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## **The Security Fragility of State and Social Exclusion in Developing Countries: Can ICT Mitigate These Effects?**

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### **Abstract**

Social exclusion is a major concern in developing countries and is the subject of a complex and non-consensual literature. In this article, we examine the effects of internal and external conflicts on social exclusion in developing countries (DCs), as well as the role of ICT as a moderator and mediator of the conflicts on social exclusion. Using a sample of 66 developing countries, we specify and estimate a dynamic panel data model by the System-Generalized Method of Moments (S-GMM) over the period 2001-2019 with specific Sobel tests and alternative Delta and Monte Carlo tests : Two main results emerge. Firstly, both internal and external conflicts contribute significantly to increasing social exclusion in DC's. Secondly, the results of the mediation analysis show that the effect of conflicts on social exclusion is fostered by the Information and Communication Technologies (ICT) diffusion channel, in particular ICT quantity and quality in DC'. In this wake, our results show that external conflicts strengthen social inclusion and are therefore considered a factor of rapprochement, social cohesion and opportunity. However, we suggest in addition to the quantitative and qualitative amelioration of technological infrastructures, the consolidating strategies for mitigating interand intra-country conflicts, favorable significantly reduces social exclusion and economic resilience in DC. Furthermore, strengthening the regulatory framework as well as the use of ICT and the promotion of a digital culture, along with measures against discrimination, social welfare instruments supporting income, health, and employment are essential to mitigate the rise of disintegration and marginalization in developing countries.

**Keywords:** Conflicts, Social Exclusion, ICT, Mediated Effects, S-GMM. Transmission Channels,

**JEL codes:** O11; Q 47; 11; P48



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## 1. Introduction

Social exclusion is currently experiencing a resurgence in popularity due to pressures from forces such as neoliberal policies, the privatization of public services, the reduction of social protection programs, economic changes, political instability, external and internal conflicts, climate change, the global movement of capital, and deindustrialization. (Ben Brik and Brown, 2024 ; Khine et Langkulsen, 2023 ; Bidandi et al., 2021 ; Cano-Hila (2022)). The inclusion of the excluded from the world is becoming increasingly essential for the well-being of socially marginalized groups, especially after the global financial crisis of 2007-2009 and COVID-19 hit the world with such intensity, disrupting the functioning of our nations and the future of the planet (Kiaga and Leung, 2020). Today, it is estimated that between 2.33 and 2.43 billion people, or 32% of the world's population, are at risk of social exclusion and stigmatization. The regions of South Asia, East Asia, the Pacific and sub-Saharan Africa each have 1.3 billion people, including 840 million in India and China, while 52% in Africa, where extreme poverty rose from 655 million to 711 million between 2020 and 2021, and will rise to 786 million in 2022 (World Bank, 2023). Without claiming to be exhaustive, in light of these statistics, three major justifications are put forward: Firstly, the recurrence of major economic and social crises and challenges such as recession, unemployment, dysfunctions in the labor market, regional disparities, growth of budget deficits and the balance of payments, inflation, the digital divide, and high external public debt which make economies very fragile and less competitive have profoundly affected the stability of states and markets in developing countries. (Asaloko et al. 2025 ; Yamben and Tenlep, 2025 ; Hmida, 2021). Secondly, most of the countries that are socially excluded are found in developing countries where institutional failures, labor market instability, and public choices have encouraged the escalation of conflicts and social exclusion (Song et al., 2024 ; Munck, 2012). Thirdly, conflict situations in developing countries generally lead to the creation of new social norms that reinforce the concentration of power and restrict individual freedoms by generating new types of conflicts that amplify the exclusion of populations, and this constitutes one of the main political challenges of the 21st century (Ferraro et al.2021).

Long ignored by traditional economic theories, social exclusion is a relatively new concept, which emerged as a new paradigm in the 1990s in poverty studies in Europe (Munck, 2004).The author of the term, René Lenior, listed the following people as constituting the "excluded": "the mentally and physically handicapped, elderly invalids, abused children, drug addicts, delinquents, single parents, households with multiple problems, marginal and asocial people, and other social 'misfits'" (Bakker and Van Vliet, 2022; Atkinson and Marlier, 2010; Townsend, 1997). The theoretical literature highlights the multidimensionality of the problem, that involves economic, social, political and cultural aspects of disadvantage and deprivation, resulting into limited access to employment, social services and community life (Kammerman 2005). Later, with the intensification of social problems in the peripheral areas of major French cities, the definition was expanded to include disgruntled young and isolated people. Therefore, social exclusion is closely linked to a French tradition, where "social density" is seen as essential to maintain social cohesion in society (Burchardt, 2000 ; Silver, 1994). Mingione (1993) defines social exclusion as the dislocation of social networks and the fragmentation of society, to which are added the heterogeneity of values and dominant representations, the difficulty of establishing other poles of assembly and spaces of identification. Bhalla and Lapeyre (1997) argue that "social exclusion overlaps with poverty defined broadly, but goes beyond by explicitly integrating relational as well as distributional aspects of poverty" (p.413).

Thus, the theoretical imprecision of the concept derives from the use of the terms 'relative' and 'relational'. Amartya Sen (2001) precisely highlights this point in his own interpretation of social exclusion. However, he argues that through relationality, social exclusion constitutively describes an aspect of capability deprivation and instrumentally causes other diverse capability failures. Schulte (2002) discusses social exclusion within the framework of rights, viewing it as the denial of a complete set of rights designated by the concept of social citizenship. Beall and Piron (2005) propose a concise definition of social exclusion as 'a process and a state arising from exclusionary relations based on power that prevents individuals or groups from fully participating in social, economic, and political life and asserting their rights' (p.9). Stewart et al (2006) define it as a concept "used to describe a group, or groups, of people who are excluded from the normal activities of their society, in multiple ways" (p.4). Kabeer (2006) considers social exclusion as an analysis of processes of disadvantage, although this is done exclusively through the lens of identity-based discrimination. According to Walsh et al. (2017) as well as Moffatt and Glasgow (2009), social exclusion is a dynamic and multidimensional process that involves the separation of individuals and social groups from the rest of society. It also discourages virtuous pro-social behaviors, hinders individual self-regulation, and thereby breaks the established links between social groups and institutions. By nature, social exclusion deleteriously effects socially marginalised groups, such as older adults (Nyqvist et al., 2021), people in workfare or public works programmes (Girardi et al., 2019 ; Gubrium et al., 2017), children (Gross-Manos, 2017 ; Koller et al., 2018), people who live in rural areas (Walsh et al., 2020), and those with developmental disabilities or mental illness (Koller and Stoddart, 2021). Silver (1994) posited three paradigms of social exclusion observed in social inclusion regimes-solidarity, specialisation,

and monopoly. The solidarity approach draws on French Republican thought and attributes social exclusion to the breakdown of social solidarity, the specialisation paradigm draws on Anglo-Saxon notions of social differentiation because of individual specialisation in the labour market, and the monopoly paradigm views exclusion as a result of hierarchical group monopolies and their exertion of power through class and status that are remedied through social citizenship. In 2001, the emergence of a new approach, such as that of Levitas et al. (2007), proposed seven dimensions of social exclusion : economic, social, political, neighborhood, individual, spatial, and group.

In an alternative conceptualization, the Centre for Analysis of Social Exclusion at the London School of Economics identified four dimensions of social exclusion : lack of consumption, lack of production, lack of engagement, and lack of social interaction (Burchardt et al., 2002). However, all these failures to integrate into a society develop a particular type of relational conflict that can lead to social unrest, violence, social anomie, environmental degradation, as well as the formulation of new social norms aimed at promoting institutional arrangements (Magazzino et al., 2021a, Collier, 1999, Sen, 2000, Piketty, 2014).

The definition of fragility differs from one source to another. According to the Organization for Economic Co-operation and Development (OECD, 2018), fragility is an unsuspected multifaceted disease, arising without an immediate curative mechanism. A state is fragile when the government and state authorities do not have the means and/or the will to ensure the safety and protection of citizens, to effectively manage the public affairs and poverty alleviation. From the end of the Cold War, the concept of "fragile state" or "failed state" was used to characterize countries facing hunger, war and extreme impoverishment of the population. Since the September 11, 2001 attacks in the United States orchestrated by the islamist movement Al-Qaida, its meaning and perception have evolved considerably, designating, according to the African Development Bank (AfDB, 2014, p.16), "a situation at high risk of institutional collapse, social fracture, breakdown of the social contract or violent conflict". While the French Development Agency (AFD) and the World Bank (WB) discuss economic and environmental indicators to which social violence is added, the Fund for Peace (FFP) breaks them down into five dimensions: economic fragility, approximated by countries' economic efficiency and taking into account GDP per capita, the share of manufactured exports, net oil production or consumption, and fluctuations in commodity prices, among others. Political fragility, approximated by political regime, political instability, democracy, autocracy, ethnicity; social fragility, calculated using the human development index, protection of human capital, level of education, level of life expectancy, among others: Security fragility, measured by the number of civil wars and armed attacks, terrorist attacks and Environmental fragility is approximated by climate change, air quality and drinking water supply rate (Avom et al., 2021) are the main factors of State fragility.

