Master's thesis

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Norwegian University of Science and Technology
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Department of Sociology and Political Science

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China and 5G: An assessment of China's motivations for promoting and developing 5G technology

Master's thesis in Political Science
Supervisor: Paul Midford
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Sammendrag: *Denne oppgaven undersøker Kina's motivasjoner for å utvikle og promotere 5G teknologi. På den ene siden kan motivene være knyttet mot kommersielle og økonomiske mål. På den andre siden kan de være knyttet mot defensive eller offensive militære mål. For å undersøke dette utledes det tre hypoteser fra teori om internasjonale relasjoner, to fra realisme, og en fra liberalisme. Offensiv realisme argumenterer for at motivasjonene er knyttet til å maksimere makt. Defensive realisme argumenterer fra Kina sine motiver er å opprettholde eller maksimere sin egen sikkerhet. Den liberale hypotesen argumenterer for at Kina sine motivasjoner er å fortsette sin økonomiske vekst, og maksimere velstand. Resultatene viser at Kina kan bruke, utvikle og promotere 5G teknologi både for offensive og defensive militære formål, og for å fortsette sin økonomiske vekst å maksimere velstand. Analysen og diskusjonen viser at det er vanskelig å identifisere Kina's motivasjoner med stor nøyaktighet. Det er sannsynlig at Kina søker en kombinasjon av dette, og at 5G er en del av en strategi for å nå disse målene. Beslutningstakere bør utvise forsiktighet når det gjelder Kina og 5G, men ikke automatisk anta det verste.*

Preface

I want to thank my supervisor Paul Midford for his guidance in the process of writing this thesis. He provided valuable advice and tips for relevant literature.

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Abbreviations

CCP: Chinese Communist Party

CMI: Civil Military Integration

PLA: People's Liberation Army

PRC: Peoples's Republic of China

ODT: Offense-Defense Theory

ICT: Information and Communications Technology

IoT: Internet of Things

S&T: Science and Technology

NCW: Network Centric Warfare

CNE: Computer Network Exploitation

RMA: Revolution In Military Affairs

1 Introduction

1.1 Research question: *What are Chinas motivations for promoting and developing 5G technology?*

1.2 Disposition of the thesis

The thesis contains 5 parts. Part 1 is the introduction, where the topic and problem are presented. The background for choosing the topic will also be discussed, in addition to how the thesis will be narrowed down. The theory applied to analyze and discuss the research question will be presented in part 2. Competing hypotheses will be presented at the end of part 2. Two of the main theories when it comes to international relations, realism and liberalism, and sub-categories of these will be used. At the beginning of part 2, central key terms will be defined. Part 3 will consist of a brief discussion regarding the methodology. The analysis and discussion will take place in part 4. Part 4 will be structured in the following way: First, a brief overview of China's technological development from commercial and military perspectives will be presented. Next, the concept of 5G, its abilities and uses will be laid out. Following this, China's promotion and development of 5G technology will be exemplified with the company Huawei. After this, the hypotheses will be explored in detail to provide an answer to the research question. A conclusion will be given in part 5.

1.3 Background for the topic of the thesis and narrowing down the problem

This thesis will address the question of Chinas motivations behind their promotion and development of the high-tech information and communications technology that is 5G.

In addition to their economic growth during the past few decades, China has also made serious progress in the technology sector, both civil and military. The country has moved from imitation towards innovation that coincides with China's development of the private sector (Greeven et al. 2019:7). The country are now in the forefront of areas such as new and renewable energy, nuclear energy, next generation telecommunications technology, artificial intelligence, robots, big data, supercomputers, space technology, e-commerce, and cyber technology (Li 2018), (Greeven et al. 2018:80), (Allison 2017:17-18), (Saltzman 2013), (Farrel and Newman 2019), (Fritz 2008), (Kaska et al. 2019). Development and innovation in the high-tech industries mentioned above includes 5G technology. This also affects the development and innovation of military capabilities. It is crucial to mention the overlap and relationship between civilian technology and military technology since it can be of great assistance in exploring Chinas motivations. This overlap is explained and referred to in the academic literature as spin on, spin off (Samuels 2018:1-32), and CMI, civil military integration (Cheung 2011:343), (Cheung 2016:728), (Cheung et al. 2018:69). Spin on, also called dual-use, refers to how civilian innovation and technology can be used for military purposes. Spin off refers to how military innovation and technology can be applied to civilian commercial industry, and how this can improve economic development. Keohane and Nye points out that many analysts are presenting the idea that the application of information technology is tied to a revolution in military affairs (Keohane and Nye 2012:218). One of the most well known definitions of RMA is formulated by Krepinevich:

> "What is a military revolution? It is what occurs when the application of new technologies into a significant number of concepts and organizational adaptation in a way that fundamentally alters the character and conduct of conflict. It does so by producing a dramatic increase—often an order of magnitude or greater— in the combat potential and military effectiveness of armed forces". (Krepinevich 1994:30).

The concept of RMA can thus be viewed as theories about how new technologies affects how warfare will be conducted in the future. Advances in information technology are contributing to the revolution in military affairs, which can transform the relationship between offensive and the defensive military capabilities (Lieber 2005:15). Central factors

here are modern information, communications, space technology, and total systems integration (Fritz 2008:28). Cyber (coercive) capabilities, information warfare and cyber warfare are being identified as a new form of RMA and paradigm (Lindsay 2015:30), (Gray 2013:21-32). The increasing proliferation of cyber (coercive) capabilities has made cyber-attacks and cyber warfare a reason for concern for both political and military leaders all over the world regarding national security (Liff 2012:401).

In today's modern society, it is imperative for consumers and governments to be able to trust electronic equipment and infrastructure. Systems related to national security and military operations, healthcare, power supply, financial institutions, transportation, and communications are some examples of critical infrastructure that depends upon such technology (Lysne 2018:5), (Park 2019:25), (Kaska et al. 2019:15). "5G networks can be regarded as the key infrastructure that innovates societies, as well as ICT industries" (Yu et al. 2017:2). Information and communications based technology can from one perspective support scientific, economic and technological development. From another perspective it can pose a threat to the national security of states (Fritz 2008:46), and ICT based technology has today become an important military capability (Saltzman 2013:40-41). Information technology and cyber (coercive) capabilities is increasingly becoming more relevant in international relations because governments rely more on such technology, which in turn makes it important to understand these concepts (Chang 2014:9). Chinese domination in the development and rollout of 5G technology by its national ICT leader Huawei, has led to concerns regarding national security across the globe, and moved the conversation about 5G from technical questions to a geopolitical issue (Foreign Policy 2020). The concerns regarding Huawei as a vendor of ICT's revolves around espionage, surveillance, and the collection of data from governments, companies, and private citizens (Lysne 2018:2). In this light, it is reasonable to question China's motivations for promoting and developing high-tech ICT's like 5G.

When discussing what Chinas motivations, they could be aggressive and hostile, peaceful, somewhere in between, or be perceived as so vague and uncertain that they are difficult to identify. Does China want to maximize its power and military capabilities with the use of new technological innovations like 5G? Are their motivations peaceful? Are these developments part of a defensive strategy that can be viewed as a strategy to protect themselves from

others? Is development of 5G technology primarily motivated by a wealth and economic growth strategy related to innovation, science and technology?

China's motivations can be examined by looking at cases of conflict and tension like the territorial disputes in the South China Sea, and China's strategies to prevail in these disputes. China has enlarged its claims in the South China Sea since 2012 when it took control over Philippine territory. It claims territorial sovereignty of 90 percent of the area (Allison 2017:127). China's motivations could also have other roots. The goal could be to continue economic growth, pursue wealth and peaceful relations with other countries. A strategy of distancing itself from the West can also be one motive. This can have multiple meanings, as in reduced dependency on foreign technology, or focusing on peacebuilding and communicating restraint. China's motivations could also be to use this technology to reduce the ability of foreign states to spy on them, or efforts to subvert the rule of the Chinese Communist Party domestically. China could use this technology to control the information available to its own population and prevent Western ideology and democratic principles from flowing into the country.

The thesis will make use of theories in international relations to derive competing hypotheses of what Chinas motivations could be. Two theories in international relations, realism and liberalism, and branches/sub-categories of these will be used to facilitate this. Offensive and defensive realism from realism, and economic interdependence and institutionalism from liberalism**.** Overall, the topic of this thesis is highly timely and policy relevant.

2 Theory

This section starts with a definition of key terms that needs to be defined. Realism and liberalism will be presented next. They will be presented separately, with the sub-categories mentioned in the introduction and hypotheses. There is a reason behind the theory chosen for this thesis. Offensive and defensive realism have some differences, even though they share certain assumptions. They are both branches from structural neorealism. Whereas offensive realism focuses on offensive strategies and capabilities, and power maximization to explain the behavior of states, defensive realism focuses defensive aspects, and maximizing security. It is therefore of great purpose to include both branches in two

separate hypotheses, because they offer different possible explanations to the research question. The liberal theory, economic interdependence and institutionalism, are both necessary to include another possible explanation to the research question except ones based on conflict framing. Core principles in these two strands overlap. As liberal theories, they both focus on cooperation. The former on economic, and the latter on cooperation facilitated by international organizations and institutions. In the field of international relations, the approaches to institutions and institutionalist theory are many. For the purpose of this thesis, institutional theory based on liberal principles will be used. This is referred as neoliberal institutionalism (Grieco 1988:503), (Keohane 1989:1-20), (Baldwin 1993:4), (Powell 1991:1303), (Stein 2008:203-205). Common themes such as how the different branches of realism and liberalism defines power, security, and the interests of states will be explored.

2.1 Definition of terms

Several relevant terms need to be defined. The concepts power, security, wealth and cyber related terms will be defined in this section.

2.1.2 Power

There are several descriptions and definitions of power as a concept in the academic literature. Dahl defines it as following: “A has power over B to the extent that he can get B to do something that B would otherwise not do” (Dahl 1957:202-203). We distinguish between the concepts hard power, soft power, and smart power. Military and economic power are examples of hard power which can be exercised to change the behavior and opinions of other actors. Hard power can be based on inducements or threats, carrots or sticks. Soft power is an indirect way of exercising power. Here is the idea to get other actors to want the outcomes you want yourself. An example of how this can be done is to be a good role model for other states in the international system. If a state has a political system and a culture that creates happiness and wealth, other states could try to mimic this in hope of achieving the same. In this way, successful states can influence other states indirectly to want the same outcomes as themselves (Nye 2004:5). Smart power is the use of smart strategies that combine the tools of both hard and soft power (Nye 2009:160).

Baldwin compares political power with purchasing power to describe the properties of political power. Money is a way to exercise purchasing power, and more is always better. Political power is different because there is no general manner to exercise it. More is not always better. From Baldwin's view, it is important to consider power resources in context with its circumstances. Analysts of international politics should start with the assumption that power resources are situationally specific (Baldwin 1979:169). A power resource is not necessarily as useful in one situation compared to another. It can serve as effective in one scenario but turn out to be a liability in another (Baldwin 1979:166). To find out if something is a power resource or not, and to what degree, it has to be analyzed in a real or hypothetical policy-contingent framework.

For the topic of this thesis, it is also necessary to mention cyber power, as this is term is present in the literature. As mentioned, power resources should be viewed in context and circumstances. Cyberspace is a new important context in world politics (Nye 2010:1). Kuehl defines cyber power as "the ability to use cyberspace to create advantages and influence events in all the operational environments and across the instruments of power" (Kuehl 2009:38). The asymmetric aspects of cyberspace in terms of increased vulnerability makes it possible for less powerful states to exercise soft and hard power in cyberspace than other areas (Nye 2010:1). The resources of cyber power are related to the "the creation, control and communication of electronic and computer based information -- infrastructure, networks, software, human skills" (Nye 2010:3). Cyber power can then further be defined as A using the cyber resources to get B to do something that B otherwise would not do.

2.1.3 Security

Arnold Wolfers defines security as "…the absence of threats to acquired values" (Wolfers 1952:485). The concept of security dilemma can be used to elaborate further on security. The term security dilemma, (Jervis 1978:169-170), (Waltz 1979:186-187) is central to theory and the topic of the thesis. The increase of security of one state can decrease the security of others. If one state increases their military capabilities, others can be of the perception that this threatens their security and do the same, which eventually could lead to conflict (Mearsheimer 2014:382). Offensive realism argues that security competition is inevitable, first because states cannot know the true intentions of others, and second based on the

assumption that states will focus on maximizing their own power. Defensive realism on the other hand, disputes this view, and contends that the security dilemma can be avoided, or at least balanced in a less intense manner if states pursue policies that communicate restraint and moderation (Taliaferro 2001:129). The security dilemma can be avoided by avoiding offensive weapons and is further reduced when technology favors the defense. Liberal theory has a more optimistic view of the security dilemma. Security competitions based on zero-sum games, power balancing and the use of military force is not universal circumstances. There are many other alternatives to the security dilemma (Moravcsik 2010:92). From this perspective, cooperation through institutions can help to resolve disputes to avoid intense security dilemmas (Wallander and Keohane 1999,2002:92).

