Engineering Peace and Security Interventions: Dynamics in Somalia

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Abstract—Peacekeeping and humanitarian aid interventions in Somalia have attempted to bring peace and stability to the country and region for more than twenty-five years. Different dynamics characterize four distinct phases of these interventions, determining the likelihood of conflict transformation. These dynamics display archetypal system behaviors representative of other persistent conflicts in Africa during the same time period. Field interviews combined with comparative statistics informed system models of conflict dynamics in Africa and Somalia. The models explored the relative impact of intervention feedback loops and key levers on potential for conflict transformation. It is shown that sustainable peace depends less on the appropriate sequencing of aid than on transparency, trust, and cooperation between various intervention actors and stakeholders to enable accountability at the local level. Technical innovations are needed to build transparency and trust between intervention stakeholders without increasing security risks. A potential solution is proposed that incorporates predictive analytics into peer-to-peer networks for monitoring interventions.

Keywords—peacekeeping; humanitarian aid; transparency; accountability; blockchain for peace; conflict persistence; conflict dynamics

I. Introduction

Even as the potential for great power confrontation has increased in recent years, violent civil conflict remains one of the greatest threats to human security and global peace. Persistent armed civil conflicts – those that have been active for twenty years or more with repeated cycles of violence and recurring civil wars– are the dominant form of armed conflict in the world today [1]. In Africa alone, more than 35 such conflicts continue to pose the utmost challenge for conflict resolution despite investments of over a trillion dollars in peacebuilding and foreign aid by the international community,[1] and the engagement of over 100,000 uniformed personnel in peace operations [2, 3]. These conflicts resulted in more than 65 million forcibly displaced persons worldwide in 2017 [4]. This record high is an increase of 20 percent from the previous year. [2]

Failures to transform conflict and achieve sustainable peace raise difficult policy questions of when and how aid and peacekeeping interventions can best achieve their objectives in conflict settings -- considering normative, material, economic, political and technical factors. The research described in this paper is motivated by three questions:

1. Are intervention failures due to unsuitable intervention policies, insufficient resources, the fundamental intractability of the conflicts, or some combination of all?
2. What are key levers that might change the dynamical responses to interventions and reduce the risk of failures?
3. How might engineering and technology enable these levers?

II. Intervention Theory and Practice

A. Peacekeeping and Humanitarian Aid in Conflict

Literature on humanitarian aid in conflict settings shows conditions under which the aid may support war instead of peace, and the implications for human security. For example, large quantities of fungible aid introduced in low-security settings are at high risk of being co-opted by combatants and increasing violence against citizens [5,6]. Unintended consequences of neutral aid (e.g., material support to alleged or potential terrorists or other combatants), has been shown to increase risk to refugees and promote arms races between combatants [7, 8]. Evidence also shows that both the anticipation of foreign aid and its sudden withdrawal may increase the risk of civil war onset and its persistence [9, 10, 11, 12]. These findings suggest that, at a minimum, absorptive capacity of aid recipients must be factored into the decision-making and programming of aid donors to reduce, rather than increase, risks in conflict settings [13]. However, as conflict persists, absorptive capacity is usually degraded, increasing the likelihood over time that resources are diverted, even as the need increases [14]. As a result, transparency of aid donations is recognized in theory as one of the factors necessary to reduce corruption and the empowerment of new conflict actors [15, 16, 17].

[1] Data on foreign aid investments in recurring conflicts in Africa compiled from AidData.org https://www.aiddata.org. Accessed May 2018.

[2] Data on displaced persons compiled from datasets of Internal Displacement Monitoring Center https://data.humdata.org/organization/international-displacement-monitoring-centre-idmc and 2017 annual report.

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The peacekeeping and peacebuilding literature suggest that sequencing of aid is critical – with emphasis on security measures (e.g., external military peace enforcement, peacekeepers, and police) to reduce violence between belligerents and protect citizens prior to a build-up of aid and development programs, conditional upon reform of government institutions [20, 21]. Neutral UN peacekeepers alone have been shown to be ineffective at reducing violence during times of active conflicts [21], requiring multi-lateral enforcement operations that include non-UN, third-party peace-making partners [22, 23, 24]. An important hypothesized causal mechanism for peace operations that do succeed in reducing violence is that they address the security dilemma by solving information and commitment problems for cease-fires and peace negotiations, and by reducing spoiler opportunities [25, 26].