The literature on State fragility regularly raises the issue of observed growth discontinuities and the resulting welfare deficit (Judson and Orphanides (1999). McKay and Thorbecke (2019) highlight the interrelationship between economic fragility and development. Focusing on the causes of political fragility, Dunne and Tian (2019) discuss the triggering and/or amplifying role of armed conflict in reducing countries' economic resilience and social fragility. In this approach to conflict, Ünver and Dođru (2015) identify eight explanatory factors for economic fragility. However, Macedo et al., 2018, based on a study conducted in Brazil, show that environmental fragility is the manifestation of human action, natural disasters, uneven terrain and irregular rainfall due to climate change. The controversial results can be explained by the different characteristics of the study areas, the measures of fragility used, the econometric approach adopted, and so on. In the empirical literature, social exclusion is generally explained by the varied and often interconnected causes giving rise to three main sources: economic explanations, including poverty and chronic unemployment, which are major contributors, and social factors such as cultural norms and discriminatory practices (Meierrieks et Schneider, 2021 ; Duclos et coll., 2011 ; Sen, 1998 ; Lachaud, 1993), and non-economic explanations, notably political, legal, educational and institutional factors (Barro, 2000; North, 1991). Finally, information poverty. With regard to the economic factors of exclusion, three approaches emerge overall: that which considers social exclusion to be a situation of lack of income, of personal will, and that which considers it to be a deficit in human capital in terms of skills or a lack of capabilities relating to segregation (WB, 2016; Sen, 1994). As for the non-economic factors that explain social exclusion, opinions differ and three observations stand out. Firstly, a political explanation relating to questions of governance, public choices and the type of political regime (Ordóñez and Sánchez (2017). Secondly, there are historical factors, in particular the colonial legacy, cultural factors in terms of cultural constraints and inequalities relating to the ineffectiveness of public policies (Absolon, 2016), and finally, the environmental dimension, in particular with regard to the Sustainable Development Goals. In a contemporary approach, social exclusion results from market failures, the quality of institutions, globalization, ICT, and the establishment of new social norms that require the concentration of power and the restriction of individual freedoms. This, in fact, reinforces social exclusion based on deprivation norms and the absence of capacities that

also generate conditions in which violent internal conflict can emerge. (Wotherspoon, 2018 ; Khine et Langkulsen, 2023 ; Munck, 2012 ; Piazza, 2021 ; Ajide, 2021).

Given the interest generated by the diversity of measures used based on these determinants, the impact of state fragility as a source of social exclusion remains insufficiently documented in developing countries. Thus, the interest in investigating the social exclusion of States security fragility perspective is justified by two complementary explanations. Firstly, most of the countries that demonstrate social exclusion are developing countries. Secondly, the spread of state security fragility increases sharply in developing countries, and is now higher than the global average (ICRG, 2021). For example, statistics on external conflicts increased from 356 in 1990 to 470 in 2019, including 143 cross-border conflicts, 139 foreign pressures and 188 wars. During the same period, internal conflicts increased from 292 to 409, including 164 civil wars, 122 civil disorders and 123 terrorist acts (International Country Risk Guide, 2021). If this trend continues, it is estimated that there will be 480 and 420 internal and external conflicts by 2025 that will increase the social divide and the number of excluded people (ICRG, 2021). In any case, the effects of State fragility on social exclusion are undeniable and controversial due to differences in econometric methodologies, geographical area and time horizon. The need to address the major challenges related to security fragility has led to a new conception of states. These challenges are taken into account in the Sustainable Development Goals (SDGs), in particular SDG-16 on "*Peace, justice and effective institutions*" and the new knowledge economy driven by ICTs. Despite the risks, ICTs offer opportunities to mitigate the security fragility of States. However, the spread of communication networks, the Internet of Things (IoT) and Big Data are all having an impact on countries' current and future security. However, advances in artificial intelligence have distorted conflicts and reshaped the threats posed by state and non-state actors. The effectiveness of cyber-attacks, physical attacks and biological attacks is strengthened by making them more precise and harder to trace. The avalanche of ICT-related threats poses a serious threat to security, illustrated violent conflicts, forced migration, investment crowding, uncertainty, vulnerability, crime, economic downturn (Triki et al., 2022) are all factors that explain social vulnerability as well as social exclusion. However, The optimistic approach, emphasizes beneficial effects such as inclusive policies, consolidation of state commitments, opportunities for progress and more creativity (Gross, 2002).

Empirical evidence, both micro and macroeconomic, indicates that social exclusion associated with better dissemination of ICTs and social media (Guo and An, 2022 ; Zeitzoff, 2017) remains unconsensual. Because, globally, ICTs and social media can be a tool for inclusion that facilitates the potential for people from all over the world to connect. Then, several studies have shown that ICT can provide marginalized and poor communities with access to much-needed education and public services – including financial services, or through social exclusion, in particular through a new form of exclusion for people who are unable to connect with or adapt to new technologies. Overall, in a contemporary approach, digital exclusion is suffered by those unable to benefit from ICT. Similarly, those who cannot access technologies are disadvantaged, marginalized in society according to how they are used. In this vein, previous studies have demonstrated that social exclusion can significantly and positively predict individuals' motivation and social media use behavior (Asongu et Roux, 2017). Thus, the emergence of ICTs brings new forms of exclusion. In this wake, Pradham et al. (2016) found that the penetration rate of optical fiber by implicitly improving economic growth induces social exclusion and risks of conflict between countries. Endeed, the relational understanding of the interaction between ICTs and security fragility incorporates technological determinism, futurism and the digital economy that reinforce the ideals of peace, transparency, equity and social cohesion. ICTs help ensure the inclusion of marginalized people through political inclusion, support for people with disabilities, health systems and e-governance, among others (Smith et al. 2011).

The consolidation of theoretical milestones to identify the nature, manifestations, and causes of social exclusion has fostered the emergence of a set of theories: social conflict theory argues that society is composed of different social classes, each with its own interests and objectives. These classes are constantly in conflict with one another as they compete for power, resources, and influence (Karl Marx, 1857). The theory of social regulation helps to understand the ways in which social obligations are constructed to which individuals submit, given that these social rules are the endogenous product of their relationships (Reynaud, 1997-1999). The theory of social action (Silver and Chambre, 1995) structured around the theory of solidarity in relation to public development aid. Human capital theory, discrimination theory and capability theory. Next, the theory of informational poverty, Rostow's modernization theory (1960), and the digital divide theory (Dlodlo, 2009) are constantly cited to explain the growth of the informal sector along with its corollary of increasing economic inequality and political instability. Real conflict theory (Sherif 1966) emphasises the fact that the information received via ICTs is processed and used to carry out tasks linked to terrorist acts that reinforce social fragility (Wolff, 2018). Finally, theory of social identity, theories of radicalization and the theory of self-categorization.

In view of the existing theoretical framework and inspired by new methodologies, the objective of this article is to assess the direct and indirect effects of security fragility on social exclusion index. Four contributions emerge. The first contribution relates to the relevance of the Social Exclusion Index used. The second contribution, we decline the States' security fragility by internal conflicts which include civil wars, civil disorder and terrorism on the one hand, and external conflicts which incorporate cross-border conflicts, foreign pressures and wars on the other hand. The third contribution is specific to the identification of the transmission channels through which ICT quality and quantity reduce social exclusion. Fourthly, taking into account the striking rarity of studies, we use mediation analysis to determine the level of involvement of each transmission channel in mitigating security fragility. Given that sustainability, inclusivity, and the digitization of processes amplify the digital transition through the adoption and dissemination of ICT, this leads to the problem of security fragility. Nevertheless, developing countries continue to adhere favorably to global calls through the actions on peace building and security of the United Nations, which contribute to the Sustainable Development Goals (SDG), notably to SDG-9 and SDG-16.

Considering a sample of 87 countries over the period (2000-2020), we specify and estimate a dynamic panel data model using the Generalized System Moment Method. Two main results emerge. Firstly, both external and internal conflicts increase social exclusion, although this effect is nuanced according to the type of conflict. Secondly, the analysis of transmission channels shows that the effect of conflict on social exclusion is mitigated, in particular by the quantity and quality of ICTs.

The rest of the article is organized into four additional sections. The second presents a selective review of the state of the art. The third describes the methodology adopted. The fourth discusses the results. A conclusion suggests some policy recommendations.

## **2 Synthesis of the state of the art**

This section describes the analytical framework useful for understanding the theoretical anchoring of social exclusion. It also provides an empirical synthesis of the direct effects of security fragility of State and the transmission channels that transmit the effects of security fragility of State on social exclusion.

### **2.1. Theoretical synthesis of the effects of security fragility of State on social exclusion:**

Without claiming to be exhaustive, the theoretical anchoring of the effects of security fragility of state on social exclusion is explained by two groups of theories. On the one hand, there are traditional theories that integrate the theory of social conflict associated with Marxism, which thus considers that dissensions and conflictual relationships are constitutive of social order. Every society is made up of antagonistic interests, divisions, and tensions that do not necessarily result in declared struggles. The theory of social regulation posits the existence of a plurality of legitimate regulatory sources, which helps to understand how they form, oppose or combine and interact to shape social relationships. The theory of social disorganization by referring, for example, to the Great Depression of 1929 which will completely disorganize the economy and society, Social theories that explain social exclusion as the result of social inequalities, the withdrawal of which from social life combines individual internalization of ambient social norms and lack of access to regular means of social integration, Theories related to the stigmatization of a category of individuals from the Chicago School of Sociology, which shows that categorization by devaluing representations discredits individuals and their groups by stigmatizing them in three domains such as bodily anomalies, character deviance (drugs, alcohol, delinquency, homosexuality) and collective attributes (race, nationality, religion), communication theory (Shannon, 1948), cybernetic theory (Wiener, 1948).

