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SYSTEMIC ANALYSIS OF ILLEGAL MASS MIGRATION IN THE CENTRAL MEDITERRANEAN REGION

Enekes, Ede

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THESIS

SYSTEMIC ANALYSIS OF ILLEGAL MASS MIGRATION IN THE CENTRAL MEDITERRANEAN REGION

by

Ede Enekes

June 2021

Thesis Advisor:	Sean F. Everton
Co-Advisor:	Steven J. Iatrou
Second Reader:	Imre Porkolab, Hungarian Defense Forces

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13. ABSTRACT (maximum 200 words)

This thesis explores the systemic behavior of illegal mass migration in the Central Mediterranean region and proposes strategic approaches to address the problem. We hypothesize that the illegal migration is a complex systemic problem, where parts of the system are interdependent and behavioral change of any element affects the behavior of the whole.

This research applies a series of quantitative and qualitative analyses where each reveals different aspects and properties of the migration system as a whole. The systemic analysis highlights the interconnectedness of different parts and their impact of the system's output. Also, it reveals the cognitive background as a unique aspect of this region: namely, the decision to migrate is based on biased perception and bounded rationality rather than rational choice.

In conclusion, we claim that the system's output (i.e., level of illegal migration) is characterized by the interrelated behavior of parts of the migration system; therefore, strategic planning requires the notion of the dominant feedback loops, self-organization, time delays, limitations, and non-linear relations. Also, we conclude that a skewed perception based on social influence and cognitive biases influences a large number of people in that region to migrate.

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SYSTEMIC ANALYSIS OF ILLEGAL MASS MIGRATION IN THE CENTRAL
MEDITERRANEAN REGION

Ede Enekes
Captain, Hungarian Defence Force
BS, Miklós Zrínyi National Defence University, 2009

Submitted in partial fulfillment of the
requirements for the degree of

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June 2021

Approved by: Sean F. Everton
Advisor

Steven J. Iatrou
Co-Advisor

Imre Porkolab
Second Reader

Douglas A. Borer
Chair, Department of Defense Analysis

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ABSTRACT

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LIST OF ACRONYMS AND ABBREVIATIONS

ACLED	Armed Conflict Location & Event Data Project
API	application programming interface
CAS	complex adaptive system
CoA	course of action
COVID-19	SARS-CoV-2 novel coronavirus
CUG	conditional uniformed graphs
ERGM	exponential random graph models
EU	European Union
EUROPOL	European Union's Law Enforcement Agency
FRONTEX	European Border and Coast Guard Agency
GDP	gross domestic product
GNC	General National Congress (Libya)
HDI	Human Development Index
HoR	House of Representatives (Libya)
IBCs	illegal border-crossings
LNA	Libyan National Army
NATO	North Atlantic Treaty Organization
NGO	non-governmental organizations
OLS	ordinary least squares model
PTS	political terror scale
SACEUR	Supreme Allied Commander Europe
SHERLOC	Sharing Electronic Resources and Laws on Crime System
SME	subject matter expert
SNA	social network analysis
UN	United Nations
UNODC	United Nations Office of Drugs and Crime

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I.   INTRODUCTION

Since 2015, illegal mass migration—and its interrelated challenges like human trafficking, terrorism, weapon smuggling, and drug gangs—is the pre-eminent threat that has emerged on the southern flank of the North Atlantic Treaty Organization (NATO) and the European Union (EU).[1] On January 1, 2019, 4.9% of the total population of the EU 27—21.8 million people—was composed of non-EU citizens.[2] According to the European Border and Coast Guard Agency (FRONTEX), 2.3 million illegal border-crossings (IBCs) were detected in 2015 and 2016.[3] Although this number decreased to 150,144 in 2018 due to countermeasures like the enhanced border protection of most EU countries, the EU-Turkey migration pact, and the EU-Libya relations, member countries on the southern flank still perceive significant illegal migration pressure in the Mediterranean and Balkans regions.[4] At the end of March 2020, 940,960 asylum applications were pending.[5] Consequently, millions of illegal migrants entered EU/NATO countries without any legal control or security check upon their border crossing.

Considering the security aspect of the illegal migration, transnational terrorism and humanitarian crisis are imminent threats, while the expansion of diaspora/parallel societies and decreasing resilience among target and transit countries are potential consequences in the long run. As the European Union's Law Enforcement Agency (EUROPOL) annual *Terrorism Situation and Trend Report* indicates, there is a strong correlation between the number of terrorist attacks and the number of illegal migrants (see Appendix A for

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[1] Alessandro Marrone, "What's New on NATO's Southern Flank: Security Threats and the Alliance's Role after the Warsaw Summit" (working paper, Federal Academy for Security Policy, 2016), http://www.jstor.org/stable/resrep22159.

[2] "Migration and Migrant Population Statistics," Eurostat, accessed 1 March 2021, https://ec.europa.eu/eurostat/statistics-explained/index.php/Migration_and_migrant_population_statistics.

[3] "Detection of Illegal Border-Crossings Statistics," Frontex, accessed 4 September 2020, https://frontex.europa.eu/along-eu-borders/migratory-map/.

[4] Eurostat, "Migration and Migrant Population Statistics."

[5] European Asylum Support Office, "Latest Asylum Trends," accessed 18 July 2020, https://www.easo.europa.eu/latest-asylum-trends; and European Parliament, 'Asylum and Migration in the EU: Facts and Figures', European Parliament, 30 June 2017, https://www.europarl.europa.eu/news/en/headlines/society/20170629STO78630/asylum-and-migration-in-the-eu-facts-and-figures.

details).[6] Moreover, with cases such as the illegal detention centers in Libya, arson in the Moria Camp in Greece, or continuing loss of life in the journey across the Mediterranean Sea, one can argue that the humanitarian crisis escalated along main migratory routes.[7] As a long-term challenge, we might be concerned with emerging parallel societies and consequently the decreased resilience level of EU/NATO countries.[8]

Both NATO and the EU realize the urgency of addressing the complex and diverse threats emanating from the south, but the two organizations recently applied different approaches to address the threat. While NATO concluded that the illegal mass migration is a severe security threat to the Alliance and dedicated the NATO Strategic Direction South Hub to address it, the reactions of EU countries have been less unified due to their varying political perspectives.[9] To summarize, illegal mass migration has created a severe humanitarian crisis along the main migration routes, while it has also provided channels to violent extremist organizations to infiltrate and operate within the territory of the North Atlantic Alliance and created inherent vulnerability points within EU and NATO countries.

A.   RESEARCH OBJECTIVES

The main objective of this thesis is to provide a better understanding of the illegal migration and propose strategic approaches that aim to increase the stability and security of NATO/EU member countries and decrease the suffering and exploitation of migrant

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[6] Europol, *EU Terrorism Situation & Trend Report (Te-Sat) 2018* (European Union, 2018), https://www.europol.europa.eu/activities-services/main-reports/european-union-terrorism-situation-and-trend-report-2018-tesat-2018.

[7] Gábor Pap, "Milíciák Líbiában: Hatásuk Az Ország Biztonsági Helyzetére, Bel- És Külpolitikájára [Militias in Libya: Their Impact on the Security Situation, Interior and Foreign Policy of the Country]" (master's thesis, University of Public Service, 2019); and "Moria Migrants: Fire Destroys Greek Camp Leaving 13,000 without Shelter," *BBC News*, 9 September 2020, sec. Europe, https://www.bbc.com/news/world-europe-54082201; and Simona Varrella, "Deaths of Migrants in the Mediterranean Sea 2014–2020," Statista, accessed 26 January 2021, https://www.statista.com/statistics/1082077/deaths-of-migrants-in-the-mediterranean-sea/.

[8] Dénes Albert, "Berlin's Migrant Clans Are Major Factor behind High Crime Rate, Chief Prosecutor Says," *Remix*, 1 October 2020, https://rmx.news/article/article/berlin-s-migrant-clans-are-major-factor-behind-high-crime-rate-chief-prosecutor-says.

[9] North Atlantic Treaty Organization, "Brussels Summit Key Decisions 11–12 July 2018" (North Atlantic Treaty Organization, 2018), https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2018_11/20181105_1811-factsheet-key-decisions-su.pdf.

populations. This thesis argues that a multi-disciplinary systemic analysis is a necessary approach to understand and mitigate illegal mass migration in the Central Mediterranean. Illegal migration is a complex systemic problem where parts of the system are interdependent and the "behavior of each element has an effect on the behavior of the whole."[10] Consequently, analyzing any of the subsystem without the notion of the system as a whole would lose sight of some fundamental properties of the system.

B.   LITERATURE REVIEW: MIGRATION THEORIES

E. G. Ravenstein in 1885 laid down the fundamentals of the modern migration theories in his work titled *The Laws of Migration.*[11] This study identified certain factors like infrastructure, distance, call for labor market, and commerce that drove migration throughout the United Kingdom. Based on Ravenstein's widely admired findings, a set of scholars developed theoretical background to migration based on economic and demographic functions.[12]

Everett S. Lee's migration model in 1966 served as a basis for the widely applied push-pull model that explains the reasons to emigrate as a net effect of those factors and the obstacles between the origin and the destination country.[13] However, this model only took into account the aggregate effects of the push and pull factors and failed to explain empirical observations, as it excluded environmental (exogenous) factors.[14]

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[10] Russell Lincoln Ackoff, *Creating the Corporate Future: Plan or Be Planned For* (New York: Wiley, 1981), 15.

[11] E. G. Ravenstein, "The Laws of Migration," *Journal of the Statistical Society of London* 48, no. 2 (1885): 167–235, https://doi.org/10.2307/2979181.

[12] John R. Harris and Michael P. Todaro, "Migration, Unemployment and Development: A Two-Sector Analysis," *The American Economic Review* 60, no. 1 (1970): 126–42; and Harry Jerome, *Migration and Business Cycles* (Cambridge, MA: National Bureau of Economic Research, 1926), https://www.nber.org/books-and-chapters/migration-and-business-cycles; and Everett S. Lee, "A Theory of Migration," *Demography* 3, no. 1 (1966): 47–57, https://doi.org/10.2307/2060063.

[13] Lee, "A Theory of Migration."

[14] Silvia Migali et al., *International Migration Drivers*, JRC112622 (Luxembourg: Publications Office of the European Union, 2018), 15, https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/international-migration-drivers.

To overcome these shortcomings, neo-classical economic theories explored the dynamics of migrant flow based on economic drivers. These theories were built on two basic assumptions: (1) Individuals are rational actors who tend to maximize their well-being based on economic differences between origin and destination countries, and (2) the interplay between these actors tends to reach an equilibrium in the marketplace.[15] These findings highlighted the interactions between the agents but did not explicitly address feedback mechanisms and systemic behavior. Also, the model was not able to explain empirically observed patterns.[16]

Based on the fundamental notion of Ravenstein's "Laws," Zipf proposed a model that is based on the positive correlation between migration and the difference between two economies, and the negative correlation between migration and the distance of the two geospatial locations.[17] This model became known as the *basic gravity model of migration*. As a refinement of the basic model, scholars introduced other variables to mitigate sampling biases and provide a better fit for the observed behavior.[18] This is called the *augmented gravity model*, and it acknowledged diaspora as a major factor of migration. Critiques of the gravity models claim that the related regression models can be potential sources of biased result.

Migration systems theories came into existence based the assumed relationship between the globalization process and international migration.[19] Based on the systems theory, Douglas S Massey in 1990 described migration systems as a self-perpetuating phenomenon caused by the creation of social and economic structures that keep up a certain

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[15] George J. Borjas, "Economic Theory and International Migration," *The International Migration Review* 23, no. 3 (1989): 457–85, https://doi.org/10.2307/2546424.

[16] Migali et al., *International Migration Drivers*, 15.

[17] George Kingsley Zipf, "The P1 P2/D Hypothesis: On the Intercity Movement of Persons," *American Sociological Review* 11, no. 6 (1946): 677–86, https://doi.org/10.2307/2087063.

[18] Örn B. Bodvarsson and Hendrik Van den Berg, *The Economics of Immigration* (New York, NY: Springer New York, 2013), 65, https://doi.org/10.1007/978-1-4614-2116-0.

[19] Immanuel Maurice Wallerstein, *The Modern World-System* (New York, NY: Academic Press, 1974); and Wilbur Zelinsky, "The Hypothesis of the Mobility Transition," *Geographical Review* 61, no. 2 (1971): 219–49, https://doi.org/10.2307/213996.

level of flow even though "the structural determinants that prompted it in the first place no longer exert their force."[20]

In 2011, Oliver Bakewell et al. highlighted the relevance of emergent patterns of migration systems. They focused on the question of why initial migration movements give rise to self-perpetuating behavior in one case and not in the other.[21] The authors identified three shortcomings of the prior migration systems studies: (1) while migration systems theory was engaged with self-perpetuation behavior and reinforcing loops, it could not explain the emergent patterns that lead to self-perpetuation behavior; (2) the theory also disregarded the conceptual analysis and the exogenous factors; (3) finally, it provided little understanding of internal mechanisms and paid little attention to balancing loops and limiting factors that inherently characterize the systems behavior.[22]

Built on the development of migration theories, several studies apply systemic approaches to understanding migration to the United States, but I found no research based on a systemic analysis of illegal migration to the EU. Also, while researchers recognize the decision to migrate as a collective (family) decision, they hypothesize rational actors who make decisions based on relevant knowledge of destination countries and a rational cost-benefit calculation.[23] Based on my knowledge, no study applies system dynamics modeling to represent the system's behavior. This thesis aims to fill this gap by exploring the system's behavior and the interconnectedness of its parts. Also, while migration scholars assume rational actors in the system, this thesis hypothesizes a strong social influence and biased perception that leads to mass migration through the Mediterranean region.

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[20] Douglas S. Massey, "Social Structure, Household Strategies, and the Cumulative Causation of Migration," *Population Index* 56, no. 1 (1990): 8, https://doi.org/10.2307/3644186.

[21] Oliver Bakewell, Hein De Haas, and Agnieszka Kubal, "Migration Systems, Pioneer Migrants and the Role of Agency," *Journal of Critical Realism* 11, no. 4 (January 2012): 413–37, https://doi.org/10.1558/jcr.v11i4.413.

[22] Bakewell, De Haas, and Kubal, 6–7.

[23] Arcadius Kahan, "Economic Opportunities and Some Pilgrims' Progress: Jewish Immigrants from Eastern Europe in the U.S., 1890–1914," *The Journal of Economic History* 38, no. 1 (1978): 235–51; and Terance J. Rephann and Coomaren P. Vencatasawmy, "Determinants of the Spatial Mobility of Immigrants: Evidence from Sweden', *The Review of Regional Studies* 30, no. 2 (2000): 189–213.

C.   DATA SOURCES

The primary data source regarding the volume and tendencies of illegal migration is the FRONTEX Detection of Illegal Border-Crossings (IBCs) database.[24] This dataset consists of the monthly statistics of illegal border crossing by nationalities from 2009 to the present. The statistical analyses in Chapter II use open-source datasets of acknowledged organizations like the World Bank's Gross Domestic Products (GDP) per capita dataset, Uppsala University's Conflict Data Program, the Political Terror Scale (PTS) database of the University of North Carolina, or the Polity5 dataset of the Center for Systemic Peace and Societal-Systems Research Inc.[25] The Human Development Index (HDI) data was acquired from the UN HDI database. Georeferenced conflict data was accessed through the Armed Conflict Location & Event Data Project (ACLED) dataset.[26]

The fundamental data source for analyzing the cognitive process that leads to the decision to migrate (Chapter III) is a 2018 study of the European Commission's Directorate of General Migration and Home Affairs, which examined the communication patterns of migrants and asylum seekers in Italy.[27]

Social media data for exploring the Perception of Illegal Migration in Destination Countries (Chapter IV) was collected using Twitter's REST Application Programming Interface (API) and the R programming language (Rtweet package).[28]

The Social Network Analysis (SNA) of the smuggling organizations involved in illegal migration (Chapter V) uses data from the United Nations Office of Drugs and Crime

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[24] Frontex, "Detection of Illegal Border-Crossings Statistics"; and "World Development Indicators," World Bank, accessed 28 February 2021, https://databank.worldbank.org/reports.aspx?source=2&series=NY.GDP.PCAP.PP.KD; and 'Uppsala Conflict Data Program', Department of Peace and Conflict Research, accessed 28 February 2021, https://ucdp.uu.se/; and Mark Gibney et al., 'The Political Terror Scale', 2020, http://www.politicalterrorscale.org/About/Contact/; and 'Polity5 Level', Center for Systemic Peace, accessed 19 March 2021, https://www.systemicpeace.org/inscrdata.html.

[25] World Bank, "World Development Indicators."

[26] ACLED, "The Armed Conflict Location & Event Data Project," ACLED, accessed 6 April 2021, https://acleddata.com/.

[27] Gabriella Sanchez et al., *A Study of the Communication Channels Used by Migrants and Asylum Seekers in Italy, with a Particular Focus on Online and Social Media* (European Commission, 2018), https://doi.org/10.2837/77854.

[28] "Twitter API," Twitter, 23 October 2020, https://developer.twitter.com/en/products/twitter-api.

(UNODC) Case Law Database, UN Security Council Sanction List, and studies of the post-Qadhafi civil wars in Libya, while the SNA of individuals involved in smuggling operations (Chapter VI) uses relational data from the N. 1874/2015 / DDA RG court file of the Public Prosecutor's Office of Palermo District, Italy.[29]

D.   SCOPE AND METHOD

This thesis considers illegal mass migration in the Central Mediterranean as a systemic strategic problem. In a complex system, the system's output is characterized by the behaviors of interdependent parts, where no part can change its behavior without affecting the system as a whole.[30] Consequently, analyzing a part of the system without the notion of the containing whole leads to loss of sight of some essential properties of the system as a whole.[31] Observing a complex system from one perspective produces an imperfect representation of the reality. As Hester and Adams claim, a perfect understanding of a complex systemic problem requires an infinite number of perspectives.[32] Consequently, we may never have perfect understanding of a complex systemic problem, but the more perspective gained, and the more time provided for the observation, the better our understanding. Based on this notion, the main intention of this thesis is to gain as many aspects of system behavior as possible within the given limitations. The following chapters examine different parts of the migration system using qualitative and quantitative analyses to reveal different perspectives and underlying characteristics of the whole system, just like slicing an orange vertically or cross sectionally reveals inherently different aspects of the

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[29] "Case Law Database," United Nations Office on Drugs and Crime, accessed 22 July 2020, https://sherloc.unodc.org/cld/v3/som/cldb/index.html?lng=en; and "Security Council Committee Established Pursuant to Resolution 1970 (2011) Concerning Libya," United Nations Security Council, accessed 12 September 2020, https://www.un.org/securitycouncil/sanctions/1970/materials/summaries; and Pap, Gábor, "Milíciák Líbiában: Hatásuk Az Ország Biztonsági Helyzetére, Bel- És Külpolitikájára [Militias in Libya: Their Impact on the Security Situation, Interior and Foreign Policy of the Country]" (master's thesis, University of Public Service, 2019); Glauco II, Case n. 7472/15 R.N. G.I.P, 2015, https://sherloc.unodc.org/cld/case-law-doc/criminalgroupcrimetype/ita/2015/case_n._747215_r.n._g.i.p._-_glauco_ii.html?lng=en&tmpl=sherloc , accessed 28 April 2021.

[30] Ackoff, *Creating the Corporate Future*, 15.

[31] Ackoff, 17.

[32] Patrick T. Hester and Kevin Adams, *Systemic Thinking: Fundamentals for Understanding Problems and Messes*, Topics in Safety, Risk, Reliability and Quality (Cham Switzerland: Springer International Publishing, 2014), 27, https://doi.org/10.1007/978-3-319-07629-4.

of the same object.[33] This thesis applies a set of quantitative and qualitative analyses that focuses on the Central Mediterranean migration route as one of the most frequented smuggling areas of the world. This migration route directly targets the southern flank of NATO and the European Union, posing a severe security challenge alongside the grave humanitarian crisis.

I also consider the illegal migration system as an open, complex adaptive system (CAS) that generates self-organizing emergent patterns as a response to environmental change. Therefore, its behavior is not understandable without recognition of the interactions between the parts and their containing environment. The political and socio-economic dynamics of origin and target countries, the economically and politically motivated influence of EU decision making, the activity of violent extremist organizations, and the cooperation between EU and donor/transit countries are all parts of the containing environment (exogenous system). On the other hand, IBCs, smuggling networks, NGO activity, security threat level, border protection, and the diaspora within the EU are all parts of the endogenous system (Figure 1).

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[33] Hester and Adams, 27.
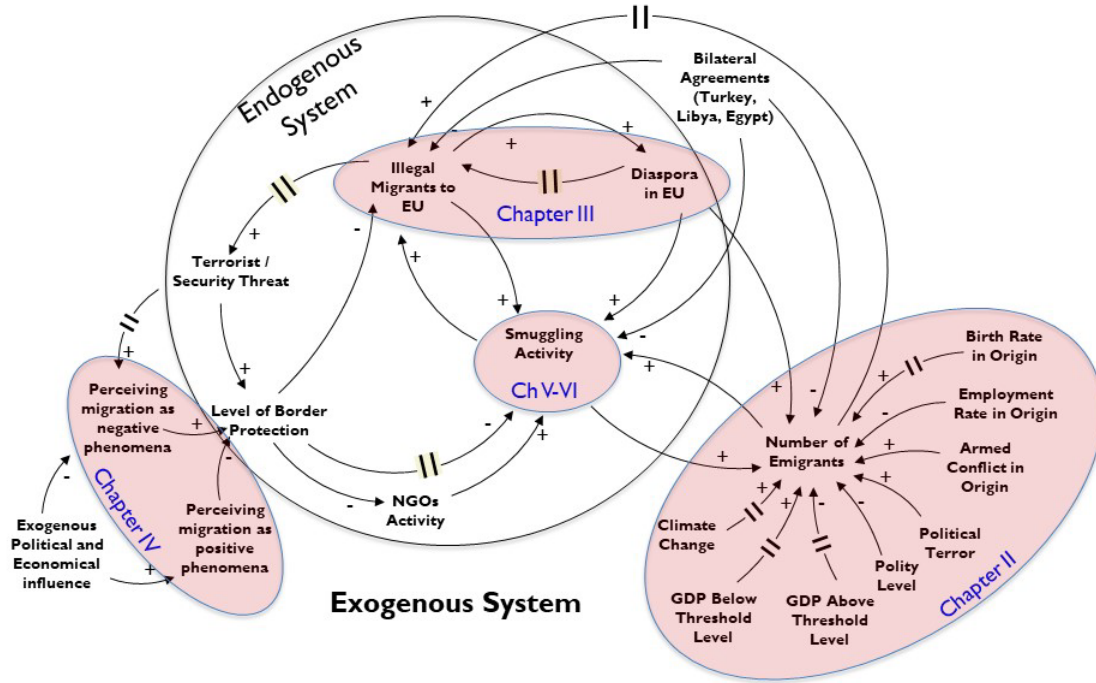
The causal loop diagram represents only causal relationships between system variables. Polarity notation was assigned to each link such that a positive notation represents a reinforcing (i.e., same) causal relationship between the independent and dependent variables, and a negative notation represents a balancing (i.e., opposite) causal relationship. The setup of the causal loop diagram is explained in detail in Chapter VII.

Figure 1.   Causal Loop Diagram—Illegal Migration

Chapter II applies quantitative statistical and geospatial analysis using a multiple regression model to explore the relationship between socio-economic drivers and system output (IBCs). Chapter III provides a qualitative analysis of the cognitive process of migrants focusing on the perception of European countries and the decision-making process that leads a person to migrate. This chapter hypothesizes that strong social influence and social diffusion is shaping the perception of the susceptible populations that triggers the decision to migrate for millions of people. Chapter VI uses text and sentiment analysis on a Twitter communication network to reveal the perception of illegal migration in European societies and its underlying patterns. Chapter V applies SNA to explore the social structure of smuggling organization in the Central Mediterranean. It highlights the prominent role of the Eritrean Smuggling Group. Thus, Chapter VI uses SNA to explore the characteristics and structural vulnerabilities of this particular smuggling organization.

Chapter VII applies system theory to synthetize the findings of the previous analyses. It considers the systemic nature of the problem to suggest three strategic options that could have a decent probability of succeeding.

E.   LIMITATIONS

Data collection was predominantly limited to English language open-source data; therefore, the fit of the applied models and their predictions can be further developed by including more detailed information or classified data sources. The system is embedded into a dynamically changing and turbulent environment; therefore, any application of the proposed techniques requires the refinement of the models based on updated data. This thesis is primarily focusing on the security aspects of the illegal migration. While the political aspect is also an inherent part of the problem, I included it only to the extent that is necessary to understand the behavior of the system. This thesis does not recommend influence activity against any civil societies within the area of interest.

F.   CHAPTER SUMMARY

This thesis considers illegal mass migration as a complex systemic problem on the strategic level. It also acknowledges that any observation of the system's behavior is just an imperfect representation of the reality.[34] While gaining perfect understanding is impossible, the more systemic parts are analyzed, and the more aspects that are included, the better our understanding of the problem will be. Therefore, this thesis applies a series of quantitative and qualitative analyses as each reveal different aspects and properties of the migration system as a whole. Finally, systems theory provides the theoretical basis to synthetize the findings of each chapter and develop strategic approaches to address the problem.

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[34] Ackoff, *Creating the Corporate Future*.

II. DRIVERS OF MIGRATION—A STATISTICAL AND GEOSPATIAL ANALYSIS

This chapter applies statistical analysis to consider the main drivers and underlying factors of illegal mass migration in the Mediterranean region. The analysis explores the relationship between socio-economic drivers and IBCs (as the system's output). The chapter is divided into three main sections. The first is a regional overview exploring the main dynamics of the migration system. The second is a prescriptive statistical analysis that aims to identify the driving factors of the illegal migration in the Mediterranean Basin by using a multiple regression model. The final section is a geospatial analysis that places the drivers into geospatial context focusing on the Central Mediterranean.

A. DATA AND METHOD

Both the regional overview and the statistical part focus on the number of IBCs as the main indicator of illegal migration level. IBC data were retrieved from the Frontex database.[35]

The statistical analysis aims to explain the change in the number of IBCs by considering the following independent variables:

- Population /country of origin/

- GDP per capita /country of origin/

- Armed conflicts /country of origin/

- Diaspora count within the EU

- Unemployment Rate /country of origin/

- Human Development Index (HDI) /country of origin/

- Polity level /country of origin/

- PTS /country of origin/

---

[35] Frontex, "Detection of Illegal Border-Crossings Statistics."

- Distance between the capitals /origin-destination/

We can hypothesize that an increased level of armed conflict, diaspora count, unemployment, and PTS leads to an increase in number of IBCs, while GDP per capita, HDI, polity level, and distance negatively correlate with IBCs. The statistical analysis uses the ordinary least squares (OLS) model to explore the explore the relationship between independent variables and number of IBCs. Referring to the European Commission's *International Migration Drivers Report*, I selected those statistically significant drivers that might also have regional implication in the Central Mediterranean region.[36]

GDP per capita, Unemployment Rate, and Population data were collected from the World Bank database.[37]

Level of armed conflict was collected by the Uppsala Conflict Data Program and measured by the fatalities of armed conflicts in the respective country.[38]

Diaspora within the EU is measured by the Eurostat Migration and Migrant Population dataset.[39]

The HDI data was acquired from the UN HDI database. It measures a country's "average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living. The HDI is the geometric mean of normalized indices for each of the three dimensions."[40]

Polity levels were acquired from the Polity5 dataset of the Center for Systemic Peace and Societal-Systems Research Inc.[41] The dataset assigns a polity level between -10 and 10 to every country, where -10 is a total autocracy while 10 is a mature democracy. War-torn countries with no effective government like Syria or Libya qualify as 0.

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[36] Migali et al., *International Migration Drivers*.

[37] World Bank, "World Development Indicators."

[38] Department of Peace and Conflict Research, "Uppsala Conflict Data Program."

[39] Eurostat, "Migration and Migrant Population Statistics."

[40] "Human Development Index," Human Development Reports, UN Human Development Programme, accessed 6 April 2021, http://hdr.undp.org/en/content/human-development-index-hdi.

[41] Center for Systemic Peace, "Polity5 Level."

