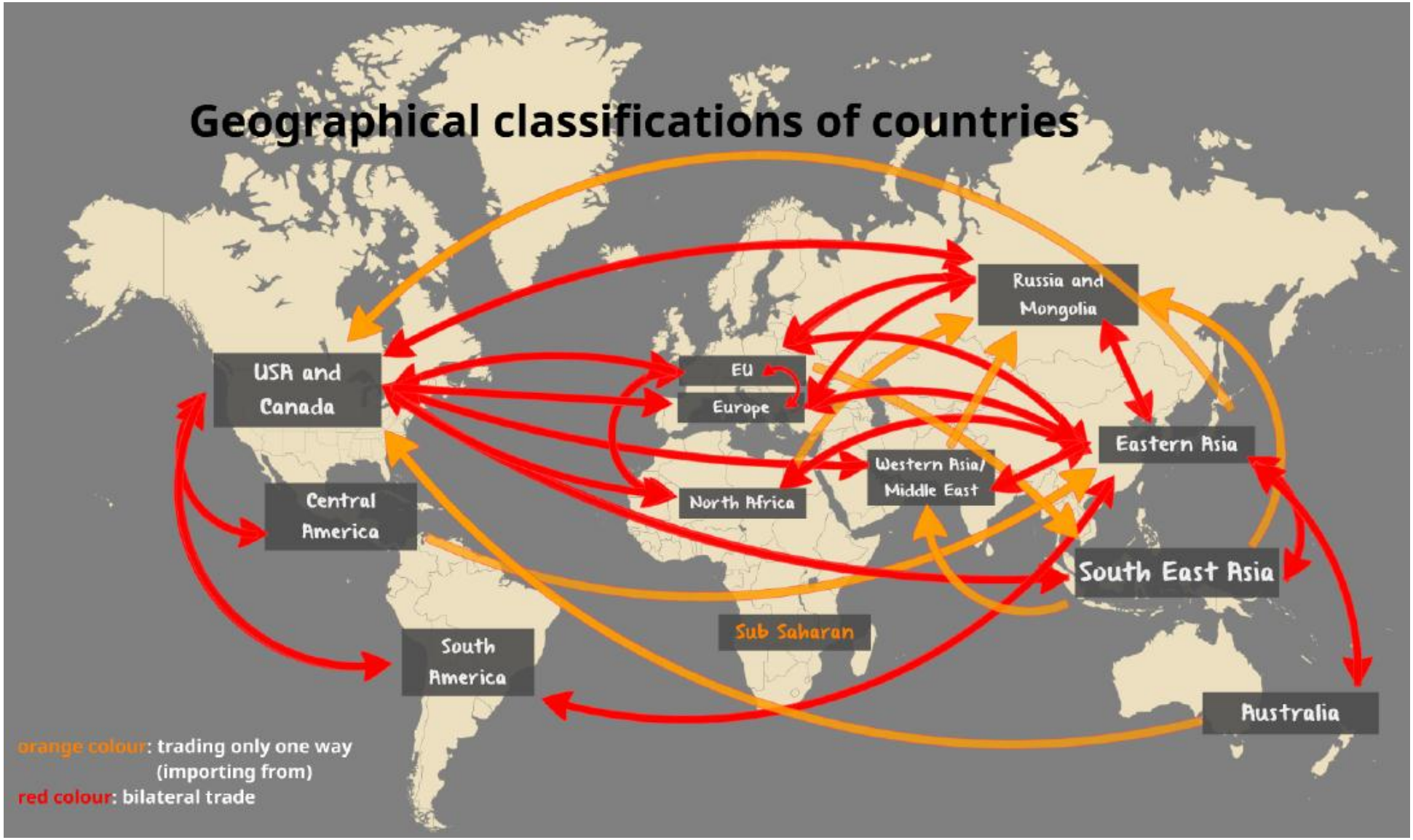
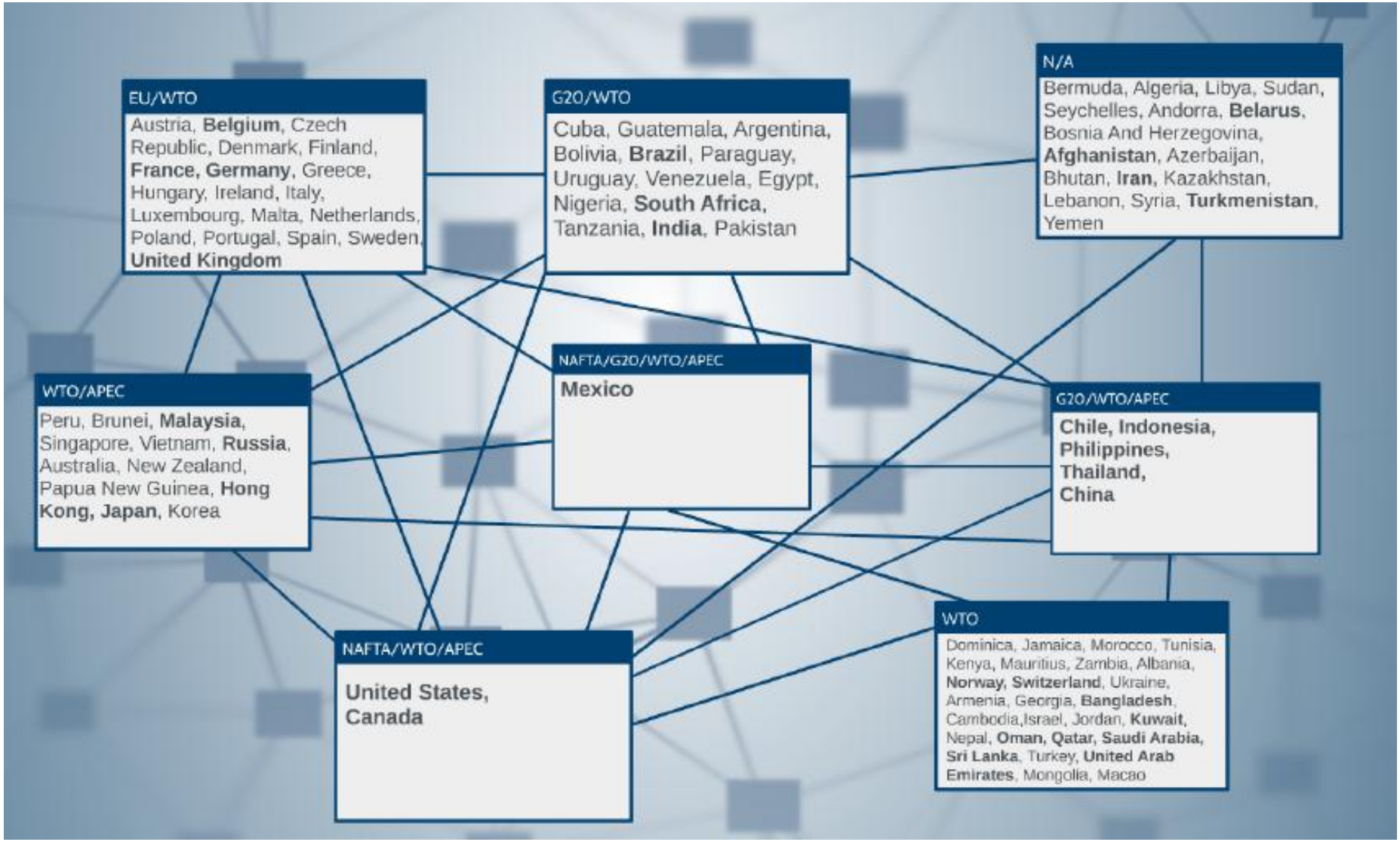


Image 2 Visual representation of countries belonging to groups based on the ten most widely spoken languages (World Bank, 2013)

Image 3 Visual representation of countries belonging to groups based on trade organisations (World Bank, 2013)



4.3 Internet Fragmentation and its influence on global trade through interpretive analysis (Ertina Dyrma)

The data derived for this part of the project was from interviews from senior officers of ICT and trade ministries and departments in eight governments (Albania, Brazil, Ghana, India, Kenya, Sweden, Turkey and UK). Efforts were made to contact the US, Russia and China, but unsuccessfully. There are two parts being emphasized: the countries' preparedness for a fragmented Internet and its influence on global trade.

There are ongoing discussions regarding the change of multistakeholder model among recognised key players of Internet governance, for example Brazil and China. Brazil considers the multistakeholder model is the best form of Internet governance, stating that Internet should serve as a tool for development and that the issues of concern to developing countries (infrastructure, access, capacity building, etc.) should occupy the center of international debate. The "NETmundial Multistakeholder Statement" reinforced the need for the transition process occurs in an open, ensuring also the participation of actors that are not in the ICANN community.

However, data collected from this study shows that other governments feel that Internet fragmentation is unlikely to occur, particularly based on countries' inactions in preparation for a fragmentation. According to other government officials, such inactivity signals a de-facto approval of the current multistakeholder model.

India argues that everyone's purpose is to have a unified Internet in order to maintain the openness and freedom of information flow. Despite the fact that Brazil supports this statement, they say that its governance needs to be more independent.

The developing countries felt that they would face increased challenges in creating and maintaining their trading image and additional barriers would lead to increased bureaucracy among trading partners leading to higher cost. This

provides additional support to maintaining the current multistakeholder approach.

Different point of views of countries including here Ghana, Kenya and Albania, discuss that even though they do not foresee an Internet break up they do believe that if in any scenarios this assumption takes place, the developing countries will be the main ones to suffer when it comes to global trade. On the contrary, Brazil and Sweden say that despite political debates trade won't be affected and the reason behind this is that business leaders will not stop trading links with their partners due to economic reasons. A current example is trade between Russia and Germany, where despite Germany being against Russia's actions in Crimea, Ukraine, business connections continue.

Considering this, it can be concluded that the Internet will remain untouched and following its current governance structure. Most of these key players do not foresee a change in Internet governance. Different developing level countries support different views, where the developed once are positive that Internet fragmentation will not affect any global trading link and the developing countries arguing against by string that the strong countries will not face any problem due to the fact they have already created their trading image and are strong enough to overcome any issue of this scale.

Despite the difficulty of reaching to the right representative of the countries regarding Internet fragmentation and its influence upon global (online) trade, some significantly potential responses were reached. Responses collected from key players of the industry and also secondary players to reach at a general view of the issue, tend to draw one key conclusion: Internet fragmentation shall not take place and that a multistakeholder governance approach needs to take place.