2.1.4 Wealth

In international political economy, the pursuit of wealth can be defined as the "marketable means of want satisfaction, whether these are to be used for investment or consumed by their possessors" (Keohane 1984:20). Mearsheimer notes that wealth can be mobilized into military power, and so can technology (Mearsheimer 2014:62). GDP, gross domestic product is a way to measure wealth. While GDP does not directly convert into military or economic strength, states with higher GDP's have more influence in world politics (Allison 2017:19).

2.1.5 Cyberspace, cyber warfare, cyber-attacks and cyber capabilities

The Military Balance from 2020 by IISS defines cyberspace and cyber capabilities.

> "Cyberspace is the realm of computer networks in which information is stored, shared and communicated online. A cyber capability entails the use of cyberspace to deliver an effect, which can be defensive in nature (such as protection and resilience) or offensive (such as influence, coercion, disruption and destruction). These effects can be intended to achieve numerous national objectives, including in the economic, national-security and diplomatic realms." (IISS 2020:515).

Kuehl offers a similar definition:

> "Cyberspace is a global domain within the information environment whose distinctive and unique character is framed by the use of electronics and the electromagnetic spectrum to create, store, modify, exchange, and exploit information via interdependent and interconnected networks using information-communication technologies". (Kuehl 2009:28).

Hjortdal gives more context to the concept:

> "Cyberspace is essential in modern warfare at the operational level, where soldiers are increasingly dependent on cyberspace; and at the strategic level, where a state's weaknesses and strengths in cyberspace can be used to deter and affect the strategic balance of power". (Hjortdahl 2011:2).

The definition of a cyber capability by IISS must be addressed. Cyber capability is a general term that includes the ability of any actor to operate in cyberspace, including not only cyber warfare capabilities, but all cyber capabilities, for example operating a website. For practical reasons, coercive will added in a parenthesis. Cyber (coercive) capabilities are referring to an actor's ability to conduct defensive or offensive cyber warfare operations.

Definitions of cyber warfare and cyber-attacks have similarities. Cyber warfare can be defined as actions by both non-state actors and nation states which use cyber capabilities to access networks or computers with a purpose of disruption, corruption or damaging computer networks or devices, in addition to inflict damage upon or disrupt computer control systems (Clarke and Knake 2011:70). Cyber warfare also includes using cyber capabilities for espionage, economic warfare, and criminal activities (Krepinevich 2012:16). Hjortdal presents three reasons to use cyber warfare (Hjortdal 2011:1). Deterrence through infiltration of critical infrastructure, espionage to obtain military knowledge, and industrial espionage to obtain economic gains.

Fritz (2008:48) presents several definitions and descriptions of cyber related terms. A cyber-attack can be defined as inflicting damage upon computer systems, with intent of disruption or destruction. Cyber reconnaissance, also referred to as cyber espionage or network intrusion refers to collecting data. Libicki defines a cyberattack as "the deliberate disruption or corruption by one state of a system of interest to another state" (Libicki 2009: 23). He further distinguishes between the term computer network exploitation, and an actual cyber-attack. CNE refers to spying, where as an attack involves disruption or corruption of systems (Libicki 2009: 23). Thus, cyber-attacks and cyber reconnaissance can be used for cyber warfare.

When it comes to the weaponization of cyberspace, dual use of technology is highly relevant. "Both military cyberweapons and civilian information technology run software on commercial computing infrastructure, the former relying on deception to exploit the latter"

(Lindsay 2015:41). IISS points out how cyber capabilities are connected to spin on/spin off, and CMI. Cyber capabilities used for military purposes can originate from civilian technology, while military cyber capabilities can be used for civilian purposes. This can make it difficult to know for certain if the use of cyber capabilities is performed by military forces, civilians, or intelligence agencies unrelated to armed forces (IISS 2020:515).

2.2 Realism

2.2.1 Realist conceptions of power

To begin with, offensive and defensive realism conceptions of power will be presented. To give a straightforward description on how offensive and defensive realism view power, I draw on Schmidt's distinctions between them (Schmidt 2005:528). He defines how the branches define the nature of power, location of power, measurement of power, and the effect/pattern of behavior in relation to power. For both offensive and defensive realism, the nature of power is material resources. For both branches, power is located in the distribution of capabilities which indicates the resources states have to use to exercise power. In defensive realism, power is measured in capabilities that represent the total sum of numerous national attributes. For offensive realism, it is measured in military and latent power. Latent power is defined as the societal resources a state has available for military forces, with population and wealth being the most important (Mearsheimer 2014:60-61). Defensive realists argue that states are security maximizers, while offensive realists argue that states are power maximizers (Schmidt 2005:528).

2.2.2 Introduction to realism

Now, a short, general description of the core ideas and assumptions of realism will be given. After a short introduction, some key differences and concepts relevant to both offensive and defensive realism will be explained. Following this, the two branches will be presented separately.

Realism dates back to Thucydides (Stein 2008:206), a solider in Ancient Greece who observed Athens challenging Sparta in the Peloponnesian war (Allison 2017:28). It was

introduced in the academic literature by Carr in the book "The twenty year crisis" in 1939 (Carr 2001). Realists are pessimistic in nature about international politics. States will put their own interests first in an anarchic world, which has no supranational power that can challenge the sovereignty of states. For a classical realist like Morgenthau, the reason for this is human's lust and search for power. For a defensive realist like Waltz, anarchy is the main reason (Mearsheimer 2014:19). Also, they would like a peaceful world, but when it comes to the arguments of realist theory, security competition and war is often seen as inevitable. Although, realists like Waltz and Mearsheimer acknowledge that war is the exception rather than the norm in international politics. Realists further describe the international system as a zero-sum game, where only one actor wins while other loses. States could cooperate, but with different interests, cooperation between states presents limits because the actors are constrained by the nature of the constant ongoing security competition (Mearsheimer 1994). Realists tend to focus on military capabilities as the most important indicator of power.

Both offensive and defensive realism was first described by Jack Snyder. He argues that both branches find the strongest motivation for states to be security in a world of anarchy, but they differ in the best strategy to realize this goal. Offensive realism contends that offensive behavior leads to security, while defensive realism disagrees with this (Snyder 1991:11-12). Both these schools of realism lead up to the same idea of security competition and potentially aggressive behavior from states, but the root causes that make this happen are different. Taliaferro notes that one of the key differences between them is the implications of anarchy. He further describes the two branches as, "…theoretical competitors because they generate different predictions and policy prescriptions" (Taliaferro 2001:134). Offensive realism differs from defensive realism regarding how much power states will seek to achieve security. Compared to offensive realism, defensive realism has a more positive view on international relations. States are focused on maximizing their relative security, not their relative power. This is best achieved through foreign policy of caution and restraint. The aggressive and expansionist behavior that offensive realism advocates would only be favored in special circumstances in order to achieve security (Jervis 1978:189-190). In most cases, restraint and caution is the best strategy for attaining security, which defensive realism proposes exists in abundance (Van Evera 1999:11).

2.2.3 Offensive realism

To explain the principles of offensive realism, the focus will be on works by John Mearsheimer. Mearsheimer is a proponent of offensive realism. Whereas classical realism sees human nature as the root cause of an intense security competition, structural theories like offensive realism argues that it is the structure of the international system, not human nature, that leads to security competition and aggressive behavior from states. He presents five assumptions to illustrate as to why the theory has a pessimistic world view (Mearsheimer 1994:10). (1) The international system is anarchic by principle. The system is made up of sovereign states with no authority to answer to. (2) States possess inherent offensive military capabilities, which gives them the opportunity to inflict damage, and even destroy each other. States are therefore a danger to each other. (3) States can never be certain of the intentions of other states in the system. States are not evil by nature, but one cannot be certain of this. Intentions can also change quickly. By not knowing the intentions of other states, one can also not rule out the possibility of others using military force. (4) The most important goal of states is survival. States strive to keep their sovereignty. If sovereignty is lost, states ceases to survive. (5) States are strategic about how to survive in the international system and are rational actors. Nevertheless, states can make miscalculations in a world with a lot of misinformation. States also have incentives to misrepresent their own strengths or weaknesses and hide their real intentions.

Offensive realism assumes that the anarchic nature of the international system is the reason why states act aggressively. The structural factors, anarchy and distribution of power is the most important elements in international politics. Individuals such as state leaders and a state's ideological preference are not considered to be important. Structural factors are used to explain the behavior of states in the international system. States are actors who wants to survive in this anarchic world without a supranational police. Power is the key to survival. Offensive realism proposes that the international system creates incentives for states to look for opportunities in which they can gain power at the expense of their rivals, and further take advantage of situations where the benefits outweigh the costs. The ultimate goal for a state from the perspective of offensive realism is to achieve global hegemony, because this

would almost guarantee survival (Mearsheimer 2014:21), (Mearsheimer 2010:387). “A hegemon is a country so powerful that it dominates all the other states” (Mearsheimer 2010:387). This means that no other country can challenge this state using military capabilities (Mearsheimer 2010:387). While the best situation for any state would be global hegemony, this is not likely to achieve because of the stopping power of water. It is hard to exercise power over great distances of water, and that makes it near impossible for a state to conquer and dominate regions that are separated from themselves by large bodies of water (Mearsheimer 2010:387). The second best thing would be to achieve regional hegemony, when a state dominates its own region (Mearsheimer 2010:387). Offensive realism is mostly a descriptive theory. It tries to explain how great powers have behaved in the past, and how they are expected to behave in the present or future. For advocates of offensive realism, it is prescriptive in the sense that states should act accordingly with the principles of the theory because this is the best strategy to survive in a dangerous world. Offensive realism proposes that the international system forces states to maximize their relative power because this will maximize their own security. Survival demands aggressive behavior. Not because of statesmen have inherent lust or wanting for power, but because they have to seek more power in order to attain the best possible odds for survival (Mearsheimer 2014:21). Labs elaborates on this point and argues that the most rational response to the anarchy in world politics is to seek relative power maximization, which in turn maximizes security. He also adds that states still will maximize power in the absence of specific threats (Labs 1997:11-12).

Expansionist and aggressive behavior are often considered to be the best alternative to gain relative power over other states. Relative power is more important than absolute levels of power (Mearsheimer 1990:12). The more power a state can gain relative to others, the bigger the chance is for survival. Offensive realism therefore views states as revisionists because their goal is to revise the distribution of power in the system to their advantage. Mutual security is not possible to attain and is therefore not being considered an option to search for. This makes offensive realists argue that the security dilemma is inescapable (Lieber 2005:10). Offensive realism admits to the fact that expansionist and aggressive behavior has the potential to do more harm than good, which explains why states are not in a constant state of war (Lieber 2005:10). States are not ruthless expansionists all the time.

Costs and benefits of opportunities are calculated with rational strategy. When the costs exceed the benefits, states are less likely to seek expansion (Labs 1997:13).

2.2.4 Defensive realism

This section will be structured in the following way: First, Taliaferro's assumptions regarding how defensive realism views international relations will be presented. After this, Kenneth Waltz' views will be presented. Next, theory from Stephen Walt will be explained, before looking at the offense-defense theory, where Robert Jervis and Stephen Van Evera are central.

Taliaferro presents four assumptions that defensive realism has about international politics (Taliaferro 2001:136-143). (1) The security dilemma is an immovable, constant element in the international system. The system is characterized as a self-help system and is anarchic. States cannot be certain of the intentions of others now, or in the future, or relative distributions of capabilities over time. (2) Although the security dilemma is immovable, defensive realism proposes that it does not have to lead to an intense security competition or war. In addition to gross distribution of power, other factors like structural modifiers can increase or decrease the chances of violent conflict. The gross distribution of power is usually measured by looking at the polarity of a system, and the relative share of capabilities that is available to the states. Structural modifiers describe the relative distribution of capabilities for specific strategies in foreign policy. Taliaferro's description and views on structural modifiers is close to Van Evera's concept, fine-grained structure of power, which will be presented later. (3) Assumption number three focuses on foreign policy strategies based on state leaders' perceptions. Because the international system is characterized by an uncertain distribution of relative power, variables like preexisting beliefs and benign or malign perceptions of adversaries can be used to explain foreign policy strategies. Taliaferro also points out that perception is highly relevant regarding how states adjust and adapt to structural modifiers like the offense – defense balance. The perception of this balance could be different than the objective balance. (4) Defensive realism proposes that under certain circumstances, domestic politics has an effect on international relations and a state's foreign policy. When dealing with immediate external threats, state leaders are important to shape

policies. If no threats exist, it will be harder for leaders to have an effect on foreign policy strategies.