PTS data were retrieved from the database of the University of North Carolina.[42] This database describes the violation of basic human rights by agents of the state in the respective country on a scale from 1 to 5, with 1 referring to countries governed by rule of law and 5 to large-scale violation of human and political rights. PTS data is based on the annual human rights reports of Amnesty International, Human Rights Watch, and the U.S. Department of State. For estimating the model, I am using the mean values of the three reports.

Distance data were acquired by the CEPII dataset measured between the capital of the country of origin and Rome as a reference point.[43] The analysis applies 95% confidence level.

B.   REGIONAL OVERVIEW

Migration between North Africa and Italy shows an annual pattern where the peak lies between May and October, while IBCs reach the annual minimum around January of each year (Figure 2). The Mediterranean Basin is divided into Western, Central, and Eastern routes. The unprecedented peak in volume of illegal migration in 2015 was most prevalent along the Eastern Mediterranean route, but the entire Mediterranean region was affected to some extent. The EU-Turkey Agreement, which came into effect on 20 March 2016, resulted in a significant drop in illegal migrants' numbers along the Western Balkans and Eastern Mediterranean routes.

The agreement triggered an increase in the number of IBCs in the Central Mediterranean, however, which became the most frequented migration route to the European Union in the same year. We have witnessed similar tendencies when the combined efforts of the Italian Government and the international community resulted in an 80% drop in the Central Mediterranean region in 2018, but the Western Mediterranean route experienced a great migratory pressure in the same year. In 2019, when both Central and Western routes experienced a decreased number of IBCs, seemingly the bulk of

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[42] Mark Gibney et al., "The Political Terror Scale."

[43] "Geographical Distance Database," CEPII, accessed 19 March 2021, http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=6.

migratory pressure shifted to the Eastern Mediterranean route. To sum up, this observation highlights the fluid characteristic of the overall migratory flow in the Mediterranean region. Locally applied policies and bilateral agreements shift the migratory pressure from one path to the other while barely impacting the volume of the overall flow.
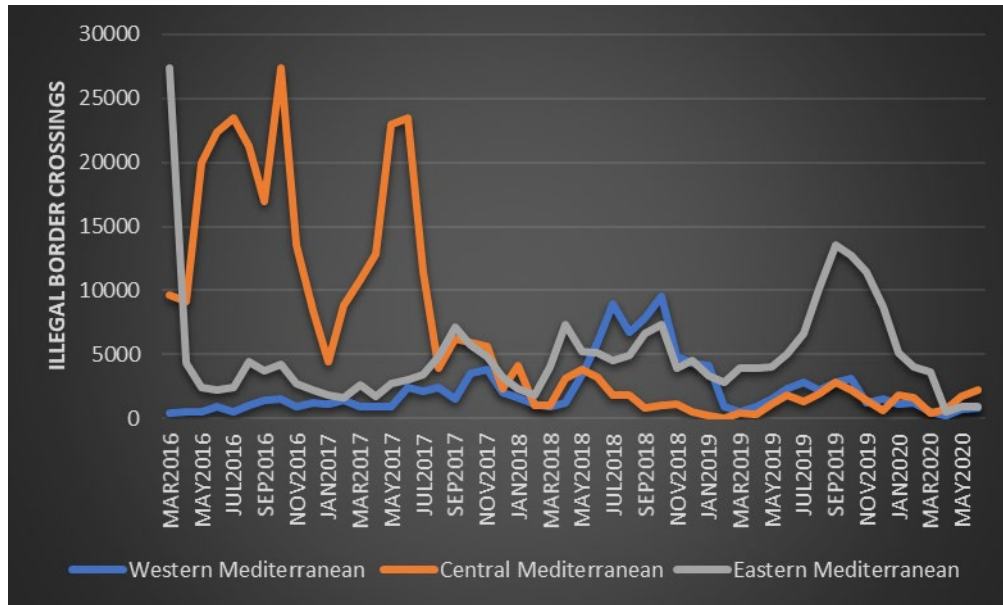
Figure 2.   Migratory Flow in the Mediterranean (May 2016–June 2020)[44]

Notably, the SARS-CoV-2 novel coronavirus (COVID-19) shutdown in the EU countries serves as evidence that a unitary approach and enhanced border protection can halt the migration (despite the former viewpoint of migrant scholars).[45] As shown in Figure 3, the border control measures implemented due to the coronavirus also had the side effect of reducing unlawful border crossings to almost zero. During this time, the EU had the lowest number of IBCs since 2010. This section established the main dynamics of the

[44] Adapted from Frontex, "Detection of Illegal Border-Crossings Statistics."

[45] Clare Cummings et al., *Why People Move: Understanding the Drivers and Trends of Migration to Europe* (London, UK: ODI, 2015), 4, https://odi.org/en/publications/why-people-move-understanding-the-drivers-and-trends-of-migration-to-europe/.

illegal migration in the Mediterranean Basin; the following section explores the socio-economic drivers of illegal migration.
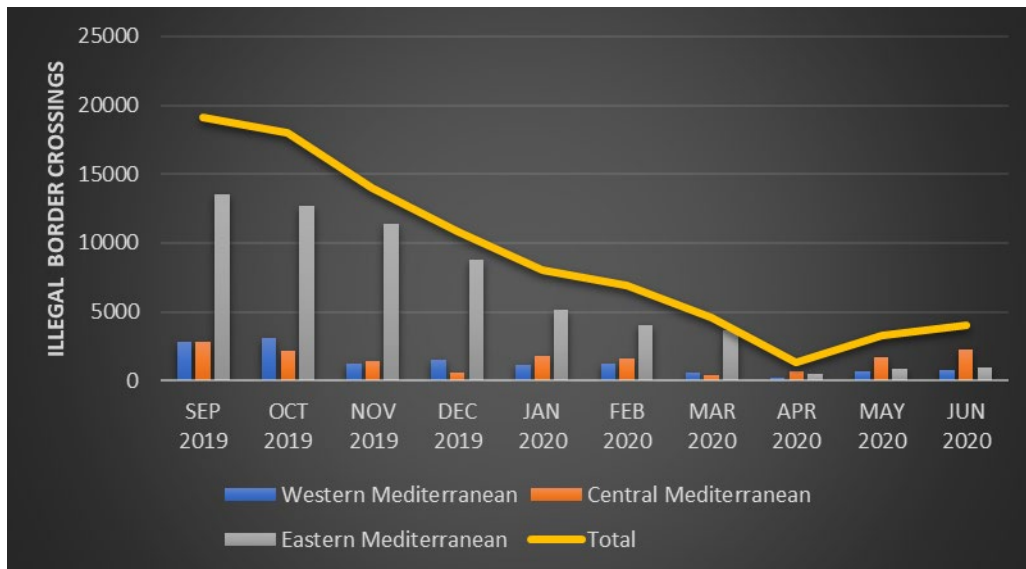
Figure 3.   Impact of COVID-19 in the Mediterranean (September 2019–June 2020)[46]

C.   STATISTICAL ANALYSIS—DRIVERS OF ILLEGAL MIGRATION

Understanding why people migrate is paramount for predicting tendencies of illegal migration and analyzing the possible effects of migration policies. Consequently, drivers of illegal migration are a central concern for security planning and policy making. This set of analyses uses multiple regression to identify potential drivers of illegal migration and explain the relative importance for each independent variable.

The dependent variable is the base ten logarithm of IBCs by nationalities. The independent variables are established in Section II.A.[47] The observation period is between

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[46] Adapted from Frontex, "Detection of Illegal Border-Crossings Statistics."

[47] Marie McAuliffe, Binod Khadria, and Céline Bauloz, *World Migration Report 2020* (Geneva, Switzerland: UN International Organization for Migration, 2019), https://www.un.org/sites/un2.un.org/files/wmr_2020.pdf; and Elisa Mosler Vida and Jasper Dag Tjaden, *Global Migration Indicators 2018* (Geneva, Switzerland: UN International Organization for Migration, 2018), https://publications.iom.int/system/files/pdf/global_migration_indicators_2018.pdf.

2014 and 2018. The analysis considers the top 50 countries that contribute the most to the total number of IBCs. I excluded South American, Southeast Asian, and European donor countries to focus the scope on the Central Mediterranean region. The model applies a one-year lag in respect of diaspora data, as we can assume time delay between the initial social influence that contribute to the decision to migrate and the time of arrival. Referring to Table 1, the OLS model estimates the following relationship between the number of IBCs and the independent variables (driving factors):

Table 1.   Regression Table

	log(IBCs+1)
log(Population $_o$)	-0.105
	(0.117)
log(GDP per capita $_o$)	-0.084
	(0.230)
log(Armed conflicts $_o$)	0.058
	(0.054)
log(Diaspora $_{t-1}$)	0.789***
	(0.082)
log(Unemployment $_o$)	0.522***
	(0.194)
Human development index $_o$	-7.544***
	(1.966)
Polity level $_o$	-0.074***
	(0.024)
Political terror scale $_o$	0.074
	(0.198)
log(Distance $_{o-t}$)	-0.726***
	(0.263)
Constant	3.833**
	(1.943)
Observations	242
MAE	1.236
AIC	940
BIC	978
Log Likelihood	-458.882

* $p < 0.1$;   ** $p < 0.05$;   *** $p < 0.01$

Referring to the regression table, five factors are statistically significant. These are diaspora count, unemployment, human development index, polity level, and distance.

There is enough statistical evidence to infer a moderate positive relationship (0.52) between the diaspora count and number of IBCs, and a weak positive relationship (0.28) between the unemployment rate of the country of origin and number of IBCs.

The analysis also provides statistical evidence to infer weak negative relationships (0.21; 0.16; 0.17) between HDI, polity level, distance as independent variables, and the number of IBCs as dependent variable.

The model indicates weak positive relationships between levels of armed conflicts and political terror scale (0.35; 0.38) with IBCs, while it shows weak negative relationship (0.23) between GDP per capita and IBCs. None of these factors are statistically significant, however, although that does not necessarily mean that there is no relationship between the abovementioned factors and number of IBCs. It also can be a result of non-linear behavior in respect of these factors.

D.   GEOSPATIAL ANALYSIS

Geospatial analysis places the statistical analysis into a context that highlights geographic patterns, which helps us to understand why migrants chose specific routes instead of others. As Libya accounted for most of the illegal migrants in the Central Mediterranean in the observation period, the scope is somewhat gravitated to this county. The presence of low if any governmental control, the diverse network of militias and smuggling groups, and an emergent war economy set the condition for a successful migration network across Libya.

In Qadhafi's absence, the balance of power within Libya dissolved from a centralized, autocratic government into decentralized control by various militia groups no longer aligned by the threat of a common enemy. This absence of any centralized government allowed the different militia groups to establish businesses based on the transportation of migrants seeking a better economic life as they leave countries dominated by decades of armed conflict. Combining the ACLED and United Nations Social Indicator

data offers a glimpse into the scale of the conflict events and demographic indicators that may be related. Figures 4 and 5 show the regional armed conflict attacks in North Africa from the 10 years before Qadhafi's ousting and the nine years after.
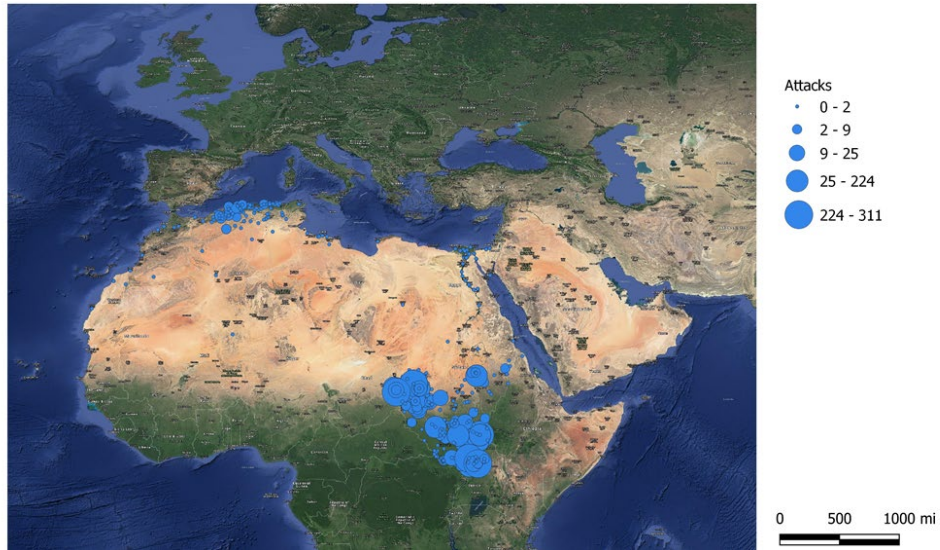
Figure 4.   Conflict Attack Events 2000–2010[48]

48 Adapted from ACLED, "The Armed Conflict Location & Event Data Project."
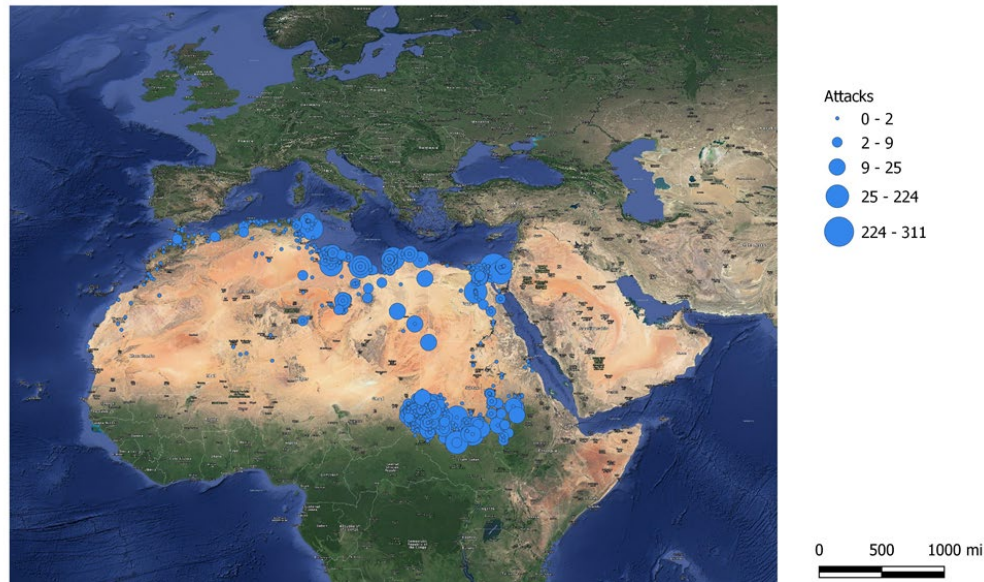
Figure 5.　Conflict Attack Events 2012–2020[49]

Geospatial and temporal analysis of these data suggest the surrounding populations were influenced by the nearby conflict and likely sought an environment with not only significantly lower levels of armed conflict but better economic opportunity as well. According to the last five years of data, populations in the North Africa region's surrounding countries experienced tremendous conflict and subsequent fatalities (Figure 6). These factors likely produced the migratory behaviors exhibited within the populations as conflicts have been proven to be a factor of migration. Figure 6 shows the regional conflict fatalities from grouped by size. Along with conflict conditions in the region, several economic factors offer suggestions that may help understand why migratory populations often choose Libya as the country of choice for migration.

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[49] Adapted from ACLED.
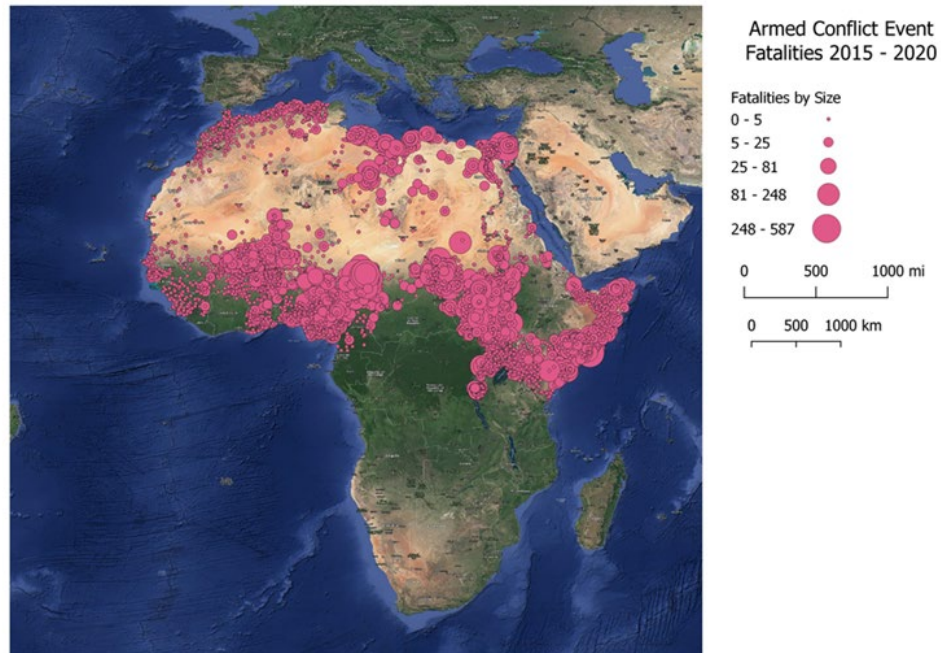
Figure 6.   Armed Conflict Event Fatalities 2015–2020[50]

Continuing geospatial analysis of the region, I merged World Bank Development indicators with the previous dataset. GPS coordinates aligned the data with the UN Social Index shapefile. Figure 7 shows GDP per capita for each country.

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[50] Adapted from ACLED.
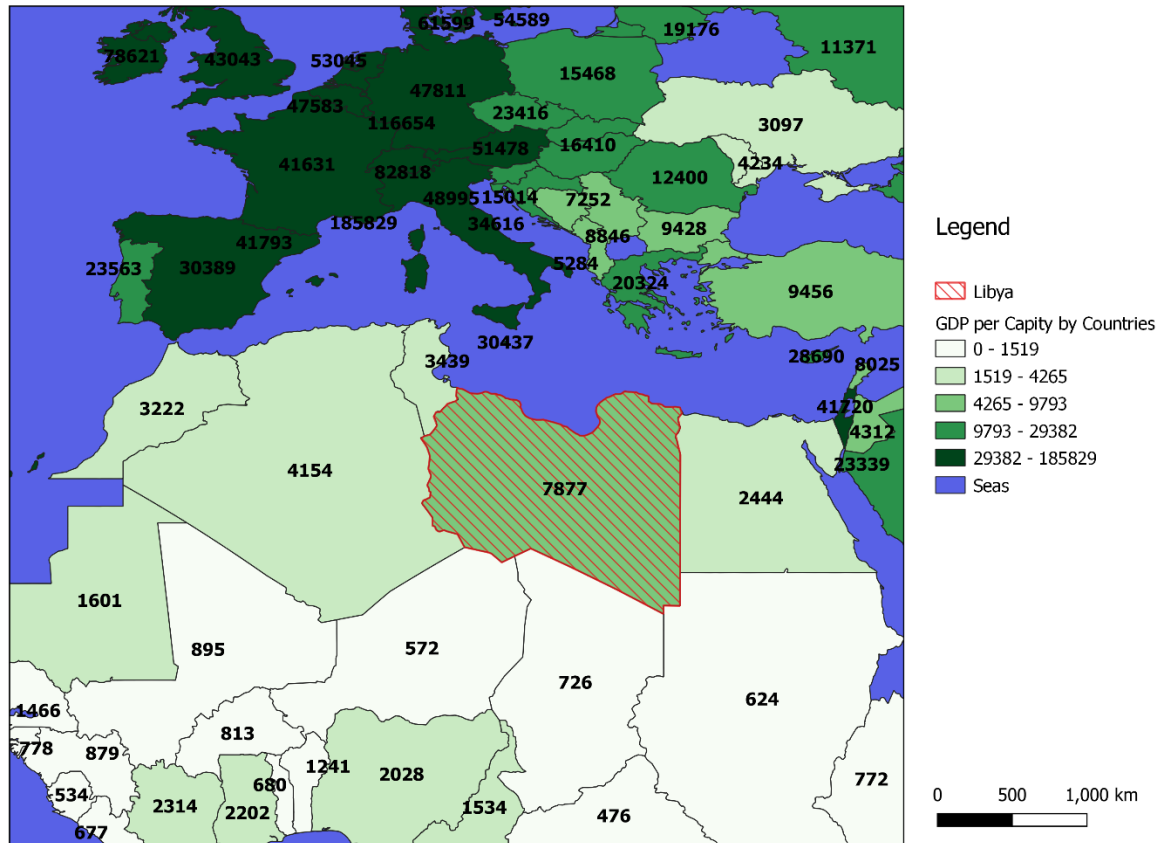
Figure 7.   GDP per Capita, 2020[51]

This data suggests that of all the countries in the North Africa region, Libya has the highest GDP per capita, which would attract migrants from significantly lower-income areas seeking economic means to travel to Europe. Those looking to migrate, specifically to Europe, likely choose Libya after departing an area of high conflict, while others merely looking to escape the turmoil brought by conflict may seek a country less disturbed by warring factions. Next, the Center for Systemic Peace database provided polity data for the region. Polity data provides a reference to democracy levels offered by qualities of democratic and autocratic governing institutions. The governments are given a score on a scale ranging from -9 to 10, which corresponds to fully institutionalized autocracies, such as North Korea, all the way to formal democratic governments, like the United States.

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51 Adapted from World Bank, "World Development Indicators."

Figures 8 and 9 show polity levels and PTS for the region. Referring to the polity levels, code -77 is assigned to countries with no effective governance (for example, in a state of civil war).

Figure 8.   Polity Levels 2018[52]

[52] Adapted from Center for Systemic Peace, "Polity5 Level."
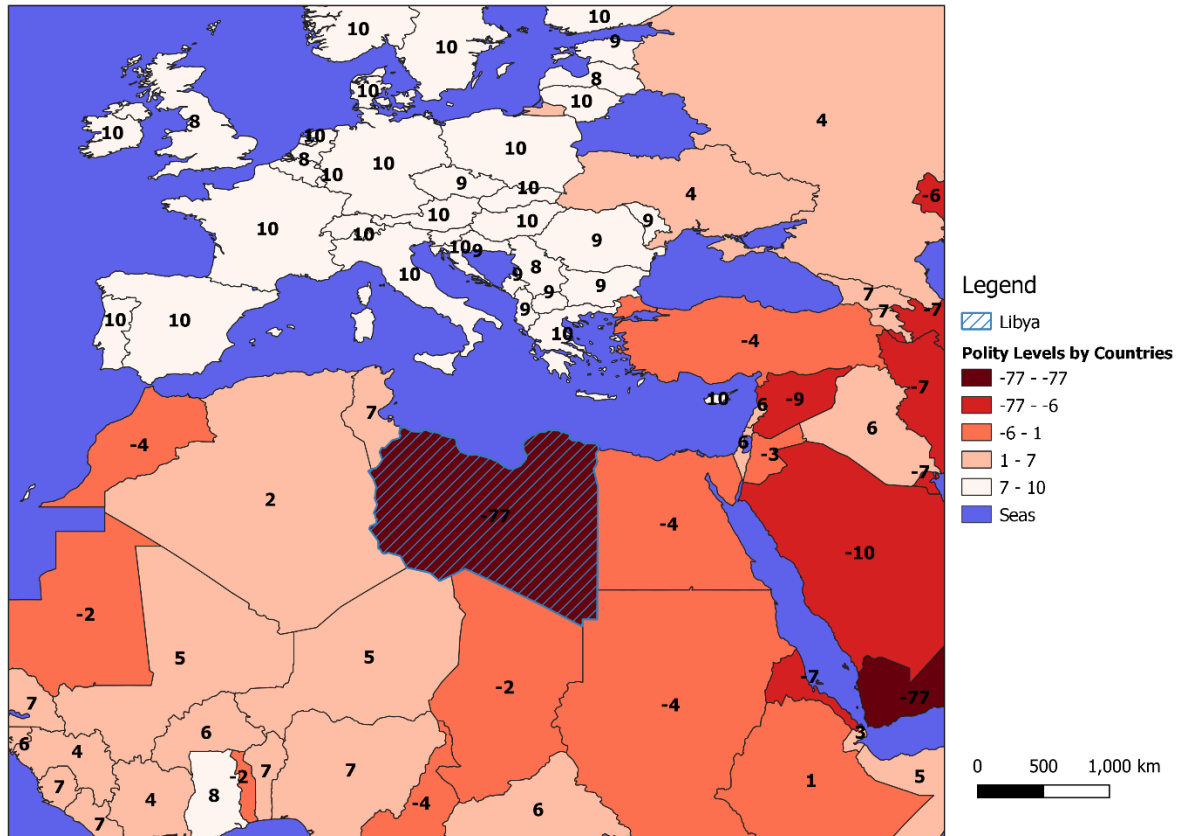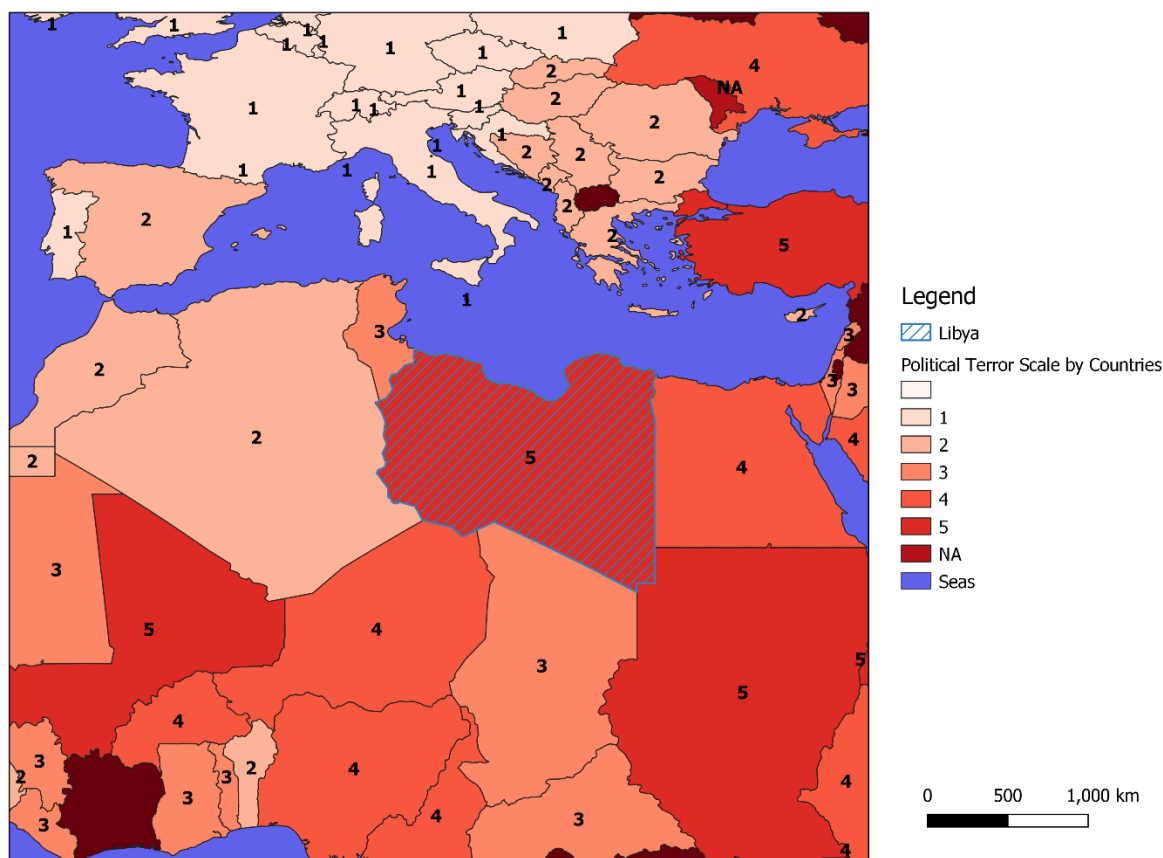
Figure 9.   PTS 2018[53]

As the polity data show, the areas surrounding Libya all have some form of government control. The highest democratic government score in the region is found by Tunisia, which ranks relatively high on the democratic institution scale, suggesting that the rule of law, effective border control, and democratic policies contribute to the quality of life. Other countries in the region show moderate autocratic control, which suggests centralized control provided by a dictatorship with the absence of a third party to enforce any policy decision, preventing even militia groups engaging in migrant smuggling from operating within these regions. However, looking again at Libya and the central question for this research, Libya's polity score is 0, indicating that neither a democratic institution nor an autocratic dictatorship controls the country's political mechanisms. Without any

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53 Adapted from Mark Gibney et al., "The Political Terror Scale."

form of the formalized institutions of law or control by a dominating authority, the militia groups left behind by the civil war of 2011 have been left to do as they please within their fragmented silos. This "lawlessness" or self-policing by the various factions has driven a new business model within the country, allowing militias to engage in migrant smuggling as a means of making money.[54]

Interestingly, a significant decrease in the illegal migrant flow from Libya has occurred since 2017 as General Haftar's troops took control the southwestern part of the country and disrupted important migrant smuggling routes and hubs (e.g., by the seizure of Shaba). This environmental change triggered a self-organizing pattern within the migrant smuggling network that resulted in the activation of Tunisian smuggling routes. Tunisia became the most prevalent transit country in 2018, and Algeria followed in 2020.[55]

E.   DISCUSSION

The regression model provides statistical evidence about the importance of socio-economic and socio-political factors that lead to a higher level of migration, such as unemployment rate, HDI, and polity level. Moreover, the presence of diaspora in one of the EU countries is highlighted as a major factor of illegal migration. Diaspora count shows the highest correlation (0.51) with number of IBCs comparing to the other variables in the model.

