

Societal Security as a System-of-Systems: Customs Agencies' Cross-Sectoral Contributions

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The aim of this paper is to provide new insights into cross-sectoral, cooperative aspects of societal security. Societal security can be defined as the continuous outcome of a resilience-based system-of-systems whose purpose is to protect society against a wide range of risks. One of its subsystems is the field of customs. The role of customs agencies in societal security is not well understood. In particular, the cross-sectoral, cooperative aspects have been overlooked both in official guidance and in practice. This paper analyzes the contributions of the Norwegian Customs (NC) to societal security from a system-of-systems perspective, using data from governance documents, official reports, and a list of the NC's collaborators. The main findings are that (1) customs is a node in societal security, and its role much wider than earlier recognized; that (2) the current framework for societal security does not adequately account for agencies whose normal contributions are outside their own sector; and that (3) this lack of understanding impedes efficient and effective measures. Insights on societal security as a system-of-systems are summarized in a jigsaw puzzle analogy.

Keywords: Societal security, risk, resilience, system-of-systems, customs, critical functional capabilities

1. Introduction

Societal security is influenced by a variety of multi-sectoral and interconnected risks. The management of these risks usually involves cross-sectoral cooperation, e.g. in addressing organized crime, natural disasters, pandemics, and geopolitical uncertainties. Scientific literature and policy documents acknowledge the necessity of cross-sectoral cooperation, especially when the risks extend beyond a single sector's boundary. A common underlying assumption is that organizations align their goals and activities to support shared interests, while each of them continues operating *within* its own sector. While useful, this sector-centric assumption has limited ability to account for dynamics related to organizations that contribute substantially *outside* their own sector. It recognizes some cross-sectoral contributions. One is the operation of critical infrastructure that other vital societal functions depend on, such as power supply and telecommunications. Another is the temporary transfer of resources in crises, such as civil-military cooperation during natural disasters. However, neither of these types cover organizations who as a *normal* part of their operations serve in other capacities than those related to their own sector.

Customs agencies are illustrative. They represent authorities that regulate goods that enter or exit a country. Many areas of society depend on cross-border movement of goods, and a significant

portion of these goods, such as food, vaccines, and chemicals, are indispensable for the functioning and hence security of society. Yet, little is published in the scientific and public sector literature on the cross-sectoral role of customs agencies in societal security. As will be discussed, this knowledge gap may impede effective and efficient measures for societal security, especially in emergency preparedness and crisis management.

The aim of this paper is to provide new insights into cross-sectoral and cooperative aspects of societal security, and in particular the role of customs agencies in societal security. Using system-of-systems (SoS) as our theoretical framework, we emphasize dynamics related to contributions that an organization makes outside its sector. To highlight this cross-sectoral knowledge gap, contributions are described in terms of 'critical functional capabilities' (CFC). CFCs are operationalized as specific services and supplies that meet the needs of the population and society, and that are so essential that a disruption of seven days or less would threaten the population (DSB 2017, 2016).

The research question is as follows: How do the characteristics of systems-of-systems emerge in a customs agency's contributions to societal security?

The Norwegian Customs (NC) is used as a case. This offers several benefits to answering the research question. First, contemporary studies of an old organization transitioning into societal security

may reveal issues not experienced by organizations that historically have had such a mandate. The NC's original task was timber tax collection, and later tasks were seen through an economical lens (Jørgensen 1969). Now it explicitly defines its role as a protector of societal security (NC 2022). This is a recent development, marked by milestones such as terrorism prevention since 2001, the gradual transition to pure border control since 2014, the COVID19 pandemic since 2020, and enforcement of sanctions related to the war in Europe since 2022 (MoF 2023; NC 2016; NOU 2012:14). Second, the complexity of customs' contributions to societal security is not well understood. While some countries combine customs with immigration or military authorities, the NC is a civilian agency focused on goods. Therefore, the case's examples of cross-sectoral contributions to other CFCs cannot be attributed to other kinds of border authority. Third, a customs agency's presence at security critical locations, such as ports, airports, and border-crossing points, can highlight security challenges related to transnational issues. Fourth, the NC enforces regulations on behalf of approximately 20 governmental agencies, most of which have a safety and/or security role in CFCs. Meanwhile, official Norwegian guidelines associate it with one CFC only. The convergence of the interests of many organizations in the operations of one can illustrate risk management challenges related to a coherent cross-sectoral approach.