(Taliaferro distinguishes between neoclassical realism, neorealist realism, and offensive and defensive versions of these (Taliaferro 2001:132). When it comes to assumption 3 and 4, these are based on the neoclassical defensive realism approach.)

Waltz' is considered a defensive realist with his book «Theory of international politics» from 1979. It argues that the structure of the international system does not give states an incentive to seek more power. States are not inherently aggressive and in constant search for power. States are better off with maintaining the existing balance of power and can be described as defensive positionalists, who seeks to at least maintain their relative power position. "The first concern of states is not to maximize power but to maintain it" (Waltz 1979:126). The emphasis here is on preserving power, and not increasing it. States are first and foremost trying to survive by seeking security. If a state seeks to much power, it can be viewed as a threat, and the risk to be punished by others increases. It is therefore futile to seek hegemony. Waltz explains how states navigate the search for security in relation to power with the balance of power theory. It makes the following assumptions about states: They are considered unitary actors who at a minimum wants to survive, therefore they must maintain their autonomy. At a maximum, states would seek domination over other states. Further, states will use the internal efforts that is available to them to reach their goals. Internal efforts refer to improvements in economic and military capabilities (Waltz 1979:118).

Glaser gives reasons as to why the strategy of power maximizing not would be advisable. A state could be decreasing their own security by seeking too much power. Further, this strategy could also lead to a state losing an arms race, and last if a state is maximizing power, this does not necessarily include their military capabilities for deterrence or defense (Glaser 1994:71-72). Seeking too much power could lead to hostile balancing from other countries in the form of coalitions, or arms races that could be avoided (Lieber 2005:9).

According to defensive realism, the anarchy of the international system is the reason for security competition between states. States could sometimes be forced to seek power

because of the worlds anarchic aspects if this is the best means for security and survival. An example of this is are if military technology favors offense over defense, which Van Evera discusses in his book Causes of War (Van Evera 1999). Defensive realism argues that powerful states generally would be wise to exercise some caution and restraint when it comes to the foreign policies of economy, military, and diplomacy (Jervis 1978:167-214).

Walt explains states behavior with the balance of threat theory (Walt 1985), (Walt 1987). Walt comments that different sources of threats greatly affect states behavior (Walt 1987:21-34). One source is a state's aggregate power, and how the total resources can be viewed as a threat. Another is offensive power. This can be converted from aggregate power but is different from aggregate power in its ability. Offensive power is the ability to threaten the sovereignty and territorial integrity of another state. States that possess large amounts of offensive power is more likely to be balanced against than others who do not have large amounts of offensive power. States that are perceived by others as having aggressive intentions are also a source of threat. Balance of threat theory argues that states make judgements about whether others harbor aggressive intentions, and align with states that are perceived not to, against those that are perceived to harbor such intentions. The theory does not suggest that states necessarily will balance against the state that poses the greatest threat in the system. States will preferably balance against states that poses an imminent threat to the survival of the state first and foremost. In short, Walt's main argument is that states appear threatening to the extent they combine great power resources with aggressive intentions.

ODT is central to defensive realism in the way it relates to the security dilemma. For offensive realism, the variation in states behavior is not explained by ODT, but rather through opportunities and limitations that comes from a constant shift of the balance of power (Lieber 2005:8). ODT was first introduced by Jervis (Jervis 1978), and further developed by Van Evera (Van Evera 1999), (Van Evera 1998). Lieber elaborates that the basis for the theory was formed during the cold war as a response to the emergence of nuclear weapons, and that many scholars argued that nuclear weapons gave the defense the advantage (Lieber 2005:7). Defensive realism proposes that an objective and perceived offense – defense balance of military technology and capabilities exists in the international system. The defensive realist position is that the defense has the advantage in most cases

(Labs 1997:10). The theory as introduced by Jervis consists of two variables. If the offense or defense has the advantage, and if it is possible to distinguish between offensive and defensive weapons (Jervis 1978:186-187). Moreover, the theory subscribes to the idea that when the offense has the advantage, the severity of the security dilemma increases. Jervis' and Van Evera's definitions of offense and defense advantages are similar. Jervis contends that when the offense has the advantage, it is easier to destroy another state's army and conquer its territory than it would be to defend, and when the defense has the advantage, it is easier to defend than attack (Jervis 1978:187). Van Evera uses the similar terms offense dominance and defense dominance. When offense is dominant, conquest is easy. Although he notes that conquest never is easy, it is easier than usual. In a defensive dominant world, conquest is considered difficult (Van Evera 1999:118).

ODT makes the following assumptions: The risk for war is higher when the offense is dominant. States that have the impression of having offensive opportunities and defensive vulnerabilities has a higher chance of engaging in conflict (Van Evera 1999:166). Observers including Evera, (Jervis 1978:194), (Levy 1984:223), (Taliaferro 2001:137-138), argues that military technology and geography are factors that influence the offense-defense balance. The idea is that new developments in technology can give advantages to the offense or defense. Military technology is somewhat manipulative, since states affect the offense-defense balance by how they are using their military capabilities. The geography factor acts as a natural barrier, which could be the stopping power of water. Natural barriers like this makes conquest harder and defense more dominant (Van Evera 1999:163).

Van Evera describes the concept fine-grained structure of power (Van Evera 1999:7-9). The concept fine-grained structure of power refers to the distribution of particular types of power: Offensive and defensive power, including the power of first strike capability from the power of being able to retaliate after suffering a first strike. The contents of the fine-grained structure of power is more manipulative than the gross distribution of power. The fine-grained structure of power is characterized by caution and restraint, and the international structure of power has few incentives for aggression, which could be punished. Van Evera makes the following comments regarding his fined-grained structural realism:

> "It locates the causes of war in the fine-grained structure of international power – in the offense-defense balance, the size of first-move advantages, the size and frequency of power fluctuations, and the cumulativity of resources" (Van Evera 1999:10).

Misperception of the fined-grained structure of power can lead to war because states believe these to be more aggressive or malignant than it is.

> "It locates the causes of war in national misperceptions of the fine-grained structure of international power – in exaggeration of the power of the offense, the size of first-move advantages, the size and frequency of power fluctuations, and the cumulativity of resources" (Van Evera 1999:11).

Fine-grained structure of power thus has a great deal of similarities with structural modifiers. Both concepts prescribe explanatory power to the offense – defense balance for explaining the behavior of states. Both Taliaferro and Van Evera propose that the offense – defense balance can make increase or decrease the intensity of the security dilemma, depending on the balance.

2.3 Introduction to liberalism

First, a general overview of liberal core ideas and principles in international relations will be presented. The concept of complex interdependence will then be explained to assist with distinguishing liberal and realist views, and to illustrate the similarities and overlaps in economic interdependence and institutionalism. Next, economic interdependence and institutionalism will be presented.

The liberal perspective does in general favor a more optimistic view of international politics. Liberal theory is based upon the notion of a globalized and interconnected world. The interests created by interdependence and through institutions that states can use to settle disputes and facilitate cooperation can make it possible for states to cooperate. Economic interdependence focuses on economic gains and wealth. Institutionalism emphasizes the cooperation that takes place in international multilateral organizations. In contrast to realism, these branches of liberal theory do not view the international system as a zero-sum game. Zero-sum games, security competition, the use of military force, and power balancing are not the only alternatives in the international system. These are just a few options in a world of possibilities. The circumstances mentioned are also rather rare from a liberal view. From a liberal theory perspective, it can be a positive-sum game, where multiple actors can

achieve their goals at the same time without losing (Moravcsik 2010:92). Keohane illuminates this: «The more tightly intertwined and interdependent the valued interactions among states, the greater the incentives for long-term cooperation in order to avoid disrupting these ties» (Keohane 1990,2002:54).

It is useful to explain the term complex interdependence to clarify in detail what the differences between realist and liberal core ideas and principles are. The term is described by Keohane and Nye (Keohane and Nye 2012:19-31). Whereas realism can be seen as defining an extreme set of conditions or ideal type, complex interdependence can be viewed as the antitheses, an opposite worldview with a different set of conditions that has a lot of common with liberal theory. Keohane and Nye presents three assumptions that realists make of international politics. The first one assumes that states are the dominant actors in world politics. This assumption means that states are predominant, and act as coherent units, therefore this is assumption is double. The second one assumes that the use of force is effective and a good policy. The third one assumes that that the international system is made up of a hierarchy of issues, where military security is in the forefront (Keohane and Nye 2012:19). There are three main characteristics of complex interdependence (Keohane and Nye 2012:20-24). Multiple channels, the absence of a hierarchy among issues, and that military power is not as effective as perceived from the realist view. Multiple channels focus on the connection between societies. These connections could be interstate, transgovernmental, and transnational relations. Interstate relationships are characterized by multiple issues which are not arranged in a specific hierarchy, and military security does not dominate these issues. Military power is not useful or effective when it comes to economic issues or disagreements between allies. It is furthermore not effective because it has become more destructive, costlier, and riskier to use. Military force will not be used by states against other states in their region, or because of issues, when complex interdependence prevails.

These three characteristics of complex interdependence thus presents alternatives to the realist assumptions. States are not the only or primary participants in international politics, issues are not hierarchical in nature, and military force is not the most important instrument for a state. If such conditions are present, world politics are different than from the realist view. The concept of complex interdependence aligns with core ideas and principles from

liberalist theory in international relations. It also aligns with the core principles of economic interdependence and institutionalism and show how these theories share assumptions and views from liberalism.

2.3.1 Economic interdependence

Before discussing economic interdependence in more detail, the term interdependence will be defined. Dependence refers to a state where a country is being determined or significantly affected by external forces. If a state is dependent on others, its behavior and actions can be dictated or affected by external forces (Keohane and Nye 2012:7).

> "Interdependence, most simply defined, means mutual dependence. Interdependence in world politics refers to situations characterized by reciprocal effects among countries or among actors in different countries" (Keohane and Nye 2012:7).

Interdependence in international relations implies a situation of mutual dependence. The mutual benefits in a state of mutual dependence comes from international transactions, trading, traveling between countries, and communications. These are just some of the examples of areas where mutual benefits can be found in an interdependent relationship between two actors. Power balancing between powerful states or superpowers can also be somewhat interdependent. If the actors in the system all wants to keep the status quo stable, this will be good for all of them (Keohane and Nye 2012:9).

The assumption that interdependence generated by trade, economic interdependence, will lead to peaceful cooperation between states, also implies the assumption that the dependence of state A on state B, is close to the dependence of state B on state A (Hirschman 1945:10). Hirschman identifies that John Stuart Mill was one of the first to introduce the idea that material benefits from international trade not necessarily had to be evenly distributed among the participating states (Mill 1884:1-46, cited in Hirschman 1945:10). Keohane and Nye points out that the concept of interdependence is not limited or excluded to the idea of mutual benefits. It would be less usable for analytical purposes if this were the case. If interdependence were to be limited to a definition of only mutual benefits, it would only make sense from a modernistic world view, where military threats and conflicts are few (Keohane and Nye 2012:8). The concept of interdependence therefore also

applies to relationships where the mutual benefits are not equal in a precise manner. It still applies in an asymmetrical relationship where one state can gain more than the other. Interdependent relationships between states will always involve costs from both sides. According to Baldwin, "the relevant costs are not those involved in carrying out the transaction, but rather those involved in foregoing it" (Baldwin 1979:175-176), when discussing dependence and interdependence. Interdependence limits the autonomy of states. It can be hard to decide how to identify or define an interdependent relationship regarding the degree of mutual benefits for both actors. It would certainly complicate how we view the interdependent relationships between rich developed industrialized countries, and poorer developing countries that are described as such. Interdependence is rarely symmetrical. Interdependence often lies somewhere between the extremes of pure dependence and little dependence. It is in imbalances of interdependence that states can gain influence and leverage over other states (Keohane and Nye 2012:9).

Most would argue that interdependence is a situation where states are affected by their interactions with each other. Baldwin also recognizes this and presents how it can be identified if these interactions has significant effects or not (Baldwin 1979:175). Interaction is sometimes prescribed some of the same properties as interdependence. Interactions describes the connection between states, but not the details of the interdependent relationship, and what effects are created by this. The definition from Keohane and Nye (Keohane and Nye 2012:8) that interdependence can be defined as terms of interactions or transactions that have reciprocal costly effects leaves some questions unanswered. Even though international interactions like trade involves reciprocal costly effects, it does not necessarily have to mean that it involves a state of mutual dependency. Baldwin argues that this definition is too vague because it does not capture the idea of dependence. Reciprocal costly effects on the countries involved in trading does not need to create a state of mutual dependence. If a state purchases something that can easily be acquired somewhere else, or something that they do not need, dependency is not present (Baldwin 1979:175). Baldwins definition of dependence and interdependence mentioned earlier is based on these arguments. He further clarifies dependency:

> "The true measure of dependency of a commodity is not what is given to get it, but rather what some would give up to go without it. If a country can go without or easily forego importing a commodity, they are in this setting not dependent on it" (Baldwin 1979:176).

