RESEARCH ARTICLE

Security as an Emergent Property of a Complex Adaptive System

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Security in Africa continues to be problematic to both scholars and practitioners. Its study often takes an itemised approach where actors are studied in detail and security outcomes are linked to the effectiveness or ineffectiveness of actors. Perceived and actual security threats are correlated to conflict or presented as causal factors of conflict. In other words, security provision is explained through an itemised and reductionist analysis of security actors. In the past few decades, it is increasingly evident that non-linearity is pervasive in all forms of social organisation. This article rejects the Newtonian paradigm. It is argued that security is often a product of a system, which can be a complex adaptive system (CAS). It contends that a resilient security system guarantees a minimum level of security. To support this argument, empirical evidence from Cameroon is used to prove that Cameroon's security system is a CAS. The conceptualisation of Cameroon's security system as a CAS enables the application of both complexity science and resilience perspectives to security analysis. These perspectives allow the argument that Cameroon's security system is resilient. The characterisation of Cameroon as fragile, failing or failed is rejected.

Introduction

African security literature can be classified into four broad categories. The first category is the traditionalist approach, which examines security from the state perspective. Consequently, the analysis focuses on what happens or does not happen to the state (the actions or inactions of the state) (Acemoglu and Robinson 2012; Bell and Hindmoor 2009; Börzel and Risse 2010; Clapham 2001). The second category is literature, which considers and analyses the role of actors (state and non-state). In some cases, it takes an itemised analysis of such actors (Baker 2008; Baker 2010; Francis 2005; Collier and Hoeffler 2002; International Crisis Group [ICG] 2010; (Goodfellow and Lindemann 2013; Bevir 2013). The third category conceptualises security governance as a network of state and non-state actors (Baker 2010, Baker 2008, Shearing and Johnston 2010). The final category argues that security provision takes a hybrid form (constant negotiation and renegotiation between formal and informal actors) (Mallett 2010; Boege et al. 2008).

In general, existing analysis of Cameroon's security itemises threats and correlates them to the apparent mediocrity of certain security actors, then concludes by discussing Cameroon's vulnerabilities. Such analysis characterises Cameroon as a weak state, a fragile state, or a failing or failed state.

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Indeed, one such study by the ICG is titled "*Cameroun: mieux vaut prévenir que guérir*" (prevention is better than cure) (ICG 2014) and another is titled "Cameroon: a fragile state" (ICG 2010). These analyses assume that Cameroon is about to fail, and that some policies with expected linear results must be implemented.

Most studies (Abrahamsen and Williams 2009; Boege et al. 2008; Cummins 2013; Mallett 2010; Peoples and Vaughan-Williams 2015; Meagher 2012; Baker 2008; Baker 2010; Collier and Hoeffler 2002; Francis 2005; ICG 2010; ICG 2014), regardless of the broad categories above, tend to take an additive or reductionist and linear approach — analysing security as the aggregate product of the actions of individual security actors. Alternatively, some studies reduce security outcomes to the actions of individual actors. Invariably, they draw linear cause-and-effect conclusions. It has become increasingly clear that in the Anthropocene (Grove and Chandler 2017), this Newtonian paradigm (the view of the world as a set of isolated objects that interact in a linear cause-and-effect fashion), no longer sufficiently accounts for the complexity seen in the world today (Chandler 2014a; Mitchell 2009: ix).

An itemised analysis of the effects of security threats to a state can be compared to an itemised analysis of the effects of pathogens on humans without regard for the power of the immune system. Depending on the state of the immune system, the flu virus (for example), affects various individuals differently. The research on making humans resilient to the flu focuses on either a vaccine, which helps the immune system prevent infection, or treatment, which helps the immune system cope with infection. It is the understanding of the virus in combination with the power of the immune system that helps scientists to invent medication that provides resilience and, consequently, health for the individual. The author sees no reason why security threats and security systems should be treated any differently from pathogens and the immune system. Just as a human has an immune system to defend against pathogens, the state has a security system to defend against security threats.

African literature (like that presented above) is useful in giving anthropological background to concepts such as security and the actors involved in security. However, it is argued that those studies are necessary but not sufficient. Instead, it is submitted that security is an emergent property of something else. While traditional anthropological, criminological and sociological studies may describe security conditions, it is argued that it is impossible for them to analyse security. The analysis of complex emergence is the reserve of complexity science and its tools, such as computational modelling.

This article contends that security can only be understood through the holistic study of security systems in conjunction with the specific threats that attack these systems within a specific context. In this context, threats (perturbations) are considered as inevitable; while some can be eliminated, the system evolves coping methods for most instead (Mazzar 2014). The essence of research becomes the understanding of threats and the ability of the security system to invent the vaccines and medication (resilience policies) necessary to enhance resilience. The research in this article, therefore, turns to complexity science and complex adaptive systems to enhance the study of security.