2. Conceptual and Theoretical Framework

In this section we first define the core concepts of the paper. Then we present the theoretical framework of the analysis.

2.1. Core concepts: societal security, risk, and resilience

Societal security has been studied under different names like disaster risk reduction, homeland security, and societal safety, sometimes with little interaction between them (Staupe-Delgado, Abdel-Fattah, and Pursiainen 2022; Høyland 2018). We have chosen the term 'societal security', as it is a well-established and widely adopted term (Høyland 2018). Societal security relates to the protection of society against (the potential for) unwanted events of a magnitude that is threatening to society. In the Nordic countries, it has evolved as a widely defined concept in a pan-sectoral environment, with a strong intention of cooperation between institutions (Larsson and Rhinard 2020). Over the years, its practices have changed from being predominantly focused on preparedness for war, to natural disasters and large-scale accidents connected to civilian

activity (Olsen, Kruke, and Hovden 2007; Høyland 2018), continuing with protection from terrorism, capacity to deal with cyber threats, preparedness and handling of pandemics (Morsut 2020), and most recently back to preparedness for war.

Societal security can be explored through various aspects. It is:

“... an **ability** of the society with the following attributes: to maintain, safeguard, protect, and manage... [It] is a **state's task**, which, through measures and actions against a wide range of stresses, provides **protection** to society and lessens **vulnerabilities**, but at the same time, seeks to make ... society more **self-reliant**... [Finally, it] is **everything that needs to be protected and preserved to make the ... society properly perform: fundamental values, critical infrastructures, societal functions, basic needs, the integrity and the sovereignty of the state.**” (Morsut 2020, 86, our emphases).

In the Norwegian context, societal security is commonly approached with a broad, a narrow, and a political interpretation (NOU 2006:6). Briefly, the broad approach includes the prevention and handling of both extraordinary and everyday negative events of any kind. The narrow approach excludes everyday events, focusing on events with high damage potential. The political approach may be located between the two previous ones but is also more responsive to crises and the public discourse that follows. While this paper focuses on a narrow part of societal security, both other interpretations merit consideration.

Common for all three approaches is that risk and resilience are fundamental concepts that guide the practical work in societal security. Here, risk is understood as the uncertainty (U) related to the consequences (C) and likelihood (P) of an event (A). The U depends on knowledge (K) (Aven and Thekdi 2022). The choice of risk perspective has implications for how risk is managed. For instance, a P-based perspective is more appropriate for a stable, frequent, and well-understood phenomenon. Security events tend to be unstable, harder to predict, and less understood, making U and K more appropriate. Hence, the understanding of risk should correspond to the domain if risk assessments are to provide useful support to decision-makers.

When uncertainties are great, resilience is more relevant. Resilience can be defined as “the intrinsic ability of a system to adjust its functioning ... so that it can sustain required operations under both expected and unexpected conditions.” (Hollnagel, Puriès, and Wreathall 2011, xxxvi). It was introduced as an answer to complex emergent risks, which are difficult to foresee and which probability-

based risk analysis could not respond to (Dekker, Cilliers, and Hofmeyr 2011). This view regards resilience as independent of the risk concept. However, one cannot manage resilience without an identification of vulnerabilities (Birkland and Waterman 2009). Aven and Thekdi (2022) point out that this identification requires risk analysis, and that vulnerabilities can themselves be described as conditional risks (C,U|A). We have adopted the stance that risk and resilience are complementary concepts relevant for societal security.

