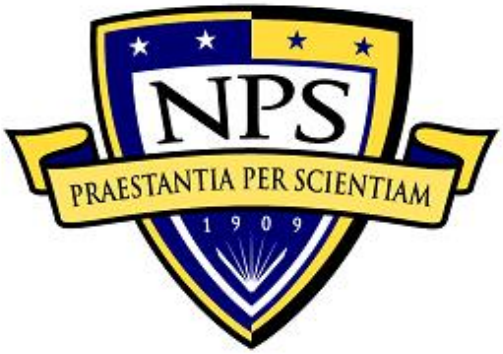

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

SAUDI ARABIA'S "PERMEABLE" INTERNET ICT

by

Martin M. Battcock

December 2018

Thesis Advisors: Scott E. Jasper
Rodrigo Nieto-Gomez

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REPORT DOCUMENTATION PAGE			*Form Approved OMB No. 0704-0188*

1. AGENCY USE ONLY *(Leave blank)*	**2. REPORT DATE** December 2018	**3. REPORT TYPE AND DATES COVERED** Master's thesis

4. TITLE AND SUBTITLE SAUDI ARABIA'S "PERMEABLE" INTERNET ICT	**5. FUNDING NUMBERS**
6. AUTHOR(S) Martin M. Battcock	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000	**8. PERFORMING ORGANIZATION REPORT NUMBER**
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A	**10. SPONSORING / MONITORING AGENCY REPORT NUMBER**

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release. Distribution is unlimited.	**12b. DISTRIBUTION CODE** A

13. ABSTRACT (maximum 200 words)

Due to countless political, economic, and social interactions between China and the United States since China's opening to the West in 1971, their economies have been inextricably linked. However, recent fundamental disagreements over governance of the internet have led to a contentious relationship. Both China and the United States have political and economic interests in "winning" the internet governance debate. Today, due to the political, social, and economic dynamics inherent in authoritarian countries across the globe, more of these governments may accept and use the China internet model, thereby forcing the United States and other Western countries to acknowledge the legitimacy of a censored and filtered internet.

This thesis seeks to answer a central question: Why does the Kingdom of Saudi Arabia have a "permeable" internet? The answer to this question may inform the strategies of Western nations attempting to counterbalance the Chinese "closed" Internet model through the U.S. "open" internet model.

14. SUBJECT TERMS Saudi Arabia, China, P.R.C., United States, U.S., information and communications technology, ICT, STEM, net neutrality, internet sovereignty, internet governance	**15. NUMBER OF PAGES** 97
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	**18. SECURITY CLASSIFICATION OF THIS PAGE**	**19. SECURITY CLASSIFICATION OF ABSTRACT**	**20. LIMITATION OF ABSTRACT**
Unclassified	Unclassified	Unclassified	UU

NSN 7540-01-280-5500 Standard Form 298 (Rev. 2-89) Prescribed by ANSI Std. 239-18

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SAUDI ARABIA'S "PERMEABLE" INTERNET ICT

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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF ARTS IN SECURITY STUDIES
(MIDDLE EAST, SOUTH ASIA, SUB-SAHARAN AFRICA)

from the

NAVAL POSTGRADUATE SCHOOL
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ABSTRACT

Due to countless political, economic, and social interactions between China and the United States since China's opening to the West in 1971, their economies have been inextricably linked. However, recent fundamental disagreements over governance of the internet have led to a contentious relationship. Both China and the United States have political and economic interests in "winning" the internet governance debate. Today, due to the political, social, and economic dynamics inherent in authoritarian countries across the globe, more of these governments may accept and use the China internet model, thereby forcing the United States and other Western countries to acknowledge the legitimacy of a censored and filtered internet.

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TABLE OF CONTENTS

LIST OF FIGURES

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LIST OF ACRONYMS AND ABBREVIATIONS

CAC	Cyberspace Administration of China
CALEA	Communication Assistance for Law Enforcement (U.S. Law)
CEDA	Council of Economic and Developmental Affairs
DARPA	U.S. Defense Advanced Research Projects Agency
DPRK	Democratic People's Republic of Korea
EO	Export Oriented Economy
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
IMF	International Monetary Fund
IMP	Interface Messaging Processor
ISI	Import Substitution Industrialization
ISP	Internet Service Provider
KSA	Kingdom of Saudi Arabia
MBS	Crown Prince Mohammed bin Salman bin Abdulaziz Al Saud
MENA	Middle East and North Africa
MNC	Multinational Corporation
NSA	National Security Agency
NSTIP	National Science and Technology Innovation Plan
NTP	National Transition Plan
OTTP	Over-the-Top Providers
PIF	Public Investment Fund (Saudi Sovereign Wealth Fund)
PRC	People's Republic of China
SOE	State Owned Enterprise
SRI	Stanford Researching Institute
STEM	Science, Technology, Engineering, and Mathematics
SV2030	Saudi Vision 2030
UCSB	University of California Santa Barabara
WTO	World Trade Organization

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I. INTRODUCTION

A. MAJOR RESEARCH QUESTION

This thesis seeks to answer a central question: **Why does the Kingdom of Saudi Arabia have a "permeable" internet?** To investigate this central question, the thesis will examine how Saudi Arabia's internet allows information to flow through its information and communication technology (ICT) network structure onto the cell phones and computers of Saudi citizens to promote economic growth, while the Kingdom censors or filters content questionable or unfavorable to the Saudi royal family to maintain social stability.

B. SIGNIFICANCE OF THE RESEARCH QUESTION

Saudi Arabia's quest to promote economic growth and maintain social stability is on the continuum between two distinct internet model options—the U.S. "open" internet model or the People's Republic of China (P.R.C.) "closed" internet model. The U.S. model demonstrates sustained economic growth with an unfiltered or "open" flow of information to the population. The U.S. model introduces vast amounts of information that may lead to social instability. The second model, the P.R.C. model, demonstrates sustained economic growth without a chaotic flow of information due to its filtered internet. China's model limits disruptions from vast information flows, thereby lessening the chances of social instability. The U.S. and Chinese internet models are extremes on the internet freedom continuum yet both are able to produce economic growth. Authoritarian countries, such as Saudi Arabia, may find aspects of each internet model attractive. The Saudi government may have difficulties deciding which internet model to choose from because of personal or political interests. The United States creates a counter-narrative against the P.R.C. model of the internet to dissuade countries, such as Saudi Arabia, from migrating toward a "closed" internet structure. Two key factors may reaffirm benefits and pitfalls of both internet models: STEM (science, technology, engineering, and mathematics) expertise organic to the Saudi population and Saudis' reliance on the international economic markets associated with oil exportation.

China attempts to export its ICT infrastructure and policy model, which produces a "closed" internet. P.R.C. officials justify their model by highlighting how it mitigates the instability caused in the unfiltered or "open" U.S. internet model. China produces enough hardware, software, and personnel with STEM expertise to help states, such as Saudi Arabia, build and maintain the Chinese internet model. The second key factor, Saudi Arabia's reliance on international markets for oil exportation, will be the most difficult factor for Saudi Arabia to compensate for due to the geopolitical benefits that accompany trade with the United States. Saudi Arabia is a key ally of the United States in the Middle East. In 2016, Saudi Arabia imported 115 billion dollars in weapons sales from the U.S. while the U.S. imported approximately one million barrels of oil from Saudi Arabia per day.[1] Saudi Arabia may find it difficult to close its internet off due to its lack of STEM-capable citizens and its reliance on international markets for oil exportation. The U.S. and Chinese internet models require further explanation to understand how each model matured through the governmental structures that formed them.

The U.S. model of the internet, which includes ICT infrastructure and government policies, adheres to the inclusive or "open" internet. The United States began its history by protecting infant industries with tariffs and preferential domestic policies. During the U.S. economic transition from an agricultural-based economy to an industrial economy, the U.S. government fostered policies promoting individual rights and also protecting citizens against monopolistic agents that stifled economic growth. These rights and protections strengthened over time due to the pluralist governmental system. Since the modern computer age began in the 1980s, the U.S. focused government funding on the initial stage of research and development (R&D) to grow infant industries in sectors important for national security—defense and health care.[2] The progress made in these sectors continued

[1] Michael Jansen, "Arms Trade at Cold War Levels as Demand Rises in Middle East," *Irish Times*, last updated March 8, 2017, https://www.irishtimes.com/news/world/arms-trade-at-cold-war-levels-as-demand-rises-in-middle-east-1.3002789.

[2] Robert H. Wade, "The Paradox of U.S. Industrial Policy: The Development State in Disguise," in *Transforming Economies: Making Industrial Policy Work for Growth, Jobs and Development*, ed. José M. Salazar-Xirinachs, Irmgard Nübler, and Richard Kozul-Wright, 379–400 (Geneva: International Labour Organization, 2014), 389, http://www.ilo.org/wcmsp5/groups/public/---dgreports/-inst/documents/publication/wcms_315679.pdf.

and migrated to other sectors due to investment from private industry. Private industry maintained its place as the driver of the U.S. economy. The ICT infrastructure followed the core values of the Declaration of Independence of the United States because citizens viewed the unfiltered internet as essential to "life, liberty, and the pursuit of happiness."[3]

The Chinese model for maintaining social stability and sustaining economic growth reflects an exclusive or "closed" model of the internet with a majority of the ICT infrastructure being state owned. Following the 1949 Communist Revolution, China protected infant industries with tariffs and preferential domestic policies.[4] The Chinese state monopolized society through its communist ideology. Unlike the U.S., which empowered its citizens and industries with individual rights and protections against monopolies, China limited individual rights and protections from monopolies for its citizens and industries, thereby forcing the state to intervene more often in the daily lives of its citizens. State-owned enterprises (SOEs) overshadowed private industry and became the driver of the Chinese economy.[5] China attempted to move toward an industrial economy through reform efforts beginning in 1978, which roughly correlated to the convergence of the modern computer and internet age.

C. LITERATURE REVIEW

The overarching policy significance of this thesis relates to internet freedom—defined differently by each country and culture.[6] The term internet freedom can be described by defining "open" and "closed" internet structure and policy. Terms such as "open" and "closed" are best explained by what they are not instead of what they are. In general, when something is "open" it does not impede something else from flowing or

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3 "The Declaration of Independence," USHistory.org, accessed May 11, 2017, http://www.ushistory.org/declaration/document/.

4 Jianming He and Yongzheng Yang, "The Political Economy of Trade Liberalization in China" (working paper, Asia Pacific Press, 1999), 5, https://openresearch-repository.anu.edu.au/bitstream/1885/40385/3/cep99-1.pdf.

5 Min Jiang, "Authoritarian Informationalism: China's Approach to Internet Sovereignty," *SAIS Review of International Affairs* 30, no. 2, (2010): 81, https://muse.jhu.edu/article/403440.

6 Derek Bambauer, "The Enigma of Internet Freedom," Bureau of International Information Programs, U.S. Department of State, July 29, 2010, 1, http://www.america.gov/st/democracyhrenglish/2010/July/20100727141139enelrahc0.947201.html.

moving through it. When something is "closed" it does not allow something else to move or flow through it. In this instance, an "open" internet means that the ICT structure and policy does not filter or limit the free flow of information. A "closed" internet means that the ICT structure and policy will significantly filter or limit the free flow of information. The United States and China appear to be at opposite ends of the internet freedom spectrum due to fundamental disagreements surrounding individual rights and freedoms. The U.S. pushes for an open and free cyberspace for all with multi-stakeholder leadership. China pushes toward a future with multi-lateral leadership, which gives each state the ability to define what internet freedom means for its citizens. In the future, China and the United States may attempt to influence Saudi Arabia's ICT structure and policy development.

The Kingdom of Saudi Arabia's (KSA) ICT structure is neither "open" like the U.S. internet model, nor "closed" like China's model. KSA allows vast amounts of information to flow through filters that limit specific topics, such as pornography, for the stated purpose of protecting its citizens from "moral corruption."[7] Therefore, Saudi Arabia has neither an "open" or "closed" internet model. The Saudi Arabian internet model from here forward will be considered a "permeable" internet model because of the targeted filtering practices of the government.

Internet freedom remains a contentious issue between societies around the globe due to the political, social, and economic influence and future prosperity that is at stake. internet freedom is defined as the guarantee to "freely accessible information and communication, alongside the right to privacy, is crucial for the further development of open, democratic societies."[8] The U.S. intends to maintain internet freedom through multi-stakeholder cooperation because of the exponential growth possibilities that the internet offers. While China appears to isolate its population from the social shocks free flowing information has on the Communist Party. Saudi Arabia currently filters specific information to protect its citizens from moral corruption similar to China. Except, Saudi's

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[7] "The Kingdom of Saudi Arabia Vision 2030 (SV2030)," Kingdom of Saudi Arabia SV2030, accessed January 31, 2017, https://vision2030.gov.sa/download/file/fid/417.

[8] Shanthi Kalathil, "Internet Freedom: A Background Paper," The Aspen Institute, last updated October 17, 2010, 3, https://www.aspeninstitute.org/blog-posts/internet-freedom-backgro/.

filtering efforts will allow significantly more information flow. Saudi filters more than the U.S. but significantly less than China. KSA falls between the U.S. and China on the internet freedom continuum.

Important terminology must be clarified before discussing ICT structure and policy information and communications technology (ICT) is defined as a "term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them."[9] With significant advances in ICT in the last decade, governments have become more comfortable and rely more on technology to execute routine functions. Recent history has shown that reliance on certain technology will only increase in the future through greater advances in ICT and the omnipresence of technology in all sectors. ICT advances have the ability to bring significant wealth but also disruptive change. The Arab Spring is an example of social instability enabled by ICT structure and policy. The Arab Spring also provided the Arab Gulf State of Saudi Arabia with ample justification to look more carefully at the ICT structure and policy of China because of its ability to maintain social stability, rather than the United States ICT structure and policy. A clear example of how ICT structure can undermine government control of its citizens is Egypt, which experienced a revolution and subsequent regime change in 2011. China sidestepped similar social instability by blocking western social media platforms and created copy-cat Chinese social media platforms with harddrives located inside Chinese borders. The P.R.C. "closed" internet model demonstrates the strength of countries capable of controlling information flow to minimize social instability.

The United States and China sit at opposite ends of the internet freedom continuum. The People's Republic of China prefers an intergovernmental or multilateral internet governance policy for the protection of Chinese netizens from western ideas that promote

9 "ICT4D (Information and Communications Technologies for Development)," TechTarget, last updated March 2011, https://whatis.techtarget.com/definition/ICT4D-Information-and-Communications-Technologies-for-Development.

individualism and disunity.[10] Both the U.S. and China are able to set ICT structure and policy according to their own National Strategic Objectives. The two factors of oil market reliance and STEM workforce expertise will be studied further to assess Saudi's efforts to set ICT structure and policy and protect its citizens from social instability while promoting economic growth.

KSA's 2030 Vision strategy attempts to correct the lack of STEM capable citizens that already are present in the U.S. and Chinese populations. Saudi Arabia, however, relies heavily on international partners such as the U.S. and China to provide the technology hardware and the personnel capable of building and maintaining ICT infrastructure. Saudi's strategy does not mention privacy or ensuring individual rights of their citizens. The priority is not the individual but the greater society. Until the introduction of the 2030 Vision in 2016, Saudi did not promote ICT innovation from their population. Without domestic innovation or international assistance, Saudi Arabia will not be able to close off from other markets because its economy cannot absorb the economic shock that would ensue. Saudi Arabia will require STEM capable citizens to fuel the economic growth that will provide the incentives for Saudi citizens to accept future social, political, and economic reforms that will be needed to diversify the Saudi economy from oil. For the near future, KSA relies on the United States not only for ICT related topics and defense to promote stability but also to sustain economic growth through the Saudi oil export market.

D. POTENTIAL EXPLANATIONS AND HYPOTHESES

Figure 1 displays visually how the United States and China sit at opposite ends of the internet freedom continuum with the Kingdom of Saudi Arabia in between. The internet freedom continuum highlights China's and the United States' ICT structure and policy disparity, which places each country either at the "open" or "closed" internet position. Saudi Vision 2030 and Saudi ICT policy documents informed the decision to place Saudi Arabia in the middle of the spectrum. The hypotheses of the thesis reveals that Saudi

[10] Ian Brown and Christopher T. Marsden, "Net Neutrality and Control of the Internet," *MIT Press Blog*, https://mitpress.mit.edu/blog/net-neutrality-and-control-internet.

Arabia's final location on the continuum will be influenced by both domestic policies and also international pressures from the United States and China.

There are two main hypotheses related to this thesis informed by two key factors. Both hypothesis contain the determinant of ICT infrastructure and policy, either the "open" or "closed" internet model, and the fixed variables of social stability and economic growth. The first hypothesis argues that Saudi Arabia will follow the path of the U.S. "open" internet by limiting its government filtering, which will allow even more information into Saudi Arabia without diminishing social stability and at the same time sustain economic growth. The opposing hypothesis argues that Saudi Arabia will follow the path of China's "closed" internet by significantly increasing attempts to filter information and close-off their internet to maintain social stability and promote economic growth. The two key factors for each hypothesis are: STEM (science, technology, engineering, and mathematics) expertise organic to the Saudi population and Saudi's reliance on the international economic markets associated with oil exportation. The preponderance of the evidence will determine which hypothesis to support and which hypothesis to refute.

