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Understanding Islamic State through Complex Systems Analysis

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Abstract

The aim of this article is to analyze the development capabilities of the self-proclaimed Islamic State (IS) in its different levels of projection, by means of System Thinking (ST). It is a Qualitative methodology that helps analyzing Complex Systems, characterized by feedback mechanisms between actions taken by a decision maker and the reactions that the system manifests over time. Considering IS as a multifaceted and self-sustainable phenomenon, completely de-structured, whose elements with different skills and culture interact and influence each other through the Web, it is possible to create a simulation model that takes into account the relationship between the different levels of development through which the threat is increasing its power. There are: the level of territorial expansion, the level of virtual projection and economic infrastructure on which the group evolves. After building a possible model accounting for the development dynamics of Islamic State, analysis will focus on the recognition of “attractive” variables, which in terms of complex analysis reinforce the growth of the whole system over time. Subsequently, these variables will be the target of the proposed policy of containment of the threat.

Keywords

Counter-Terrorism, Islamic State, Support to *Intelligence*, Complex Systems Analysis, Systems Thinking, Antiterrorismo, Stato Islamico, Supporto all’analisi di *Intelligence*, Analisi dei Sistemi Complessi, Pensiero Sistemico

1. Introduction

The self-proclaimed Islamic State (IS) has taken an interesting path in terms of historical development. Originally IS was part of al *Tawhid al Jihad*,

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armed group of *Abu Mussab al Zarqawi*; after it became *Islamic State in Iraq* (ISI) and then it merged with *Al-Qaida*, forming *Al-Qaida in Iraq* (AQI). Then in 2010 *Abu Bakr al Baghdadi* became the leader of the group and brought back to the previous name (ISI). In 2013, after they merged with a part of *Jabhat al Nusrah*, it was renamed *Islamic State of Iraq and Levant* (ISIL) or *Islamic State of Iraq and Syria* (ISIS), until June 2014 when it self-proclaimed *Islamic State* (IS) (Napoleoni, 2014)².

Historically, as with most Islamic Terrorist groups after II World War, IS began its growth from Iraq and Syria Proxy wars to start their foundation for an autonomous economy. Analyzing IS from Complex Systems point of view, it seems to draw its strength from the product of different levels (e.g. Local operations, Social Media Communication, economic infrastructure) that come into relationship each other, producing particular situations defined as “non-linear”.

Generally, a system is defined as “non-linear” when the effects of an action are not proportional to the causes that have generated over time. In particular, in terms of cause-effects, the unbalance of the system seems to be increased overall by the role of the Web as a multiplier of communication.

In this way, IS could be defined as a changeable and self sustainable phenomenon, whose components with different skills and culture interact and influence each other through the use of the Web. This interacting process, involves the continuous transformation of the terroristic entity over time, that then becomes de-structured and almost unpredictable, not able to follow a standard procedure in the prevention and control of the phenomenon.

In this article, *complex* representation of IS will be examined, through three different aspects that appears to be the source of IS development: Military local operations (Territorial Expansion), Social Media Communication (Virtual expansion) and Economical Infrastructure. The added value that this paper attempt to provide, is to use a methodology that is able to correlate systemically the cited levels of IS System, to try to break or contain the reinforcing mechanisms underlying its development.

Furthermore, the response of Western countries to the growth of IS, is viewed with a delay in the perception of threat behavior, that has fostered the growth of the various aspects of the group over time. In this sense, it will be demonstrated that in systemic terms, countering a single aspect of the threat (e.g. Communication activities) could not effectively resolve or contain the whole system. This is due to the reinforcing mechanism with which other variables of IS systems evolve. So, after highlighting “valuable variables” in

² It is important to note that IS has known in Syria and Iraq as *al-Dawlat*, literally the “State” (Napoleoni, 2014).

terms of complex analysis, some counter-terrorism policies will be proposed in order to contain *systemically* the growing of the group.

The purposes of this research are:

1. To use the Systems Thinking (ST) approach to explain a new emerging threat: the self-proclaimed Islamic State, as a complex and multi-faceted phenomenon. This will include several sociological, economical and new communication factors that contribute to support the involved organization. The ST approach seems to be an appropriate methodology to delve with the understanding of the underlying dynamics.
2. To propose some Counter-terrorism policies in order to contain systemically the dynamics of IS development.

Under the previous perspective, Research Questions (RQs) presented in the paper are:

1. Which dynamics drive the IS growth?
2. How can we control or reduce the threat?

2. Previous studies and research

During the research, a detailed analysis of the literature was conducted, aimed at finding references (including models) that would respond to the presented research objectives.

Regarding the System Thinking and System Dynamics approaches, research has been conducted of existing models in the “System Dynamics Review”; furthermore, several empirical works through the website of the System Dynamics Society have been selected by means of open search (OSINT – Open source Intelligence analysis) on the web (with the keywords: Terrorism, Counter-Terrorism, System Thinking, System Dynamics, and others of the kind). The following results were obtained:

- “A look at systems thinking Terrorism” (2001) by Barry Richmond, where it is shown that the mental model which has been addressed the war on terrorism by the Bush administration caused a decrease in short-term threat, but in long-term a growth of the same threat thanks to the anger caused by the military methods used by Western powers to combat the threat.
- “Understanding the driving factors of Terrorism” (2002) by Bruce K. Skarin, which examines the threat of terrorist group Al-Qaeda against the United States of America. In particular, Skarin, based on the work of B. Richmond (2001), trying to figure out if the instrument of System Dynamics can help to

- analyze the complex system of Islamic terrorism. The results are encouraging, which comes in terms of analytical and synthetic understanding of the threat.
- “The Use of System Dynamics Analysis and Modeling Techniques to Explore Policy Levers in the Fight Against Middle Eastern Terrorist Groups” (2005). The paper analyzes the causal relationship between the policies implemented by the United States in the Middle East and the activities of terrorist groups in the Middle East.
 - “Modeling Jihad: A System Dynamics Model of the Salafist Group for Preaching and Combat Financial Subsystem” (2006) by Alex Grynkewich and Chris Reifel. The model describes the behavior of the organization and financing operations of a Salafist group (GSPC). The three RQs analyzed in the research paper by Alex Grynkewich and Chris Reifel are: 1) how the funding operations affect the amount and type of operations of the GSPC, 2) how the same operations change the “lifecycle” regarding the organization of the group, and 3) what policy-makers should expect in terms of development of the group. The paper has been considered in the analysis of the financing of some Islamic terror groups.
 - “A System Dynamics (SD) Approach to Modeling and Understanding Terrorist Networks” by Dr. Stuart Madnick and Dr. Michael Siegel. The paper shows how the instrument of SD can be used to model the issue of terrorism. In this sense, it has been used as a model for the this research model.

Articles and research works carried out by Luigi Geppert (2012), John D. Sterman (2000), Leweling Tara A. and Otto Sieber (2006), Roger Smith (2002), and Torres D.S., De Mena M.P. Lechon F.R. Soto P.F.(2013) were also studied to explore the theme of the paper related to complex system analysis.

The analysis of the above mentioned models and researches supports the thesis that System Thinking and System Dynamics approaches can be successfully applied to analyze the complex dynamics of the development of a terroristic threat, thus emphasizing the possibility of a wider development of such methodologies, due to the (relative) novelty of the application of them in this field.

Regarding the Islamic Terrorism issue and in particular IS Threat, the analysis was carried out from several field sources. Among them, with a focus on the works of Loretta Napoleoni (2008, 2014), Jason Burke (2004), Arije Antinori (2009,2012,2014,2015), Walter Laqueur (1978, 2002), Marco Lombardi & ITSTIME analysis (2014,2015), Global Terrorism Index Report (2014), United Nations reports (2014), ICSA reports (2014), ISPI analysis (2014,2015), SITE monitoring alerts, IBM “Red Cell” analysis (2014), “The Soufan Group” reports (2014) and other international sources.