Complexity theory argues that there exists a special type of system called "complex adaptive systems" (Hudson 2000; Homer-Dixon 2001; Eidelson 1997). Key characteristics of these complex adaptive systems can be extracted from complexity science literature. These characteristics are related to the composition and the behaviour of a CAS. The characteristics include: multiplicity of agents that are heterogeneous, autonomous and interact in a network through specified protocols (Schneider and Johannes 2007: 25); agents are organised in a hierarchical structure; and complex systems contain multiple subsystems. The behaviour of complex systems is characterised by emergence, non-linearity and non-reductionism (Urry 2006, Eidelson 1997). A CAS is self-organising, and

perturbations within these systems often express cascading behaviour (Holland 1995; Duit and Galaz 2008).

Some have argued that resilience thinking, and practice, is born out of the change in both natural and social science ushered in by complexity science (Pugh 2014). It has now become pervasive in many academic disciplines and professional practice (Chandler 2013, 2014a) with exponential growth in the number of academic papers published (Dunn Cavelty, Kaufmann and Søby Kristensen 2015). Grove (2017: 184) points to an ecologists' definition, which refers to resilience as "a system's capacity to reorganise itself in order to maintain its basic structure and function." This thinking is further supported by Adger (2000, 347), who argues that resilience is "the ability of groups or communities [such as a state] to cope with external stresses and disturbances as a result of social, political and environmental change." With these definitions in mind, and from a reading of Chandler (2014a: 8), it is submitted that resilience in a security studies context refers to the ability of a state to maintain its core characteristics and a minimum level of operational capacity in the face of significant security threats and incidents. It is added that threats include both internal and external threats (Bourbeau 2015).

From a synthesis of the debates in the traditional (Walt 1991), Copenhagen (Buzan 1991b; Waever 1995) and human security (Alker 2005; Kaldor, Martin and Selchow 2007; Ogata and Cels 2003) schools, security is argued to be both "freedom from fear" and "freedom from want" (Booth 1999). It is submitted that there should be a level of analysis where the state is a referent for security and a level of analysis where the individual is a referent for security. However, the security of the state and that of the individual are interdependent. The insecurity of the state leads to insecurity of the individual and vice versa. In this regard, this article focuses on the security of the state, arguing that when the state is secure it automatically creates the conditions for the security of its citizens. It is also submitted here that the security of the state

is derived from its security system. In other words, a resilient security system guarantees the security of the state, which, in turn, creates the conditions for individual security.

The aim of this article, therefore, is to investigate Cameroon's security system and security threats to ascertain whether it is resilient or not. Based on this background, this paper poses the following question: in the face of multiple security incidents and threats, is Cameroon's security system resilient? The answer to this question is pursued from both the complexity science and resilience perspectives. If the system is found to be resilient, it can be concluded that Cameroon enjoys security and, consequently, creates the conditions of security for its citizens. Resilience and consequent security do not mean the absence of perturbations from time to time (as at present in Cameroon). It means, *ceteris paribus*, the system should maintain core characteristics and a minimum level of operational capacity amid a plethora of security challenges (Grove 2017: 184). Security in Cameroon is not investigated as a thing but as an emergent property of Cameroon's security system.

This article starts with an analysis of Cameroon's security system, focusing on its composition and behaviour. It maps the characteristics of the system and compares them with the characteristics of a CAS per complexity science. It is found that the characteristics are overwhelmingly similar to a CAS. It is, therefore, submitted that security in Cameroon is produced by a CAS. With this knowledge, the central research question is answered from both the complexity science and resilience thinking perspectives.

Methodology
Cameroon is a Central African state that has enjoyed relative stability for most of its existence. Recently, however, Cameroon has made global headlines with regards to the Islamist group Boko Haram and secessionist violence in its two English-speaking regions (Al Jazeera News 2017; BBC 2015). At the time of writing, violence continues to escalate in the English-speaking regions. The issue of Boko

Haram in the north of Cameroon, incursions from rebels from the Central African Republic and insecurity in the Gulf of Guinea continue to pose serious security concerns.

The current president, Paul Biya, has been in power for close to 36 years, in a system that has dominated Cameroon for over half a century. In the recent presidential elections, an opposition candidate proclaimed himself the winner before the official proclamation of the results by the constitutional council. The opposition argues that the election was marred by fraud and the 71 per cent attributed to President Biya is fabricated. A disputed election is feared to be a catalyst for wider crisis. Indeed, the *Financial Times* quoted an analyst from the ICG, who said that Cameroon is in "*de facto* post-election crisis" (Munshi 2018). The fallout of the election continues to inspire anti-government protests that have led to significant injuries and imprisonment of many anti-government activists. The issues of Boko Haram (terrorism), the anglophone crisis (secessionist civil war) and anti-government protests with ethnic undertones (ethnic conflict) create critical security challenges for Cameroon.

Furthermore, Cameroon is the most populous and biggest economy in francophone Central Africa. It is a source of critical raw materials (oil and timber) for the global economy. As a result, Cameroon is essential to regional and international security. With active security challenges plus a long history of relative stability, Cameroon provides a unique opportunity to investigate security systems and resilience.