Unsurprisingly, distance as a factor of migration is also statistically significant, but the correlation with IBCs is relatively low (0.17), indicating that other factors often dominate over the intuitive notion of distance between country of origin and EU countries.

On the other hand, there is not enough statistical evidence to claim a relationship between IBCs and GDP per capita, level of armed conflict, or PTS. However, a lack of statistical evidence does not necessarily mean that there is no relationship between these

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[54] Maggie Michael, Lori Hinnant, and Renata Brito, "Making Misery Pay: Libya Militias Take EU Funds for Migrants," *AP News*, 30 December 2019, sec. Europe, https://apnews.com/article/europe-united-nations-tripoli-ap-top-news-international-news-9d9e8d668ae4b73a336a636a86bdf27f.

[55] "Central Mediterranean Route," European Council, accessed 9 April 2021, https://www.consilium.europa.eu/en/policies/migratory-pressures/central-mediterranean-route/.

factors at all. A number of qualitative and quantitative studies infer a strong relationship between illegal migration and all of the abovementioned drivers.[56] But why does recent analysis find no statistical significance for those drivers? The complex and non-linear behavior of the system provides a possible explanation: the high number of interacting factors and self-organizing behavior of the system generate patterns and probabilistic behaviors, but linear (causal) relationships are often masked by the time delay and interrelated feedback loops.

For example, the study of the Joint Research Center of the European Commission highlights non-linearities between GDP per capita and the number of migrants.[57] The authors divided the countries into three groups according to their economic power: low-, medium-, and high-income countries. They identified different dynamics of general migration with the respect of GDP per capita for countries with different income levels. While GDP per capita shows no relationship with migration in low-income countries, a higher level of GDP increases migration in medium-income countries and decreases it in high-income countries. The authors describe these dynamics as an inverse U-shaped curve, where an increase in GDP per capita results in an increased level of migration in a short term, while it decreases over the medium and long run. Framing it another way, we could say that the dynamics between GDP and migration show a somewhat goal-seeking behavior, where a certain threshold level generates the highest number of illegal migrants. When GDP per capita is below this threshold level, the relationship is positive and an increase of GDP per capita produce higher IBCs. On the other hand, when GDP is higher than the threshold, the relationship turns into negative and the higher the GDP per capita the lower the number of IBCs of the same nationalities. We could infer that this threshold level is between $1,100 and $1,500 per capita per year along the Central Mediterranean migratory route. We might think of it as a probabilistic factor, where a country with the GDP per capita between $1,100 and $1,500 has the highest probability to trigger mass

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[56] Migali et al., *International Migration Drivers*; and Vida and Tjaden, *Global Migration Indicators 2018*.

[57] Migali et al., *International Migration Drivers*, 40.

migration, while above or below this level the probability to migrate is generally decreased given that every other factor is constant.

We might also think of armed conflicts as a probabilistic factor of illegal migration (and migration generally). By plotting the level of armed conflicts over number of IBCs, we can see a clear positive relationship between the two variables for those nations who suffer from armed violence; a number of countries produce high level of IBCs without any armed conflicts, however. We can argue that a higher level of violence triggers a higher number of IBCs. On the other hand, a higher level of IBCs obviously does not necessarily correlate with high level of armed conflicts as several other factors can cause the same level of migration. This characteristic prevents the regression model to indicate statistically significant relationship between the two variables, but based on the data analysis, we should consider armed conflicts as one of the most powerful factors of migration. This observation correlates with notions of migrant scholars, who claim armed conflict as a fundamental reason to migrate.[58]

Similarly, PTS shows a general tendency toward higher PTS coupled with higher IBCs, although the relationship is somewhat masked as PTS 2.5 produces higher IBCs than a linear relationship would justify. As a result, we should accept PTS as a probabilistic factor, where a higher level of PTS increases the probability to migrate.

Geospatial analysis highlighted how social-economic factors and instability shape migratory routes. The patterns of high-intensity conflicts and low HDI pushed a large number of illegal migrants from Sub-Saharan countries toward Libya. While Libya has large uncontrolled territories and a war-torn governmental control, it also has relatively high GDP per capita that supports an extended militia ecosystem and provides resources for smuggling activity. These factors facilitated an emergent smuggling network that promotes large-scale illegal movement toward the European Union. This network had been partially disrupted by the 2014–2018 civil war and bilateral agreement between European countries and one of the Libyan governing powers (GNA), however. As a result, the

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[58] Justin Schon, "Motivation and Opportunity for Conflict-Induced Migration: An Analysis of Syrian Migration Timing," *Journal of Peace Research* 56, no. 1 (1 January 2019): 12–27, https://doi.org/10.1177/0022343318806044.

smuggling network adapted to the changing environment and shifted the main migratory paths to Tunisia, then Algeria. This behavior is clear indication of self-organizing behavior and emergent patterns of migrant smuggling networks.

F.   CHAPTER SUMMARY

According to the statistical analysis, we can accept the hypothesis in respect of diaspora count, unemployment rate, HDI, polity level, and distance. Statistical evidence shows that an increase in diaspora count and unemployment results in an increased level of IBS, while an increase in HDI, polity level, and distance correlate with a decreased level of IBCs. GDP per capita, armed conflicts, and PTS are not statistically significant, but we can interpret these variables as probabilistic factors based on further analysis. We can claim that a higher level of armed conflict and PTS increase the probability to migrate. On the other hand, plotting GDP per capita over IBCs shows a somewhat goal-seeking behavior, where GDP level of $1,100–$1,500 produces the higher number of IBCs, while either higher or lower GDP decreases the probability to migrate.

Geospatial analysis highlighted that social-economic factors and instability shape migratory routes and result in the fluid characteristics of migration flow. The analysis also highlights the emergent patterns of smuggling networks as a response to the exogenous (environmental) factors. The non-linearities and adaptive, self-organizing behavior are indicators of the systemic nature of migration.

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III.   SOCIAL INFLUENCE AND COGNITIVE DOMAIN OF MIGRANTS

While the statistical analysis (Chapter II) identified the main factors of illegal migration, this chapter aims to analyze the cognitive process that leads to the decision to migrate. According to the global sample of Gallup's World Poll between 2015 and 2017, 15% of the adult population of the world (more than 750 million people) is willing to migrate, while only 1.1% made actual preparations to do so.[59] But what drives the decision to migrate? As decision making is a cognitive process, it is inherently subtle and could be subject to social influence, social contagion, and cognitive biases that together shape the perception of migrant populations. This analysis focuses on the information that the decision is based upon, the source of the information, and the possible social influences that shape the pseudo-environment of the migrants.

As Walter Lippmann argues, "the real environment is altogether too big, too complex, and too fleeting for direct acquaintance."[60] Consequently, human cognition establishes oversimplified mental models of the reality and acts upon them regardless of the accuracy of the representation. We might question whether the decision to migrate is based on a rational cost-benefit calculation or is a result of a biased mental model. What social and psychological factors impel some to migrate, and what differences exist between the actual and perceived environment of potential migrants? More importantly, what are the possible sources of the disparities between the actual and perceived environment?

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[59] Neli Esipova, Rajesh Srinivasan, and Julie Ray, "Global Desires to Migrate: Trends in Global Migration and Migration Policy," in *Adjusting to a World in Motion: Trends in Global Migration and Migration Policy*, ed. Douglas J. Besharov and Mark H. Lopez (New York, NY: Oxford University Press, 2016), 21–57, https://doi.org/10.1093/acprof:oso/9780190211394.003.0002; and Neli Esipova, Anita Pugliese, and Julie Ray, "More Than 750 Million Worldwide Would Migrate If They Could," *Gallup*, 10 December 2018, sec. World, https://news.gallup.com/poll/245255/750-million-worldwide-migrate.aspx; and Vida and Tjaden, *Global Migration Indicators 2018*, 33.

[60] Walter Lippmann, *Public Opinion* (New York, NY: Macmillan, 1922), 4, http://hdl.handle.net/2027/uc1.b5232744.

A. THEORETICAL BACKGROUND

As Lippmann explains, "whatever we believe to be a true picture, we treat as if it were the environment itself."[61] Humans are biologically, geographically, and temporally incapable of sensing the world in its entirety, due to its complex and erratic nature. As our cognition is not capable to process this complexity, we reconstruct the reality in our mental models as a simplified representation of the environment.[62] As a result, people may act in ways that do not "rationally" conform to what the situation logically would require. Moreover, if someone has no direct experience in a particular situation, his mind applies a created mental image to generate feeling as the basis of the reaction.[63] Lippmann refers to this imperfect representation of the reality as the pseudo environment, which is formed as an interaction between the human mind and the real environment.[64]

This pseudo environment is characterized by the state of mind, previous knowledge, and the sensory ways as we receive environmental stimuli. The dynamic model of situated cognition by Shattuck and Miller argues that sensors (including human sensors) perceive only a portion of reality; moreover, the array of sensors and the related technological system transfer only a subset of all available data.[65] In this uncertain environment, we tend to seek patterns based on previous experiences. The incoming data is propagated through different lenses that may or may not change the information content. The data might be filtered by the array of sensors (our attention), the cultural and social factors, and the state of mind (emotions, psychological factors).

Tversky and Kahneman found that human cognition relies on heuristics when faced with complex and uncertain problems.[66] While these heuristics are useful and necessary

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[61] Lippmann, 1.

[62] Lippmann, 4.

[63] Lippmann, 4.

[64] Lippmann.

[65] Lawrence G. Shattuck and Nita Lewis Miller, "Extending Naturalistic Decision Making to Complex Organizations: A Dynamic Model of Situated Cognition," *Organization Studies* 27, no. 7 (2006): 989–1009, https://doi.org/10.1177/0170840606065706.

[66] Amos Tversky and Daniel Kahneman, "Judgment under Uncertainty: Heuristics and Biases," *Science* 185, no. 4157 (1974): 1124–31.-

for rapid decision making, they might serve as a basis for cognitive biases that lead to severe judgmental errors and poor decision making. In addition to the imperfect perception, human cognition tends to fill in the blanks based on previously experienced patterns.[67] Consequently, human cognition processes only a portion of the already reduced and probably misrepresented dataset. In other words, humans act upon what they perceive to be true even if there is a significant difference between the perceived image and the real environment.

The Joint Publication 3-13, Information Operations published by the U.S. Joint Chiefs of Staff describes the information environment as an aggregate of three interrelated and continuously interacting dimensions: physical, information, and cognitive.[68] The cognitive dimension is the space where "information processing, perception, judgment, and decision making" occur.[69] While the concept of cognitive dimension is more abstract than the already recognized warfighting domains (air, land, sea, space, cyber), more and more scholars urge the consideration of cognitive space as an operational domain.[70] The publication of the Reflection Group to the NATO Secretary General recommended development of "capabilities for operating in the cognitive and virtual dimensions."[71] Considering the impact of the Fourth Industrial Revolution on the changing nature of conflicts, we can argue that the concept of the cognitive domain is one of the most

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[67] Linton C. Freeman, "Filling in the Blanks: A Theory of Cognitive Categories and the Structure of Social Affiliation," *Social Psychology Quarterly* 55, no. 2 (1992): 118–27, https://doi.org/10.2307/2786941.

[68] Joint Chiefs of Staff, *Information Operations*, JP 3-13 (Washington, DC: Joint Chiefs of Staff, 2014), https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_13.pdf.

[69] Joint Chiefs of Staff, I–3.

[70] Paul Ottewell, "Defining the Cognitive Domain," *Over The Horizon, Multi Domain Operations and Strategy*, 7 December 2020, https://othjournal.com/2020/12/07/defining-the-cognitive-domain/; and Robert S. Ehlers Jr. and Patrick Blannin, "Making Sense of the Information Environment," *Small Wars Journal*, 3 March 2020, https://smallwarsjournal.com/jrnl/art/making-sense-information-environment; and Deric J. Holbrook, "Information-Age Warfare and Defence of the Cognitive Domain," The Strategist - Australian Strategic Policy Institute, 13 December 2018, https://www.aspistrategist.org.au/information-age-warfare-and-defence-of-the-cognitive-domain/.

[71] Thomas de Maizière et al., *NATO 2030: United for a New Era* (Reflection Group to the NATO Secretary General, 2020), https://www.nato.int/nato_static_fl2014/assets/pdf/2020/12/pdf/201201-Reflection-Group-Final-Report-Uni.pdf.

dynamically developing areas in security thinking.[72] Therefore, considering this factor is paramount for further analyzing illegal mass migration.

B.   LIMITED KNOWLEDGE ABOUT EUROPE

According to the study of the European Commission's Directorate of General Migration and Home Affairs in 2018, we can claim that the migrants' knowledge of Europe is somewhat limited and distorted.[73] The study surveyed 686 migrants (including illegal migrants, asylum seekers, and refugees) who arrived in Italy in the second half of 2017. The majority of the respondents originated from Sub-Saharan Africa, north of the Equator. The gender ratio was 90% male and 10% female, while the vast majority (96%) of the respondents were between the ages of 16 and 34.

The study highlights that 73% of the surveyed migrants had little if any knowledge of any European country upon arrival. "In fact, even among those who were able to provide the name of a specific country, knowledge of its location and/or dynamics was scant."[74] It is worth noting that there were significant differences between nationalities in this regard. While approximately 70% of migrants from Mali, Senegal, and Nigeria could not name a specific destination country, only 23% of Tunisian migrants could not.[75] This notion correlates with the geographical proximity, the higher polity level, and the higher HDI of Tunisia compared to Sub-Saharan countries (Chapter II—Geospatial Analysis). Also, migrants who had friendship or kinship ties to any EU member country were most likely to name a specific country of destination.[76] This demonstrates the significance of knowing the source of information and the role of social structure in the decision-making process.

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[72] NATO Science & Technology Organization, *Science & Technology Trends 2020–2040* (Brussels, Belgium: NATO Headquarters, 2020), https://www.nato.int/nato_static_fl2014/assets/pdf/2020/4/pdf/ 190422-ST_Tech_Trends_Report_2020-2040.pdf.

[73] Sanchez et al., *Communication Channels Used by Migrants*.

[74] Sanchez et al., 15.

[75] Sanchez et al., 16.

[76] Sanchez et al., 17.

C.   SOURCE OF INFORMATION

According to the European Commission's survey, the main source of information for migrants is the kinship and friendship network. While migrants prefer face-to-face communication before leaving their home country and during the journey, they also apply social media and telephone communication to keep in contact with friends and relatives living in the diaspora.[77] During and after the journey, they prefer to communicate with fellow migrants from the same ethnic group. The initial movement is often a collective decision made by the family in which the individual is embedded. Immediate relatives often take the financial burden of the journey; therefore, they are directly involved into the decision making in these cases. The migrant smugglers demand a significant amount of money in return for their service. They are usually paid for different segments of the journey as they are selling modular service for parts of the migratory routes. The subsequent payments are often paid by family members using money transfer service or middleman process called "hawala method." As a result, the collective decision-making process also could be true for the subsequent phases of the journey: "The decision to leave Libya was a collective process. Migrants reported talking with family members, employers and co-workers in Libya and in their countries of origin, mainly by phone, to consult them about leaving."[78] Interestingly, conditions in Libya were frequently cited as the main factor in the decision to travel to Europe, while they were concise and obscure in articulating the incentives to leave their home country (making the initial step to migrate).[79]

Social media platforms are usually not a means of communicating about illegal migrant activity. Smugglers and illegal migrants often use encrypted communication platforms like Viber or Whatsapp to discuss the details of the illegal journey.[80] Interestingly, migrants do not see interactions with smugglers negatively. It seems that they are well aware of the dangers and the possible exploitations by smugglers; moreover, they

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[77] Sanchez et al., 7.

[78] Sanchez et al., 19.

[79] Sanchez et al., 15.

[80] Glauco II, Case n. 7472/15 R.N. G.I.P, 2015, https://sherloc.unodc.org/cld/case-law-doc/criminalgroupcrimetype/ita/2015/case_n._747215_r.n._g.i.p._-_glauco_ii.html?lng=en&tmpl=sherloc.

mostly accept it as a necessary condition of the journey.[81] Also, we can highlight that the migrant smuggling network consists of competing groups who are not selling specific destinations, rather they provide transportation generally to the territory of the EU. In several cases, the smuggling groups put high emphasis on their reputation and credibility to gain competitive advantage.[82] While they are not the primary source of expectations, they are definitely shaping the perception (pseudo-environment) of migrants by effectively spreading their narratives through face-to-face communication. The reputation of smuggling groups and their contact information is spread through the social network in which both the migrants and the smugglers are embedded.

Interestingly, the first relevant sources of information regarding the destination country are humanitarian workers, who encounter migrants only at the final phase of their journey.

> The interactions with humanitarian staff, mediators and other migrants, along with occasional encounters with Italian citizens, gradually shaped migrants' understandings of Italy and of the way they were perceived in Italian society. Focus groups revealed migrants believed the initial messages that they would be welcomed by a country and people that respected human life, and where they would be unlikely to experience or witness the violence that they had seen in Libya or in their countries of origin. These notions were repeatedly communicated to migrants upon their rescue by ship crews, humanitarian and reception centre staff. Yet, as shown in the following section, everyday social interactions often proved difficult.[83]

Upon arrival, migrants are confronted with a reality that differs from their perception of what the reality would be; this often causes confusion, fear, and anxiety. "During the first few weeks following their arrival, migrants start to realize that many of the initial messages about being welcomed in Italy are not necessarily reflective of the

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[81] Nima Elbagir, Hassan John, and Lillian Leposo, "Don't Struggle If You're Raped': A Smuggler's Chilling Warning," *CNN*, 27 February 2018, https://www.cnn.com/2018/02/27/africa/nigeria-migrant-smugglers-intl/index.html.

[82] Glauco I, Case n. 10341/15 R.N. G.I.P. 2014 , https://sherloc.unodc.org/cld/case-law-doc/criminalgroupcrimetype/ita/2014/case_n._1034115_r.n._g.i.p._-_glauco_i.html (2014); and Glauco II, Case n. 7472/15 R.N. G.I.P, 2015, https://sherloc.unodc.org/cld/case-law-doc/criminalgroupcrimetype/ita/2015/case_n._747215_r.n._g.i.p._-_glauco_ii.html?lng=en&tmpl=sherloc.

[83] Sanchez et al., *Communication Channels Used by Migrants*, 25.

conditions that they face."[84] Later on, migrants become highly anxious about the inability to work legally.[85] Even if they possess the documentation, they are faced with several structural difficulties to be integrated into the labor market. The deprived social situation leads to an increased homophily of migrants from the same ethnic group that might promote biased information and increase their vulnerabilities. Powerful incentives like providing for their families or paying migrant smugglers may trigger desperate steps that could drive migrants to the illegal labor market, forcing them into abusive employment situations.[86]

D.   SOCIAL INFLUENCE

We can argue that the social network in which migrants are embedded plays a key role in the decision making of migrants. Before leaving the country of origin, friends and family members—either in the home country or in diaspora—provide those norms, beliefs, and expectations that inherently influence the behavior of the individual. Moreover, possible migrants are directly exposed to smugglers' narrative. Narratives generally means story telling through connected events.[87] Based on Walter Fisher's narrative paradigm, here it refers to reconstructed signs, symbols, and a good reason to communicate that eventually serves as a proxy of propaganda.[88] Smugglers are often part of this social network either directly or indirectly. Maybe they are living in the same village or the same district and everyone knows who they are. Susceptible individuals can easily contact them or arrange a face-to-face meeting. Consequently, smugglers can effectively disseminate their narrative and influence the perception of migrants. As a result, that narrative might become a significant factor in the decision to migrate. In this regard, smugglers, diaspora, and migrants are embedded in the same social network that allows both smugglers and

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[84] Sanchez et al., 26.

[85] Sanchez et al., 11.

[86] Sanchez et al.

[87] *Oxford Lexico*, s.v. "narrative," accessed 18 April 2021, https://www.lexico.com/definition/Narrative.

[88] Walter R. Fisher, "Narration as a Human Communication Paradigm: The Case of Public Moral Argument," *Communication Monographs* 51, no. 1 (1 March 1984): 1–22, https://doi.org/10.1080/03637758409390180.

relatives/friends to influence the pseudo-environment of possible migrants by spreading information about the journey or the destination country. As the survey highlights, the disseminated information is often strongly biased or distorted. Every smuggler is interested in promoting his business model and persuading susceptible populations to migrate; therefore, their narrative can be considered influential messaging. On the other hand, the messaging of the diaspora is often based on one-sided incomplete information due to the lack of relevant knowledge of the host country and the homophily among migrants of the same ethnic group.

While family members and smuggling groups play a key role before leaving their home country, fellow migrants and humanitarian workers become the most trusted sources of information during the journey (Figure 10).
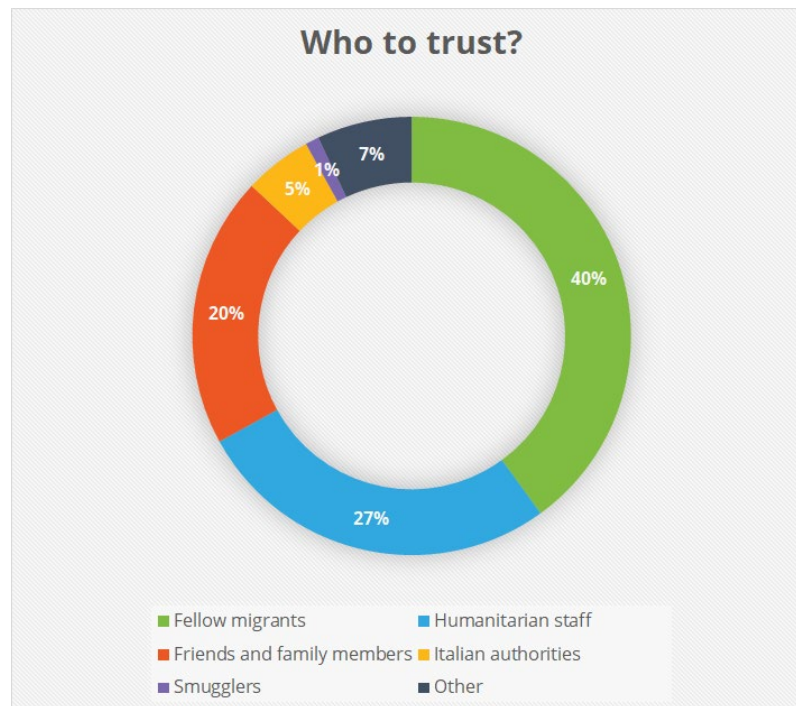
Figure 10.   The Most Trusted Sources of Information Among Surveyed Migrants[89]

[89] Source: Sanchez et al., *Communication Channels Used by Migrants*, 23.

Migrants mostly interact with their own ethnic group during the journey or in detention camps based on national or tribal ethnicity.[90] If the discrepancy between the expectations and the reality causes fear and anxiety during the integration phase, the homophily based on ethnicity will be enduring, causing a closed and cohesive social structure that hiders the information exchange with its surrounding environment. In this state, the illegally arrived migrants, who are faced with the difficulties of integration or the legal consequences of the IBCs, become the diaspora, and now they are spreading their anchored and incomplete perceptions to the next wave of illegal migrants.

We can assume that there is a reinforcing loop in the cognitive domain of the migrant population that inherently affects the decision to migrate. This reinforcing loop propagates biased and distorted information about the journey and the destination. The larger the diaspora of one particular ethnic group, the higher the social influence over susceptible population of the donor country, which further strengthens the business model of smugglers. As Figure 11 indicates, the dissemination of this information could be very fast and widespread considering the capabilities of the Internet and social media platforms. As Sanchez et al. found, the Facebook network of the nine Nigerian migrants of the focus group consists of a communication network that spans 75 countries with 1,850 nodes.[91]

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[90] Sanchez et al.

[91] Sanchez et al., 40.
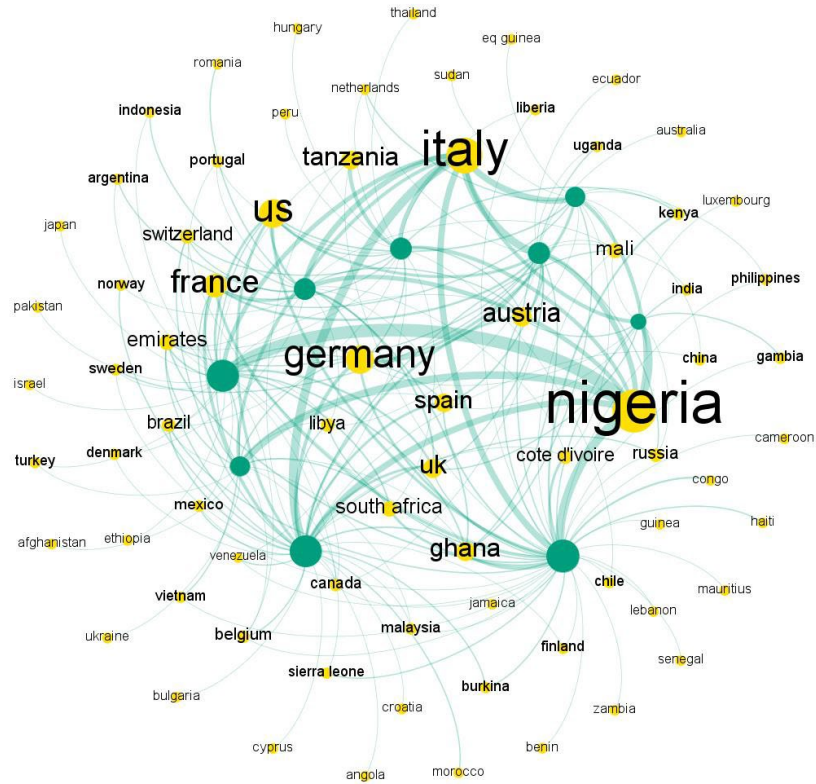
Figure 11.   Two-Mode Networks of Nigerians' Facebook Friends
(n=1850; countries=75; individuals=9)[92]

E.   CHAPTER SUMMARY

We can argue that the decision to migrate is based upon biased and distorted information influenced by smuggling groups, home society, and diaspora. Before the first move, the primary source of information are friends and family members, especially when they are living in one of the EU member countries as diaspora. Later, the fellow migrants and humanitarian workers become the most trusted source of information. NGOs and humanitarian workers have great responsibility upon sharing relevant and realistic information as often they are the first credible source of information regarding the EU. If they provide one-sided information about the expectations and possibilities, it increases the probability for illegal migrants to get trapped in a deprived and desperate situation.

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[92] Source: Sanchez et al.