Resilience is an outcome of multiple dimensions: monitoring, responding, anticipating, and learning (Hollnagel 2009). There is a social context of who has the legitimacy to decide which values and objects to protect, and there is a bias towards status quo. Furthermore, resilience is built through a network of non-hierarchical relationships between individuals, organizations, sectors, nations and macro-level politics (Haavik 2020), and weaknesses in one area may decrease resilience on other levels (Birkland and Waterman 2009).

2.2. Theoretical framework: System-of-Systems (SoS) perspective

The SoS concept refers to wide, decentralized networks of autonomous and complex subsystems (Harvey and Stanton 2014). In this paper societal security is seen as a SoS that various state agencies (subsystems) contribute to. A SoS perspective is applied here as a loose theoretical framework that contributes to discussing the focal points of inter-organizational collaboration in the context of societal security.

A characteristic of SoS is that subsystems are autonomous and hence managed independently from each other. To obtain an effective and successful outcome, i.e., societal security, these subsystems need to fulfill both their own goals and contribute to the (common) goals of the SoS. These common goals are not necessarily defined clearly.

The conceptual and theoretical frameworks are merged thus: *Societal security can be defined as the continuous outcome of a resilience-based system-of-systems whose purpose is to protect society against a wide range of risks.* For this paper we have selected three challenges associated with SoS (Harvey and Stanton 2014) to provide input to the analysis of cross-sectoral contributions.

The first challenge refers to interactions between organizations. These interactions happen between sectors and hierarchical levels, and involve the coexistence of different strategies, roles, and responsibilities. This can lead to horizontal and vertical inconsistencies, gaps, and inefficient or ineffective measures. The second challenge concerns

information and communication transfer across the boundaries between the organizations. While each organization is autonomous, with its own goals and interests, they are also interrelated. Therefore, a decision often has an effect across boundaries. These boundaries exist between all organizations and are not only organizational, but can also be geographical, and cultural. When acting together, a shared understanding regarding the content and form of information needs to be obtained. At the same time, there may be legal or practical restrictions on information sharing. The third challenge concerns responsibility. Each organization has its own goals, policies, strategies, and responsibilities. When organizations interact, the responsibility will expand from the organization's unit level/or mandate level to the societal security level.

3. Data and Methods

The data consist of a list of the NC's collaborators in societal security, a governmental framework for the coordination of societal security risk management in Norway, and 11 documents from public institutions that provide insights into societal security in a customs context. Further, 12 background interviews with customs officers have supported the interpretation of the data.

3.1. List of collaborators

Our first dataset is a list of the NC's national collaborators, obtained directly from the NC through a freedom of information request. The list was controlled against open-source data to ensure completeness. It omits collaborators without a role in border control of goods, such as facility managers. Local, formalized cross-agency organizations are also excluded. While relevant, they are already represented on national level. International collaborators are outside the scope of this paper.

3.2. Vital Functions in Society (KIKS)

Our second dataset consists of elements extracted from a framework for risk management named Vital Functions in Society (KIKS). The framework has been developed by the Norwegian Directorate for Civil Protection (DSB) to help coordinate societal security efforts across the Norwegian public sector. It rests on two decades' defense research (DSB 2012), and the described needs, vulnerabilities, and categorizations are referenced in other governance documents such as white papers and letters of allocation. KIKS offers valuable data because it represents a logic that has shaped policy and discourse on societal security. This strengthens its relevance for an exploration of how an agency contributes to societal security.

3.3. Public documents

Our third dataset consists of 11 publicly available governance documents that give insights into customs and border management. The main sources were LOAs (Letters of Allocation, which contain the budget that the MoF gives to the NC), the NC’s annual reports, and official reports and documents describing the handling of the COVID19 pandemic and other crises. This dataset was searched for examples of collaboration and systemic challenges relevant to societal security. It was further used to contextualize the role of customs agencies, and to help interpret the analysis of the first two datasets.