4.3.1 Countries' Preparedness

'The strategy of a business is something like an airplane, if it does not move forward then it will fall off the sky, and it comes even more true with the evolution of the Internet. You have to have even if you do not have a product you can sell over the Internet you should use it to your advantages even by the way of marketing or by the way of some sort of platform'

UK representative, 2014

Developed countries such as UK find Internet the key tool of trade development, which has helped the all globalisation process of opening up the market for anybody to trade anywhere. The importance of Internet as a catalyser towards globalisation is noticed and supported by all the countries. However, there are concerns associate to the Internet evolution as well.

The main concern that Turkey worries about is the Cyber security of the users in conducting global business. Considering this, they support Internet fragmentation to a certain degree. While Albania argues that a fragmented Internet in this stage of their development, where they are trying to reach out for transparency sharing their activities and policies online, it is not helpful for the government. In addition, Kenya is using Internet openness for the same reason, arguing that a fragmented Internet would lead to restrictions for other countries and businesses to reach out for information for their country.

On one hand countries such as Turkey and India state that they are prepared for a fragmented Internet and support the idea that countries 'have to provide the cyber security for itself, its citizens and the companies, but for sure the fragmentation has to enable smooth online trading' (Turkey representative). On the other hand, Sweden argues that there are so many different aspects of the fragmentation in different ways that it is difficult to determine the Internet fragmentation effects.

To conclude, it is important to say that despite the fact that countries refuse to give information of certain actions being taken by their governments, they claimed that preparing for the worst is strategic for each country.

4.3.2 Internet Fragmentation Impact on Online Trade

A different story emerges with regard to global trade. Different views were expressed that seem to be linked to the country level of development. Developed countries felt that Internet fragmentation would not affect global trading links, because economic growth and global business would be prioritised.

Developed countries such as UK are more concerned with the side effects that a fragmented Internet would bring, including 'difficulties to access information, to share it, to have that globalisation; and you get to come back to much more fragmented market, so leads in more bureaucracy and slowing everything down and thereby more costs' (UK representative). While developing countries such as Ghana and Kenya point out the cultural flow issues and the limitation of knowledge and expertise regarding to global trade, present both pros and cons to fragmentation.

Emerging economies, for example India, argue that a multiple Internet 'might create boundaries between nations which will hinder the online trading, though few countries believe it as a major concern but Internet fragmentation might hinder the online trade drastically.' However, Turkey states that as time passes and as long as

solutions are produced the trading would recover from the effects of the fragmented Internet.

'Trade is not very sentimental about politics sometimes. The traders will want to keep up the trade, for instance the relationship with Russia and Germany. It should have been cooled down but the companies do not will to do that, they would want to keep up trade even with Internet fragmentation. But the trade between partners will be a glow; will be strong interest to keep the trade up. the lack of new trade, new innovative exchanges and continues development, it would stall in the situation we have today, not continue to develop rather than retract, trying forces to keep it up.'

Sweden representative, 2014

Different issues of Internet fragmentation were raised through the data collection with the representatives, providing a closer insight of the issue in country level that may be available through written literature already.

4.4 Assessing the impact of internet fragmentation on international business operations (Lakmal Liyanage)

In this section a comprehensive analysis of companies based on their organisational structure is carried out. Here we try to identify the relationship between the structure of companies and the impact of fragmentation on this relationship. An analysis is carried out on features of organisations such as the risk associated with the industry of the parent company, the industries diversification of the subsidiaries and also the location of the subsidiaries.

4.4.1 *Global* company structure

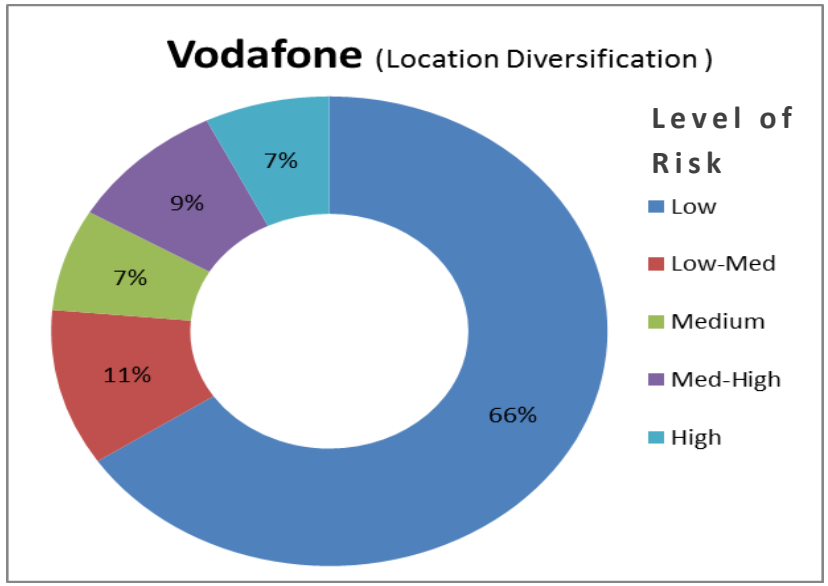
Table 7 - Data from Global Companies

Company name	Core RISK	Industry Based W Average	Location Based W Average	Core + weighted industry	Overall Risk
VODAFONE GROUP PUBLIC LIMITED COMPANY	5	4.652	1.795	9.652	11.447
BHP BILLITON PLC	2	3.800	2.333	5.800	8.133
GLENCORE XSTRATA PLC	2	3.167	2.800	5.167	7.967
RIO TINTO PLC	2	3.835	1.816	5.835	7.651
ROYAL DUTCH SHELL PLC	2	3.817	1.512	5.817	7.329

Table 7 above displays Global companies ranked by their overall risk. As shown, Vodafone has the highest overall risk with a score of 11.447 whereas Royal Dutch Shell PLC has the lowest at 7.329. On close inspection we see that the industry that Vodafone operates under, in both the parent company and the subsidiaries' distribution, is at the highest risk of all global companies, with a risk score of 5 and 4.652 respectively. This is in contrast to the score by Royal Dutch Shell PLC for example which has a parent (core) risk of 2 and an industry based average of 3.817. Interestingly, Vodafone's location based score is one of the lowest for Global companies at 1.795 while Glencore Xstrata PLC has the highest score of 2.800. This warranted further inspection of Vodafone's subsidiaries given that its overall risk is so high.

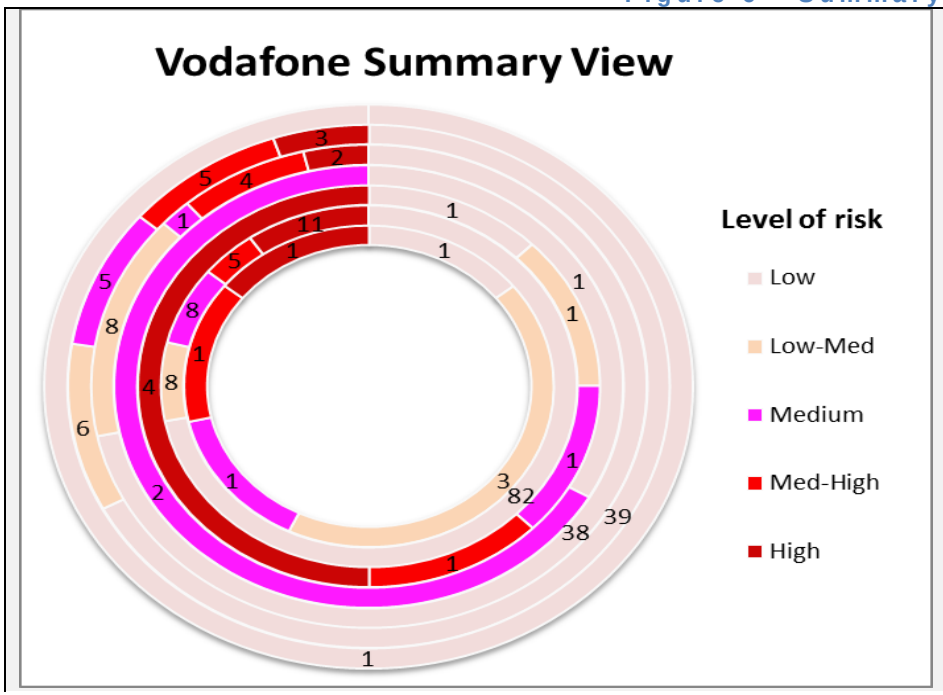
For further analysis, the wheel (Figure 5) was redrawn to examine the risk associated with the location distribution of Vodafone's subsidiaries. 66% of subsidiaries are based in countries with lowest e-Friction which has thus had an impact on the total location based score that Vodafone has received (1.795). Here we can begin to understand that assessing effects of fragmentation by just looking at the locations where companies operate is not sufficient. In order to overcome this and give a better understanding of how a company would be affected by fragmentation the distribution of subsidiaries across industries are also incorporated. In the case of Vodafone, there are no subsidiaries operating in industries 0,1,2,3 which are essentially considered as low risk industries (with

Figure 5 - Vodafone Location Diversification



respect to Internet fragmentation based on their primary stages of the production process). Vodafone has most of its subsidiaries in industry 4 which is related to 'communications' and that would be a highly affected industry if fragmentation was to occur. The next significant portions of subsidiaries for Vodafone are within industries 7 & 8, namely 'finance & insurance' and 'services,' which are again also highly affected industries if fragmentation was to occur. In essence, 225 subsidiaries (92%) of Vodafone's 244 subsidiaries are operational in industries that are more susceptible for risk if fragmentation was to occur. This then presents logic as to why despite Vodafone having a low location based average score, its overall risk score is high as it has been positively impacted by industry average

Figure 6 - Summary of effects on Vodafone



Level of Friction	Industry Classifications							% on location
	3	4	5	6	7	8	9	
1	1	82	1	1	38	39	1	67%
2	3	8	1		8	6		11%
3	1	8	1	2	1	5		7%
4	1	5	1		4	5		7%
5	1	11	4		2	3		9%
Total number of subsidiaries	7	114	8	3	53	58	1	244