While these theories are generally understood, pressures generated among the donor community often constrain strict adherence to the principles of security, transparency, accountability, absorptive capacity for humanitarian aid in conflict settings, with policy choices often conforming to the "least bad" principle rather than the "do no harm" principle. Moreover, research to advance understanding of how interactions between causal mechanisms in conflict that determine the success or failure of aid, on balance, to increase human security and resilience without contributing to the resilience of belligerents and exacerbating conflict has been hampered to date by two factors: (1) lack of longitudinal data of sufficient granularity and quality for comparative analysis, and (2) paucity of interdisciplinary research at the local level accounting for interactive affects between interventions of peace operations and humanitarian aid.

B. Need for a Systems Approach

Academic researchers, practitioners and policy makers alike recognize that a systems approach is critical to address research, doctrinal, and policy gaps. For example, the US Department of Defense (USDOD), European Union Military Commission (EUMC), the World Bank, the US Agency for International Development (USAID), United Nations Security Council (UNSC), and the United Nations Development Program (UNDP) have all called for more system-based approaches to doctrine, policy, and operations that account for interdependencies between different intervention vectors in conflict settings, as well as multiple levels of policy implementation.[3] Such an approach must consider not only the nature and context of the conflict, but also the scope, timing, and dynamic interactions among different modes and types of aid and peacekeeping interventions. Yet the right balance and coordination among security assistance, military peace operations, humanitarian relief aid, and long-term peacebuilding remains an elusive goal. As noted during the debate on United Nations Security Council Resolution for Conflict Prevention (UNSC 2171), system approaches are often at risk of being "little more than a thematic vision". [4]

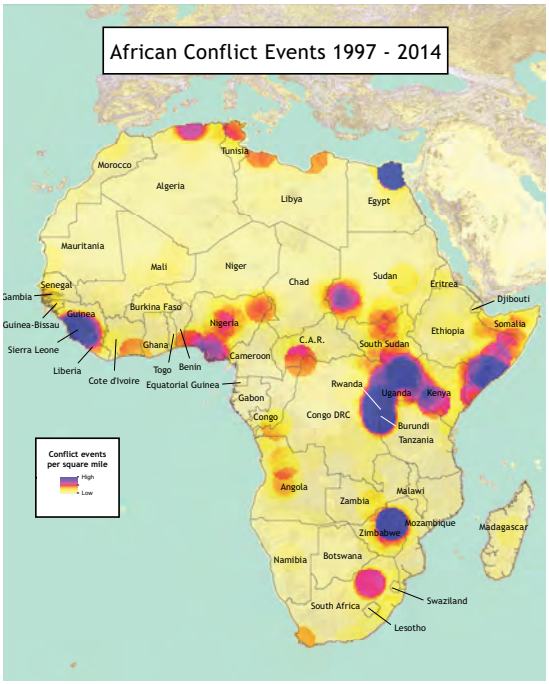

Fig. 1. Heat map of violent conflict events in Africa. Data Source: Armed Conflict Location and Event Database (ACLED Version 5. [27]

III. Research Methodology

Twenty-five years of data on thirty-five persistent armed civil conflicts in Africa between 1992-2017 (Figure 1) informed the creation of a systems framework to explain the relationship between conflict persistence and structural factors determined by the interactions of with conflict settings, peacekeeping and aid interventions. Statistical and system dynamic models based

[3] The *US Army Counterinsurgency Field Manual 3-24* calls for explicit consideration of interactions between peacekeeping, stabilization, and kinetic operations while prioritizing the security of citizens in order to defeat insurgents. In her foreword to the field manual, former US Deputy Assistant Secretary of Defense Sarah Sewall calls the systems approach contained therein a "radical departure" from previous military doctrine. The EUMC adopted a systems approach in its revised Concept for Military Planning of 2008, which calls for the integrated use of a wide range of tools across "institutions and policy areas that comprise political, diplomatic, economic, humanitarian, and military actions." Similarly, in adopting Resolution 2171, which pledges a systems approach to conflict prevention, the UNSC recognized in 2014 that early warning, preventive diplomacy, mediation, deployment, peacekeeping, disarmament and peacebuilding are "interdependent, complementary and non-sequential". *The World Development Report of 2011* notes that failure to address the security of citizens, justice, access to resources, and economic development with a systems approach results in repeated cycles of violence in fragile states and makes specific recommendations for layered approaches across multiple levels. Taking up this theme in 2012, the US AID hosted a summit on "Strengthening Country Systems" to explore ways to apply systems approaches being piloted by the Agency to the problems of aid effectiveness. More recently, UNDP Administrator Helen Clark highlighted the need for systems approaches in her speech at the High-Level Panel on Humanitarian Financing, July 14, 2015, "Building a New Vision to Address Long-term and Recurrent Humanitarian Crisis".