3.4. Method

The analysis is done in two parts. First, the NC’s collaborators were cross-referenced with organizations associated with each CFC in the KIKS framework. Since the collaborators have other functions in addition to societal security, each cross-reference was evaluated to determine whether the organization’s role in that CFC could be related to cross-border transfer of goods. This subjective judgment was informed by public documents and background interviews. The interviews have not been analyzed as proper data but have given general insights. Second, we conducted a thematic analysis on representative CFCs, based on the SoS framework described in 2.2.

4. Results

4.1. The NC’s extensive network of collaborators

The KIKS framework consists of 3 levels. The upper level contains three basic needs of the population, named ‘governance capacity and sovereignty’, ‘security of the population’, and ‘societal functionality’. These are subdivided into 14 vital functions, which in turn are operationalized as 40 CFCs and associated public entities (Table 1).

Table 1: NC’s involvement in KIKS areas.

Levels	KIKS framework	NC contrib. to
Upper	3 basic needs	All
Middle	14 vital functions	7
Lower	40 CFCs	16

Overview of the NC’s direct contributions to societal security through their collaborators, in areas that involve cross-border transfer of goods.

The NC has 49 national collaborators: 19 regulators, 18 other state agencies, and 12 other collaborators, including national networks. Of these, 30 (18 regulators) are mentioned in KIKS. These collaborators are mentioned in 30 different CFCs, some of them multiple times. That a collaborator is

mentioned in KIKS does not mean that its relationship to the NC involves societal security; it could be tax enforcement.

One main finding is that in 16 of these CFCs, the collaborators serve a role where cross-border movement of goods is directly relevant for that capability (Table 2). It is noteworthy that a national risk management framework for societal security mentions the NC only in relation to the CFC of ‘border control’. In contrast, we found that the NC contributes directly to all upper-level basic needs, and half of the second-level vital functions (Table 1).

Table 2. Associated ‘critical functional capabilities’.

No.	Critical functional capability	Collaborators
1	Chemical and explosive emergency response (*)	7
2	Public health measures (*)	5
3	Nuclear emergency response	5
4	Military response	4
5	Health services	4
6	Food supply (*)	3
7	Secure transport	3
8	Crime countering activities	3
9	Secure transport systems	2
10	Investigation and prosecution	2
11	Surveillance and intelligence	2
12	Border control (*)	2
13	Emergency response and crisis management	2
14	Fuel supply	1
15	Fire protection	1
16	Peace and order	1
Total mentions		47

CFCs sorted after the highest number of associated NC collaborators. CFCs with asterisk have been analyzed thematically in section 4.2.

There are 47 connections between the NC and its collaborators. This number does not reflect the magnitude of contribution, but rather the number of routes for the NC’s contribution to societal security.

4.2. NC’s key role supporting other organizations

In the following, we have chosen four CFCs for further analysis, based on representativeness and variety. The first (chemical and explosives) was selected because of internal diversity, exemplification of cross-sector contribution, and the highest number of collaborators. The second (public health) was selected because of exemplification of cross-sector contribution and recent and well-documented examples from the COVID19 pandemic. The third (food supply) was selected because of recent interorganizational changes

exemplifying the potential role of NC in societal security. The fourth (border control) was chosen because it represents some dependencies that characterize the societal security SoS.

4.2.1. Chemical and explosive emergency response

This CFC is defined as the “ability to prevent and deal with incidents involving chemicals and explosives and to implement measures to protect lives, health, the environment and other important community interests.” (DSB 2017, 20). It involves the highest number of NC collaborators (see Table 2). It also exemplifies variety; even if it were only focusing on chemicals and explosives, a customs agency can be a SoS node in the prevention of terror attacks, drug production, pollution, and chemical accidents. In the Nordic countries, crime prevention in this area has mainly been directed at drug production and terrorism (Skår 2014), although weapons export to conflict zones has gained new relevance. Customs agencies are also critical in enforcement of international conventions against the spread of chemicals and waste that threaten environment and human health, such as covert exports of electronic waste in unsafe cars (Knudssøn, Berentsen, and Bakke 2019).