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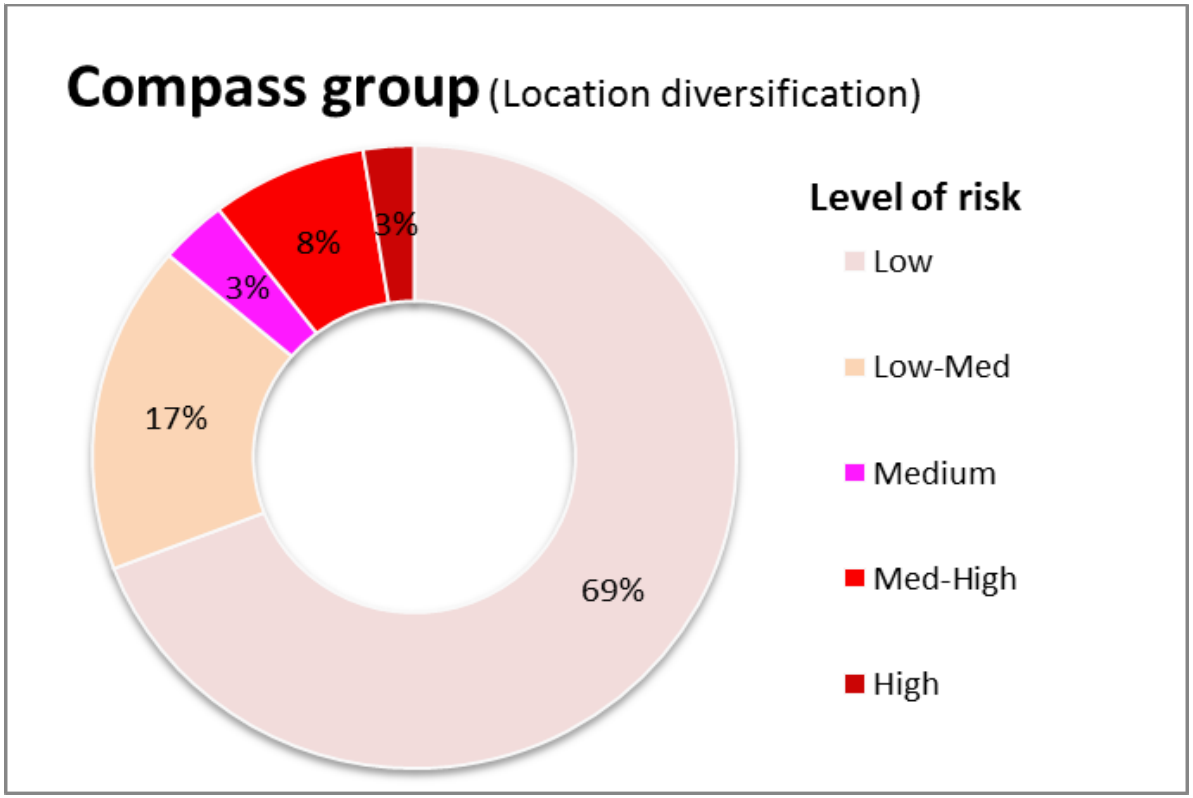
4.4.2 International company structure

Table 8 - Data from International Companies

Company name	Core RISK	Industry Based W Average	Location Based W Average	Core + weighted industry	Overall Risk
COMPASS GROUP PLC	5	4.649	1.514	9.649	11.163
LLOYDS BANKING GROUP PLC	5	4.123	1.154	9.123	10.277
BRITISH SKY BROADCASTING GROUP PLC	5	4.231	1.015	9.231	10.246
ITV PLC	5	4.127	1.101	9.127	10.228
WM MORRISON SUPERMARKETS PLC	5	3.892	1.000	8.892	9.892

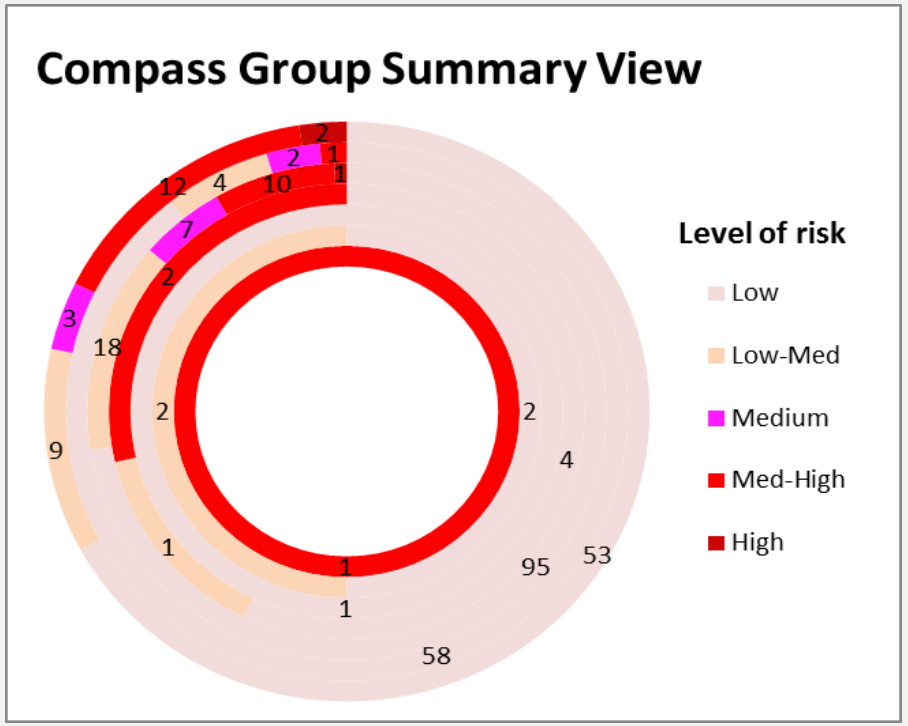
Table above (Table 8) shows a set of International companies based on their overall risk ranking. Compass Group PLC has the highest risk of 11.163 while WM Morrison Supermarkets PLC has the lowest risk value (9.892). All companies have the same core risk score of 5; a score based on the industry the parent company operates under. What differentiates the companies is the industry based and location based average scores. Although quite similar amongst the companies, Compass has the highest score in both categories: 4.649 and 1.514 respectively. Morrison and British Sky Broadcasting Group PLC have a significantly low location based average as all of their subsidiaries are located in lower e-Friction countries. With regards to Compass, 69% of its subsidiaries are located in countries with low e-Friction ratings and only 3% are located in countries associated with high e-Friction. Therefore, location itself will seemingly

Figure 7 - Compass Location Diversification



have a low impact on the company under cases of fragmentation.

From the chart and the accompanying table below we can see that a high portion of subsidiaries operate within 'retail trade' (131), 'services' (79) and 'finance & services' (65), which cumulatively account for 95% of Compass' subsidiaries. Such industry sectors are related to medium-high and high risk levels. This validates Compass' high industry based average of 4.649. Despite a larger percentage of companies located in low e-Friction countries, more of these subsidiaries are related to industries with high risk levels. Therefore, such operations are considered to be highly vulnerable to the drawbacks of fragmentation



Level of friction	Industry Classifications							Total
	0	3	4	5	6	7	8	
1		2	1	4	95	58	53	213
2		2		1	18	4	9	34
3					7	2	3	12
4	1			2	10	1	12	26
5					1		2	3
Total	**1**	**4**	**1 7**	**131**	**65**		**79**	**288**

4.4.3 *Transnational* company structure

Table 9- Data from Transnational Companies

Company name	Core RISK	Industry Based W Average	Location Based W Average	Core + weighted industry	Overall Risk
HSBC HOLDINGS PLC	5	4.051	1.808	9.051	10.860
INTERNATIONAL CONSOLIDATED AIRLINES GROUP S.A.	5	4.259	1.429	9.259	10.688
UNILEVER PLC	4	4.178	2.196	8.178	10.374
GLAXOSMITHKLINE PLC	4	3.901	2.066	7.901	9.967
ASTRAZENECA PLC	4	3.892	1.955	7.892	9.847

Out of the following ranked transnational companies, HSBC Holdings PLC presents with the highest overall risk of 10.860 and Astrazeneca PLC has the lowest risk of 9.847. The companies all have a medium-high core risk rating based on the parent industry. International Consolidated Airlines Group has an industry based average of 4.259, the highest of all companies analysed. HSBC falls third on this category and Astrazeneca has the lowest of scores (3.892). In terms of location based score, Unilever PLC has the highest rating (2.196) and International consolidated Airlines Group has the lowest rating (1.429).

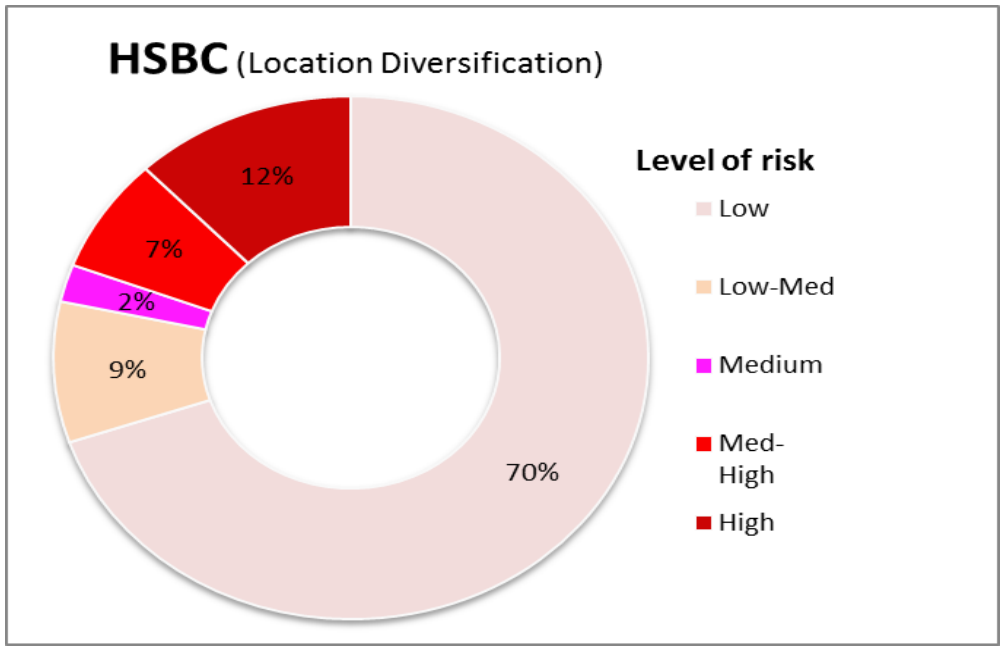
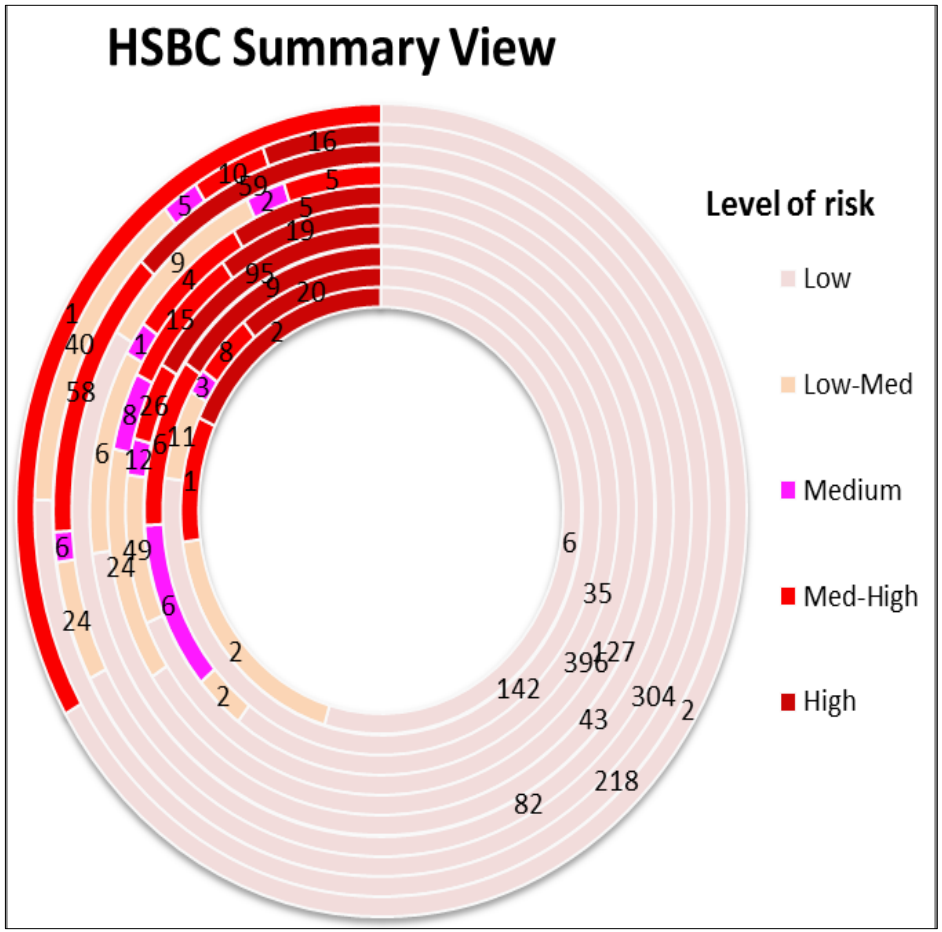