While smugglers are secondary sources of expectations, they are capable and highly interested in influencing susceptible populations to migrate. Their narratives are playing on emotions that construct an unreal image about a distant prosperous place. As possible migrants usually have no direct experience regarding European countries, they construct their mental images based on the available information. Moreover, their mental models tend to fill the information gaps based on previously observed patterns.[93] Based on the European Commission's survey, we can infer that the available information upon which the mental images are constructed is inherently distorted and possibly biased. Most of the surveyed migrants had no prior information about Europe, nor did they consider the continent a specific destination. Rather, they were looking for a destination that was far enough from their home country. But in that case, who chooses the destination? We might raise the question of why do people accept the risk of being kidnapped, raped, or murdered without relevant information of the destination and their future? Is it a higher control, or is it a self-organizing and emergent pattern? Either way, we can argue that migrants act upon a biased perception—a pseudo-environment—that is usually far from the reality. Their cognition picks up the distorted and biased information and creates an image by filling in the blanks using already familiar patterns.

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[93] Freeman, "Filling in the Blanks."

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IV. PERCEPTION OF ILLEGAL MIGRATION IN DESTINATION COUNTRIES

This chapter explores the different perceptions of illegal mass migration using data from the Twitter social media platform, with a special focus on European Union member countries. The study aims to use text and sentiment analysis to reveal underlying patterns of the communication network.

A. DATA AND METHODS

This analysis uses Twitter data drawn through Twitter's REST API.[94] Specifically, this examination leveraged the R rtweet package to collect conversations related to relevant hashtags.[95] Hashtags were selected in terms of their relevance to the overall conversation; also, specific topics and Italian-related hashtags were used to focus the scope to the EU and the Mediterranean region:

- #migrantcrisis
- #matteosalvini
- #migrationeu
- #profugo

- #migration
- #migranti
- #migrationpact

- #immigrazione
- #migrationcrisis
- #openborders

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[94] Twitter, "Twitter API."

[95] rtweet package, "R Documentation," rtweet package, accessed 23 October 2020, https://www.rdocumentation.org/packages/rtweet/versions/0.4.0.

Tweets were pulled and combined by columns into one dataset listing the user ID, user name, retweets, quotes, and replies. Binding the datasets together provided a database of 14,150 tweets created between 12 and 21 October 2020. The listed attributes provided relational data between Twitter accounts where retweets, quotes, or replies to one particular tweet qualified as a social tie. The network data were saved as a comma separated file (.csv) where ties weight equals one for each instance of interactions. The boundaries of the network are described by relation to any of the abovementioned hashtags. An actor qualified as part of the network if he or she retweeted, quoted, or replied to any of the abovementioned hashtags. As depicted in Figure 12, the described procedure revealed a communication network of 8,618 nodes and 11,704 edges (ties).
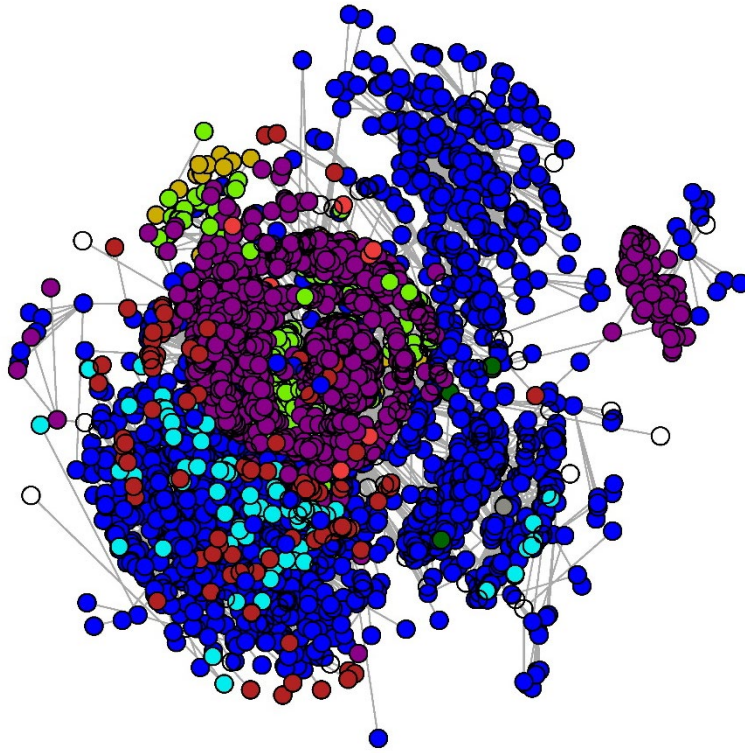
Figure 12.   Twitter Communication Network, Main Weak Component,
Colored by Hashtags

As this analysis aims to explore different perceptions of illegal migration, I apply sentiment analysis to this collection of tweets. I am also interested in identifying subsequent drivers of clustering and intergroup communication patterns within the observed Twitter network. I do this by focusing on the main weak component, which is the largest part of the network where every actor is directly or indirectly connected to every other actor if we ignore the directions of ties. Weak component is extracted to disregard isolates or conversations that are not tied to central discussions. The main reason behind selecting the main weak component is twofold. First, as the research focuses on social interactions and information flow, isolates and disconnected dyads are not necessary for understanding network dynamics. Second, the largest strong component does not capture all aspects of interactions and dissemination of the information at the same time. Consequently, the topographical measures will be calculated on an undirected network, while the study will notify using directed ties in every case when it is justified, for example, when exploring social structure within communities.

B.   ANALYSIS OF THE COMMUNICATION NETWORK

As European perception of destination countries is an important factor in illegal mass migration, this analysis focuses on communication pattern between subclusters. The following exploratory analysis can be divided into two parts. The first explores the aggregate structure of the main weak component, while the second focuses on modularity groups to reveal underlying drivers of clustering. A working hypothesis is that some level of correlation exists between the geographical location (tweet location) and the average sentiment of the conversation within any given subcluster.

The network is aggregated by three types of relationships: retweets, quotes, and replies, although retweets represent 90.422% of all edges. The weak component consists of 4,883 nodes and 6,891 edges with the average distance of 8.016. The topographic measures suggest a relatively sparse and dispersed communication network with low density (0.0005) and a diameter of 28. Diameter refers to the longest geodesic, which is the path that indirectly connects two distant actors using the shortest possible way. A longer diameter indicates a decentralized network with higher probability to adapt to a changing

environment.[96] Network density refers to the level of interconnectedness of the network and it is calculated as the total number of ties divided by the total possible ties.[97] Consequently, density score 1.0 indicates a network where every actor is directly tied to every other actor. A denser network structure allows for the spread of ideas, information, or material resources and facilitate a better enforcement of norms and shared values. Degree centralization measures "the extent to which a single actor possess several ties while other actors do not."[98] On the other hand, an actor's centrality score is the count of its ties. Centralization is a global measure that refers to the structure of the whole network, while centrality score ties to actors within the network. The Conditional Uniformed Graphs test (CUGs) confirms the significance of the high degree of centralization score (0.2115). The CUG test generates thousands of simulated networks based on a predetermined condition (degree centralization in this case) and compares the measure of the observed network with the simulated one.[99] The test indicates the probability that the selected characteristic of the network is formed by random chance (not statistically significant). The observed topographical measures indicate a sparse and decentralized network, where a small number of highly centralized actors control most of the information flow, while no actor has control over the whole network. The degree report confirms the unique topographical characteristics of the analyzed Twitter network (Appendix B, Section E). It indicates a scale-free network where a low number of actors have numerous ties and thus control most of the resources (information, in this case).[100]

In the observed network, cohesive subgroups are often structured around central nodes where a number of actors are connected by a single edge to the central communicator (Figure 13).

[96] Daniel Cunningham, Sean Everton, and Philip Murphy, *Understanding Dark Networks: A Strategic Framework for the Use of Social Network Analysis* (Lanham, MD: Rowman & Littlefield, 2016), 89; and John Arquilla, *Networks and Netwars* (Santa Monica, CA: RAND Corporation, 1999).

[97] Cunningham, Everton, and Murphy, *Understanding Dark Networks*, 97.

[98] Cunningham, Everton, and Murphy, 93.

[99] Cunningham, Everton, and Murphy, 235.

[100] Albert-László Barabási and Eric Bonabeau, "Scale-Free Networks," *Scientific American* 288, no. 5 (2003): 60–69.
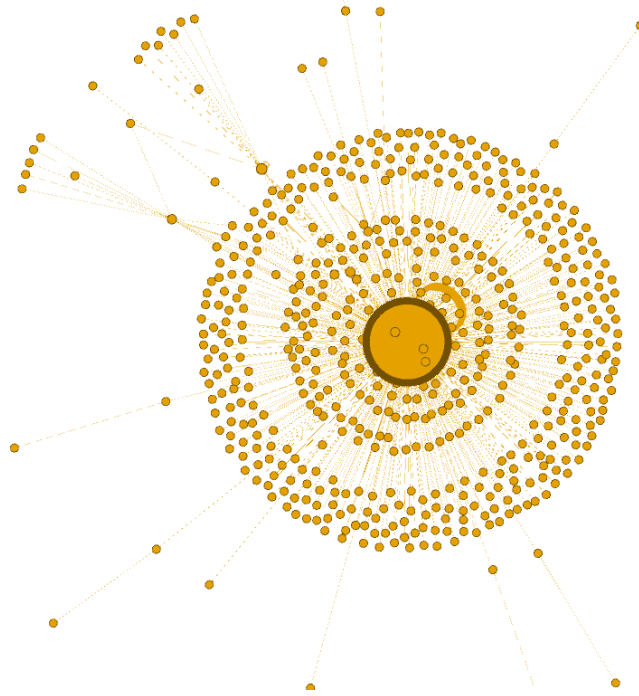
Figure 13.   Twitter Communication Network, Largest Subgroup
(Louvain – Group 43)

Unsurprisingly, we can see a high-level correlation between subgroups, languages and hashtags (Figure 14), though communication patterns within subgroups cannot be explained only by these factors. I apply sentiment analysis by subgroups to gain a better understanding of the underlying factors that drive clustering within the network. The aim of the sentiment analysis is to capture the group's shared (average) attitude toward the central topic and to highlight those factors that affect this attitude.
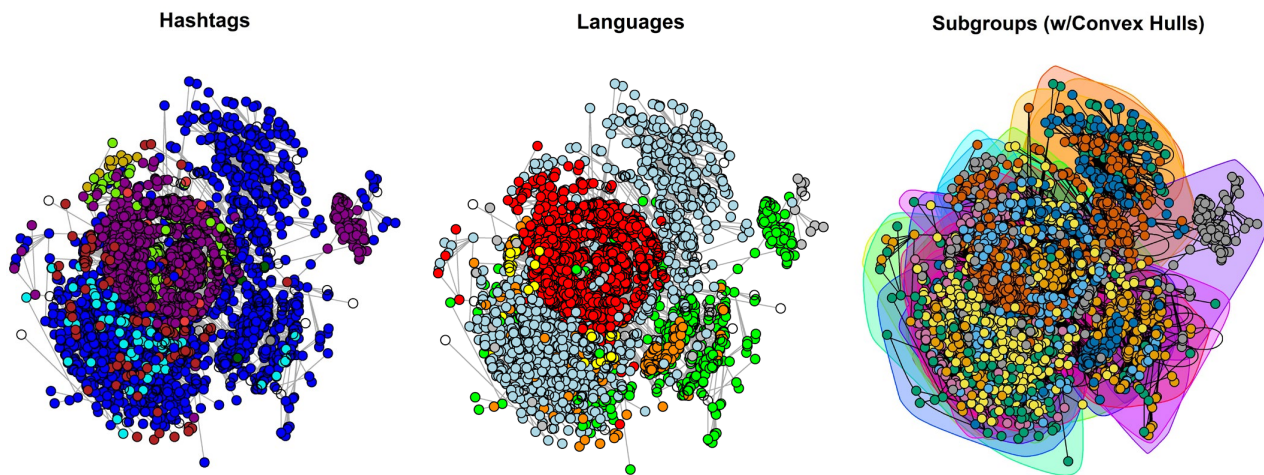
Figure 14.   Twitter Communication Network, Hashtags, Languages, and Subgroups

Subgroups are communities within the network that are interacting closely and frequently enough to influence each other and form a distinct subculture.[101] Subgroups are generally measured by having more ties within the community and fewer between groups than a random network structure would justify. I am using the Louvain algorithm for detecting subgroups as this is an effective method to apply for large networks and gives the best possible grouping for my analytical purpose.[102] As depicted in Figure 15, the algorithm identified 43 cohesive subgroups of the main component with the normalized modularity of 0.88 (modularity = 0.81), indicating a highly clustered network. Modularity indicates the cohesion of the subgroups within a network by measuring the number of the ties within communities divided by the ties between them. I collapsed the network by each subgroup and varied the size of the collapsed nodes by betweenness centrality. Higher

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[101] Cunningham, Everton, and Murphy, *Understanding Dark Networks*, 109.

[102] Pasquale De Meo et al., "Generalized Louvain Method for Community Detection in Large Networks," in *11th International Conference on Intelligent Systems Design and Applications*, 2011, 88–93, https://doi.org/10.1109/ISDA.2011.6121636.

betweenness centrality highlights subgroups with potentially higher control over communication flow. Also, a central group with a higher betweenness score has higher probability to access novel information.
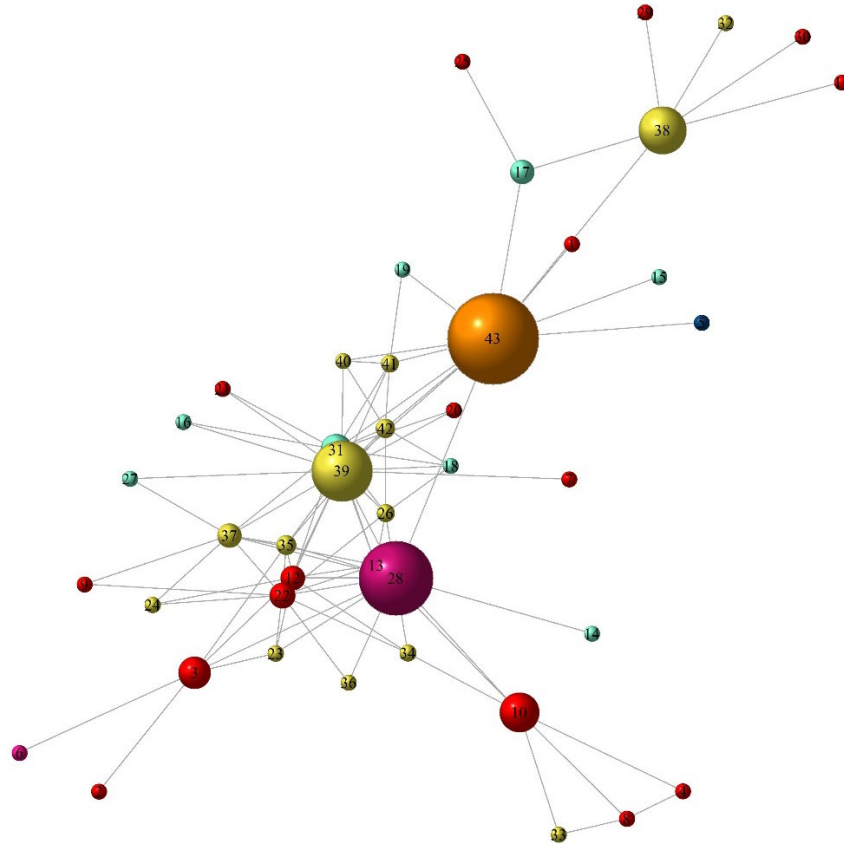
Figure 15.   Twitter Communication Network, Collapsed by Subgroups

Turning to the analysis of the content of the tweets, most frequent bigrams (pairs of words) are depicted in Figure 16. These suggest that the conversations are focusing on the political perspective of the migration rather than its humanitarian or security aspects. We can assume that the different political approaches toward illegal migration (and migration in general) trigger reflections in the country's society, and this reflection might be captured by Twitter data.
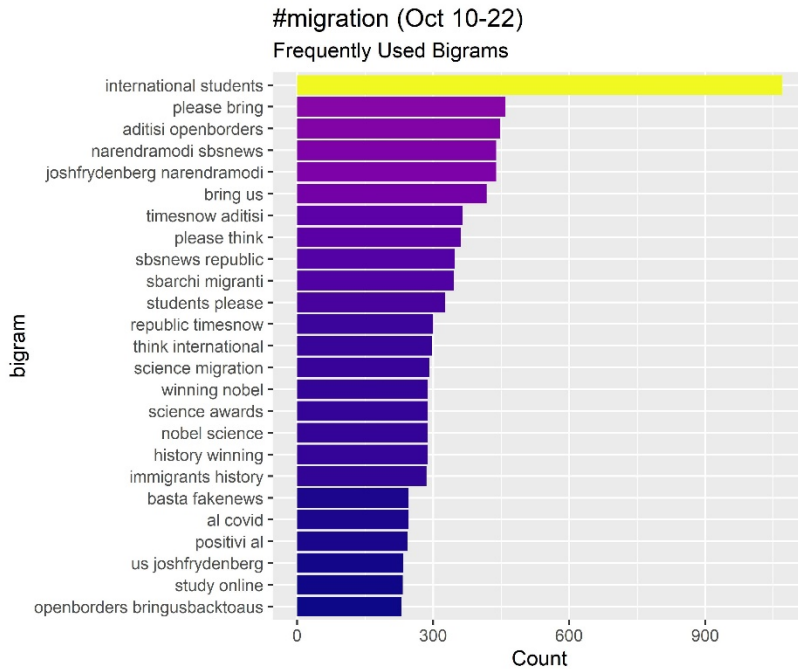
Figure 16.   Frequently Used Bigrams

To explore the general attitude toward the topic by subgroups, I applied sentiment analysis to the English language tweets in each subgroup. Where negative sentiment predominated, I colored the collapsed nodes red, and in those where positive sentiment predominated, I colored the nodes blue. Subgroups where sentiment analysis was not available due to other languages are colored gray (Figure 17). We can see that blue nodes are often connected to other blue nodes, and red nodes are often connected to other red nodes, such as groups 43 and 39.[103] A notable exception is group 10, which is almost exclusively tied to groups with different sentiment, although this subgroup is very close to neutral sentiment value.

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[103] M. McPherson, L. Smith-Lovin, and J. M. Cook, "Birds of a Feather: Homophily in Social Networks," *Annual Review of Sociology* 27 (2001): 415–44.
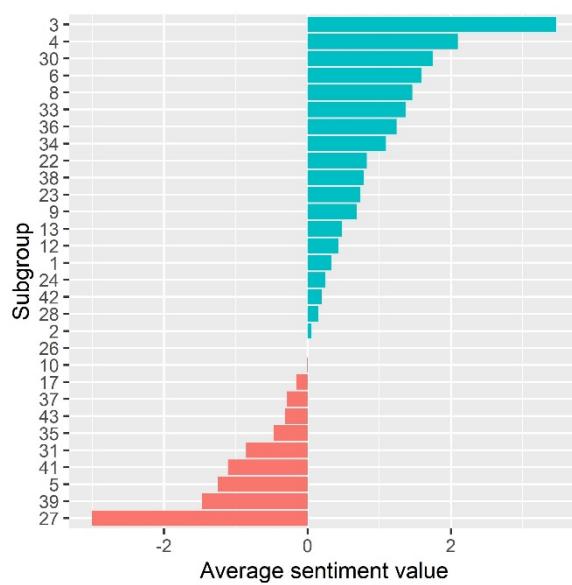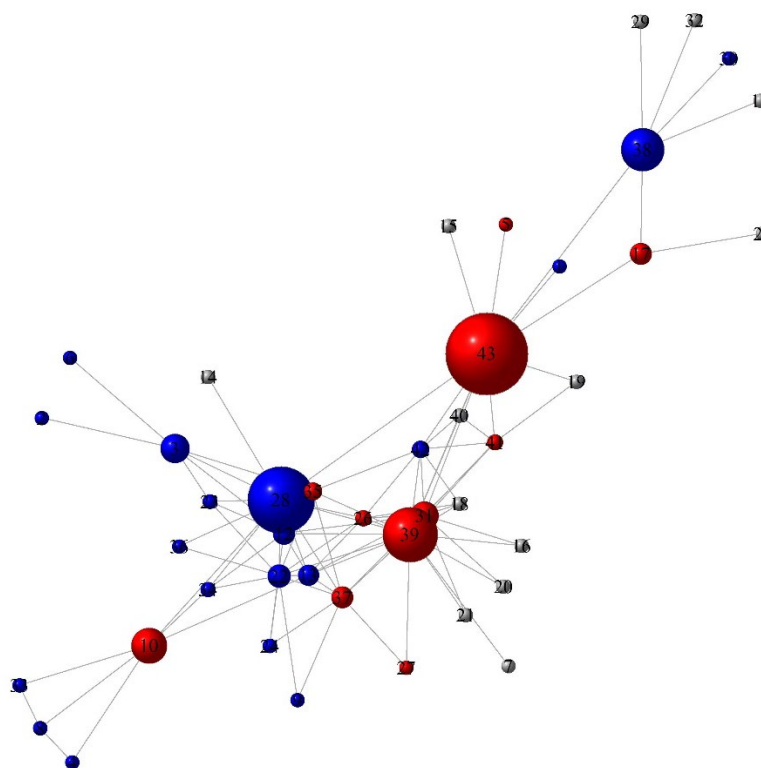
Figure 17.　Average Sentiment Value of Subgroups

I assigned a single geographical location to a subgroup if the majority of "retweet locations" pointed to a specific country or region, and I applied multiple locations if tweets were divided between up to three identifiable locations (Appendix 3). There is a strong correlation between geographical location and average sentiment for both positive and negative subgroups. The subgroups expressing high negative sentiments are typically tied to those countries that are primarily affected by illegal mass migration, while those expressing positive sentiment are those tied to countries with secondary movements of illegal mass migration. For instance, the Twitter conversation from Spain, Italy, and France reflected negative sentiments toward migration, while conversations from Switzerland, Malta, Germany, and the Scandinavian countries reflected positive sentiment toward migration.

As frequently used bigrams indicated, political perspective is the primary aspect of these conversations. While political leaders of EU member countries agree upon the need for a new European Union migration policy that takes the place of the Dublin Regulations, the debate over the general approach of the new legislation has continued since 2015. There are two conflicting approaches: pro-migration countries like Italy, Spain, France, and Germany promote a dissemination system to share the illegal migrants and asylum seekers between the 27 EU countries according to an automatic mechanism (compulsory), while governments of V4 countries propose to handle the crisis outside of the European borders.[104] These countries claim that an irresponsible welcome policy and mixed signaling from EU leadership foreshadow a humanitarian crisis, as millions of people are choosing the deadly journey across the Mediterranean Sea based on very little knowledge about the conditions of the destination countries. Interestingly, while frontier countries are identifying illegal migration as a severe socio-cultural, economic, and security challenge, they promote the compulsory redistribution mechanism within the EU.[105] Considering

[104] Migrációkutató Intézet [Migration Research Institute], "A dublini rendszer javasolt reformja a zsákutcás kvótára épül [The Reform of Dublin Regulation is Facing Stalemate]," 8 November 2017, https://www.migraciokutato.hu/2017/11/08/a-dublini-rendszer-javasolt-reformja-a-zsakutcas-kvotara-epul/.

[105] Republika la Malta, *Irregular Immigrants, Refugees and Integration, Policy Document*, 2005, https://www.refworld.org/pdfid/51b197484.pdf; and Gabriele Abbondanza, "Italy's Migration Policies Combating Irregular Immigration: From the Early Days to the Present Times," *The International Spectator* 52, no. 4 (2 October 2017): 76–92, https://doi.org/10.1080/03932729.2017.1384606.

groups with top positive and top negative sentiments, we can conclude that the sentiment of subclusters and the political approach of the respective governments do not correlate.

C.   CHAPTER SUMMARY

To summarize, this analysis revealed some factors that contribute to different perceptions of the illegal mass migration. Conversations are generally saturated by political narratives, rather than the security of the humanitarian approach. We could see a high level of correlation with geographical location and illegal migration but no linear correlation between the political approach of respective governments and the perception of mass migration. We can infer a social influence among European societies (characterized by intense political debates) that push the conversation toward political messages while underplaying the security and humanitarian aspects of the illegal migration.

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V.   SOCIAL NETWORK ANALYSIS OF MIGRANT SMUGGLING ORGANIZATIONS

This chapter explores the social structure of migrant smuggling networks in the Central Mediterranean. The observation period spans from 2014 as a reference point prior to the 2015 peak until the end of 2019 due to data availability. As Libya was the far most prevalent transit country in the region in this period, the scope is naturally gravitated toward organizations that facilitate migrant smuggling through Libya. The analysis applies data from the UNODC Case Law Database, UN Security Council Sanction List, and studies of the post-Qadhafi civil wars in Libya.[106]

A.   THEORETICAL BACKGROUND

This thesis argues that network approach offers a unique and insightful perspective of dynamics within a social structure and the cognitive dimension of those dynamics. The social structure in which actors are embedded constrains and offers them opportunities as well as affecting their behaviors more than pure rational choice models typically suggest.[107]

1.   Social Network Analysis

SNA is a set of theories and methods that provides a better conceptualization of enduring patterns of social ties that helps to understand the constraints, reach, and capacity of actors within the network. SNA is based on the notion that nodes (individuals, groups, or organizations) are affected by their ties to other actors and the

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[106] United Nations Office on Drugs and Crime, "Case Law Database"; United Nations Security Council, "Security Council Committee Established Pursuant to Resolution 1970 (2011) Concerning Libya"; Gábor, "Militias in Libya"; Richard Barrett et al., *Libya, Extremism, and the Consequences of Collapse* (New York, NY: Soufan Center, 2016), https://thesoufancenter.org/wp-content/uploads/2017/05/TSC-Report-Libya-REBRANDED.pdf.

[107] Mark S. Granovetter, "The Strength of Weak Ties," *American Journal of Sociology* 78, no. 6 (1973): 1360–80, https://doi.org/10.1086/225469; and Cunningham, Everton, and Murphy, *Understanding Dark Networks*, 15.

social structure (i.e., networks) in which they are embedded rather than their individual attributes.[108]

In 1979, Mark Granovetter argued that social network models were a collection of methods constructed in "theoretical vacuum" while he urged a coherent theoretical framework for SNA.[109] In the following decades, network scholars like Stanley Wasserman, Katherine Faust, David H. Knoke, Song Yang, James H. Fowler, and Nicholas A. Christakis published a set of perspectives and theories of network approach that was built on theoretical foundations of early scholars like Granovetter, Milgram, and Burt.[110]

Sean Everton describes SNA as "a collection of theories and methods that assumes that the behavior of actors is profoundly affected by their ties to others and the networks in which they are embedded."[111] He also synthetized the assumptions underlying these theories and methods:

- Actors and their related actions are interdependent, rather than independent, with other actors.
- Ties between actors are conduits for the transfer or flow of various types of material and/or nonmaterial goods or resources (e.g., funds, supplies, information, trust, enmity).
- Social structures are seen in terms of enduring patterns of ties between actors (i.e., social networks).
- Repeated interactions between actors give rise to social formations that take on a life of their own, follow their own logic, and cannot be

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[108] Sean F. Everton, *Disrupting Dark Networks* (New York, NY: Cambridge University Press, 2012), 5; and Cunningham, Everton, and Murphy, *Understanding Dark Networks*, 3.

[109] Mark S. Granovetter, "The Theory-Gap in Social Network Analysis," in *Perspectives on Social Network Research*, ed. Paul W. Holland and Samuel Leinhardt (New York, NY: Academic Press, 1979), 501.

[110] Stanley Wasserman and Katherine Faust, *Social Network Analysis: Methods and Applications* (New York, NY: Cambridge University Press, 1994), 4; and David H. Knoke and Song Yang, *Social Network Analysis* (Los Angeles, CA: SAGE Publications, Inc, 2007), 4; and James H. Fowler and Nicholas A. Christakis, *Connected: The Surprising Power of Our Social Networks and How They Shape Our Lives -- How Your Friends' Friends' Friends Affect Everything You Feel, Think, and Do* (New York, NY: Little, Brown Spark, 2011); and Stanley Milgram, "The Small World Problem," *Psychology Today* No. 1, no. 1 (May 1967): 61–67; and Granovetter, "The Strength of Weak Ties"; and Ronald S. Burt, *Structural Holes: The Social Structure of Competition* (Cambridge, MA: Harvard University Press, 1992).

[111] Everton, *Disrupting Dark Networks*, 5.

reduced to their constituent parts even though they remain dependent on those parts.