Given time and resources contraints, a Cameroon-wide survey was not feasible. A decision had to be made on which region of Cameroon is most representative. Most of the southwest region of Cameroon is part of the founding territory of Cameroon since the arrival of the Portuguese in the fifteenth century. It contains three cities that are of considerable significance to Cameroon. Limbe (formerly known as Victoria) in Fako Division is one of the oldest cities in Cameroon. As a result, Limbe has received

settlers from other parts of Cameroon and beyond for more than 200 years. Limbe is also a beach city with a significant tourist population, with visitors from all parts of Cameroon. Cameroon's sole petrochemical refinery (a major employer) is located in Limbe. The refinery brings in workers from all parts of Cameroon. Furthermore, the Cameroon Development Corporation (an agribusiness company), one of the biggest employers in Cameroon, has its headquarters in Limbe.

Buea is the regional headquarters of the Southwest Region. It is also the former political headquarters of Cameroon under Germany and British Southern Cameroons under Britain. As a result, Buea also has a significant settler population from all parts of Cameroon. Furthermore, one of the most prominent universities in Cameroon is located in Buea. The University of Buea is host to a Pan African University Institute operated by the African Union. The university opens up Buea to all Cameroonians. Kumba, in Meme Division bordering Ndian Division, is a significant cocoa production area of Cameroon. Cocoa constitutes a significant export product for Cameroon, and Cameroonians come from far and wide to participate in cocoa production.

As a result of the above factors, it is argued that the population of the Southwest Region is sufficiently diverse to be representative of the whole of Cameroon. Consequently, the responses gained from end-users(residents) can be generalised to all of Cameroon. Nonetheless, there are those who will argue that such generalisation is problematic. While officially Cameroon could be divided into French- and English-speaking regions, in reality, Cameroon is made up of similar ethnic groups, cultures and traditions. The English-French divide has little bearing on traditional African customs and beliefs among the different ethnic groups in Cameroon. For example, the cultural similarity between the Lebialem people (English-speaking) and the Dschang people (French-speaking) is not affected by French or English influences.

In accordance with the critical approach in international relations and the so-called vernacular approach, the research for this article incorporated both elite and non-elite sources of security knowledge (Waever 1995; Jarvis and Lister 2012; Vaughan-Williams and Stevens 2016: 40; Bubandt 2005: 276). The research combined a questionnaire for security end-users (any individual who consumes security), semi-structured interviews with security actors and a limited degree of documentary research. This approach was chosen to capture both elite and non-elite perspectives on security. It surveyed 407 individuals (security end-users) and 41 semi-structured interviews were held with security actors. Documents relating to the establishment and regulation of security actors, such as chiefs, divisional officers, mayors and governors, were also studied. The survey was conducted in 2015 before the onset of the current civil war.

A multi-stage sampling process was used (Brase and Brase 2010: 15) for the questionnaire. First, the population (end-users) was divided into six clusters in line with the six administrative divisions of the Southwest Region. Second, simple random sampling was applied to select three clusters (namely Fako, Meme and Ndian Divisions). Finally, convenience sampling was used for selecting respondents (ibid.: 16). The questionnaire was paper, and clipboard based. It was administered by six research assistants who have experience through their work in a research agency. The data was later input into an online survey form and exported to SPSS.

Both public places and door-to-door visits were utilised to ensure wide participation. The survey was extended over six weeks. A register of respondents' gender, age group, educational level and occupation was kept. These records enabled balanced representation of all groups. To ensure that the views of illiterate respondents were captured, their questionnaires or interviews were read or spoken in pidgin English. These measures helped to mitigate or eliminate bias.

The first question on the questionnaire asked respondents to list five things (in order of importance) that make them feel secure. The second questions asked for five things that make them feel insecure. The category of "secure" in the questions that asked the respondents to rate their security means the absence of the factors that made end-users feel insecure or the presence of the factors that made them feel secure. The interpretation or understanding of "secure" is determined by the end-user (the individual who experiences the security). Similarly, one of the survey questions asked the end-users to rate security actors. Security end-users rated actors based on their experience of that actor. The category of "good," for example, means the end-user had a good experience with the security actor on the specific issue referred.

Cameroon's Security Systems

When end-users were asked to indicate whom or what they turn to for security, the end-users indicated that they turned to a multiplicity of actors. They were also asked to indicate what issues were taken to which actor. Based on the issues listed by the end-users as day-to-day security issues, most day-to-day security issues were taken to a specific group of actors. This paper refers to this group of actors as the primary system.

The areas shaded white in the pie chart (see **Figure 1**) indicate the proportion of end-users who turn to customary security actors. The areas shaded grey indicate the percentage of end-users who turn to civil society actors. The areas shaded black indicate the percentage of end-users who turn to modern state actors.