Figure 8- HSBC location Diversification

HSBC has a relatively low location based average score (1.808). On analysis, HSBC have situated 70% of their subsidiaries in countries of low e-friction. Therefore, it appears that location itself will be at a relatively low risk of impact should fragmentation occur. The breakdown of HSBC's subsidiaries in terms of industry reveals that 578 (30% subsidiaries fall under 'manufacturing' and 451 (23%) subsidiaries under 'finance and insurance.' A substantial portion of subsidiaries (15%) are related to the industry sector of 'services.' These industry categories are in turn associated with medium-high and high risk levels, thereby presenting HSBC with a high industry based average rating. As previously mentioned, two other transnational companies had an average industry rating higher than HSBS however, combined with its core risk and location based average, HSBC was presented with the highest overall risk. A substantial portion of HSBC's subsidiaries operate under industry sectors that are most vulnerable to the risks of fragmentation. Going by industry risk itself, HSBC are in a position to be strongly affected by fragmentation factors.

Figure 9 - Summary of effects on HSBC



Level of Friction	Industry Classifications										Grand Total
	0	1	2	3	4	5	6	7	8	9	
1	6	142	35	396	127	43	82	304	218	2	1355
2	2	11	2	49	24	6	9	24	40		167
3		3	6	12	8	1	2	6	5		43
4	1	8	6	26	15	4	5	58	10	1	134
5	2	20	9	95	19	5		59	16		225
Grand Total	**11**	**184**	**58**	**578**	**193**	**59**	**98**	**451**	**289**	**3**	**1924**

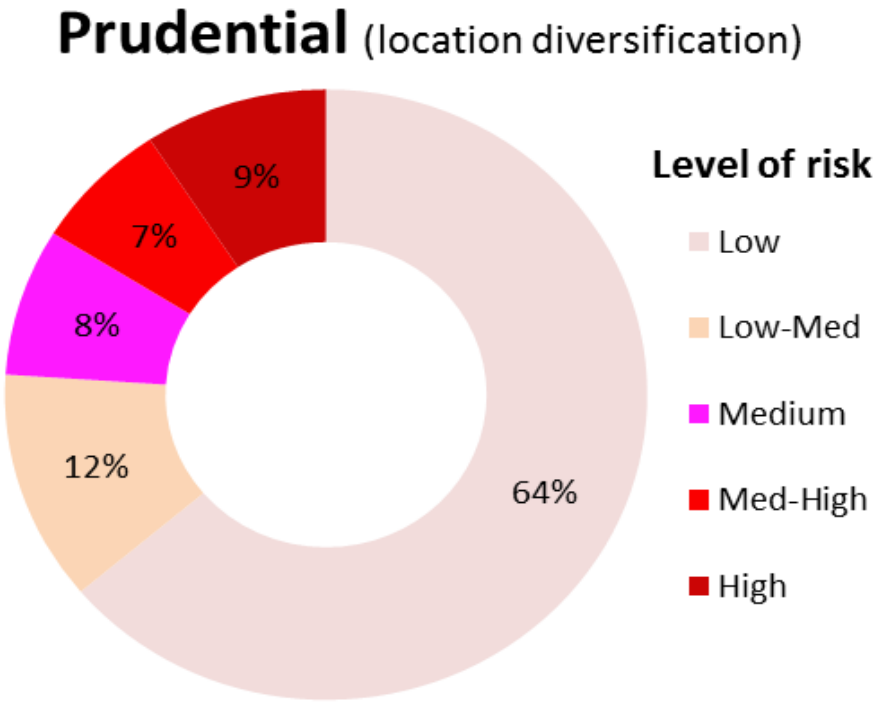
4.4.4 *Multinational* company structure

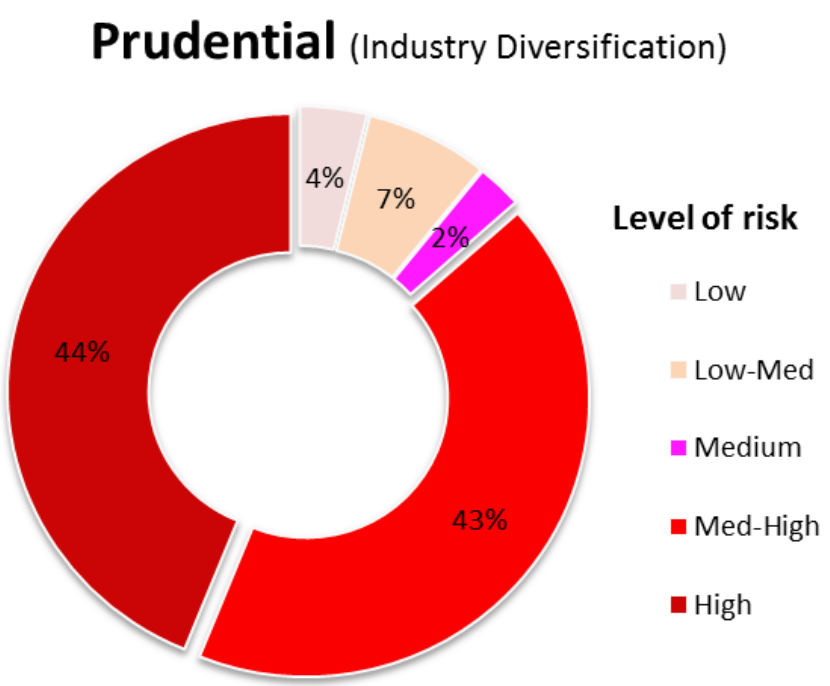
Table 10- Data from Multinational Companies

Company name	Core RISK	Industry Based W Average	Location Based W Average	Core + weighted industry	Overall Risk
PRUDENTIAL PLC	5	4.151	1.855	9.151	11.006
TESCO PLC	5	4.237	1.374	9.237	10.611
BARCLAYS PLC	5	4.124	1.313	9.124	10.438
CRH PUBLIC LIMITED COMPANY	4	3.471	1.640	7.471	9.110
BP PLC	4	3.800	1.063	7.800	8.863

Companies listed above (Table 10) are multinational companies based on overall risk in case that fragmentation should occur. As the table shows Prudential Plc would be highly affected with an overall risk of 11.006. One of the main reasons behind this is in the industry based average especially because the company operates in the Finance and Insurance sector. Prudential PLC has 66% of their subsidiaries in locations where there is less “e-friction” it seems logical due to the company operating in a highly technology oriented industry. BP’s core industry falls under manufacturing hence the subsidiary score is lesser than the other companies.

Figure 10- Prudential Location Diversification vs Industry Diversification

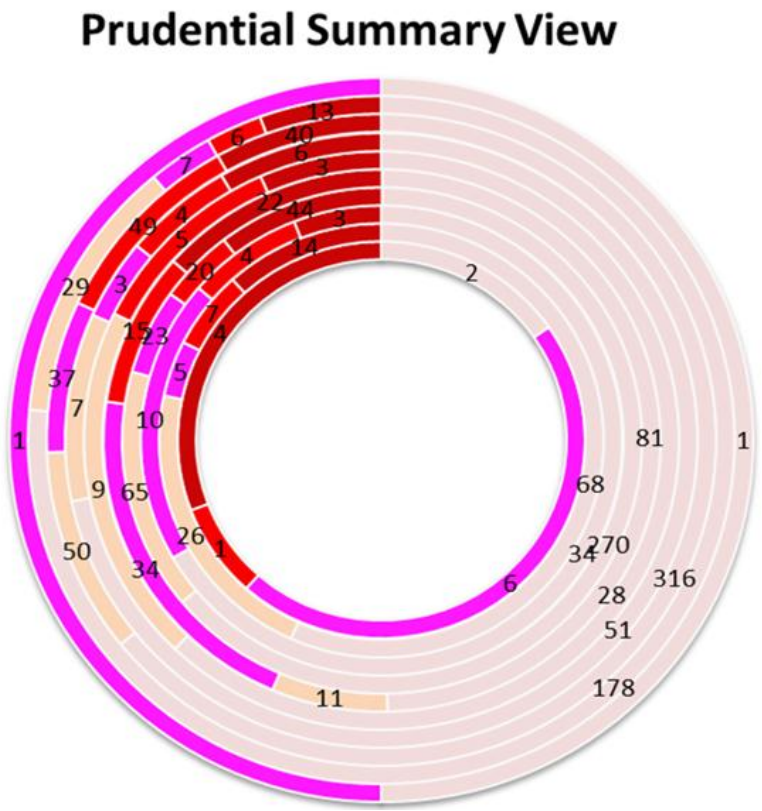




As it can be seen in the graph most of the subsidiaries are located in the industries that are in 'high' or 'medium to high' areas. This since the company is a multinational company they localise their operations in operating regions which can also be seen in the industry diversification chart.