Another alternative for examining if interactions between states has significant effects or not, is to identify situations that would be costly for both parties involved to forego. This also reveals the connection between dependency and power.

> "In order to study dependency, one must look at opportunity costs of alternative relationships as well as at actual relationships. Likewise, in order to study power, one must look not only at what B does, but at what B would otherwise do" (Baldwin 1979:177).

Albert Hirschman goes into detail and describes the relationship between trade and dependency:

> "The influence which country A acquires in country B by foreign trade depends in the first place upon the total gain which B derives from that trade; the total gain from trade for any country is indeed nothing but another expression for the total impoverishment which would be inflicted upon it by a stoppage of trade. In this sense the classical concept, gain from trade, and the power concept, dependence on trade, now being studied are seen as merely two aspects of the same phenomenon" (Hirschman 1945:18).

Both Baldwin and Hirschman illustrate with this how state A can gain influence over state B by foreign trade. As previously mentioned, interdependence suggests that the gains from trade creates a state of mutual dependence between states. This also shows that a state dependent upon another state can have its behavior and actions dictated or affected by external forces, such as other states. If two countries are in a state of mutual dependence, each of them can incur costs on the other by quitting the trading relationship on a few or all commodities. The ability to incur costs upon others is a form of influence, therefore countries in an interdependent relationship has the ability to affect each other.

Keohane and Nye explains how the role of power can be seen in context with interdependence with the concepts sensitivity interdependence and vulnerability interdependence. Sensitivity interdependence looks at the sensitivity of states if changes in an interdependent relationship occurs. It is policy framework contingent in the sense that it concerns situations in a specific policy framework. If one state changes terms of trade in the relationship, how fast will this incur costs in another state, and how strong will this effect be? Thus, it looks at a state's liability to costly effects by external forces before alternative policies are considered. Vulnerability interdependence is not limited to a policy contingent framework. The point here is that states should change the framework and policies, to limit the costs from changes. An alternative framework presents alternative options to adjust to these changes. One country can become more vulnerable than another if they both are

importing commodities they need, and the price increases, and one of the countries adjusts by producing this domestically while the other cannot. The vulnerability aspect looks at a state's liability to costly effects by external forces after an alternative framework and policies has been established (Keohane and Nye 2012:10-11).

Keohane description of commercial liberalism is related to economic interdependence (1990,2002:47-49). Trade and economic interactions are not guaranteed safeguards for peace. Nevertheless, trading by the principle of non-discrimination promotes the idea of cooperation based upon enlightened national conceptions of self-interest that focuses on maximizing wealth rather than security. Moravscik also describes commercial liberalism, (Moravcsik 2001:13-16), (Moravcsik 2011), and points out the importance of economic interdependence as a concept that supports liberal theory. Besides gains from trade and the costs of foregoing this trade, economic interdependence has an impact on international security. International trade is a less costly strategy for achieving wealth than other alternatives such as war, sanctions, or other strategies that involves coercion. The possible collateral damage from those strategies are also making them costly and risky (Moravscik 2001:14).

It is also necessary to mention developmental state theory. It its recognized that it may be unclear where it fits within the theoretical paradigm, as there are many approaches to the concept, including a neoliberal economic one (Öniş 1991:109-111). The purpose of including it is to explain wealth motivation, so it will be viewed in this context. Chalmers Johnson introduced the concept to explain the role of the Japanese state in Japan's postwar economic growth (Johnson 1999:32-61). "A crucial feature of the developmental state was the intimacy of its relationship with the private sector and the intensity of its involvement in the market" (Johnson 1982:9-10, cited in Leftwich 1995:3). "The concept "developmental state" means that each side *uses* the other in a mutual beneficial relationship to achieve developmental goals and enterprise viability" (Johnson 1999:60). Leftwich defines it as "states whose politics have concentrated sufficient power, autonomy and capacity at the centre to shape, pursue and encourage the achievement of explicit developmental objectives, whether by establishing and promoting the conditions and direction of economic

growth, or by organising it directly, or a varying combination of both" (Leftwich 1995:1-2).

2.3.2 Institutionalism

Institutionalism concentrates on the functions that international organizations performs. The term international institutions in international relations are by most scholars seen as sets of rules that is meant to govern international behavior (Martin and Simmons 2012:328). First, a brief comment on realist views on institutions and institutionalism will be put forward to clarify how we can distinguish between perspectives on the subject. Following this, the characteristics of neoliberal institutionalism will be presented, the significance of institutions, and how and why states would choose to cooperate. Economic interdependence will also be discussed in relation to institutionalism. Institutionalists would claim that institutions have a positive effect on international stability, realists would not. Realists are of the opinion that institutions are not an important factor for peaceful relations, and that they do not affect state behavior (Mearsheimer 1994:7). Notwithstanding, realists still subscribes to the idea that states can operate within institutions, but as Mearsheimer puts it:

> "However, they believe that those rules reflect state calculations of self-interest based primarily on the international distribution of power. The most powerful states in the system create and shape institutions so that they can maintain their share of world power, or even increase it" (Mearsheimer 1994:13).

Realists would question how sovereign states can trust international institutions. From a liberal perspective, institutions should be viewed as an aid for states to reach their goals, not as an opponent or a supranational authority (Keohane 1998,2002:29).

International institutions gained traction among observers after the second world war, with the creation of the UN. The observers that began to study the international organizations that emerged in the postwar era was referred to as liberals due to the interest in the cooperation that took place between states (Stein 2008:204). Before the international arena experienced institutional developments after the second world war, the topic of institutions was not seen as important or relevant. Before this, negotiations between states regarding international politics were managed on an ad hoc basis (Keohane 1998,2002:28). During the 1980s observers began to look at which conditions that led to cooperation between states.

More specifically, how does cooperation happen between sovereign states, and how does international institutions affect this? Cooperation is a term that demands closer attention. It is important to note that cooperation and harmony has different meanings. In a state of harmony, policies can be pursued based on self-interest without considering the interests of others. A state of harmony will automatically make sure that the goals of others also gets fulfilled. If harmony exists, cooperation would be irrelevant (Keohane 1984:51). Harmony could also be described as apolitical because it does not require communication, or the use of influence. Cooperation takes place in what is being referred to as policy coordination and is highly political compared to harmony. Negotiations are taking place that leads to change in the behavior of states.

> "Cooperation requires that the actions of separate individuals or organizations – which are not in pre-existent harmony – be brought into conformity with one another through a process of negotiation, which is often referred to as «policy coordination»" (Keohane 1984:51).

Today, many different international institutions exist with various objectives and purposes. Examples of this are the World Trade Organization (WTO), International Monetary Fund (IMF), Association of Southeast Asian Nations (ASEAN), Organization of the Petroleum Exporting Countries (OPEC), North Atlantic Treaty Organization (NATO), AsiaPacific Economic Cooperation (APEC), among numerous others. Stein comments that "International politics today is as much institutional as intergovernmental" (Stein 2008:201).

Neoliberal institutionalism focuses on cooperation and institutions. Further, it views the creation of international institutions as a consequence of state's self-interest. States create institutions because behavior that only promotes autonomous self-interest can lead to issues which institutions can mitigate (Stein 2008:208). Neoliberal institutionalism accepts the realist assumption that anarchy can be an obstacle to cooperation. Nevertheless, it still opposes the pessimistic concerns that realists have about conflict, argues that it is exaggerated, and that realists underestimate the effects that international institutions can have on cooperation (Grieco 1988:486). Neoliberal institutionalism supports the idea that cooperation is important in a world where economic interdependence exists. The argument is that shared economic interests creates a demand of international institutions and rules. This approach highlights the functions of such institutions (Mitrany 1975, cited in Keohane 1984:7). Institutionalism thus focuses on how countries are recognizing the benefits that comes from cooperation. From an institutionalist perspective, the liberal international

arrangements for trade and finance can be viewed as a tool for policy coordination demanded by economic interdependence. Interdependence can be viewed as the framework which institutions operates in. Creation and proliferation of institutions are the response of interdependence (Keohane 2002:10). These liberal international arrangements are referred to as international regimes. International regimes consist of rules, norms, principles, and the processes that revolves around decisionmaking.

Keohane and Stein argues that international organizations and institutions have multiple benefits for states. "They reduce costs of making, monitoring, and enforcing rules – transaction costs – provide information, and facilitate the making of credible commitments" (Keohane 2002:3). The idea of reciprocity and a state's reputation in international politics give states a reason to make commitments. Reciprocity could both mean cooperation and threats to retaliate. Stein echoes this in a similar fashion. If states were to form new alliances for every possible issue, the cost of this would be high. States can therefore benefit from the creation of institutions because this can reduce costs of governance that autonomous decisionmaking presents. He compares this with how companies internalize arm's length transactions in corporate governance structures. States can reduce transaction costs in the same manner (Stein 2008:209).

Keohane's regulatory liberalism can be regarded as neoliberal institutionalist theory (Keohane 1990,2002:49-51). It presents the idea that the international system is based upon common rules and norms, and that actors in the system follow these. The original assumption by Kant was that republics are inherently better suited for international cooperation than other forms of government. It is necessary to also work together with autocratic regimes. They will also have invested interests in following rules and international agreements on arms control, nuclear safety, and the regulation of international trade. International norms and institutions play an important part in promoting cooperation. Even though, results could vary depending upon how actors apply such tools for cooperation and how committed they are when doing so. Regulatory liberalism says that before one can form expectations about patterns of behavior in the international system, the institutional aspects has to be developed (Keohane 1990,2002:50). Harmony as a result of common interests does not happen automatically. It has to be created based upon the notion that sovereign states both have power resources and more legitimacy from human populations than any

other international organization. Peace, or economic and social policies of common interests cannot be solved with hierarchical organizing above states. States must be conversed with and persuaded, not bypassed. This means that international institutions need to be constructed in a way that recognizes the interests of states as a collective, and gradually change states perspectives of their own self-interests to increase the level of cooperation. International institutions provide information, communication, and other useful tools that states cannot provide as easily.

An element that is important to touch upon is absolute versus relative gains. This is central in explaining why states would choose to cooperate according to neoliberal institutionalism. Absolute gains are the idea that states only focus on their absolute gains and highlights the positive effects of cooperation. Relative gains focus on the relative gains states can make from cooperation (Powell 1991:1303). Realists would argue that cooperation would be challenging and difficult because relative gains is more important than absolute gains (Mearsheimer 1994:12), (Grieco 1988:487). Neoliberal institutionalism argues that if cooperation leads to absolute gains, it does not matter whether it also leads to relative gains or relative losses (Powell 1991:1303). The assumptions that neoliberal institutionalism makes about the preferences of states leads to different expectations for conflict and cooperation. From a neoliberal view, the idea of cooperation does not exclude conflict. Sometimes cooperation takes place because of conflicting interests between states, if its discovered that specific policies are creating a conflict between the states involved. In this sense, cooperation could be a reaction to the potential conflicts that could arise if cooperation were not attempted (Keohane 1984:53-54). The neoliberal approach to cooperation has been illustrated by scholars with different theoretic games and models. The prisoner's dilemma is used as an example by neoliberals of how to solve the problems of mixed interests and anarchy that revolves around cooperation (Grieco 1988:496). Powell presents a neoliberal institutional model in the form of a model with similarities to a repeated prisoners dilemma that deals with conflict and cooperation (Powell 1991:1306-1311). This shows how states can be engaged in mutual cooperation and keep this going with an equilibrium outcome as a result by a strategy that punishes potential cheating, also referred to as defection. Jervis also explains how cooperation is more likely with the use of a repeated prisoners dilemma (Jervis 1978:171). The prisoner's dilemma when repeated

shows that states who often interact with each other would discover that cooperation is the best future strategy (Grieco 1988:493).

2.4 Hypotheses

Competing hypotheses will now be derived from the theory. The hypotheses will be further elaborated in the hypotheses discussion.

Realism: The realist theory argues that promotion and development of 5G technology relates to the use of cyber (coercive) capabilities for offensive or defensive military purposes, for example in relation to espionage, sabotage, and cyber warfare. Because of the differences in these realist branches, the realist theory will be the subject of two hypotheses.

H1 Offensive realism: China's motivations and in promoting and developing 5G technology is to maximize its power and use the technology to develop offensive military capabilities that can be used in cyberspace.

H2 Defensive realism: China's motivations in promoting and developing 5G technology is using this technology to maximize its security.