Figure 1. Internet Freedom Continuum

E. RESEARCH DESIGN

The thesis research design will use a comparative case study to evaluate the underlying factors that demonstrate whether the Kingdom of Saudi Arabia's internet will become more "open" or "closed" while maintaining social stability and attempting to promote economic growth. The thesis will develop the main case study of KSA based on two key factors—STEM (science, technology, engineering, and mathematics) expertise organic to the Saudi population and Saudi's reliance on the international economic markets

associated with oil exportation. The Saudi case study will compare and contrast the U.S. and Chinese case studies to explain Saudi Arabia's final location on the internet freedom continuum. The case studies will explain the general historical development for each state and how they developed the current ICT infrastructure and policy. This thesis relies on an assortment of sources such as policy papers, scholarly journals, U.S. and foreign government documents, U.S. Congressional Research Service reports, and Carnegie Endowment assessments.

The U.S., China, and Saudi Arabia are appropriate selections for this thesis due to their regional/international influence. Saudi is one of the last true hereditary monarchies on earth and it is the most influential country among the Arab Gulf States. While Saudi Arabia is the center of the Islamic World, the topic of religion will remain separate from this thesis because the focus of the thesis is economic and political in nature. The United States and China are included because the U.S. is the father of the "open" internet and China is the largest consumer economy in the world with approximately 1.4 billion people. Both the United States and China are economically influential in the Middle East region. Saudi Arabia's large supplies of oil and natural gas fuels the economic engines of both the U.S. and China. The size of the national economy and the size of the population for both China and the United States dwarfs that of Saudi Arabia. Yet, the per capita income is highest in Saudi Arabia, then the United States, and lastly China. China and the United States champion their separate internet freedom models for social stability and economic growth while competing to maintain alliances among influential nations such as Saudi Arabia. The two key factors of STEM (science, technology, engineering, and mathematics) expertise organic to the Saudi population and Saudi's reliance on the international economic markets associated with oil exportation will be studied further to demonstrate whether Saudi Arabia's internet will become more "open" or "closed" while maintaining social stability and promoting economic growth.

F. THESIS OVERVIEW

This comparative case study thesis contains five chapters. Succeeding the introduction chapter, Chapter II compares and contrasts the U.S. and Chinese internet models, which highlights the "open" and inclusive internet of the U.S. ICT structure and policy along with the "closed" and exclusive internet of China's ICT structure and policy. The material in Chapter III covers the Kingdom of Saudi Arabia, the main case study. This chapter includes information on Saudi Arabia's development as a state that influences its ICT structure and policy and KSA's internet freedom status. Chapter IV contains the analysis of the two key factors—STEM (science, technology, engineering, and mathematics) expertise organic to the Saudi population and Saudi's reliance on the international economic markets associated with oil exportation. Finally, Chapter V contains the conclusion and preponderance of the evidence that will support which path Saudi Arabia will favor, either the U.S. "open" internet or China's "closed" internet.

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II. U.S. AND CHINESE INTERNET MODELS

This chapter frames U.S. and Chinese positions surrounding internet freedoms, as demonstrated in each country's statements and actions regarding internet governance. Due to countless political, economic, and social interactions between China and the United States since China's opening to the West in 1971, their economies have been inextricably linked. However, recent fundamental disagreements over governance of the internet have led to a contentious relationship. Both China and the United States have political and economic interests in "winning" the internet governance debate. The traditional open and free Western internet model refers to the U.S. internet model employed in this paper. This chapter illustrates where the U.S. internet model came from and why the United States requires their model to continue as the gold standard. The Chinese internet model, or "the internet with Chinese characteristics," enables the Chinese government to censor domestic content and filter international internet content as information flows through China's Great Internet Firewall.[11] This chapter also illustrates where China's internet model came from and why China wants to have their model surpass the U.S. model as the gold standard. Future chapters will demonstrate U.S. and Chinese efforts to influence authoritarian government elites, such as the King, Crown Prince, and the Minister of the Interior (MOI) of the Kingdom of Saudi Arabia, to fully adopt either the U.S. or Chinese internet model. Today, due to the political, social, and economic dynamics inherent in authoritarian countries across the globe, more governments that are authoritarian may accept and use the Chinese internet model, thereby forcing the United States and other Western countries to acknowledge the legitimacy of a censored and filtered internet.

The chapter begins by defining common terms such as "net neutrality," and "internet sovereignty" to further explain the U.S. and Chinese positions surrounding internet governance. A thorough discussion of China's and the U.S. internet models will help to differentiate these disparate internet models; from their defined differences, the

[11] "Chinese Internet Companies: An Internet with Chinese Characteristics," *The Economist*, last updated July 30 2011, http://www.economist.com/node/21524821.

reader begins to understand why contention exists between the United States and China surrounding internet governance. Lastly, this chapter concludes with the possible repercussions that may result from the adoption of each respective internet model, particularly the China internet model.

A. NET NEUTRALITY

Internet freedoms, such as the freedom of expression and freedom to privacy, are conjoined with the concept of "net neutrality." Mueller defines net neutrality as "collective decision-making by owners, operators, developers, and users of the networks connected by Internet protocols to establish policies, rules, and dispute resolution procedures about technical standards, resource allocations, and/or the conduct of people engaged in global internetworking activities."[12] The current discussion surrounding net neutrality appears in the U.S. media as domestic infighting among ISPs, media companies, the U.S. government, and internet freedom rights groups. The U.S. media frames the net neutrality debate as an economic interest.[13] However, the "socio-cultural and political" interests are arguably more important because of their transformative nature on the global population of internet users.[14] The net neutrality debate "winner" may affect how the U.S. government protects internet freedoms and information flow on the free and open internet. Negative effects can come in the form of loosening of U.S. government protections for small businesses and individual citizens to access information over the internet. Small businesses have economic interests to maintain a level playing field with larger companies. Individual citizens have limited economic interests but U.S. citizens also have social and political interests to maintain equal access to information over the internet. The U.S. relies on its citizens to elect government officials at the local, state, and national level. A large majority of the campaigning occurs online. Voters may find it difficult to vote for a candidate if they have

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[12] Milton Mueller, John Mathiason and Hans Klein, "The Internet and Global Governance: Principles and Norms for a New Regime, *Global Governance* 13, no. 2 (April-June 2007): 241, https//www.jstor.org/stable/27800656.

[13] Vlad Savov, "The U.S. Net Neutrality Fight Affects the Whole World," The Verge, last updated November 23, 2017, https://www.theverge.com/2017/11/23/16693840/net-neutrality-us-fcc-global-effect.

[14] Kasinathan Gurumurthy and Anita Gurumurthy, "Internet Governance and Development Agenda," *Economic and Politcal Weekly* 43, no. 14 (April 2008): 19–23, http://www.jstor.org/stable/40277309.

never heard his or her positions on major social or economic issues. On the other hand, voters and constituents may not be able to influence the prioritization of major social and economic issues if they do not have equal ability to access the internet. The original intent of the internet was to allow for equal access to information among all people no matter their social, political, or economic status. Net neutrality aims to ensure those principles, which are taken from the founding documents of the U.S. democratic system. The organizations and institutions fighting for net neutrality, like the founders of the internet, know that creativity and innovation, and truly disruptive technology can come from anywhere as long as people have access to information and the incentives to use their creativity.[15]

Authoritarian regimes, such as China, often argue that net neutrality complements the U.S. government aims, not because of the access to information of global citizens, but because the U.S. intelligence apparatus benefits most from the free and unfettered internet.[16] China argues that less opportunity by individuals to access the internet often equals less ability for the U.S. government to surveil those individuals. This argument became more plausible following the allegations by a U.S. contractor with the NSA, Edward Snowden, surrounding U.S. mass internet surveillance operations. This paper does not discuss ICT's role in intelligence gathering against foreign nations. The Snowden example, however, must be mentioned because the international community publicly condemns U.S. surveillance of the internet. U.S. surveillance became a major justification for China to put more effort into their push for "internet sovereignty."[17]

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[15] Joe Pinsker, "Where Were Netflix and Google in the Net-Neutrality Fight? Big Tech Firms Have Gone From Pushing For Open-Internet Protections to Being Powerful Enough Not to Need Them," *The Atlantic*, last updated December 20, 2017, https://www.theatlantic.com/business/archive/2017/12/netflix-google-net-neutrality/548768/.

[16] Brown and Marsden, "Net Neutrality and Control of the Internet."

[17] Zachary Keck, "Has Snowden Killed Internet Freedom? By Ousting Western Cyber-Espionage Programs, Snowden Has Severely Set Back the Cause of Internet Freedom," *The Diplomat*, last updated July 13, 2013, https://thediplomat.com/2013/07/has-snowden-killed-internet-freedom/.

B. INTERNET SOVEREIGNTY

The Internet Sovereignty debate can generally be described as one between security and privacy debate.[18] Of course, there is much at stake for the "winner" and "loser" in this debate. Klein from the Center for a New American Society asserts, "This is not an artificial debate in which one side is completely wrong and the other is completely right; it is an authentically difficult policy conundrum in which various legitimate interests are in tension with one another."[19] China does not want to cede its sovereign right to decide the laws that govern Chinese citizens. While the Chinese economy transitions from a planned to a market economy, China must participate in the global economy to maintain its influence in Asia and allow economic and political reforms to strengthen domestic industries through competition. China wants every country to have the ability to regulate and secure information to their respective populations as the governments of each country see fit.[20] The United States, on the other hand, wants each state to follow basic liberal values or freedoms that value individual rights while regulating and securing information to respective populations.[21] These two respective ideologies that surround the flow of information to the population align with the traditional values of each state. The difference being the means to control information into China and the United States has drastically changed the speed and ability to either limit or stop completely the flow of information to the respective populations using Information and Communication Technologies (ICT). The relative ease with which countries can now use ICT to censor and filter information on their internet networks may be too alluring for many countries to resist. China's Internet Sovereignty position may strengthen if countries, outside the authoritarian regime countries like Saudi Arabia, begin to increase the filtering and censoring activities inside their respective borders. The manner in which China attempts to influence the future of the Internet will be discussed in this chapter after covering definitions for cyberspace and ICT

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[18] Brad D. Williams, "State of Encryption, Part I: Cryptic Laws," Fifth Domain, last updated February 27, 2017, http://www.fifthdomain.com/home/2017/02/27/state-of-encryption-part-i-cryptic-laws/.

[19] Ibid., 1.

[20] Jiang, "Authoritarian Informationalism," 81.

[21] Theodore Kahn, "Internet Freedom and the Challenge of a Principled Foreign Policy," *SAIS Review of International Affairs* 30, no. 2, (2010): 1, https://muse.jhu.edu/article/403434.

to ensure terms are commonly understood. Also, the factors that motivate the United States and China to pursue their specific version of Internet Sovereignty will be discussed in detail.

According to Joint Publication 3-12 (R), cyberspace is a "non-physical realm consisting of the interdependent networks of Information Technology (IT) infrastructures and resident data, including the internet, telecommunications networks, computer systems and embedded processors, controllers, and even the individuals who interact with these systems."[22] While the definition of cyberspace is significant, the definition of the ICT sector provides a crucial understanding of a sector that crosscuts multiple sectors. The ICT sector definition gives a clear outline of the ICT equipment, personnel, and training materials that China attempts to export to authoritarian regimes.

The ICT sector by definition splits two subcategories within the sector – ICT goods and ICT services.[23] The definition of the ICT sector is a conglomeration of manufacturing and services industries "whose products capture, transmit or display data and information electronically."[24] The Chinese definition of Cyberspace and ICT provides a foundation for conceptual differences between Chinese and Western viewpoints surrounding the concept of cyberspace. The term cyberspace is not found within written Chinese policy. The term Chinese officials use to represent the concept of cyberspace is "Informatisation."[25] "Informatisation" encompasses the ICT instruments that dictate how information is passed, processed, and received. The Chinese authorities that handle "Informatisation" are currently state owned enterprises and government ministries. However, in the future, China intends to pass "Informatisation" away from government ministries and state owned

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[22] Scott Douglas Applegate and Christopher L. Carpenter, David C. West, "Searching for Digital Hilltops: A Doctrinal Approach to Identifying Key Terrain in Cyberspace," *Joint Forces Quarterly*, no. 84 (2017): 19.

[23] "ICT goods exports," OECD Factbook, accessed March 15, 2017, https://data.oecd.org/ict/ict-goods-exports.htm#indicator-chart.

[24] "E-Commerce and Internet Use: What Defines the Digital Sector?" Government of the United Kingdom, https://www.ons.gov.uk/businessindustryandtrade/itandinternetindustry/articles/ecommerceandinternetuse/2015-10-08.

[25] Mikk Raud, "China and Cyber: Attitudes, Strategies, Organization," NATO CCDCOE, 2016, 10.

enterprises to private industry.[26] The tipping point for the Chinese government to begin the transition from state owned ICT firms to private companies will come once the private ICT companies prove themselves capable of economically stable growth in the Chinese domestic market. "Informatisation" demonstrates the distinct difference between the Western views on cyberspace as a separate realm dependent on physical equipment and the Chinese view of cyberspace as simply the devices used by people to pass, process, and receive information. The Chinese President argues that cyberspace policies and ICT-related equipment should resemble any other sector in the Chinese economy with "informatisation" policies overlaid.[27] A core assertion of the China model remains that China controls all activity within its borders. Chinese control of cyberspace is top-down from the government and military leadership, unlike Western nations that prefers cyberspace mirror liberal democratic controls from the bottom-up by individuals and private corporations. China realizes the importance of the ICT sector and the possibilities cyberspace allows. In 2014, Chinese President Xi commented, "no Informatisation means no modernization."[28] But for the Chinese government to acknowledge that the ICT sector and the internet combine to create another domain, which Western countries call cyberspace, would run contrary to China's strategy to maintain control over their respective citizens. Defining "informatisation" as similar to the other economic sectors that rest within the Chinese sovereign borders, allows China to push back against the Western notion that an international governing body or another sovereign state has the ability to dictate how China controls its state functions.

C. FOUNDATION OF THE INTERNET

The U.S. Defense Advanced Research Projects Agency (DARPA) founded the modern internet. The funding for the DARPA project came through U.S. congressional appropriations, which led to cooperation between DARPA engineers and academics at

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[26] Greg Austin, *Cyber Policy in China (China Today)* (Cambridge & Malden: Polity Press, 2014), 90.

[27] Chinese President's Shanghai convention assertion that China must control ICT internet infrastructure to maintain control of the Chinese population.

[28] Raud, "China and Cyber: Attitudes, Strategies, Organization," 15.

universities across the United States. Originally the ARPANET, or the name for the original internet, relied on circuits instead of packet switching technology. Circuits were not so efficient as packet switches for the intended use of the ARPANET.[29] Academics and engineers working on the ARPANET by the late-1960s had migrated from circuits to packet switches, officially called Interface Messaging Processors (IMPs). In 1969, the first node of the ARPANET came online at UCLA's Network Measurement Center and connected to the University of Stanford's Stanford Researching Institute (SRI). That same year, University of California Santa Barbara (UCSB) and University of Utah added two additional nodes to the ARPANET. Throughout the late 1960s and into the 1970s, academic institutions and government officials continued to support DARPA's initiatives to refine the technology underpinning the ARPANET. Once the technology behind the ARPANET proved reliable, researchers and academics began to develop applications to support communications over the ARPANET to increase critical information flows between academic institutions. An initial application, electronic mail (email), received widespread acceptance in 1972.

The migration from circuits to IMPs has Led to the modern structure of the internet. IMPs allow for separate networks of computer to connect as "peers" instead of a "component of another" network.[30] IMPs allow networks to maintain connections with the internet even in the event of degradation of other networks. The military utility for the ARPANET, and the subsequent improvements that maintain the modern internet, remain because of the choice to use the "open-architecture network" structure by DARPA personnel in 1972.[31] The internet, and its precursor ARPANET, lent the military a resilient means of communication because of the "open-architecture network" structure. With this "open-architecture" structure, academics and engineers designed their networks and interfaces according to their research needs and the sharing of that research information.

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[29] Vinton Cerf and Barry Leiner, "Origins of the Internet," InternetSovereignty, last updated 2015, 4, https://www.internetsociety.org/internet/history-internet/brief-history-internet/

[30] Ibid., 6.

[31] Ibid.

The internet, begun as a United States government funded platform for military communication and for sharing research information among researchers at various academic institutions, passed to private institutions and businesses once the internet's relevance and importance to efficient business operations had been established. The U.S. government commonly funds the initial research stage because costs associated with this stage of development are usually more than large businesses, let alone small businesses such as startups and entrepreneurs, can justify return on investment. According to the 1994 report, *Realizing the Information Future: The Internet and Beyond*, the private ICT sector companies have paralleled the original intent of the internet—"Open to all users, Open to all service providers, Open to all network providers, and Open to change."[32] The U.S. federal government has acknowledged that while the initial research funding came from public funds, the building and upkeep of infrastructure and services, and the development of next generation technology becomes exponentially more expensive.[33] The transition of the internet from public funding to private funding signifies a major tenet of the U.S. internet model.