The NC does not have the mandate to investigate or prosecute. Therefore, it relies on information exchange across organizational boundaries to many regulators and law enforcement agencies. Some chemicals are legal to ship, but for specific purposes only. Therefore, customs officers must combine experience, knowledge, information, and sometimes intelligence to determine whether a shipment has plausible and legal cause. In SoS such information exchange can be hard and confusing (Harvey and Stanton). For instance, leading up to the terror attacks in Norway in July 2011, the NC had detected and relayed information about suspicious imports of explosive precursors for bombs and fireworks to the security services (Strand, Christophersen, and Eidsvik 2011; NOU 2012:14). The tip was handled inefficiently due to lack of institutional clarity on channels of information sharing (NOU 2012:14). In recent years the NC has sought to improve the information exchange through almost 30 formal inter-agency collaboration agreements. An added benefit is easier resolution of strategic conflicts of interests, e.g., when an agency wants to follow an illegal shipment to its intended destination to gather evidence. The NC is the only agency with authority and presence to stop restricted items at the border. However, coordination with police, and road safety and environmental authorities is needed to address the causes of the problem.

4.2.2. Public health measures

This CFC is defined as the “ability to protect life and limb in the population by public health measures in the event of outbreak of illness and other incidents.” (DSB 2017, 19). The NC is not an agency in the health sector but has a direct impact on public health measures. The COVID19 pandemic provides a clear example of how cross-sectoral contributions improve resilience. The NC observed a surge in postal consignments of face masks, gloves, disinfectants, and medicines against viruses and malaria from unreliable sources (NC 2020), and intercepted significant amounts of equipment of uncertain medical quality (NC 2021). Another contribution is that the NC was able to advise on logistical and legal challenges to importing vaccines (NOU 2022:5).

At a higher level of abstraction, the COVID19 pandemic illustrates two types of emergent behavior in the societal security SoS. Such crises may lead to the emergence of new or unknown networks and dynamics. Sometimes new networks emerge into being because of specific characteristics of that crisis. Other times, existing networks of resources or dependencies become widely known due to failures. The pandemic laid bare the magnitude of reliance on imported health equipment. If this had been sufficiently produced locally, customs agencies would have a less prominent role within ‘public health measures’, apart from export control. The high volume of international trade and the just-in-time principle of logistics makes the role of customs agencies more important in any kind of supply preparedness.

4.2.3. Food supply

This CFC is defined as an “ability to guarantee the population’s access to food so that a normal diet can be maintained.” (DSB 2017, 25). The stresses on the Norwegian authorities’ preparedness during the COVID19 pandemic has uncovered one way that the NC is essential for the proper functioning of this CFC (Børner 2021). The Ministry of Trade, Industry and Fisheries (NFD) is responsible for coordinating the supply preparedness for food and businesses’ ability to offer goods and services during crises (DSB 2016). This coordination requires data on the flow of goods and traffic across the borders. Within weeks of the lockdown the NC began providing such data to the NFD (MoF 2023). While it was not its responsibility, the NC was at an advantage. First, its geographic spread corresponds well with the needs of the NFD. Second, it has an institutional overview of this flow. This monitoring of the flow was traditionally done for efficient taxation and regulation, but a specific crisis elicited an emergent behavior. The detailed and

comprehensive historical data and prognoses from pre-arrival declarations contributed to a more resilient SoS because it was realized that the situation could be monitored in real-time. This overview is not limited to food, but also to other goods with critical functions, such as medicines, vaccines, and various intermediate goods. Third, their knowledge, experience, and connection with other customs agencies enable them to give advice on how to formulate and implement urgent border restrictions in ways that achieve the intention while reducing side effects (NOU 2022:5). The importance of this newfound aspect of the NC's role in societal security can be seen in the fact that this service has been marked as a prioritized measure in the MoF's LOA to the NC in 2021, 2022 and 2023. Another example illustrating societal security as a SoS is how strategic government decisions can have unforeseen, cascading operational consequences at the border. For example, goods are normally transported in mixed shipments, and a decision to allow only a few types of goods is unfeasible to follow and control without advance notice and transshipment facilities.