Liberalism: Because of the similarities and overlaps in the two strands economic interdependence and institutionalism, the liberalist theory will be the basis of one hypothesis, to consolidate the liberalist theory and hypothesis.

H3 Economic interdependence and institutionalism: China's motivations in promoting and developing 5G technology are related to economic growth and the pursuit and maximization of wealth.

3. Methodology

This is a qualitative study to gain understanding of an intrinsic important question. The method of inquiry used is a case study. China is the case that is being studied. Inside this case study is different elements like 5G technology, cyberspace and cyber related terms, technological developments from military and commercial aspects, and the Chinese company Huawei. A case study is recognized by the fact that the phenomenon that is being studied is viewed in context with the topic of the thesis and research question (Busch 2014:56). Document analysis and literature review are the methods used for obtaining and analyzing information within the context of the case study. "A literature review needs to draw on and evaluate a range of different types of sources including academic and professional journal articles, books, and web-based resources" (Rowley and Slack 2004:31). The sources are secondary sources: Books, documents, reports, academic articles, magazine articles, and internet articles. The sources used are highly relevant. Much of the literature on the subject have been recommended by my supervisor. Other literature has been selected by using Oria, the database at the NTNU university library, and google scholar.

4 Analysis and discussion

The analysis and discussion will be structured in the following way: First, relevant background information regarding China's technological developments from commercial and military aspects will be presented. This is necessary to consider how these developments from the past few decades into recent years can be considered to have an impact on motivations related to the realist or liberalist hypotheses. As central to the thesis, it will also be presented how developments in 5G and cyber (coercive) capabilities has emerged in the last few years, with these concepts, especially 5G being fairly new. After this, Huawei and 5G will be examined regarding China's motivations for developing this technology. Next, the hypotheses will be explored.

4.1 China's technological developments from commercial and military aspects

As mentioned in the introduction, Chinas growth during the past decades has made them more and more powerful in the technology sector. This section will look at China's technological development since the 1970s, both commercial and military. It will also contain information about how China's economic development ties into innovation and technological development. This section will be subdivided into commercial and military aspects. Both will be addressed by highlighting important developments in strategies and policies over the past few decades.

4.1.2 Commercial aspects

The Chinese government has since the 1970s played a large part in introducing policies for facilitating development in S&T. These policies have increased funding for research and development, increased the number of scientist and engineers, and overall contributed to create a society focused on innovation in S&T both domestically and internationally (Appelbaum et al. 2018:161). In 1995 under a National Conference of S&T, it was declared that China's strategy would be "revitalizing the nation through science, technology, and education" (Appelbaum et al. 2018:49). This strategy also puts more emphasize on the connection between S&T and economic development. S&T should be oriented towards the economy, economic development should depend on S&T, and China have to aim for a global status of S&T (Appelbaum et al. 2018:49-50).

With their development in innovation, S&T, China is a significant global player, if not already a superpower in S&T (Appelbaum et al. 2018:161). Kaska et al. comments that China's determination to achieve this goal gained traction over a decade ago in 2006, when the country introduced a long-term innovation strategy that contained goals of technological domestic innovation, with a purpose to distance itself from the West (Kaska et al. 2019:10). This distancing, or untying, is based on implementing restrictions on the access of foreign companies to the Chinese market. One example of how this has been done is through policies demanding that foreign companies give up the intellectual property rights, source codes, and backdoors into software and hardware of products to the Chinese government before getting access to the market (Raud 2016:13). If these conditions are accepted, it can lead to technology leakage to China from foreign companies.

The distancing is further based on government investments in technological development. Government subsidizing has strengthened Chinese companies' competitiveness globally when it comes to technological advances and pricing (Kaska et al. 2019:10). This Indigenous innovation is an important element of China's development in the future. China has goals of becoming a world S&T superpower by 2050 (Appelbaum et al. 2018:10). This distancing can thus be seen as China wanting to reduce its dependence on the West, while continuing its economic growth.

Li (2018) presents reasons as to why China is becoming a technological powerhouse. China is demonstrating its ability in planning and going the distance with projects. They have many planned projects going on, and the resources to do so. Concrete examples of this are programs 863 and 973 which focuses on technological innovation. Program 863 is considered to be "the country's premier high-technology development program" (Cheung 2011:345). It focuses on the following seven areas: Biotechnology, space technology, information, lasers, automation, energy, and new materials (Appelbaum et al. 2018:42). Program 973 was created to finance research on six important areas to the country's economic and social development: Agriculture, information, population and health, resources and the environment, energy, and new materials (Appelbaum et al. 2018:42). Most of the ongoing projects about technological innovation lies within the Made in China 2025 policy. With the government's policy Made in China 2025, China has ambitions of distancing itself from the label as the world factory for cheap unsophisticated products, and moving towards making Chinese products that have increased quality and technological sophistication (Allison 2017:123). The president, Xi Jinping, wants China to become a world leader in science, technology, and innovation by the middle of the 21st century. (Allison 2017:124). The program "…focuses on making China a global leader of smart manufacturing" (Greeven et al. 2019:9). The policy focuses on ten areas related to innovation, S&T, with new advanced information technology being one of them (Kennedy 2015). Made in China 2025 is a strategy in three steps. China is going to be a manufacturing powerhouse by 2025, be in the medium ranks of global advanced manufacturing by 2035, and claim their advanced manufacturing status by being at the forefront of global manufacturing by the PRC's 100 year celebration in 2049 (Appelbaum et al. 2018:58). Greeven et al. notes that China is in a good position to reach the goals outlined in this program, based on their abilities and

improvements in S&T, manufacturing and entrepreneurship (Greeven et al. 2019:9). With the status as the world factory for production, the country has an abundance of resources to its disposal from several different sectors and industries.

4.1.3 Military aspects

China's shift to a more technologically focused nation can be traced back at least three decades regarding military modernization and innovation in S&T. The country has modernized its military technology since the 1970s. A new conceptualization of Chinese warfare emerged with the leadership of Deng Xiaoping, after Mao's death. This new approach focused more on S&T, industry, modernization of agriculture, national defense and economic development (Saltzman 2013:49), (Appelbaum et al. 2018:37). Further, China observed USA's application of RMA and technology in the first Gulf war, Kosovo, Afghanistan and Iraq, and how this could be used as a force multiplier in battle. This spiked their interest in asymmetric warfare and NCW. China realized that the PLA's capabilities in these areas was lacking. (IISS 2020:9), (Saltzman 2013:49), (Newmyer 2010:485), (Fritz 2008:28), (Allison 2017:129). Jiang Zemin supported a strategy to catch up with the technology of the US. Him and other Chinese officials viewed this modernization to be important for China since the observation of RMA in warfare had showed the military superiority of the US, which could be a threat to China (Saltzman 2013:49). The concept of asymmetric warfare, especially in relation to cyber warfare, gained further traction in 1999 with the book Unrestricted Warfare by two colonels from the People's Liberation Army. This book described how China could defeat a military superior adversary using asymmetric means, in this case USA, and noted already back then that ICT-based systems was an area where China could achieve asymmetric advantages (Raud 2016:9).

Under Deng Xiaoping, China focused more on technological development. Successors like Jiang Zemin, Hu Jintao, and Xi Jinping have all been significant in prioritizing the development of technology and innovation, not only related to the military, but also how this have contributed to China's economic development (Appelbaum et al. 2018:49), (Cheung et al. 2018:55), (Chang 2014:15-16). Under Zemin and Jintao, development of ICT-based technology became a priority as national and economic security were described as dependent upon each other (Zemin 2009, cited in Chang 2014:16). President Jiang Zemin announced a revolution in military affairs in 1993 as a part of the national strategy for

military modernization (Fritz 2008:28). Newmyer divides China's approach to RMA into two periods. A period of detection and investigation from the late 1980s until the mid to late 1990s, which set the stage for the current period of implementation. The detection period refers to China's observation of other countries capabilities, like the US. In the current decade we have seen a strategy of implementation, with the country showing more of its capabilities and modernization of its military (Newmyer 2010:494-499). Newmyer points out that China views RMA as advances in technology that presents new methods of producing threats or using force.

The modernization of China's military has sped up with the leadership of Xi Jinping. Key terms here are mechanisation, informatisation, and intelligentisation. Mechanisation refers to "ambitions to modernize and replace the PLA's legacy equipment across all services and branches, though with a significant focus on the ground forces" (IISS 2020:10). In Chinese, the term informatisation means how the PLA can improve their abilities to use new technologies (Fritz 2008:42). Informatisation is close to how the US defines the term netcentric capability and network centric warfare. This is the ability to gain the advantage of an opponent with the use of advanced communications and IT equipment. NCW is all about information superiority, and using information obtained from information technology to gain military advantages (Fritz 2008:40). This is a method of using ICT to gain advantage on physical battlefields and in kinetic combat. With informatisation, China has the ambitions of improving ICT and cyber warfare capabilities related to the military. Education of PLA forces in cyber and NCW is also embedded in informatisation (Fritz 2008:43). In addition to focusing on how these technologies can be used to inflict damage upon opponents in cyberspace, the PLA aims to further develop its abilities to collect and analyze information attained from the use of such capabilities. Intelligentisation refers to the idea that automation, big data, and artificial intelligence will improve military systems. It is pointed out that especially big data will have a tremendous impact on the development of artificial intelligence systems. Collection of big data related to surveillance, reconnaissance and intelligence and its integration into military systems are important aspects of the concept of intelligentisation (IISS 2020:10). CMI has also been given more attention. Both public and private research on new technology related to the areas of informatisation and intelligentisation has been promoted to national level strategy under Xi Jinping (IISS 2020:11). This is evident in the 13th

Five-Year Special Plan for S&T Military–Civil Fusion. Research and development of artificial intelligence is central in this plan (IISS 2020:238). Another example is the 13th Defense, S&T and Industry Five-Year Plan, which has stronger emphasis on weapons technology and CMI than previous plans. China has a strategy focusing on the development of artificial intelligence. Advanced manufacturing and artificial intelligence are key areas that China is giving a great deal of attention towards in the near future regarding its development of high-tech industries and economic restructuring (Appelbaum et al. 2018:58).

With the emergence of numerous types of cyber technology, China has also included this in strategies and policies in more recent years. The Military Balance by IISS from 2020 mentions how the Chinese white papers from 2015 and 2019 illuminates this (IISS 2020:9-10). First, the white paper from 2015 notes that cyberspace is a new commanding height when it comes to strategic competition, and that the concept of warfare is moving towards informatisation. Moreover, the PLA has to be prepared to confront adversaries in cyberspace. The white paper from 2019 says China should be prepared for informatised wars, and that:

> "The era of 'intelligentised' warfare (the military application of artificial intelligence (AI)/machine learning to warfighting) is now 'on the horizon'. Both the People's Liberation Army and non-military government agencies are investing heavily in the development of AI and machine-learning capabilities". (IISS 2020:237).

Furthermore, Lindsay notes that cyberwarfare is consistently referred to as "a revolutionary development in military affairs" (Lindsay 2015:30) in official Chinese military doctrine and sources in Chinese military professional literature (Lindsay 2015:30). The creation of the Strategic Support Force, SSF, is another example of national policy related to cyberspace. SSF will be "responsible for every aspect of information warfare, including intelligence, technical reconnaissance, cyber warfare, and electronic warfare, which are central to China's strategic thinking on asymmetric warfare and pre-emptive attack" (Raud 2016:25).

As presented above, there are numerous examples that highlights China's increasing attention towards technological development, related to commercial and military aspects. Promoting companies like Huawei and their technology can thus be identified as a result of Chinese government policies previously mentioned.

4.2 5G

This section will define what 5G is, present some statistics of how it affects the global market and economy, and how this can be a cyber (coercive) capability and netcentric capability that can be used in cyberspace and for NCW.

4.2.1 5G, the technology explained

5G is the next generation of wireless mobile technology, providing greater data speeds, lower latency, and the possibility to connect to more devices (De Looper 2020). It will create the possibility for autonomous cars, a new generation of robots, remote surgery, and more advanced drones (Yu et al. 2017:8-16). Brett Simpson of Arete Research comments in an interview with the Diplomat:

> "With 5G, we will have network infrastructure that enables mainstream AI and connected machines (e.g. automotive) on a scale we have never seen before. The amount of data generated from these machines become a significant source of new value in tomorrow's world. China is likely to be the first market to launch 5G commercial services and given the unique scale of their networks (serving 1 billion-plus people) they will benefit from cost leadership." (Kuo 2019).