As indicated above, it was found that day-to-day security issues were mostly referred to a specific group of agents. A second group of actors only intervene when the first set of actors (primary system) is overwhelmed. This research refers to the second group as the secondary system. The interviews showed that there is a third group of actors who are not interested in providing security directly to the end-users but are engaged in keeping

DISTRIBUTION OF END USER PREFERENCES
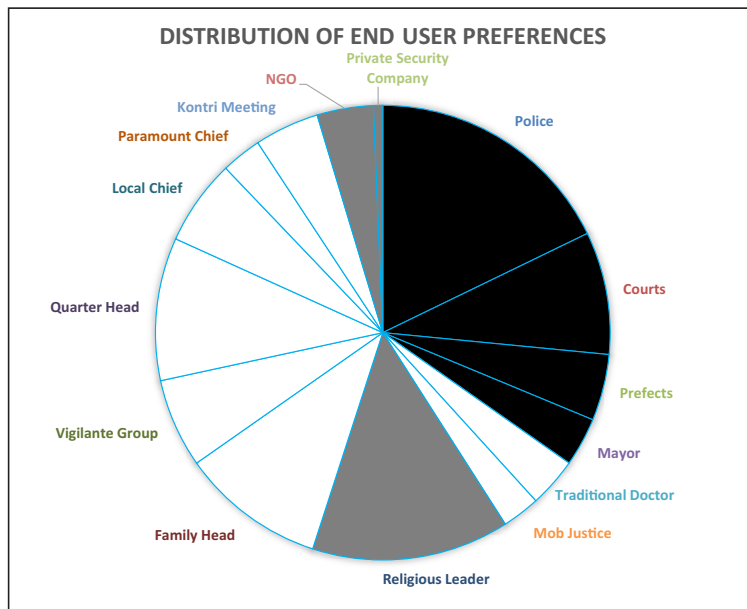
Figure 1: Showing the distribution of end-user preference of actors in Cameroon's security architecture.

the security provision systems in check.[1] This research refers to the third group as the regulatory system. It must be noted that some actors are involved in more than one system. This paper argues that Cameroon's security system is made up of three crucial micro/sub systems.

Primary security system

The primary system is composed of multiple agents, which include family heads, quarter heads, chiefs, Non-governmental Organisations (NGOs), tribal associations, witch doctors, the local police, the local gendarmerie and religious leaders. The function of this system is thus to provide basic safety, basic needs, settle disputes, socialise, educate, enforce and reinforce customs, and provide mutual support to end-users in crisis (end-user survey).

Secondary security system

The secondary security system deals with issues that the primary system lacks the specialisation to resolve. In other words, this system resolves issues that are outside day-to-day security needs. Most parts of this system are interventionist only. It was found

that specific agents only engage in security provision when specific issues arise. When such issues are resolved, these agents disengage. Some actors within the system (especially police and army actors) often have the word "intervention" in their name. Examples include the *Batalion d'Intervention Rapid* (Rapid Intervention Battalion), *Brigade d'Intervention Rapide* (Rapid Intervention Brigade), *l'Equipe Spéciale d'Intervention Rapide* (Special Team for Rapid Intervention) and *Groupement Mobile d'Intervention* (Mobile Intervention Group). These agents are specialised in removing "spillovers" from the primary system and the entire security system but are not engaged in day-to-day security provision.

The deployment of the *Batalion d'Intervention Rapid* (BIR) in the Northwest and Southwest Regions, the creation of a new *Région Militaire Interarmées* (RMIA5) in Bamenda (Northwest Region) and a new BIR battalion stationed in Mabanda Kumba (Southwest Region), is evidence of strengthening the secondary system for it to perform its role of removing entropy from the overarching security system. The current activities of these agents in the far north, the

northwest and the southwest are examples of this system at work.

Regulatory system

This research found that there exists within Cameroon security architecture a layer of agents whose prime responsibility is to regulate other systems. Regulation is achieved through education, customs, religion, beliefs, traditions, laws and neo-patrimonialism (Clapham 2001; Hansen 2003). The actors in these systems do not act in isolation; culture, pre-colonial history and tripartite colonial heritage shape the way actors behave in the regulatory systems (Hansen 2003; Mbaku 2005). The culture where a leader is perceived as a father explains how certain actors perform their role. The "father-son" metaphor exemplifies how intangible cultural reciprocal behaviour and mutual obligations shape the regulatory system.

Furthermore, the regulatory system is shaped and dominated by the interest of the presidency. The efficacy of the incumbent (through the regulatory system) in avoiding rapid change in the agents and the systems, is one of the most important reasons for the perpetuation of the incumbent. The dominance of the presidency has also been demonstrated by Hansen (2003).

## Composition of Cameroon's Security Systems

As can be seen in the pie chart in **Figure 1**, there are multiple security agents in Cameroon. These agents are a mixture of individual and organisational agents. The data showed that family heads, quarter heads or prefects are examples of individual agents. NGOs, *Kontri*[2] meeting, the police and the army are examples of organisational agents. The list of agents shows significant heterogeneity. The interviews and survey data show that the agents within Cameroon's security system are significantly diverse. It was shown that the *Kontri* meeting and the army, private security companies and witch doctors, and priests and the police are all agents within Cameroon's security system. These agents have little or nothing in common.

Furthermore, security agents were drawn from many different sectors. These include the modern administrative structures, the modern elected structures, the traditional customary structures and the religious structures. The group of actors includes modern state actors, civil society actors, customary actors and religious actors. These have emerged through organic self-organisation, appropriation and co-optation by both the colonial and post-colonial governments (Belaun et al. 2010, 15).