[4] Remarks made by Carolyn Schwalger, Deputy Permanent Representative of New Zealand at the 7247th meeting of the United Nations Security Council, "Speakers in All-Day Debate Cite Early Warning, Mediation, Cooperation with Regional Organizations as Effective Tools," UN Meetings Coverage and Press Releases, SC/11528, 21 August 2014. < http://www.un.org/press/en/2014/sc11528.doc.htm>, Accessed August 10, 2015.

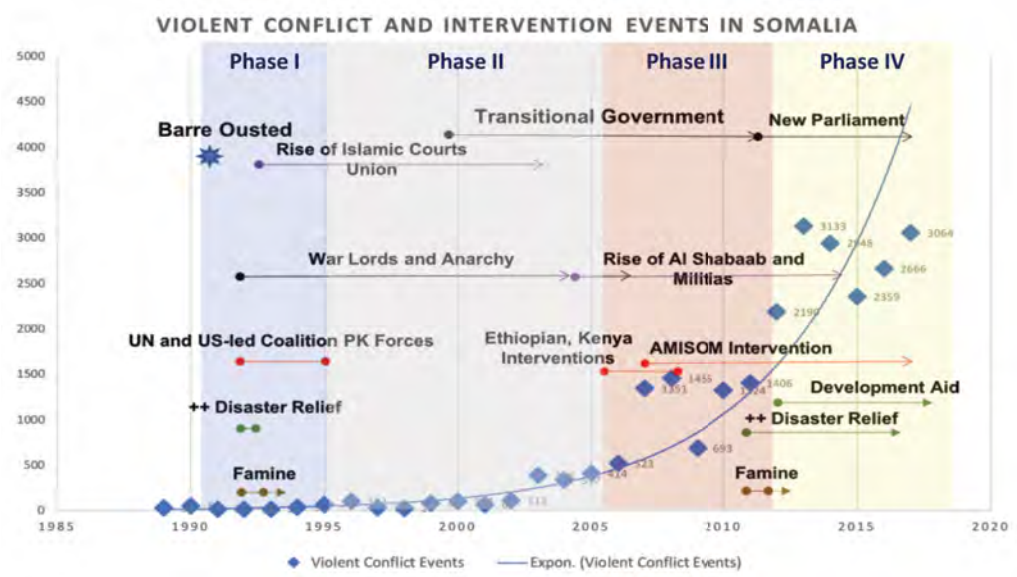

Fig. 2. Four intervention phases of Somalia conflict: (I) UN humanitarian aid secured by international task force; (II) No interventions; (III) Regional security interventions; (IV) Combined Regional security, UN peacekeeping, international humanitarian and development aid

on this framework were tested against four phases of the Somalia conflict from 1992-2017 (Fig. 2).[5]

The case study employed a mixed-method approach drawing on both sub-national (district-level) quantitative data and qualitative data from 100 field interviews in Africa, Europe and the US with government officials, Diaspora community, refugees, AMISOM peacekeepers, the African Union, UN, World Bank, and various NGOs. Combined model analysis revealed conflict dynamics and intervention levers most likely to result in conflict transformation that increases human security, and those intervention pathways most likely to sustain conflict.

IV. Results

A. Statistical Analysis: System Explanations and Key Levers

Longitudinal analysis of violent events in the African conflicts in Fig. 1 shows that the conflict dynamics map to four archetypal system behaviors (Figure 3): Exponential Growth; Sustained Oscillations; repeated episodes of Overshoot-and-Collapse; or Damped Impulse (an intense but limited stimulus followed by gradual decline). Moreover, the within-case study of Somalia suggests that these behaviors scale from local to state level [28]. From a system perspective, each behavior is characteristic of different underlying structural conditions in combination with resources within the system [29]. Once established, the behavioral dynamics become self-reinforcing and may dictate the likelihood of conflict persistence or transformation through interventions, where conflict persistence is associated with exponential and oscillatory behavior. In contrast, overshoot and collapse and/or damped impulse behaviors may lead to conflict transformation.