By looking at the industries that subsidiaries operate in 56% of subsidiaries operate in industries related to Manufacturing (3) and finance and insurance (7). This is one of the key reasons behind why Prudential Plc has a high weighted industry based risk value in comparison with other multinational companies.

Figure 11- Summary of effects on Prudential



Level of friction	Industry Classifications										Total
	0	1	2	3	4	5	6	7	8	9	
1	2	68	34	270	81	28	51	316	178	1	1029
2		26		65	11	9	7	50	29		197
3	6	5	10	23	34		3	37	7	1	126
4	1	7	4	20	15	5	4	49	6		111
5	4	14	3	44	22	3	6	40	13		149
Total	**13**	**120**	**51**		**422**	**163**	**45**	**71**	**492**	**233**	**2** **1612**

5.CONCLUSION

The impact that the Internet has on daily activities of everybody's life changed the way people communicate and do business. Sharing information and knowledge, with an ease of access, brought a revolutionary development into the society. The ongoing discussion on a possible Internet fragmentation would lead to the breakdown of the Internet freedom especially in the authoritarian regimes. Different nations and companies will get a tighter control on how and how much information people will get access to. Therefore, the main loser will be the Internet users, as nations will step up their level of censorship and punishment against freedom of speech. The developing world, however, will struggle even more to catch up with the developed countries, which more likely will find a way around Internet fragmentation. With more resources and knowledge, the developing countries will be more affected than the developed countries. Furthermore, the digital gap will increase, where women will be the biggest losers of the Internet fragmentation. It will be harder for them to improve their income and education, as well as it will get harder to overcome the barriers of discrimination against women and their education.

With a fragmented Internet another story emerges regarding global trade. This research demonstrates that offline trading links among countries will not be affected in ten years and the links among countries, in the worst scenario, will stay the same or slightly reduce, but will not be eliminated totally. The USA and Canada and the Eastern Asian countries are the main players in the network having trade connections with every other blocks, and their links will not change after applying the partition vectors. European Union countries trade with the eastern part of Asia along with Russia, the USA and Canada and the rest of the European countries and North Sahara.

Interestingly, according to the analysis, Sub Sahara African countries show no offline trade links with any trading blocks. It is seen that these countries are increasingly engaged in offline trading activities based on the different partitions. After the analysis, some links in the African countries are reduced, but the

main offline trading connections stay the same for the time being. In addition, some countries are offline trading with themselves, like Russia and China, taking into consideration their geographical area, which makes it possible to trade with different parts in the same country. Offline trading with Russia would increase after a possible fragmentation as more countries would trade with it. It was also seen, that other blocks are trading within the block itself, like USA and Canada and the European Union for instance.

On the other side of the discussions, a multiple Internet is argued to have a significant effect in terms of online trade. Developing countries, including African countries (including Kenya) and European countries (for example Albania) worry about the potential of Internet fragmentation and what impact would have on their GDP growth as well as their cultural development. Having said that, developed countries seem more positive in regard to the influence of a multiple Internet on global trade (online trade). Countries from both levels of development, such as Sweden and Turkey argue that, although a possible Internet fragmentation is unlikely to occur, its negative side of influence would diminish as solutions evolved.

Finally, this research showed the impact of the fragmented Internet on business level. Essentially understating the impact of fragmentation on FTSE100 companies, all companies would be relatively affected due to the international nature of business operations. However, the extent of this effect is strongly influenced by the industry of operation; not only of the parent company but also of the industry diversification of the subsidiaries. Each company is therefore in a unique position to be affected by fragmentation.

There was no particular relationship observed between the typology of these companies and the risk associated with fragmentation. This disproves the hypothesis that company structure can be attributed to different risks under fragmentation. This suggests that, given the fact that these organisations operate in highly complex networks, business strategy alone or location alone are not enough to determine what risk companies would face. One factor that was interesting however was concerned with the relationship between parent companies and their subsidiaries. As business strategy dictates the nature of this relationship and the nature of operations, unique vulnerabilities are generated within.

Essentially, the communication efforts between the parent and the subsidiaries are susceptible to the effects of a fragmented internet.

These are novel findings that raise practical implications about the potential vulnerability of a company under a fragmented internet. As the e-Friction Model alone does not provide a complete picture of the effects of fragmentation, there are still further research to be made. These insights will prove invaluable to our understanding of how risks associated with a fragmented internet can impact on companies operating on a global scale.

Regarding the blockmodel analysis, a possible fragmentation would not have a negative effect on the offline trading patterns. Even though, offline trade is not affected, the situation with online trade might be different. Regarding next steps, if online trade data becomes available, this now and innovative tool used for the analysis can be done again in the future.

Various findings and results are drawn from this research regarding the impact of a fragmented Internet on different economic, social and political aspects. Despite the numerous discussions on international conferences and summits, the multistakeholder model seems to be the most strategic solution to the future of the Internet governance, where the interests of all the stakeholders are met and taken into consideration for sustainable future decisions and policy frameworks.

6. REFERENCES

1. Ackerman, S. (2014) Microsoft, Facebook, Google and Yahoo release US surveillance requests, The Guardian, 3rd February, [online] Available at: http://www.theguardian.com/world/2014/feb/03/microsoft-facebook-google-yahoo-fisa-surveillance-requests (Accessed 13 February 2014).

2. Allagui, I., Kuebler, J., 2011. The Arab Spring & the Role of ICTs | Introduction. Int. J. Commun. 5, 8.

3. Anderson, R.H., Kedzie, C., Bikson, T.K., Keltner, B.R., Law, S.A., Panis, C. (Stan), Mitchell, B.M., Pliskin, J., Srinagesh, P., 1995. Universal Access to E-Mail [WWW Document]. URL http://www.rand.org/pubs/monograph_reports/MR650.html (Accessed 30 April 2014).

4. Annan, K., 2002. Kofi Annan's IT challenge to Silicon Valley - CNET News [WWW Document]. CNET. URL http://news.cnet.com/2100-1069_3-964507.html (Accessed 30 April 2014).

5. Arthur, C., 2012. Walled gardens look rosy for Facebook, Apple – and would-be censors. [Online] Available at: http://www.theguardian.com/technology/2012/apr/17/walled-gardens-facebook-apple-censors (Accessed 28 04 2014).

6. Badkar, M. (2012) Nomura's Geopolitical Guru Can't Stop Worrying About These 10 Issues. Business Insider. [Online] http://www.businessinsider.com/most-important-geopolitical-events-2012-8 (Accessed 11 December 2013).

7. Bartlett, C. A. and Ghoshal, S. (2002) Managing Across Borders: The Transnational Solution, Harvard Business Press.

8. BBC, 2005. A Guide to World Trade Blocs. [Online] Available at: http://news.bbc.co.uk/1/hi/business/4510792.stm (Accessed 12 12 2013).

9. INTERNATIONAL TRADE AND THE INTERNET Elizabeth J. Bailey, Troy State University Ernest A. Capozzoli, Troy State University 2000

10. Bertola, V., 2010. Power and the internet. J. Inf. Commun. Ethics Soc. 8, 323–337. doi:10.1108/14779961011093336

11. Bill Clinton Would Prefer U.S. Oversight of the Internet, n.d. Re/code.

12. broadbandcommission, 2013, Annual Report, [online] Available at: http://www.broadbandcommission.org/documents/bb-annualreport2013.pdf (Accessed 14 February 2014)

13. Brzeziński, Z. (1986) Game Plan: The Geostrategic Framework for the Conduct of the U.S.--Soviet Contest, Atlantic Monthly Press.

14. Burt, S.R. (1995) Structural Holes : The Social Structure of Competition. Harvard University Press .

15. Internet Governance: Infrastructure and Institutions Lee A. Bygrave and Jon Bing Print publication date: 2009 The naming game: governance of the Domain Name System Lee A. Bygrave (Contributor Webpage) Susan Schiavetta Hilde Thunem Annebeth B. Lange Edward Phillips DOI:10.1093/acprof:oso/9780199561131.003.0006

16. Castells, M., 2001. The Internet Galaxy: Reflections on the Internet, Business, and Society, 1st Edition edition. ed. OUP Oxford, Oxford ; New York.

17. Chadwick, Andrews, P. N. H., 2009. Routledge Handbook of Internet Politics. Abingdon : Routledge .

18. Chebib, N., Sohail, R.M., 2011. The Reasons social media contributed to 2011 Egyptian Revolution. Int. J. Bus. Res. Manag. 2, 139–162.

19. HAS THE INTERNET INCREASED TRADE? DEVELOPED AND DEVELOPING COUNTRY EVIDENCE GEORGE R. G. CLARKE and SCOTT J. WALLSTEN*Economic Inquiry doi:10.1093/ei/cbj026 (ISSN 0095-2583) Advance Access publication December 1, 2005 Vol. 44, No. 3, July 2006, 465–484 _ Western Economic Association International

20. THE U.S. ROLE IN GLOBAL INTERNET GOVERNANCE DERRICK L. COGBURN, MILTON MUELLER, LEE MCKNIGHT, SYRACUSE UNIVERSITY HANS KLEIN, GEORGIA INSTITUTE OF TECHNOLOGY JOHN MATHIASON, SYRACUSE UNIVERSITY IEEE Communications Magazine • December 2005

21. Daniela, 2014. EU's top telecoms official rules out government control of the internet [WWW Document]. EurActiv EU News Policy Debates Lang. URL http://www.euractiv.com/infosociety/eu-rejects-un-state-rule-interne-news-533476 (Accessed 3 May 2014).

22. Deibert, R. J. (2009) The geopolitics of internet control: Censorship, sovereignty, and cyberspace, The Routledge Handbook of Internet Politics, pp. 323–336.

23. DeNardis, L. (2014) The Global War for Internet Governance, Yale University Press.

24. DeNardis, D. and Raymond, M. (2013) Thinking Clearly About Multistakeholder Internet Governance, Mark, Thinking Clearly About Multistakeholder Internet Governance (November 14, 2013), [online] Available at: http://www.phibetaiota.net/wp-content/uploads/2013/11/Multistakeholder-Internet-Governance.pdf (Accessed 2 May 2014).

25. Dibbell, J. (2012) The Shadow Web, Scientific American, 306(3), pp. 60–65.

26. Dijk, J.A.G.M. van, 2005. The Deepening Divide: Inequality in the Information Society. SAGE Publications, Inc, Thousand Oaks, Calif.

27. Drake, W. J. (2005) Reforming internet governance: Perspectives from the working group on internet governance (WGIG), United Nations

Publications, [online] Available at: http://www.wgig.org/docs/book/WGIG_book.pdf (Accessed 13 February 2014).