4.2.4. Border control

This CFC is defined as the "ability to implement necessary border controls relating to individuals and goods" (DSB 2017, 18). Since this is the most well-known aspect of the NC, we focus on lesser-known aspects of border control. Many organizations depend on the NC's representation at the border. These include agencies for taxation, fisheries, agricultural health, medicines and narcotics, and food safety. If these services were suddenly terminated, 19 regulators and some agencies would have to establish presence at all relevant border crossings. This high number of dependent collaborators indicates complex coordination, which in turn requires a stable communication flow across sectors and between strategic and operational levels.

The advantages of geographical spread, institutional overview, and knowledge, experience and network that were elaborated in 4.2.3 make the NC a flexible node in the SoS. Hence, a failure to involve the NC in preparedness planning may impede effective and efficient societal security measures on behalf of quite a few other authorities (Børmer 2021). During the COVID19 pandemic, the NC took on the police's control of individuals on some border crossings. This contributed to efficient use of resources, and the police increased its own endurance (NOU 2021:6). Such an increase in efficiency of societal security measures can also be seen in the recent expansion of the NC's mandate in areas such as the authority to hold back intoxicated drivers and unsafe vehicles.

5. Discussion

The NC's contributions to societal security are more extensive than generally recognized. This is evident in the KIKS framework, which aims to facilitate the coordination of societal security in the Norwegian public sector. Customs has traditionally been viewed as tax enforcement at the border, and consequently associated explicitly with 'border control' and implicitly with 'crime prevention'. Recently, this understanding was expanded to include the NC's role in 'public health', in part through the process of evaluating the Norwegian authorities' response to the COVID19 pandemic. Yet, the NC's contributions to the other 13 CFCs identified in our results remain nearly invisible in official policies and in practice. This remains the case despite the clear involvement of 30 of its collaborators with the said CFCs. This discrepancy indicates that the NC's versatile role in societal security is not adequately understood.

One reason for this lack of understanding may be that the Norwegian approach to societal security is sector-based. It emphasizes the responsibility of upper-level actors, e.g., ministries and appointed directorates, to create policies and strategies and to coordinate efforts within their own sector. The NC is not an upper-level actor, and the public documents indicate an assumption that the NC's categorization as a border control agency automatically limits its mandate and attention to border control issues. This understanding of the NC's role has negative implications for effective and efficient coordination of societal security at the strategic, operational, and tactical levels, because the NC is a nodal point for efforts and information sharing at all these levels, across sectors and organizational boundaries. The homogeneity of the actors requires a more network-based understanding of societal security (Haaavik 2020).

Coordination of cross-sectoral cooperation is complex and requires detailed understanding of inter-organizational interactions and boundaries. The report on the authorities' management of the COVID19 pandemic supports the finding that the versatility of customs activities in crisis management (societal security) was not well-understood by other state agencies (NOU 2022:5). The crisis management was conducted without involving the customs in the design of protective measures, even in questions directly pertaining to border control. This suggests that the NC's role has been seen as simple enforcement of regulations in a clearly demarcated area with little effect on societal security. Taken with the KIKS framework, it appears that even the Ministry of Justice and Public Security (MoJPS), which is responsible for the cross-sectoral

coordination of societal security, has limited understanding of the NC's involvement in various CFCs. The report's recommendation that customs be involved in preparedness planning would lead to a more effective crisis management.