D. U.S. MODEL OF THE INTERNET

The United States internet model is largely free and open. Societies intrinsically hold values and among those values there are one or multiple values prioritized above the rest. These supreme social value(s) may eventually find their way into law, regulations, or some form of policy. A universal example of this appears in laws that protect children from mental or physical violence. Laws pertaining to more traditional sectors of the economy, that had preceded the development of ICT and the internet, have been stretched to cover the ICT sector and online content. For instance, the U.S. Congress had to pass legislation to cover the protection of children online similarly to children's protections offline.[34] Since the internet and ICT sector is a recent phenomenon, U.S. politicians had to propose

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[32] National Research Council, *Realizing the Information Future: The Internet and Beyond* (Washington, DC: The National Academic Press), 13, https:/doi.org/10.17226/4755.

[33] Ibid., 11.

[34] S. 782, 115th Cong. (2018), https://projects.propublica.org/represent/bills/115/s782.

amendments to current law to cover the distinctly different nature of cyberspace. The nature of the U.S. political system mandates that elected officials propose bills, attempt to gather a quorum to support said bill, and amend the bill as necessary to ensure its approval. The U.S. political system ensures that proposed legislation from politicians represent the will of the American people. This bottom-up political system lends itself to turmoil both socially and politically due to competing interests but the result is often relatively equitable.

The foundational documents of the United States, such as the U.S. Constitution and the Bill of Rights, explains the framework for the U.S. internet model. The Constitution of the United States, a founding document of the republic, prioritizes freedom of speech, freedom of the press, and freedom to assemble without undue harassment from the government.[35] These three freedoms, embedded in the first amendment to the U.S. Constitution, are central to the United States' bottom-up democratic system. The foundational documents of the Constitution and Bill of Rights, along with the U.S. legal system, stand to limit government inference in the daily lives of U.S. citizens both online and offline.

The U.S. internet model reflects a largely unregulated internet.[36] The U.S. internet model experiences its regulation in the form of "self-regulation" by private industry.[37] The central institution in the U.S. internet regulation process is the U.S. Congress and "[it] is the role of Congress to create laws that govern the internet and delegate regulatory authority."[38] Congress delineates private-industry the ability to "self-regulate" with few exceptions. Congress had gone a step further by enacting the 1996 Telecommunications Act, "which generally shields online sites and services from legal liability for the activities of other users, allowing rich user-generated content to flourish on a variety of platforms."[39]

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35 "The Constitution of the United States: A Transcription," U.S. National Archives, accessed May 11, 2017, https://www.archives.gov/founding-docs/constitution-transcript.

36 "Freedom on the Net 2016: United States Country Profile," Freedom House (2016), 3, https://freedomhouse.org/report/freedom-net/2016/united-states

37 Ibid., 6.

38 Ibid., 1.

39 Ibid., 8.

In 1997, President Clinton and Vice President Gore passed into law *The Framework for Global Electron*ic *Commerce* because the administration "did not want to limit businesses' expansion by posting costly and mandatory regulations over their operations."[40] This favoring of private businesses by Clinton and Gore places economic interests above the American citizen. Predictable increases in online surveillance because of the United States governments lack of private sector regulation "allowed the commodification of personal information to evolve, and led to extensive private sector surveillance for economic purposes by information monopolies like Google and Facebook."[41] The 1994 Communication Assistance For Law Enforcement (CALEA) Act "provided a significant compensation for Telecom businesses to make their communication infrastructure 'surveillance friendly' for the government."[42] Through the remainder of the 1990s, the U.S. private sector and government surveillance programs continued relatively unchecked. The September 11th 2001 attacks on the World Trade Center had justified the passage of the USA Patriot Act (2001) and continuation of the mass surveillance operations. The information leaks by National Security Agency (NSA) contractor, Edward Snowden, had exposed the true extent of the U.S. surveillance operations to the American people and to our international partners. The leaking of sensitive government information by Snowden "[has caused] journalists and writers to self-censor and raise[d] concerns about whether they are able to protect their sources."[43]

Concerns surrounding mass surveillance on and through ICT networks had enflamed vigorous debate in American society about U.S. citizens' rights and their responsibilities to uphold the Constitution and Bill of Rights. Within two years after Snowden's disclosures, due to increasing pressure by citizens, Congress passed the USA Freedom Act (2015) that "significantly reformed" section 215 of the Patriot Act.[44] The

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[40] Ido Sivan Sevilla, "Trading Privacy for Security in Cyberspace: A Study Across the Dynamics of U.S. Federal Laws and Regulations Between 1967 and 2016," Hebrew University, 85.

[41] Ibid., 86.

[42] Ibid., 83.

[43] "Freedom on the Net 2016: United States Country Profile," Freedom House, 2016, 11, https://freedomhouse.org/report/freedom-net/2016/united-states.

[44] Ibid., 18.

pendulum appears to be swinging away from the mass surveillance programs existing in the late 1990s into the 2000s.

However, recent examples from the 2016 U.S. Presidential election highlights the problems private business have balancing their responsibilities to limit socially destructive content without censoring unpopular speech. Other examples, such as the online hate speech on social media platforms during the Charlottesville, Virginia, white supremacy rally and militant offshoots of the Black Lives Matter social movement find their content dangerously close to being censored or blocked by social media platforms and cloud space owners. The U.S. internet model has no overarching governing body, only stakeholder institutions that aim to balance the protection of unalienable rights under the Constitution and Bill of Rights through Congressional legislation without diminishing economic prosperity of citizens and businesses. This multistakeholder approach to the U.S. internet model reflects the United States' strong beliefs concerning the international implementation of internet governance.

E. CHINESE MODEL OF THE INTERNET

Before continuing the discussion of China's internet model, the historical maturation of the Chinese government reforms that lead to the current model must be touched on briefly. The two reform periods generally discussed following the Cultural Revolution are from 1970s through the 1990s and from the late 1990s until today. The first reform period, according to Yang, "was the era of economic liberalization and state retrenchment from direct productive activities."[45] During this reform period, the central government pushed to recognize information technology as an important ingredient of coordination and growth with the founding of the State Economic Information Management Leading Small Group in 1986.[46] This period witnessed significant fiscal reforms with the 1994 tax reform law that pushed the power to collect revenues from the localities to the central state level. The second reform period "trends toward corporatization

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[45] Dali L. Yang, ed. *The Global Recession and China's Political Economy* (New York: Palgrave Macmillan, 2012), 35.

[46] Raud, "China and Cyber," 11.

and privatization."[47] This period witnessed significant organizational reforms with the central government's aim to "seize the big and release the small" state owned firms.[48] Decentralized government policies sustained bloated state-owned enterprises (SOE) and limited funding for private enterprises in China except for the Special Economic Zones (SEZ) along the coastal areas of Southeastern China. Authors Saich and Bergsten/Freeman believed decentralization was the cause of Chinese economic growth but Hongbin and Treisman dispute this claim and assert that "the key reforms that reshaped China's economy began in the late 1970s and early 1980s, before any significant decentralization had occurred."[49] Hongbin and Treisman also note "China's centralization (pre-1980s) helped speed the geographic spread of politics found to work well."[50] This is an important assertion that supports the Chinese central government's push to recentralize in the late 1990s.

The late 1990s to the 2000s witnessed a shift toward recentralization to bring revenue back to the central government and away from the local banks and SOEs. Zhu Rhongji attempted to fix the economic issues with SOEs. The 1997–98 Asian financial crisis caused the Chinese central government to intervene in the economy to infuse capital and limit the damage done to the economy. During the crisis, China experienced the difficulties associated with interdependent economies and also saw the importance of the foreign cash reserves they had on hand. These reserves would be part of the larger push by Jiang Zemin and other Chinese government officials to "go out" or "go global" and invest outside of China.[51] This was the beginning of the push by Chinese government officials to promote Outward Direct Investment (ODI) in the form of investments in foreign firms and R&D laboratories with the hope of continuing technology transfers and also gaining access to restricted markets such as in the U.S. or underdeveloped markets such as in Africa and

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47 Yang, *The Global Recession and China's Political Economy*, 35.

48 Ibid., 35.

49 Cai Hongbin and Daniel Treisman. "Did Government Decentralization Cause China's Economic Miracle?," *World Politics* 58, no. 4 (2006): 506.

50 Ibid., 506.

51 David Shambaugh, *China Goes Global: The Partial Power* (New York: Oxford University Press, 2013), 177.

the Middle East.[52] Chinese officials hoped ODI would focus capital away from the energy sector and toward the telecom, electronics, and R&D sectors.[53] The Central Chinese government was poor and without capital to invest in research and development (R&D) to catch up to the more developed Asian and Western countries with booming ICT sectors. During this time, the Chinese policy of "growth at any cost" accomplished short-term economic goals but in the long-term distorted the economy to focus on GDP growth without consideration for strengthening institutions or private industry.[54] China attempted reforms to convince World Trade Organization member states of their worthiness to join and in 2001 China received membership status. China continued to sign Free Trade Agreements (FTA) with global partners to gain important alliances that would influence regional and international disputes surrounding trade and other economic issues.

China has asserted its international position on "internet governance." China expressed in writing in 2011 at the U.N. General Assembly through the Shanghai Cooperation Organization (SCO), that the member nation's "believe in the primacy of the nation state, which should be carried over into cyberspace."[55] China formally expressed its belief that sovereign nations should make their own path as they see fit. China maintains valid concerns about the United States and other liberal western nations undermining this demand. The U.S. holds privacy and human rights to a high degree and forms policy with these beliefs in mind. Contrarily, China affirms that "maintaining social order is unquestionably more important than individual privacy."[56] The irreconcilable differences between China and the U.S. regarding the purpose of the state, respect for citizen's individual rights, and the purpose of the internet, gives China ample justification to resist the United States' efforts to create international rules and norms in cyberspace.

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[52] Ibid., 177.

[53] Ibid., 176.

[54] Fred C. Bergstenand and Charles Freeman, *China's Rise: Challenges and Opportunities* (Washington, DC: Peterson Institute for International Economics, 2008), 78.

[55] Christine Jiang, "Why China Changed Its Tech Policy (And What it Means for Cybersecurity and Trade) – Part II," Berkeley APEC Study Center, April 21, 2015, https://basc.berkeley.edu/?p=1701.

[56] Raud, "China and Cyber," 7.

China's dependence on the internet for growth also shows one of China's weaknesses—social instability caused by the free flow of western ideas that diversify thought toward politics, society, and the economy. China first opened the internet in 1994. Anyone alive during that time remembered how the internet and its surrounding ecosystem was sparsely populated, especially compared to the internet ecosystem of today. Chinese officials saw the potential in a system that united or centralized control across China. Ideally the system provided a policing function over their population and promised to increase productivity among China's public SOEs and private industries.[57]

The sheer size of China and its massive population of 1.4 billion people makes minimizing social instability without the use of ICT very difficult for the ruling Communist Party. The Great Firewall of China, or the Gold Shield Project as it was known in the 2000s when first introduced, focused on "the adoption of advanced information and communication technology (ICT) to strengthen central police control, responsiveness, and crime combating capacity, so as to improve the efficiency and effectiveness of police work."[58] China's internet firewall eventually morphed into a system that was most efficient at controlling content as it attempted to penetrate or transit the firewall.[59] The Golden Shield Project was state of the art at the time when this novel network of software, hardware, and personnel came online. The Great Firewall alone did not explain how Chinese officials coerced their domestic population to limit oppositional voices online. China's Great Firewall also came with laws and regulations that forced Internet Service Providers (ISP) and ICT companies to censor content or face harsh governmental reprisals. The legal system in authoritarian regimes naturally favored censorship instead of human rights or freedom of expression.

China's surveillance system became so effective that foreign nations, of the authoritarian regime type, purchased China's surveillance techniques to produce similar

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[57] Pingp, "The Great Firewall of China: Background," Torfox: A Stanford Project, last updated June 1, 2011, https://cs.stanford.edu/people/eroberts/cs181/projects/2010-11/FreedomOfInformationChina/the-great-firewall-of-china-background/index.html.

[58] Ibid., 1.

[59] Ibid.

repression of the populations in Cuba, Zimbabwe, Belarus, Ethiopia, and Zambia.[60] Albon writes that the Chinese government "has been quietly turning its expertise in Internet censorship and repression into a product to be sold to foreign governments who are looking to construct their own Great Firewalls."[61] The European Parliament study on surveillance and censorship around the globe reports on Chinese ICT companies Huawei Technologies and ZTE Corporation as suppliers of surveillance equipment to the Iranian government.[62] Min Jiang, an Associate Professor of Communication Studies at UNC Charlotte, asserts that "[w]ith the government's backing, many Chinese Internet and telecommunications companies, state-owned and private ones, have been expanding overseas, particularly in Asia, Africa, South America and the Middle East, places that prefer inexpensive Chinese technological products or have an interest in China's surveillance technologies."[63] The Chinese ICT companies are not alone in their efforts to sell surveillance equipment to authoritarian regimes. Other countries sell monitoring and censorship ICT products too. Several western Cyber Security companies sell monitoring and censorship technologies to international partners. Examples of western ICT companies selling monitoring and surveillance equipment to authoritarian regimes such as Bahrain, Pakistan, Libya, the United Arab Emirates (UAE), and Saudi Arabia include, the Hacking Team (Italian company), FinFisher (English/German company), Ultimaco (German company), and Qosmos (French company)[64] As of 2013, even U.S. companies like Blue Coat are selling censoring ICT products to authoritarian regimes such as Eqypt, Kuwait, Qatar, UAE, and Saudi Arabia.[65] Highlighting the Chinese ICT companies along with the western

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[60] Chris Albon, "Building the Great Firewall of China," *Daily Dot*, accessed February 24, 2017, https://ww.dailydot.com/via/albon-building-great-firewall-china/.

[61] Ibid., 2.

[62] "Surveillance and Censorship: The Impact of Technologies on Human Rights," Directorate-General for External Policies Policy Department, European Union Study, April 2015, 11, http://www.europarl.europa.eu/RegData/etudes/STUD/2015/549034/EXPO_STU(2015)549034_EN.pdf.

[63] Jiang, "Authoritarian Informationalism," 81.

[64] Directorate-General, "Surveillance and Censorship," 11.

[65] John Markoff, "Rights Group Reports on Abuses of Surveillance and Censorship Technology," *NY Times*, January 16, 2013, http://www.nytimes.com/2013/01/16/business/rights-group-reports-on-abuses-of-surveillance-and-censorship-technology.html.

companies that sell surveillance, censoring, and monitoring ICT aims to show that countries like Saudi Arabia with the will to surveil and monitor their population and who have the capital to invest in such ICT, have ample opportunities to do so without great political costs. These western private companies that sell monitoring and censorship ICT to international partners do so without the complicity of their respective western governments. China, however, sells its monitoring and censorship ICT as a function of its government strategy. China's government complicity in the sale of monitoring and censorship ICT products places the PRC in a small club with governments such as the Democratic People's Republic of Korea (DPRK) and the Islamic Republic of Iran.

The United States monitored international internet traffic as divulged in the intelligence leaks by Booz Allen Hamilton contractor Edward Snowden. Examples of censorship and monitoring by sovereign nations, outside of the United States, feed into the Chinese narrative that countries using monitoring and censorship ICT remain stable while maintaining economic growth. The leaders of those nations can act in accordance with their strategic national interests to promote economic growth and limit the effects of social instability, or a mixture of all of the above. China benefits most from this mixture of motives and uncertainty in cyberspace. If clear policies and restrictions surrounding surveillance ICTs does not exist, then the international community will find it hard to get solidly behind either argument. China gained supporters because their economy sustained growth similar to the U.S. but without any major episodes of social instability that currently affect the United States. China accomplished its goal to complicate the internet governance debate by providing itself as a contrary option to the U.S. internet model. The China internet model has been accepted by atleast a few authoritarian states with imported Chinese ICT surveillance equipment and know-how, but without considerable social instability.

Authoritarian regimes, such as China, must remain ahead of disruptive technological advances if regime leadership wants to remain in power. The Arab Spring, or popular demonstrations that swept the Middle East and North Africa (MENA) region in 2010–2011, demonstrates to the Chinese government the importance of controlling the data used by domestic populations and also the destabilizing influences of disruptive ICT if

uncontrolled by authoritarian regimes. During the Arab Spring, countries such as Tunisia, Libya, Syria, and Egypt experienced unlawful public assemblies and demonstrations critical of the current government, which were planned and organized through social media over state ICT internet infrastructure. The underlying conditions of inequality among the population and other perceived grievances had been important factors for the popular uprisings in these countries during the Arab Spring but these underlying conditions are beyond the scope of this paper. These conditions exist to varying degrees in all societies. The choices of political leadership to diffuse perceived grievances may differ slightly but the root causes of instability seem to gain momentum more quickly through social media and other ICT-enabled communication platforms than through traditional communication modes. China views the Arab Spring uprising as additional justification to wrest control of the internet and social media applications away from privately controlled business and the Chinese population.