Regression analysis of over 800 observations across these 35 conflicts revealed that the prospect of conflict transformation depends strongly on two structural factors—opportunity costs of conflict and gender equality, in combination with processes by which external interventions are implemented. Specifically, the likelihood of successful conflict transformation is highest when accompanied by gender empowerment and implemented through transparent, inclusive mechanisms at the local level that provide accountability, that scale from local to national levels, and that ensure coordination between security and humanitarian operations [16, 28, 30, 31, 32]. Absent such mechanisms, resources provided through interventions may prolong conflict and human suffering rather than provide pathways for transformation [30, 33].

B. The Case of Somalia

Narratives from the field interviews in combination with district-level data informed model-building and analysis of conflict dynamics at the local level in Somalia. The analysis corroborates the macro-level findings from comparative statistical analysis. Security and aid interventions interact at local levels to reinforce conflict structures and capacities,

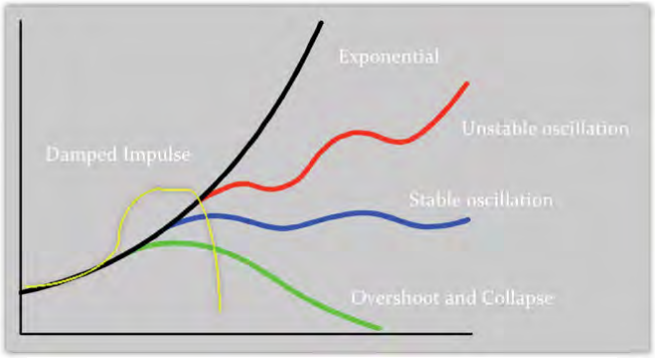

Fig. 3. Archetypal system reference behaviors

[5] In Phase I of the Somali conflict, UN troops provided humanitarian relief under the protection of UNITAF security forces. Phase II was characterized by limited humanitarian aid with no security or peace interventions by international or regional actors. Phase III was characterized by limited humanitarian aid and peacemaking interventions from Ethiopia, Kenya, and the UN-sanctioned African Union Mission in Somalia (AMISOM). Phase IV has been characterized by large infusions international aid with security provided by continued AMISOM operations.

consistent with previous literature. A dominant driver is the increased demand for security to protect aid workers and prevent cooptation by combatants when delivering humanitarian aid in conflict settings. Security providers subsequently become endogenous to the conflict and may even contribute to the resilience of combatants [19, 28, 34]. Conflict transformation must account for, and interrupt, these dependencies and other unintended consequences that include:

- Local economies become dependent on conflict-driven demands for security measures to protect aid. The creation of "security-entrepreneurs" among local populaces has been a repeated programming challenge for NGOs and peacekeeping operations in East Africa during Phase III and IV [28, 36]. These dynamics are shown in Figure 4.[6]
- Competing "war lords" emerge to oversee aid distribution. The empowerment of rival warlords in Somalia to help with UN aid delivery significantly increased the intensity and duration of violence in Phase I and Phase IV. The same dynamic has been seen in Liberia and the Democratic Republic of Congo [28, 32, 37].
- Communities become isolated and vulnerable in humanitarian deserts in the wake of limited peacemaking operations that may drive combatants out, but not away [38]. Combatants profit by imposing road taxes ("zaqat") where they control access of aid workers to the communities. This has been a common practice by Al Shabaab in Somalia during Phase IV (Figure 5). Combatants in Syria commonly use this tactic.

Conflict intervention policies have shifted in recent years to address the failures and unintended consequences described above. The first shift is an increased emphasis on development