Furthermore, 5G makes it possible to have massive amounts of computing at high speed, without having to connect the input device, for example a smartphone (Malcomson 2019). "The magic of 5G is its ability to connect within milliseconds a phone or car or sensor-equipped locomotive to the cloud, which can process the data, combine it with other data, and return to the end device." (Malcomson 2019). To explain this more clearly, 5G is computing and networking combined on the same platform. In a 4G network, the smartphone previously was the platform to the network. With 5G, the network is now the platform. 5G will have a huge effect on connecting the internet of things, IoT (Farrel and Abraham 2019:11). IoT describes the connection between devices, everything from kitchen appliances to phones to cars. In short, more and more devices that rely on an internet connection will be connected and create what is referred to as IoT. Halpern comments that with the IoT "Remote robotic surgery will be routine" (Halpern 2019) and "autonomous vehicles will cruise safely along smart highways" (Halpern 2019). This will also contribute to smart cities, where 5G technology-based infrastructure and the IoT will facilitate smart

parking and optimization of traffic flow (Appelbaum et al. 2018:99-100), (Yu et al. 2017:11). It is expected that IoT will be highly dependent on infrastructure based on 5G technology (Schneier 2020), and that IoT based systems will increase in proliferation because of 5G technology (Kaska et al. 2019:15).

Thus, 5G technology will be have massive implications for the future. Park points out how massive these implications could be with the following quote "He who controls 5G controls the world because of the overwhelming importance of telecommunications grids and networks for a nation's prosperity." (Park 2019:25). Oxford Economics has combined studies done on the macroeconomic impact of 5G on the global market and at regional levels. They summarize these findings. "5G's contribution to global GDP is estimated at between US$1.4 trillion and US$3.5 trillion over the next 10-to-15 years" (Oxford Economics 2019:4) "At the regional level, studies have put 5G's contribution to GDP at €113 billion (US$125.4 bn) in the European Union by 2025, US$500 billion in the US, and 6.3 trillion yuan (US$925 bn) in China over the same time period" (Oxford Economics 2019:4). (It must be addressed that this report was commissioned by Huawei. Still, Oxford Economics is a reputable and reliable source). At the start of 2019 Huawei had obtained almost 30% of the global market for telecommunications equipment. If the company continue its growth, this will give China the opportunity to control and shape the global market regarding 5G products and promote 5G networks and technology with their preferred standards (Halpern 2019). 5G is a fundamental game changer from 4G because of its speed and ability to connect more and more devices. Hyperconnectivity will lead to innovation in multiple industries like healthcare and transportation. It will lead to innovation in military technology. The use of 5G will provide macroeconomic and geopolitical benefits for those who apply it and dominates it in the global market. (Park 2019:25).

4.2.2 The cyber (coercive) capabilities of 5G

Observers point out how ICT's like 5G has cyber (coercive) capabilities, and how these can be used (Saltzman 2013), (Hjortdahl 2011). 5G technology has potential and possible cyber (coercive) capabilities and netcentric capabilities in its current stage and in the future. As mentioned earlier, critical functions in society relies on wireless, cellular and ICT's. The same technology can be used to paralyze or disrupt critical systems of infrastructure, and hence

present a threat to national security (Saltzman 2013:41). Spin on and CMI can integrate 5G technology developed by Chinese companies into the military for both offensive and defensive purposes. China has focused on CMI since the 2000s, and this is considered to have great importance for innovation. Xi Jinping's regime has reignited the nations focus on CMI by elevating it to a national policy in 2015, which has helped the effectiveness of CMI by overcoming bureaucratic challenges (Cheung and Mahnken 2018:69). Offensive purposes would be to conduct cyber reconnaissance and cyber-attacks on civilian infrastructure. This could be sabotage, surveillance, and espionage. China can use cyber (coercive) capabilities to shut down military networks and power grids (Allison 2017:163-164). In short, it could be used to take control of civilian infrastructure that relies on the technology. It could also be used in NCW by using information obtained through cyber reconnaissance to gain military advantages, offensive or defensive, on the physical battlefield in kinetic combat. It could also be used for defensive cyber warfare operations like deterrence in cyberspace, and encryption by consumers for protection (Lysne 2018:112-113).

Depending on the motivations, 5G technology could be used for offensive or defensive military objectives. The examples presented above confirms that the technology has cyber (coercive) capabilities.

4.3 Huawei and 5G

Huawei can be of use as concrete example to illustrate how China has promoted and developed 5G technology. It is noted that other Chinese companies also are developing 5G technology, but Huawei is the leading company in this technology. This thesis is not trying to argue that Huawei has closer ties to the CCP and PLA than any other Chinese company. It is highly useful and relevant to present this case before exploring the hypotheses, as it gives a stronger foundation for the discussion.

Huawei, a private company founded in 1987, is one of the most innovative companies in the world. Some of their areas of production and research are ICT based solutions, data centers, cloud computing and phones. Their products are available in more than 170 countries, has 3 billion users, and are providing its services to 45 of the 50 top telecom operators in the world. (Yip and McKern 2016:53). The company has become the largest global manufacturer

of telecom equipment in the last few years (The Economist 2012), (Kaska et al. 2019:7). Globally, Huawei is the leader when it comes to market shares for mobile infrastructure equipment (Grotto 2019:15). Huawei had close to 30% of the global market for telecommunications equipment by the start of 2019 (Halpern 2019). Huawei and ZTE together both have close to a quarter of the market for telecommunications equipment in Europe (Lysne 2018:4). The influence of the CCP in any business operating in China, and politicization of innovation, must be taken into consideration (Greeven et al. 2019:13), (Yip and McKern 2016:30). The difference between business in China and liberal democracies is "…the tight linkage to the government, the communist party, the private sector, and the many wholly and partially state-owned enterprises" (Yip and McKern 2016:30). China's National Intelligence Law which was introduced in 2017 is an example that gives further insight into this. Article 7 and 14 are especially worth mentioning. Article 7 makes citizens obligated to be supportive of national intelligence work (Girard 2019), (Tanner 2017). Article 14 gives intelligence agencies authority to demand that companies and private citizens provide needed support, assistance, and cooperation for any intelligence work (Park 2019:24), (Tanner 2017).

The implementation of this law shows how the Chinese state and military can use 5G technology in cooperation with Huawei for data collection and espionage toward civilian targets, and defensive operations as well as offensive operations. Again, it is important to note that this is not only the case with Huawei, but also other companies that are developing 5G, for example ZTE. This law also affects foreign companies in China. For observers and other state leaders, the law can blur the line between the interests of Chinese companies and the interests of the Chinese state. This law could also create a lack of transparency regarding the operations of Chinese companies in the global market, but not if laws in foreign countries require transparency regarding their operations there. (At the same time, its noted that other countries can put pressure on their private companies, but the focus here is China and Chinese companies).

The US have criticized Huawei heavily. USA and China are currently embroiled in a conflict over Huawei. USA fear that China will use this technology to gather data on customers and individuals. They are also worried about how 5G can be used for sabotage, taking control over machines, automated technologies, and in general things that are controlled by 5G. The

US wants to stop China's ambitions of dominating the telecommunications sector and the development of 5G (Farrel and Newman 2019:8). Donald Trump has accused the company of being "a conduit to Chinese intelligence" (Halpern 2019). The Trump administration has acted to combat these concerns by imposing sanctions on Huawei and placing them on the Entities list. The Entities list identifies companies and individuals which are a threat to national security according to the US government (Farrel and Newman 2019:11). Huawei was placed on this list in May 2019, and as IISS puts it, "President Trump declared a national emergency in cyberspace" (IISS 2020:8). This prohibits American companies from doing business with Huawei without a special license. At the same time, the Trump administration has continually issued waivers, so licenses are not needed. The other side of the argument is that the US could be using these fears, if not sincere, to prevent China's technological development and commercial gain. Many see the Huawei ban simply as sanctions in the ongoing trading war (Huong 2019:45). Based on fears from the US and other countries, It can be argued from one perspective that Chinese companies like Huawei, in cooperation with the Chinese state, poses a threat to the national security of other states with their development of 5G technology.

Others do not agree that China has malignant interests by using Huawei as a tool for its objectives, or at least that it is very difficult to prove. The company itself denies all accusations of ties to the CCP and PLA (Schuman 2018), (Global Asia 2019:17). Lysne comments that no evidence is presented for accusations that Huawei "misused its position as a vendor of equipment for any of its customers" (Lysne 2019:4). From this perspective, on the basis that Huawei never has been discovered or exposed in the act of espionage, the company has to defend against accusations of crimes with a lack of evidence (Schuman 2018). Lysne notes that electronic equipment is not easy to investigate (Lysne 2018:5), and that "verifying an ICT system to ensure that it is not doing harm is a monumental task" (Lysne 2018:28). Still, it is not considered impossible to improve the safety of ICT systems. One method to overcome challenges in ICT safety is through encryption. If Huawei's 5G products sold to other countries are being encrypted, the argument is that the use of this equipment, both for private use by citizens and in civilian infrastructure, would be assured safety from Huawei regarding cyber reconnaissance and cyber-attacks from third-parties. Nevertheless, those who built the equipment used for encryption can still be a threat if their

intentions are not known (Lysne 2018:112-113). It is also necessary to point out that reactions to China's promotion of Huawei and 5G can be viewed as the choice between state of the art Chinese equipment or inferior and delayed equipment from somewhere else. The trade-off between these two options can be affected by the fact that it is difficult for policymakers to know what China's motivations are.

(The focus of this thesis is not to present how countries of the world are reacting to Huawei and their rollout of 5G technology, even though US reactions were mentioned. For information on how other countries and regions are reacting, see Huong 2019, Park 2019, Dutta and Marek 2019, Kaska et al. 2019:15-18).

To summarize, Huawei's promotion and development of 5G technology could be related to commercial/economic and national development objectives on the one side, and military objectives, defensive or offensive on the other.

4.4 Hypotheses discussion

The hypotheses will now be explored in the same order they were presented in the introduction.

H1 Offensive realism

Offensive realism would assume that all states can make their companies do whatever they want. In this case it assumes that Chinese companies developing 5G technology are being used as a tool by the CCP and the PLA to conduct cyber espionage, surveillance, and cyber warfare. The CCP and PLA can use the technology and information from companies like Huawei at ZTE for whatever coercive purposes they want. China's motivations in promoting and developing 5G technology is related to several factors that can be identified by applying offensive realism. To begin with, the security dilemma is inescapable for states. China have no way of knowing the intentions of other states and cannot rule out the possibility that others will exercise military force upon them. It can be argued that China and Western countries, particularly the US, is in a high-tech security dilemma, more specifically a cyber or 5G security dilemma. For example, because of USA's long unquestioned dominance in technology and military superiority, it is necessary for China to develop capabilities of the

same level or better (Appelbaum et al. 2018:185). China could also have concerns that the US as the technological leader in the world wants to create new international standards that favors them (Raud 2016:7). Tunsjø argues that we are witnessing the reemergence of bipolarity, with the two superpowers being USA in the lead, and China second (Tunsjø 2018:1). This can motivate China to seek more power. Mearsheimer points to China's modernization of its military, combined with the relative decline of the US. This can increase the chances of China having aggressive motivations with regards to the US (Mearsheimer 2014:360-403). A new bipolar system with US power in decline relative to China could make China motivated to act assertive in the search for power. Offensive realism also argues that because of the security dilemma and uncertainty the intentions of other states, China will maximize power without a specific threat.

China will use the advantage it has in 5G technology to maximize its power relative to other states. As established in previous sections, 5G technology has potential cyber (coercive), and can thereby contribute to military power resources. It was also demonstrated how CMI and the concepts spin-on and dual-use can facilitate the use of civilian developed technology for offensive military purposes. 5G technology can then be used to conduct cyber warfare. Many observers argue that cyberspace is offense dominant (Libicki 2009:32), (Lindsay 2015:29), (Nye 2010:5), (Krepinevich 2012:95), (Saltzman 2013:44). Saltzman argues that cyberspace and cyber (coercive) capabilities changes the paradigm of ODT. Traditional ODT-theory emphasizes territorial elements, the use of kinetic firepower and the destructive ability of specific weapons. This becomes largely irrelevant when discussing cyber warfare and cyberspace. Firepower in cyberspace is about inflicting technological damage on infrastructure supported by ICT (Saltzman 2013:44). When nuclear weapons emerged, this gave the defense the advantage. As nuclear weapons before gave the defense the advantage, cyber (coercive) capabilities and cyberspace is a new technological paradigm which gives the offense advantage. This also gives more context to describing an intense high-tech security dilemma. Cyberspace is from this view considered offense dominant which could increase the severity of the security dilemma.