On the other hand, modern theories that integrate modernization theory (Rostow, 1960), Merton's anomie theory (1976), information poverty theory (Chatman, 2000), and digital divide theory (Dlodlo, 2009) As well as economic theories. The theoretical underpinnings provide a glimpse of the economic theories that explain social exclusion. The theory of real conflict (Sherif, 1966) bases social exclusion on a hierarchical conception of society, according to which different classes and social groups compete for control of resources in a context of resource scarcity as explained by the marginalist theory of utility. This led to the emergence of the economics of crime and the economics of conflict, as developed by Haavelmo (1954) and Grossman (1995). Grossman and Haavelmo extended the debate, leading to two opposing views. On the one hand, the pessimistic view, which emphasises the contribution of security fragility to the increase in poverty, inequality, migration, crime, economic instability, the destruction of infrastructure, the spread of uncertainty, transaction costs and capital flight (Collier, 1999). On the other hand, there is the optimistic view, which emphasises the consolidation and strengthening of the role of the state in protecting citizens and economic territory (Blattman and Miguel, 2010). The theory of informational poverty, which is constantly mentioned, explains social exclusion based on the expansion of informational asymmetries. The conceptual distinction between poverty and social exclusion results from this informational asymmetry. Poverty is defined as a distributive outcome, while social exclusion is

viewed as a relational process, with the particular characteristic of being dynamic and persistent (Silver and Miller 2003; Bhalla and Lapeyre 2004). The theory of Public Choice shows that the major choices of society are excluded from the responsibility of the people, since it is necessary to rethink the institutions and the mode of governance by relying in particular on incentives, market mechanisms and competition as the levers which the State can use to improve the efficiency and effectiveness of the provision of public services (Olson, 1962). Keynesian theory explains social exclusion on the basis of the insufficiency of effective demand, which symbolizes the lack of integration or unemployment due to a persistent insufficiency of effective demand, which it defines as the level of demand necessary to achieve full employment of resources. In this movement, the emergence and above all the important affiliation of the new Keynesians with behavioural economics, explains social exclusion as a distributional conflict which pits the holders of capital against the workers can be explained by three channels, in particular the expectations of economic agents, supply shocks due to environmental degradation or change, and finally, demand pressure through the unequal distribution of resources between individuals and groups. Social exclusion is justified by one or more breaks in the anchor points that determine integration.

The second group includes modern theories. Social action theory brings together four theories, notably solidarity theory, which sees social exclusion as the product of a breach of the social contract (Silver and Wilkinson, 1995). Human capital theory provides the main justification for the potential differences in productivity between men and women, in particular differences in participation in the labour market and in mobility rates between men and women may be reflected in differences in investment in human capital (level or type of initial education and professional experience), and therefore in productivity differentials. In addition, the human capital approach has been used to try to explain the phenomenon of occupational segregation (Becker, 1964). The theories of discrimination originally developed show that exclusion arises from differences between individuals in terms of their abilities, aptitudes and interests in the exchanges that take place within society and on the market. It is the result of individual choices, market failures, all forms of discrimination, failure to respect rights and contractual relations between social actors and institutions. They are structured around two main categories (Cain, 1986). On the one hand, theories based on discriminatory preferences in a context of perfect information following the work of Becker (1957). On the other hand, the model based on imperfect information, following Phelps (1972), bases the differences in treatment between men and women on differences in average performance relative to certain characteristics. Capability theory shows that the inequalities between individuals that are sources of social exclusion are not assessed solely in terms of their resource endowments, but also in terms of their ability to convert them into real freedoms. He thus introduces the notion of 'capabilities', which invites us to consider exclusion beyond the aspects of income and to think of it in terms of freedom of action, of capabilities to do things. From this observation, Sen (2001) identifies three trends to explain social exclusion: social exclusion related to a lack of potential, social exclusion related to a lack of opportunities and, finally, social exclusion related to a lack of accessibility. The theory of modernization by Rostow (1960) with the use in particular of modern tools, not only by States, but also by working groups to achieve their respective intentions. The theory of the digital divide (Dlodlo, 2009). In theory, the spread of misinformation through the dissemination of ICTs and social media is a significant source of conflict. These theories have helped to illustrate the conflicts that are constantly cited to explain the growth of disaffiliation and social exclusion.

## **2.2. Empirical synthesis of the effects of security fragility of State on social exclusion**

In literature, the direct effects of conflicts on social exclusion in terms of new social norms regarding regulation to shape social relations remain controversial. The concept of social exclusion and its multiple manifestations and drivers are the focus of a growing literature (Atkinson 1998 ; Sen 2000 ; Levitas, 2006 ; Hoff and Walsh 2018). While the economic analysis of State fragility was initially supported by theoretical work, it has gradually seen the development of a sparse, complex and non-consensual empirical literature. Collier (1999) and Thies (2005) found that security fragility, including internal conflicts and civil wars, encourages social disaffection and malaise in populations. Ndumbe and Cole (2005) and Buhaug and Gleditsch (2008) concluded that the security fragility of states increases the extent of marginalization and disqualification of populations beyond national borders through negative externalities that lead to an increase in illicit trade flows. Using data from 146 developed and developing countries over the period 1971-2012, Peksen and Early (2019) find that internal conflicts contribute positively to the growth of the informal economy, which is a source of low income and increased social exclusion. In the same vein, they found that security fragility is a central factor contributing to the spread of social exclusion, but above all a consequence of the new changes in contemporary societies as mentioned and incorporated in the Maastricht Treaty and its protocol. Some scholars who study causes of terrorism have long noted the broad impact of social exclusion and group-based conflict. Bonanate (1979), for example, described the organizational dimension of terrorism as stemming from social crises and popular discontent. Meanwhile, Crenshaw's (2000) seminal study emphasized the multiple levels of causation that may drive political violence. She highlighted the impact of "grievances among an identifiable subgroup" who may be

excluded from policymaking processes or suffer discrimination by the government. Dirk (2022), Sekrafi et al., (2020) found that the impact of terrorism on the economy has a negative bearing on the formal and a positive effect on the informal sector in African countries. Wei et al., (2023) using data on 429 observations from 62 countries over the period 2006-2017, found that State fragility significantly increases informal entrepreneurship. Recently, Shirodkar et al., (2024) considering a sample of 707 Indian firms over the period 2008-2018, and using generalised random-effect least-squares estimation, found that the institutional fragility of states increases the informality of firms, and in particular their internationalisation. Finally, research that investigates social exclusion also helps to elucidate the linkage between causes of security fragility and the justification for security fragility.

**Hypothesis 1:** Security fragility of State increases social exclusion

### 2.2.1. Empirical synthesis of the indirect effects of security fragility of State on social exclusion

Although the economic analysis of security fragility of State was initially supported by theoretical work, it has gradually seen the development of a sparse, complex and non-consensual empirical literature (Song et al., 2024; Moumié, 2021). One of the fundamental limitations of these studies is that they do not explore the transmission channels through which State fragility affects social exclusion. Based on the literature, we identify the diffusion of information and communication technologies (ICTs) as a potential channel for the effects of State fragility on social exclusion. Empirical investigations of the effects of ICT on security fragility are highly controversial. Two directions are considered in the literature. First, indirect effects through the work of Benson (2014) and Jefferson (2007) found that the use of ICTs contributes to the mitigation of internal conflicts, limiting civil unrest, civil wars and terrorist activities. In this perspective, Clemens and McKenzie (2018) conclude that conflicts increase the use of social media, as levers to amplify internal dissent, interfere in democratic elections, incite armed violence, recruit members of terrorist organizations or contribute to crimes against humanity. Second, drawing on the work of authors such as Zeitzoff (2017) and Zaidi (2012), as well as that of Klein (1999) and Vidal (1997), we conclude that ICTs are a means of forming new solidarities, helping to reduce disparities by reconstituting a relationship of social proximity. The diffusion of ICTs can accelerate bilateral trade, notably the improvement of productivity, the reduction of costs and Foreign Direct Investments attractiveness (Song et al., 2024). These technologies also help to bring together the players involved in social development by virtually creating new economic, social, cultural or political territories that not only strengthen financial inclusion but also, and above all, are a factor in integration rather than social exclusion.

**Hypothesis 2:** The effect of security fragility of State on social exclusion is mediated by the spread of ICTs.

Three observations emerge from this non-exhaustive summary of the state of the art. Firstly, research has focused more on investigating the direct effects of State security fragility on social exclusion. Secondly, very few studies have looked at the indirect effects, particularly the transmission channels. Thirdly, the non-consensual conclusions of the empirical work justify new investigations in a context of growing conflict, social interaction and State security fragility.

## 3. Methodological strategy

The methodological strategy is presented in four successive stages : the empirical model, the estimation technique, the endogeneity processing process and the data.

### 3.1 Empirical model

The empirical model is the result of a constellation of the work of Song et al., (2024), Hoffman (2006), Pizza (2021), Choudhary et al. (2020), who adopted specifications taking into account the social exclusion index. Its choice is justified by the fact that social exclusion cannot be explained by traditional models, but by a social exclusion model that would predict that State security fragility improvements should influence the three main dimensions of social exclusion according to Hilbert (2019). The reduced model is presented in the Equation (1) below :

$$Social\_exclusion_{it} = \alpha_0 + \alpha_1 StateSecurity\_fragility_{it} + \eta_i + \gamma_t + v_{it} \quad (1)$$

With the  $Social\_Exclusion_{it}$ , the column vector of the dependent variables integrates three majors components. Firstly, access to essential goods and services means guaranteeing the poorest access to water, electricity, education, health, medicines, knowledge as Hilbert (2019) points out. Secondly, access to employment. According to traditional analysis of the labor market, access to employment depends on job search behavior, salary distribution and the rate of arrival of job offers, in connection with the dynamism of the job market economy and the generosity of the unemployment insurance system. Thirdly, Access to opportunities

offered by States (Hilbert, 2019). Without claiming to be exhaustive, two justifications can be put forward. Firstly, the choice for us to use the Variety Democracy index (VDEM, 2019), which retains three dimensions of social exclusion, including poor access to public goods and services, employability and opportunities offered by the state, remains a precise and concise index as a good approximation of social exclusion in view of the complexity and scarcity of empirical work duly provided. Secondly, contrary to previous empirical evidence in developed countries, which seems to reduce the construction of the global social exclusion index to a region, a country or in developed economies through the relationships between poverty, deprivation, social exclusion (Paugam, 1995) or through a relative aspect or through a dynamic and cumulative process, or a "spiral of precariousness". A wide range of aspects of chronic deprivation, functioning, employability and/or dysfunction of the main social systems that should guarantee full citizenship (Tsakloglou, 2002 ; Sen, 1998). In developing countries, given the absence of a legal space that guarantees contracts, a rule of law that protects and strengthens property rights and, above all, with the SDGs relating to global calls taken into account through the actions of the United Nations in favour of the consolidation of peace and security, that contribute to the Sustainable Development Goals (SDGs), including SDG-9 and SDG-16.