- An actor's position in the social structure (i.e., its structural location) impacts its beliefs, norms, and observed behavior.
- Social networks are dynamic entities that change as actors, subgroups and ties between actors enter, from, leave, or are removed from the network.[112]

2.   Social Structure

Social network theory holds that the behavior of social actors is affected by the social networks in which they are embedded, and we cannot analyze their actions independently of the structure of those networks: "actors' attitudes, beliefs, intentions, behavior, and even their identities are largely determined by their location in the social structure."[113] Culture and norms also play an important role. Networks, in fact, are constituted by the stories (and the related symbols and norms) that they tell about themselves.[114] Norms are the shared and accepted ideas that guide how actors interact with one another within the social structure. Milgram's Obedience to Authority experiments, Zimbardo's Stanford Prison experiment, and Sherif's Robbers Cave experiment demonstrate the compelling power of accepted norms on actor behavior.[115] Mark Granovetter also notes that the greater a network's density, the easier it is to enforce the norms of that network.[116] Thus, with greater density and cohesion, the probability of effective information sharing, monitoring, and mobilizing increases.

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[112] Everton, 15–16.

[113] Cunningham et al., *Understanding Dark Networks*, 15.

[114] Harrison C. White, *Identity and Control: How Social Formations Emerge*, 2nd ed. (Princeton, NJ: Princeton University Press, 2008); Mark A. Pachucki and Ronald L. Breiger, "Cultural Holes: Beyond Relationality in Social Networks and Culture," *Annual Review of Sociology* 36, no. 1 (2010):205-24, doi: 10.1146/annurev.soc.012809.102615; Jan A. Fuhse, "Theorizing Social Networks: The Relational Sociology of and Around Harrison White," *International Review of Sociology* 25, no. 1 (2015):15-44, doi: 10.1080/03906701.2014.997968.

[115] S. Milgram, "Behavioral Study of Obedience," *Journal of Abnormal Psychology* 67 (1963): 371–78; and Muzafer Sherif, *The Robbers Cave Experiment: Intergroup Conflict and Cooperation* (Middletown, CT: Wesleyan University Press, 1988); and Philip Zimbardo et al., *The Stanford Prison Experiment: A Simulation Study of the Psychology of Imprisonment* (Palo Alto, CA: Stanford University, 1971).

[116] Mark S. Granovetter, "The Impact of Social Structure on Economic Outcomes," *Journal of Economic Perspectives* 19, no. 1 (2005): 33–50, https://doi.org/10.1257/0895330053147958.

To illustrate, consider the coercive power of social structure and norms prevalent in Nigerian mafia-type organizations. Black Ax, MAPHITE, and Vikings apply secret ritual affiliation ceremonies, where candidates drink a drug-based beverage mixed with blood, and heavy beatings and other forms of violence are integral aspects of the ceremony.[117] The ceremony emphasizes values like obedience and loyalty and enhances the role of violence in the internal and external life of the social network. In some cases, the victims and illegal migrants also go through similar bloody rituals, where they swear loyalty to the smuggling organization. The oaths they swear are highly monitored and enforced within dense and cohesive cells. These rituals have lasting socio-psychological effects that impact the perception of the affiliates and the victims by their transformed quasi-social environment. This social situation heavily influences the behavior of the actors according to the interest of the group rather than acting out of pure self-interest. Since social context impacts behavior, understanding the topography of a network and the interactions within it is critical to determine the necessary effect for triggering favorable action or inaction.

3. Social Influence, Social Diffusion

In their article on social contagion theory, Christakis and Fowler argues that actors can spread ideas, norms, and emotions across the social network up to three degrees (e.g., a friend of a friend of a friend).[118] Even a complex phenomenon like obesity can travel across the social structure through various ties. An actor's beliefs concerning obesity can influence not just its friends, but its friends' friends, and its friends' friends' friends. Conversely, the actor is also influenced by every other actor within the social structure up to three degrees. Christakis and Fowler discovered that the strongest effect occurred through reciprocal ties where social distance is a major factor,

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[117] Ministro dell'Interno [Ministry of Interior, Italy], *Criminalità Organizzata Nigeriana In Italy [Nigerian Organized Crime in Italy]*, Legislature XVIII, Doc. LXXIV N. 3 (Rome, 2018), https://www.camera.it/_dati/leg18/lavori/documentiparlamentari/indiceetesti/074/003_RS/00000034.pdf.

[118] Nicholas A. Christakis and James H. Fowler, "Social Contagion Theory: Examining Dynamic Social Networks and Human Behavior," *Stat Med* 32, no. 4 (20 February 2013): 556–77.

more so than geographical distance. Nevertheless, crosscutting ties push and pull actors in different directions, and the net effect of these ties determines the actual behavior.[119]

According to social scientists, social diffusion mostly happens when exogenous information and social reinforcement are in play together.[120] Another important characteristic is how new ideas and norms spread across the social structure. Everton and Pfaff define social diffusion as "the outward movement of an innovation (or cultural trait) from one source to another."[121] The dynamics of spreading new norms or ideas is based on the notion the social actors assess their choices in light of the norms and attitudes of other actors.[122] The pattern of adopting new ideas follows a normal (Gaussian) distribution when the number of adopters plotted over time results a bell-shaped curve. Early scholars of social diffusion differentiated five categories referring to the adoption of an innovation: (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards.[123] An interesting notion is that when the proportion of adopters achieves a critical mass somewhere between 10 and 20 percent, the diffusion turns into a self-reinforcing mechanism that is very difficult to reverse.[124]

How does this inform our understanding of illegal migration? We can assume that the society of the donor country and diaspora living in a European country constitutes a social network, where actors are socially close to each other (kinship and

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[119] Sean F. Everton and Steven Pfaff, "Historical and Comparative Research on Social Diffusion" (forthcoming in *Social Science History*), 2021, 10.

[120] Roger V. Gould, "Multiple Networks and Mobilization in the Paris Commune, 1871," *American Sociological Review* 56, no. 6 (1991): 716–29, https://doi.org/10.2307/2096251; and Peter Hedström, "Contagious Collectivities: On the Spatial Diffusion of Swedish Trade Unions, 1890–1940," *American Journal of Sociology* 99, no. 5 (1994): 1157–79; and Charles Crabtree, H. Kern, and Steven Pfaff, "Mass Media and the Diffusion of Collective Action in Authoritarian Regimes: The June 1953 East German Uprising," *International Studies Quarterly* 62, no. 2 (June 2018): 301–14, https://doi.org/10.2139/SSRN.2801854; and H. Peyton Young, "Innovation Diffusion in Heterogeneous Populations: Contagion, Social Influence, and Social Learning," *American Economic Review* 99, no. 5 (December 2009): 1899–1924, https://doi.org/10.1257/aer.99.5.1899.

[121] Everton and Pfaff, "Historical and Comparative Research on Social Diffusion."

[122] Everton and Pfaff, 2.

[123] Bryce Ryan and Neal Gross, "Acceptance and Diffusion of Hybrid Corn Seed in Two Iowa Communities," Research Bulletin (Iowa Agriculture and Home Economics Experiment Station) 29, no. 372 (1950): 49.

[124] Everton and Pfaff, "Historical and Comparative Research on Social Diffusion," 6.

friendship ties) regardless of the physical distance. In that particular case, actors living in the diaspora are a source of information that shapes the attitudes and expectation of donor societies regarding the European countries and the expected benefits of illegal migration. Moreover, this social influence diffuses in the donor societies and, after reaching a critical mass, it produces a self-reinforcing behavior.

4. Strong and Weak Ties

According to Mark Granovetter, the strength of ties between actors can vary from strong to weak within an interconnected social structure.[125] "The strength of a tie is a (probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie."[126] In an analysis of how people had secured their current jobs, he found that while strong ties are common in highly connected networks where most actors know each other, weak ties—characterized by lower frequency of social interaction—are more likely to act as "bridges" between such highly connected clusters.

This leads Granovetter to argue that "whatever is to be diffused can reach a larger number of people and travels greater social distance when passed through weak ties rather than strong."[127] Since weak ties are more effective at bridging social distance, they will have a significant impact on diffusion of information, new ideas, and innovations.[128] While dense, highly connected clusters with strong ties allow for exponential information dissemination within dense clusters of actors, weak ties can facilitate the diffusion of new and unique information across clusters. As such, these

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[125] Mark S. Granovetter, "The Strength of Weak Ties," *American Journal of Sociology* 78, no. 6 (1973): 1360–80, https://doi.org/10.1086/225469.

[126] Granovetter, 1361.

[127] Granovetter, 1366.

[128] They are also related to the small-world phenomenon: Milgram, "The Small World Problem"; and Granovetter, "The Strength of Weak Ties," 1368–69.

ties—in certain conditions—play a crucial role in disseminating influential messages and measuring indicators of effectiveness.[129]

5.   Structural Holes

Ronald Burt expanded upon Granovetter's theory of weak ties. Noting that distinguishing weak from strong ties can be difficult and arguing that strong ties will occasionally function as bridges between clusters, Burt focused on identifying the gaps between clusters, what he called "structural holes."[130] "Structural holes are disconnections or nonequivalencies between players in the arena" that might provide access to information, resources, and control.[131] Ties bridge structural holes by "transmitting unique and nonredundant information across otherwise largely disconnected segments of social networks,"[132] and "a node has more structural holes if it has more nonredundant ties."[133] Thus, actors who are "rich" in structural holes lie in positions of brokerage, which allow them to potentially control the flow of resources, information, or influence. Therefore, these nodes often became the focal point of network-destabilizing strategies and non-kinetic targeting.

6.   Flow

Stephen Borgatti and Daniel Halgin synthetized these theories in 2011 into what they called the *network flow model*. They argued that weak ties are the best potential conduit to insert novel information into a network.[134] The authors differentiated state-type ties and event-type ties, where state-type ties represent relations that have extended

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[129] Chairman, Joint Chiefs of Staff, *Military Deception, JP 3-13.4* (Washington, DC: Joint Chiefs of Staff, 2012), xi, https://jfsc.ndu.edu/Portals/72/Documents/JC2IOS/Additional_Reading/1C3-JP_3-13-4_MILDEC.pdf.

[130] Burt, *Structural Holes: The Social Structure of Competition*.

[131] Burt, 2, 47.

[132] Granovetter, "The Impact of Social Structure on Economic Outcomes," 35; and Stephen P. Borgatti and Daniel S. Halgin, "On Network Theory," *Organization Science* 22, no. 5 (2011): 1173, https://doi.org/10.1287/orsc.1100.0641.

[133] Borgatti and Halgin, "On Network Theory," 1171.

[134] Borgatti and Halgin, 1171.

continuity over time like kinship ties or perceptual relations, while event-type ties link actors over a discrete time period such as participating on the same event. Both types of ties represent conduits that permit some measure of flow over the network.[135] Here, flow is analogous to bonding in that it "aligns and coordinates action, enabling groups of nodes to act as a single node, often with greater capabilities."[136] While bonding models focus on network coordination, however, Borgatti and Halgin's flow model focuses on how ties function as conduits that disseminate information across the network.[137] It examines network structure to determine possible outcomes.

One of the central questions it asks is how often and with what certainty a given node receives a particular flow. As the model highlights, isomorphic nodes in similar structural positions will produce similar outcomes, but attributes and context might significantly impact actual outcomes.[138] For this thesis, the network flow model might provide valuable insight into network dynamics that can serve as a basis for determining possible outcomes to inform and influence operations.

B.   HISTORICAL BACKGROUND AND KEY ACTORS

After the 2011 anti-Qadhafi uprising, it became apparent that no single authority could unify Libya's political landscape. In 2014, protests began against the elected government after it refused to step down by the end of its mandate.[139] Armed attacks against the elected government launched the first post-Qadhafi civil war between 2014 and 2018, which forced the House of Representatives (HoR)—the internationally recognized governing body at that time—and its armed forces, the Libyan National Army (LNA), to flee to Tobruk.[140] This move practically created two ineffective rival governmental bodies as the General National Congress (GNC) seized control over

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135 Borgatti and Halgin, 1170.

136 Borgatti and Halgin, 1174.

137 Borgatti and Halgin, 1174–75.

138 Borgatti and Halgin, 1179.

139 Richard Barrett et al., *Libya, Extremism*, 6.

140 Pap, Gábor, "Militias in Libya."

Tripoli, while the HoR set up its government in Tobruk, controlling the eastern part of the country.[141] Although the UN-backed Libyan Political Agreement was signed by both the GNC and the HoR on 17 December 2015, establishing the Government of National Accord (GNA)—a UN-recognized governing body—the reconciliation failed when the HoR withdrew from the newly formed government shortly after the signing ceremony. As a result, the rivalry continued as GNA became the internationally recognized government, while the Tobruk-based HoR and LNA maintained control of the eastern part of the country. The second civil war started in late April 2019 when General Haftar—the leader of LNA—launched an extensive military operation to seize Tripoli and the Western part of the country to become the only governing authority in Libya.[142] While the LNA leadership planned a short and decisive offensive against the GNA and the fragmented militia groups of the Western territories, the action brought into existence an anti-LNA coalition by unifying the scattered militias and criminal groups under a GNA umbrella, which resulted in prolonged struggle throughout the country. Most of the fragmented and opportunistic militias around Tripoli were unified into one sparsely coordinated Alliance under control of the GNA. Some militias—like most members of the Zintani militia group—changed sides after the second civil war between 2014–2018 and entered the fight by GNA's side in 2019.[143]

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[141] Richard Barrett et al., *Libya, Extremism*, 10.

[142] Pack, "Kingdom of Militias: Libya's Second War of Post-Qadhafi Succession," 13–14.

[143] Pack, 27.

C. SOCIAL STRUCTURE OF MIGRANT SMUGGLING GROUPS IN CENTRAL MEDITERRANEAN

Table 2 lists the key organizations involved in the illegal smuggling of migrants, while Figure 18 graphs these organizations and ties between them. While the two main powers in Libya— the GNA and the LNA—officially oppose migrant smuggling activity, both are directly connected to militias involved in smuggling activity. GNA's armed forces constitute a wide variety of opportunistic militia groups unified to counter the LNA offensive in April 2019. The GNA militias generally control Libya's northwestern territories, including migrant smuggling hubs like Tripoli, Zawiya, and Sabratha.
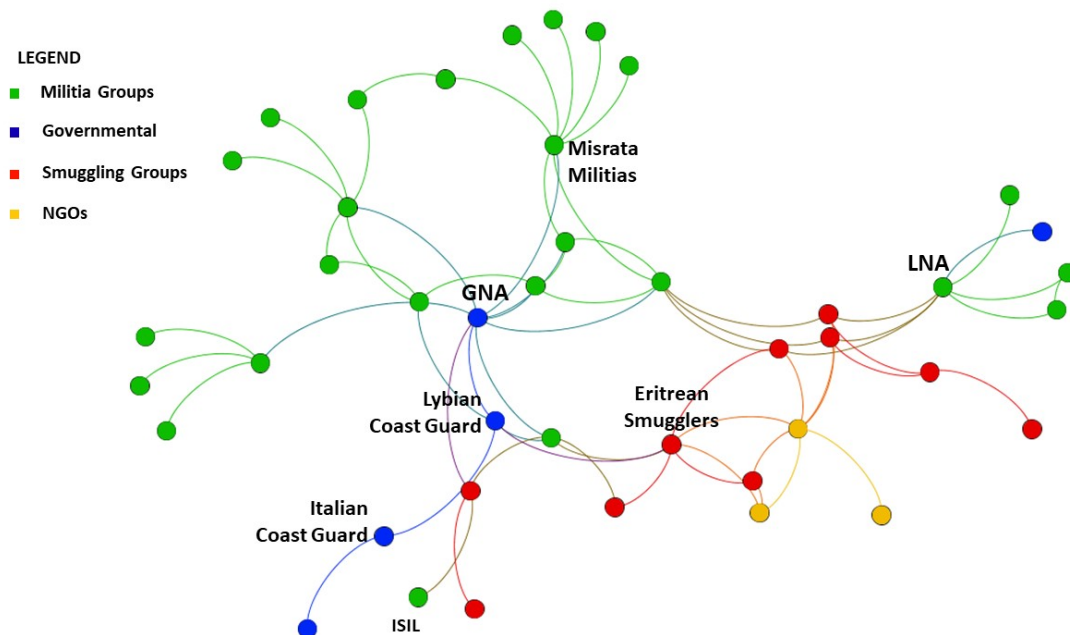
Figure 18.   Social Structure of Migrant Smuggling Groups and
Interrelated Organizations

Table 2.　Key Organizations in the Smuggling Network

Organization	Affiliation	Description
Government of National Accord (GNA)	Italy, Turkey, Qatar, Tebu, Tuareg, GNA militias,	The internationally recognized legislative body of Libya that controls Tripoli and the northwestern territories.[144]
House of Representatives (HoR)	LNA	The internationally recognized governmental body between 2012–2014. After that, HoR was forced to flee Tobruk and recently represents the rival government against GNA controlling the Eastern and Southern part of Libya.[145]
Libyan National Army (LNA)	HoR, France, Russia, Egypt, UAE, Saudi Arabia, mixed signal from the U.S.	Represents the most sophisticated and largest militia group of Libya consists of 7.000 men regular force and 18.000 men auxiliary militias. LNA serves as the armed forces of HoR; Despite of its name, it does not qualify as a national army.[146]
NGOs	Other NGOs, Smuggling Organizations, Italian Coast Guard	Western European NGOs operating vessels to provide transportation for illegal migrants crossing the Mediterranean Sea. While the NGO vessels provide humanitarian assistance and decrease human suffering, they regularly provide illegal transportation across the Sea.[147]
Tuareg	GNA, Tebu	Nomadic tribes situated along the south-western border of Libya. Due to their extended tribal relationships on both sides of borders often facilitates illegal migration into Libyan territory.[148]
Tebu	GNA, Tuareg	Nomadic tribes controls territories South of Kufra and Sebha. Similarly to Tuaregs, Tebu tribes facilitate migrant activity by establishing migratory routes through their territories.[149]
Eritrean Smuggling Group	GNA, Libyan militias	The Eritrean Smuggling Group led by Ermias Ghermay is a "transnational network responsible for trafficking and smuggling tens of thousands of migrants, mainly from the Horn of Africa to the coast of Libya and onwards to destination countries in Europe and the United States."[150]
Nigerian Smuggling Groups	Nigerian mafia	Medium size smuggling groups that focuses on illegal migrants mostly from Nigerian ethnic group. Nigerian mafia directly benefit their smuggling activity.

The topographical metrics of the network (Table 3) indicate that the network is decentralized and relatively sparse with large network diameter. As expected, the relatively

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[144] United Nations Support Mission in Libya, "Statement by UNSMIL on Joint Military Commission Meetings," United Nations Support Mission in Libya, 10 June 2020, https://unsmil.unmissions.org/ statement-unsmil-joint-military-commission-5-5-meetings-and-developments-sirte.

[145] Richard Barrett et al., *Libya, Extremism*, 8.

[146] Pack, "Kingdom of Militias: Libya's Second War of Post-Qadhafi Succession," 7.

[147] European Union Agency for Fundamental Rights, "NGO Ships Involved in Search and Rescue in the Mediterranean and Legal Proceedings against Them," European Union Agency for Fundamental Rights, 15 June 2020, https://fra.europa.eu/en/publication/2020/2020-update-ngos-sar-activities.

[148] Richard Barrett et al., *Libya, Extremism*, 15.

[149] Mark Shaw and Fiona Mangan, *Illicit Trafficking and Libya's Transition: Profits and Losses* (Washington, DC: United States Institute of Peace, 2014), 18, https://www.usip.org/publications/2014/02/ illicit-trafficking-and-libyas-transition-profits-and-losses.

[150] "Security Council Committee Established Pursuant to Resolution 1970 (2011) Concerning Libya."

low level of density correlates with a low average degree and clustering coefficient. This suggests a flexible network with high adaptability and resiliency.

Table 3.   Topography Measures of Smuggling Network

Network	Size	Edges	Diameter	Avg Path Length
Organizations	43	63	7	3.514

Network	Density	Clustering Coefficient	Avg Degree	Degree Centralization
Organizations	0.07	0.285	2.93	0.21

While the UN-recognized GNA receives significant support from the European Union to control illegal migration activity along the Libyan shore, its military power relies heavily on militias and criminal groups that directly benefit from migrant smuggling.[151] On the other hand, the LNA's core elements often target smuggling organizations to interdict their activity—for example, expelling the al-Dabbashi group from Sabratha—however, their allied militias control remote regions in the Eastern and Southern parts of the country and manage migrant flow through Kufra, Tazirbu, Ghat, and Sabha.[152]

To focus on the ties between smuggling groups, I extracted those subgroups that consist of the migrant smuggling organizations (Figure 19). By measuring the topography on these subgroups (Table 4), we observe a much higher density (0.115) and large network diameter (8). These metrics highlight the overarching nature of the smuggling network, where decentralized, often autonomously operating small- and medium-sized groups (like Nigerian and Somali smugglers) cover only one or two parts of the overall operation. Large and hierarchic international networks like the Eritrean smuggling group or the Nigerian mafia often operate larger migrant hubs and benefit the activity of smaller, locally operating criminal groups. These highly sophisticated transnational groups (like Eritrean

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[151] "EU-Libya Relations," European External Action Service - European Commission, 3 February 2021, https://eeas.europa.eu/headquarters/headquarters-homepage/19163/eu-libya-relations_en.

[152] Pack, "Kingdom of Militias: Libya's Second War of Post-Qadhafi Succession."

smuggling network) coordinate migrant flow along the entire region and have embedded cells in Italy and Western Europe.
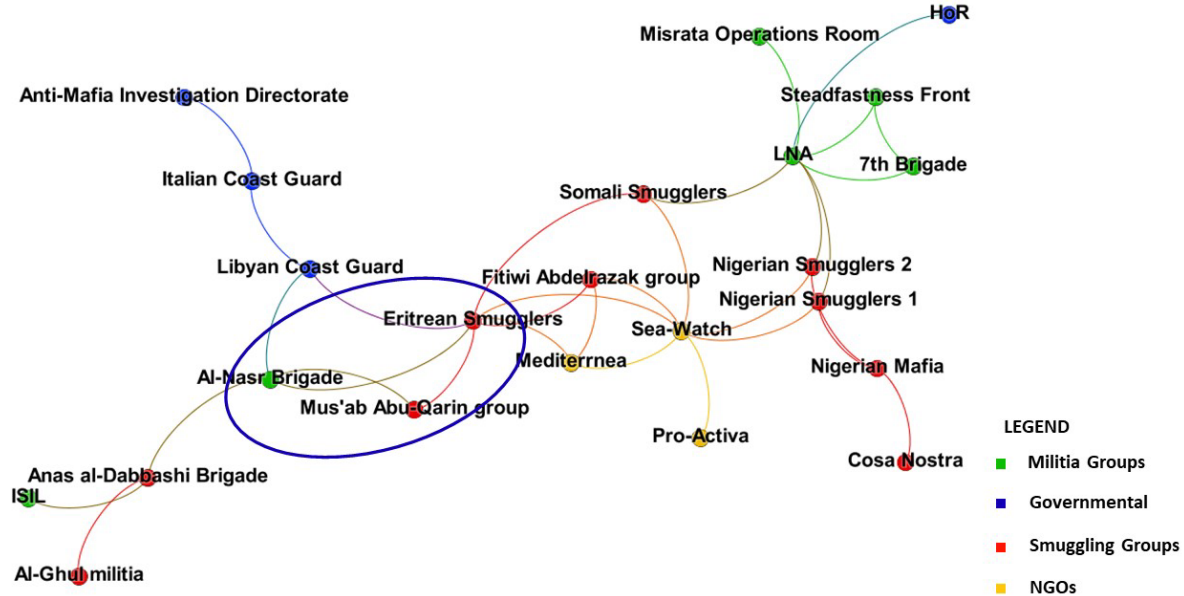
To focus on the ties between smuggling groups, I depicted those subgroups that consist of the migrant smuggling organizations.

Figure 19.   Migrant Smuggling Organizations

Table 4.   Smuggling Organizations, Network Measures

Network	Size	Edges	Diameter	Density	Avg Path Length
Subgroups	23	29	8	0.115	3.545

The most recent study did not find evidence of any direct involvement of the Libyan government in migrant smuggling activity. Both the GNA and the LNA promote militias directly affect migration flow, however. This phenomenon is well illustrated by the triadic relations of the Eritrean smuggling group, the Abu-Qarin group, and the Al-Nasr brigade. While the Al-Nasr brigade fights under the GNA flag and controls detention centers and Libyan Coast Guard units around Zawiya, Mohammed Kachlaf (Al-Nasr brigade's head)

has a kinship tie to Abu-Qarin—an infamous smuggler highlighted on the UN Sanctions List. Additionally, he also cooperates with the transnational Eritrean smuggling group. The investigation of the Palermo Prosecutor's Office of the Italian Anti-Mafia Directorate revealed that smuggling groups cooperate to promote the migrant flow along main routes. At the same time, there is a feud over control of the illegal migrant groups. This rivalry mostly remains under the level of open violence. Instead, it generates competition over the illegal migrants as objects and resources of the illegal activity. The better service and larger controlled territory result in an increasing number of illegal migrants for the respective smuggling group.

D.   CHAPTER SUMMARY

The SNA on the organization level reveals a decentralized, relatively sparse network. Small, autonomously operating organizations and centralized international criminal groups are connected by opportunistic ties that promote migrant smuggling activity in close cooperation with armed militias. The overall network spans the entire North African and Mediterranean region, with strong criminal groups or even mafia-type organizations in the target counties.

Sparse and decentralized network structure indicates high adaptability and resiliency. The flexibility of the network can be a major factor of the fluid nature or the migratory flow that is indicated by the shifts between main migratory paths (Section B, Chapter II). As smuggling organizations operate in a highly uncertain environment, their structure tends to facilitate a higher flexibility and resiliency. We can see indicators of self-organizing behavior and emergent patterns as a response to environmental effect. It is worth noting that smuggling organizations are operating in a resourceful environment. As a result, targeting a specific organization or a specific route might cause minimal impact on the overall flow as the network is able to restructure itself after a shock. A strategic option to address the problem requires a systemic approach to simultaneously affect several leverage points.

VI. SOCIAL NETWORK ANALYSIS OF THE ERITREAN SMUGGLING NETWORK

The SNA of the smuggling organizations (Chapter V) highlighted the prominent role of the Eritrean smuggling group in the Central Mediterranean. As such, this chapter uses SNA to analyze the social structure of this particular organization in order to identify structural vulnerabilities that might provide a better understanding of underlying dynamics of the endogenous network and its surrounding environment.

While the observed criminal network is labeled as Eritrean Smuggling Group—referring to the prominent ethnic group—the network facilitated migrant smuggling activity between the Horn of Africa and Northern Europe through Libya and Italy. The criminal organization collected migrants from several countries in the region, and it had Sudanese, Somali, Tunisian, Ethiopian, and Ghanaian members besides the leading ethnic group (Eritrean). This overarching criminal network controls every aspect of the smuggling activity from the country of origin to the destination country. Their affiliates are embedded into societies in donor countries and spread their narratives to the susceptible population. This thesis argues that the narrative of smuggling group (along with diaspora) inherently shapes the perception of societies in donor countries that plays a prominent role in the decision to migrate for millions of people (Chapter III).

A. THEORETICAL BACKGROUND

The two main categories to destabilize illegal and covert networks are the kinetic and non-kinetic approach.[153] As Admiral Eric T. Olson argues, while the kinetic approach "will always be required, its overall effects are not decisive. It may 'buy time,' but it is the non-kinetic approaches that 'achieve the decisive results' by shaping the environment and get long term effects.[154] As migrant smuggling activity in North Africa and the Mediterranean region is frequently conducted by independently operating criminal groups

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[153] Nancy Roberts and Sean F. Everton, "Strategies for Combating Dark Networks," *Journal of Social Structure* 12, no. 2 (2011): 1–32.

[154] Admiral Eric T. Olson, "Remarks to the Washington Institute for Near East Policy," Washington Institute, 2009, 9, https://www.washingtoninstitute.org/html/pdf/Olsonremarks20090917.pdf.

that cover only one or two phases of the whole operation, a kinetic approach will have a limited impact on the overall network. Moreover, kinetic targeting is often either too costly or unavailable due to the political and security environments. Therefore, this thesis will focus on non-kinetic strategies for disrupting or destabilizing these networks, while considering kinetic approaches only to the extent of their impact on the information space and cognitive dimension. For example, while key-leader targeting might have a limited impact on the overall activity due to its highly flexible and decentralized nature, higher detention rates within the European Union might generally impact the cost-benefit calculation of adversaries' decision makers.