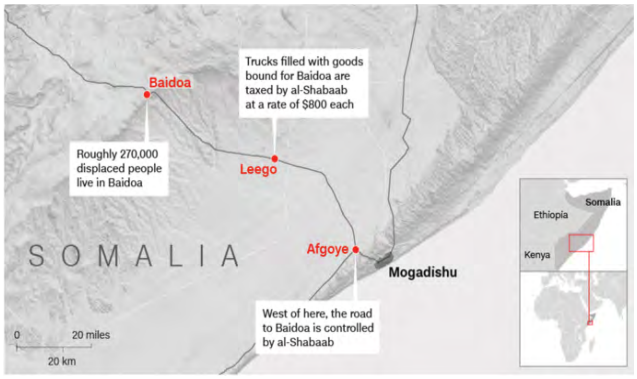

Fig. 5. Al Shabaab profits from peace operations in Somalia [39]

assistance as a means of conflict prevention. The second is increasing the use of NGOs as the vehicles for aid delivery in conflict settings, with an emphasis on building absorptive capacity at local levels, working through civil society organizations. The third is donor emphasis on local community priorities and resilience for aid programming in conflict settings, and less on state-level metrics of development. Finally, multidimensional peace operations are increasingly deployed in active conflicts, including those that involve regional organizations (such as the European Union or the African Union Mission in Somalia, or AMISOM) and coalitions (such as the Economic Community of West African States, or ECOWAS) for peace enforcement activities as precursors to UN peacekeeping operations.

Evidence from Somalia suggest that results are mixed at best. Both the peacekeeping and humanitarian aid communities rely on normative and operational principles of neutrality and security that are usually contradictory to objectives of structural

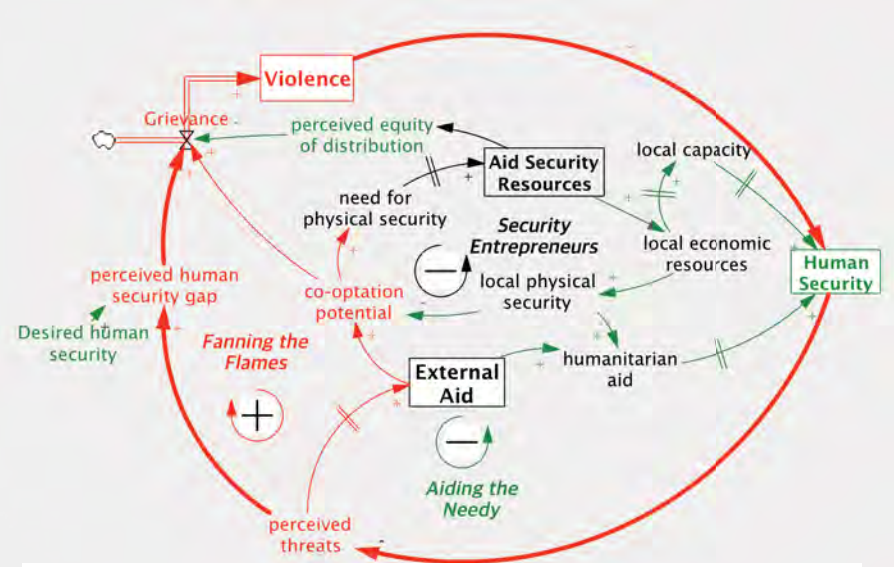

Figure 4 Economic dependence on aid security creates Security Entrepreneurs

[6] The model in Figure 4 is a Causal Loop Diagram (CLD) of system dynamics based on interactions (flows) between variables. The polarity of the arrows leading into a variable indicates an increase (+) or decrease (-) that occurs in that variable based on an increase in the amount of the proceeding variable. Hash marks on an arrow indicate a delayed response. Feedback loops, indicated by clockwise or counterclockwise circles, are the consequence of closed chain of forward-directional links between variables, and also have positive (reinforcing) or negative (balancing) polarity. The dynamic behavior of the system as a whole – i.e., exponential, oscillatory, overshoot and collapse, or damped impulse – depends on the relative strength and polarity of the feedback loops and delays.

change, and rarely achievable to the ideal desired. As a result, interventions fail to create sufficiently strong levers to balance the conflict reinforcing feedback structures that perpetuate the conflict and dependency traps in Figure 4.

V. Implications for Peace Engineering

A. Transparency for Local Accountability

Transparent and inclusive mechanisms to balance competing interests in how aid and security interventions are implemented at the local levels are minimum requirements to resolve this dilemma. However, transparency mechanisms in regional peacekeeping organizations, as exemplified by AMISOM, are most often minimal to non-existent. Transparency within the aid community active in conflict settings also varies widely. Reporting mechanisms for official development assistance by government donors and major NGOs are robust and increasingly accessible to the public for monitoring, research, and policy planning. However, these mechanisms lack transparency beyond the first level of donors and providers, who increasingly push funds down to lower levels through civil society NGOs and other domestic actors. These funds are extremely difficult to quantify and track within the community.