3. Context

The historian Walter Laqueur (2002) argues that the proxy war is “the strategy that supports dissidents, separatists, ambitious politicians, or simply the population unhappy with a rival state” and “in some cases it was a defensive strategy, which aims to prevent possible attacks by the enemy’s potential, other times it was part of an offensive strategy aimed at weakening the enemy and perhaps even prepare the ground for the invasion”.

The forms of asymmetric influence, can be of several types:

- financial,
- ideological,
- logistical,
- diplomatic support to opposition movements
- armed support.

The proxy wars have the specific characteristic of being conducted outside national borders, and by Third Party on behalf of another State that is not directly involved in acts of war.

Due to the multiple changes imposed mainly by digital technology and its characteristics in terms of multiplication of the Audience, it is appropriate to start thinking the Islamic State as neo-asymmetric threat rather than asymmetric threat.

As the development of some Terrorist groups after the II World War, the IS development starting from taking advantage of the instability in Iraq and Syria Arab Republic (United Nations, 2014).

According to Napoleoni and United Nations reports (2014), IS was originally part of Al-Zarqawi’s *al Tawhid al Jihad*, that renamed itself ISI and after merging with *Al-Qaida*, *Al-Qaida in Iraq* (AQI). After killing of *Al-Zarqawi* (2006), terror groups in Iraq began to lose power, thanks also to a U.S. strategic doctrine called “Surge”. When in 2010 *Abu Bakr al Baghdadi* became the leader of AQI, it brought back to the previous name (ISI), moving away from *al-Qaida*. In 2011, ISI expands in Syria, used it “as a pretext to seek international donations and volunteers, generating multi-million-dollar financial resources and attracting thousands of foreign terrorist fighters” (United Nations, 2014 pp. 6/35). After conquering much territorial parts in Iraq e Syria, in 2013 IS merged with a part of *Jabhat al Nusra* and it was renamed *Islamic State of Iraq and Levant* (ISIL) or *Islamic State of Iraq and Syria* (ISIS). In June 2014 it self-proclaimed *Islamic State* (IS).

Observing the context of development of some terrorist groups during Cold War, as for example PLO³, IS growth has some particular new aspects. In this way, globalization process has changed the whole environment in terms of number

³ Palestine Liberation Organization (PLO), is an organization founded in 1964 with the purpose of the “liberation of Palestine” through armed struggle (Wikipedia).

of “sponsor” and short-term interests. The product of these multiple situations (actors, short-term interests etc), as written above, has created complexity in the system and in turn multiple “non linear” situations, in which “a today supporter could become tomorrow an enemy and alliances are not clear and could change daily” (Napoleoni, 2014 p. 41). Through a good understanding either of the context and the needs of Muslims, Islamic State has built internal consensus through kind of Welfare State policies⁴ (internal) and Social media Communication (internal and external level) that in turn either have increased its territorial power. Showing an organized image of itself to the world, many Muslims have become impressed by this entity have joined war zones, increasing military capability in terms of number of militants and magnitude. They are called “Foreign Fighters”. Furthermore, the group has organized themselves faster than other historical groups by implementing proper economical infrastructure, thanks to its territorial conquests (Natural resources power) and strong relationships with local leaders. In this way, IS can become independent from foreign “sponsors” and contain the internal corruption (Napoleoni, 2014), a powerful potential division element.

4. The model

The theoretical parts described above are the basis of the complex model. The *Causal Loop Diagram* (CLD), that will be introduced and explained, represents in dynamic logic the relationship between the various development aspects of the self-proclaimed Islamic State, as described in the introduction. The complete CLD is reported at the end of the paper (Figure 21).

Following, the methodological note to read CLDs: the arrows show the relationships between the different variables of the system and arrows’ signs (+ or -) characterize respectively a directly or inversely proportionality between variables. In this sense, for example, if the proportionality between two variables is direct, the increase of a variable increases the other, while if the proportionality is inverse, the increase of a variable, decreases the other. The product between all signs (+ or -) of different loops, denotes feedback Reinforcing (R) or Balancing (B), in terms of system growth over time. According to the System Dynamics theory, these two feedbacks are the “elementary” behavior of all complex systems. The interaction between several “elementary” feedback loops creates complex dynamics in the system, producing time delays, and non-linearity. The concept of non-linearity has been discussed above.

⁴The economic development, is used mainly in the construction of internal consensus through Welfare policies offering. As other groups as for example Hezbollah in Lebanon, IS trying to create social programs to reach the consensus of local populations in order to become a legitimate State.

The first part of the model represents the Local⁵ Military operations, thanks to which the Islamic State expands itself territorially.

Figure 1 shows that the increase of “*Successful operations*” increases “*Territorial expansion*”. In this model, the success of military operations depends on “*Military Capability*” (e.g. “*Weapons Supply*”, “*Military Training*”, “*Logistical support*”, “*Unconventional Weapons*”), “*N’ of Militants*” and “*Other Terr. Groups or Local Communities support*”. According with United Nations reports (2014), local communities support and/or cooperation is a critical success factor for the growth of the group.

The increase of “*Territorial expansion*”, increases in turn either the natural resources that IS preys after conquering different local areas (“*Natural resources gained*”) and the Military resources gained from enemies (“*Military resources gained*”). In this way, the more the group expands itself territorially through territorial conquests, the more it will be able to exploit local resources (e.g. Oil or wheat), which in turn increase IS economic infrastructure (“*Independent economic Infrastructure*”).

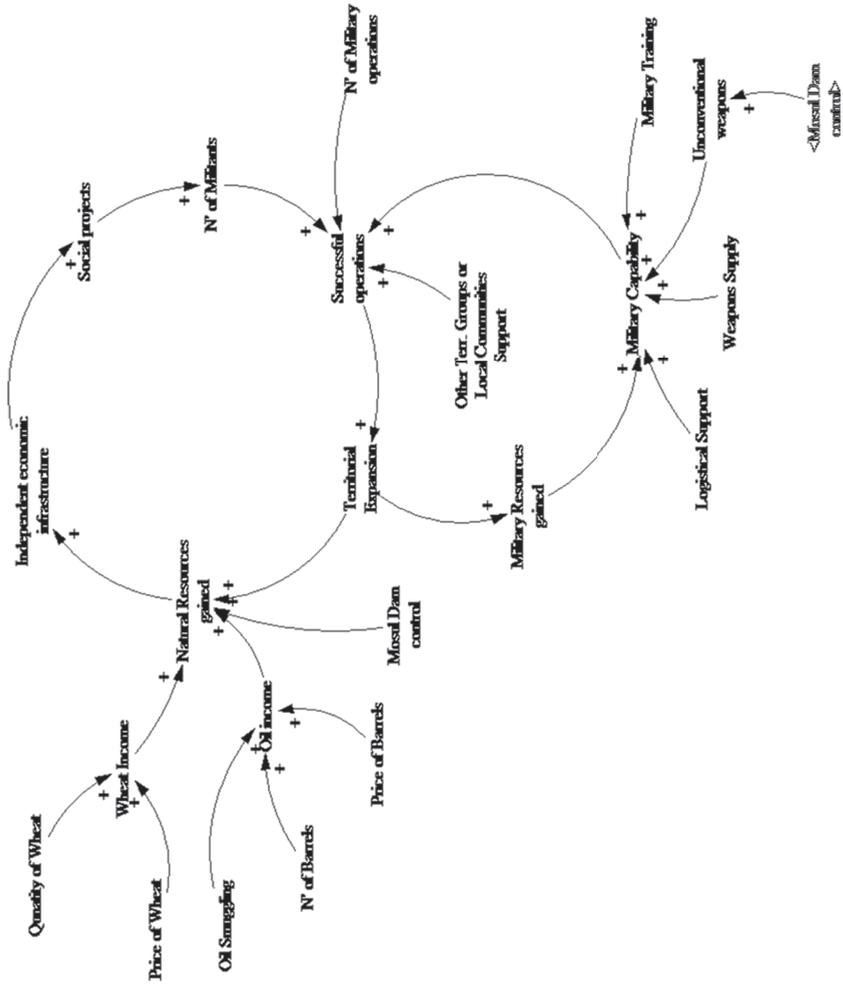
The process described above is neither peaceful (e.g.: methods of terror used by guerrillas) nor indifferent in terms of costs for the countries in which the groups settled, causing instability and poverty in the local regions. While other terrorist groups historically predated local resources to increase only their own economical infrastructures, IS is trying to make “*Social projects*” in order to build local consensus. By modeling this dynamic, the increase of “*Independent economic Infrastructure*” (through “*Natural resources gained*”), increases “*Social projects*” with the aim to enhance the “*N’ of Militants*”. Obviously, not all local people agree with the ideological program of IS. For this reason, in the quantitative model, the dynamics of “*N’ of Militants*” acquisition will not have only a positive flow.