28. TOWARDS COMMERCE 3.0 Roadmap for Building Sustainable Growth into Commerce ©eBay Washington DC Office 2012 – Published October 2012 Design by Karakas

29. http://www.ft.com/cms/s/0/e1643694-4619-11e3-9487-00144feabdc0.html#ixzz2mKPJja9E November 5, 2013 7:33 pm The NSA and the risk to the internet The US must give assurances to stop Balkanisation of the web

30. Dutton, W.H., 2013. The Oxford Handbook of Internet Studies. OUP Oxford, Oxford.

31. The effect of the Internet on international trade C.L. Freund, D. Weinhold / Journal of International Economics 62 (2004) 171–189

32. Federal Communications Commission, 2013. The Open Internet. Available at: http://www.fcc.gov/guides/open-internet (Accessed 28 04 2014).

33. Fuchs, C., 2011. Internet and Society: Social Theory in the Information Age, Reprint edition. ed. Routledge, London.

34. Galperin, E. and York, J. C. (2013) A Deeper Dive Into Yahoo and Facebook's Transparency Reports, Electronic Frontier Foundation, [online] Available at: https://www.eff.org/deeplinks/2013/10/deeper-dive-into-facebook-and-yahoo-transparency-reports (Accessed 13 February 2014).

35. Gerlach, M. (1992) The Japanese Corporate Network: A Blockmodel Analysis. Administrative Science Quarterly. 37(1992): 105-139

36. Gladwell, M., 2010. Small Change. New Yorker.

37. Guillén, M.F., Suárez, S.L., 2005. Explaining the Global Digital Divide: Economic, Political and Sociological Drivers of Cross-National Internet Use. Soc. Forces 84, 681–708. doi:10.1353/sof.2006.0015

38. Hargittai, E., & Hsieh, Y. P. (2013). Digital Inequality. In W. H. Dutton (Ed.), The Oxford Handbook of Internet Studies (pp.129-150). Oxford, UK.: Oxford University Press.

39. Hill, J. F., 2012. Internet Fragmentation Highlighting the Major Technical, Governance and Diplomatic Challenges for U.S. Policy Makers, s.l.: John F. Kennedy School of Government, Harvard University.

40. Hill, R., 2013. The Future of Internet Governance: Dystopia, Utopia, or Realpolitik?

41. Hill, R., 2014. The internet, its governance, and the multi-stakeholder model. info 16, 16–46. doi:10.1108/info-05-2013-0031

42. Hoffman, D.L., Novak, T.P., 1998. Bridging the Racial Divide on the Internet. Science 280, 390–391. doi:10.1126/science.280.5362.390

43. ITU 2013, Doubling Digital Opportunities: Enhancing the Inclusion of Women and Girls in the Information Society. [online] Available at: http://www.broadbandcommission.org/

documents/working-groups/bb-doubling-digital-2013.pdf(Accessed 14 March 2014).

44. Global DNS-CERT Business Case: Improving the Security, Stability and Resiliency of the DNS Presented by Internet Corporation for Assigned Names and Numbers (ICANN) For Public Comment 12 February 2010 through 29 March 2010

45. ICANN, 2013. New Generic Top Level Domains. [Online]
Available at:
http://newgtlds.icann.org/en/about/program
(Accessed 12 12 2013).

46. Internet Interconnections Proposals For New Interconnection Model Comes Up Short www.internetsociety.org 2012 Geneva

47. http://www.ft.com/cms/s/0/52327396-8359-11e3-aa65-00144feab7de.html?siteedition=uk#axzz2uRwcZdiu January 22, 2014 8:34 pm Expert panel to investigate internet governance By Sam Jones in London and John Gapper in Davos

48. Kaspersky, E. (2013) What will happen if countries carve up the internet? [online] Available at: http://www.theguardian.com/media-network/media-network-blog/2013/dec/17/internet-fragmentation-eugene-kaspersky 23/05/2014

49. Kelley, S., Ttruong, M., Earp, M., Reed, L., Shahbaz, L., Shahbaz, A., Greco-Stoner, A., 2013. FREEDOM OF THE NET 2013.

50. Kahn, J. (2014) Apple, Facebook and Google set to expand transparency on government data requests, TechSpot, [online] Available at: http://www.techspot.com/news/56621-apple-facebook-and-google-set-to-expand-transparency-on-government-data-requests.html (Accessed 6 May 2014).

51. Telecommunications Policy 24 (2000) 553}563 - ICANN between technical mandate and political challenges - Wolfgang Kleinwachter Department for Information and Media Sciences, University of Aarhus, Nordre Ringgade 1, 8000 Athus C, Denmark - Published by Elsevier Science Ltd.

52. Kroes, N., 2014, Commission to puruse role as honest broker in future global negotiations on Internet Governance, European Commission, [online] Available at: http://europa.eu/rapid/press-release_IP-14-142_en.htm (Accessed 06 May 2014)

53. Kruger, L. G., 2013. Internet Governance and the Domain Name System:Issues for Congress, Washington : Congressional Research Service.

54. Improving ICANN's governance and accountability: A policy proposal Thomas M. Lenard a, Lawrence J. White b,⇑ Information Economics and Policy 23 (2011) 189–199_ 2011 Elsevier B.V.

55. Margetts, H. 2013, The Internet and Democracy in ed. In Dutton, W.H., 2013. The Oxford Handbook of Internet Studies. OUP Oxford, Oxford.

56. Mead, R. and Andrews, T. (2009) International Management: Culture and Beyond, Wiley-Blackwell.

57. Meinrath, S. (2013) The Future of the Internet: Balkanization and Borders [Online] Available at: http://ideas.time.com/2013/10/11/the-future-of-the-internet-balkanization-and-borders/ (Accessed on: 08 December 2013).

58. Published on 19 Mar 2014 Brookings Mountain West Lecture Series. Joshua Meltzer - March 12, 2014. International Trade, the Internet and Cross-Border Data Flows https://www.youtube.com/watch?v=98MYfrwIuQM

59. Meltzer, J. 2012 Global Trade in the BERKSHIRE ENCYCLOPEDIA OF SUSTAINABILITY, Vol 10: The Future of Sustainability (Berkshire Publishing)

60. Mind the digital gender gap: Empowering women online [WWW Document], n.d. URL http://www.womenundersiegeproject.org/blog/entry/mind-the-digital-gender-gap-empowering-women-online (Accessed 15 May 2014).

61. Martin A. Negron Engineering Management and Systems Engineering The George Washington University Washington DC, USA

62. Norris, P., 2001. Digital Divide: Civic Engagement, Information Poverty, and the Internet Worldwide. Cambridge University Press.

63. NASDAQ (2012) Towards Commerce 3.0: Roadmap for Building Sustainable Growth into Commerce, Washington

64. Papers, No. 200, OECD Publishing. http://dx.doi.org/10.1787/5k962hhgpb5d-en

65. Paul DiMaggio, Hargattai, E., Celeste, C., Shafer, S., 2004. Digital Inequality: From Unequal Access to Differentiated Use.

66. Paulo, J. L. in S. (2013) Brazil sparks furore over internet privacy bill, Financial Times, 11th November, [online] Available at: http://www.ft.com/cms/s/0/5cd5b638-487a-11e3-8237-00144feabdc0.html#axzz2t8DsbmWg (Accessed 13 February 2014).

67. Pitelis, C. and Sugden, R. (2000) The Nature of the Transnational Firm, Psychology Press.

68. Sambharyaa, R. B., Kumaraswamyb, A. and Banerjee, S. (2005) Information technologies and the future of the multinational enterprise, Journal of International Management, 11, pp. 143–161.

69. Anarchy, State, or Utopia? Checks and Balances in Internet Governance M. Christopher Riley American Universitywww.computer.org/internet/ IEEE INTERNET COMPUTING Published by the IEEE Computer Society 1089-7801/13/$31.00 © 2013 IEEE

70. Shipman Wentworth, S., 2013. Testimony.

71. Schermerhorn, J. R. (2011) Exploring Management, John Wiley & Sons.

72. Schmidt, E. and Cohen, J. (2013) Web censorship: the net is closing in, the Guardian, [online] Available at: http://www.theguardian.com/technology/2013/apr/23/web-censorship-net-closing-in (Accessed 13 December 2013).

73. Schroeder, S. (2009) My Internet is Not the Same as Your Internet, Mashable, [online] Available at: http://mashable.com/2009/04/27/my-

internet-your-internet/ (Accessed 1 May 2014).

74. Smith, D.A. and White, D.R. (1992), “Structure and Dynamics of the Global Economy: Network Analysis of International Trade 1965-1980”, Social Forces, 70(4): 857-893

75. Internet Governance: Infrastructure and Institutions Lee A. Bygrave and Jon Bing 2009 in Models of Internet governance by Lawrence B. Solum http://www.oxfordscholarship.com/view/10.1093/acprof:oso/9780199561131.001.0001/acprof-9780199561131-chapter-3

76. Democracy in America American politics Surveillance Should the government know less than Google? Jun 11th 2013, 8:34 by M.S. The Economist

77. Travis, H. (2013) Cyberspace Law: Censorship and Regulation of the Internet, Routledge.

78. Traynor, I. (2014) Internet governance too US-centric, says European commission, The Guardian, 12th February, [online] Available at: http://www.theguardian.com/technology/2014/feb/12/internet-governance-us-european-commission (Accessed 13 February 2014).

79. United Nations Conference on Trade and Development Use of the Internet for Efficient International Trade Guide for SME Managers Prepared by the UNCTAD secretariat New York and Geneva, 2004

80. Weber, R.H., 2009. Internet of things – Need for a new legal environment? Comput. Law Secur. Rev. 25, 522–527. doi:10.1016/j.clsr.2009.09.002

81. United Nations (2012) Country Classification. [online] Available at: http://esa.un.org/unpd/wpp/Excel-Data/country-classification.pdf 23/05/2014

82. U.S. Department of Commerce (2013) U.S. International Trade in Goods and Services: October 2013, U.S.: Washington DC

83. U.S. to Give Up Key Internet Governance Role, n.d. Re/code.

84. Women and ICT in Africa: A new digital gap [WWW Document], n.d. URL http://www.aljazeera.com/indepth/opinion/2014/05/women-ict-africa-new-digital-ga-201452210244121558.html (Accessed 11 May 2014).

85. World wakes up to digital divide, 2010. . BBC.

86. Yewkes, Y. and Yar, M. (2010) (ed) Handbook of Internet Crime. Portland: William Publishing

7. APPENDIX 1 – Detailed Methodology

7.1 Methodology for An analysis of the social and political effects of fragmentation

The analysis focuses on discourse data in social and political forums, such as debates, speeches, and hearings of the phenomenon of Internet governance, security, censorship and digital inequality. The reason for focusing on these topics is because these are the topics, which will make it possible for the researcher to get a speculative look into the future. Thus, enabling to come to conclusions on the discourse of the texts in terms of what is being discussed the most as the literature on discourse analysis suggest that language discourse overtime becomes the reality or the practice, such analysis will enable the researcher to speculate about the future, therefore coming to conclusions about who wins or loses under DNS fragmentation.