The variable that explains interest, including the fragility of state security, is the column vector of the said variable, which includes two disaggregated indices. On the other hand, the internal conflict index measures the level of political violence in a country and its impact on the governance of the country. It incorporates three sub-dimensions : (i) the civil war ; (ii) civil disorders ; (iii) terrorism ; which are approximated by scores. On the other hand, the index of external conflicts represents the risk of a government against foreign pressures, which themselves can be nonviolent or violent. This index incorporates : (i) cross-border conflicts ; (ii) foreign pressures ; and (iii) war. The States security fragility Index provided by the International Country Risk Guide (ICRG). Measured by the number of civil wars and armed attacks, terrorist attacks. By considering all the indices, this study makes it possible to take into account the development realities of the countries which, for the most part, face armed conflicts, social inequalities and weak political alternation. The latter are calculated taking into account the principal component analysis and the geometric mean formulas. In addition, has three advantages. Firstly, it provides information about a fairly large panel of developing countries. Secondly, the time horizon of the index calculation extends in the long run. Thirdly, the indicators selected for this purpose are multidimensional.

ICTit represents the information and communication technologies of country *i* at period *t*. but used as technological channels. Four variables of interest are taken into consideration : (i) internet penetration measured by the subscription rate of the public population to the internet (% of the population for 100 peoples) ; (ii) the penetration of the mobile phone measured by the subscription rate to the mobile phone for 100 peoples ; (iii) the penetration of the fixed phone measured by the subscription rate for the fixed phone for 100 people. These last two variables illustrate subscriptions to a mobile public service that gives access to the Public Switched Telephone Network (PSTN) using cellular technology ; (iv) The broadband is measured by the number of fixed high-speed subscriptions for 100 peoples. Indeed, in the theoretical and empirical literature, two approaches are cited: the optimistic approach, which presents the positive effects of ICTs on the economic, political, social, environmental, security and governance levels. On the other hand, a pessimistic approach that considers ICTs as a factor of instability for peace, social cohesion and similarly, for inclusive and sustainable economic development.

X is the control vector consisting of the following variables :

- Real GDP per capita captures the standard of living of the population. According to Xu (2017), its increase increases the resilience of economies in the face of exogenous shocks, through a better distribution of property, and mitigates security fragility;
- Education is approximated by the number of high school students. it explains the ability to acquire and internalize new technologies (Anyanwu, 2014) whose effects improve productive efficiency, making growth sustainable and self-sustaining
- Unemployment refers to the inactive rate as a percentage of GDP. In the economic literature, unemployment is today a central problem for the majority of contemporary economies: whether they are followers of liberalism or

attached to the Keynesian model. Almost all countries face a situation of imbalance between supply and demand on the job market (Akerlof and Yellen, 1990).

- **Ethnic tensions:** Ethnic tensions generally arise from the most fragmented societies, particularly through differences in access to political and economic resources between groups. Ethnic divisions become conflictual when they coincide with socio-economic divisions. Ethnic mobilization results from inequitable access to power and resources, not from intrinsic hatred. For other countries, weak institutions, collective grievances and political terror are important factors fueling terrorism.

- **Corruption,** a governance variable, is calculated by the World Bank (WGI) according to citizens' perception of it. It is produced by the ICRG database. This variable is continuous and truncated, taking values between 0 and 6, 0 is for the country with serious corruption problems and 6 is for a country with no real corruption problems. So, for example, a score of 4 reflects very low corruption in the country in question.

- **Institutional variables** refer to the vector of control variables. Recent empirical analyses have generally taken into account three main measures of institutions. These include the quality of governance, including corruption, political rights, public sector efficiency, and regulatory burdens. The second is the legal protection of private property and law enforcement. Indeed, These are institutional variables whose objective is to create a legal space that guarantees contracts, strengthens property rights and good governance (North, 1991). Reduce transaction costs and risk, therefore, encourage official economic activities. Among these determinants we find: real GDP per capita captures the standard of living of the population. According to La and Xu (2017), its increase increases the resilience of economies to exogenous shocks, through a better distribution of assets, and mitigates security fragility.

$$\begin{aligned} Social\_exclusion_{it} = & \alpha_0 + \alpha_1 Social\_exclusion_{it-1} + \alpha_2 StateSecurity\_fragility_{it} + \phi_1 GDP/Capita_{it} \\ & + \phi_2 Education_{it} + \phi_3 Unemployment_{it} + \phi_4 Ethnic\_tens_{it} + \phi_5 ICT_{it} + \phi_6 Institutional\_var_{it} + \eta_i + \gamma_t + v_{it} \end{aligned} \quad (2)$$

$\eta_i$  and  $\gamma_t$  represent country and time fixed effects to control for unobserved heterogeneity respectively  $v_{i,t}$  refers to the error term. Where Indices i and t provide information about countries and periods.

The estimated models are specified below :

$$\begin{aligned} Social\_exclusion_{it} = & \delta_0 + \delta_1 Social\_exclusion_{it-1} + \beta_1 StateSecurity\_fragility_{it} + \beta_2 GPD/Capita_{it} \\ & + \beta_3 Eduction_{it} + \beta_4 Unemployment_{it} + \beta_5 Ethnic\_tens_{it} + \beta_5 ICT_{it} + \beta_6 Institutional\_var_{it} + v_i + \mu_t + \varepsilon_{it} \end{aligned} \quad (3)$$

The influence of interactive variables is taken into account in models below :

$$Social\_exclusion_{it} = \delta_0 + \delta_1 Social\_exclusion_{it-1} + \beta StateSecurity\_fragility_{it} + \lambda X_{it} + \gamma V_{it} + v_i + \mu_t + \varepsilon_{it} \quad (4)$$

Where V takes into account interactions illustrating the channels of transmission through which external and internal conflicts influence social exclusion. In order to highlight the transmission channel of the effects of ICT on State security fragility, we use as alternatives variables of interest, ICT quality and ICT quantity approximated by the number of subscriptions and ICT quality approximated by the average quality of subscriptions, and then include bandwidth in kbps.

The transmission variables are taken into account in Equations. (5) – (6) below :

$$\begin{aligned} \text{Social\_exclusion}_{it} = & \delta_0 + \delta_1 \text{Social\_exclusion}_{it-1} + \beta_1 \text{Exterconflict}_{it} + \lambda_1 \text{GDP/Capita}_{it} + \lambda_2 \text{Educ}_{it} \\ & \lambda_3 \text{Unemploy}_{it} + \lambda_4 \text{Ethnic\_tens}_{it} + \lambda_5 \text{Institutional\_var}_{it} + \gamma_1 (\text{External\_conflicts* ICT\_Qual})_{it} \\ & + \lambda_2 (\text{External\_conflicts* ICT\_Quant})_{it} + v_i + \mu_t + \varepsilon_{it} \quad (5) \end{aligned}$$

$$\begin{aligned} \text{Social\_exclusion}_{it} = & \delta_0 + \delta_1 \text{Social\_exclusion}_{it-1} + \beta_1 \text{Interconflict}_{it} + \lambda_1 \text{GDP/Capita}_{it} + \lambda_2 \text{Educ}_{it} \\ & \lambda_3 \text{Unemploy}_{it} + \lambda_4 \text{Ethnic\_tens}_{it} + \lambda_5 \text{Institutional\_var}_{it} + \gamma_1 (\text{Internal\_conflicts* ICT\_Qual})_{it} \\ & + \lambda_2 (\text{Internal\_conflicts* ICT\_Quant})_{it} + v_i + \mu_t + \varepsilon_{it} \quad (6) \end{aligned}$$

The Effects of the Sub-dimensions of Internal conflicts are taken into account in Equations. (7) – (8) - (9) and (10) below :

$$\begin{aligned} \text{Social\_exclusion}_{it} = & \delta_0 + \delta_1 \text{Social\_exclusion}_{it-1} + \beta_1 \text{Crossbord\_conflict}_{it} + \beta_2 \text{Foreign\_pressu}_{it} + \\ & \beta_3 \text{War}_{it} + \lambda_1 \text{GDP/Capita}_{it} + \lambda_2 \text{Educ}_{it} + \lambda_3 \text{Unemploy}_{it} + \lambda_4 \text{Ethnic\_tens}_{it} + \lambda_5 \text{Institutional\_var}_{it} + \\ & \gamma_1 (\text{Crossborder\_conflicts* ICT\_Qual})_{it} + \lambda_2 (\text{ForeigPressu}_{it} \text{ _conflicts* ICT\_Qual})_{it} + \\ & \lambda_3 (\text{War* ICT\_Qual})_{it} + v_i + \mu_t + \varepsilon_{it} \quad (7) \end{aligned}$$