An issue that affects the cross-sectoral collaboration is the understanding of the risk concept. Since societal security usually deals with an uncertain future, the ability to anticipate, monitor and respond depends on risk assessments and the information, knowledge, and intelligence underpinning them. Hence, the definition of risk influences how risks are understood, assessed, and managed. Norwegian ministries are obliged to follow a risk-based approach to societal security (MoJPS 2017), so each conducts its own risk and/or threat assessments. The mixed use of the risk and threat concepts indicates an imprecise understanding of these concepts. As Utne (2017) has shown, there is a variety of risk understandings across the entities. The particular challenge for the NC is that they not only have to prioritize risks across many sectors into one unified strategy for their own institution, but that they also have to reconcile a variety of hard-to-compare risk perspectives. A multi-sectoral, risk-based approach to societal security will be more efficient if based on the newest knowledge on risk perspectives, which also includes the resilience aspects underlying the concept of CFCs.

This paper was based on the premise that societal security is a continuous outcome of a resilience-based SoS that aims to protect society against a wide range of risks. This outcome depends on collaborative processes between organizations and sectors, at the strategic, operational, and tactical levels. The effectiveness and efficiency of this SoS depends on the constituents' understanding of each other's roles and on a somewhat unified risk perspective. This understanding appears to be weak in governance documents and in practice. Since the NC acts on behalf of 19 regulators and is a node for more, weak knowledge of its contributions among coordinating institutions, such as the DSB and the MoJPS, will undermine societal security.

6. Conclusion: Societal Security SoS as a Jigsaw Puzzle Analogy

The insights from the customs case in the examination of societal security as a SoS can be summarized in an analogy: Societal security is like the picture that emerges when assembling a jigsaw puzzle (Figure 1). Each piece represents an actor (A), which can be an organization, a community, or individuals. Clusters of pieces (each color) constitute CFCs. The indentations of each piece represent that actor's dependencies and needs, whereas tabs

represent contributions or resources. And just as collaboration in a CFC improves stability, the interlocking of single pieces within a cluster strengthens that cluster.

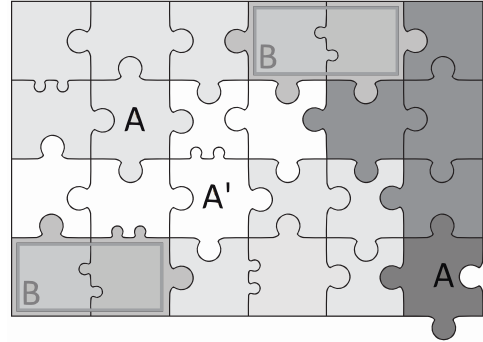


Figure 1: Societal security is like the picture that emerges when assembling a jigsaw puzzle. "A" indicates an actor, "B" indicates a CFC that supports other CFCs.

As the pieces are assembled, certain patterns emerge. Some clusters are repeated in the puzzle (B), indicating CFCs that are necessary for other CFCs. For example, most services today depend on power supply and telecommunications, hence they reappear. The tabs and indentations along the boundary between clusters form a relation, such that a disturbance of the supporting cluster will affect stability in the dependent group.

A piece can exist in multiple locations, either copied (A) or modified (A'). Similarly, a resource can serve different needs. This adds flexibility in shifting resources from one capability to another, or even within the same capability. A broken piece can be replaced or repaired with a tab from another, mirroring resilience. Although the model would be tidier if each piece could appear only once, such a reduction would limit the possibility to apply this analogy to complex systems.

The puzzle is under persistent influence of both constructive and destructive forces. Similarly, societal security is affected by budget allocations, hybrid threats, accidents and natural disasters, changes in the values of society etc. A limitation of the analogy is the ability to express changes over time, since a jigsaw puzzle is fairly static. However, it can be a helpful framework to express the emergent dynamics of societal security as a SoS, such as cross-sectoral collaboration, resilience, representation, cascading consequences, flexibility of resources, and interdependence in a complex SoS. The total is more than the sum of the parts. And societal security does not stop at the border; all the puzzles in each country interlock to make a global, interdependent puzzle.

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