The variable “*Natural Resources gained*”, up to now⁶, is formed mainly by “*Oil income*”, “*Wheat income*” and “*Mosul dam control*”. According to United Nations reports (2014), Oil income process depends also on smuggling (“*Oil smuggling*”) of it through some trucks which are used for the transportation. Furthermore, regarding the control over Mosul Dam, according to United Nations reports (2014), it can be used also as “*Unconventional Weapons*”. This is the reason because in the model, “*Mosul dam control*” influences positively “*Unconventional Weapons*”.

⁵ With the term “local” it is referred primarily to Iraq and Syria military operations. It is to consider that at the time of writing the IS group is expanding either in North Africa and Lebanon.

⁶ Modeling process allows us to edit and/or add variables over time.

Figure 1: Local Military Operations



As described above, “*Territorial expansion*” increases the gaining of military (enemies) resources (“*Military Resources gained*”) in terms of e.g. Weapons or Tanks that IS could gain when conquer a new city. In this way, the variable “*Military Resources gained*” increases in turn “*Military Capability*”, raising the possibility of military “*Successful operations*”. Increasing in “*Territorial expansion*”, increases also other sources of income as “*Territorial income*”; in this way, “*Extortion*”, “*Robbery*”, “*Kidnapping for Ransom*”, “*Taxes*”, “*Checkpoint*” and “*THB*” (Trafficking in Human Beings) are part of this variable.

The relationship between “*Territorial income*” and “*Territorial expansion*” comes from the idea that the more IS conquers and expands itself locally, the more they can increase their income (“*Extortion*”, “*Checkpoint*”, “*Taxes*” etc.). This behavior is evident for example the Checkpoint; the more the group expands itself territorially, the more checkpoints can be added, thus gaining more income and control over the territory.

Regarding the variable “*Kidnapping for Ransom*”, it is useful to note that it is linked to the Communication part of the model that it will be presented below. In fact, the Islamic State forms part of its propaganda spreading images of kidnappings on the Internet. Please see the Figure 21 for the complete CLD.

The third macro-source of IS income is what so called “*Supporters Income*”. It is mainly formed by Private “*Donations*” as e.g. “*Wealthy Arabs in the Persian Gulf who believed in the group’s ideology*” (Satti B., 2014). The growth of “*Supporters Income*” is linked with the using of Social Media (Satti B., 2014), in the sense that increasing in the “*Social Media communication activities*”, allows IS to reach a greater audience of donators. “*Territorial income*” and “*Supporters Income*” are part of the “*Independent economic infrastructure*” of the group.

As any organization, the IS has also costs. So, the variable “*Independent economic infrastructure*” is decreased by “*Expenses*”.

As shown in figure 3, IS “*Expenses*” is formed by “*Salary costs*” and “*Military Operational costs*”. The first one is the product between “*AVG Militants salary*” and “*N’ of Militants*” while the second one (“*Military Operational costs*”) is the product between “*AVG Operational Costs*” and “*N’ of Military Operations*”. “*AVG Operational Costs*” depends on “*Military Capability*”.

“*Independent economic infrastructure*”, as the difference between Income and Expenses, supports either the territorial and communication levels. Regarding the growth of territorial level, “*Social projects*” increase “*Expenses*” that in turn decrease “*Independent economic infrastructure*”.

In this first part of the model, there are three feedback loops: the first two (figure 4 and figure 5) are positive or self-reinforcing (Loop R1, R2). The third one (Loop B1) is negative or Balancing (B).