$$\begin{aligned} \text{Social\_exclusion}_{it} = & \delta_0 + \delta_1 \text{Social\_exclusion}_{it-1} + \beta_1 \text{Crossbord\_conflict}_{it} + \beta_2 \text{Foreign\_pressu}_{it} + \\ & \beta_3 \text{War}_{it} + \lambda_1 \text{GDP/Capita}_{it} + \lambda_2 \text{Educ}_{it} + \lambda_3 \text{Unemploy}_{it} + \lambda_4 \text{Ethnic\_tens}_{it} + \lambda_5 \text{Institutional\_var}_{it} + \\ & \gamma_1 (\text{Crossborder\_conflicts* ICT\_Quant})_{it} + \lambda_2 (\text{ForeigPressu}_{it} \text{ _conflicts* ICT\_Quant})_{it} + \\ & \lambda_3 (\text{War* ICT\_Quant})_{it} + v_i + \mu_t + \varepsilon_{it} \quad (8) \end{aligned}$$

$$\begin{aligned} \text{Social\_exclusion}_{it} = & \delta_0 + \delta_1 \text{Social\_exclusion}_{it-1} + \beta_1 \text{Civilwar}_{it} + \beta_2 \text{Civildesorder}_{it} + \\ & \beta_3 \text{Terrorism}_{it} + \lambda_1 \text{GDP/Capita}_{it} + \lambda_2 \text{Educ}_{it} + \lambda_3 \text{Unemploy}_{it} + \lambda_4 \text{Ethnic\_tens}_{it} + \\ & \lambda_5 \text{Institutional\_var}_{it} + \gamma_1 (\text{Civilwar* ICT\_Qual})_{it} + \lambda_2 (\text{Civildesorder* ICT\_Qual})_{it} + \\ & \lambda_3 (\text{Terrorism* ICT\_Qual})_{it} + v_i + \mu_t + \varepsilon_{it} \quad (9) \end{aligned}$$

$$\begin{aligned} \text{Social\_exclusion}_{it} = & \delta_0 + \delta_1 \text{Social\_exclusion}_{it-1} + \beta_1 \text{Civilwar}_{it} + \beta_2 \text{Civildesorder}_{it} + \\ & \beta_3 \text{Terrorism}_{it} + \lambda_1 \text{GDP/Capita}_{it} + \lambda_2 \text{Educ}_{it} + \lambda_3 \text{Unemploy}_{it} + \lambda_4 \text{Ethnic\_tens}_{it} + \\ & \lambda_5 \text{Institutional\_var}_{it} + \gamma_1 (\text{Civilwar* ICT\_Quant})_{it} + \lambda_2 (\text{Civildesorder* ICT\_Quant})_{it} + \\ & \lambda_3 (\text{Terrorism* ICT\_Quant})_{it} + v_i + \mu_t + \varepsilon_{it} \quad (10) \end{aligned}$$

### 3.2. The estimation technique

Existing empirical evidence uses cross-sectional regressions. However, limits emerge, on the one hand, cross-sectional data do not allow solve the problems of endogeneity. In addition, most of the investigations are based on the econometric technique of Ordinary Least Squares (*OLS*), which although allows to have the general trend of the results, does not also solve the endogeneity (Legendre, 1805). To better exploit and take advantage of panel data, we use the Generalized Moments Method (GMM) whose estimator of the Generalized Timing Difference Method (GMM-D) was introduced by Arellano and Bond (1991), Arellano and Bover (1995).

Subsequently, Blundell and Bond (1998) refined the MMG-D estimator by developing the Generalized System Moment Method (GMM-S) estimator, which is more appropriate for solving endogeneity problems. The advantage of MMG-S modelling is that it allows to correct the endogeneity of the explanatory variables of interest and other explanatory variables. While the MMG S seems in theory to be more efficient than the MMG-D, it uses more instruments than the latter, which makes it particularly inappropriate when the individual size is small. However, the quasi-stationarity of the variables and the absence of autocorrelation of the residuals guarantee that these estimators are obtained. Given the increase in the flow of innovations, we cannot exclude the risk of measurement errors. Thus, this method was used because it is expected that there exists an endogenous relationship between explanatory variables and inequality measures. To overcome this econometric problem, instruments are introduced. The *S-GMM* has three advantages (Davidson, 2000): (i) firstly, in the presence of lagged variables, it produces unbiased, convergent and efficient estimators; (ii) secondly, it takes account of unobservable geographical factors, such as climate and openness to the sea, which may influence urbanization; (iii) lastly, it corrects for simultaneity bias between the variables of interest and the control variables.

The absence of autocorrelation in the residuals ensures that the estimators are unbiased. Although the measurements of institutional variables are objective, we cannot exclude the risk of measurement error. One solution is to introduce instruments and test their validity using tests envisioned by Sargan and Hansen (Roodman, 2009). Starting from the fact that it is the instruments, the first differences of the explanatory variables were used by their values lagging by at least one period in level. As for their level values, they are instrumented by the most recent first difference values. Also, the tests of model over-identification (Hansen test), error autocorrelation (*AR1 and AR2*), and Windmeijer (2005) correction were performed to validate the results of our specifications. The *S-GMM* estimation technique recommends the prior consideration of certain conditions. These include inter alia identification, simultaneity and exclusion restriction. Specifically, identification concerns variables that are suspected to be endogenous or that are predetermined. It has been proven that all explanatory variables are assumed to be predetermined (or assumed to be endogenous), while only time-invariant variables are assumed to be endogenous in the first difference. As a result, time-invariant variables years only influence the dependent variable social exclusion through the presumed endogenous variable fragility. In simultaneity situations, lagged explanatory variables are generally used as instruments for differences indicators. In addition, to assess the exclusion validity of instrument exogeneity, we rely on Hansen's test (Asongu et al., 2016a)

### 3.3. The data

This study covers a sample of 87 over the period 2000–2019. The choice of this period of study is due to the rise in power of egalitarian demands that have been observed since the beginning of the 1990s, which led to disputes over the imposition of democratic ideology in developing countries. However, these claims reached their peak following the attacks of September 11, 2001, in the USA, which subsequently led to the generalization of terrorist movements, as well as other geostrategic conflicts. The choice of the sample has been dictated by the availability of data, as well as the fragility that characterizes countries. Developing countries form a group of countries with fairly similar characteristics, in particular a low institutional quality which leads to a disconnection between the policies designed and their application. In addition, these countries have a population whose living conditions are precarious. Three fundamental reasons justify the variability of the list of developing countries : (i) the first deals with statistical indicators of underdevelopment ; (ii) the second reason is on the dominant features of underdevelopment and (iii) thirdly on the typology of developing countries.

Overall, the dataset comes from four main sources. The dependent variable it's obtained from the Variety Democracy (Hilbert, 2019). The interest variable is State security fragility it's obtained from the International Country Risk Guide (*ICRG, 2021*). The other variables come from the World Development Indicators (*WDI, 2021*) and Global Governance Index (*WGI, 2021*). The list of countries in the sample and the correlation matrix are presented respectively in table A2 in the appendix. Table 1 presents the descriptive statistics for the variables used. In general, the standard deviation is lower than the mean, suggesting a low dispersion of the variables in our sample. It is generally accepted that small fluctuations in the data lead to unbiased results. An analysis of the

correlation between the State security fragility index and the overall social exclusion index sheds some light. The average level of the overall index of social exclusion is 0.453, with minimum and maximum values ranging from 0.032 to 0.975. The average levels of the external and internal conflict indices are 9.527 and 8.571 respectively. This reflects the fact that in our sample the risk of State security fragility tends to be minimized. When we look at the various ICT indicators, their penetration levels are mixed.

**Table.1**

Descriptive statistics.

<i>Variable</i>	<i>Observations</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Minima</i>	<i>Maxima</i>	<i>Sources</i>
<i>Social_Exclusion</i>	1960	.453	.234	.032	.975	VDEM (2019)
<i>External conflicts</i>	1960	9.527	1.449	2.125	12	ICRG (2019)
<i>Cross border-conflicts</i>	1862	3.021	.657	0	4	ICRG (2019)
<i>Foreign Pressure</i>	1862	2.735	.716	0	4	ICRG (2019)
<i>War</i>	1862	3.777	.459	1.5	4	ICRG (2019)
<i>Internal conflicts</i>	1960	8.571	1.548	.417	12	ICRG (2019)
<i>Civil War</i>	1862	3.482	.697	0	4	ICRG (2019)
<i>Civil Disorder</i>	1862	2.478	.501	.5	4	ICRG (2019)
<i>Terrorism</i>	1862	2.643	.801	0	4	ICRG (2019)
<i>GDP/Capita</i>	1906	8.064	1.218	5.555	11.084	WDI (2021)
<i>Education</i>	1198	4.164	.526	1.78	4.951	WDI (2021)
<i>Unemployment</i>	1862	1.604	1.128	0	4	WDI (2021)
<i>EthnicTensions</i>	1960	3.839	1.338	0	6	ICRG (2019)
<i>lnICT_qual</i>	1620	20.384	3.468	10.396	30.924	Hilbert (2019)
<i>lnICT_quan</i>	1620	15.445	2.104	7.313	21.108	Hilbert (2019)
<b><i>Control_of_Corruption</i></b>	1843	-.481	.696	-1.869	2.326	WGI (2021)
<b><i>Government_Effectiveness</i></b>	1843	-.396	.733	-2.447	2.437	WGI (2021)
<b><i>Political_Stability</i></b>	1843	-.5	.867	-3.315	1.616	WGI (2021)