The data showed that relationships or interactions between agents and between end-users and agents were codified in law, customs and beliefs. This laid down specific protocols for interaction. All relationships were rule-based, albeit unwritten in some cases. All cultures had a clearly understood prescription of actions in different security situations. For example, "if, then" rules were found in cases of theft: if "minor steals goat" then "local chief"; if "minor steals goat (twice or more)" then "gendarmerie."[3] These rules, which determine interactions, are what complexity science refers to as protocols of interactions. Different agents are fully aware of what is within their capability and what to pass on to other agents. A low level of referrals (from agent to agent) is proof of well-known rules followed by both the agents and end-users (see **Figure 2** below).

From legal documents establishing governance structures in Cameroon, the semi-structured interviews and end-user survey, it was found that the organisational structure of Cameroon's security architecture is hierarchical. The presidency is at the top level of the hierarchy and actors such as family heads and quarter heads are at the lower levels of the hierarchy. In an ascending order, the hierarchy is thus family head, quarter head, local chief, paramount chief, sub-prefect, prefect, governor, minister of territorial administration, with the prime minister and the president at the top of the hierarchy.[4]

The data showed that customary agents, for example, are auxiliary to the modern state agents (decree no 77/245 of 15 July 1977).[5] The modern state agents rely on
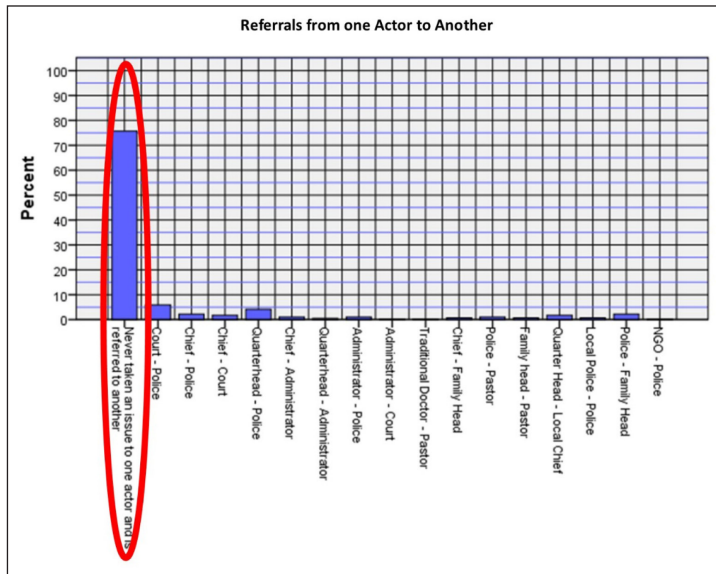
Figure 2: Referrals from actor to actor.

customary agents for intelligence. The police and gendarmes use quarter heads to deliver convocations.[6] Though the role of some customary agents is derived from tradition, they rely on the recognition of the modern state to perform their duties (decree no 77/245 of 15 July 1977).[7] Since the modern state is absent in some parts of the territory, the modern state relies on the customary agents to perform modern state duties.[8] This is evidence of interdependence.

It was also found that the modern state elite solicits the support of locals through customary agents.[9] The customary agents support and recruit locals to support the state. In return, the state agents recognise these customary agents and provide them with the necessary resources (salaries, construction of palaces) to conduct their duties as auxiliaries to the state.[10] The provision of development could be politicised in favour of client customary agents.[11] On the issue of land, for example, the process is interdependent as both the input of customary and modern state agents is required for resolution.[12] Furthermore, the hierarchical structure of the security system enables agents at one level to depend on agents at other levels.

The existence of multiple agents who are interdependent, operating in different systems and interacting through protocols, means that the existence of a network is inevitable. It was found that many actors regarded certain issues to be out of their area of competence, thus, the necessity to pass things on to specialist agents. Indeed, these actors could name which actors specific issues are passed to.[13] This shows that they were connected in a network and are aware that they are. Information-sharing networks and mutual assistance networks, such as the case where the police use quarter heads for convocation delivery and suspect identification and arrest, are found in Cameroon.

In the exercise of their duties, agents within Cameroon's security system possess varying degrees of autonomy. While some actors enjoy more autonomy than others, it was observed that autonomy is a characteristic that is associated with many agents within the system. For instance, Christian religious leaders and NGOs enjoy a significant degree of autonomy. These agents are not part of the hierarchy of either the modern state actors or the customary actors (though they operate on similar levels as the customary actors).

It is argued that public opposition of the *status quo* by Christian leaders (especially Catholic bishops and Presbyterian Church leaders) demonstrates their independence

and autonomy. Such opposition is evidenced by the many episcopal letters critical of the government.[14] The recent court cases brought against some Catholic bishops and the moderator of the Presbyterian Church has been decried as politically motivated to intimidate them for being critical of the government (Mbunwe 2017). It is thus an attempt to curb their autonomy.

It was found that the presidency is the dominant agent. Consequently, the interest of the presidency shapes the collective actions of agents. However, while the system imposes parameters on the behaviour of agents, within their area of responsibility agents enjoyed local autonomy to resolve security issues. In other words, the presidency influences the system at a macro level but does not necessarily direct agents at the micro level. This is, therefore, consistent with the autonomy often witnessed in a CAS.