Figure 2: Territorial Income and Supporters Income

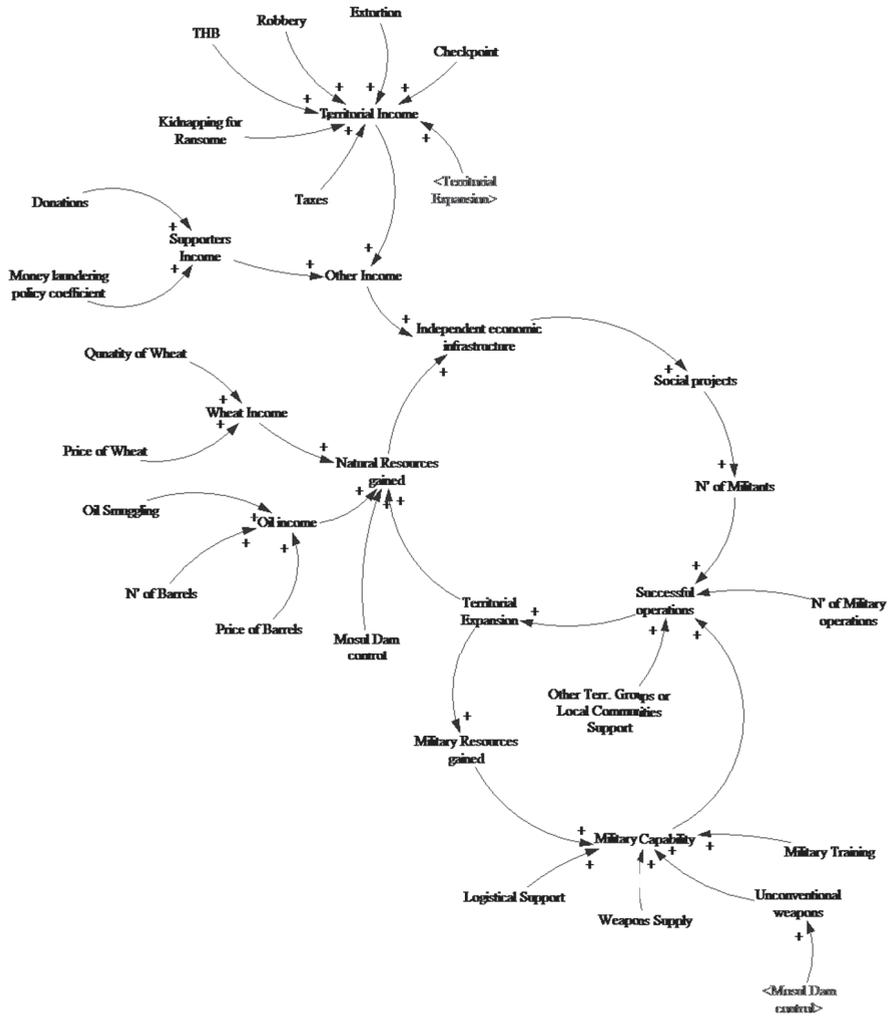


Figure 3: Expenses

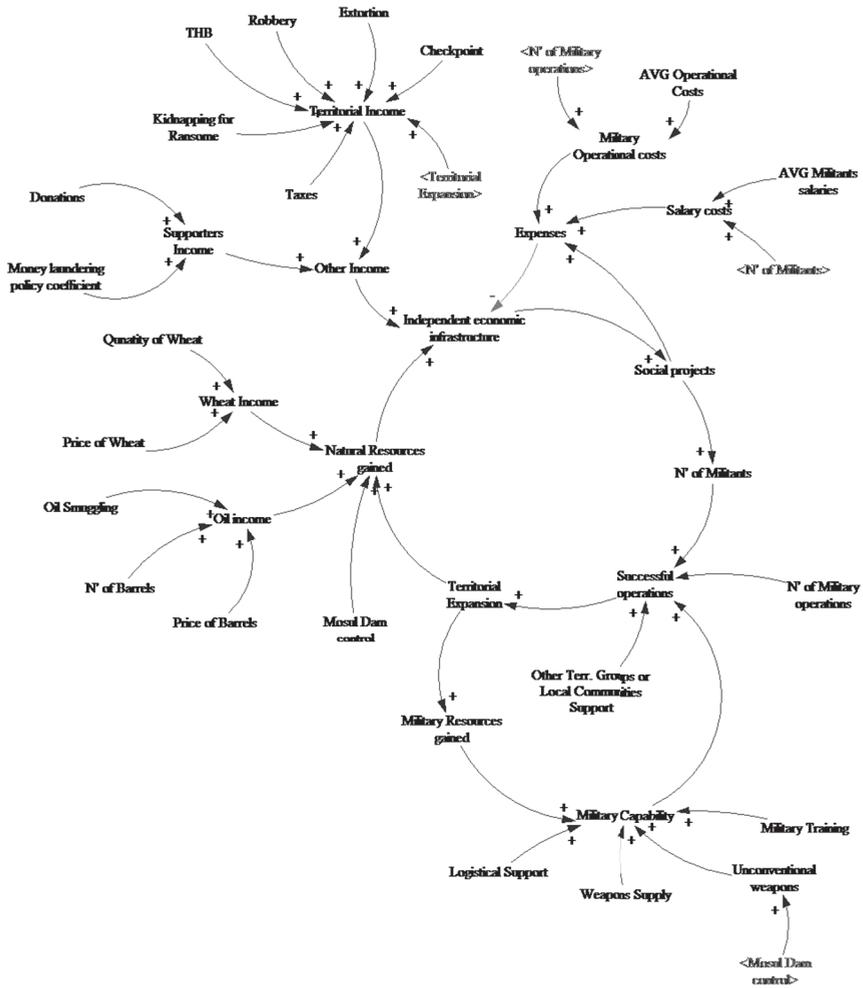
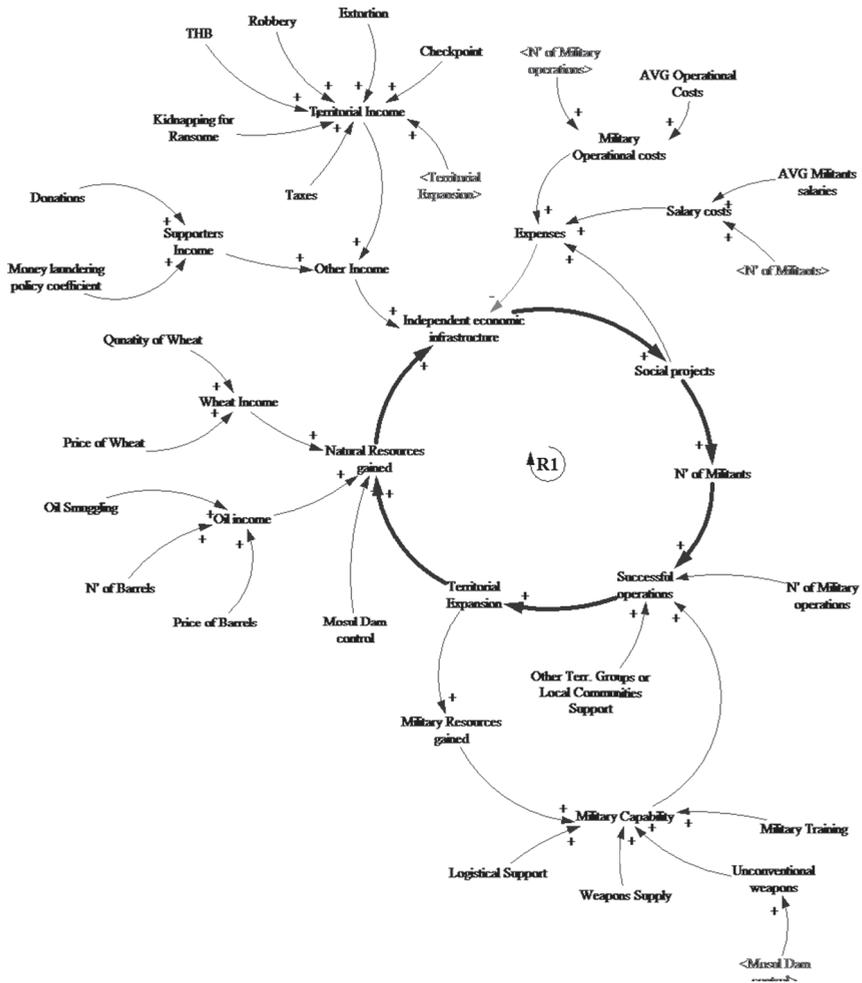


Figure 4: Loop R1



In the next part of the model will present the Islamic State Communication Infrastructure and its relationship with the entire model. For a better view of the entire model, please see the Figure 21. As mentioned in the Introduction, IS excels in their use of Social Media Communication and in turn forms a process of Internal and External consensus building.

As neo-asymmetrical tool, Internet could distorts the reality of the phenomena, projecting them into illusory forms that don't belong to them. This is the case of IS, that thanks to an intelligent use of the Web, it is trying to reach and acquire the best expertise (in various fields) to fuel its cause. Furthermore, the process of "different"⁷ target acquisition is done to a very low cost expense.

As shown in figure 7, once the group has created Terror Products as for example books, magazines, reports, videos, mp3 etc. it spreads them through the use of the Web in order to reach the huge "Audience". Additionally, they utilize traditional communication channel such as Television or radio.

Regarding the difference between the two communication ways, Social media communication has the characteristic to be "viral", in the sense that people have an active role on the web, spreading the Terror Products' release process. In this way, in the model, "Social Media Communication Activities" is increased by the "Audience" because it is the product between "Audience" and "N' of Terror Products". Furthermore, the "Audience" is increased by "Social Media Communication Activities" through "iNCULTURATION"⁸ process (Antinori, 2015).

In terms of complex systems analysis, the "virality" process of Social Media communication is given by reinforcing feedback loop (R3) (Figure 8).

"Social Media Communication Activities" exist thanks to "IT Infrastructures"⁹.

"Traditional Communication Activities" is the product between "N' of Terror Products" and a "Broadcasting coefficient" and enhance "Audience", without the "spreading effect" of the web. In terms of complex systems, in "Traditional Communication Activities", "Audience" is passive¹⁰ and doesn't increase the "Traditional Communication Activities". "Total Communication

⁷ In the model will not be specified all the difference target that IS try to "activate" through its Communication activities. With "different target", it is referred to different class of "Audience" that IS try to reach (e.g. "followers", "lone wolf", "small groups" etc.). Internet allows to reach the broadest audience.

⁸ "iNCULTURATION" is written with the tiny "i" because it is a new theory of the Criminologist Arije Antinori (2015).

⁹ In the model are not specified the different types of IT infrastructures.

¹⁰ Compared to Social networks, in traditional communication activities such as Television or radio, people don't have an active role in terms of dissemination of information or terror products.

Activities” is the sum between “*Social Media Communication Activities*” and “*Traditional Communication Activities*”.

The creation of a (virtual) socialization process (Antinori, 2015) among individuals over time, enhances “*Consensus building*” that in turn increases the resource acquisition flow of the group.

In this way, thanks to some “*Motivational Factors*” (e.g. “*iNCULTURATION*” process or economic motivation such as salary) and a “*Mobilization capability coefficient*”, part of the “*Audience*” that IS reaches through “*iNCULTURATION*” process, leaves their countries to join different war theaters, becoming what is called “*Foreign Fighters*”.

With “*Mobilization capability coefficient*”, it refers to the capability of people to move from one country to another. In the model, “*N’ of Foreign Fighters*” increases “*N’ of Militants*” that fight in different war zones, that in turn increases potentially “*Successful operation*” etc.