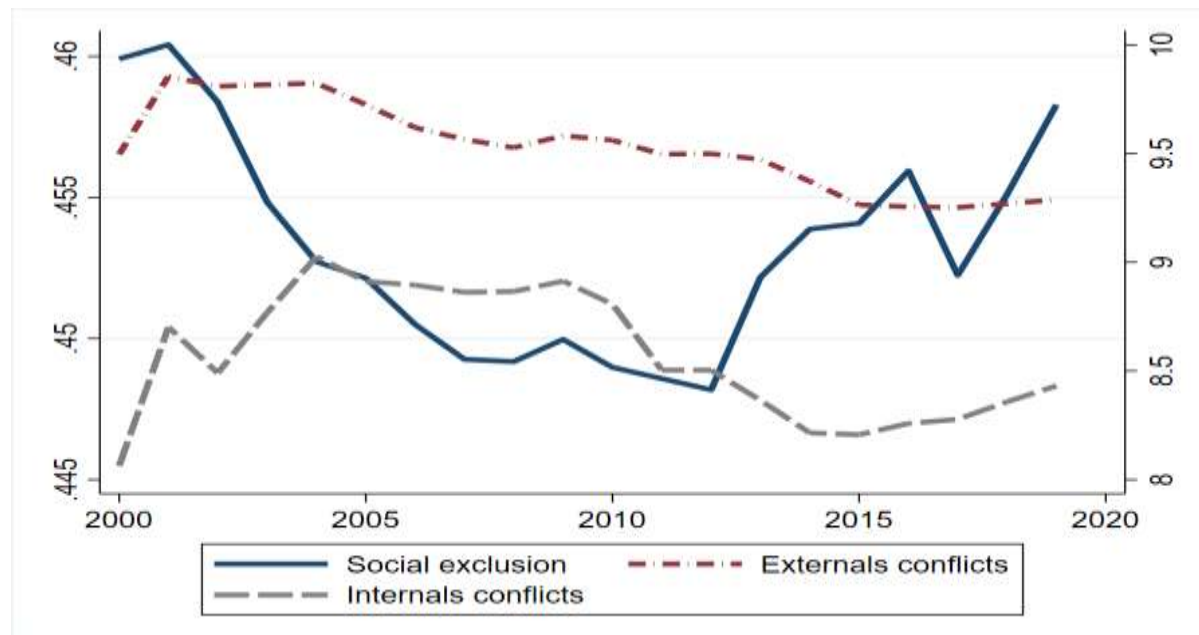
<i>Regulatory_Quality</i>	1843	-.382	.768	-2.645	2.261	WGI (2021)
<i>Rule_of_Law</i>	1843	-.49	.704	-2.606	1.879	WGI (2021)
<i>Voice_and_Accountability</i>	1843	-.477	.757	-2.313	1.293	WGI (2021)

notes : Hilbert, M. (2019). digital data divide database. rochester, ny : social science research network. available at : [ssrn 3345756](https://ssrn.com/abstract=3345756). w.d.i : world development indicators (2021). w.g.i : world governance indicators (2021). vdem : variety democracy (2019). World Bank

Source : authors elaboration.

Figure 1 shows the evolution of social exclusion and security fragility of State in developing countries. In the case of social exclusion, the scores are almost as low as those for security fragility. As far as conflict is concerned, it appears that the scores for the internal and external conflict indices are evolving divergently, in different proportions. They exploded between the end of 2005 and 2020. However, well before these latter dates, i.e. between the end of 2000 and the beginning of 2004, conflict scores increased considerably in most developing countries, reaching an average proportion of around 9.1 for external conflicts and 9.8 internal conflicts per year corresponding to very high levels (external and internal conflicts) of fragility as presented in the Table A2. This makes countries less attractive despite high GDP growth rates/h. Property rights are not assured. Production costs are very high compared to low transaction costs

Figure 1.



Source : Authors elaboration.

#### 4. Results

This section presents and discusses the results of the basic model as well as those of the robustness analysis, derived from empirical investigations. First, the direct effects of security fragility of State on social inclusion at

the level of indicators and sub-dimensions are estimated. Second, we estimate indirect effects. Finally, the robustness and analysis of mediation.

#### 4.1. Analysis of basic results

In Tables 2, 3, 4 and A2 present the results of the basic model of the effects of external conflict and internal conflict on social exclusion. Each of the specifications is independent due to a degree of connection between the conflict indicators greater than 0.5. In the literature, many tests have been used to assess the validity of the model (Tchamyou et al., 2019). Firstly, the Arellano and Bond autocorrelation test, which postulates as a null hypothesis the absence of autocorrelation of the second-order residuals in the difference equation. Given the results of the various tables in this test, the null hypothesis should not be rejected for AR (2). Secondly, the Sargan/Hansen identification tests should not be significant. Indeed, these tests emit a null hypothesis according to which the instruments used are valid and uncorrelated with the error term. In practice, the Sargan test is not robust but is not affected by the number of instruments. On the other hand, the Hansen test is robust and deteriorates with the number of instruments. However, to limit the proliferation of instruments, we ensure that they are fewer than the number of countries in each specification. Overall, the results show the existence of a long-term trend effect by analyzing the unaltered signs of the lagged dependent variable in the various tables above.

According to Sherif (1966), conflict is a state of hostility, antagonism and incompatibility or scarcity of resources. They are also explained by economic issues, economic underdevelopment, by economies of rent and predation and by the rise in power of a criminal and mafia world economy. Neoclassical analysis prefers the term competition and not conflict to describe situations of divergence of interests between economic actors. It considers that conflicts only arise in the event of sub-optimality of market processes, when certain practices are carried out outside of pre-established legal rules, as in the case of situations of information asymmetries, opportunistic behavior or anti-selection. For them, these situations can be automatically dealt with by the application of competition law rules. In this vein, Hugon (2001), in the *International and Strategic Review*, n° 43, as well as the *International Country Risk Guide* (ICRG, 2019), structured conflicts around two major components. Internal conflicts oppose the citizens of the same nation (terrorism, civil disorder and civil wars), are traditionally distinguished from external conflicts (war, cross border-conflicts and foreign pressures) which oppose the citizens of one nation to another or to a group of countries.

Although the relationship between security fragility of State and social exclusion has generally remained on the margins of the central concerns of traditional economic theories, Wars are undoubtedly detrimental to the process of wealth accumulation. The lack of accumulation of wealth makes available resources scarce, which are already less important and already lead to less access to social and economic opportunities and this fuels conflict and social exclusion. In table 2, 3 and 4 two main trends emerge for the effects of conflict on the social exclusion index. Firstly, the security fragility increases overall and significantly social exclusion in developing countries. The coefficients for these seven variables are negative and significant at the thresholds of 1% and 5% levels. These results also confirm those of Shirodkar et al., (2024) and Wei et al., (2023). Secondly, at the level of the sub-dimensions of the overall conflicts index. Two major trends emerge for the case of sub-dimensions security fragility measures. Firstly, cross-border conflicts and war (external conflicts), civil war, civil disorder and terrorism (internal conflicts), make possible to increase significantly, the index score of social exclusion. There are two plausible explanations. Initially, people fleeing the war abandoned their comfort and moved elsewhere. Internally and externally displaced persons leave behind their land, physical, social and material capital.

Specifically, terrorist organizations use propaganda, including recruitment, radicalization as well as incitement to terrorism, financing, scoping, planning, execution, and cyberattacks. Secondly, foreign pressure conflict measure significantly reduce the risk of social exclusion. Indeed, the coefficient associated with this variable is positive and significant at the threshold of 5%. Therefore, foreign pressure can be seen as one of the alternatives to social exclusion. Since they exercise coercive force at the level of States in terms of respect for the rule of law and through good governance. Third, ethnic tensions are increase significantly the risk of social exclusion. All coefficients are negative and significant at the thresholds of 1%, 5% and 10% (Tables 2, 3 and 4). General argument is that developing countries already experience high (levels of social exclusion and, as a result, ethnic tensions exacerbate this exclusion (The multiplicity of ethnic groups, the scarcity of available resources and the situations of income are sources of conflict). ICTs are instrumented to train members and communicate instructions (Piazza, 2021). In the case of the determinants of social exclusion, education shows the expected sign. The have positive effects on social exclusion. Education coefficient are positive and

significant at thresholds of 1% levels (models, 1, 2 and 3). This because, education facilitates assimilation, technological sophistication and digital culture complementary to internal conflicts. More generally, knowledge benefits increase the returns of private human capital, which has the effect of peaceful behaviors to mitigate conflicts (human capital theory).

However, except in the internal conflicts in sub-dimensions where economic growth is a factor that increases social exclusion, particularly in tables (2 and 3) of models 1, 2 and 3 show that the loss is due to the combination of negative effects of wars such as the destruction of infrastructure, capital flight, and increase in uncertainty which penalize investments. Productivity gains and trade performance being negatively affected. Since in developed countries, GDP per capita reflects the standard of living and the amount of wealth that people own (Acemoglu et Robinson, 2005). But this contrasts with the reality of developing countries, where sometimes higher growth rates are synonymous with extreme poverty, unemployment, inequality and social exclusion, which are usually explained by the disadvantages associated with the use of public policies for private purposes and the gains detrimental to their development.

These results are consistent with those of Horsell (2006), Paugam (1991) and Silver (1994). ICTs contribute to deepening social marginalization and exclusion in countries that already experience high levels of social exclusion. All coefficients are negative and significant at the thresholds of 1%, 5% and 10% except model 3. Among the plausible explanations. Family warmth, the rapprochement of communities as well as social cohesion have taken a hit because of social networks such as Facebook, WhatsApp, Instagram or YouTube (Ongo Nkoa and Song, 2023).