The mere existence of a diversity of actors and systems within the security architecture of Cameroon is evidence of distributed capability. The specialisation seen where actors were fully aware of which issues to deal with and which ones to pass to other actors is also evidence of the redundant capacity discussed in complexity science literature (Eidelson 1997, 46). *En temps normal* ("in normal times") day-to-day security provision is conducted by specific agents (the primary security systems). Other agents such as the *Groupement Mobile d'Intervention* (GMI) and specialised units of the army (the secondary security system) are redundant capability that is only drawn on in times of crisis (*en temps de crise*).

For example, when Cameroon experienced severe disturbances from the phenomenon of *coupeur de route* (highway bandits), it created a specialised unit within the army (outside of the primary system) to deal with this threat (the BIR, which now spearheads the fight against Boko Haram). Also, specific types of vigilante groups are called upon only in time of crisis. The government has often relied on vigilante groups in *en temps de crise* such as in the anglophone student crisis in Yaoundé in the 1990s and the current fight against Boko Haram (Konings 2011, 212; Moki 2015). These vigilante groups often disappear when the specific threat disappears. This creates redundant capacity in the system. The GMI and ESIR (L'Equipe Spéciale d'Intervention Rapide), for example, are sections of the police designed only to intervene, they do not take part in the typical day-to-day security provision.[15]

Nature and Behaviour of Cameroon's Security System
Anti-reductionism and non-linearity
End-users were asked to rate actors on a scale of 1–5 where 1 = very bad, 2 = bad, 3 = average, 4 = good, 5 = very good. Most end-users rated the agents as average. Exceptions arose only in the case of religious leaders and the NGOs.[16] In other words, most individual security actors and the security they offer to security end-users in Cameroon is considered to be mediocre. However, when end-users were asked to rate their security (which is the outcome of the combination of interactions between these agents), 81.3 per cent of the end-users rated their security as secure or extremely secure.

In addition, when asked to rate their security in terms of where they feel secure (at home, in the streets, in their town or village or generally), up to 84.7 per cent of the end-users felt extremely secure in at least one of these places at any given time. The fact that the end-users are generally dissatisfied with individual agents providing security,[17] yet feel secure, indicates that the whole cannot be understood from the analysis of the parts. Linked to anti-reductionism, discussed above, is the concept of non-linearity. There is no linear explanation of why mediocre actors do not produce mediocre security. Linear logic suggests that average security actors will produce average security. The feeling of "extremely secure" that is observed is an indication of non-linearity. It was clear that it is impossible to understand a complex system from the sum of the actions of its components or reduce the system to accounts of the actions of individual constituents (Byrne 1998: 15, 16).

Co-evolution

The introduction of the French policy of *encadrement des paysans* has greatly influenced leadership in Cameroon (Geschiere 1993: 151). It has been argued that the father figure (defined and used in the traditional sense), or the chieftaincy and influences from the customary sector (in general), shapes leadership within the modern state sector (Hansen 2003: 210). Indeed, the president is often referred to as *père de la nation* and *Fon of Fons* (Bongmba 2006: 16–17). Modern state influences have also reached the customary system by shaping the organisation of customary courts and the occasional reference to laws (Penal Code) by local chiefs.[18]

The complexity science concept of co-evolution means the evolution of one system could cause evolution in another system and the environment. The presence of more than one system in Cameroon's overarching security system has been shown. It has also been demonstrated that issues arising from one system could affect the behaviour of other systems. Systems influence each other and their environment; in effect, the phenomenon of co-evolution.

Adaptive behaviour

Protocols for interactions (traditions, customs, religion and beliefs) significantly determined security in Cameroon. History and anthropology posit that these customs, beliefs, religion and traditions (through which individuals wish to relate or live by) often arise and evolve when people settle in a place. These customs evolve, and change, as the reality of settling in such a place are understood with time. The influences on this evolution include natural (climate change, floods, disease) as well as political influence (other settlers, religion, personal disputes, wars).

In recent history, security-providing customs survived slavery (forced migration of the ablest populations), settlers (freed slaves and missionaries), colonialism (which injected too many alien ideas too quickly) and post-colonial state building, which also brought ideas, practices and orders. The fact that these customs and customary institutions still exist after many years of these interventions is self-evidence of their ability to adapt, evolve and accommodate change. Furthermore, the multiplicity of agents, systems and redundant capacity, means that the system has the ability to adapt in the face of varying security challenges.

In addition, adaptation has led to the extinction of many cultural practices that contradict both local and international laws. For instance, in some cultures, rape victims were required to marry the offender. However, it was found that aggravated rape was one of the crimes that could not be contained within the primary system. Such crimes are passed to the secondary system.[19] Adaptation and evolution are very much alive in Cameroon's security system.

Emergence

Evidence has already been given showing that the feeling of "secure" or "extremely secure" recorded by the end-users cannot be reduced to the ratings given by the same end-users to the actors and security options represented by these actors. Security in Cameroon is an emergent property of Cameroon's security system.