China attempts to control their populations and diminish social instability. To do this the Chinese government coerces foreign companies in order to leverage their technological and managerial expertise to build the domestic Chinese ICT sector. In line with efforts to "enforce internet control within its boundaries; deem what can be seen by its citizens on the web; censor content if necessary," China accomplishes these goals while also attempting to "force foreign companies to comply with local laws."[66] Following decades of growth by, with, and through technology transfer in the ICT sector from foreign firms, several Chinese firms in the ICT sector have gained enough stability and strength to compete on the international stage. Due to the stringent ownership regulations surrounding sectors such as telecommunications and Information Technology, U.S. and other foreign companies are unable to purchase majority stakes in Chinese ICT companies. Initially, Chinese government regulations aimed to protect infant sectors, such as ICT, while also transferring as much technology and management skills from foreign firms as possible in the future hope that these Chinese firms could grow to stand on their own in the

66 "New China Internet Law Signals Fresh Troubles For U.S. Technology Firms-and Future Governance," *IHS Markit Blog*, last updated October 25, 2015, http://blog.ihs.com/q24-new-china-internet-law-signals-fresh-troubles-for-us-technology-firms—and-future-internet-governance.

international market against U.S. and other foreign companies. China transitioned several ICT sector companies from fully state owned to mostly or partially state owned companies, which cloned U.S. company applications and operating systems. Chinese firms such as internet search company Baidu (mirror of Google), Sina-Weibo (mirror of Facebook and Twitter), and telecom equipment suppliers Huawei and ZTE (competition for Cisco Systems) took advantage of preferential regulations focused on the lucrative Chinese domestic market. During President Xi's time in office the Cyberspace Administration of China (CAC) enforced deliberate internet controls and policy aimed to restrict foreign firm competition in China's domestic market.[67] The U.S. companies that operate within the Great Firewall of China struggled to maintain strong liberal values of individual rights that promote privacy among consumers. In 2014, China cut "foreign produced technology from all future government purchases" and introduced a law that "included stipulations requiring firms both domestic and foreign to provide the Chinese government with encryption keys, install "backdoors" in software for access by regulators, and localize servers and user data within Chinese borders."[68] The real beneficiaries of the internet and other ICT related laws passed by the Chinese government are clearly the Chinese "domestic tech companies, as Beijing is wholeheartedly supporting a homegrown effort to dislodge foreign expertise from Chinese shores."[69]

F. CONCLUSION

China exports Information and Communication Technology (ICT) goods and services to influence the global Internet Sovereignty debate in their favor. The survival of the Chinese Communist Party (CCP) depends upon Chinese elites delivering economic growth without social instability. China's ICT sector remained the vehicle to deliver economic growth without instability. The Chinese government reformed traditional sectors of the economy and enacted policies to continue reforms with the help of China's Information and Communication Technology sector. Developed nations, such as the

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[67] Ibid.

[68] Jiang, "Why China Changed its Tech Policy."

[69] *IHS Markit Blog*, "New China Internet Law."

United States, have vested interests in an open and free internet while authoritarian nations, such as the People's Republic of China (China), have vested interests in a closed and restricted internet. China influences foreign nations to adopt their version of the internet and persuades the international community to allow an internet model that more closely resembles the Chinese internet model.

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III. SAUDI ARABIA'S INTERNET MODEL

Saudi Arabia's internet model gains its shape from the political, social, and economic realities borne out of the relationship between the state and its citizens in the Kingdom of Saudi Arabia. The internet model resembles aspects of the both the U.S. and Chinese internet models. Saudi's internet model resembles China's model because of the censorship and filtering of the internet by government ministries and the self-censorship by public and private companies. The Saudi's internet model resembles the U.S. model because of the physical structure of the internet that allows information to flow into the country while being monitored by the Saudi government ministries. Saudi's internet model also differs from the U.S. and Chinese internet models. For instance, China effectively stops content that the Chinese government decides is unfit for their citizens. The United States allows all content into its internet borders while at the same time monitoring those communications to decide if the content is illegal. In the simplest terms, China censors information before it enters its national borders and the U.S. monitors its information and decides after the fact if the content is illegal. The Saudi Arabian internet model allows information to pass into the national internet borders like the United States. But, instead of deciding if the information is illegal and then taking appropriate legal action so as to not violate the guaranteed rights of citizens like in the United States, the Saudi government, from the direction of the King, censors the websites that host the information and often arrests or harasses the citizens involved without due process or concern for their individual rights. During the discussion of the Saudi Arabian internet model, concepts such as the resource curse, the rentier state, coup-proofing, and Saudi's Basic Law of Governance will further explain how an authoritarian regime such as Saudi Arabia can survive and possibly even prosper while allowing a disruptive technology like the internet within its society. This chapter discusses the resource curse, the rentier state, coup-proofing, and the Basic Law of Governance, all in the context of the recent history of Saudi Arabia. This discussion continues to provide a better understanding of how the Saudi state came to view ICT as an important sector not only to diversify KSA away from oil but also to stifle social instability.

A. SAUDI ARABIA'S BASIC LAW OF GOVERNANCE

The Basic Law of Governance lays the foundation for the social contract between the Saudi citizen and the Saudi state. Grynkewich argues, "[T]he modern state gains loyalty and legitimacy from the populace in return for providing the public goods and services implied in the social contract."[70] Loyalty and legitimacy from Saudi citizens equates to "popular support" and "social peace."[71] Social peace or social stability is critical for authoritarian regime longevity, and the Saudi King attempts to fulfill the government's part of the social contract by enforcement of the Basic Laws, which affirm in writing the political, social, and economic standards for all citizens to follow. While all articles in the Basic Law give insight into the motivations behind the actions of the Saudi government, the articles that are of most significance to the Saudi Internet model are articles 1, 12, 39, and 40. Article 1 affirms that the Saudi state's "constitution is Almighty God's Book, The Holy Qur'an, and the Sunna (Traditions) of the Prophet."[72] With the Saudi King as the custodian of the two holy mosques in Mecca and Medina, Saudi Arabia, he becomes the de facto head of all branches of the government in KSA that pledge allegiance fully to Islam's Holy Scriptures, the Qur'an and the Sunna. Saudi Arabia is an absolute monarchy with a King as the head of the executive, judicial, and legislative branches of the state. The Saudi King designates the Crown Prince, who will become the next King in the event of the King's death or incapacitation. As the head of the three branches of government, the King appoints all senior positions in each branch of government and approves all laws (Royal Decrees), in accordance with the Quran and Sunnah. Article 12 "forbids all activities that may lead to division, disorder and partition" to ensure the aim of Saudi's Royal Family – regime survival.[73] Article 39 covers "mass media and other vehicles of expression."[74] The Saudi state prohibits, in Article 39, "acts leading to disorder and

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[70] Alexus G. Grynkewich, "Welfare as Warfare: How Violent Non-State Groups Use Social Services to Attack the State," *Studies in Conflict and Terrorism* 31, no. 4: 353.

[71] Ibid., 352.

[72] "Basic Law of Governance," The Embassy of the Kingdom of Saudi Arabia, accessed 18 November 2017, https://www.saudiembassy.net/basic-law-governance.

[73] Ibid., 1.

[74] Ibid.

division, affecting the security of the state."[75] Article 40 concerns privacy of communications and confirms that private citizen communications "shall be inviolate," and also there "shall be no confiscation, delay, surveillance or eavesdropping, except in cases provided by the Law."[76] Keep in mind, the "law" comes from the King alone. Therefore, the King decides when the Saudi government has probable cause to break the stated social contract with Saudi citizens in the Basic Laws of Governance. Specifically relating to ICT, Articles 1, 12, 39 and 40 form the foundation of the Saudi government's justification to openly censor and filter the internet through foreign-developed Information and Communication Technology (ICT).

B. COUP-PROOFING

The Saudi King's preoccupation with regime survival manifests itself through the actions of the Saudi state to coup-proof. According to Quinlivan, there are five means of active repression regimes enact during coup-proofing: "exploitation of family, ethnic, and religious loyalties; creation of paramilitaries to counterbalance conventional military units; establishment of security agencies for surveillance; encouragement of expertness in the regular military; and funding."[77] Repression is a tool used by states to maintain control and can be either pre-emptive or reactive and selective or indiscriminate.[78] Pre-emptive repression examples include mass arrests before upcoming elections or protests. While reactive repression often involves violence from the state police and military units against protestors or smaller groups before collective actions continue to gain momentum during the protest cycle. Non-democratic regimes use pre-emptive repression to keep the cost of collective action against the state high and, therefore, the likelihood that opposition forces will coordinate and mass in large enough numbers is low. Selective or indiscriminate

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[75] Ibid..

[76] Ibid., 1.

[77] James T. Quinlivan, "Coup-Proofing, its Practice and Consequences in the Middle East," *International Security* 24, no. 2 (1999): 135, http://libproxy.nps.edu/login?url=http://search.proquest.com/docview/43648658?accountid=12702.

[78] Mohammed Hafez, "Why Muslims Rebel," chap. 3, Wicktorowicz, Quintan, ed. *Islamic Activism: A Social Movement Theory Approach* (Bloomington: Indiana University Press, 2004), 73.

repression by regimes often has definite consequences on the opposition movements. Hafez argues that "selective repression predisposes the broader movement toward non-militancy, while indiscriminate repression pushes it toward rebellious strategies."[79] The Saudi Ministry of Interior (MOI), which controls the Saudi surveillance and censorship programs across the Saudi population, uses selective repression to minimize instability and maximize the justification for self-censorship by public and private organizations.

The U.S. declaration of the War on Terror following September 11, 2001, gave Saudi Arabia the justification to continue their repressive actions against their population without objections and with assistance from western nations.[80] KSA relabeled opposition movements as terrorists to satisfy western countries self-proclaimed War on Terror. Saudi Arabia aimed to remove opposition movements while also fractionalizing the forces necessary to maintain internal state control. Non-democratic regimes, like Saudi Arabia, focus on "…decreasing the military's capabilities to successfully organize a coup."[81] There are distinct divisions between military and paramilitary units in Saudi Arabia to ensure cooperation and 'joint' training and exercises do not take place. Collective action leads to the possibility of collusion against the Saudi Royal Family. Both Saudi military and paramilitary organizations have organic surveillance units to monitor their respective organization and the other organizations simultaneously. Through technical surveillance by ICT means, the Saudi MOI can provide selective and pre-emptive targeting of opposition groups.

C. THE RENTIER STATE

Within the context of advancing technologies, the economic, political, and social byproducts of the rentier state illustrate the shortcomings of the Saudi government's heavy reliance on oil as percentage of its Gross Domestic Product (GDP). Saudi Arabia resembles the hegemonic rentier state definition—an "uncontested one-party regime provides a

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79 Ibid., 75.

80 Omar S. Dahi, "Understanding the Political Economy of the Arab Revolts," *Middle East Report* 259 (2017): 1.

81 Jun Koga Sudduth, "Coup Risk, Coup-Proofing and Leader Survival," *Journal of Peace Research* 54, no. 1 (January 2017): 4, http://dx.doi.org/10.1177/0022343316676885.

relatively peaceful order and some degree of public goods for society."[82] The hegemonic rentier state allows the possibility of unchecked controls of state functions. If Saudi Arabia does not diversify its economy away from oil, social instability may result as a byproduct and risk regime survival for the current Saudi royal family. In a resource rich country, like Saudi Arabia, the King and his family take advantage of the abundant wealth from oil exportation. Barma asserts "[g]overning elites can make policy choices and build institutional arrangements in and around the natural resource sector that enhance the prospects of reaping the benefits of their natural abundance."[83] The fact of natural resource revenues transforms the way the state functions and the way the society and the state link. Due to the extraordinary revenues, governments do not have to raise revenue by taxing the population and as a result the government is not so accountable to the population. However, if oil prices remain low, in keeping with the present day prices below fifty dollars per barrel, the Saudi government cannot maintain the current subsidies for fuel, food, medical care, education, housing, and other monetary benefits now considered by Saudi citizens to be living necessities. In 2016, the Saudi government cut the pay of Saudi workers at several government ministries and the negative backlash almost certainly triggered the response by the King to several long-time ministers on the advisory council and promote his son, Mohammed bin Salman, as Deputy Crown Prince.[84] The response to fire the ministers and promote his son, shows that the King prioritizes maintaining social stability while aiming to reorient the Saudi economy away from traditional oil-sector dependent economic growth.

D. CONTEXT—SAUDI ARABIA'S ECONOMIC HISTORY

During the 1960s and 1970s, the Import Substitution Industrialization (ISI) conceptual economic framework prescribed state intervention in the domestic economy.

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[82] Naazneen H. Barma, "The Rentier State at Work: Comparative Experiences of the Resource Curse in East Asia and the Pacific," *Asia & the Pacific Policy Studies* 1, no. 2 (May 2014), 260.

[83] Ibid., 257.

[84] Reem Shamseddine and Katie Paul, "Saudi King Sacks Top Ministers, Gives More Power to Crown Prince," Reuters, November 4, 2017, https://www.reuters.com/article/us-saudi-cabinet/saudi-king-sacks-top-ministers-gives-more-power-to-crown-prince-idUSKBN1D40U2.

Statist policies created the so-called "financial gap," which international monetary organizations, such as the International Monetary Fund (IMF) and World Bank, along with international aide attempted to fill this gap in financing in the developing world.[85] States adopted the Import Substitution Industrialization (ISI) strategy to "alter the trade patterns between the first and third worlds," but unfortunately ISI "wasted resources and did too little to stimulate increases in exports."[86] Statist policies during this period largely failed the nations that the policies intended to help. States then turned their strategies toward the Export Oriented (EO) economy model similar to those followed by the "Little Tigers" in Asia.[87] The decades of the 1980s and 1990s witnessed the continuation of the "neoclassical assault" or "neoclassical turn" comprised of structural adjustment and the roll back of the state from society.[88] The mantra of the day mandated states "privatize, liberalize, and stabilize."[89] Toward the end of this decade and after the 1998–99 oil price slump, "the Saudi authorities reinforced their structural reform effort with a view to enabling the private sector to take a leading role in the economy and help diversify the economy away from the oil sector."[90] While this development sounds positive on its face, in reality, Saudi's private sector remained weak and therefore the state intervened in the economy to maintain macroeconomic stability.

During the 2000s, the Saudi King chose technocratic leadership to guide the economy and ensure KSA prepared itself for their economic future. During the early 2000s, Saudi Arabia aimed for membership into the World Trade Organization (WTO). The Saudi reforms of this period include the approval of investment laws, establishment of the investment authority (SAGIA), decreased restrictions on foreign direct investment and

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85 John Rapley, *Understanding Development: Theory and Practice in the Third World* (3rd edition). (Boulder, CO: Lynne Rienner, 2007), 87.

86 Ibid., 48, 70.

87 Ibid., 58.

88 Ibid., 63.

89 Naazneen H. Barma, "Resource Curse," Political Economy of Development class notes, August 9, 2017.

90 Aasim M. Husain, "Saudi Arabia: Selected Issues," IMF Country Report No. 16/327, October 13, 2017, 20, https://www.imf.org/external/pubs/ft/scr/2016/cr16327.pdf.

foreign ownership, along with the strengthening of laws and regulations ensuring a level playing field for multinational corporations (MNC).[91] All of these reforms are crucial for the enticement of foreign ICT companies to bring their capabilities of updating telecommunications and internet services, along with managerial expertise of such services, to Saudi Arabia.

The influence of oil and ICT on Saudi's corresponding political, economic, and social changes, demonstrates how certain resources and technologies can change the future of the Saudi Royal family and the Saudi society's stability. The Saudi economy and business sectors may hold significant growth potential for Saudi Arabia and with that growth comes the possibility of instability. Changes present opportunities for the Saudi King to either maintain or lose his control over the Saudi population. If the Saudi King and the Crown Prince are able to choose the correct technological strategies regarding human capital and divestment from the energy sector (read petroleum), the results may foster standard of living increases on par with the economic growth witnessed during the 20th century following the founding of oil in Saudi Arabia. The Saudi government, particularly the Royal Family, hopes that "digitalization" will not only make business easier in Saudi Arabia but will also make it more transparent and attractive to investors."[92] The economic reforms during the 20th century, combined with the "digitalization" push from the Saudi King may not be enough to stave off the social instability that he currently suppresses.

Saudi Arabia's dependence on the oil sector for regime survival haunts the Saudi economy as Saudi attempts to strengthen non-oil sectors by investing in ICT infrastructure and training for their population. According to the resource curse theory, the Saudi King allowed oil to retard other sectors of the Saudi economy that could have functioned independently without oil revenue rents. Due to the slow growth in the non-oil related sectors, the Saudi King continued to have his minister of economy and oil study the effects oil exports had on economies to better understand possible future economic limitations.

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[91] Ibid., 34.

[92] "ICT in Saudi Arabia Draws Private Sector Interest," Oxford Business Group, Oxford Business Group, last updated March 30, 2017, http://www.oxfordbusinessgroup.com/news/ict-saudi-arabia-draws-private-sector-interest.

From the study of the Saudi economy and the negative repercussions from oil revenue rents on the Saudi economy, the King began to view the ICT sector as a strategic option for KSA to divest its economy gradually while maintaining stability and ensuring economic growth in the future. While rents for the oil sector far outpaced the ICT sector, the ICT sector created far greater value in other sectors unlike the oil sector.