Depending on various motivational factors, sometimes “*Foreign Fighters*” decide to return to their hometown: it is the process called *Foreign Fighters* “*return*”. In the model, this process is planned in the variable “*N’ of returning Foreign Fighters*”, that depends overall on the “*Mobilization capability coefficient*”. The returning dynamic of “*Foreign fighters*” has a delay time due to the time that they spend in war zones.

Depending on the “*iNCULTURATION*” level, increasing of the “*Audience*”, will increase the possibility to have terrorist attacks (“*N’ of Possible Global Lone attacks*”). This variable is also increased by the “*N’ of returning Foreign Fighters*” with different coefficient of effectiveness (“*effectiveness coefficient*”) in terms of bringing a successful attack. In other words, it seems to be easier to accomplish attacks by people who return from war zones, rather than by unskilled people. Moreover, this dynamic is still under observation.

The concept of “*Lone*” attacks is still under analysis in terms of criminological factors. In the model are not specified the different types of “*Lone*” actors (e.g. skilled followers, small groups, unskilled followers, etc.).

In Figure 12 is shown a more systemic view of the Possible Global “*Lone*” attacks.

Figure 7: Communication Capability

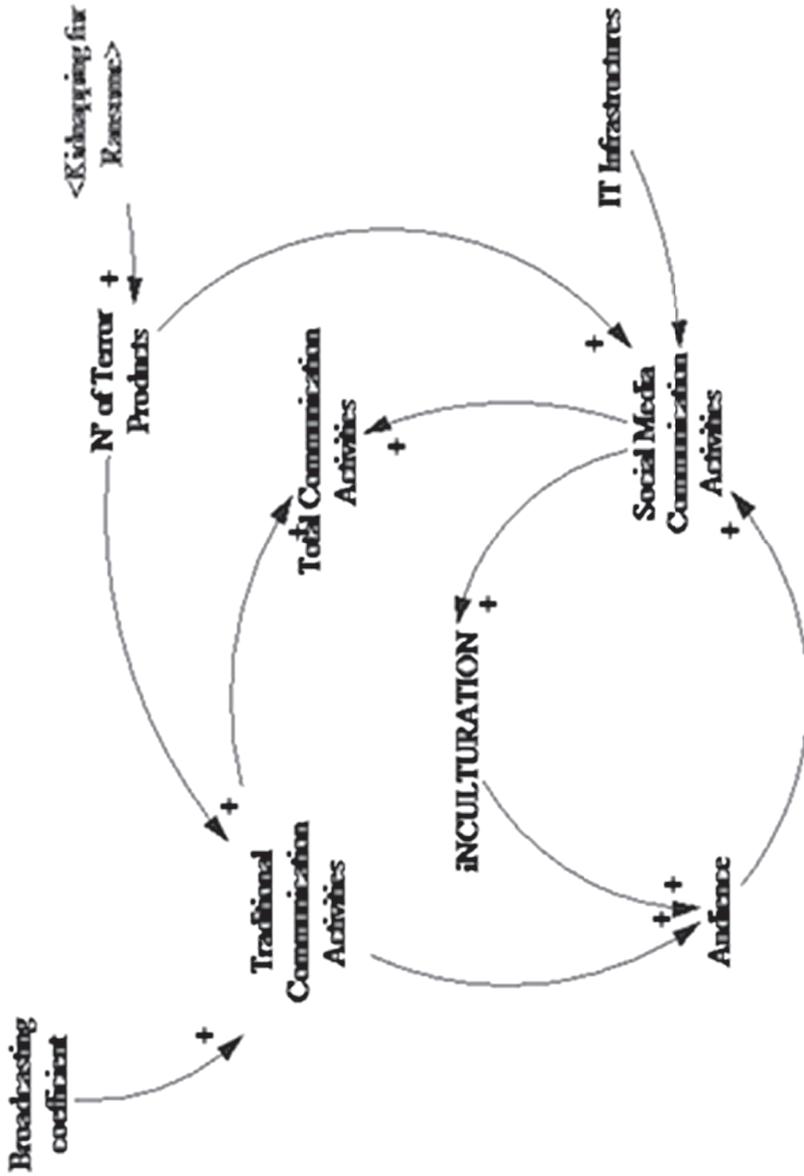


Figure 8: "Virality" of Social Media Communication, Loop R3

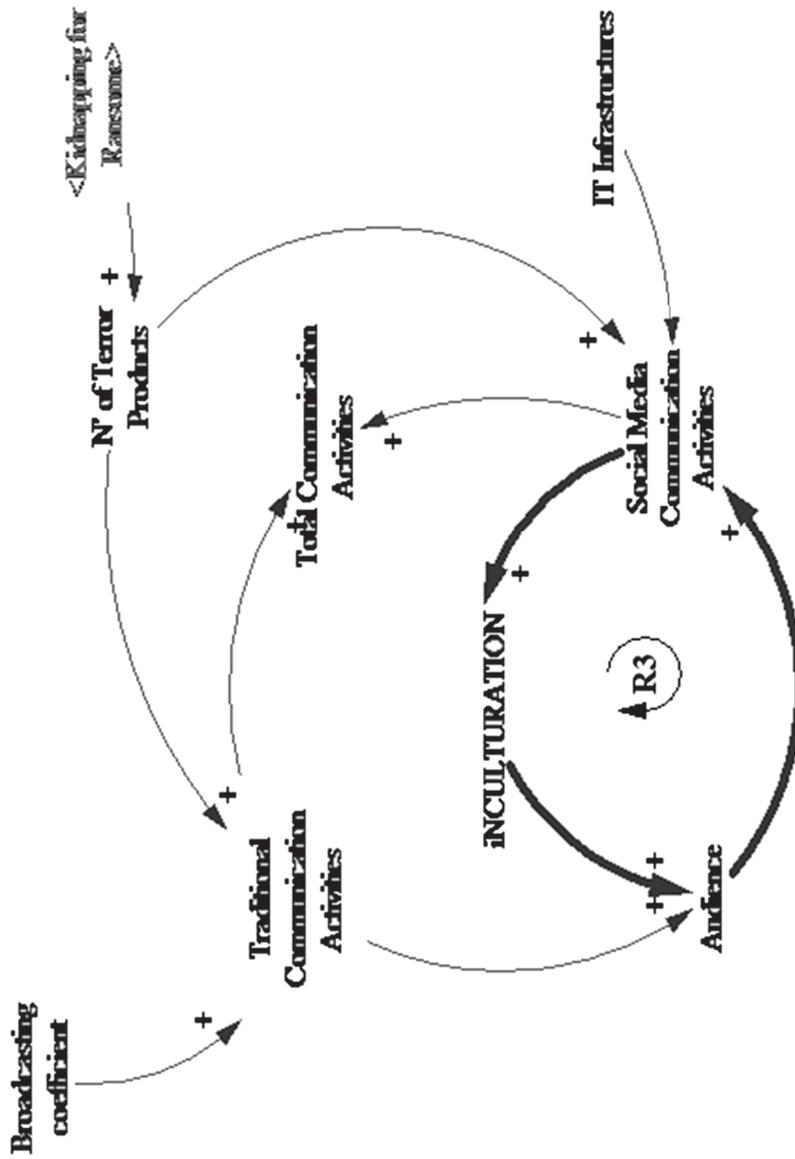


Figure 9: Foreign Fighters flow

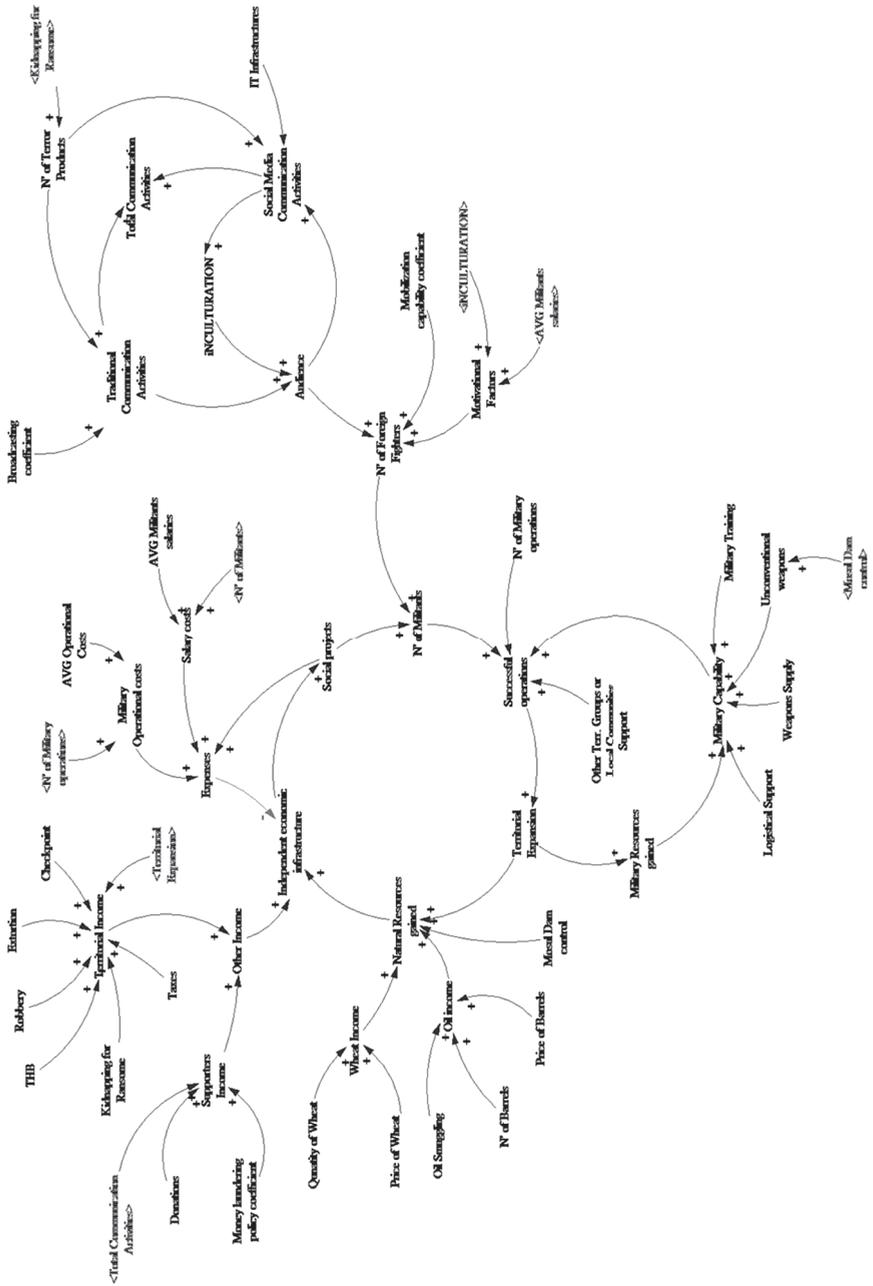


Figure 10: Foreign Fighters returning from war zones

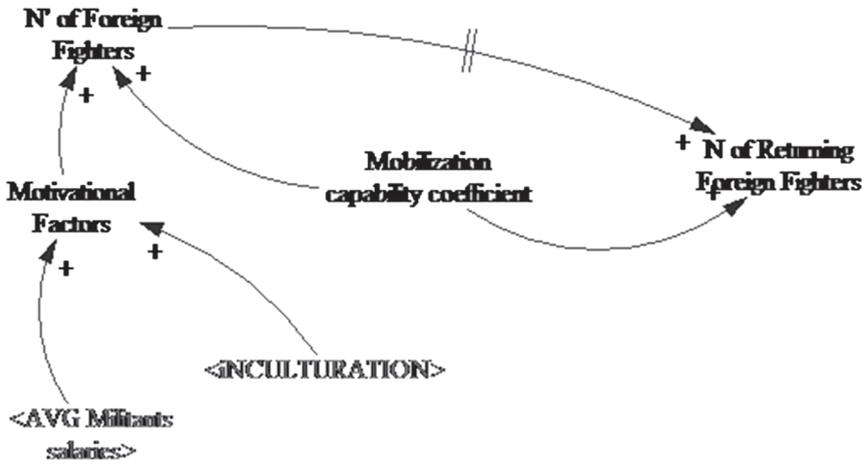
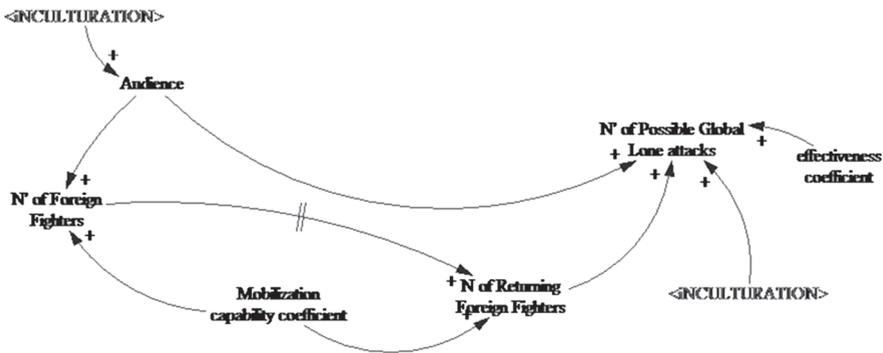
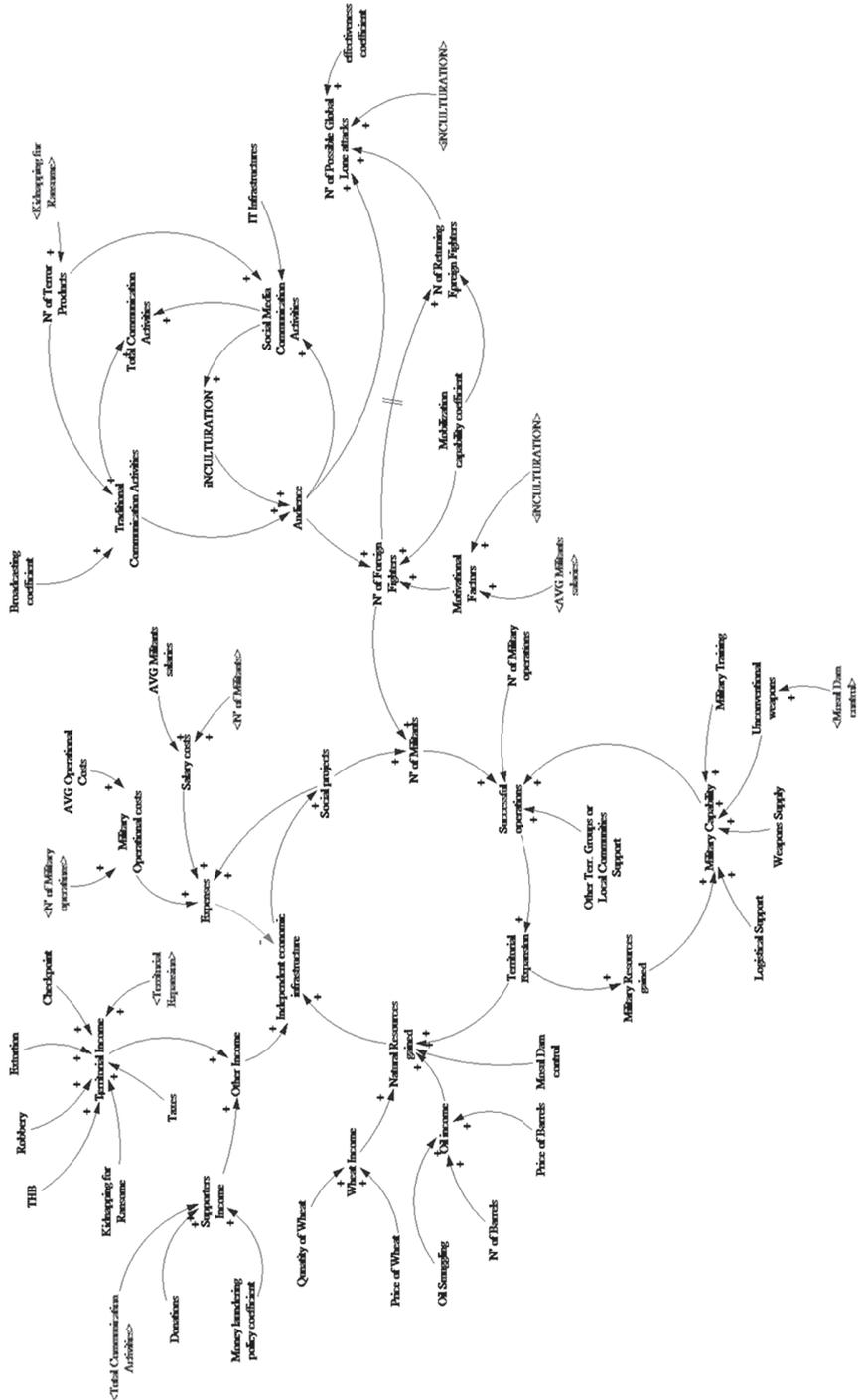