Cascading behaviour

It is argued that the grinding poverty witnessed in northern Cameroon is a significant contributor to the recruitment of young people by Boko Haram.[20] Desertification in northern Cameroon is linked to poverty. Perturbation such as a drought could lead individuals into poverty. Poverty, in turn, could push individuals into criminality (Boege et al. 2008: 315–16). In other words, desertification creates poverty, and poverty drives young people into terrorist organisations, which cause insecurity to everyone.

Furthermore, the worsening state of Cameroon's economy in the 1990s is argued to be a causal and accelerating factor of the phenomenon of *coupeur de route*.[21] Poverty and unemployment caused by poor economic performance push young people to criminal activity as a means of survival. The

alleged political and economic marginalisation of the anglophones is claimed by some to be the cause of the current low-level civil war in the Northwest and Southwest regions of Cameroon.[22]

Resilience and Cameroon's Security System

This section brings together all the evidence and arguments in the previous sections to answer the central research question, is Cameroon's security system resilient in the face of multiple security incidents and threats? This question is answered from both a complexity science and resilience thinking perspective.

The findings above have demonstrated that Cameroon's security provision is achieved through several systems. They have shown that the systems consist of multiple agents. These agents are diverse, autonomous and interdependent, are organised hierarchically and relate through networks controlled by specific protocols. The system has redundant capacity, as seen in the case of the BIR and the GMI. With regards to the nature and behaviour of the system, it was found that Cameroon's security system exhibits anti-reductionism, non-linearity, adaptive behaviour, emergence and cascading behaviour, which are core characteristics of a CAS (Kauffman 1996; Byrne 1998: 15, 16).

The empirical evidence from Cameroon is overwhelmingly consistent with the characteristics of a CAS. As a result, it is argued that security in Cameroon is produced by a CAS. From a complexity science perspective, the very nature of a CAS makes it resilient. In a CAS, resilience is associated with redundant capacity, low percolation, self-organisation, adaptation and evolution. These have been demonstrated to be characteristics of Cameroon's security system. As a CAS, Cameroon's security system is argued to be resilient.

Due to a complicated colonial heritage, independent Cameroon inherited boundary issues with its neighbour Nigeria over the Bakassi peninsular. This created tense relations with a military inclination. Cameroon

succeeded in standing up to the far superior Nigerian army during the Bakassi disputes for more than 14 years.[23] Furthermore, the successive armed groups (Bakassi Freedom Fighters and its splinter group Africa Marine Commandos), which emerged after the handover of Bakassi to Cameroon, have also been kept under control.

It is widely accepted that Cameroon has generally held its ground against Boko Haram thus far (De Marie Heungoup 2017). In fact, "Boko Haram has now perpetrated about 490 attacks and kidnappings on Cameroonian soil, and some 50 successful suicide bombings. A further 58 attempted suicide bombings failed" (ibid.). Unlike in neighbouring Nigeria, where Boko Haram has taken complete control of entire local government areas, Boko Haram has not been able to take and hold Cameroonian territory for more than a day (Blair 2015).

Cameroon's security system has frequently been tested by internal security incidents. In the 1960s and 1970s, Cameroon, with the help of France, defeated the *Union des populations du Cameroun* guerrillas (Weigert 1996: 36). A *coup d'état* was attempted against Paul Biya in April 1984, orchestrated by the Republican Guard. The rest of the army fought against the Republican Guard for six days to restore the government.[24] Biya is still president at the time of writing. The early 1990s saw protests in demand of multi-party democracy and in 1992 there were protests against an election that was presumed rigged (Page, Evans and Mercer 2010: 356; Nkwi 2006: 95: Konnings and Nyamnjoh 1997: 215-16). In 2008, there were several nationwide protests during which the armed forces were used.

Currently, there is a conflict between the armed forces and separatist groups in the anglophone regions of Cameroon. These groups claim to be fighting for an independent state, which they call Ambazonia (Blomfield 2017). In places like Wabane Sub-Division in the Lebialem Division, most actors, both customary and modern state, are expelled by the secessionists.[25] However, the secessionists do not form an alternative

to the government. Nevertheless, the conflict has exposed weaknesses in Cameroon's security system; it is yet to be seen how these are resolved. It must be noted that, since the onset of the civil war, the government has steadily invested in the secondary security system to improve its ability to remove entropy from the entire security system. The effectiveness of this strategy is yet to be seen.

As the previous paragraphs show, in the face of multiple security threats, Cameroon has maintained the core characteristics of a state.[26] Cameroon is still one of the few countries in Africa that has never experienced a change of government by force. It has remained one of the most stable governments in Africa, with only two presidents since independence. Despite the threats and occasional crisis, since independence, there has never been an armed group that has successfully formed an alternative to the Cameroonian government in any part of the country. Cameroon continues to enjoy full diplomatic relations with most of the states in the international system. It is a member of the UN, the Commonwealth and La Francophonie, among other intergovernmental organisations. From a resilience perspective, since Cameroon has maintained its "core characteristics and a minimum level of operational capacity" for more than 50 years, this article submits that Cameroon's security system is resilient thus far. Because of a resilient security system, the state of Cameroon enjoys security, which creates the conditions of security for its citizens.