ICT enables and crosscuts many sectors creating forward and backward linkages. Due to the crowding out of other sectors by the oil sector, the productive resources of the economy, such as labor or capital, migrate into the booming resource sector. In the case of oil, which is capital intensive, labor is much less necessary when compared to labor-intensive sectors such as agriculture. Prices for that sector rise with rents as more and more resources fill the booming sector leaving less for the remaining sectors. As developing nations begin to sell their oil on the international market, their exchange rates increase. Once their respective currency value increases then exported goods are less attractive to the international market and exports decrease while imports increase due to less costly foreign options for domestic consumers. The increase in imports and decrease in exports will also increase the countries debt. This well-known phenomenon enlists the name "Dutch disease."[93] The decrease in oil exports has global implications and causes resource scarcity, which "drive up prices, whereupon supply, demand and, especially, technology respond with a lag, driving the prices back down."[94] The "Dutch disease" demonstrates another example of the possible negative affects Saudi Arabia can inadvertently trigger from its reliance on oil.

High oil prices in the late twentieth century forced firms to create efficiencies, which allowed the market to force new producers to compete against MNCs (Multinational Corporations).[95] "The oil sector has many international investments from MNCs without much investment from domestic firms. Volatility in the commodity market translates to

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[93] Michael L. Ross, "The Political Economy of the Resource Curse," *World Politics* 51 (1999): 306.

[94] Jeffrey A. Frankel, "The Natural Resource Curse: A Survey," (Working Paper 15836, National Bureau of Economic Research, 2010), 9.

[95] Ibid., 9.

economic volatility domestically."[96] The sheer fact of this volatility makes it a bad idea for domestic firms to speculate on the oil sector. High volatility of commodities disrupts predictability because governments will find it difficult to plan or budget for an unpredictable future. Intertemporal decisions become difficult to make and that constrains forward-looking productive economic activity.

Saudi Arabia is not a unique case with respect to the resource curse because oil wealth has masked many of the underlying conditions that had undermined Saudi's future development.[97] Saudi Royal Family members understand that diversification of the economy as a strategy can move Saudi Arabia away from its dependence on oil. But diversification for the sake of diversification is not a strategy. Frankel asserts, "one must think where the market failure lies before assuming that deliberate diversification necessarily raises economic welfare."[98] The Saudi King and his Royal Family are fully aware of the negative effects of the oil sector on the rest of the Saudi economy. There is now considerable pressure to reform the Saudi economy even with Saudi's vast oil reserves. As Sheik Ahmed Zaki Yamani, the former Saudi oil minister, famously said, "The Stone Age came to an end not for a lack of stones and the oil age will end, but not for a lack of oil."[99] The ICT sector will be the forcing mechanism to motivate Saudi Arabia to reform its economy and advance politically sensitive agendas for the sake of economic growth. Historically low oil prices since 2014, forces Saudi Arabia to look away from not only oil but also the costly subsidies programs that have increased pressures on the Saudi government to make the ICT sector perform. The Oxford Business Group reports that "Saudi Arabia is the biggest ICT market in the Middle East, with annual sector spending expected to reach about SR140bn ($37.3bn) by 2017…and the government has identified ICT as a key driver of smart, cost-effective solutions for government and commerce alike,

96 Barma, "Resource Curse."

97 Ibid., 1.

98 Frankel, "The Natural Resource Curse," 9.

99 Ibid., 9.

and as a major pillar of the Kingdom's long-term development strategy, Vision 2030."[100] ICT will allow the Saudi government to build credibility over time. Bureaucratic efficiencies from ICT can also function as a coup proofing measures to limit opposition groups from convincing large portions of the society that drastic political change is necessary to remedy perceived grievances.

The history of the Kingdom of Saudi Arabia (KSA) helps to give context to Saudi Arabia's focus on information and communications technology (ICT) along with human capital development to maintain social and economic stability to ensure economic growth. Saudi Arabia believes "there is a strategic need to create a sound ICT security industry…"[101] not only for economic stability but for the social stability of the Kingdom. The Saudi King and his government economic ministers tightly control economic strategies, along with the economy itself. A cornerstone of Saudi's 2030 Vision strategy relies on the cooperation of the Saudi population to allow the reforms and the disruptive effects to occur. The Saudi government coerces the population through ICT surveillance tools to ensure the gradual economic reforms and its effects do not allow for social unrest or instability. The ICT tools used by KSA during the Arab Spring proved to be effective in coercing the cooperation of Saudi citizens. The Arab Spring protests, which were limited in number, received dedicated attention from the Ministry of Interior (MOI) by shutting down the internet and later by filtering social media posts unflattering to the royal family and the Saudi state.[102] Another form of censorship, which is common among citizens of authoritarian regimes, is self-censorship. Saudi law requires Internet Service Providers (ISP), which are mostly state owned or majority state owned enterprises, to police their user's content or face reprisals from the Saudi government. In a similar vein as in the China

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[100] "ICT in Saudi Arabia draws private sector interest," Oxford Business Group, Oxford Business Group, last updated March 30, 2017, http://www.oxfordbusinessgroup.com/news/ict-saudi-arabia-draws-private-sector-interest.

[101] "OBG Talks to Ghassan Al Shibl, CEO, Advanced Electronics Company," Oxford Business Group, accessed May 11, 2017, http://www.oxfordbusinessgroup.com/interview/obg-talks-ghassan-al-shibl-ceo-advanced-electronics-company.

[102] Ben Wagner, "Exporting Censorship and Surveillance Technology," Humanist Institute for Co-operation with Developing Countries (HIVOS), last updated January 8 2012, https://www.hivos.org/sites/default/files/exporting_censorship_and_surveillance_technology_by_ben_wagner.pdf.

internet model, Saudi ISPs function as a second layer of censorship against posting information deemed inappropriate about the Saudi government or royal family.

The limited protests in Saudi Arabia during the Arab Spring highlighted the acquiescence of the Saudi population to the demands of the state. The royal family tightly controls the state, therefore the Saudi population found no recourse but to bend to the will of the King. The Saudi King also cashed-in on the regional turmoil as a sobering example of what may occur if authoritarian governments, such as Saudi, loses the ability to coerce their respective population. Iraq, Syria, Libya, and Egypt are some of these examples that give the Saudi population a glimpse of what life could be like if the KSA government and its weak institutions no longer control political, social, and economic aspects of everyday Saudi life. Saudi's harsh crackdown indicated the government's reach over its citizens but also uncovered the insecurities of the ruling King and Crown Prince against changes in the relationship between the state and its citizens. For the near term, Saudi Arabia maintains real control over its population. Control of this magnitude provides ample ammunition for human rights groups to highlight the inequality existing currently in Saudi society. While inequalities on this level are abhorrent compared to Western standards, the Saudi government has the ability to position itself to take advantage of the political, economic, and social structure of the nation to quickly push for modernization through human capital development and information and communication technology (ICT) sector development.

However, the time window for Saudi to modernize its workforce and develop the ICT sector is limited and may have already passed. By the time Saudi Arabia funds the schooling and graduates citizens with the appropriate level of technical training, the job market may have already shifted significantly as in the example of the OTTPs (Over-the-Top Providers) selling audio and video services while free riding on the infrastructure built and investments made by the Telecommunication state owned enterprises (SOE) in Saudi.[103] Saudi Telecom CEO, Khaled Biyari, highlights the Saudi government's push to "leverage technology in order to improve productivity and responsiveness to public

[103] Instruction will be conducted by Saudi educational institutions with the aim of providing certification to 19,000 students by 2020. Represent a significant contribution to the NTP's goal of having 20,000 Saudis retrained and employed in the ICT sector.

needs."[104] KSA will need well-trained and flexible citizens who are able to fill the next emerging market opportunity through ICT development. The CEO of Saudi's Advanced Electronics Company, Ghassan Al-Shibl, acknowledges the deficiencies in "professional skills, such as business ethics and commitment to the work environment."[105] The expanding private sector can help to minimize the skill gap between graduates and workers ready to provide value-added input to their employer. Al-Shibl recommends Saudi SOEs and private sector business push for graduates in the appropriate quantities with degrees that correspond to the sectors that need them most.[106] As KSA diversifies its economy away from oil and opens its regulatory structure to allow for more foreign owned companies, the opportunities for domestic workers will increase.[107] Since Saudi men usually receive jobs offers first, there will need to be a significant increase in job opportunities to give female graduates more opportunities or there will need to be a shift in public policy to make the hiring of workers more equitable for women.

The Middle East region has consistently lagged behind developed countries in internet penetration and data usage per capita. Through the right policies and careful study of market trends in developed nations to inform strategy, Saudi Arabia can position its workforce to take advantage of the next Telecom growth area. While this sounds simple, even countries like the United States have difficulty predicting the future of innovate sectors such as ICT. The CEO of the Saudi Telecom Company, Khaled Biyari, gave an important indication that Saudi Arabia is attempting to be proactive instead of reactive with its focus on education in ICT related fields. Education platforms, such as STEM gain more prominence as Saudi Arabia attempts to transition to a knowledge based economy that requires significant ICT investment. The Saudi King understands the cost to fund the

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104 "OBG Talks to Ghassan Al Shibl, CEO, Advanced Electronics Company," Oxford Business Group, accessed May 11, 2017, http://www.oxfordbusinessgroup.com/interview/obg-talks-ghassan-al-shibl-ceo-advanced-electronics-company.

105 Ibid., 2.

106 "Khaled Biyari, Group CEO, Saudi Telecom Company (STC): Interview," Oxford Business Group, accessed April 21, 2017, http://www.oxfordbusinessgroup.com/interview/innovative-approaches-obg-talks-khaled-biyari-group-ceo-saudi-telecom-company-stc.

107 Oxford Business Group, "OBG Talks to Ghassan Al Shibl."

necessary ICT investment in the Saudi internet infrastructure are massive so in 2015 he put pressure on his ministers of finance, education, telecommunications (ICT), along with the Crown Prince to update their strategy to drive private industry in KSA to fund the massive ICT infrastructure investments. Following the pressure from the King, Biyari asserts that KSA is "aiming to drive the pricing strategy of an operator [Telecommunciations] to be more on data rather than voice, which is already taking place in more mature markets."[108] Saudi Arabia missed the initial transition to data services because their ICT industry could not respond quickly enough to transition and KSA's ICT policies did not incentivize the SOEs to move in that direction. Essentially, the ICT market transitioned faster than KSA anticipated and they were unable to reform their sluggish SOEs fast enough to capitalize. Due to this setback, Saudi Arabia seems determined to ensure their workforce has the right training and can flex with market transitions.[109]

E. CONCLUSION

The resource curse may have contributed to the KSA's current political, social, and economic structure but it did not cause the state to be authoritarian in the first place. Frankel asserts regarding the resource curse, that the "conclusion will not be that oil wealth need necessarily lead to inferior economic or political development, through any of these channels. Rather it is best to view oil abundance as a double-edged sword, with both benefits and dangers."[110] Barma asserts that "the resource curse is not a deterministic outcome."[111] Saudi Arabia's maturation as a state came through multiple stages where the King and royal family made choices that drastically improved the standard of living for their population. Incentives for the King and his family to grow the economy and minimize social instability explain why Saudi ICT infrastructure and human capital have seen significant investment since the beginning of the twenty first century. The KSA

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[108] Ibid.

[109] The Saudi Ministry of Information Technology signed an MoU earlier this month (March 2017) with U.S. tech giant IBM. Under the partnership, IBM will train 38,000 people over the next of four years in various ICT programs.

[110] Frankel, "The Natural Resource Curse," 4.

[111] Barma, "The Rentier State at Work," 269.

government expects "digitalization" to attract investors while improving the day-to-day lives of Saudi citizens.[112] Saudi Arabia will continue to focus on Information and Communications Technology (ICT) structure and policy, diversification from oil, and human capital development to maintain social and economic stability to ensure economic growth.

112 "ICT In Saudi Arabia Draws Private Sector Interest," Oxford Business Group, last updated March 30, 2017, http://www.oxfordbusinessgroup.com/news/ict-saudi-arabia-draws-private-sector-interest.

IV. SAUDI DIVERSIFICATION AND DEVELOPMENT

The Kingdom of Saudi Arabia (KSA) is the political and economic engine of the Middle East. While it is resource rich, it is not the only country in the majority Muslim Middle East that has abundant resources. But since the King of Saudi Arabia, Salman bin Abdulaziz Al Saud, bares the title of custodian of the two holy mosques inside the Islamic Holy cities of Islam, Makkah (Mecca) and Medina, Saudi is the most influential country in the region. Low oil prices since 2014 have hit the Kingdom of Saudi Arabia especially hard because of the Kingdom's dependence on the oil sector as a majority of Saudi's Gross Domestic Product (GDP). King Salman and Crown Prince Mohammed bin Salman realize how Saudi's dependence on oil revenue negatively distorts their economy. As proof of the Saudi King and Crown Princes' realization of the negative effects of dependence on oil revenue, in 2017, Saudi Arabia published their strategic vision – Saudi Vision 2030 – as the guide for Saudi's economic and education reform efforts. The sole purpose of these intended reforms under Saudi Vision 2030 focuses on reducing Saudi's reliance on oil as the economic engine of Saudi's economy along with developing the Saudi education system. SV2030 articulates the strategy for development of the Saudi population through education reforms in STEM fields at Saudi universities. Diversification of the economy away from oil will be discussed first followed by Saudi's efforts to grow KSA's reputation as a regional science, technology, and innovation (STI) society.

Saudi Vision 2030, states the Kingdom of Saudi Arabia's grand strategy. It signals to its respective population and to the international community that Saudi Arabia intends to reform its economy in ways that will make investment in Saudi state-owned and private firms profitable while maintaining return on investment over the long-term. SV2030 relies on the government for economic growth, unlike western economic strategies that rely on the private sector as an economic engine to sustain growth. In line with Saudi Vision 2030, the Saudi Council of Economic and Development Affairs (CEDA), led by Saudi Crown Prince Mohammed bin Salman bin Abdulaziz Al Saud, controls the Public Investment Fund (PIF) program, which will finance Saudi's medium to long-term economic growth. Saudi Vision 2030 states the PIF "has created several of the Kingdom's national

champions, and funded key projects and companies, providing financial support to initiatives of strategic importance to the national economy."[113] People commonly refer to the Saudi PIF as the Saudi sovereign wealth fund.[114] The mission of the Saudi PIF or sovereign wealth fund is "[t]o actively invest over the long term to maximize sustainable returns, be the investment partner of choice for global opportunities, and enable the economic development and diversification of the Saudi economy."[115] Key to the PIF mission is the "development and diversification" segment of the Saudi economy.[116] Saudi Arabia's government acknowledges that if they do not develop the Saudi workforce through education reform and lessen their current dependency on the oil sector, KSA will be unable to maintain the economic growth that ensures regime survival.

There are three main pillars under the PIF program—"A Vibrant Society…A Thriving Economy…An Ambitious Society."[117] Two of the three pillars under PIF mention "society" in their title, but their focus emphasizes the role of economic reforms to support the last, and most important pillar, "A Thriving Economy."[118] The third and most important pillar of SV2030, "A Thriving Economy," illuminates the challenges that lay ahead for Saudi Arabia. Saudi's vision for "A Thriving Economy" breaks down further into two subcategories—"Grow & Diversify the Economy and Increase Employment."[119] The titles of the two subcategories under "A Thriving Economy" indicate that Saudi Arabia's government accepts the important role that economic diversification and workforce development contributes to economic growth.

As a supplement to Saudi's Vision 2030, the National Transformation Plan (NTP) attempts to address the challenges that the Saudi government may face as part of the

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113 "The Kingdom of Saudi Arabia Public Investment Fund: Vision Realization Program," Kingdom of Saudi Arabia, accessed February 25, 2017, http://vision2030.gov.sa/en/pifprogram/about.

114 Ibid., 12.

115 Ibid., 13.

116 Ibid., 21.

117 Ibid., 12.

118 Ibid.

119 Ibid., 21.

aggressive reforms laid out in Saudi Vision 2030. When initially proposed by Crown Prince Mohammed bin Salman in 2016, the NTP reform goals gave the Saudi government ministries approximately a decade to initiate, maintain, and accomplish the objectives. One of the most controversial NTP objectives, from the Saudi population's perspective, surrounds the initial public offering (IPO) of approximately five percent of Saudi Aramco. The aim of the Saudi Aramco offering relates to the sovereign wealth fund. If the evaluation of Saudi Aramco proves accurate at over a trillion U.S. dollars, then the five percent share of the company would bring in billions of dollars to the sovereign wealth fund. The wealth fund could then provide the capital necessary to invest in medium to long-term initiatives like human capital investment, subsidies continuation, and growth of the non-oil sector of the economy. However, as of 2017, the Crown Prince began revising the NTP to make the reforms less aggressive. As Simeon Kerr of Financial Times notes in relation to the NTP reforms, "[t]here is a recognition that too many of these targets were too aggressive and may be having too much impact on the economy."[120] The pushback against the aggressive NTP reforms from Saudi royal family members led to the reforms either being removed completely or their completion dates being pushed from 2020 to 2030.[121] Without the NTP reforms the Saudi Crown Prince must find other ways to fund the reforms and intended transformation of the Saudi economic engine.