**Table 2**

Effects of Conflicts on Social exclusions

	(1)	(2)	(3)	(4)
<i>Variables</i>	Social exclusion			
<i>Social exclusion</i> <sup>t-1</sup>			0.9944***	0.9952***
			(0.0016)	(0.0016)
<i>External conflicts</i>	-0.0197***		-0.0011**	
	(0.0057)		(0.0005)	
<i>Internal conflicts</i>		-0.0215***		-0.0010**
		(0.0054)		(0.0004)
<i>GDP/Capita</i>	0.0183*	0.0204**	0.0003	0.0003
	(0.0104)	(0.0103)	(0.0005)	(0.0005)
<i>Education</i>	-0.0545**	-0.0553**	0.0016**	0.0016**
	(0.0242)	(0.0238)	(0.0006)	(0.0006)

<i>Unemployment</i>	-0.0309*** (0.0064)	-0.0273*** (0.0064)	0.0002 (0.0003)	0.0005* (0.0003)
<i>Ethnic tensions</i>	-0.0538*** (0.0058)	-0.0474*** (0.0059)	-0.0014*** (0.0005)	-0.0012** (0.0005)
<i>Constant</i>	0.9591*** (0.0888)	0.9104*** (0.0731)	0.0088* (0.0052)	0.0049 (0.0035)
<i>Observations</i>	1,117	1,117	1,117	1,117
<i>R-squared</i>	0.1801	0.1816		
<i>Number of Countries</i>			91	91
<i>Number of instruments</i>			50	50
<i>AR1(P)</i>			0.00373	0.00360
<i>AR2(P)</i>			0.419	0.445
<i>Hansen (P)</i>			0.915	0.893

Notes: \*, \*\*, \*\*\* significance at 10 % per cent, 5 % per cent and 1 % per cent respectively. (.):

Robust standard deviation

Source : Authors elaboration.

**Table 3**

Effects of the Sub-dimensions of External conflicts on Social exclusion

	(1)	(2)	(3)
<i>Variables</i>	<i>Social exclusion</i>		
<i>Social exclusion</i> <sup>t-1</sup>	0.9973*** (0.0018)	0.9982*** (0.0013)	0.9982*** (0.0014)
<i>Cross border conflicts</i>	-0.0037*** (0.0011)		
<i>Foreign pressures</i>		0.0007** (0.0003)	
<i>War</i>			-0.0040**

			(0.0016)
<i>GDP/Capita</i>	0.0001	-0.0001	-0.0003
	(0.0004)	(0.0003)	(0.0003)
<i>Education</i>	0.0022***	0.0021***	0.0025***
	(0.0007)	(0.0006)	(0.0005)
<i>Unemployment</i>	0.0002	0.0005**	0.0003
	(0.0003)	(0.0002)	(0.0003)
<i>Ethnic tensions</i>	-0.0011**	-0.0014***	-0.0011***
	(0.0005)	(0.0003)	(0.0003)
<i>Constant</i>	0.0058	-0.0047***	0.0116**
	(0.0050)	(0.0010)	(0.0046)
<i>Observations</i>	1,117	1,117	1,117
<i>Number of id</i>	91	91	91
<i>Number of instruments</i>	52	55	53
<i>AR1(P)</i>	0.00384	0.00366	0.00361
<i>AR2(P)</i>	0.434	0.435	0.436
<i>Hansen(P)</i>	0.813	0.535	0.856

Notes: \*, \*\*, \*\*\* significance at 10 % per cent, 5 % per cent and 1 % per cent respectively. ( ): Robust standard deviation

Source : Authors elaboration.

In table 4, the effects of the sub-dimensions of internal conflicts increase social exclusion. All coefficients are negative and significant at the thresholds of 1% and 5%. Indeed, in situations of internal conflict, inequitable access to already scarce services and resources, favouring the privileged to the detriment of the most vulnerable, reinforces social exclusion. In particular, by highlighting new forms of marginality and poverty. The destruction of political, economic, social, environmental, technological and security infrastructures aggravates other forms of social exclusion. They mainly affect the most vulnerable section of the population, accentuate the unemployment rate and the associated costs which go well beyond economic difficulties, it is "a key factor of social status and sense of dignity" (Colin and Lene, 2011). Furthermore, civil wars are significantly more damaging than external wars. Responsible for the demolition of all the potential of a country and the immediate deterioration of its capital, civil wars are likely to harm the cohesion of society and the viability of the political system and institutions. This differs substantially from external conflict which, at its end, can give way to more rapid social cohesion. social cohesion is often described as the 'glue' that holds a society together in which individuals, groups and institutions with different beliefs or objectives can coexist in harmony. It is structured around good governance, respect for human rights and individual responsibility are conducive to social cohesion which, in turn, promotes peace. Internationally, external conflicts promote social cohesion, by strengthening social relations and interdependence which is based on institutional arrangements between different countries.

Specifically, internal conflicts accentuate social exclusion. Faced with uncertainties linked to internal conflicts, notably the effects of civil war, civil disorder and terrorism, it is more difficult to anticipate the future. This leads to a reduction in social spending, accentuating social exclusion. On the economic level, we are witnessing an increase in opportunism in economic transactions and capital flight. At the political level, the persistence of bad public policies. Aid is becoming scarce because the State finds itself excluded from international credit markets and the domestic market is drying up. In response, the State takes advantage of the tax levied by inflation. The economy that recovers from conflict therefore finds itself with high inflation and a currency in which there is little confidence (Adam, Collier and Davies, 2008. Indeed, internal conflicts require strong mobilization of the international community. To the extent that most conflicts involve the reorganization of international relations on a regional or global scale. The two major issues of which are, on the one hand, an issue of power, and the other, the organization of common life on the other hand.

**Table 4**

Effects of the Sub-dimensions of Internal conflicts on Social exclusion

	(1)	(2)	(3)
<i>Variables</i>	<i>Social exclusion</i>		
<i>Social exclusion</i> <sup>t-1</sup>	0.9940*** (0.0016)	0.9993*** (0.0006)	0.9962*** (0.0014)
<i>Civil war</i>	-0.0022*** (0.0002)		
<i>Civil disorder</i>		-0.0018** (0.0009)	
<i>Terrorism</i>			-0.0013** (0.0006)
<i>GDP/Capita</i>	-0.0002 (0.0005)	-0.0002 (0.0003)	-0.0001 (0.0004)
<i>Education</i>	0.0026*** (0.0006)	0.0015*** (0.0004)	0.0019*** (0.0005)
<i>Unemployment</i>	0.0009*** (0.0003)	0.0007*** (0.0001)	0.0004 (0.0003)
<i>Ethnic tensions</i>	-0.0018*** (0.0004)	-0.0006** (0.0003)	-0.0013*** (0.0004)
<i>Constant</i>	0.0058**	0.0008	0.0023

	(0.0023)	(0.0019)	(0.0021)
<i>Observations</i>	1,117	1,117	1,117
<i>Number of id</i>	91	91	91
<i>Number of instruments</i>	52	58	53
<i>ARI(P)</i>	0.00358	0.00364	0.00370
<i>AR2(P)</i>	0.445	0.439	0.432
<i>Hansen(P)</i>	0.846	0.928	0.870

Notes : \*, \*\*, and \*\*\* mean statistical significance at 10 %, 5 % and 1 % levels respectively. ( ) : robust standard deviation.

Source : Authors elaboration

#### 4.2. Transmission channels for the effects of ICT on conflicts

Starting from the occurrence of the transmission channels underlined and discussed in the teaching of the literature, we proceed with the interaction variables by estimating the equations. (4) -(5) and (6). The results portrayed in Tables 5, 6 and 7 shows that (external and internal conflicts) and broadband dissemination (ICT quality and quantity) have positive and significant effects on the channels considered. All other things being equal, the practice of conflict increases social exclusion in developing countries. At the level of the external conflict indicator, the interaction term between the external conflict indicator and the quantity of the ICT is negative and statistically significant at the 1% significance level reduces social exclusion. This suggests that the external conflict indicator further reduces social exclusion due to the digital divide that remains in developing countries. Two coefficients are positive and significant at thresholds of 1% are observed (models 1 and 3) except for model 2. With regard to the interaction between internal conflicts, (quality and quantity of the ICT index) reduce social exclusion. The Coefficients are positive and significant at thresholds of 1% are observed. Even the risks may be exogenous or endogenous. Whose effects of ICTs on conflicts reduce social exclusion in developing countries. In addition, unresolved regional tensions, the breakdown of the rule of law, the absence of state institutions, illicit lucrative activities and the development of the shadow economy as well as the scarcity of resources, aggravated by climate change, are among the causes. This change the behavioural functions of economic agents (Khine and Langkulsen, 2023). This prevents access to amenities and reinforces social fragility and social exclusion.

Focusing on the coefficients of the interaction of variables, between ICT quality and quantity and conflict indicators, the relationship between (ICT quality and ICT quantity) and the external conflict index (Mei-Se et al., 2020), shows that ICT indicators significantly reduce social exclusion. This result is transposed for the case of the internal conflict index in the presence of the quality and quantity of ICT. This consolidates the results obtained in Tables 4,5,6 and 7 with regard to the interaction of the quality and quantity of ICT with external and internal conflicts. Positive and significant interaction coefficients at thresholds of 10 and 5 % are also observed. The interaction variables between the sub-dimensions measurements of conflicts and the quality and quantity of ICT to that obtained in the same Tables stand out the same results, except civil disorder and foreign pressures reported in tables 5, 6 and 7.

Similarly, as La and Xu (2017) have pointed out, ICTs indirectly enhance internal and external conflicts in developing countries through remittances, which contribute to the financing of armed groups, terrorist activities, armed conflicts and criminal networks responsible for human violence and crime. Specifically, these aspects lead generally to insecurity, violence, loss of legitimacy, ethno-linguistic repression and social fragmentation. In the context of conflict sub-dimensions, the interaction between conflict sub-dimensions and ICTs quality or quantity sometimes reduce social exclusion in some cases (foreign pressures: model 3) and increases it in other cases, in developing countries. This finding contrasts with the work of Conway (2017) and Koehler (2014), who found that internet connectivity amplifies internal conflict.