Figure 11: Possible Global Lone terroristic attacks; particular



As mentioned in the introduction, IS threat is formed by at least two levels: on the one hand there is the territorial level and on the other hand there is the global (virtual) communication levels with the aim to reach the broadest audience. “*Territorial Expansion*” and “*Total Communication activities*” form the “*Threat Projection Coefficient*” that in the model indicates the level of threat projection, either Real and Virtual. The increase of this coefficient, in turn, increases the “*Threat Perception*” by Police force and other information Agencies. In this model, the process of “*Threat Perception*” has a time delay due to the natural human non-immediate or false perception of alert. Furthermore there is the role of the Web, which thanks to the propaganda process, distorts the phenomena, increasing the false perception of the Agencies and in turn the delay time of the operations.

Figure 12: Possible Global Lone terroristic attacks; systemic view



Increasing in the “*Threat Perception*”, increases in turn the “*Counter Terrorism Activities*” due to contain the Threat. As shown in Figure 13, variable “*Counter Terrorism Activities*” tries to reduce “valuable” variables (that become *Targets* of counter terrorism activities) in order to contain the threat.

Regarding *Virtual projection level*, the variables that seems to be “valuable” in terms of *systemic analysis*, are primarily “*iNCULTURATION*”, thanks to that IS could construct own culture and in turn acquiring human and tech resources. Secondly, “*IT Infrastructure*”, with which Social Media communication works. In the model, variable “*IT communication counter-activities*” tries to contain these two communication level variables. With working on “*iNCULTURATION*” and “*IT Infrastructure*” it tries to reduce the increasing “*Audience*” in order to decrease on the one hand the “*Foreign Fighter*” flows and on the other hand the possibility to have terroristic attacks over the world.

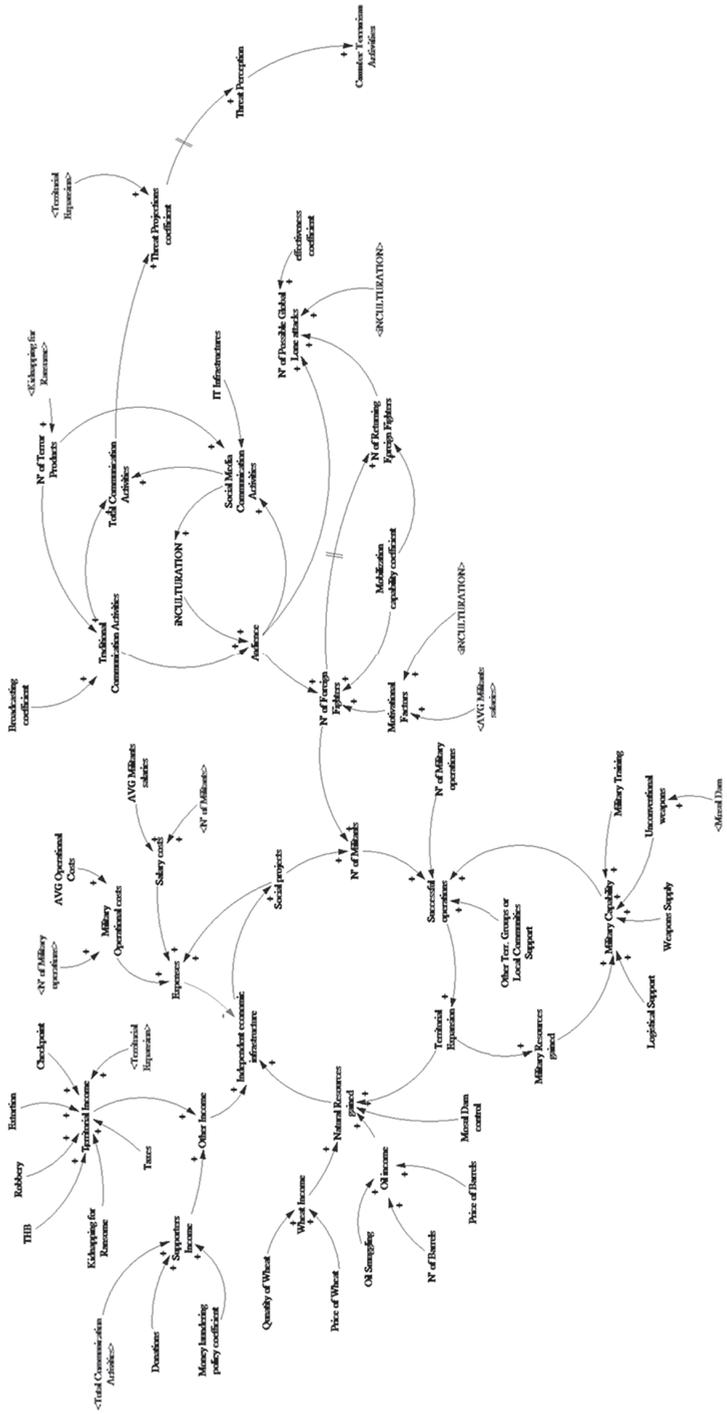
Regarding *Local Expansion level*, the variables that appears to be valuable are first of all “*Military Capability*” (e.g. Logistical Support, Weapons Supply, Military Training) thanks to that IS could obtain success in Military Operations. Furthermore, in the model, control over Mosul dam (“*Mosul Dam Control*”) could be valuable in order to decrease on the one hand part of economic income and power in terms of critical infrastructure control and on the other hand the possibility to use it as “*Unconventional Weapon*” (United Nations, 2014).

In this model, the variable “*Military counter-activities*”¹¹ attempts to decrease primarily “*Military Capability*” of IS. The aim is to reduce the “*Territorial Expansion*” of IS, because it increases systemically the development and projection of the threat. An example of “*Military counter-activities*” on “*Military Capability*” are the coalition Air strikes in Iraq. Furthermore, “*Military counter-activities*” tries to decrease “*Oil Smuggling*” processes that according to united Nations reports (2014) appears to be a “valuable resources” and a “point of vulnerability” in terms of success in oil revenues. Finally, “*Military counter-activities*” tries also to decrease “*Mosul Dam Control*” for the strategic reasons written above.

Regarding *Economic Infrastructure* of IS, “*Financial Counter-activities*” attempts to decrease on the one hand natural resources income through decreasing “*Price of Oil*” and “*Price of Wheat*”. On the other hand, it tries to decrease “*Money laundering coefficient*” that in the model represents the money laundering process with which donators fund IS.

¹¹ With “*Military counter-activities*” it refers to either symmetrical and asymmetrical activities.