Due to the fact that the secondary data is based on debates, speeches and hearings the data are not likely to be published in databases or other academic archives. For the research to be reliable and valid there have been extensive consideration to identifying the credibility of the data. The stakeholder and the data will therefore be carefully chosen .The data is therefore mostly collected from the EU-database, press releases, government websites, and credible news forums. However, some of the data is collected from personal Twitter accounts, thus from reliable stakeholders.

When interrogating the data, the discourse content will be divided into topics, where each topic is presented and followed by text quotes of the different stakeholders opinion about the topic. Furthermore the unit of the data will be analysed and identified and discussed in the end of each topic. When drawing conclusion the topics will be drawn together to discuss the advantages and disadvantages for each topic in order to speculate how the future for the DNS Fragmentation will look like and to distinguish social and political impact of DNS Fragmentation.

7.2 Methodology for: An analysis of the effects of fragmentation on international trade through blockmodeling

Two different processes will be used to successfully undertake the simulation. First, business network analysis will help to introduce the whole offline trading networks between countries. Second, blockmodeling analysis will help in the grouping of countries with similar characteristics, providing a deeper insight into the trading patterns. By using partition vectors based on different criteria, partition vectors will help to create the simulation itself. Smith and White (1992) explain what is blockmodeling (p.859)

"A blockmodel of relations between positions (blocks) can be characterized in terms of aggregate relationships between countries in the respective blocks or positions. Blockmodeling, as the principal method for the network analysis of positions, consists of two steps: the blocking or clustering of factors on the basis of patterns in their network ties, and the description of aggregate relations between the positions or blocks."

Blockmodeling is clustering or grouping those individuals in the network that are equivalent or have similar attributes. This analysis helps to interpret unstructured networks to transform into structural ones. The reason for using blockmodelling is because this analysis focuses the researcher's attention on the overall patterns of the network, and as Gerlach (1992, p.119) notes, 'subsets of actors within the network (blocks) are determined based on the similarity of their relationships with the actors in other blocks, regardless of the presence or absence of ties directly among themselves.'

A so called partition vector has been used, to illustrate and create different scenarios. These partition vectors are based on geographical classifications of countries because it will be interesting to see how countries will be partitioned according to their geographical location. The second partition vector is based on trade organisation, as different countries are part of the most important and biggest trade organisations, and to see how countries are grouped together according to their belongings to one or more organisation. The third partition vector is based on language. Here, the ten most widely used languages have been taken

into account and to see how language can fragment trade between countries.

7.3 Methodology for: Internet Fragmentation and its influence on global trade through interpretive analysis

The purpose of this methodology is to explain the methods used in this part of the research project and to justify the reasons, limitations and the reliability of the data used where primary data is used as the main tool of data collection. In order to get an in-depth understanding on how DNS Fragmentation would affect the relationship between countries interpretive analysis is used.

Interpretive analysis allows the researcher to identify the most critical interpretive elements of data gathered. The benefit of which gives the possibility to see and understand the main context of why the decisions and actions are made; although, there is still the difficulty of generalising to a larger population.

Due to the speculative nature of the research, interviews between the main countries are analysed and compared, to obtain data to answer the research questions and to meet the objectives, by providing an understanding of what the fragmentation could do to the trading relationship with countries. Selection of the countries is based on judgmental sampling method due to the fact that the research focuses on the main international players of Internet governance and global trading. This type of probability sampling provides close measurement to outreach a strong conclusion.

Data collection starts with looking at public data available on the Internet through the university's access to a wide range of databases, journals, books and e-books, country profiles and publications. The primary data are mainly collected in London, UK through Skype and call conferences with governmental officials of the countries selected for this research.

Given the importance of the sensitive information the client are providing and the importance of ethics for the conduct of the project, it is taken full responsibility of storage of the information. Confidential information is protected and respected. It is also important to strive that it is not on researchers'' intention to fabricate and misrepresent data. The study has objective nature, with no personal interest that can affect the study. In addition, the research is also signing a non-disclosure

form and an ethical form with University of Greenwich, where serious consideration to ethical issues such as: age, difficulties on understanding the topic, disability, confidentiality and anonymous concerns, are taken in consideration, in accordance to University of Greenwich policy.

7.4 Methodology for: Assessing the impact of Internet fragmentation on international business operations.

The present research sought to identify how companies that engage in electronic commerce would be affected in a scenario where Internet fragmentation occurs.

In order to execute this, the largest companies in the UK would need to be sampled. To that effect, the FTSE100 Index was considered a suitable sample as it consists of the largest companies based on issued shares (Stevenson, 2012). The FTSE 100 index had been selected assuming that the effects of fragmentation would have a greater impact on companies operating internationally. Multinational firms rely heavily on the Internet for communication with and between subsidiaries and to gain competitive advantage via a global supply chain. Due to these reasons, fragmentation will have a significant impact on companies operating internationally.

Secondary data of the FTSE100 was gathered from the Orbis database and exported into Excel. The information deemed most suitable for analysis included the industry that company operated in, region of business activity and industry operations of subsidiaries.

The first part of the project will theorise on how companies in different industries will be affected in a scenario where the global Internet is fragmented. The effect of this fragmented Internet is identified based on the global operational strategy of these companies and information related to their subsidiaries. The key to understand such corporations is to recognise and evaluate the organisational strategies underpinning the business itself and the structure employed.

The 100 companies were categorised into one of the four MNE strategies as identified by Bartlett and Ghoshal (2002): International, Global, Multinational and Transnational. To execute this, a thorough analysis was carried out of each company's most recently available annual report to help pinpoint what strategy the company adhered to. In particular,

sections related to the company vision, mission, business strategy and business model were analysed. In the instance that the annual report provided insufficient information, the company profile found on the organisation's website was examined. This information can generally be found in the investor relations sections in the company corporate website.

To allow for identification, Bartlett and Ghoshal's (2002) typology chart was used in order to categorise each company. A company would fulfil the criteria of employing a specific strategy if it met all three requirements. The final sample used for the presented study consisted of 20 FTSE100 companies, 5 from each typological category.

The effects of fragmentation are then measured by creating a link between the strategies that a company follows and how a closed and fragmented Internet would affect those business activities. Where companies follow a strategy where power is decentralised effects of fragmentation is considered to be lower. Where companies are following a centralised structure where most of the decision making is done through the head office the effects of fragmentation is high.

Next, the information gathered through Orbis about the FTSE100 companies was used to extract specific data regarding the number of subsidiaries, the industry the parent company and the subsidiaries operated within, the countries these subsidiaries were located and the distribution of the subsidiaries. This information was generated for the finalised sample.

Using this raw data, a 'core' risk value was determined based on the companies' industry and a weighted average based on a risk value associated with the subsidiaries' industries and their locations was calculated. These values were then combined to present a 'total risk value' which allowed for company analysis within each typology category.

The table below contains description of industries and the level of risk associated with each of the distinct industries. The level of risk is scored based on the primary stages of its production process and its dependence on the internet to operate effectively and efficiently.

US SIC RISK TABLE

CODE	Description	Risk	Level
0	Agriculture, Forestry, And Fishing	Low	1
1	Mining	Low-Medium	2
2	Construction	Low	1
3	Manufacturing	Medium-High	4
4	Transportation, Communications, Electric, Gas	High	5
5	Wholesale Trade	Medium	3
6	Retail Trade	High	5
7	Finance, Insurance, And Real Estate	High	5
8	Services	Med-High	4
9	Public Administration	Low	1

8. APPENDIX 2 - Country classifications

CountryName	Intern. Org.		Geographical class.		Language	
Afghanistan	11	N/A	9	Western Asia/Middle East	11	Others
Albania	1	WTO	7	Europe	11	Others
Algeria	11	N/A	4	North Africa	5	Arabic
Andorra	11	N/A	7	Europe	11	Others
Anguilla	11	N/A	2	Central America	11	Others
Antigua And Barbuda	1	WTO	2	Central America	11	Others
Argentina	5	G20, WTO	3	South America	2	Spanish
Armenia	1	WTO	9	Western Asia/Middle East	11	Others
Aruba	11	N/A	2	Central America	11	Others
Australia	6	WTO, APEC	11	Australia (New Zealand, New Caledonia)	3	English
Austria	7	EU, WTO	6	EU	11	Others
Azerbaijan	11	N/A	9	Western Asia/Middle East	11	Others
Bahamas, The	11	N/A	2	Central America	11	Others
Bahrain	1	WTO	9	Western Asia/Middle East	11	Others
Bangladesh	1	WTO	9	Western Asia/Middle East	10	Bengali
Barbados	1	WTO	2	Central America	11	Others

Belarus	11	N/A	7	Europe	7	Russian
Belgium	7	EU, WTO	6	EU	11	Others
Belize	1	WTO	2	Central America	11	Others
Benin	1	WTO	5	Sub Sahara	11	Others
Bermuda	11	N/A	2	Central America	11	Others
Bhutan	11	N/A	9	Western Asia/Middle East	11	Others
Bolivia	5	G20, WTO	3	South America	2	Spanish
Bosnia And Herzegovina	11	N/A	7	Europe	11	Others
Botswana	1	WTO	5	Sub Sahara	11	Others
Brazil	5	G20, WTO	3	South America	6	Portuguese
Brunei	6	WTO, APEC	8	South East Asia	11	Others
Bulgaria	7	EU, WTO	6	EU	11	Others
Burkina Faso	1	WTO	5	Sub Sahara	11	Others
Burundi	1	WTO	5	Sub Sahara	11	Others
Cambodia	1	WTO	8	South East Asia	11	Others
Cameroon	1	WTO	5	Sub Sahara	11	Others
Canada	8	NAFTA, WTO, APEC	1	USA and Canada	3	English
Cape Verde	1	WTO	5	Sub Sahara	6	Portuguese
Central African Republic	1	WTO	5	Sub Sahara	11	Others
Chad	1	WTO	5	Sub Sahara	11	Others
Chile	9	G20, WTO, APEC	3	South America	2	Spanish
China	9	G20, WTO, APEC	12	Eastern Asia	1	Chinese
Colombia	1	WTO	3	South America	2	Spanish
Comoros	11	N/A	5	Sub Sahara	11	Others
Congo	1	WTO	5	Sub Sahara	11	Others
Cook Islands	11	N/A	11	Australia (New Zealand, New Caledonia)	11	Others
Costa Rica	1	WTO	2	Central America	11	Others