In November of 2017, Crown Prince Mohammed bin Salman formed an anti-corruption committee and then quickly arrested over 200 Saudi government officials and royal family members.[122] The anti-corruption campaign by the Crown Prince ties to his efforts to portray Saudi Arabia as a country reforming its corrupt business practices that will be more attractive for multinational corporations to provide foreign direct investment (FDI) into the Saudi economy.[123] The anti-corruption arrests, that occurred in November

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120 "Saudi Arabia Redrafts Crown Prince's Transformation Plan," *Financial Times*, accessed August 18, 2017, https://www.ft.com/content/2cd73084-92e4-11e7-a9e6-11d2f0ebb7f0.

121 Ibid., 2.

122 Zeeshan Aleem, "Saudi Arabia's Anti-Corruption Purge Is All About Life After Oil," Vox, accessed November 29, 2017, pp 2, https://www.vox.com/world/2017/11/17/16658142/saudi-arabia-prince-salman-corruption-oil-women-rights.

123 Ibid., 2.

and included eleven royal family members, are intended to send a direct signal that Saudi Arabia is no longer a country with opaque or unpredictable business regulations and laws.[124] Additionally, the Saudi government has seized billions of dollars' worth of assets from the 200 Saudis arrested in the anti-corruption arrests.[125] In early December 2017, prince Miteb bin Abdullah paid the Saudi government over one billion dollars to settle corruption charges and be released from his detention suite at the Ritz Carlton in Riyadh, Saudi Arabia. The money ensnared by the anti-corruption committee reportedly will go to replenish the sovereign wealth fund that Crown Prince Mohammed bin Salman controls.[126] The effects of the anti-corruption campaign are twofold. First, the Saudi government can use the campaign to rebrand itself as a country with an attractive business climate and location ripe for foreign direct investment. Second, the assets and accompanying payments from the anti-corruption campaign help to fill the coffers of the sovereign wealth fund while the reforms of the NTP take hold and help to diversify Saudi's economy away from oil revenues.

In the recent past, Saudi Arabia has attempted short-sighted programs to diversify and develop their economy, while maintaining social stability, with limited success. One such example is "Saudiazation," or the deliberate hiring of specific percentages of Saudi nationals in managerial positions of foreign companies to increase local national job opportunities and gain valuable experience with foreign multinational corporations. While "Saudiazation" remains part of the business landscape in Saudi Arabia, it did not provide the jobs required or the experience needed to alleviate the unemployment rate or improve the business environment. The Saudi government will need to create many more jobs than those added from "Saudiazation" to quench the demand from the Saudi youth bulge that resulted in Saudi Arabia in the last twenty years. The Saudi government predicts that just

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[124] William Maclean, "Shifting Sands: What Is changing In Saudi Arabia?," Reuters, November 8, 2017, 2, https://www.reuters.com/article/us-saudi-arrests-milestones/shifting-sands-what-is-changing-in-saudi-arabia-idUSKBN1D8181.

[125] Zeeshan Aleem, "Saudi Arabia's Anti-Corruption Purge Is All About Life After Oil," Vox, accessed November 29, 2017, 2, https://www.vox.com/world/2017/11/17/16658142/saudi-arabia-prince-salman-corruption-oil-women-rights.

[126] Ibid., 2.

under half of Saudi's population of 32 million people are under 29 years old.[127] With the recent social advances to permit women drivers in the Kingdom by 2018, the demands for women to work alongside their male Saudi counterparts may not be far behind. If that is the case, then the Saudi government should be expected to produce significantly more job opportunities than previously predicted. The marginal success of economic programs like "Saudiazation" and the continuing demand for more and more job opportunities from Saudi youth have shown the King and Crown Prince that significant economic reforms are necessary to attract business opportunities that can bring much needed job opportunities to Saudi Arabia.

Saudi Vision 2030 attempts to set the KSA economic engine into a virtuous cycle instead of a vicious cycle. Virtuous cycles, in respect to the economy, are comprised of economic and non-economic sectors that lead to positive growth that results in positive momentum for the greater economy. In the general case of Saudi, the Sovereign Wealth Fund, the economic reforms, and the anti-corruption campaign all act as sectors or pieces of the diversified economy that provide positive values and when added together give momentum to the Saudi economy in the form of economic growth. Those same sectors or pieces of the diversified economy can also provide negative values and when added together decelerate the Saudi economy, known as a vicious circle. The vicious circle will not allow Saudi Arabia to diversify itself from oil revenues. Med Yones from the International Institute of Management, asserts regarding the vicious circle that, "[i]n order to avoid higher unemployment and social instability, the government has to raise more debt to fund spending and welfare support…, reduce corporate profits and slow economic investments, thus resulting in more job losses and reduced government revenues..."[128] Saudi Vision 2030 aims to promote the upward momentum of the virtuous circle by making Saudi an attractive location to conduct business with predictable investment opportunities

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[127] Carlyle Murphy, "Saudi Arabia's Youth and the Kingdom's Future," Wilson Center, accessed July 20, 2017, https://www.wilsoncenter.org/sites/default/files/Saudi%20Arabia%E2%80%99s%20Youth%20and%20the%20Kingdom%E2%80%99s%20Future%20FINAL.pdf.

[128] Med Yones, "Virtuous Economic Cycle Theory & Vicious Economic Cycles Theory," International Institute of Management (IIM), (December 2017): 2, https://www.iim-edu.org/virtuous-vicious-economic-cycles-theory/Virtuous-Vicious-Economic-Cycles-Theory.doc.

while also diversifying the KSA economy away from oil and using STEM education to enable Saudi's future workforce.

The PIF or sovereign wealth fund could, with enough capital, allow the Saudi government to maintain a revenue surplus while investing in non-oil sectors such as education, health care, technology, and infrastructure. Those investments along with economic reforms could lead to the influx of multinational corporations along with investment opportunities for smaller businesses, which may lead to increased job opportunities and more competition in the Saudi workforce along with higher paying wages. Increased job opportunities and higher wages with traditionally low or no taxes will help to increase consumer spending and bring money back into the Saudi economy instead of that money departing the country in the form of remittances through non-Saudi workers. An economic virtuous circle, empowered by Saudi corporations with Saudi workers, appears to be the ultimate aim of King Salman and Crown Prince Mohammed bin Salman in SV2030.

There are two major efforts in Saudi Vision 2030 that are key to Saudi Arabia's future economic growth while limiting social instability – diversification of the economy away from the oil sector and development of the Saudi workforce through STEM education reform. As part of Saudi Vision 2030 and the NTP, the diversification and development efforts gain funding from the sovereign wealth fund and continued foreign direct investment. The Saudi economic diversification plan will be discussed first followed by Saudi's plan to further develop their workforce, or more commonly called their human capital.

A. DIVERSIFICATION OF THE ECONOMY AWAY FROM THE OIL SECTOR

With oil prices at historic lows since 2014, Saudi Arabia can no longer depend on public spending and oil revenues for economic growth.[129] McKinsey & Company predicts

[129] Gassan Al-Kibsi et al., "Moving Saudi Arabia's Economy Beyond Oil," McKinsey Global Institute, accessed December 28, 2015, 2, https://www.mckinsey.com/global-themes/employment-and-growth/moving-saudi-arabias-economy-beyond-oil.

that "unemployment will rise sharply, household income with fall, and the fiscal position of the national government will deteriorate sharply" unless Saudi Arabia transitions its economy to a more market-based system while diversifying its economy away from the oil sector.[130] The International Monetary Fund (IMF) expects economic growth to flat line in 2018, therefore the Saudi King and Crown Prince have more incentive than ever to privatize state companies, reduce unemployment, and incentivize multinational corporations to invest in Saudi's future.[131] Crown Prince Mohammed bin Salman admitted in October 2017 that "We are under pressure to achieve something new in a short time…"[132] The ambitious Saudi Vision 2030, released in 2016, holds up the diversified Saudi economy as the vehicle to transport the Kingdom of Saudi Arabia from an oil dependent economy toward an information based economy.

Saudi Arabia's Vision 2030 will face great challenges to accomplish its stated goals within even the recently extended 20-year timeline. The challenges that face the current Saudi economic strategy are due to the Vision 2030 strategy reforms dealing with diversification of the economy and reform of Saudi's fiscal house, yet leave out the political and social structural reforms necessary to transition KSA to a post oil economy. The main efforts to diversify the economy come in the form of Saudi Aramco's five percent initial public offering (IPO) and the NEOM (NEO-Mustaqbil) megaproject with the aim of increasing investor confidence in Saudi and also bringing much needed capital into the sovereign wealth fund. The Saudi King and Crown Prince push these major initiatives from the top-down without the consensus of the greater Saudi population. Sumaya Almajdoub, from the Huffington Post, argues that changes in the Kingdom of Saudi Arabia will see citizen's "demand accountability if such reforms fail to yield results."[133] Demand for

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[130] Ibid., 3.

[131] "Saudi Arabia 2017 Article IV Consultation," International Monetary Fund, Report No. 45312 (Washington, DC: IMF, 2017), https://www.imf.org/en/Publications/CR/Issues/2017/10/05/Saudi-Arabia-2017-Article-IV-Consultation-Press-Release-and-Staff-Report-45312.

[132] "Saudis Aim To Diversify Economy With The New $500 Bn City," *Financial Times*, November 2, 2017, https://www.ft.com/content/fd4b10c0-b8b7-11e7-8c12-5661783e5589.

[133] Sumaya Almajdou, "Can Saudi Arabia Achieve Its Dream of A Post-Oil Economy?," *Huffington Post*, last updated April 14, 2017, https://www.huffingtonpost.com/entry/can-saudi-arabia-achieve-its-dream-of-a-post-oil-economy_us_58f0fad8e4b048372700d7c9.

accountability from Saudi citizens may come in the form of social instability such as protests and demonstrations or even social media posts speaking out against the King or Crown Prince. But for the time being, the regional turmoil that has led to hundreds of thousands of dead and displaced people in Syria, Lebanon, Egypt, Iraq, and Yemen are constant reminders of the costs that could visit the Saudi population if they push back against the initiatives proposed by the King and Crown Prince of Saudi Arabia.

The Saudi Aramco IPO and the NEOM megaproject aim to increase investor confidence in Saudi Arabia and bring capital into the wealth fund. A further discussion of each project will give context to the size and scope of these ventures. As per the earlier discussion in the chapter, the aim of the Saudi Aramco offering relates mostly to increasing capital in the sovereign wealth fund. The NEOM megaproject located in the Northwest of Saudi, sharing land with Jordan and Egypt, ambitiously projects to build a 26,500 sq-km complex of roads, bridges, rail lines, airports, seaports, hotels and other living and business infrastructure to sustain millions of tourists and business people flocking to NEOM annually.[134] Crown Prince Mohammed bin Salman projects NEOM to distinguish itself and the businesses that incorporate within it with renewable energy, robotics, and other innovative technologies. Part of Saudi's strategy involves localizing not only tourism, but also logistics and industry, in an attempt to capture innovative technologies and management while keeping capital inside of Saudi Arabia and growing the domestic economy.[135] Critics of these projects point to the many less aggressive projects endeavored by KSA as part of their 5 year plans from 1970–2015. While the goals for these more modest projects were similar—diversify the economy while developing human capital—the results do not give confidence because these efforts were largely failures.[136]

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134 "What Does Saudi Arabia's Mega Project 'NEOM' Actually Stand For?," *Al Arabya*, last updated October 24, 2017, http://english.alarabiya.net/en/business/economy/2017/10/24/What-does-NEOM-mean-.html.

135 "The Kingdom of Saudi Arabia Public Investment Fund: Vision Realization Program," Kingdom of Saudi Arabia, accessed February 25, 2017, http://vision2030.gov.sa/en/pifprogram/about.

136 "Saudis Aim To Diversify Economy With The New $500 Bn City," *Financial Times*, November 2, 2017, https://www.ft.com/content/fd4b10c0-b8b7-11e7-8c12-5661783e5589.

The main questions the Saudi King and Crown Prince must answer are –What has changed or what will you change to ensure Saudi Vision 2030 will succeed where other more modest initiatives failed? The domestic changes necessary, such as bankruptcy and investor protection laws dealing with transparency and rule of law, require significant reform. The anti-corruption campaign certainly inspires confidence that Crown Prince Mohammed bin Salman seriously considers reforming the obstacles that stand in the way of Saudi modernization and economic growth not dependent on the oil sector. In the short term, Saudi Arabia may rely on non-Saudi companies to provide the business acumen for these ambitious megaprojects in Saudi Vision 2030. The technological expertise and equipment will need to come from outside of KSA. Countries with large state owned public companies such as China, with shoddy track records of infrastructure project completion, lack of payments to governments, and poor quality technology, do not inspire confidence to meet the challenges of Saudi's ambitious strategy.[137] Western companies with proven records of accomplishment will be relied upon to plan and manage these megaprojects.[138] Western companies laid the structure of Saudi Aramco and also provided the managerial experience and the technical acumen for Saudis ever increasing internet infrastructure. In October of 2017, Klaus-Christian Kleinfold, previous head of U.S. companies Arconic and Alcoa, became the chief executive of NEOM.[139] Kleinfold's acceptance signaled KSA's desire to rely on western management and companies for positive economic growth in the future. With Western management and companies comes Western ICT infrastructure on top of the already Western influenced ICT infrastructure backbone. Western influenced infrastructure and Western management helps to keep the Saudi internet from moving closer to the China model on the internet freedom continuum, but it does not change the Saudi internet to be more free and open similar to the United States internet model.

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[137] Abdi Latif Dahir, "China 'Gifted' The African Union A Headquarters Building and Then Allegedly Bugged It For State Secrets," *Quartz Africa*, January 30, 2018, https://www.google.com/amp/s/qz.com/africa/1192493/china-spied-on-african-union-headquarters-for-five-years/amp/.

[138] Elizabeth Dickinson, "Saudi Arabia Is Betting Its Future On A Desert Megacity NEOM Qaddiya Vision 2030," *Foreign Policy*, November 3, 2017, www.google.com/amp/s/foreignpolicy.com/2017/11/03/saudi-arabia-is-betting-its-future-on-a-desert-megacity-neom-qaddiya-vision-2030/amp/.

[139] "Saudis Aim To Diversify Economy With The New $500 Bn City," *Financial Times*, November 2, 2017, https://www.ft.com/content/fd4b10c0-b8b7-11e7-8c12-5661783e5589.

Common sense dictates that Saudi Arabia will continue targeted surveillance and censorship of their own citizens to limit social instability. Saudi King Salman and Crown Prince MBS answered the question 'What has changed or what will you change to ensure Saudi Vision 2030 will succeed where other more modest initiatives failed?' by demonstrating their preference for innovative Western managers and their accompanying ICT internet infrastructure. For now, Saudi Arabia will have an ICT infrastructure that is less similar to the Chinese internet model and more similar to the U.S. internet model.

B. DEVELOPMENT OF HUMAN CAPITAL

The short term aim of the Saudi Government is to realign education to build the science/technology education infrastructure to attract recognized experts to Saudi universities.[140] A large piece to SV2030's STI (science, technology, innovation) or STEM initiatives leverage the momentum created by investments in Saudi's Science and Technology laboratories and higher education institutions. The KSA government's investments, in line with NSTIP (National Science and Technology Innovation Plan) under the overarching SV2030, help to include Saudi into the science and technology innovation global ecosystem. The KSA government's STI investments should help to begin Saudi's virtuous circle, which begins with government investment and leads to the recruitment of international faculty who publish STI papers that help to gain Saudi the reputation as an innovation supportive government.[141] KSA government investments may have second order effects that trickle down to the pre-university Saudi education system enabling Saudi's grade 1–12 faculty with the tools to prepare workers with the STEM capability to sustain KSA's future information economy.

This paper intends to describe the factors that may indicate the likelihood that future Saudi generations will have enough momentum to transition to an information based economy. Considering long term and comprehensive education studies are not released by

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[140] H. El-Deghaidy and N. Mansour. "Science Teacher's Perceptions of STEM Education: Possibilities and Challenges," *International Journal of Learning and Teaching* 1, no. 1 (June 2015): 52, doi: 10.18178/ijlt.1.1.51-54.