To be effective in shifting conflict dynamics, inclusive mechanisms must empower the local populace to hold their leaders accountable. For example, transparency can increase the variable, *perceived equity of aid distribution* and decrease *co-optation potential* shown in Figure 4 for how the stock of *External Aid* is received and managed. To be effective at shifting conflict dynamics, these mechanisms must also reduce amounts necessary to be expended on the variable, *aid security resources*, increase support to the stock of *Human Security,* and reduce the overall power of the *Security Entrepreneurs* loop.

B. Engineering Solutions

Modeled after other peer-to-peer networks [40], distributed blockchain frameworks for public-private identity and protected, collaborative data exchanges might provide engineering solutions implemented on apps using trusted mobile networks. There are some indicators of movements in this direction for international humanitarian aid delivery outside of conflict settings. The Overseas Development Institute of the United Kingdom (UK) developed a networks functions approach (NFA) for advising and training the aid sector for disaster settings more than ten years ago [41]. However, at the time, technologies did not exist to overcome operational challenges. More recently, the UK Department for International Development (DIFD) commissioned a study by the GSM Association (GSMA)[7] to study how blockchain platforms can "improve people's access to sovereign identities, bring new levels of transparency to the distribution of international aid, and improve the efficiency of humanitarian cash transfers" in support of the UN Sustainable Development Goals [42]. The GMSA study provides evidence that blockchain technologies could help to resolve challenges in delivering humanitarian aid in non-conflict settings (such as disaster relief or development) while providing Mobile Network Operators (MNOs) with new opportunities. However, the GMSA also cautioned that a clear value proposition for the MNOs could not yet be established.

C. Implementation Challenges

Challenges for implementing such a system in conflict settings are many - including security risks at levels not present in disaster or development scenarios. Concerns include what people might do with information, and how to protect those who provide information. Layered security should incorporate three complementary components: procedures and practices, network security technologies, and tracking technologies. Existing monitoring and evaluation principles and best practices during humanitarian emergencies could contribute to conceptual designs of the overall system [43, 44]. Technologies for network security should be incorporated to detect threats to peer-to-peer networks, protect against malicious uses, and address privacy concerns [45]. Technologies for tracking and monitoring humanitarian aid in insecure environments should be incorporated into the network data system and made available under appropriate protocols for sharing with the local populace. These include mobile phones (under appropriate conditions); digital data entry with smartphones; remote sensing with satellites, radars, or UAVs; location tracking (e.g., GPS/barcodes); radio programming and online platforms [46]. On-board predictive analytics using machine learning based on voluntarily shared security information from peacekeepers and crowd-sourcing could augment monitoring capabilities (similar to current traffic monitoring apps, such as WAZE).

D. Opportunity for Change

Cultural resistance within donor and recipient communities may also challenge implementation of such a system. However, the aid community is in the midst of significant changes in thinking about aid delivery from the local to the national and international levels. For example, in the New Deal Compact of 2012,[8] international donors and aid recipients in Fragile States agreed to core principles of transparency, coordination, equitable access, and inclusivity for aid delivery [47]. This compact has been implemented in Somalia but with limited success [48]. Key challenges have been the lack of coherency among humanitarian and development efforts, corruption, lack of involvement of the private and civil sectors, and lack of real engagement with Somalis [49].

In spite of cultural challenges, both old and new players in the aid delivery system are calling for programming designed using "on-the-ground" perspectives, by guided by principles that overcome fragmentation and volatility that leads to uncertainty and ambiguity [50, 51, 52, 53]. These new approaches are being actively discussed and debated by the international community, providing timely opportunities for technology innovation and policy changes to come together for the advancement of peace.

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[7] The GSM Association (GSMA) is an industry organization representing the interests of mobile operators worldwide, uniting more than 750 operators with over 350 companies in the broader mobile ecosystem.

[8] The New Deal Compact is a key agreement between fragile and conflict-affected states, development partners, and civil society to improve the current development policy and practice in fragile and conflict-affected states. It was developed through the forum of the International Dialogue and signed by more than 40 countries and organizations at the 4th High Level Forum on Aid Effectiveness on November 30th 2011 at Busan, Korea.

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