To explore this hypothesis further, it is necessary to include the power concept. In today's digital world, data, and especially big data can be viewed as an important and strategic resource. The ability to aggregate data can provide types of power regarding warfare and influence operations in cyberspace and digitally connected infrastructure. It provides cyber power resources, which can give China control over massive amounts of information. It can be argued that China has potentially enormous cyber power resources in the cyber domain with 5G technology. They have created and developed the technology, control over ICT information and data, and can get access and control over critical civilian infrastructure and networks by performing cyber reconnaissance, cyber-attacks, and surveillance. This gives China the opportunity to collect massive amounts of big data. China could then use these cyber power resources to get other states to do what they otherwise would not have done. To clarify, China will be able to, as Nye describes, to achieve their preferred outcomes by the use of cyber power resources in the cyber domain (Nye 2010:4). Huawei is already building 5G infrastructure in many countries (Farrel and Newman 2019:11). From an offensive realist perspective, China would use this opportunity to take advantage of the vulnerability this creates for said infrastructure. This is important for two reasons. First, cyberspace is considered to be offense dominant. Second, the risks of conducting aggressive and offensive operations in cyberspace, such as cyber reconnaissance and cyber-attacks are low compared to conventional warfare, or physical espionage operations, and less costly (Saltzman 2013:58). The risks and costs are also lower because it is harder to detect and find out the origins of actions performed in cyberspace (Inkster 2013:59). From this view, the benefits clearly outweigh the costs in performing offensive actions in cyberspace.

Regarding the controversies surrounding Huawei, 5G, and China's motivations, Farrel and Newman comments that "Powerful states now understand that the networks of globalization can be turned into powerful tools of coercion and surveillance, gaining advantage over their adversaries" (Farrel and Newman 2019:12). Offensive realism would argue that China could take advantage of this opportunity use these networks of globalization to obtain power resources that can be used in cyberspace to maximize power. To elaborate with another example, China would have more to gain in conducting military technological and industrial espionage, than the US, their biggest rival (Hjortdal 2011:3-4). China would have larger interests acting offensive in cyberspace (Hjortdal 2011:1). The

asymmetric properties of cyberspace make this appealing for China, because even if the US is superior in military and technological development in the bigger picture, it is still vulnerable in the cyber domain.

Offensive realism also contends that the best strategy to guarantee survival is by seeking global or regional hegemony. While the achievement of global hegemony is difficult, 5G development could be part of a strategy to seek regional hegemony. While Mearsheimer argues that global hegemony is difficult to achieve because of the stopping power of water, it can be argued that cyberspace makes this less of an obstacle. Still it is recognized that it is a massive undertaking to achieve global hegemony. From an offensive realist view, China's motivations can be to seek regional hegemony, which will be the only way for China to achieve their preferred outcomes in its territorial disputes (Mearsheimer 2014:375-376).

The promotion and development of 5G technology for the purposes stated in this discussion can be viewed as prescriptive offensive realist theory in practice. From an offensive realist view, the strategies and actions presented would be the best way forward for China to secure its own survival in a dangerous anarchic world with no supranational police, as long as China does not overestimate or miscalculate their advantage in 5G technology, and its uses.

H2 Defensive realism

From this view, the security dilemma does not lead to intense power competition and can be mitigated through the actions of states. Like offensive realism, defensive realism would also assume that all states can make their companies do what they want. From this view, China will not use 5G technology for power maximization, because it would not be the best strategy for survival. The most important thing for survival is to at a minimum maintain relative power position to other states, not increase it. From this view, China's development of 5G technology could be part of a strategy to maintain its existing power relative to others, for example the US, and act as a defensive positionalist without seeking more power than this requires. It can be seen as counterbalancing USA's long unquestioned dominance in technology and military superiority. Defensive realism would argue that China is developing

5G technology for defensive purposes by necessity to ensure its survival in the international system. In other words, China will use it for defensive military objectives. The balance of power structure theory from Waltz would add that China will use internal efforts related to economy and military, to help with the goal of survival. As established earlier, the promotion and development of 5G technology is related to both commercial and military interests.

While defensive realism would argue that China has defensive motivations, others can still perceive the developments as a move towards more assertive behavior from China. As Fritz notes, "…it is impossible for a state to develop a defense against cyber warfare without simultaneously learning how to execute attacks themselves" (Fritz 2008:40). This is central to the second variable Jervis prescribes to the security dilemma: If it is possible to distinguish between offensive and defensive weapons. Defensive realism would argue that China is seeking security, not maximization of power. A strategy of increasing and maximizing power would put survival at risk, because other states will find ways to punish China if feeling threatened. The US ban of Huawei is an example of this. Again, it is not known if this reaction is based on national security or commercial interests, and therefore this is not confirming an argument that China is seeking too much power and being punished as a result. Whether the fear of Huawei is legitimate or not, at least it shows how other states can react based on their perceptions of threats.

The balance of threat theory would suggest that China is developing this technology to combat real threats originating from the offensive power of states with large amounts of aggregate power, or perceived threats of aggression from other states not necessarily that powerful. China can view the US as a threat with offensive power and balance stronger against it. With the US and other states disputing China's claims in the South China Sea, China could see this as a threat to its sovereignty and territorial integrity (Mearsheimer 2014:375). China could then find ways to integrate 5G technology into military defensive capabilities. From this view, China's reactions would be defensive, and not offensive even if it can be perceived this way by others.

Defensive realism could provide further arguments to support this hypothesis. Misperceptions of the fine-grained structure of power can lead states to view China's potential cyber (coercive) capabilities as offensively oriented, and China's intentions as

malign, when the motivations might be defensive. States can present threats in other ways that increases their own security but decreases China's. This can include foreign attempts to subvert the CCP's rule. This can be attempted by espionage and actions in cyberspace designed to spread information to the country's citizens that is unfavorable to the Chinese government, encouragement of Western ideology and democratic principles, and attempts to penetrate the great firewall. As Lindsay notes: "Subversion of the great firewall is a major ideological threat for the CCP as well as official U.S. policy" (Lindsay 2015:19).

The sources of these threats can be viewed as originating from the aggregate power, the real or perceived motivation of other states, in this case that China assumes that these states harbors aggressive intentions. 5G technology is highly relevant for addressing these threats. China already has measures in place that can be further developed and supported by 5G. The great firewall is "…a collection of hardware and software that enables Beijing to monitor and block vast segments of online content" (Allison 2017:165). It monitors all traffic in Chinese cyberspace and can disconnect all networks in China from the rest of the world (Raud 2016:6). Lindsay describes it as the most sophisticated architecture regards to internet censorship in the world (Lindsay 2015:15). Lindsay illustrates the importance technological defensive capabilities has for China when explaining what penetration or destruction of the great firewall can result in (Lindsay 2015:19). If it is penetrated, this can create a dilemma for China where it must choose to allow more information in the country, or it can close off all the networks, which can hurt economic dynamism. Threats to the CCP's rule can also originate from within China, from citizens opposing the regime. One example of how China is using 5G to mitigate this threat and increase its security is with infrastructure in smart cities and the introduction of the social credit system by Xi Jinping. The social credit system uses mass surveillance and big data to track the behavior and movements of citizens, whether it is physical, digital, or financial, and can punish or reward citizens based on behavior (Allison 2017:121), (Chin and Wong 2016). By 2022, there could be two surveillance cameras for every one citizen (Chinascope 2019). By enforcing social control, China exercises control over its population which contributes towards keeping the CCP in power and increases internal security. 5G technology can thus be used to enforce social control and control information flow to weaken foreign and domestic attempts of subverting the CCP's rule. It is also important to note that China have increased their spending on domestic/internal security

over the last few years since Xi Jinping became president, and are spending more on this than external defense/security (Chin 2018), (Tan 2018), (Zenz 2018), (Zhou 2018). As Klimburg argues, most of China's cyber activities are not related to attacks and espionage on foreign countries, but towards ensuring internal security (Klimburg 2011:48).

5G technology can be used as strategy for deterrence in cyberspace. Nuclear deterrence has been replaced by information deterrence (Newmyer 2010:488), and as Libicki defines it, cyberdeterrence is to create a distinctive towards an adversary to stop aggressive behavior (Libicki 2009:7). This deterrence strategy can be effective in itself and reduce attempts to penetrate the great firewall. 5G can be used for other defensive purposes which in this case can be used to deliver what IISS refers to as an effect of defensive nature, such as for protection and resilience (IISS 2020:515). China can use it to defend against cyber-attacks and cyber reconnaissance. The argument here is that China is promoting and developing 5G technology because the international system is forcing them to pursue such a strategy to increase the odds of their survival.

On one side, defensive realism makes assumptions that weakens the strength of this argument. Defensive realism argues that technology generally favors the defense in the offense-defense balance, and that defending would be easier than attacking. If this is the case, security will be plentiful, and states will not have an incentive to seek power and act aggressively. Defensive realism would then advocate for communicating restraint in world politics. However, with the new paradigm established by cyberspace regarding ODT, the offensive realist hypothesis makes a strong argument in that the offense defense balance is offense dominant. If military technology does favor offense over defense, the severity of the security dilemma increases. It is further acknowledged that states will seek more power in these situations if this increases their chance of survival.

From the other side, there are reasons as to why the defensive realism hypothesis could make a strong argument. Jervis' two variables regarding ODT must be considered. Again, misperception of the fine-grained structure of power can make other states assume that China has hostile intentions even if this is false. This can support that the offense-defense balance not necessarily is offense dominant. If it is hard to distinguish between offensive and defensive weapons, China's motivations are difficult to assess. Cyber (coercive) capabilities

can be used for both defensive and offensive purposes, but it can be hard to know where the line crosses from the one to the other. It can also be hard to know who is using it, and from where. For one, it can be difficult to figure out where actions in cyberspace originates from. The point of origin can be disguised (Inkster 2013:59). A state can increase its security without decreasing the security of others if offensive and defensive weapons can be distinguished. If the offense-defense balance is defense dominant, an increase in the security for one state does not lead to a big decrease in the security of other states. Security will then be assured for all parties (Jervis 1978:187). China can also make these misperceptions. If China perceive the offense-defense balance as offensive dominant when it is not, it could be overestimating its power. If China perceives it as defense dominant when it is not, it could decrease China's security.

H3 Economic interdependence and institutionalism

This hypothesis argues that China's motivations behind promoting and developing 5G technology is to pursue economic growth and maximize wealth through cooperation facilitated by economic interdependence and multilateral institutions. Because of the benefits and new solutions ICT's creates, this technology is viewed as important for economic development (Yu et al. 2017:1). As mentioned, 5G technology will be central in critical civilian infrastructure, and can assist in creating new solutions, for example in healthcare and transport. The liberal theory subscribes to the idea that China could use this opportunity to participate in "…a global science and engineering effort to solve common problems through expanded cross-border cooperation" (Appelbaum et al. 2018:185). Initiative to engage in tight cooperation on new technology can facilitate further cooperation and trading related to technology, by China showing other states that they wish to cooperate on issues regarding new technology, and its uses. This could again lead to economic gains for China, as they will have access to international cooperation on innovation, S&T, and incoming capital. Appelbaum et al. describes an optimistic scenario that economic interdependence theory and neoliberal institutionalism would support (Appelbaum et al. 2018:183). In this scenario, China will follow in line with other East Asian economies. It will liberalize its economy and reach the same levels as the US, Europe and Japan, and be considered a leader in S&T and an economic powerhouse. China will be open

to globalization and the Bretton Woods system. A scenario like Appelbaum describes, especially with regards to following other East Asian economies, can be further elaborated with developmental state theory. If China is motivated by wealth maximization, principles from developmental state theory can be applied to pursue wealth. South Korea is an example of a country that followed the Japanese model by the "…use of market mechanisms for developmental purposes" (Johnson 1999:40). As noted previously, the Chinese government has introduced policies for developing S&T since the 1970s that has contributed to a nation focused on innovation in S&T. Johnson comments that China "…began to adapt the institutions of Japan's developmental state to its own Leninist heritage, a command economy it was attempting to dismantle" (Johnson 1999:40). With a liberal theoretical approach to developmental state theory, these policies can be viewed as facilitating economic growth, by establishing conditions and objectives. Thus, there is an argument to be made that China could be applying these principles to maximize its wealth.