[141] Cathy O'Neil, *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*, (New York: Crown, 2016): 75.

authoritarian regimes, Saudi does not have an extensive number of open-source data to predict specific outcomes regarding specific KSA STEM education policy or return on investment for investments in higher education infrastructure and faculty. Open-source information does discuss the four main Saudi universities, which are overseen by the King Abdulaziz City for Science and Technology (KACST) that "monitors the implementation of NSTIP."[142] KACST claims that it is an "independent scientific organization that is essentially the country's national scientific agency and … also conduct[s] applied research and provide[s] advice to the [KSA] government."[143] KACST is the science and technology clearing house that doles out government funding to the main four Saudi science and technology (S&T) universities and also decides ICT policy for Saudi universities and the overall KSA education system.[144]

The four main Saudi Arabian S&T universities are the King Abdullah University of Science and Technology (KAUST), Al Faisal University, King Saudi University College of Science (KSU), and King Fahad University of Petroleum and Minerals (KFUPM). KAUST focuses on "nonfabrication, biotechnology, electronics and photonics, computational bioscience, advanced membranes and porous material, solar and energy engineering."[145] KAUST has twenty academic partnerships with universities such as Oxford and Cambridge. Al Faisal University considers itself a research university with academic relations with Harvard, MIT, and Oxford. KSU specializes in "Biochemistry, enzymology, bioenergetics, chemical thermodynamics, quantum chemistry and geophysics."[146] KFUPM specializes in Physics, Chemistry, Geology, and Nanotechnology. The four main Saudi S&T universities recruited internationally recognized faculty to write S&T related research papers to grow the science, technology,

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[142] Mohammed Alzamil, "Science and Technology in Saudi Arabia" (unpublished PowerPoint, April 17, 2017), 3.

[143] Ibid., 4.

[144] "The Rise of Saudi Arabia as a Science Powerhouse," *Nature Middle East*, May 30, 2016, 61.

[145] "Science and Technology in Saudi Arabia," Science-Engineering.net, accessed June 15, 2017, http://www.science-engineering.net/science/asia/science-and-technology-in-saudi-arabia.

[146] Ibid., 1.

and innovation reputation of KSA.[147] Reciprocal agreements between Saudi universities and prestigious western universities, such as Oxford, Harvard, and MIT also help to positively increase Saudi's reputation as a science, technology, and innovation society. The push from Saudi Arabia for their university faculty to publish research papers led to the Middle East's regional universities being responsible for "almost 4% of global research papers."[148] More specifically, "Saudi Arabia is responsible for almost 90% of the Middle East's research paper output."[149]

C. WHERE DID THE SAUDI INTERNET BEGIN?

As mentioned previously, Western companies provided the technical acumen to build Saudi Arabia's internet Information and Communication Technologies (ICT) infrastructure. The impetus for the internet in Saudi, however, came from Saudi nationals with the foresight to understand how the internet could bring education to the Saudi masses along with positions of influence inside the Saudi government and Saudi corporations. Saudi Aramco, KSA's oil producing giant, began the initial push to bring the internet to Saudi Arabia with the important decision for Saudi Aramco to migrate all administrative tasks online.[150] According to Sharif, "normally, what happens at Aramco sets a trend for procurement throughout the kingdom."[151] The person identified inside Saudi Aramco as the mastermind behind the migration of administrative services online for the multiple Aramco locations across Saudi is Dr. Ibrahim Mishari, V.P. of Aramco's IT department.[152] Sharif asserts that "once Aramco mandated learning and development via computers, the youth and indeed older people were able to hold their heads high about having internet

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147 Cathy O'Neil, *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*, (New York: Crown, 2016): 75.

148 "Science and Technology in Saudi Arabia," Science-Engineering.net, accessed June 15, 2017, http://www.science-engineering.net/science/asia/science-and-technology-in-saudi-arabia.

149 Ibid., 2.

150 "How is Technology Changing the Culture of Saudi Arabia?," Quora Blog, last updated November 29, 2015, 1, https://www.quora.com/How-is-technology-changing-the-culture-of-Saudi-Arabia.

151 Ibid., 1.

152 Ibid.

access."[153] Aramco's emphasis on the technology helped to move social and religious stigma associated with technology away from the corrupting pornographic material online. Once the internet and computers demonstrated their importance, they became indispensable in the lives of Saudi citizens just as in western countries. With constant access to the internet, the Saudi population witnesses the disparity between Saudi Arabia and western society.[154]

A U.S. General Accounting Office (GAO) report in 2000 stated that the top three priorities for organizations to function are – "people, process, and technology."[155] Since 2000, ICT use has become synonymous with increased workplace efficiencies across all sectors of the economy. ICT covers the "technology" priority for functional organizations. Also, the introduction of innovative ICT solutions increases the efficiencies of the "people" and "process" that are vital to economic growth. The "process" section of the GAO report aims to make the "people" work more efficiently through three areas – "financial management, information technology management, and performance-based management."[156] These three management priorities parallel Saudi Vision 2030 and the NTP. The GAO report asserts the "people" are most important "because an agency's people define its character and its capacity to perform."[157] The term "people" will be substituted for the term human capital in this thesis. According to the Organization for Economic Co-operation and Development (OECD), human capital is "[t]he knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being."[158] The term human capital in this chapter refers to Saudi nationals, not the third country nationals who comprise most of the manual labor workforce

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153 Ibid.

154 Ibid.

155 General Accounting Office, *Human Capital: A Self-Assessment Checklist for Agency Leaders* (Washington, DC: General Accounting Office, 2000), 3, http://www.gao.gov/assets/80/76520.pdf.

156 Ibid., 1.

157 Ibid.

158 "The Well-being of Nations: The Role of Human and Social Capital," Centre for Educational Research and Innovation, Organisation for Economic Cooperation and Development, 2001, 18, http://www.oecd.org/site/worldforum/33703702.pdf.

in the Kingdom of Saudi Arabia. Human capital investment is internationally recognized as a varying mix of expenditures on education and health services, with the aim of increasing citizen productivity and thereby increasing economic growth.[159] The Saudi King and Crown Prince acknowledge the importance of strengthening Saudi Arabia's human capital by earmarking government funds to raise the level of education and health services to Saudi nationals. Saudi Arabia's investments in education dwarfed investments in health and social services in the billions of dollars, from 2011 to 2015, by a ratio of three to one.[160]

The relationship between human capital investment and economic growth is arguably impactful. Abla Bokhari synthesizes empirical studies from countries inside and outside of the Middle East and asserts, "some might have declared that [the impact of investment in human capital on economic growth] has the significant effect, others fail to prove this."[161] While the effect of human capital (education and health services) on economic growth may appear negligible depending on the country case study, investment in health services has a significant impact on economic growth.[162] Bokhari asserts "the massive investments in education fails to generate productivity and growth in Saudi Arabia."[163] Bokhari also states the "investment in health and physical capital significantly contribute to economic growth."[164] The 5-year strategic economic plans sanctioned by the Saudi King from 1970–2015 have focused physical capital on education more so than on health services to the detriment of the Saudi economy. The previous Saudi sovereign, King Abdullah, intended to continue funding education through public financing. But upon his death in 2015, King Salman ascended the throne and changed the plan to what would later be renamed Saudi Vision 2030. The current Saudi Vision 2030 strategy invests physical

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159 Abla A. H. Bokhari, "Human Capital Investment and Economic Growth in Saudi Arabia: Error Correction Model," *International Journal of Economics and Financial Issues* 7, no. 4 (2017): 104.

160 Ibid., 104.

161 Ibid., 111.

162 Ibid., 112.

163 Ibid., 111.

164 Ibid.

capital in the hopes that this time the strategy will succeed and both aspects of human capital (education and health services) can work toward sustaining economic growth.

Unfortunately, the limited number of published studies conducted by KSA funded researchers are too few in regard to the number of studies and teachers surveyed to represent even a minority number of Saudi's STEM educators. Therefore, until a larger more representative swath of Saudi educators are interviewed and the results released by the authoritarian regime, it will remain difficult to demonstrate the effects of STEM education on future Saudi economic growth.

D. CONCLUSION

Saudi Arabia is the economic engine of the Middle East. King Salman Al Saud can no longer delay the necessary reforms proposed within Saudi Vision 2030 due to the dismal economic forecasts that resulted from historically low oil prices. While the motivation to reform exists in Saudi Arabia, recent government 5-year plan strategies have failed to diversify the Saudi economy away from oil or develop Saudi's human capital. Through the actions of Mohammed bin Salman with his anti-corruption campaign, the Crown Prince demonstrates his willingness to go beyond economic reforms to ensure Saudi Vision 2030 succeeds. With the hiring of Western multinational corporations and managers, Mohammed bin Salman further signals his commitment to modernizing KSA and making Saudi more transparent and a more attractive investment environment. SV2030 funding focuses on Saudi universities with hopes that a virtuous STEM education circle will bring Saudi a reputation as a science, technology, and innovation society.

Social and political reforms may be required to modernize Saudi Arabia. Those reforms may be accompanied by social instability in the most influential country to the Islamic world. Saudi lacks a STEM educated population prepared to work by, with, and through cutting-edge ICT. Therefore, Saudi will rely on non-native companies comprised of foreign educated labor to maintain, upgrade, and manage its ICT infrastructure. The nationality of that labor is predominantly from Western countries because of Saudi's past reliance on innovative ICT management and technology applications along with the mutually beneficial relationships in the war on terror between Saudi Arabia and Western

nations. Western nations look to Saudi Arabia to demonstrate the economic promise of Western ICT infrastructure with the ability to maintain social stability similar to how Saudi Aramco demonstrated the early Internet's economic promise. The shape of Saudi's ICT infrastructure—open or closed—may depend most on the Saudi leadership's view on which internet model can allow for diversification of the KSA economy from oil and also allow for the education of Saudi's population while maintaining social stability. The thesis final conclusion will be covered in the next and final chapter.

V. THESIS CONCLUSION

This thesis covered two possible hypotheses for the future of Saudi Arabia's internet -Saudi Arabia will continue to resemble the U.S. "open" internet model while limiting information flow to its population using information and communication technology (ICT) or Saudi Arabia will attempt to change its ICT infrastructure and policies to more closely resemble China's "closed" internet model that restricts information flow to its population to minimize social instability. Both the U.S. and Chinese internet models claim economic growth as a byproduct. However, China's model boasts of social stability along with economic growth, unlike the U.S. internet model. China and the United States are competing for the future structure of the internet. The U.S. "open" internet version is widely practiced throughout the world and allows for economic growth while also allowing social instability. The Chinese "closed" internet model allows for economic growth but without allowing social instability. China attempts to influence the future internet by influencing authoritarian regimes, such as Saudi Arabia. China's internet model is difficult to execute and requires large amounts of organic ICT expertise in the executing nation's population. Saudi Arabia cannot simply import technical experts from allied authoritarian regimes to manage KSA's ICT infrastructure. Saudi Arabia's Internet, from its infancy, was more Western-leaning because its Western-influence infrastructure allowed information to flow into Saudi Arabia before being censored. The current Saudi ICT infrastructure, and therefore the Saudi Internet, is heavily Western structured and managed. Therefore, the Saudi population learned the Saudi "permeable" Internet model. Significant changes made by the Saudi government to move its ICT infrastructure to favor the Chinese Internet model would stifle a main outcome envisioned by SV2030—organic innovation from Saudi workers. Also, the cost to replace Western companies and workers would be costly for Saudi as they attempt to transition their economy away from oil and maintain social stability. Nations that choose to follow China's model must have economies that can function while cutting themselves off from the Western internet. Authoritarian countries may wish to close themselves off from the Western internet to limit social instability but are often unable to do so economically without significant assistance. If China's support is

accepted by authoritarian regimes, such as Saudi Arabia, then the Chinese internet model may gain momentum toward international acceptance as a legitimate internet option. China, however, would need to provide significant ICT equipment along with the ICT trained personnel to redesign, build and manage Saudis ICT infrastructure. The following paragraphs will revisit the U.S. "open" internet model, the Chinese "closed" internet model, and the Saudi Arabian "permeable" internet model to attempt to indicate if KSA will be capable enough to follow the U.S. or Chinese internet model.

A. THE U.S. "OPEN" INTERNET MODEL

The U.S. internet model, demonstrates sustained economic growth with an unfiltered or "open" flow of information to the population. The U.S. model introduces vast amounts of information that may create the conditions for social instability. The U.S. internet model has no overarching governing body, only stakeholder institutions that aim to balance the protection of unalienable rights under the Constitution and Bill of Rights through Congressional legislation without diminishing economic prosperity of citizens and businesses. This multistakeholder approach to the U.S. internet model relies on checks and balances and reflects the United States' strong beliefs concerning the international implementation of internet governance.

The United States of America holds privacy and human rights to a high degree and forms policy with these beliefs in mind. The U.S. model of the internet, which includes ICT infrastructure and government policies, adheres to the inclusive or "open" internet. The United States' ICT infrastructure followed the core values of the Constitution and the Declaration of Independence of the United States because the original creators of the internet viewed the unfiltered internet as essential to "life, liberty, and the pursuit of happiness."[165] The Constitution of the United States, a founding document of the republic, priritizes freedom of speech, freedom of the press, and freedom to assemble without undue

165 "The Declaration of Independence," USHistory.org, accessed May 11, 2017, https://www.archives.gov/founding-docs/declaration-of-independence-transcript.

harassment from the government.[166] The internet, which began as a United States government funded platform for military communication and for sharing research information among researchers at various academic institutions, passed to private institutions and businesses once the internet's relevance and importance to efficient business operations had been established.

The U.S. internet model reflects a largely unregulated internet.[167] The U.S. internet model experiences its regulation in the form of "self-regulation" by private industry.[168] The central institution in the U.S. internet regulation process is the U.S. Congress and "[it] is the role of Congress to create laws that govern the internet and delegate regulatory authority."[169] U.S. politicians had to propose amendments to current law to cover the distinctly different nature of cyberspace. Congress delineates private-industry the ability to "self-regulate" with few exceptions. The U.S. political system ensures that proposed legislation from politicians represent the will of the American people. Congress had gone a step further by enacting the 1996 Telecommunications Act, "which generally shields online sites and services from legal liability for the activities of other users, allowing rich user-generated content to flourish on a variety of platforms."[170] This bottom-up political system lends itself to turmoil both socially and politically due to competing interests but the result is often relatively equitable.

Predictable increases in online surveillance because of the United States governments lack of private sector regulation allowed the "commodification of personal information for revenue."[171] This "commodification," as cybersecurity expert Ido Sevilla asserts, led to extensive private sector surveillance for economic purposes by information

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166 "The Constitution of the United States: A Transcription," U.S. National Archives, accessed May 11, 2017, https://www.archives.gov/founding-docs/constitution-transcript.

167 "Freedom on the Net 2016: United States Country Profile," Freedom House (2016), 3, https://freedomhouse.org/report/freedom-net/2016/united-states.

168 Ibid., 6.

169 Ibid., 1.

170 Ibid., 8.

171 Sevilla, "Trading Privacy for Security in Cyberspace," 2.

monopolies like Google and Facebook. The 1994 Communication Assistance For Law Enforcement (CALEA) Act "provided a significant compensation for Telecom businesses to make their communication infrastructure 'surveillance friendly' for the government."[172] Concerns surrounding mass surveillance on and through ICT networks had enflamed vigorous debate in American society about U.S. citizens' rights and their responsibilities to uphold the Constitution and Bill of Rights. Within two years after Edward Snowden's disclosures, due to increasing pressure by citizens, Congress passed the USA Freedom Act (2015) that "significantly reformed" section 215 of the Patriot Act.[173] After the USA Freedom Act passed, the pendulum appeared to swing away from the mass surveillance programs that existed in the late 1990s into the 2000s.

B. THE CHINESE "CLOSED" INTERNET MODEL

The Chinese model, demonstrates sustained economic growth without a chaotic flow of information due to China's filtered internet. China's model limits disruptions from vast information flows, thereby lessening the chances of social instability. China affirms that "maintaining social order is unquestionably more important than individual privacy."[174]

To gain allies internationally, China attempts to export their ICT infrastructure and policy model. The Chinese internet model mitigates the instability caused in the unfiltered or "open" U.S. internet model. China's surveillance system became so effective that foreign nations, of the authoritarian regime type, purchased China's surveillance techniques to produce similar repression of the populations in Cuba, Zimbabwe, Belarus, Ethiopia, and Zambia.[175] Chris Albon of DailyDot.com writes that the Chinese government "has been quietly turning its expertise in Internet censorship and repression into a product to be sold to foreign governments who are looking to construct their own

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[172] Sevilla, "Trading Privacy for Security in Cyberspace," 11.

[173] "Freedom on the Net 2016: United States Country Profile," Freedom House (2016), 18, https://freedomhouse.org/report/freedom-net/2016/united-states 18.

[174] Raud, "China and Cyber," 7.

[175] Chris Albon, "Building the Great Firewall of China," *Daily Dot*, accessed on February 24, 2017, https://ww.dailydot.com/via/albon-building-great-firewall-china/.