Both kinetic and non-kinetic targeting can be applied at the individual, group, and organizational levels.[155] Depending on the background information, the environment, the culture, and the available capabilities, analysts can focus on financial ties, communication ties, or operational ties by recommending a kinetic or non-kinetic approach or the combination of both.[156] In 2011, Nancy Roberts and Sean Everton filled a theory gap by proposing a strategic framework for combating dark networks using both kinetic and non-kinetic strategies. Included in the former are approaches that target individuals, groups, or organizations, or building the capacity of partner nations to do so.[157] Included in the latter are strategies such as "institution-building, psychological operations (PSYOP), information operations (IO) and rehabilitation."[158]

B.   DATA SOURCE

The primary data source for this study was the N. 1874/2015 / DDA RG court file proposed by the Public Prosecutor's Office of Palermo District, Italy.[159] The court document describes the results of a large-scale investigation based on phone tapping,

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[155] Roberts and Everton, "Strategies for Combating Dark Networks," 4.

[156] Cunningham, Everton, and Murphy, *Understanding Dark Networks*, 25.

[157] Roberts and Everton, "Strategies for Combating Dark Networks," 4.

[158] Roberts and Everton, 5.

[159] Glauco II, Case n. 7472/15 R.N. G.I.P, 2015, https://sherloc.unodc.org/cld/case-law-doc/criminalgroupcrimetype/ita/2015/case_n._747215_r.n._g.i.p._-_glauco_ii.html?lng=en&tmpl=sherloc.

surveillance operations, and testimonies of victims conducted by the Anti-Mafia Investigation Directorate (Direzione Investigativa Antimafia) between October 2013 and April 2015. The operation was launched after the tragic Lampedusa shipwreck in 2013 that claimed the lives of 366 migrants. The court document was obtained through the UNODC Case Law Database accessed by the Sharing Electronic Resources and Laws on Crime System (SHERLOC). The relational data was systematically extracted by manual content analysis, anonymized, and then stored in a database saved in a CSV file structured for analytical purposes. The observation period was between October 2013 and April 2015.

An actor qualifies as a member of the smuggling group if he or she has an active role in smuggling operations under the direct or indirect control of a leader of the smuggling organization. Based on the court files, the analysis revealed three different layers of the social structure: financial, trust, and cooperation networks. The different subnetworks had been stacked into a single aggregated graph. Weighted edges apply only to the Italy-based subcluster while the whole network is depicted by single undirected ties. This is because the edge weights of the Italy-based subgroup are not comparable with relational data of the Libya-based clusters, due to the different intensity and frequency of surveillance.

C.   ANALYSIS

The analysis of the Eritrean smuggling group is divided into three main parts and aims to analyze the aggregate structure and the underlying functions of the network. The first focuses on the whole network to explore the social structure, capacity, and vulnerabilities of the aggregated network. The second explores the Italy-based subcluster of the network to reveal underlying factors of this particular subgroup. As Italy-based smugglers were a subject of enhanced surveillance conducted by the Italian Anti-Mafia Investigation Directorate, detailed relational data provides a deeper picture of social structure and flow of resources within this subcluster. In the third part, the study applies exponential random graph models (ERGMs) to test those attributes that may lead to tie formation within the network.

1.	**Whole Network**

The extensive criminal investigation revealed a rather hierarchic, highly sophisticated transnational smuggling organization that managed a high-profile criminal activity managing the movement of tens of thousands of illegal migrants from the Horn of Africa to Western Europe. While the smuggling operations exploited migrants from Eritrea, Sudan, Morocco, Algeria, Tunisia, and Mauritania, the network had members in Israel, Sweden, the United Kingdom, and the United States. The investigation resulted in the accusation of 24 convicts. Palermo Public Court found them all guilty on 10 April 2015 and 23 culprits were detained. The 24th actor is still at large and active in North Africa. With the verdict in April 2015, the criminal court case of the largest known migrant smuggling organization in history was closed.

### a.	*Roles and Tasks*

The systematic analysis of the court document revealed four different roles within the network: organizers, intermediate leaders, executors, and facilitators. An organizer is an actor who gives orders to others but does not receive them. It is worth noting that "organizers" are somewhat independent, and they are coordinating horizontally with other "organizers," while there is no single central actor within the network. This suggests some level of self-organizing behavior of the overall network.

"Intermediate leaders" receive orders from "organizers" and control a smaller subgroup that is often operating within a discrete geographical location.

"Executors" receive orders and fulfill tasks like collecting migrants, transportation, operating safe houses, or organizing logistical support. The fourth role is "facilitator." Facilitators do not take part actively in smuggling operations, but they provide essential services like financial operations (like hawala method) or forging documents.

I identified four tasks: "coordination," "logistical," "transportation," and "collecting migrants." The task "coordination" is tied to "organizers" and refers to a wide spectrum of tasks that aims to control resources within a particular subgroup under the direct control of "organizer" and coordinate its activity with other smuggling groups. "Logistical" tasks include complex operational profile like collecting money, withdrawing

migrants from detention camps, buying tickets, promoting official documents for asylum seekers, and organizing trips to Western European countries. The task is provided by "executors" The task "transportation" is also typically done by "executors" and refers to moving migrants within the area of operation. "Collecting migrants" is a critical task of the operation when the smuggling organization link up with illegal migrants upon their arrival in the detention camp. This task is also performed by "executors" and includes organizing the escape of illegal migrants from detention camps.

b.   *Network Structure*

The stacked network consists of 129 nodes and 299 edges with the average distance of 2.76 (Table 5, Figure 20). Topography measures reveal low density score (0.036) and a high level of degree centralization (73%). The Conditional Uniform Graphs test (CUG) justifies the statistical significance of the high degree of centrality in the Eritrean network. CUG compares the density of the observed network to 1,000 randomly generated graphs.[160] None of the random graphs produced the observed centralization; therefore, we can infer that it is a unique feature of the network structure that might not be formed by random chance. Network density is calculated as total number of ties divided by the total possible ties (every actor is connected to every other actor).[161] A low density indicates a flexible and adaptable network, while it has a lower probability of quick employment of resources. Degree centralization measures the distribution of ties.[162] In a highly centralized network, a few actors possess most of the ties and control the resources or information. Modularity compares the ties within and across subgroups to a randomly generated network with the same size and same number of ties. A higher modularity indicates higher clustering within the network that results in a larger number of ties within the subgroups and fewer ties between them. I use normalized modularity that indicates a more accurate measure regardless of the number of communities.

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[160] Cunningham, Everton, and Murphy, *Understanding Dark Networks*, 102.

[161] Cunningham, Everton, and Murphy, 97.

[162] Cunningham, Everton, and Murphy, 93.

A modest level of normalized modularity (q-prime) (0.404) and low density (0.036) combined with a high degree of centralization and relatively short average path length (2.763) suggest a sparse and spread, rather hierarchical network structure, where "organizers" have quick access to information and resources in their local cluster but not necessarily across the entire network. We can assume that the whole network tends to achieve an optimal level of centralization and resilience where highly centralized local clusters allow quick mobilization, but the lower number of ties between subgroups provide a flexible structure for the whole network.

Table 5.   Eritrean Smuggling Group, Network Measures

Network	Size	Edges	Diameter	Density	Avg Path Length	Degree Centralization	Q-prime
Eritrean Smuggling Group	129	299	6	0.036	2.76	0.73	0.404

Uncertain environment and competition over resources could be major factors that led to higher centralization and a rather hierarchical structure in the network. For example, while Libyan smugglers tend to dominate areas and migratory routes, the boundaries on the Italian side are less rigid. As a common "modus operandi," Libyan smugglers launch boats from the Libyan shore to Sicily or Lampedusa. Interestingly, Libyan smugglers usually release direct control over the vessels as they leave the North African shores. Although Libyan smugglers inform their Italian counterparts about the time of arrival and the number of vessels, different smuggling groups compete over collecting illegal migrants on the Italian side. In other words, the faster and more sophisticated a smuggling group, the larger its share of the market.
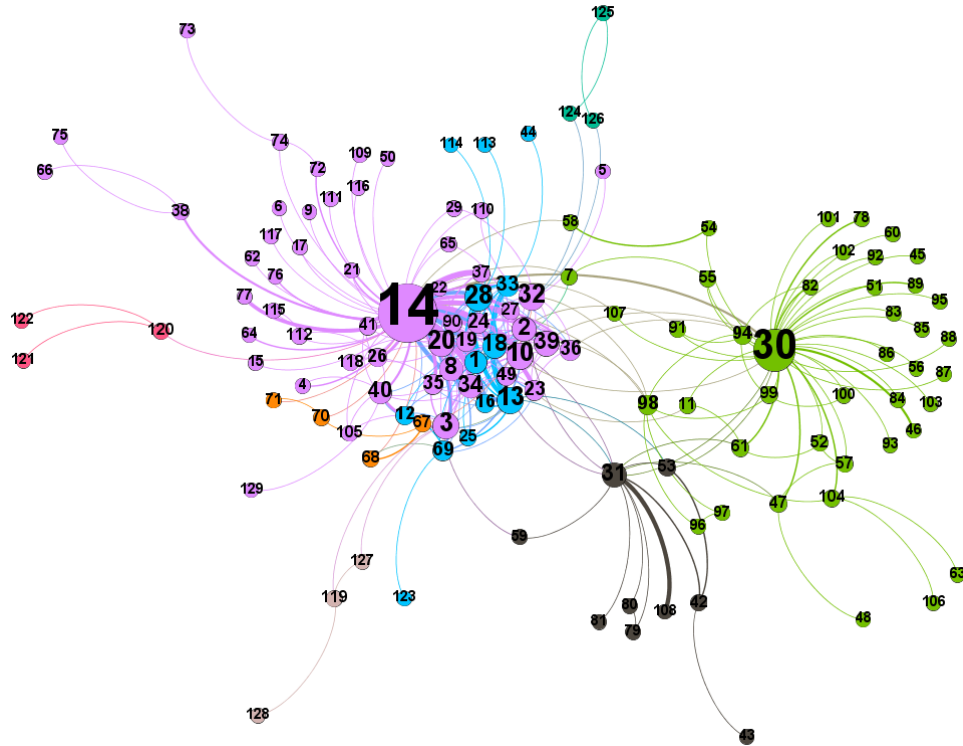
Subgroups correlate with geographical location: Green and gray subgroups are located in North Africa, while communities in purple and blue are active in Italy.

Figure 20.   Whole Network, Colored by Subgroups

Despite the high centralization, the social structure is not composed of a single hierarchy; rather, it suggests horizontally coordinating local hierarchies.[163] As dark networks tend to converge to an optimal level of density and centralization, in this case, the system might mitigate the vulnerability of high centralization by independently operating decentralized groups linked together by flexible and opportunistic ties. For instance, Actor #14 is the top-level leader of the Italian subgroup, who horizontally cooperates with Libyan leaders like Actors #30, #31, and #49, while he directly controls criminal cells in Italy.

The court case indicates that Italian and Libyan organizers coordinate—sometimes even personally—the strategic aspects of the smuggling operations, while the daily

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[163] Paolo Campana, "Out of Africa: The Organization of Migrant Smuggling across the Mediterranean,," *European Journal of Criminology* 15, no. 4 (2018): 491, https://doi.org/10.1177/1477370817749179.

activities are coordinated by lower-level executors. This observation supports the assumption that the organizers are operating rather independently, while their subgroups tend to be more centralized and interconnected. It is worth noting that there is no single authority who controls the network rather self-organized horizontal groups that produces emergent patterns. This feature can be a major factor of the resilience of the overall network, as local organizers are able to supervise their subordinates and enforce norms, although disabling one or more subgroups has little effect on the overall flow.

2.   Italy-Based Subgroup

For further analysis, I extracted the subgroup operating in Italy. Subgroups are communities within the network that have more ties within the group than with other groups comparing to a random graph.[164] I apply Girvan-Neuman community detection algorithm to identify subgroups within the Eritrean network.[165] As this subgroup had been exposed to enhanced surveillance, I could calculate edge weights in case of cooperation and financial ties based on frequency of the contacts or sum of the money transferred (Section F, Appendix C). Weighted ties and extended attribute data facilitate a more accurate understanding of the network structure and flow of resources and non-material goods.

The extracted network has 39 nodes and 146 edges with a much higher density (0.196 vs. 0.036) but similar centralization level (0.73 vs. 0.78) compared to the whole network (Table 6). Figure 21 highlights that while the subnetwork gravitates toward Sicily—as disembarkation is one of the most critical part of the illegal operation—the smuggling group spans the whole country. The subcluster consists of three different roles within the network that highly correlate with the hierarchical structure: organizers, intermediate leaders, and executors. The only organizer in this group is Actor #14, who is by far the most central node of the network with the degree centrality score of 67, while the second most central node has the score of 20. Actors #5, #41, #13, and #27 fulfill

164 Cunningham, Everton, and Murphy, *Understanding Dark Networks*, 109.

165 M. Girvan and M. E. J. Newman, "Community Structure in Social and Biological Networks," *Proceedings of the National Academy of Sciences* 99, no. 12 (11 June 2002): 7821–26, https://doi.org/10.1073/pnas.122653799.

intermediate leadership roles. The area of operations of intermediate leaders often described by a specific spatial location (see the Lombardy cell with actors #26, #40, and #41). Based on the court document, Actor #13 is second in leadership, which correlates with the observation that he has the highest degree centrality score (18) between intermediate leaders and that he is the third most central node in the extracted network. "Executors" typically fulfill tasks like "collecting migrants," "transportation," or fulfilling "logistical" tasks. As logisticians provide complex operations, actors with this task have typically higher prestige within the network. The centrality scores and network attributes reveal a flat hierarchy that results in a large leadership span for organizers. This observation will be further analyzed as a vulnerability in the Summary.
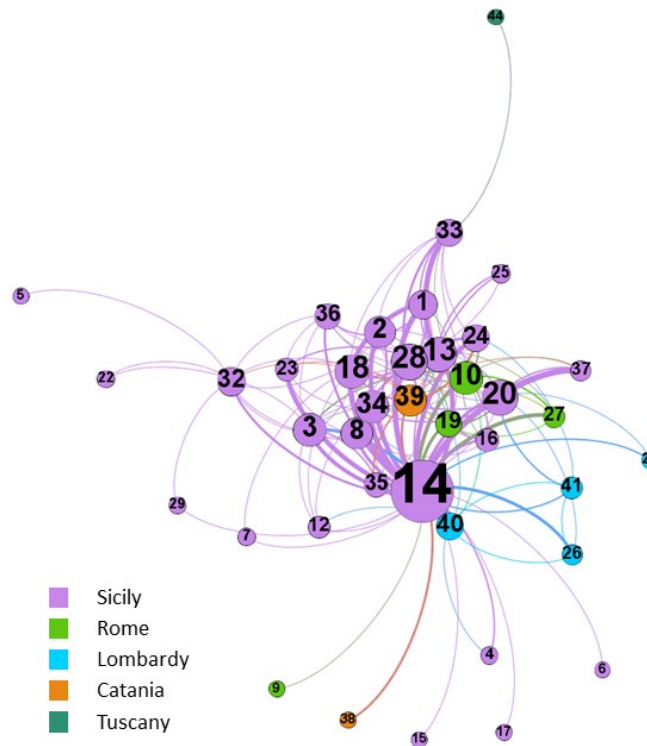
Figure 21.   Italy-Based Subgroup Colored by Spatial Location

Table 6.   Italy-Based Subgroup, Network Measures

Network	Size	Edges	Diameter	Density	Avg Path Length	Degree Centralization	Q-prime
Italy-based subgroup	39	146	4	0.197	1.93	0.73	0.298

a.   Impacts of Disrupting Italy-Based Network

The descriptive statistics of IBCs suggests that targeting even a prominent subgroup might have little effect on the overall flow of illegal migrants in a specified region. Figure 22 depicts the number of IBCs in the Central Mediterranean region between 2013 and 2017.[166]
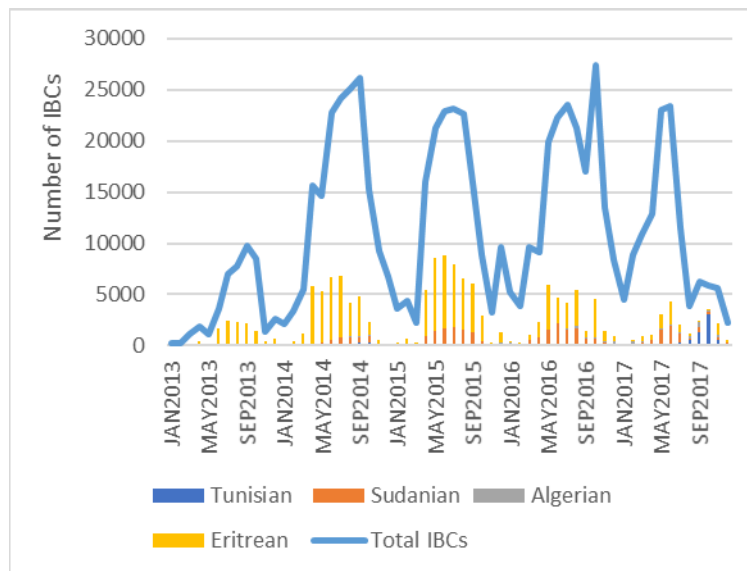
Figure 22.   IBCs in Central Mediterranean Between 2013 and 2017[167]

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166 European Commission, "Detections of Illegal Border-Crossings; Monthly Statistics," 9 October 2019, https://ec.europa.eu/knowledge4policy/dataset/ds00032_en.

167 Adapted from Frontex, "Detection of Illegal Border-Crossings Statistics."

The line chart shows the total number of detected border crossings, while the stacked bar chart indicates nationalities influenced by the Eritrean smuggling group. IBCs in the Central Mediterranean region show an annual cyclic pattern with a maximum around late summer-early fall, and a minimum around January. As smuggling organizations usually exploit migrants from the same nationality, Eritreans are the most prominent ethnic groups between the highlighted nationalities.[168] The number of IBCs committed by highlighted nationalities decreased over time after disrupting the Italy-based subgroup (date of verdict is 10 April 2015), but the total number of border crossings slightly increased in 2016 and one year later reached the 2015 level.

3.   Explaining Tie Formation—Exponential Random Graph Models

Revealing tendencies of tie formation based on internal and external factors within the network can provide useful insight of network dynamics and serve as a starting point for planning strategies to influence dark networks. I apply ERGMs to predict underlying factors of tie formation within the Italy-based subnetwork. ERGM is a statistical model designed to predict dynamics within the network based on the network's micro-configurations (local patterns of ties) and a set of attributes.[169] ERGMs generate thousands of random simulated networks that predict what a network of the same size would look like, given the micro-configurations and attributes included in the model.[170] When we find a model where the simulations do not differ significantly (in a statistical sense) from the actual network, we can conclude that we have identified the key micro-configurations and attributes that drive the overall structure of the network. In my analysis of the Italy-based subcluster, I include "spatial location," "role," and "task" as possible predictors of forming a new tie between Italy-base smugglers (Figure 23, Table 7).

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[168] Europol and Interpol, "Migrant Smuggling Networks: Executive Summary" (European Union, May 2016), 7, https://www.europol.europa.eu/publications-documents/europol-interpol-report-migrant-smuggling-networks.

[169] Cunningham, Everton, and Murphy, *Understanding Dark Networks*, 247.

[170] Cunningham, Everton, and Murphy, 250.

Location	Role	Task
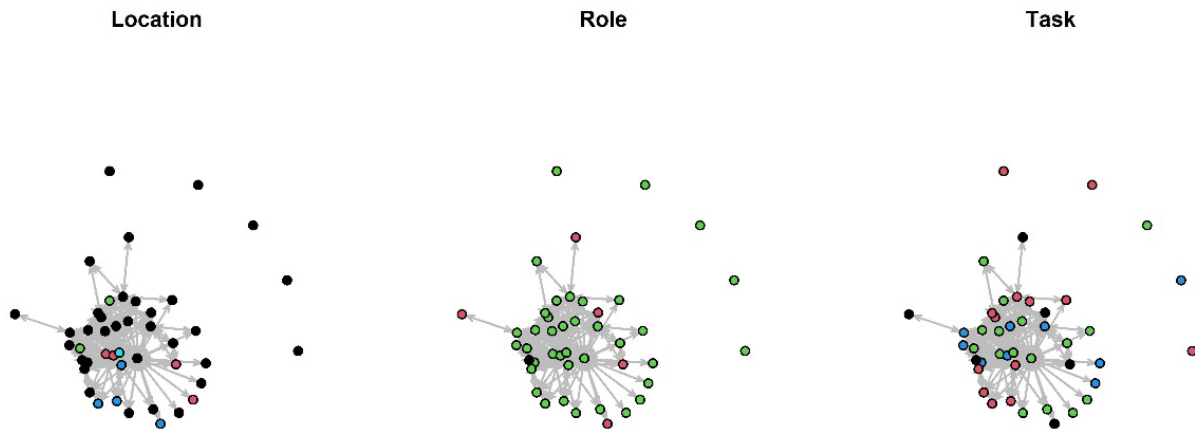
Figure 23.   Italy-Based Subcluster Colored by Attributes

Table 7.   Output of Models

Variable	Model 1		Model 2		Model 3		Model 4	
Edges	10.31		-3.22	***	-3.96	***	-3.60	***
Gwesp (Alt K-Stars)	1.68	***	1.67	***	1.80	***	1.71	***
Location:								
Sicily	-0.13		-0.23					
Shared Location	-0.14				-0.19			
Task:								
Coordination	-12.81		0.69	*			0.64	*
Shared Task	-0.11				-0.16			
Role:								
Intermediate leader	-1.52	***	-1.52	***			-1.41	***
Shared Role	-13.57				0.38			
AIC	750.20		746.40		763.60		748.00	
BIC	789.00		770.60		787.90		767.50	

*** Statistical significance at the 0.0001 probability level.

** Statistical significance at the 0.001 probability level.

* Statistical significance at the 0.05 probability level

       The first step was to determine those micro-configurations that might be consistent with tie formation based on what we know about the network. I included edge and

alternating k-stars as endogenous factors (Figure 24). The former controls for the number of ties in the network, while the latter captures popularity or preferential attachments.[171]
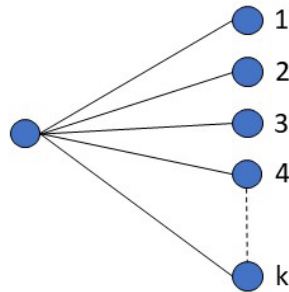
Figure 24.   Alternating k-star[172]

When just focusing on micro-configurations, together these provide the best fit. Following that, I included (exogenous) factors like "role," "task," and "spatial location" to determine which factor and to what extent explains the network's observed structure. As no shared attributes were statistically significant, I built working hypotheses for individual attributes. Several iterations indicated the importance of the task of "coordination" and role of "intermediate leaders." In Model 4, I tested how "coordination" as a task and "intermediate leader" as a role impact tie formation. According to low AIC, BIC scores and high goodness of fit value, this model is a good representation of the observed network. It suggests that two actors with the task of "coordination" have almost two times higher probability (EXP 0.63 = 1.88) to form a new tie if every other factor remain the same. On the other hand, two intermediate leaders have negative probability to form a new tie. This suggests that tie formation would support the hierarchical aspects of the network, where intermediate leaders forming new ties with executors or organizers (top-level leaders) but the horizontal coordination has a low probability.

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[171] Cunningham, Everton, and Murphy, 259.

[172] Adapted from Cunningham, Everton, and Murphy, *Understanding Dark Networks*.

D.   DISCUSSION

Based on the finding of the SNA, the research then considers resilience and vulnerabilities of the whole network. The resilience of the network could be discussed through a simple observation: while several prominent leaders were detained in 2015 (date of verdict is 10th of April), disrupting the Italian part of the network, the total number of IBCs slightly increased in 2016 and stagnated in 2017 in the same area of operation.

To explain the resilience of the whole network, we can consider three perspectives: (1) removal of the central nodes had little effect on the overall migrant flow, (2) The whole network has the capacity and flexibility to recover quickly, (3) the network is operating within a resourceful environment. At first, while a major part of the network had been disrupted by capturing 22 prominent members in Italy, smaller smuggling groups—out of the scope of this study— most likely filled the power vacuum and divided up the smuggling market in Sicily. Second, as the Libya-based clusters were almost intact (only two of the 24 convicts were operating in Libya), the network retained the capacity to recover its structure by forming new ties and bridging structural holes. Horizontally cooperating individualistic groups can restructure the network relatively quickly after a major shock. While the scope of the study is focusing on actors who are functioning within the determined network boundaries, the observed smuggling network is embedded into a larger system where several smuggling groups are covering the same stage of the migratory route. While a Libyan organizer usually keeps contact with several smuggling groups in Italy, Italy-based groups are receiving migrants from multiple organizers in Libya. Although all groups tend to occupy monopolistic positions, more often multiple smuggling groups are operating in the same space and providing a plurality of 'service' for illegal migrants. Finally, smuggling networks are operating in a resourceful environment. While the ratio of the highlighted nationalities steadily decreased after disrupting the Italian subgroup, illegal migrants from West and Central African countries increased in numbers in the same period. Consequently, the overall number of IBCs in the Central Mediterranean region stagnated after disrupting the Italy-based network. For instance, in October 2014, 1,076 illegal Nigerian nationals reached the Italian shores, while two years later this number was increased to 6,638 in the same quarter, respectively. This growth was affected by two major

factors: (1) While the Italian-subgroup was disrupted in 2015, the Libyan network was fully operational in the same period. Concurrently, widespread violence followed by the rising military power of Boko Haram caused 650,000 internally displaced people in Nigeria and 80,000 refugees in 2014.[173] The increased number of Nigerian migrants compensated the temporarily decreased flow from Eritrea, Sudan, and Somalia. Also, (2) Tuareg and Tebu tribes were able to restore the war-torn smuggling routes across the southeastern border of Libya in the same period.[174] As a result, the overall output of the system remained at the same level.

E. CHAPTER SUMMARY

The Eritrean smuggling group facilitated migrant smuggling activity between the Horn of Africa and Northern Europe through Libya and Italy. It controlled large-scale movement of illegal migrants from several countries in the region, like Eritrean Sudan, Somalia, Tunisia, Ethiopia, and Ghana. This overarching criminal network controlled every aspect of the smuggling activity from the country of origin through to the destination country. Their affiliates are embedded into societies in donor countries and spread their narratives to the susceptible population. While a prominent smuggling network was disrupted in 2015, interestingly, the total number of IBCs slightly increased in 2016 and stagnated in 2017 in the same area of operation.

Also, I found evidence that the 'modus operandi' of smuggling groups is based on influencing the susceptible population. As several opportunistic groups provide the same illegal service for migrants, they are competing over the control of resources and migrant flow. The share of the market is based on the reputation and the capabilities of the smuggling group, respectively. The better the service and the stronger the narrative of one particular group, the larger its share of the market. Therefore, smugglers are interested in spreading their own narrative and keep up their good reputation. For example, "logisticians" in the Italy-based subgroup commanded to keep migrants well and this norm

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[173] Human Rights Watch, "Rights Trends in World Report 2015: Nigeria," Human Rights Watch, 12 January 2015, https://www.hrw.org/world-report/2015/country-chapters/nigeria.

[174] Shaw and Mangan, *Illicit Trafficking and Libya's Transition*, 13; and Pack, "Kingdom of Militias: Libya's Second War of Post-Qadhafi Succession," 3.

was strictly enforced by Actor #14, the top-level leader. This rule aims to spread the reputation of the criminal group and shape the perception of the migrant population. The reputation, the contact info, and the offered service spread through social ties. Lower-level smugglers are embedded into the societies of donor countries and spread their narratives directly to the susceptible population. These narratives aim to shape the perception of migrants and influence their behavior to migrate.

Moreover, smuggling groups are operating in a resourceful environment, where targeting one specific group—even if it is a large and highly sophisticated smuggling group—has little effect on overall flow. It is worth noting that there is no single authority who controls the whole smuggling network; rather, we can infer self-organizing behavior that gives rise to emergent patterns. In the case of disrupting one or two subnetworks, the system will rapidly recover due to its self-organization and adaptation. Long-term effects require the suppression of the whole smuggling network and/or affecting the environmental (exogenous) factors. This observation drives our attention to the systemic behavior of the migratory system and confirms our hypothesis that a systems approach is required to address the problem.