Resilience notwithstanding, unpredictability is inherent in a CAS. Indeed, it has already been observed that in the case of Boko Haram in the north and incursions by rebels from the Central African Republic in the east, the system works as expected. However, in the case of the anglophone crisis, the primary system and certain parts of the secondary system (such as the police gendarmerie and some parts of the army) are incapacitated. However, the secondary system is engaged as expected. The consequences of this to

the cybernetic architecture of the system is difficult to predict. The nature of these systems does not support an extended engagement of the secondary system. An extended engagement may be evidence of or lead to system degradation. System degradation can lead to self-criticality or chaos (in this context, system-wide war).

A CAS is a dynamic system; continuous adaptation is needed for a resilient system to stay resilient. In most cases, this adaptation is achieved through self-organisation. However, just as the immune system occasionally needs intervention (in the form of a vaccine or medication) to stay resilient, complex adaptive social systems (such as Cameroon's security system) occasionally need intervention to stay resilient. It is contended that interventions must only be administered at lever points with knowledge of the complexity of the system.

Conclusion

Thanks to complexity science and resilience thinking, this article has arrived at conclusions about security in Cameroon that perhaps could not be arrived at using linear approaches. It is submitted that Cameroon's security system is resilient amidst multiple security incidents and threats. In this light, this article argues for the rejection of the use of terms such as fragile, failing, failed and hybrid political order in the analysis of security. Such terms and the studies that generate them are inadequate in the analysis of security in states such as Cameroon. Indeed, in some cases, these terms could be misleading.

The complexity science approach permits security analysts to pursue a better understanding of security systems from a non-linear, non-reductionist perspective. This understanding helps the recommendation of policy solutions that seek to enhance resilience in a system that is already working. This is opposed to policy development from a linear perspective, which recommends the replacement of systems that are termed fragile, failing or failed. The rejection of words

such as failed, failing or fragile, in favour of resilience, substantially alters the imagination of security in states such as Cameroon. Indeed, self-organising systems such as Cameroon's security system work better when they experience perturbation within a specific limit from time to time.

This research, therefore, lays the foundation for future research, which uses complexity science and agent-based modelling to map Cameroon's security system to quantify its resilience. Such a model enables the identification of possible tipping points and optimal intervention points. The identification of the optimal intervention points is vital to policy formulation. A complexity science approach significantly enhances good policy development and consequently better security outcomes for end-users.

Notes

[1] Interview with academic, University of Buea, July 22 2015; interview with sub-prefect, Fako Division, 5 August 2015; interview with police commissioner, Fako Division, 4 August 2015.

[2] Otherwise known as village or tribal associations

[3] Interview with actors.

[4] Interview with local chief C, Fako Divison, 10 August 2015; interview with sub-prefect, Fako Division, 5 August 2015.

[5] Interview with sub-prefect, Fako Division, 5 August 2015; interview with local chief B, Meme Division, 23 July 2015.

[6] Interview with police commissioner, Fako Division, 4 August 2015; interview with quarter head B, Meme Division, 25 July 2015.

[7] Interview with sub-prefect, Fako Division, 5 August 2015; interview with local chief B, Meme Division, 23 July 2015.

[8] Interview with academic, University of Buea, July 22 2015.

[9] Ibid.

[10] Interview with local chief C, Fako Divison, 10 August 2015.

[11] Interview with academic, University of Buea, July 22 2015.

[12] Interview with local chief C, Fako Divison, 10 August 2015; interview with sub-prefect, Fako Division, 5 August 2015.

[13] Security actor interviews (multiple actors indicated this).

[14] Bamenda Provincial Episcopal Conference (BAPEC) wrote a memorandum to President Biya decrying alleged marginalisation of the English-speaking regions of Cameroon (BAPEC/PRES/2016/30).

[15] Interview with senior police officer, Yaounde, 16 February 2018.

[16] End-user survey.

[17] Most security actors were rated as average by end-users when asked to rate the actors they turn to for security.

[18] Interview with local chief B, Meme Division, 23 July 2015.

[19] Interview with local chief B, Meme Division, 23 July 2015; interview with quarter head A, Meme Division, 1 August 2015.

[20] Interview with Cameroon intelligence officer, Buea, 4 January 2017.

[21] Interview with academic, University of Buea, July 22 2015.

[22] Interview with senior police officer, Yaounde, 16 February 2018.

[23] Interview with former company commander, army, 28 December 2016.

[24] Ibid.

[25] Interview with local chief three, Lebialem, 4 September 2018; interview with local chief one Lebialem, 4 September 2018; interview with local chief two, Lebialem, 4 September 2018.

[26] The Montevideo treaty defines a state as an entity that has "a permanent population, a defined territory, government and the capacity to enter into relations with the other states" (Organization of American States [OAS] 2017). International relations further argues that sovereignty is critically important to statehood (Thomson 1995).

Competing Interest

The author has no competing interests to declare.

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