Great Firewalls."[176] Min Jiang asserts that "[w]ith the government's backing, many Chinese Internet and telecommunications companies, state-owned and private ones, have been expanding overseas, particularly in Asia, Africa, South America and the Middle East, places that prefer inexpensive Chinese technological products or have an interest in China's surveillance technologies."[177] China wants every country to have the ability to regulate and secure information to their respective populations as the governments of each country see fit.[178]

The Chinese model for maintaining social stability and sustaining economic growth reflects an exclusive or "closed" model of the internet with a majority of the ICT infrastructure that comprises the Great Firewall being state owned. A core assertion of China's model remains that Chinese government controls all activity within its borders. The Arab Spring in 2010–2011 demonstrated to the Chinese government the importance of controlling the data used by domestic populations and also the destabilizing influences ICT can inflict upon authoritarian regimes. China expressed in writing in 2011 at the U.N. General Assembly through the Shanghai Cooperation Organization (SCO), that the member nation's "believe in the primacy of the nation state, which should be carried over into cyberspace."[179] The People's Republic of China prefers an intergovernmental or multilateral internet governance policy for the protection of Chinese netizens from western ideas that promote individualism and disunity.[180]

China benefits most from unclear policies and restrictions surrounding ICT surveillance. If ICT policy is unclear or if there are competing options that provide economic growth, the international community may find it hard to get solidly behind one particular vision for the future internet. China gained support for the Chinese internet model because their economy sustained economic growth similar to the U.S. but without

176 Ibid., 2.

177 Jiang, "Authoritarian Informationalism," 81.

178 Ibid., 84.

179 Jiang, "Why China Changed its Tech Policy."

180 Brown and Marsden, "Net Neutrality and Control of the Internet."

any major episodes of social instability that currently affects the United States. China accomplished its goal to complicate the internet governance debate by providing itself as a contrary option to the U.S. internet model. The Chinese internet model has been accepted by atleast a few authoritarian states with imported Chinese ICT surveillance equipment and know-how, but without considerable social instability.

C. THE SAUDI ARABIAN "PERMEABLE" INTERNET MODEL

The Saudi Arabian internet model gains its shape from the political, social, and economic realities borne out of the relationship between the state and its citizens in the Kingdom of Saudi Arabia. Saudi's internet model resembles aspects of the both the U.S. and China's internet models. Saudi's internet model resembles the Chinese model because of the censorship and filtering of the internet by government ministries and the self-censorship by public and private companies. The Saudi Arabian internet model resembles the U.S. model because of the physical structure of the internet that allows information to flow into the country while being monitored by the Saudi government ministries. China censors information before it enters its national borders and the U.S. monitors its information and decides after the fact if the content is illegal. The Saudi Arabian internet model allows information to pass into the national internet borders like the United States. But, instead of deciding if the information is illegal and then taking appropriate legal action so as to not violate the guaranteed rights of citizens like in the United States, or Saudi Arabia, from the direction of the King and Crown Prince, censors the websites that host the information and often arrests or harasses the citizens involved without due process or concern for their individual rights. Saudi Arabia relies heavily on international partners such as the U.S. and China to provide the technology hardware and the personnel capable of building and maintaining ICT infrastructure. Therefore, Saudi Arabia's internet is neither "open" or "closed" – KSA has a "permeable" internet model.

Saudi's Basic Law of Governance lays the foundation for the social contract between the Saudi citizen and the Saudi state. The Saudi King attempts to fulfill the government's part of the social contract by enforcement of the Basic Laws, which affirm in writing the political, social, and economic standards for all citizens to follow. The Saudi

state prohibits, in Article 39, "acts leading to disorder and division, affecting the security of the state."[181] Article 40 concerns privacy of communications and confirms that private citizen communications "shall be inviolate," and also there "shall be no confiscation, delay, surveillance or eavesdropping, except in cases provided by the Law."[182] The Saudi Ministry of Interior (MOI), which controls the Saudi surveillance and censorship programs across the Saudi population, uses selective repression to minimize instability and maximize the justification for self-censorship by public and private organizations.

External factors also complement Saudi's aims to minimize instability. The U.S. declaration of the War on Terror following September 11th 2001, gave Saudi Arabia the justification to continue their repressive actions against their population without objections and with assistance from western nations.[183] The Arab Spring also provided the Arab Gulf State of Saudi Arabia with ample justification to look more carefully at the ICT structure and policy of China because of its ability to maintain social stability, rather than the United States ICT structure and policy. Two key factors that may reaffirm benefits and pitfalls of both internet models are Saudi's reliance on the international economic markets associated with oil exportation and STEM expertise resident in the Saudi population.

A cornerstone of Saudi's 2030 Vision strategy relies on the cooperation of the Saudi population to allow the reforms to take place. Saudi has shown it can reform during its application for acceptance to the World Trade Organization (WTO) by reforming investment laws, decreasing restrictions on foreign direct investment and foreign ownership, along with strengthening the laws and regulations ensuring a level playing field for multinational corporations (MNC).[184] All of these reforms are crucial for the enticement of foreign ICT companies to bring their capabilities of updating telecommunications and internet services, along with managerial expertise to Saudi Arabia.

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[181] "Basic Law of Governance," The Embassy of the Kingdom of Saudi Arabia, accessed 18 November 2017, https://www.saudiembassy.net/basic-law-governance.

[182] Ibid., 1.

[183] Dahi, "Understanding the Political Economy of the Arab Revolts," 1.

[184] Husain, "Saudi Arabia: Selected Issues," 34.

With oil prices at historic lows since 2014, Saudi Arabia can no longer depend on public spending and oil revenues for economic growth.[185] McKinsey & Company predicts that "unemployment will rise sharply, household income with fall, and the fiscal position of the national government will deteriorate sharply" unless Saudi Arabia transitions its economy to a more market-based system along with diversifying its economy away from the oil sector.[186] Crown Prince Mohammed bin Salman admitted in October 2017 that "We are under pressure to achieve something new in a short time…"[187] The ambitious Saudi Vision 2030, released in 2016, holds up the diversified Saudi economy as the vehicle to transport the Kingdom of Saudi Arabia from an oil dependent economy toward an information based economy. The sole purpose of intended Saudi Vision 2030 reforms focuses on reducing Saudi's reliance on oil as the economic engine of Saudi's economy. As a supplement to Saudi's Vision 2030, the National Transformation Plan (NTP) attempts to address the challenges that the Saudi government may face as part of the aggressive reforms laid out in Saudi Vision 2030. Saudi Arabia's government acknowledges that if they do not develop their human capital and lessen their current dependency on the oil sector, KSA will be unable to maintain the economic growth that ensures regime survival.[188]

D. WHY DOES SAUDI ARABIA HAVE A PERMEABLE INTERNET?

This thesis seeks to answer a central question: **Why does the Kingdom of Saudi Arabia have a "permeable" internet?** To investigate this central question, the thesis examined how Saudi Arabia's internet allows information to flow through their information and communication technology (ICT) network structure onto the cell phones

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[185] Gassan Al-Kibsi and Jonathan Woetzel, Tom Isherwood, Jawad Khan, Jan Mischke, Hassan Noura, "Moving Saudi Arabia's Economy Beyond Oil," McKinsey Global Institute, accessed on December 28, 2015, 2, https://www.mckinsey.com/global-themes/employment-and-growth/moving-saudi-arabias-economy-beyond-oil.

[186] Ibid., 3.

[187] "Saudis Aim To Diversify Economy With the New $500 Bn city," *Financial Times*, November 2, 2017, https://www.ft.com/content/fd4b10c0-b8b7-11e7-8c12-5661783e5589.

[188] "The Kingdom of Saudi Arabia Public Investment Fund: Vision Realization Program," Kingdom of Saudi Arabia, accessed February 25, 2017, http://vision2030.gov.sa/en/pifprogram/about.

and computers of Saudi citizens while censoring or filtering content unfavorable to the Saudi royal family for the purpose of maintaining social stability and promoting economic growth. KSA's laws and ICT policies allow for internet filtering, which resembles the Chinese model. The lack of Saudi STEM trained citizens may not allow Saudi Arabia to change the physical ICT infrastructure to filter more than they do already. The idea of importing foreign labor to the ICT infrastructure in KSA allows for filtering but the Western structure, along with Western management, would indicate that the Saudi internet will either remain between the United States and China or settle on the side of the U.S. "open" internet model.

If the Saudi King and the Crown Prince are able to meet the aims of SV2030, which promotes STEM education among KSA's population and divestment from the energy sector (read oil), the results may foster standard of living increases on par with the economic growth witnessed during the 20th century following the founding of oil in Saudi Arabia. The time window for Saudi to modernize its workforce and develop the ICT sector is limited and may have already passed. By the time Saudi Arabia funds the schooling and graduates citizens with the appropriate level of technical training, the job market may have already shifted significantly. Similar to other countries, KSA will need well-trained and flexible citizens who are able to fill the next emerging market opportunity through ICT development. The CEO of Saudi's Advanced Electronics Company, Ghassan Al-Shibl, acknowledges the Saudi workforce's deficiencies in "professional skills, such as business ethics and commitment to the work environment."[189]

Until the introduction of the 2030 Vision in 2016, Saudi did not promote ICT innovation to their population. Without domestic innovation or international assistance, Saudi Arabia may not be able to close off from other markets because its economy cannot absorb the economic shock that would ensue. Saudi Arabia requires STEM capable citizens to fuel the economic growth that may provide the incentives for Saudi citizens to accept future social, political, and economic reforms that will be needed to diversify the Saudi

189 "OBG Talks to Ghassan Al Shibl, CEO, Advanced Electronics Company," Oxford Business Group, accessed May 11, 2017, http://www.oxfordbusinessgroup.com/interview/obg-talks-ghassan-al-shibl-ceo-advanced-electronics-company.

economy from oil. KSA may also rely on the United States not only for ICT infrastructure management to promote stability but also to sustain economic growth through the Saudi oil export market.

Saudi Vision 2030 strategy attempts to address many challenges facing Saudi Arabia, including the economic reforms that deal with diversification of the economy and reforms that deal with Saudi's fiscal house, yet leave out the political and social structural reforms that may be necessary to transition KSA to a post oil economy. The main efforts to fund the diversification of the Saudi economy come in the form of Saudi Aramco's proposed five percent initial public offering (IPO) and the NEOM (NEO-Mustaqbil) megaproject with the aim of increasing investor confidence in Saudi and also bringing much needed capital into the sovereign wealth fund. The Saudi King and Crown Prince push these major initiatives from the top-down without the consensus of the greater Saudi population. Sumaya Almajdoub argues that changes in the Kingdom of Saudi Arabia will see citizen's "demand accountability if such reforms fail to yield results."[190] Western companies with proven records of accomplishment may have the ability to plan and manage these megaprojects. With Western management and companies comes Western values and beliefs in addition to the already Western influenced ICT infrastructure backbone. Saudi's Western influenced ICT infrastructure strongly suggests that KSA's internet model may remain "permeable" and thus closer to the U.S. model than the "closed" Chinese model. This does not mean the Saudi ICT infrastructure will closely align with the free and open U.S. internet model. It may be a solid indication, however, that Saudi Arabia will not change its current ICT infrastructure to be more like the Chinese internet model.

SV2030's focus on university science and technology education may lead to positive improvements in Saudi Arabia's STEM education system. Without comprehensive studies of KSA's STEM education system, however, return on investment will be difficult to demonstrate conclusively. If science and technology investments in Saudi Arabia's main four universities can begin a virtuous circle, there may be hope that KSA's population can

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190 Sumaya Almajdou, "Can Saudi Arabia Achieve Its Dream of a Post-Oil Economy?," *Huffington Post*, last updated April 14, 2017, https://www.huffingtonpost.com/entry/can-saudi-arabia-achieve-its-dream-of-a-post-oil-economy_us_58f0fad8e4b048372700d7c9.

transition to an information based economy. Critics are skeptical about Saudi's chances, however. Bokhari asserts "the massive investments in education fails to generate productivity and growth in Saudi Arabia."[191] Critics point to Saudi's incorrect aims of their human capital development strategy as a reason why KSA may be unable to complete their transition to an information based economy. Similar to SV2030, the 5-year strategic economic plans sanctioned by the Saudi King from 1970 – 2015 focused physical capital on education more so than on health services to the detriment of the Saudi economy. Saudi Vision 2030 strategy invests physical capital on four main Saudi science and technology universities in the hopes that this time the strategy will succeed and both aspects of human capital (education and health services) can work toward sustaining economic growth. Saudi Arabia's goal of human capital development, focusing on science and technology expertise in four main Saudi universities, may have considerable hurdles to overcome due to the significant lack of STEM education in the current Saudi workforce. While Saudi could import labor as it did in the past, KSA's goal in SV2030 remains to develop Saudi citizens, in the vein of the "Saudiazation" policy, to work ICT sector jobs.

Whether SV2030 strategy will effectively develop human capital in the Saudi workforce or divest the Saudi economy away from oil will remain to be seen. With the introduction of so many western academics and universities as part of SV2030, it is difficult to assume Saudi's ICT infrastructure will allow KSA to move closer to China's "closed" internet model. Even a significant increase in the number of STEM capable citizens will not allow Saudi to close off its internet. Saudi Arabia's "permeable" internet model should maintain its proximity between both the Chinese and the U.S. internet models.

E. FUTURE RESEARCH OPPORTUNITIES

Future scholarly research should assess the success or failure of Saudi Vision 2030's stated goals and the resulting effect on the Saudi Arabian economy. Further study should also focus on all three internet models (U.S. / Chinese / Saudi Arabian) or delve into the specific outcomes of each individual internet model as they relate to economic

191 Bokhari, "Human Capital Investment," 111.

growth and social stability. In addition, research related to information and communication technology (ICT) could provide researchers that lack technical backgrounds with foundational studies to complement scholarship relating to institutions that are charged with strengthening future internet structure and policy.

F. CONCLUSION

The Kingdom of Saudi Arabia's five-year plans from 1970–2015 were largely unsuccessful. Those plans relied primarily on oil to drive the KSA economy with foreign labor to work both low-level service oriented jobs, and high-level science / technology and management positions such as those positions in Saudi Aramco. Historically low oil prices beginning in 2014 gave the Saudi government justification to propose a more aggressive vision for the future of Saudi Arabia with Information and Communication Technology (ICT) as the backbone of the economy instead of oil—Saudi Vision 2030. King Salman, Crown Prince Mohammed bin Salman, and Saudi government leadership faced another significant issue, the coming Saudi youth bulge. In the very near term, millions of Saudi youth will expect to enter the Saudi workforce. The recent inclusion of educated Saudi women in the workforce will only compound the lack of available jobs. Saudi programs to increase the number of Saudi jobs in the economy, such as "Saudiazation," are not enough to quench the need for jobs by Saudi youth. Saudi's bloated state owned enterprises cannot absorb the sheer number of Saudi youth that will require employment.

By approving SV2030, along with the National Transition Plan, Saudi leadership bets on the science and technology (ICT) sector to provide the jobs Saudi's may be willing to undertake. SV2030 does not curtail the programs that promote highly skilled imported labor, in small numbers, in the science and technology (ICT) sector. The high skill imported labor does not need to be Western. But, the current structure of Saudi's internet, the preponderance of Western companies working in the ICT sector in Saudi, and the significant number of Western management for Saudi Megaprojects, indicates KSA's tendency to hire high skilled Western employees. These tendencies to favor Western high skilled labor and Western innovative companies, pushes Saudi's internet and ICT structure toward the U.S. model and away from the Chinese model. Saudi may never settle on a

single location along the internet freedom continuum considering how political, social, and economic factors can change rapidly in a kingdom attempting to diversify its economy away from oil, educate its workforce with STEM, all while maintaining social stability.

The quest to maintain social stability and promote economic growth while diversifying the economy away from oil places Saudi Arabia on the continuum between two distinct internet model options—the U.S. "open" internet model or China's "closed" internet model. The U.S. and Chinese internet models are at extreme ends of the internet freedom continuum. But both produce economic growth. The difference being the U.S. model allows the free flow of information and the Chinese model restricts the free flow of information. China's internet model creates a narrative contrary to the U.S. model to entice countries, such as Saudi Arabia, from migrating closer to the "open" internet structure. The U.S. pushes for an open and free cyberspace for all with multi-stakeholder leadership. China pushes toward a future internet with multi-lateral leadership, which gives each state the ability to define what internet freedom means for their citizens. China and the United States attempt to influence Saudi's ICT structure and policy development to influence the structure of the future global internet.

The relative ease with which countries can now use ICT to censor and filter information on their internet networks may be too alluring for many countries to resist. China's internet model may become more attractive if countries, such as authoritarian regime countries like Saudi Arabia, are able to sustain their filtering and censoring activities inside their respective borders. The social instability that Western countries experience due to the free flow of information increases the calls for internet filtering as an attempt by governments to minimize social instability. Western governments have similar institutions that reinforce the free and open U.S. internet model and will remain closely tied to the U.S. model. Authoritarian states, such as Saudi Arabia, without ties to similar western institutions may be less tied to the U.S. internet model. Saudi Arabia's proximity between the U.S. and Chinese internet model may fluctuate depending on several factors. Saudi Arabia's reliance on international oil markets for economic growth and the Saudi's lack of a STEM educated population capable of managing an information based economy are two main factors that hinder KSA from completely closing its internet, as China has

done. The lack of available scholarship on Saudi Arabia's education system limits conclusive determinations about whether the Kingdom of Saudi Arabia can transition its economy to be information based. The task of weening the Saudi economy off of oil will be challenging for KSA to accomplish while also maintaining social stability, as admitted by the Saudi Crown Prince.[192] Unfortunately, the lack of available STEM education related scholarship from this authoritarian regime does not allow for any predictions of future economic transition success with any confidence.

192 "The Kingdom of Saudi Arabia Public Investment Fund: Vision Realization Program," Kingdom of Saudi Arabia, accessed February 25, 2017, http://vision2030.gov.sa/en/pifprogram/about.

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