According to the liberal theory, China can use its advances in 5G to continue its economic growth, as the technology will be highly relevant in the future. There are several reasons why developing this technology to seek power and develop military cyber (coercive) capabilities is unnecessary. From this view, world politics is not a zero-sum game. China could pursue wealth and technological development without presenting a threat to the wealth and wellbeing of other states. Neoliberal institutionalism acknowledges that anarchy can hinder cooperation, but institutions can help alleviate these obstacles, and contributes to stability. The security dilemma can be ameliorated through economic interdependence and cooperation. Intense security competition and the use of military force would therefore be rare. Cooperation will be a better strategy for states to reach their goals. Military force become unattractive for several reasons. First, it presents more risks and costs compared to the benefits obtained through interdependent relationships, and issues between states can be solved in international institutions. Allison explains this: "Thick economic interdependence raises the cost – and thus lowers the likelihood – of war" (Allison 2017:210). Second, economic interdependence will continue to boost China's economic development, innovation and S&T. If China continues its economic growth, it will become the biggest economy in the world in the near future (Yip and McKern 2016:9). If trade crosses borders, armies do not have to. Third, China could risk losing legitimacy and

influence in international institutions if it uses 5G to develop cyber (coercive) capabilities combined with malignant intentions. The international system could try to isolate the country, for example with economic sanctions like tariffs, or by ending trade deals. Another important point is this: If China continues its economic growth it can eventually accumulate massive amounts of wealth, which can give them the opportunity to influence world politics. This can also give them soft power resources. By cooperating in international institutions and communicating a strategy of economic liberalization, other countries could be inspired by China's economic growth and wealth creation, try to seek the same, and hereby wanting the same outcomes as China. Therefore, it is no reason for China to act assertive now. These reasons support the idea that the benefits of economic interdependence and cooperation outweigh the risks and costs of aggressive and expansionist behavior.

China is the largest trading partner to 130 countries including the largest Asian economies (Allison 2017:21). It currently has highly interdependent relationships with most of its trading partners, especially the US, where it has a trade surplus which have made it possible for China to invest heavily in S&T, which again leads to economic growth (Appelbaum et al. 2018:181). Commercial products and civilian infrastructure based on 5G technology will play a large role in the future of infrastructure building and smart cities. Many countries are interested in building 5G networks because of its innovative abilities (Kaska et al. 2019:18). Most of them cannot produce the advanced equipment that Chinese companies offers (Lysne 2018:5). Moreover, the alternatives to Chinese companies like Huawei and ZTE are more expensive and less technologically advanced (Halpern 2019). Huawei is the only company that can deliver all the elements of a 5G network at a better price than its competitors (Kaska et al 2019:7).

In a report from 2019, Oxford Economics estimated how countries investments costs on 5G would increase if a company like Huawei were to be restricted (Oxford Economics 2019:i-ii). This was estimated relative to a baseline scenario with no restrictions in three cost scenarios: low, central, and high. In a central cost scenario, this would increase the costs of countries from between 8% to 29% over the next decade. "In the US, this translates to an average increase in investment costs of almost $1 billion per year over the next decade in our central cost scenario" (Oxford Economics 2019:i). The report also notes that a delay of

5G caused by restrictions will reduce economic growth and decelerate technological innovation:

> "In our central cost scenario, this would result in reductions to national GDP in 2035 ranging from $2.8 billion in Australia to $21.9 billion in the US. Across all eight countries in our study, this means GDP per capita would be lower by an average of $100 per person in 2035, compared with a world where there is no such restriction in 5G infrastructure provision" (Oxford Economics 2019:ii).

This report gives insight into the costs involved for countries if they choose to impose restrictions on a Chinese company like Huawei. Considering these numbers, it can be argued that China and the countries imposing restrictions upon Huawei would experience economic losses in a scenario like this. Another report by STL Partners (also commissioned by Huawei) predicts that over the next decade, 5G technology will lead to $1.4 trillion extra in GDP for worldwide economies (STL Partners 2019:3). When it comes to economic gains for China, a report predicts that 5G technology will contribute to 6.3 trillion Yuan ($930 billion) in GDP and create 8 million jobs (China Daily 2017). Again, If China's motivation is to maximize its wealth, the economic gains that 5G technology can provide would give no reason to act assertive. It would be in both China's and other states interests to not impose restrictions on 5G products and services. Because of China's dominance in 5G, it could gain more relative to their trading partners. Neoliberal institutionalism argues that if absolute gains are present, it is not important whether some states achieve more relative gains than others. Economic interdependence would argue that it does not have to be the end of peaceful or beneficial cooperation. Interdependence does not mean that relationships between states must be equally mutually beneficial, which is a utopian idea. The concept of interdependence can still be applied in asymmetrical relationships, in this case if China were to gain more than others.

Other factors weaken the arguments for China's motivations being focused on economic growth and wealth maximization facilitated through economic interdependence, developmental state features and international cooperation. There are several reasons as to why most optimistic views about China's motivations are not well enough supported. Many countries depend on China when it comes to 5G technology. Because of how important 5G technology will be in the future, countries cannot easily forego importing it and go without it. Most countries in the world depend more on China, than China depends on them if they

wish to implement 5G technology. China could be promoting and developing 5G technology to reduce dependence on foreign technology, for example from the US. China could gain influence over other states in the global market by making them more dependent on them, or/and create more balanced relationships of interdependence. This can reduce their dependency on foreign technology from other countries.

It can be argued that China might be concerned about how rules and norms are made and revised in international institutions and want to alter them. China may communicate it is in its interests to be a part of international cooperation and globalization by following the rules and norms. Yet, they are not as clear as to what their interests really are. Allison comments that as its economy have grown, China are increasingly negative towards the Bretton Woods system, designed and dominated by Western liberal democracies like the US. China established its own alternative, the Asian Infrastructure Investment Bank, when the US refused to give China more votes at the World Bank in 2013. By 2015, 57 countries had joined the institution created by China (Allison 2017:22). Another example is when China organized BRICS. Allison describes China and the other members as "…economies capable of making decisions and taking actions without supervision from the United States or the G7" (Allison 2017:23). This suggests that China do not depend on international institutions and can create alternative institutions shaped by its own values and interests.

One could argue that globalization, international cooperation, and economic integration with the West was more important before Xi Jinping became leader. Deng Xiaoping supported international integration and cooperation during the 1980s (Cheung and Mahnken 2018:240). Xi Jinping's predecessor, Hu Jintao, promoted China as more harmonious in that they were no threat to the Western world politically or economically, and sought harmonious relationships with other states (Appelbaum et al. 2018:160). Cheung and Mahnken (2018:240-244), and Appelbaum et al. (2018:160) comment on how Xi Jinping's rule signal a difference from previous leaders. It is described as a reorientation of how China views international security, with a higher priority of national security, and a more assertive view on China's position in the world. "China has shifted from being a developmental state to becoming a national security state" (Cheung and Mahnken 2018:240). Economic development was prioritized above national security from the 1970s to the early 2010s, but this has changed. Cheng and Mahnken comments that one of the

considerations for building a strong security state is “remaking the rules and norms of the US-dominated international order on terms more favorable to Beijing” (Cheung and Mahnken 2018:240). A speech made by Xi Jinping in 2012 suggests a stronger focus on nationalism and national security. This speech can be perceived as a warning to the Western world, where China wants to signal that it is a force to be reckoned with and achieve its former glory and recognized as a great power (Appelbaum et al. 2018:160). It could further be seen as a deterrent warning the West not to threaten China’s interests and values. On the other hand, he has also promoted a cosmopolitan view of the world, in which China contributes to international cooperation to solve global issues (Appelbaum et al. 2018:160).

When applying the liberal theory to explain China’s motivations, it shows how China could continue its rise in peace and pursue wealth from one perspective. Still, these arguments are not well enough supported to conform to this view.

5 Conclusion

Offensive realism makes a strong argument, but at the same time it must be considered that the current literature can be too biased toward assuming offensive motivations than the evidence justifies. Defensive realism argued that states can misperceive the offense-defense balance, and this can also be true in cyberspace. The defensive realism discussion noted that it can be hard to distinguish between a real or perceived offense-defense balance, and to distinguish between offensive and defensive capabilities in cyberspace. Therefore, it can also be hard to distinguish if China’s motivations are defensive or offensive. Regarding the liberal hypothesis, the evidence available makes it hard to conclude that China is prioritizing wealth and economic growth over defensive or offensive military objectives. It is also necessary to note that most of the literature is rather pessimistic when it comes to explaining China’s motivations with the liberal theory.

As presented, China has introduced strategies and policies regarding S&T and innovation that can aid to both commercial/economic national development objectives on one side, and defensive and offensive military objectives on the other side. Arguments have been made that China can be developing and promoting 5G technology for both offensive and defensive military use, and to continue its economic growth and maximize wealth. While it is difficult to identify China’s motivations with any great certainty, it is likely that China seeks a

combination of these goals, and that the promotion and development of 5G is a part of a strategy for achieving these goals. Samuels observations can explain this. Samuels argues that civilian innovation and military technological developments have positive effects for both military capabilities and economic development through spin on and spin off (Samuels 2018:1-32).

Lindsay comments, “The challenges and confusion in cybersecurity are particularly acute in the case of China, which has one of the world’s fastest growing internet economies and one of its most active cyber operations programs” (Lindsay 2015:7). This again echoes the uncertainty in investigating their motivations whether they are seeking power and developing defensive and offensive technological military abilities in cyberspace, or to continue their economic growth in peace and distance themselves from the West. The most pessimistic and optimistic views are probably wrong. The hypotheses discussion indicates that China’s motivations for promoting and developing 5G is more likely to be mixed. Policy makers should be cautious towards 5G but should not automatically assume the worst. An Intermediate policy response should be considered.

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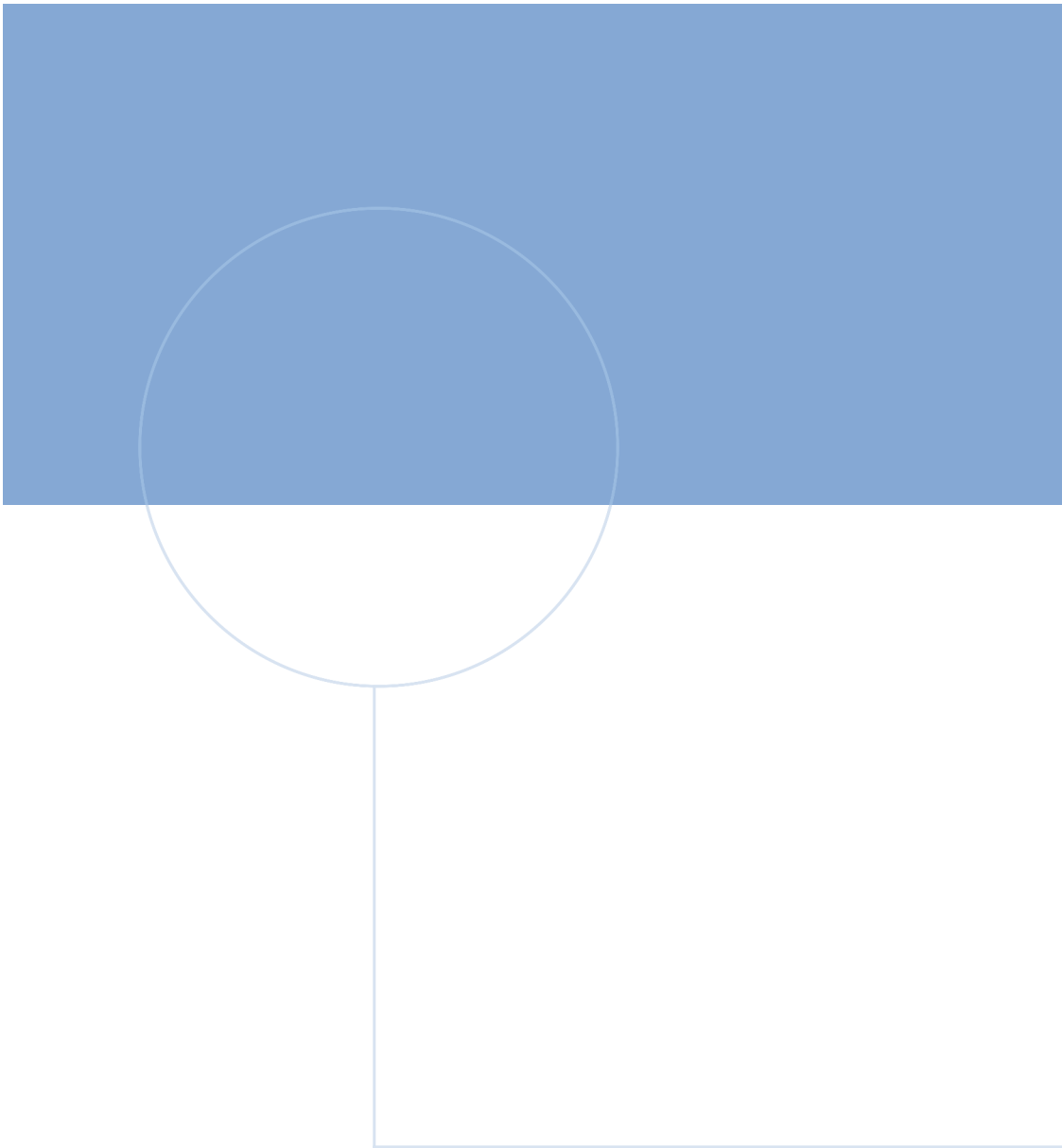

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