Figure 13: Threat Perception



The last “*Counter Terrorism Activities*”, tries to contain the dynamics of “foreign fighters” flows. In this way, in the model there is a variable called “**Control over Mobilization**” that attempts to reduce the “*Mobilization capability coefficient*” flow. With working on “*Mobilization capability coefficient*” it tries to reduce the possibility to allow people to return to their countries of origin, in order to decrease the possibility to have skilled terroristic attacks over the world.

Figure 14 shows the *Systemic* view of “*Counter Terrorism Activities*”. In order to maintain a readable picture, Figure 14 includes some “Ghost variables”, such as “*Financial Counter-activities*” that is “interrupted” and reported on the left side of the picture.

In the model, the variable “*Counter Terrorism Activities*” forms some Balancing feedback loops (B), which decrease the growth of the whole Islamic State system (Figure 15-16-17-18-19-20).

5. Conclusions and future work

The report and the results of this research paper are still ongoing, in particular with reference to the possibility of assessing and quantifying certain effects through quantitative simulation tool: System Dynamics (SD).

What appears to be a clear analysis of IS through complex systems tools is that Local Military expansion, Communications and Virtual projection and Economic Infrastructure levels reinforce each other over time. In this way, to contain the power of the threat it is necessary to implement Counter-Terrorism activities that try to break the reinforcing relationship between these three levels.

In this sense, the next steps of the research will be to:

1. Define the Stock & Flows Diagram with System Dynamics tool, in order to simulate quantitatively this model.
2. Evaluate the effectiveness of the Counter-Terrorism activities proposed in this article.

Figure 17: Control over Mobilization (B4)

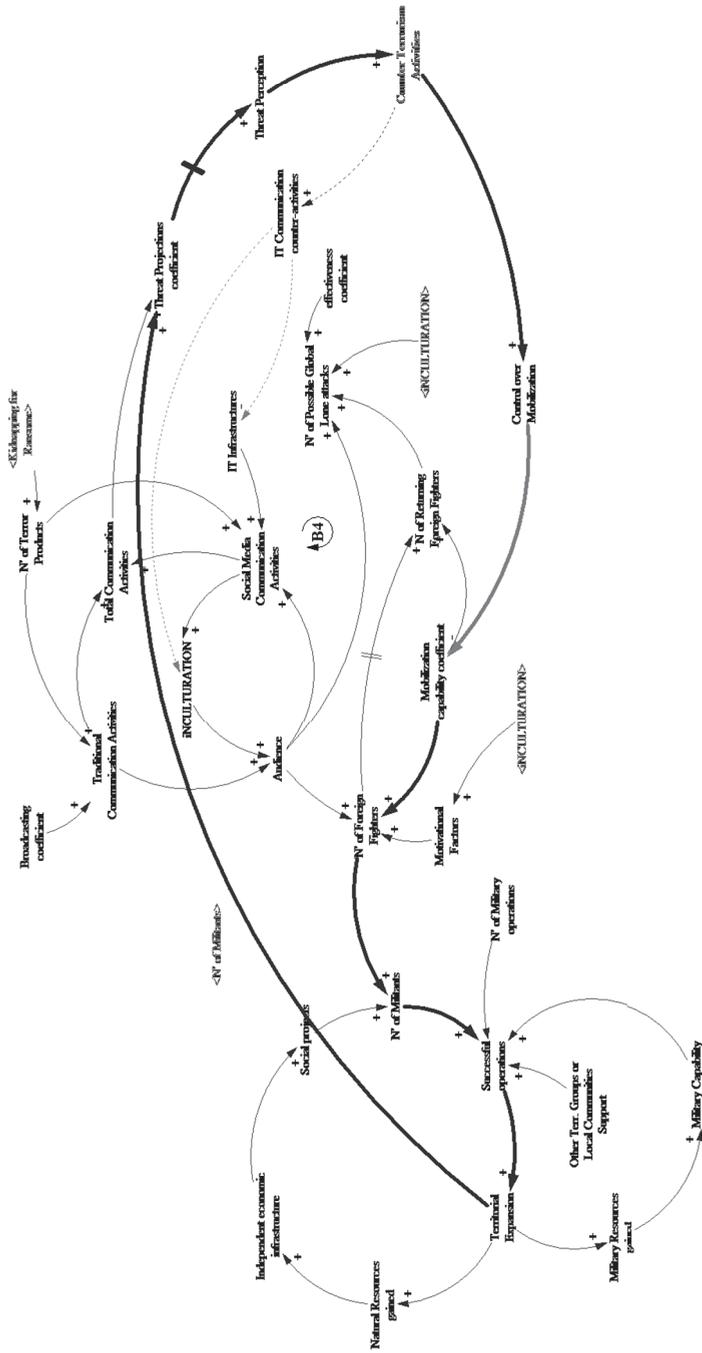
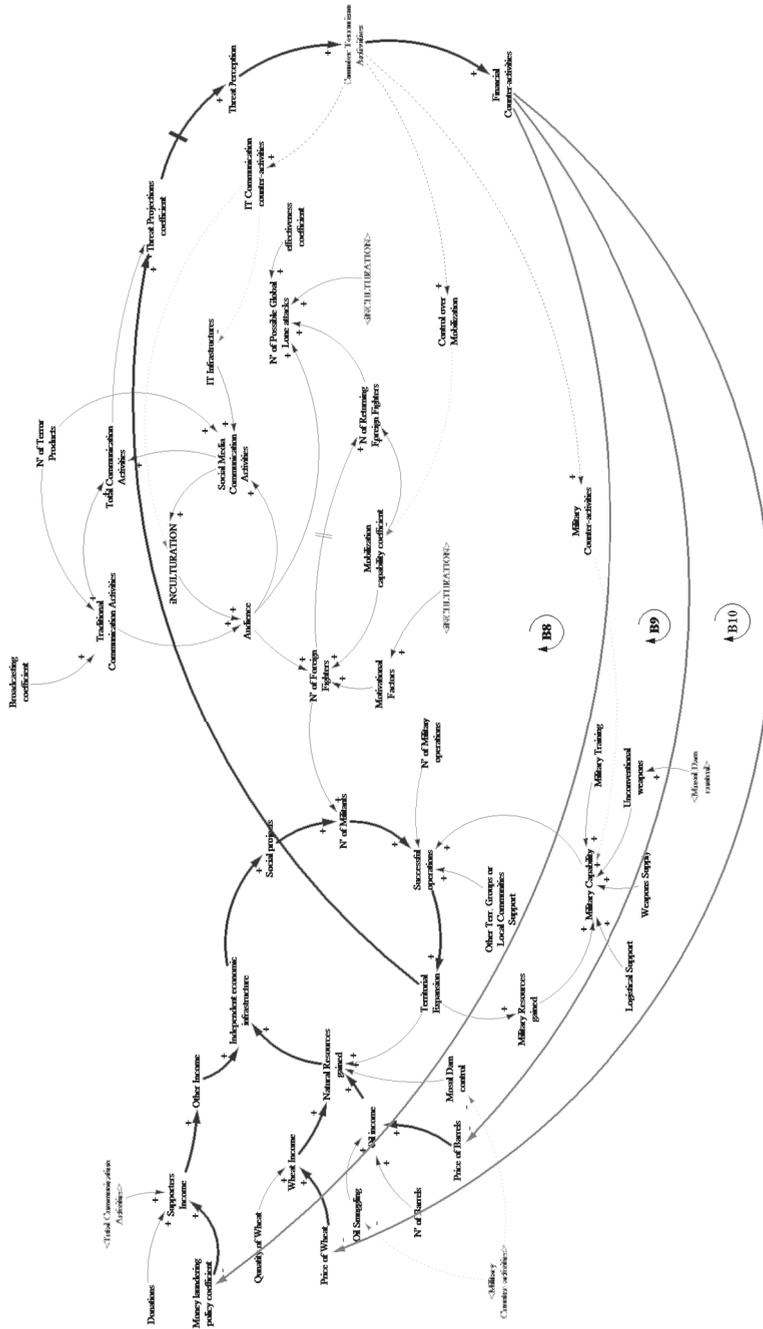


Figure 20: Financial Counter-activities (B8, B9, B10)



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