VII. SYSTEMS APPROACH

Previous chapters highlighted the self-organizing and emergent patterns of migrant smuggling networks and the systemic behavior of the illegal migration system in the Central Mediterranean. These findings drive our analysis toward the systemic planning process that is outlined in this chapter. The aim of the planning process is to inform decision makers of the causal feedback loops, time delays, self-organizing, and limitations that characterize the behavior of the migratory system. This chapter develops three strategic approaches and recommends the one with the higher probability to succeed.

A. THEORETICAL BACKGROUND

The following part consider the theoretical background that serves as a fundamental basis for systemic analysis.

1. Systems Approach

Russel L. Ackoff in 1981 defined a system as a set of elements that satisfy the following conditions: "(1) The behavior of each element has an effect on the behavior of the whole; (2) The behavior of the elements and their effects on the whole are interdependent; (3) However subgroups of the elements are formed, each has an effect on the behavior of the whole and none has an independent effect."[175]

2. Understanding a System

Ludwig von Bertalanffy argues that understanding a system requires not only an understanding of the parts but the relationship between them.[176] One of the fundamental notions of system theory is that any system when reduced to its parts would lose its functionality and some of its essential properties.[177] Consequently, analysis without synthesis will lose sight of some of the inherent fundamental properties of the observed

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[175] Ackoff, *Creating the Corporate Future*, 15.

[176] Ludwig Von Bertalanffy, "The History and Status of General Systems Theory," *Academy of Management Journal* 15, no. 4 (1972): 1972, https://doi.org/10.2307/255139.

[177] Ackoff, *Creating the Corporate Future*, 17.

phenomena, just as the age of Enlightenment was very much focused on reductionism for analysis. Ackoff argues that synthesis and expansionism are inherent characteristics of systems thinking. He defines a systems approach as a sequence in which synthesis precedes analysis:

1. Identify a containing whole (system) of which the thing to be explained is a part.
2. Explain the behavior or properties of the containing whole.
3. Then explain the behavior or properties of the thing to be explained in terms of its role(s) or function(s) within its containing whole.[178]

Bertalanffy highlights that perception is only an imperfect reflection of reality, and human understanding is inherently dependent upon the perspective of the observer.[179] Ackoff illustrated the same phenomena with the analogy of an orange: when an orange is sliced vertically, it appears very different than when it is sliced cross sectionally, although both views reveal the same object. Based on these notions and the findings of quantum physics, Hester and Adams claimed that a perfect understanding of a complex systemic problem requires an infinite number of perspectives.[180] Consequently, while we may never have perfect understanding of a complex systemic problem, the more perspective gained, and the more time provided, the better our understanding. While analysis provides a deeper understanding of different parts of the system and reveals different aspects of the same strategic problem, the synthesis and the systems approach are tools that reveal essential properties and behavior of the system as a whole.

3. Complexity Science

Jackson and Keys differentiate simple and complex systems. "A simple system will be perceived to consist of a small number of elements, and the interactions between these elements will be few, or at least regular. A complex system will, on the other hand, be seen

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[178] Ackoff, 16.

[179] Von Bertalanffy, "The History and Status of General Systems Theory," 423.

[180] Hester and Adams, *Systemic Thinking*, 27.

as being composed of a large number of elements, and these will be highly interrelated."[181] V. Rao Vemuri identifies four characteristics of complex systems: (1) Some of its parts are not directly observable. (2) Quantitative approach gives probable effects rather than exact effects. (3) Complex systems are rather open than closed and evolve over time due to the interactions with its environment; and (4) system behavior is often affected by political, cultural, ethical, etc., factors.[182]

According to Bertalanffy's General Systems Theory, a closed system transfers energy or resources across its elements but does not interact (or transfer matter) with the surrounding environment, while an open system facilitates transfer of materials or energy across system boundaries. Consequently, an open system cannot be understood without an understanding of the containing whole (i.e., Ackoff's expansionism).[183]

As Ralph D. Stacey describes the science of complexity as being "concerned with the dynamical properties of nonlinear and network feedback systems."[184] These non-linear feedback systems are characterized by two characteristics: (1) bounded instability and (2) spontaneous self-organization and emergent order. System dynamics is one tool that may be used to understand the underlying dynamics of problematic behavior in a complex system by bounding and modeling the endogenous structure of the system that is resulting in the problematic outcome. This behavior is determined by non-linear feedback processes within the system. All dynamics are related to only two types of feedback loops: positive (reinforcing) and negative (balancing) loops.[185] The concept of bounded instability is based on the notion that non-linear feedback systems are tied to deterministic rules; therefore, the short-term behavior of the system is predictable. Systems operating at the edge of instability (disequilibriated state), however, give rise to emergent self-organizing

[181] M. C. Jackson and P. Keys, "Towards a System of Systems Methodologies," *Journal of the Operational Research Society* 35, no. 6 (1 June 1984): 475, https://doi.org/10.1057/jors.1984.101.

[182] V. Vemuri, *Modeling of Complex Systems: An Introduction*, ed. J. William Schmidt (New York, NY: Academic Press, 2014).

[183] Von Bertalanffy, "The History and Status of General Systems Theory," 412.

[184] Ralph D. Stacey, "The Science of Complexity: An Alternative Perspective for Strategic Change Processes," *Strategic Management Journal* 16, no. 6 (1995): 477.

[185] Hester and Adams, *Systemic Thinking*, 12.

behavior and emergent order that generates unpredictable patterns in the long term. Bounded instability is a state that is paradoxically is both stable and unstable where patterns are identifiable in the past, but they are not predictable over the long run.[186] Consequently, a complex systemic problem is difficult to understand due to the partially observable parts that are constantly interacting with each other as well as with the environment, generating non-linear and probabilistic behavior. Also, feedback mechanisms, which are characterized by time delays and non-linearity, make it difficult to construct a reliable mental model even in the most simplistic feedback network. In the context of strategic planning, mental models provide the cognitive map that bridges the gap between the current state and the desired end state. As the starting point, the end state, and the network of feedback loops are subject to imperfect interpretation and often incomplete information, however, our cognitive maps, or mental models, are imperfect representations of the complex system in which a problem lies.

4.   Complex Adaptive Systems

The study of CAS is a derivative of complexity science, which was founded in the late 1980s. One of the most prominent contributors was John Henry Holland, who had a particular interest in genetic evolution as an inherent characteristic of CAS. Based on Holland's observations, Jason Brownlee highlighted three characteristics of CAS to explain what makes them difficult to analyze: "(1) The systems lose the majority of their features when the parts are isolated. (2) The systems are highly dependent on their history making it difficult [..] to derive trends. (3) They operate far from global optimum and points of equilibrium making them hard to assess with conventional approaches."[187] Brownlee defined CAS as "composed of populations of adaptive agents whose interactions result in complex non-linear dynamics."[188] Simon A. Levin defines CAS by three properties:

1.   diversity and individuality of components,
2.   localized interactions among those components, and

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[186] Stacey, "The Science of Complexity: An Alternative Perspective for Strategic Change Processes."

[187] John H. Holland, "Complex Adaptive Systems," *Daedalus* 121, no. 1 (1992): 17–30; and Jason Brownlee, 'Complex Adaptive Systems', 1 April 2007, 2.

[188] Brownlee, "Complex Adaptive Systems," 1.

3. an autonomous process that uses the outcomes of those interactions to select a subset of those components for replication or enhancement.[189]

Adaptation can occur at the individual, local, and system levels, but the different levels are highly interrelated. Adaptation at the individual level can lead to competition between actors and local adaptation. Actors in a CAS model anticipate the future and they take current actions based on their cost-benefit calculus and the expected outcomes that produce competitive advantage in the anticipated future. A CAS is characterized by the "ability to change its rules in response to environmental change."[190] Brownlee highlights two important aspects of CAS: emergence and self-organization. Holland argues that adaptation and self-organization lead to complexity, as local rules give rise to emergent order that eventually impacts global behavior of the system.[191] Self-organization is the capacity of the system to make its own structure more complex by generating heterogeneity.[192] Self-organization is driven by local interactions and provoked by instability.[193] Due to the utter complexity, actors cannot predict their long-term future, but the outcomes emerge from interactions between agents in a probabilistic manner.[194]

Applying this to the migration network in the Central Mediterranean, we can argue that the current strategic environment is characterized by global interconnectivity of political, socio-economic, and security factors influenced by an overarching information domain. The more we recognize and acknowledge the uncertainty and non-deterministic nature of the strategic environment, the higher the probability to successfully plan to address strategic problems.

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[189] Simon A. Levin, "Complex Adaptive Systems: Exploring the Known, the Unknown and the Unknowable," *Bulletin (New Series) of the American Mathematical Society* 40, no. 1 (2003): 4, https://doi.org/10.1090/S0273-0979-02-00965-5.

[190] Wayne N. Porter, "Complex Adaptive Systems" (Lecture, Naval Postgraduate School, Monterey, CA, 3 February 2021).

[191] John H. Holland, *Emergence: From Chaos to Order* (Reading, MA: Perseus Books, 1998).

[192] Donella H. Meadows, *Thinking in Systems: A Primer* (White River Junction, VT: Chelsea Green Pub., 2008), 79.

[193] Levin, "Complex Adaptive Systems," 4.

[194] Stacey, "The Science of Complexity: An Alternative Perspective for Strategic Change Processes," 479.

B.   THE MIGRATION SYSTEM

A complex systemic problem is a "detectable gap between a present state and a desired state," where interaction between parts determines non-linear system behavior and probabilistic outcomes.[195] Illegal mass migration in the Central Mediterranean can be characterized as a systemic problem where interconnectedness between the parts is characterized by complex adaptive behavior that causes unpredictable outcomes. System dynamics are driven by the structure of the system and the non-linear feedback mechanisms. While there is a cause-and-effect relationship between connected parts of the system, the complexity of the feedback mechanism—and the significant time delay in some cases—generates unpredictable (often chaotic) outcomes.

Our cognitive maps of a causal structure are usually oversimplified models of a complex systemic problem, and mental models tend to neglect the effect of a complex feedback mechanism. These constrained mental models are consequences of our cognitive limitations like memory recall, attention, information processing capacity, and misapplied heuristics that might ultimately lead to poor decision making.[196] Non-linearities, where cause and effect are often separated over time and space, exceed our cognitive ability to predict outcomes. For instance, while we can see a strong positive correlation between smuggling activity and the number of illegal migrants, the smuggling network is also influenced by several other factors, such as bilateral agreements between EU and transit countries, the level of border protection, and NGOs' activity. The overall effect of feedback within the migration network generates complex non-linear outcomes within the subsystems (e.g., the smuggling network) and gives rise to unpredictable, probabilistic system behavior. We can see clear indications of the probabilistic nature of the drivers of illegal migration. For example, while we have statistical evidence of the correlations between IBCs and armed conflicts, political terror, or expanding diaspora, none of these factors alone necessarily trigger illegal migration. Rather, an increase in any of these factors could increase the rate of illegal migration. Similarly, while GDP per capita is often

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[195] Hester and Adams, *Systemic Thinking*, 29.

[196] John Sterman, *Business Dynamics: Systems Thinking and Modeling for a Complex World* (Boston, MA: Irwin/McGraw-Hill, 2000), 27.

cited as a key factor of illegal migration (and migration generally), the statistical analysis found a rather non-linear goal-seeking behavior between GDP per capita and IBCs.

A causal loop diagram is used to identify those feedback loops that might contribute to the observed system dynamics. The diagram represents only a causal relationship between variables and excludes correlations as they represent only past behavior and not the structure of the system.[197] Polarity notation is assigned to each link such that a positive notation represents a reinforcing (i.e., same) causal relationship between the independent and dependent variables, and a negative notation represents a balancing (i.e., opposite) causal relationship (Figure 25).[198] Theoretically, the output of the smuggling loop would grow exponentially if every other variable remained constant. On the other hand, a feedback loop can be negative or balancing if the loop has an odd number of negative links. For example, smuggling activity increases security threats within the EU, which then lead to enhanced border protection and legal countermeasures that ultimately decrease smuggling activity.

C.   BOUNDARIES

System boundaries are essential elements of sense making, representing the "area within which the decision-taking process of the system has power to make things happen, or to prevent them from happening."[199] Boundaries are arbitrary constructions made by the observer who intends to address a systemic problem, although the interaction between an open system and its environment is subject to continuous transfer of resources, energy, or non-material goods.[200] System boundaries are not geospatial constructions; rather, they bound system elements and variables. These boundaries are sometimes tied to spatial constraints, however. On the other hand, the environment of the system is defined as "a set

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[197] Sterman, 141.

[198] Sterman, 137–56.

[199] Peter Checkland, *Systems Thinking, Systems Practice: Includes a 30-Year Retrospective* (New York, NY: Wiley, 1999), 312.

[200] Hester and Adams, *Systemic Thinking*, 165.

of elements and their relevant properties, which elements are not part of the system, but a change in any of which can cause or produce a change in the state of the system."[201]

As we consider the illegal migration system as an open, complex adaptive system, its behavior is not understandable without recognition of the interaction between the parts and their containing environment. The political and socio-economic dynamics of origin and target countries, the economically and politically motivated influence of EU decision making, the activity of violent extremist organization, and the cooperation between the EU and donor/transit countries are all part of the containing environment. On the other hand, IBCs, smuggling networks, NGO activity, border protection, and diaspora within the EU are all parts of the endogenous system (Figure 25).
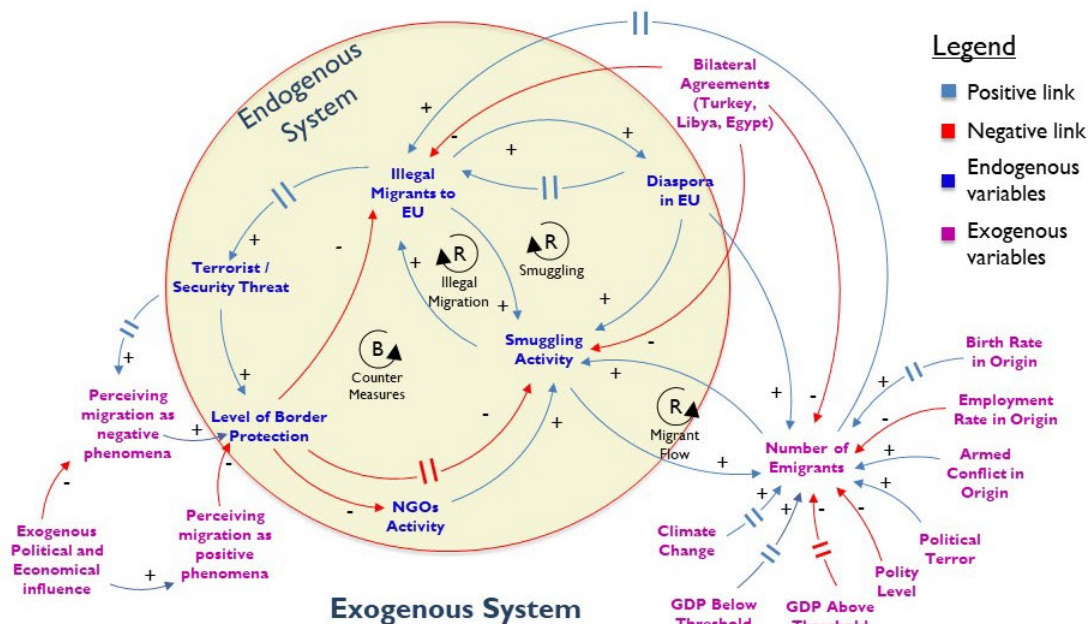
Figure 25.   Migration System, Causal Loop Diagram

[201] Russell L. Ackoff, Fred E. Emery, and Brent D. Ruben, *On Purposeful Systems: An Interdisciplinary Analysis of Individual and Social Behavior as a System of Purposeful Events* (New Brunswick, NJ: Routledge, 2006), 19.

We can see clear indications of self-organization at both local and system levels. For instance, the behavior of the smuggling system is a result of the system's structure as well as the smugglers' adaptation to changes in their surrounding environment.

D. STRATEGIES

To develop strategies for addressing the strategic problem, the eight-step planning process proposed by John M. Bryson is used.[202] The planning process shall consider the following strategic questions:

- Can enhanced border control significantly reduce the security threats related to illegal migration?

- How can a large bureaucratic system face a CAS that is operating without higher control or authority?

- What are the underlying drivers of illegal mass migration?

1. Agreement Upon a Strategic Planning Effort

The initial step of the planning process is an agreement upon the "purpose of the effort; preferred steps in the process; [and] the form and timing of reports."[203] Moreover, it should cover the members and their responsibilities of the executive committee and the planning team.[204] NATO appears to be at the appropriate strategic level to address the security threats of illegal migration. The proposed executive committee and the adjudicative authority, the stakeholders, the planning team, and subject matter experts are identified in Table 8. Strategic approaches (Course of Actions - CoAs) developed by the planners should be presented to the adjudicative authority at the end of an eight-month planning period. An initial progress report is presented to the executive committee after the end of the third week. Periodic progress reports to the executive committee are planned bi-

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[202] John M. Bryson, "A Strategic Planning Process for Public and Non-Profit Organizations," *Long Range Planning* 21, no. 1 (February 1988): 74, https://doi.org/10.1016/0024-6301(88)90061-1.

[203] Bryson, 74.

[204] Bryson.

monthly. The final review will be presented after seven months and chaired by the SHAPE Director of Development and Preparation. The planning process is based on analytics and system dynamics modeling. The execution phase varies between two and 15 years depending on the strategic approach selected. The effectiveness of the selected strategy is analyzed by net assessment conducted by SMEs and designated elements of the planning team. The result of the net assessment is shared with the executive committee. If it is necessary, the executive committee recommends strategy adjustment to the adjudicative authority.

Table 8.   Participants of the Planning Process

Adjudicative Authority	
General Tod D. Wolters	Supreme Allied Commander Europe
Stakeholders	
Supreme Allied Command Europe	
The EU High Representative for Foreign Affairs and Security Policy	
UN World Health Organization	
UN International Organization for Migration	
EUROPOL	
European Border and Coast Guard Agency—FRONTEX	
Representatives of Government of Partner Countries	
Non-Governmental Organizations	

Executive Committee	
ADM Joachim Rühle	SHAPE Chief of Staff
VADM Hervé Bléjean	Director General of the European Union Military Staff
MG Piotr A. Blazeusz, Ph.D.	SHAPE Director of Strategic Development and Preparation
LTG Eric P. Wendt	Commander NSHQ
RADM Bülent Turan	SHAPE Director of Partnership
MG Phillip A. Stewart	SHAPE Director of Strategic Employment
BG Davide Re	NATO Strategic Direction–South HUB Director
Mr. Andres B. Munoz Mosquera	SHAPE Office of Legal Affairs

Planning Team	
3 Officers (O6, O5)	SHAPE Strategic Development and Preparation Directorate, J3, J5
2 Officers (O6, O5)	EU Military Staff
2 Officers (O6, O5)	SHAPE Partnership Directorate, J9, County Engage
1 Officer (O5)	SHAPE Strategic Employment Directorate, J2
1 Officer (O5)	SHAPE Office of Special Operations
1 Officer (O5)	NATO Special Operations headquarters
2 Officers (O6, O5)	NATO Strategic Direction–South HUB
2 Officers	EUROPOL
Representative/SME	European Commission, Joint Research Centre, Security and Migration

Subject Matter Experts	
Dr. Wayne N. Porter	Naval Postgraduate School, System Science (System Dynamics Modeling)
Dr. Sean Everton	Naval Postgraduate School, Social Science (Dark Network, Religion, Social Contagion and Influence)
Dr. Paolo Campagna	University of Cambridge, Criminology and Complex Networks
Representative	Migration Policy Institute

2. Identification and Clarification of Mandates

Strategic planning seeks to decrease the security threat imposed by illegal mass migration. Every counter measure must be in accordance with the UN Universal Declaration of Human Rights and the EU Charter of Fundamental Rights.[205] Military kinetic actions are out of the scope of this planning process. Kinetic effects are available only through interagency and law enforcement cooperation with partner nations or member countries. Non-kinetic actions have to be aligned with NATO strategic guidance with special attention to North Atlantic Council-approved target audiences. Capability/capacity building, strategic communication, and non-kinetic targeting of foreign target audiences is to be worked through close diplomatic cooperation with the host nations.

3. Development and Clarification of Mission and Values

The aim of the NATO mission is to control illegal migration in order to address its related security threats and decrease the probability of humanitarian crisis within member and partner countries. Stakeholders are kept informed by the planning team/executive committee in accordance with their interest and authority to address the problem and mitigate security threats (Figure 26). The core values that underlie the mission include the provision of security to the citizens of member countries while ensuring the human rights of all populations affected by illegal migration. The end state is a contained level of illegal

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[205] United Nations, "Universal Declaration of Human Rights," United Nations, accessed 16 April 2021, https://www.un.org/en/about-us/universal-declaration-of-human-rights; and European Commission, "EU Charter of Fundamental Rights," European Commission, accessed 16 April 2021, https://ec.europa.eu/info/aid-development-cooperation-fundamental-rights/your-rights-eu/eu-charter-fundamental-rights_en.

migration while ensuring the humanitarian rights and safe and legal arrival of those persons who are eligible for refugee or legal resident status within the territory of the EU.
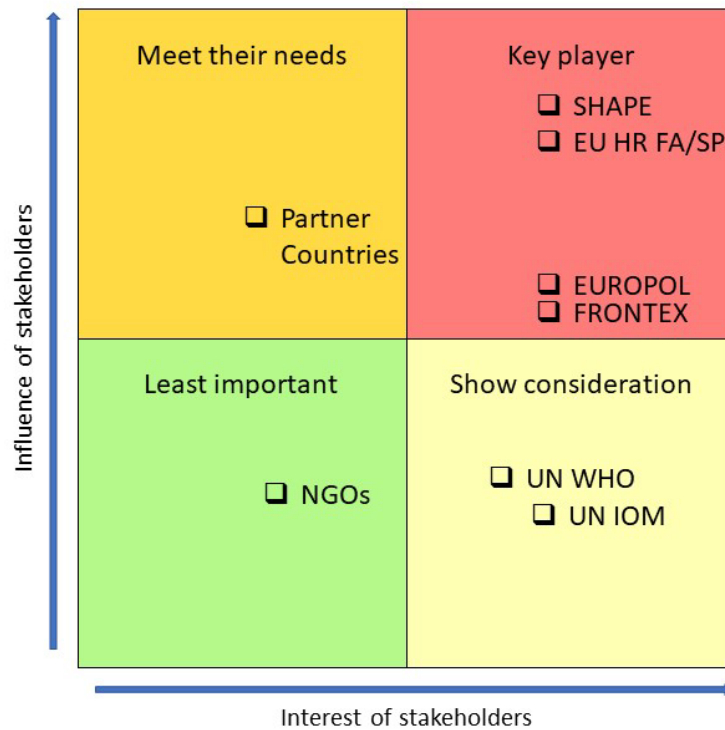
Figure 26.   Stakeholder Analysis[206]

4.   External Environmental Assessment

This step considers the threats and opportunities outside of the organization of NATO. The immediate threat to NATO member countries is the infiltration of terrorist groups and radicalization of the Islamic population. Also, the increased level of migrant flow might lead to humanitarian crises along main migratory routes. As a long-term effect, illegal migration might lead to parallel societies and increased crime rates, which could decrease the resilience of NATO member countries.[207] On the other hand, the Alliance has

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[206] Adapted from "Stakeholder Matrix - Key Matrices for Stakeholder Analysis," Stakeholdermap, accessed 17 March 2021, https://www.stakeholdermap.com/stakeholder-matrix.html.

[207] Albert, "Berlin's Migrant Clans Are Major Factor behind High Crime Rate, Chief Prosecutor Says."

the opportunity to promote NATO–EU cooperation that might contribute to an enhanced control of illegal migration through a unified political and security approach.

5.   Internal Environmental Assessment

The following steps assesses internal strengths and weaknesses of the bounded system. Steps 4 and 5 together provide the strength, weakness, opportunity, threat analysis, which will serve as a basis for strategy development. Strategic options aim to take advantage of strengths and opportunities while mitigating weakness and threats. The strength of the organization is the unified political mandate. Also, NATO countries together represent the largest military capabilities and resources in the world harnessed to cutting-edge technology. As a weakness, the alliance is a large bureaucratic organization that is facing highly adaptable and resilient self-organizing networks.

6.   Strategic Issue Identification

Emergent patterns of social interactions, the bounded rationality associated with human (cognitive) systems, and the fluid nature of migrant smuggling organizations require rapid and flexible decision making. NATO is fundamentally driven by formalized political and strategic-level decisions requiring unanimous consent that is generally time consuming and inherently rigid.

Illegal mass migration has created a severe humanitarian crisis along the main migration routes in the Central Mediterranean, but it has also provided channels for violent extremist organizations to infiltrate and operate within NATO territory and to exploit inherent vulnerability points within EU and NATO countries.

7.   Strategy Development

As we can see in Figure 25, the endogenous system—as bounded for this strategic planning effort—is the interrelated network of smuggling, illegal migration, and counter measures feedback loops and their related variables. Yet, the number of emigrant/displaced people, the bilateral agreements, and the perception of migration—either positive or negative—are parts of the exogenous system (environment). A change in any endogenous variable leads directly or indirectly to a change in every other endogenous variable. On the

other hand, change in endogenous system variables does not lead directly to a change of any of the exogenous variables.

Different strategic approaches focus on different parts of the system and exploit different leverage points. The aim of all three strategic approaches is to decrease the level of illegal migrations while mitigating related security threats. The end state is to contain the illegal migration at or below the 2010 level while both its short- and long-term effects are mitigated.

a. Strategic Approaches—Overview

(1) Strategic Approach 1 – Capability Building

- Political and institutional capability building

- Military and law enforcement capability building

- Socio-economic development

- Infrastructural development

(2) Strategic Approach 2 – Counter Measures/Restrictive Policies

- Enhanced border protection

- Bilateral cooperation with donor and transit countries

- Enhanced law enforcement operations against smuggling groups

(3) Strategic Approach 3 – Network Approach

- Alter the multiple reinforcing feedback loop between migrant smugglers, diaspora, and migrant population.

- Mitigate the social contagion and perceptional biases.

b.   *Strategic Approaches in Detail*

(1)   Strategic Approach 1

This strategic approach seeks changes in exogenous variables (environmental factors) to achieve behavioral change at the system level. The strategy is based on the concept of the Defence and Related Security Capacity Building Initiative launched in September 2014 by the NATO Wales Summit. The scope of this strategy includes key donor and transit countries like Algeria, Libya, Niger, Nigeria, Eritrea, Somalia, Syria, and Tunisia. Allied countries and partner nations would provide training and advisory support for military and law enforcement elements along with political, institutional, and economic capability development packages. The strategy aims to increase the security and HDI in recipient countries to decrease the level of displacement and economic migration, and consequently to disrupt the business model of migrant smuggling networks.

By focusing on root causes of illegal migration, the strategy has a higher probability to alter the dominant feedback loops (Figure 27). Environmental change can provide enduring effects and trigger structural change of an endogenous system's dynamics. According to Meadows, altering the system's structure might have an enormous effect, but it could be very costly and time consuming.[208] This strategy requires significant resources and a very complex effort.

As the strategy offers a long-term solution, it is the most time consuming in the implementation phase. The time horizon of the implementation is 10–15 years. The effectiveness of the strategy can be measured by the increase in security and economic capabilities of recipient countries, and the decrease in the migrant population. The effectiveness of the strategy is measured by surveys, increased economic performance, and decreased criminal rate.