Cote d'Ivoire	1	WTO	5	Sub Sahara	11	Others
Croatia	7	EU, WTO	6	EU	11	Others
Cuba	5	G20, WTO	2	Central America	11	Others
Cyprus	7	EU, WTO	9	Western Asia/Middle East	11	Others
Czech Republic	7	EU, WTO	6	EU	11	Others
Denmark	7	EU, WTO	6	EU	11	Others
Djibouti	1	WTO	5	Sub Sahara	11	Others
Dominica	1	WTO	2	Central America	11	Others
Dominican Republic	1	WTO	2	Central America	11	Others
East Timor	11	N/A	8	South East Asia	6	Portuguese
Ecuador	1	WTO	3	South America	2	Spanish
Egypt, Arab Rep.	5	G20, WTO	4	North Africa	5	Arabic
El Salvador	1	WTO	2	Central America	11	Others
Eritrea	11	N/A	5	Sub Sahara	11	Others
Estonia	7	EU, WTO	6	EU	11	Others
Ethiopia(excludes Eritrea)	11	N/A	5	Sub Sahara	11	Others
Faroe Islands	11	N/A	7	Europe	11	Others
Fiji	1	WTO	11	Australia (New Zealand, New Caledonia)	11	Others
Finland	7	EU, WTO	6	EU	11	Others
France	7	EU, WTO	6	EU	11	Others
French Guiana	11	N/A	3	South America	11	Others
French Polynesia	11	N/A	11	Australia (New Zealand, New Caledonia)	11	Others
Gabon	1	WTO	5	Sub Sahara	11	Others
Gambia, The	1	WTO	5	Sub Sahara	11	Others
Georgia	1	WTO	9	Western Asia/Middle East	11	Others
Germany	7	EU, WTO	6	EU	11	Others
Ghana	1	WTO	5	Sub Sahara	11	Others

Greece	7	EU, WTO	6	EU	11	Others
Greenland	11	N/A	1	USA and Canada	11	Others
Grenada	1	WTO	2	Central America	11	Others
Guadeloupe	11	N/A	2	Central America	11	Others
Guatemala	5	G20, WTO	2	Central America	11	Others
Guinea	1	WTO	5	Sub Sahara	11	Others
Guinea-Bissau	1	WTO	5	Sub Sahara	6	Portuguese
Guyana	1	WTO	3	South America	11	Others
Honduras	1	WTO	2	Central America	11	Others
Hong Kong, China	6	WTO, APEC	12	Eastern Asia	11	Others
Hungary	7	EU, WTO	6	EU	11	Others
Iceland	1	WTO	7	Europe	11	Others
India	5	G20, WTO	9	Western Asia/Middle East	4	Hindi
Indonesia	9	G20, WTO, APEC	8	South East Asia	9	Javanese
Iran, Islamic Rep.	11	N/A	9	Western Asia/Middle East	11	Others
Ireland	7	EU, WTO	6	EU	11	Others
Israel	1	WTO	9	Western Asia/Middle East	11	Others
Italy	7	EU, WTO	6	EU	11	Others
Jamaica	1	WTO	2	Central America	11	Others
Japan	6	WTO, APEC	12	Eastern Asia	8	Japanese
Jordan	1	WTO	9	Western Asia/Middle East	5	Arabic
Kazakhstan	11	N/A	9	Western Asia/Middle East	11	Others
Kenya	1	WTO	5	Sub Sahara	11	Others
Kiribati	11	N/A	11	Australia (New Zealand, New Caledonia)	11	Others
Korea, Republic Of (South)	6	WTO, APEC	12	Eastern Asia	11	Others
Kuwait	1	WTO	9	Western Asia/Middle East	5	Arabic
Kyrgyzstan	1	WTO	9	Western Asia/Middle East	11	Others

Latvia	7	EU, WTO	6	EU	11	Others
Lebanon	11	N/A	9	Western Asia/Middle East	11	Others
Lesotho	1	WTO	5	Sub Sahara	11	Others
Libya	11	N/A	4	North Africa	5	Arabic
Lithuania	7	EU, WTO	6	EU	11	Others
Luxembourg	7	EU, WTO	6	EU	11	Others
Macao	1	WTO	12	Eastern Asia	11	Others
Macedonia, FYR	1	WTO	7	Europe	11	Others
Madagascar	1	WTO	5	Sub Sahara	11	Others
Malawi	1	WTO	5	Sub Sahara	11	Others
Malaysia	6	WTO, APEC	8	South East Asia	11	Others
Maldives	1	WTO	9	Western Asia/Middle East	11	Others
Mali	1	WTO	5	Sub Sahara	11	Others
Malta	7	EU, WTO	6	EU	11	Others
Martinique	11	N/A	2	Central America	11	Others
Mauritania	1	WTO	5	Sub Sahara	5	Arabic
Mauritius	1	WTO	5	Sub Sahara	11	Others
Mayotte	11	N/A	5	Sub Sahara	11	Others
Mexico	10	NAFTA, G20, WTO, APEC	2	Central America	11	Others
Moldova	1	WTO	7	Europe	11	Others
Mongolia	1	WTO	10	North Asia (Russia+Mongolia)	11	Others
Montenegro	1	WTO	7	Europe	11	Others
Montserrat	11	N/A	2	Central America	11	Others
Morocco	1	WTO	4	North Africa	11	Others
Mozambique	1	WTO	5	Sub Sahara	6	Portuguese
Myanmar	1	WTO	8	South East Asia	11	Others
Namibia	1	WTO	5	Sub Sahara	11	Others

Nepal	1	WTO	9	Western Asia/Middle East	11	Others
Netherlands	7	EU, WTO	6	EU	11	Others
Netherlands Antilles	11	N/A	2	Central America	11	Others
New Caledonia	11	N/A	11	Australia (New Zealand, New Caledonia)	9	Javanese
New Zealand	6	WTO, APEC	11	Australia (New Zealand, New Caledonia)	3	English
Nicaragua	1	WTO	2	Central America	11	Others
Niger	1	WTO	5	Sub Sahara	11	Others
Nigeria	5	G20, WTO	5	Sub Sahara	11	Others
Norway	1	WTO	7	Europe	11	Others
Occ.Pal.Terr	11	N/A	9	Western Asia/Middle East	11	Others
Oman	1	WTO	9	Western Asia/Middle East	5	Arabic
Other Asia, nes	11	N/A	12	Eastern Asia	11	Others
Pakistan	5	G20, WTO	9	Western Asia/Middle East	11	Others
Palau	11	N/A	11	Australia (New Zealand, New Caledonia)	11	Others
Panama	1	WTO	2	Central America	11	Others
Papua New Guinea	6	WTO, APEC	11	Australia (New Zealand, New Caledonia)	11	Others
Paraguay	5	G20, WTO	3	South America	2	Spanish
Peru	6	WTO, APEC	3	South America	2	Spanish
Philippines	9	G20, WTO, APEC	8	South East Asia	11	Others
Poland	7	EU, WTO	6	EU	11	Others
Portugal	7	EU, WTO	6	EU	6	Portuguese
Qatar	1	WTO	9	Western Asia/Middle East	11	Others
Reunion	11	N/A	5	Sub Sahara	11	Others
Romania	7	EU, WTO	6	EU	11	Others
Russian Federation	6	WTO, APEC	10	North Asia (Russia+Mongolia)	7	Russian
Rwanda	1	WTO	5	Sub Sahara	11	Others
Samoa	1	WTO	11	Australia (New Zealand, New Caledonia)	11	Others

Sao Tome And Principe	11	N/A	5	Sub Sahara	6	Portuguese
Saudi Arabia	1	WTO	9	Western Asia/Middle East	5	Arabic
Senegal	1	WTO	5	Sub Sahara	11	Others
Seychelles	11	N/A	5	Sub Sahara	11	Others
Sierra Leone	1	WTO	5	Sub Sahara	11	Others
Singapore	6	WTO, APEC	8	South East Asia	11	Others
Slovak Republic	7	EU, WTO	6	EU	11	Others
Slovenia	7	EU, WTO	6	EU	11	Others
Solomon Islands	1	WTO	11	Australia (New Zealand, New Caledonia)	11	Others
South Africa	5	G20, WTO	5	Sub Sahara	11	Others
Spain	7	EU, WTO	6	EU	2	Spanish
Sri Lanka	1	WTO	9	Western Asia/Middle East	11	Others
St. Kitts and Nevis	1	WTO	2	Central America	11	Others
St. Lucia	1	WTO	2	Central America	11	Others
St. Vincent and the Grenadines	1	WTO	2	Central America	11	Others
Sudan	11	N/A	4	North Africa	11	Others
Suriname	1	WTO	3	South America	9	Javanese
Swaziland	1	WTO	5	Sub Sahara	11	Others
Sweden	7	EU, WTO	6	EU	11	Others
Switzerland	1	WTO	7	Europe	11	Others
Syrian Arab Republic	11	N/A	9	Western Asia/Middle East	5	Arabic
Tanzania	5	G20, WTO	5	Sub Sahara	11	Others
Thailand	9	G20, WTO, APEC	8	South East Asia	11	Others
Togo	1	WTO	5	Sub Sahara	11	Others
Tonga	1	WTO	11	Australia (New Zealand, New Caledonia)	11	Others
Trinidad And Tobago	1	WTO	2	Central America	11	Others
Tunisia	1	WTO	4	North Africa	5	Arabic

Turkey	1	WTO	9	Western Asia/Middle East	11	Others
Turkmenistan	11	N/A	9	Western Asia/Middle East	11	Others
Turks and Caicos Isl.	11	N/A	2	Central America	11	Others
Tuvalu	11	N/A	11	Australia (New Zealand, New Caledonia)	11	Others
Uganda	1	WTO	5	Sub Sahara	11	Others
Ukraine	1	WTO	7	Europe	7	Russian
United Arab Emirates	1	WTO	9	Western Asia/Middle East	5	Arabic
United Kingdom	7	EU, WTO	6	EU	3	English
United States	8	NAFTA, WTO, APEC	1	USA and Canada	3	English
Uruguay	5	G20, WTO	3	South America	2	Spanish
Vanuatu	1	WTO	11	Australia (New Zealand, New Caledonia)	11	Others
Venezuela	5	G20, WTO	3	South America	2	Spanish
Vietnam	6	WTO, APEC	8	South East Asia	11	Others
Wallis And Futuna	11	N/A	11	Australia (New Zealand, New Caledonia)	11	Others
Yemen	11	N/A	9	Western Asia/Middle East	5	Arabic
Zambia	1	WTO	5	Sub Sahara	11	Others
Zimbabwe	5	G20, WTO	5	Sub Sahara	11	Others

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