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[208] Meadows, *Thinking in Systems*, 145–67.
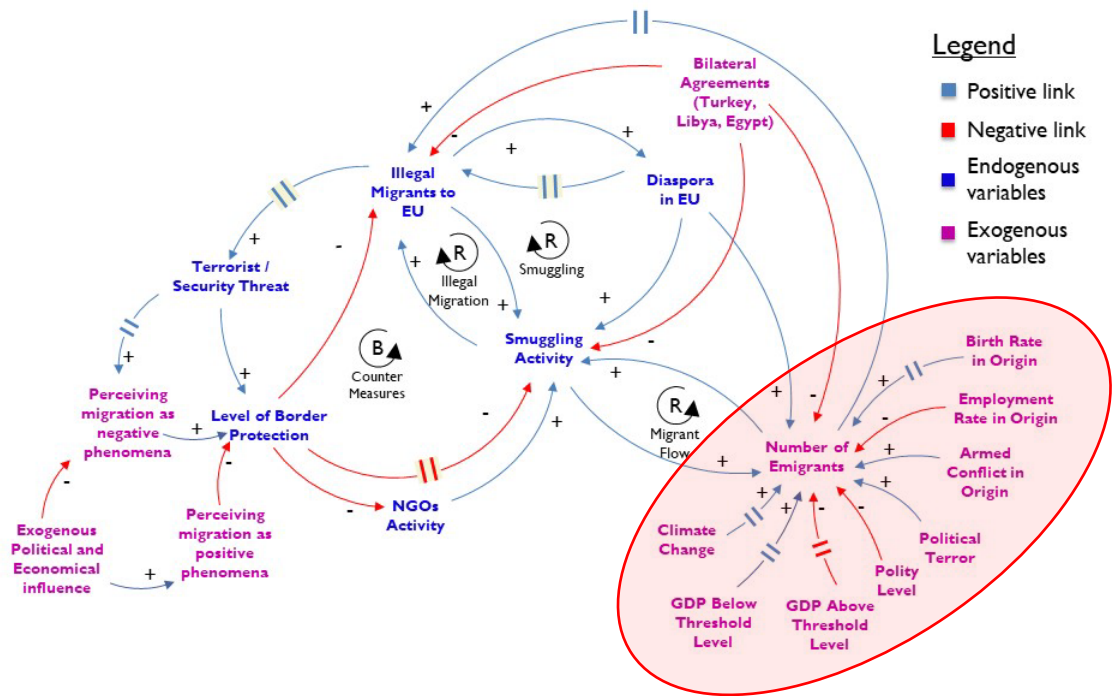
Figure 27.   Strategic Approach 1, Focus Areas

(2)   Strategic Approach 2

This strategy aims to alter the cost-benefit calculus of illegal migration by decreasing the probability of successful migrant smuggling operation (Figure 28). The concept is built on an enhanced border protection level and bilateral cooperation with key transit countries like Algeria, Egypt, Libya, and Tunisia. Coordinated large-scale law enforcement operations against migrant smuggling groups is also an integrated element of the strategy.

The key advantage is the direct effect on the security threats; moreover, the result can be assessed in a relatively short time. The strategy is not dependent on the cooperation with a third country, and it is less exposed to perceptional factors. On the other hand, it might trigger emergent and self-organizing behavior within the smuggling network.

As the systemic effects of the strategy would be more immediately apparent, this strategic approach has the shortest time horizon of 1–3 years. The effectiveness of the

strategy can be measured by the number of arrivals shortly after the strategy is put into effect. The methods of assessment could include statistical analysis and system dynamics modeling.
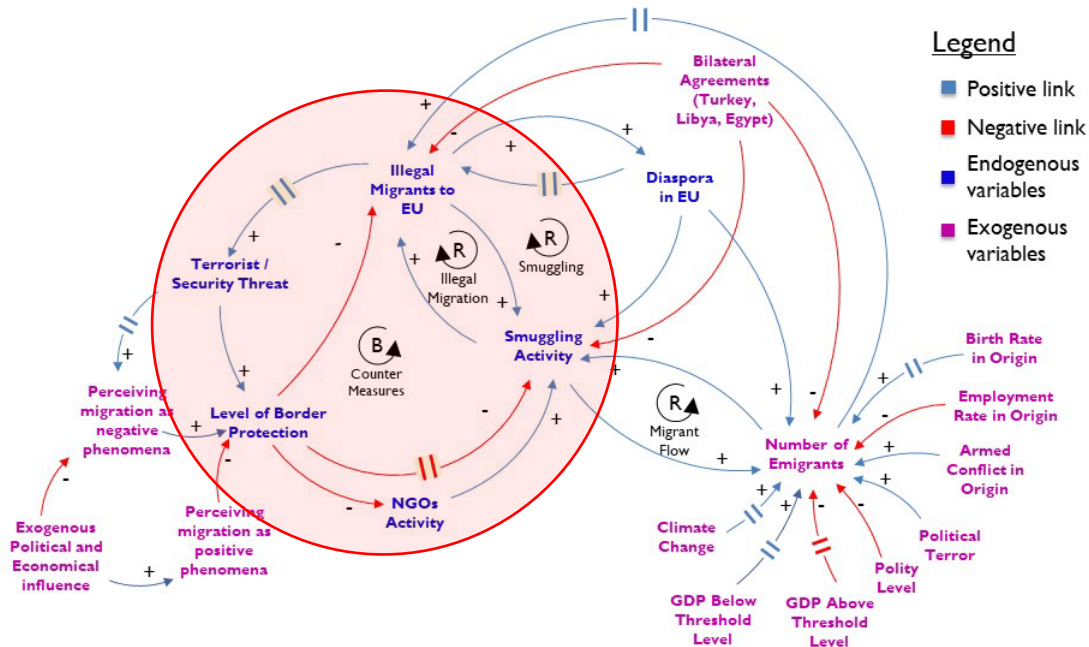
Figure 28.   Strategic Approach 2, Focus Areas

(3)   Strategic Approach 3

The third strategic approach focuses on the societies in the countries of origin. While similar to the first strategy in that it is based on solving the problem by addressing the root cause, the third strategic approach is directed at the cognitive factor, or perceptions of illegal migration in the exogenous environment (Figure 29). This strategy also requires conflict resolution and capability-building efforts, but it is more focused on the changing the perceptions of potential migrants themselves. The concept is based on the notion that the overwhelming majority of illegal migrants has little or no relevant knowledge of the European country of destination. Rather, their perception is influenced by their social relationship and the media within their society of origin. This extends to their relatives and friends living in NATO or EU countries. Smuggling groups also play a key role in shaping

the cognitive space of the susceptible population as they advertise their service by promoting unrealistic promises. The lack of a unified EU migration policy further enables the messaging of smugglers and accelerates social contagion. Shockingly, hundreds of thousands of people take the risk of being tortured, raped, or murdered based on a biased image. The third strategic approach aims to disrupt the reinforcing feedback of social influence and malicious influence activity by providing a more realistic narrative of the very real potential dangers of illegal migration through widespread media campaigns and education.

As an advantage, the strategy offers a comprehensive and long-term approach to address the problem by providing a secure environment and mitigating the negative effects of social influence. On the other hand, as the strategy involves the implications in the information domain, the long-term systemic behavior could be utterly complex. The time horizon for implementation is 2–10 years.

Effectiveness could be measured by a decrease of those who are willing to illegally migrate and the actual number of emigrants or displaced people. The assessment would also employ surveys and statistical analysis.

Table 9 summarizes the strategic approaches.
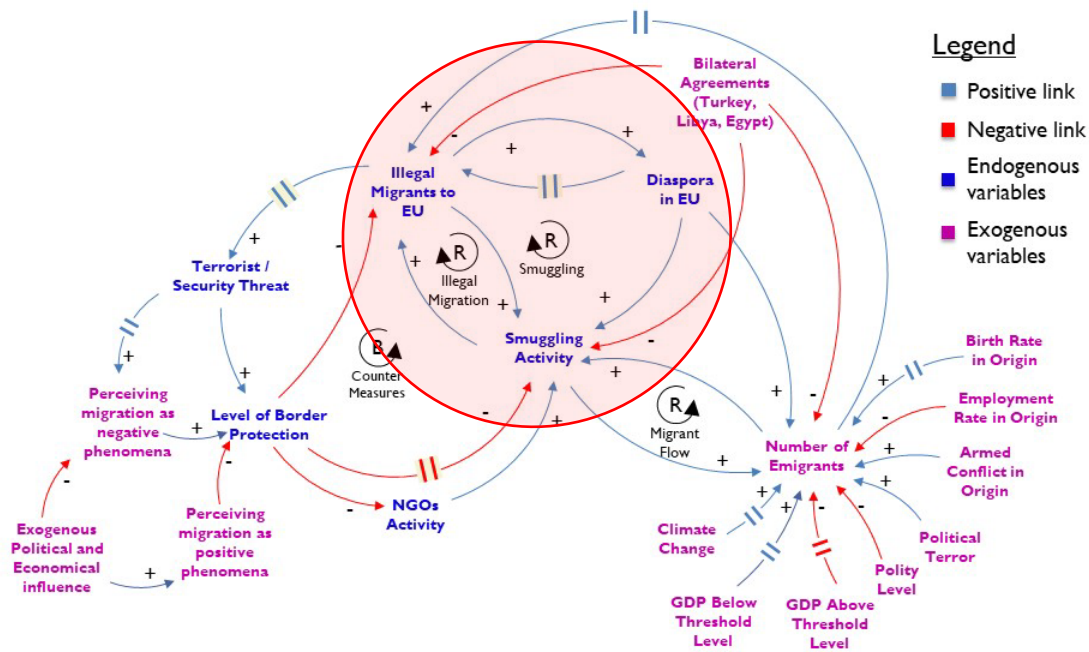
Figure 29.   Strategic Approach 3, Focus Areas

Table 9.   Summary of Strategic Approaches

	CoA 1—Capability Building	CoA 2—Counter Measure, Restrictive Policies	CoA 3—Network Approach
Strategy	Political and institutional capability building. Military and law enforcement capability building. Socio-economic development.	Enhanced border protection. Bilateral cooperation with donor and transit countries. Enhanced law enforcement operations against smuggling groups	Altering the multiple reinforcing feedback loop between migrant smugglers, diaspora, and migrant population.
Pros	Enduring structural effect.	Direct effect on security threats on a short run.	Comprehensive and long-term approach.
Cons	Costly and time consuming.	Severe failure of strategy might lead to humanitarian crisis.	Highly unpredictable systemic behavior

	CoA 1—Capability Building	CoA 2—Counter Measure, Restrictive Policies	CoA 3—Network Approach
Time Horizon	10–15 years	1–3 years	2–10 years
Measure of Effectiveness	Political and military stability. Decreased level of emigration.	Decreased number of IBCs and related crimes.	Decreased number of susceptible populations. Decreased level of emigration.
Methods of Analysis	Survey, economic measures, and security level.	Statistical analysis and system dynamics modeling.	Surveys, statistical analysis, and system modelling.

c.   *Strategy Comparison and Selection*

This section evaluates the different strategic approaches in respect to a set of perspectives. The selected perspectives and their relative weight are determined by the planning team based on the planning objectives, available resources, priorities of the executive committee, and the evaluations of the SMEs. Based on the considered criteria (Table 10), the third strategic approach is the recommended option.

Table 10.   Strategy Comparison

	CoA 1—Capability Building	CoA 2—Counter Measure, Restrictive Policies	CoA 3—Network Approach
Time Required	1	3	2
Assessment Time	1	3	2
Flexibility	2	1	3
Simplicity	2	3	1
Resources	1	2	2
Comprehensive solution (x2)	2(4)	1(2)	3(6)
Risk (x2)	2(4)	1(2)	2(4)
Total	15	16	20

8.   Description of the Organization in the Future and Assessment Methodology

The strategy development is followed by strategy selection and implementation.[209] As the final step of the planning process, NATO implements the selected strategy and develops the methodology to evaluate the results. The planning team coordinates the net assessment of the strategy to evaluate its effectiveness. The aim of net assessment is to evaluate the effectiveness of the implemented strategy weighted against the effectiveness of the smuggling network and illegal migration in the context of the objectives of the migration system. The assessment is conducted semi-annually in the first year, then annually until the end of the implementation. The assessment applies surveys, statistical analysis, and system modeling conducted by the SMEs and the EU Joint Research Center. The result of the assessment is reported to the Executive Committee, who might recommend strategy adjustment to the SACEUR.

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[209] Bryson, "A Strategic Planning Process for Public and Non-Profit Organizations," 77.

VIII. CONCLUSION

The statistical evidence indicates that illegal mass migration is positively related with diaspora count in the target country and unemployment rate of the country of origin. On the other hand, HDI, polity level, and distance are negatively related with IBCs. While GDP per capita, armed conflicts, and PTS are not statistically significant, we can interpret these variables as non-linear probabilistic factors based on further analysis. In other words, we can argue that a higher level of armed conflict or higher political terror level appears to increase the probability of migration, although the relationship is not linear nor statistically significant. A non-linear relationship is also evident in case of GDP per capita. Based on the statistical analysis, I conclude that there is a threshold level between $1,100 and $1,500 per capita that produces the highest level of illegal migration in the Central Mediterranean region, while values below or above this level both decrease the probability of migration. Consequently, a strategy that applies capability building in low-income countries should expect an increased level of migration at first then a decrease over the long run. Also, I found enough statistical evidence to infer a strong positive relationship between the number of IBCs and the number of terrorist attacks in the EU.

Socio-economic factors themselves cannot explain the behavior of the illegal migration system. I argue that a susceptible population makes decision based on distorted and biased perceptions—pseudo environment—that is significantly different from the real environment. There is a strong social influence at play that is responsible for shaping the perception of millions of people and generates large scale migration. The main elements of this abstract social network are the migrant population, the diaspora, and the smugglers, where the distorted information from family members and friends living in a diaspora and the narrative of smuggling organizations shape the perception of possible migrants. When the messaging of diaspora members and smuggling groups reaches a critical mass of people, social diffusion becomes a key factor. As Everton and Pfaff note, if the social diffusion of an idea or a practice reaches a certain level, it becomes a self-reinforcing

process and is very difficult to control beyond a certain point.[210] Perhaps this phenomenon played a crucial role in the unprecedented peak of IBCs in 2015. Nevertheless, the mixed signals and the lack of unitary migratory policy of the EU also play important roles in the information environment.

Twitter data analysis revealed a relationship between geographical location and sentiment toward mass migration. Conversations expressed negative sentiment in frontier countries, while countries facing second- or third-order effects of illegal migration tended to express positive sentiment toward the problem. However, the perception of the societies in target countries does not necessarily correlate with the political approach of the respective government. Democratic institutions generate time delay and non-linearity between the sentiment of a society and the political leadership. The significant time delay and non-linearity can be major factors that characterize the behavior of the illegal migration system.

Further, the SNA of the smuggling organizations revealed a flexible and resilient social structure that might be responsible for the fluid characteristics of migration flow within the region. I argue that disrupting even a large and overarching smuggling group has little effect on the overall migratory flow as the whole network quickly fills the power vacuum and rapidly reorganizes itself. Instead, a systemic approach is required that affects multiple leverage points and aims to trigger a behavioral change of the overall system.

The system analyses also revealed the interconnectedness of the parts of the illegal migration system and identified dominant time delays. The feedback network and the causal relations between the parts of the system are represented in Figure 25. These findings support the hypothesis that systems thinking is a valid approach to address illegal mass migration. A strategy that affects multiple leverage points and considers not just the socio-economic but also the social-psychological factors of illegal migration has a decent probability to succeed.

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[210] Everton and Pfaff, "Historical and Comparative Research on Social Diffusion."

For future study, I would suggest system dynamics modeling of the illegal migration system, which might be a very useful tool for future policy analysis. Also, a deeper multidisciplinary analysis of the role of social influence in the decision to migrate might provide useful insight into the underlying factors of the migration system.

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APPENDIX A. CHAPTER I—STATISTICAL AND GEOSPATIAL ANALYSIS

A.   LINEAR REGRESSION MODEL—TERRORIST ATTACKS PER ILLEGAL BORDER CROSSINGS

This appendix shows statistical evidence of the link between terrorist activity levels within the EU and the number of IBCs to Europe. According to the *EU Terrorism Situation & Trend Report* (Te-Sat), we can highlight a significant increase in arrests for jihadist terrorism from 2015.[211] While the suspects were mostly second or third generation migrants between 2014 and 2017, the number of foreign terrorist fighters shows a significant increase from 2016.[212] In cases like the Würzburg attack on 18 July 2016, the Nurnberg attack on 24 July 2016, and the Hamburg attack on 28 July 2017, the investigation indicated that the suspects arrived in the EU by illegal migration flow.[213] We can anticipate that there is a correlation—cause and effect relationship—between IBCs and terrorist attack levels within the EU.

This statistical analysis applies linear regression to explore the relationship between the number of IBCs as an independent variable and completed terrorist attacks within EU member countries as a dependent variable.[214][215] The observation period is 2009–2018.

We have enough statistical evidence (t = 5.23, p-value < 0.001) to infer a strong positive relationship between illegal migration and terrorist attacks in the EU (confidence level 99%). The regression model gives the best fit if we apply a one-year lag for the IBCs data. In other words, it takes an average of one year to activate the terrorist cell after arrival to the EU. We can claim that 77% of the increased number of arrests can be explained by

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[211] Europol, *EU Terrorism Situation & Trend Report (Te-Sat) 2018*.

[212] Róbert Bartkó, *A Terrorizmus Elleni Küzdelem Aktuális Kérdései a XXI. Században (Actualities of Counter-terrorism in the 21st Century)* (Budapest, Hungary: Gondolat Kiadó, 2019), 177.

[213] Bartkó, *A Terrorizmus Elleni Küzdelem Aktuális Kérdései a XXI. Században (Actualities of Counter-terrorism in the 21st Century)*.

[214] European Commission, 'Detections of Illegal Border-Crossings; Monthly Statistics'.

[215] Europol, *EU Terrorism Situation & Trend Report (Te-Sat) 2018*.

illegal migration (R^2=0.77). Specifically, those countries that are considered primary targets of illegal migration suffer the most from jihadist terrorist attacks.[216]
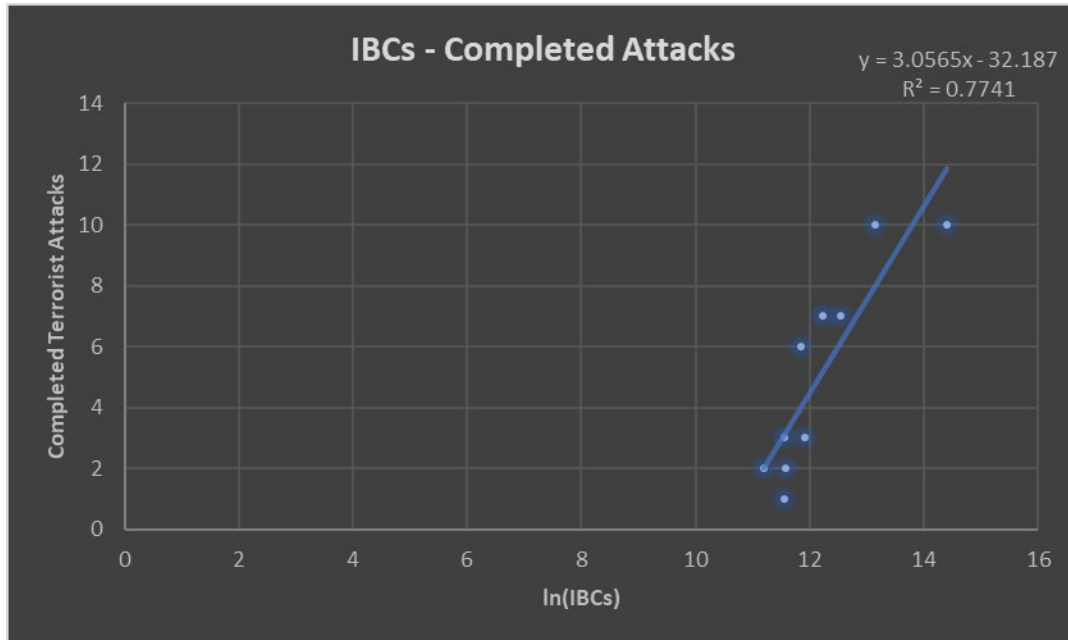

Figure 30.   Completed Terrorist Attacks in the EU over IBCs

[216] Adapted from Frontex, "Detection of Illegal Border-Crossings Statistics"; and Europol, *EU Terrorism Situation & Trend Report (Te-Sat) 2018*.

APPENDIX B. CHAPTER IV—PERCEPTION OF ILLEGAL MIGRATION IN DESTINATION COUNTRIES

A.   CODEBOOK[217]

Table 11.   Twitter Database Codebook—Relationships

Relationships	
Type	**Description**
Retweet	"A Retweet is a re-posting of a Tweet."[218] Twitter's Retweet feature helps users to share others' tweets with their followers. This study considers a retweet to be a social tie between the user of the original tweet and the retweeter. The direction of the tie is pointing from the retweeter to the user of the original tweet.[219]
Quote	Quote is retweeting a part of the original tweet while adding your own ideas or thoughts to it.[220] This study also considers quotes to be a social tie between the user of the original tweet and the user of the quote, where the direction of the tie is pointing from the quoter to the user of the original tweet.
Reply	A reply is a response to another person's tweet.[221] This study also considers replies to be a social tie between the user of the original tweet and the user of the reply, where the direction of the tie is pointing from the replier to the user of the original tweet.

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[217] Twitter, "Twitter API."

[218] Twitter, "Twitter Retweet FAQS – Deleting, RTs, and More," Twitter, accessed 16 April 2021, https://help.twitter.com/en/using-twitter/retweet-faqs.

[219] Twitter.

[220] "How to Retweet," Twitter, accessed 16 April 2021, https://help.twitter.com/en/using-twitter/how-to-retweet.

[221] "About Conversations on Twitter," Twitter, accessed 16 April 2021, https://help.twitter.com/en/using-twitter/twitter-conversations.

Table 12.   Twitter Database Codebook—Attributes

Attributes	
Type	**Description**
Source	Twitter user who reacted to a tweet using any of the observed hashtags.
Target	Twitter user who tweeted the original message.
Relationship	Interaction between two users characterized by retweet, quote, or reply.
User_id	Unique identifier for a user, expressed by integers.
Retweeted	"Indicates whether this Tweet has been Retweeted by the authenticating user."[222]
Qquoted_status_id	"This field contains the integer value Tweet ID of the quoted Tweet."[223]
In_reply_to_status_id	"If the represented Tweet is a reply, this field will contain the integer representation of the original Tweet's ID."[224]
Reply_to_user_id	"If the represented Tweet is a reply, this field will contain the string representation of the original Tweet's ID."[225]
Reply_to_screen_name	"If the represented Tweet is a reply, this field will contain the screen name of the original Tweet's author."[226]

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[222] Twitter, "Tweet Object," Twitter, accessed 23 October 2020, https://developer.twitter.com/en/docs/twitter-api/v1/data-dictionary/overview/tweet-object.

[223] Twitter.

[224] Twitter.

[225] Twitter.

[226] Twitter.

B.   GROUPS BY BETWEENNESS CENTRALITY

Table 13.   Top Ten Groups by Betweenness Centrality

Number	Size	Betweenness	Location
43	571	374.967	Italy
28	155	289.599	France/Belgium/Germany
39	470	223.02	Northern Italy
38	352	158	Germany
10	139	117.75	UK/AUS/CAN/US
3	242	81.341	Switzerland
31	128	75.888	Italy
22	141	49.046	Belgium
12	143	42.466	Switzerland
17	28	41	Eastern Europe

C.   LIST OF GROUPS BY SENTIMENTS

Table 14.   Top Five Negative Sentiment Groups

Number	Size	Betweenness	Location
27	27	0	Spain
39	470	223.02	Northern Italy
5	12	0	N/A
41	463	8.372	Italy
31	128	75.888	Italy

Table 15.   Top Five Positive Sentiment Groups

Number	Size	Betweenness	Location
3	242	81.341	Switzerland
4	43	0	Malta
30	46	0	Germany
6	13	0	Germany
8	131	0.5	N/A

D. TWITTER NETWORK DEGREE REPORT

The Degree Report shows the unique topographical characteristics of the Twitter communication network. We can see the clear indication of a scale free network—characterized by power law—where a low number of actors controls most of the resources (information in this case).[227]
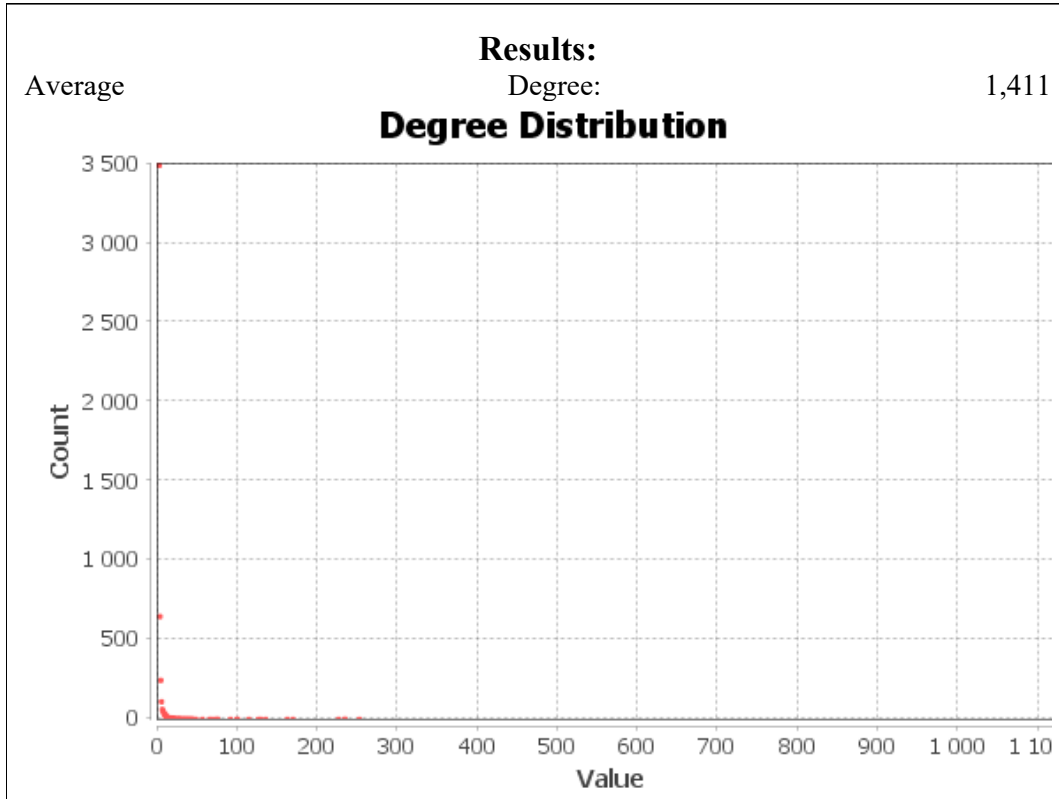

Figure 31.   Degree Report of Twitter Communication Network (QGIS)

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[227] Barabási and Bonabeau, "Scale-Free Networks."

APPENDIX C. CHAPTER VI—SOCIAL NETWORK ANALYSIS OF THE ERITREAN SMUGGLING NETWORK

A.   CODEBOOK

Network boundaries: An actor qualifies as a member of the smuggling group if he or she has an active role in smuggling operations under the direct or indirect control of one of the key leaders.

Table 16.   Codebook for the Social Network Analysis of Eritrean Smuggling Group—Relationships

Relationships		
Type	**Description**	**Value (Weight)**
Cooperation	Common involvement in migrant smuggling activity including financial operation, transportation, logistical support on coordination of illicit activity.	Number of contacts during observation period: 1 = 1–99 2 = 100–499 3 = 500–999 4 = 1000–1999 5 = 2000 and above
Superior/ Subordinate	Direct influence and control over an actor conducting migrant smuggling operations.	N/A
Trust	The investigation identified trust between actors.	N/A
Financial	Collection and transfer of money directly linked to smuggling activity.	Sum of money transferred during observation period: 1 = 1–4,999 EUR 2 = 5,000-14,999 EUR 3 = 15,000-29,999 EUR 4 = 30,000-49,999 EUR 5 = 50,000 EUR and above

Table 17.   Codebook for the Social Network Analysis of Eritrean Smuggling Group—Attributes

Attributes		
Type	**Description**	**Value (Weight)**
Operating	Main area of operation	Country, province, or city
Role	Main activity within the network	Organizer Intermediate Leader Executor Facilitator
Task	Main activity during smuggling operations	Coordinator Logistics Collecting migrants Transportation
Nationality	Place of birth or ethnicity	Characters
Sex	Gender of the actor	Categorical: Male / Female
Insider	Fulfill social position within the network boundaries	Categorical: 0/1

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