On a global scale, ICTs increase the risk of external conflict (columns, 2, 3 and 4) as well as internal conflict (columns 5 and 7). However, focusing on the measurement of ICTs in quality, we find that taking the above into account reveals a positive and significant effect of conflict on social exclusion. This result corroborates with

work by Moumie (2021), examining a sample of 49 African countries over the period 1998-2012, found that ICT diffusion increases internal conflict, including terrorist activities as well as that of Magazzino et al., (2021), who found that ICT diffusion stimulates security fragility. On the other hand, this debate also extends to its effects on social cohesion (Tsakoglou, 2002). Consequently, as Klein (1999) and Vidal (1997) have pointed out, ICTs indirectly improve social exclusion. This is particularly the case through collective action through the creation of diaspora networks or platforms to easily communicate with their target audience, thus helping to mitigate terrorist activities. ICTs offer real opportunities in the fight against terrorism and the preservation of conflict. However, the significant growth in digital interconnectivity has amplified the role and emergency of ICTs as an essential element in the security fragility of States.

They make it possible to bypass censorship, relative anonymity, a multimedia system in an environment that allows text, graphics and photos to be combined, and above all a low financial cost give. This result corroborates the work of Jipp (1963) and Song et al., 2024. Focusing on the interaction coefficients between different conflicts and ICTs, two trends emerge. For the social exclusion index, interactions between external conflicts (cross-border conflicts and war) and ICTs quality significantly decrease the risk of social exclusion. The main explications are that, ICT increase the risk of external and internal conflicts through the promotion of transparent governance by also revealing human rights violations, especially to people living under repressive regimes and access to uncensored information (La et Xu, 2017). Whereas the interaction with foreign pressures and the quantity of ICTs considerably increases the risk of social exclusion (table, 5). This result converges with that of Moumié (2021). In the same way, Wiener's cybernetic theory (1948) allows it possible to identify how the development of ICTs as well as their use serve as a communication channel for the various terrorist groups The real conflict theory of Sherif (1966) emphasizes that the information received via ICTs is processed and used to accomplish tasks related to terrorist acts as well as their deployment in the field.

Tables 5, 6, 7 and 8, ICTs reduce the effect of external and internal conflicts on the Global Social Exclusion Index. The coefficients associated with these variables are negative and significant at the threshold of 1 %. It's because they also increase the transparency of labor market information, reducing transaction costs related to information search and market failures (Models, 1, 2, 4, 5 and 6) except foreign pressures model.3. Our results reported in Tables 9,10 and 11 reveal a trend identical to that observed in Tables 5, 6, 7 and 8 for ICT coefficients.

**Table 5**

Effects of External conflicts on Social exclusion, through ICT quality

<i>Variables</i>	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>
	<i>Social exclusion</i>			
<i>Social exclusion</i> <sup>t-1</sup>	0.9944***	0.9983***	0.9900***	0.9934***
	(0.0026)	(0.0017)	(0.0027)	(0.0046)
<i>External conflicts</i>	-0.0085**			
	(0.0040)			
<i>Cross border conflicts</i>		-0.0302***		
		(0.0108)		

<i>Foreign pressures</i>			0.0181**	
			(0.0080)	
<i>War</i>				-0.0305**
				(0.0116)
<i>LnICT_qual</i>	-0.0036*	-0.0036**	0.0032**	-0.0047**
	(0.0019)	(0.0016)	(0.0013)	(0.0018)
<i>External conflicts* lnICT_qual</i>	0.0004**			
	(0.0002)			
<i>Crossborder conflicts*lnICT_qual</i>		0.0013**		
		(0.0005)		
<i>Foreign pressures* lnICT_qual</i>			-0.0010**	
			(0.0004)	
<i>War*lnICT_qual</i>				0.0013***
				(0.0005)
<i>GDP/Capita</i>	0.0016***	0.0006	0.0002	0.0017**
	(0.0006)	(0.0005)	(0.0006)	(0.0006)
<i>Education</i>	-0.0011	0.0014	0.0002	-0.0012
	(0.0009)	(0.0010)	(0.0008)	(0.0008)
<i>Unemployment</i>	-0.0002	-0.0005**	-0.0002	-0.0005
	(0.0003)	(0.0003)	(0.0002)	(0.0003)
<i>Ethnic tensions</i>	-0.0019**	-0.0009	-0.0015*	-0.0016
	(0.0007)	(0.0006)	(0.0008)	(0.0011)
<i>Constant</i>	0.0769*	0.0803**	-0.0529**	0.1096**
	(0.0392)	(0.0315)	(0.0244)	(0.0426)
<i>Observations</i>	992	992	992	992
<i>Number of id</i>	85	85	85	85
<i>Number of instruments</i>	34	35	37	39
<i>AR1(P)</i>	0.00961	0.00974	0.0103	0.00954
<i>AR2(P)</i>	0.493	0.522	0.519	0.506

Hansen (P)

0.445

0.775

0.808

0.811

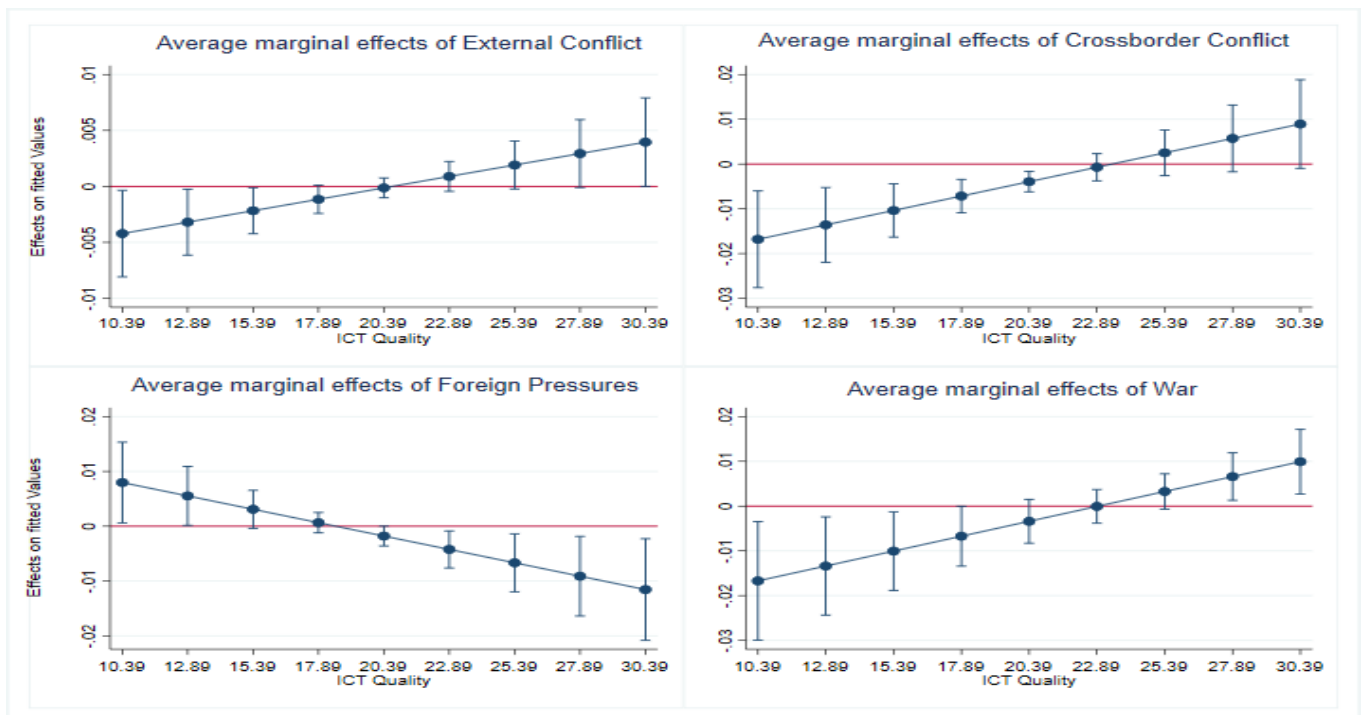
Notes : \*, \*\*, and \*\*\* mean statistical significance at 10 %, 5 % and 1 % levels respectively. ( ): robust standard deviation.

Source : authors elaboration

In figure 2, we show that for ICTs quality values below 20.39, the average marginal effects of external conflicts have a negative effect on social exclusion. Thus, the use of quality ICTs increases social exclusion. The same observation is made for the case of cross-border conflicts, foreign pressures and war for ICTs values equal to or less than 17.39. By the same token, when ICTs quality values tend to exceed 22.39, the average marginal effects of cross-border conflict and war reduce social exclusion. This provides fertile ground for tensions and demands from groups that can lead to the transformation of existing economic and social structures. This also demonstrates the ambivalent role of conflict which is discussed in the literature where two major findings emerge: on the one hand, those who consider conflicts as an opportunity to be seized since they can give rise to real institutional reforms making it possible to improve redistribution and the credibility of state redistributive processes. In particular, by establishing quotas for civil servants, checks and balances and increasing the role of civil society as well as taking actions in favor of excluded groups (Bilal et al. 2024). On the other hand, those who see conflicts as factors of state fragility annihilating any development process (Hugon, 2006) On the other hand, foreign pressures have the opposite effect (Ndumbe and Cole, 2005). However, in terms of the quantity of ICTs for values above 17.81, the average marginal effects of cross-border conflict and war have a negative effect on social exclusion. Thus, this reflects an increase in social exclusion. This has the opposite effect in the case of foreign pressures (figure 3). These results support those obtained in Tables 2, 3, 4 and A2 for the case of the foreign pressures.

Overall, when the ICT quality value is greater than 15.39, the average marginal effects of civil disorder increase social exclusion. When it is less than 20.39, the average marginal effects of terrorism increase social exclusion. Finally, when equal to 30.39, the average marginal effects of civil war significantly increase exclusion (Figure 4).

Figure 2: Average marginal effects of external conflicts



Source: authors elaboration

**Table 6**

Effects of External conflicts on Social exclusion, through ICTs quantity

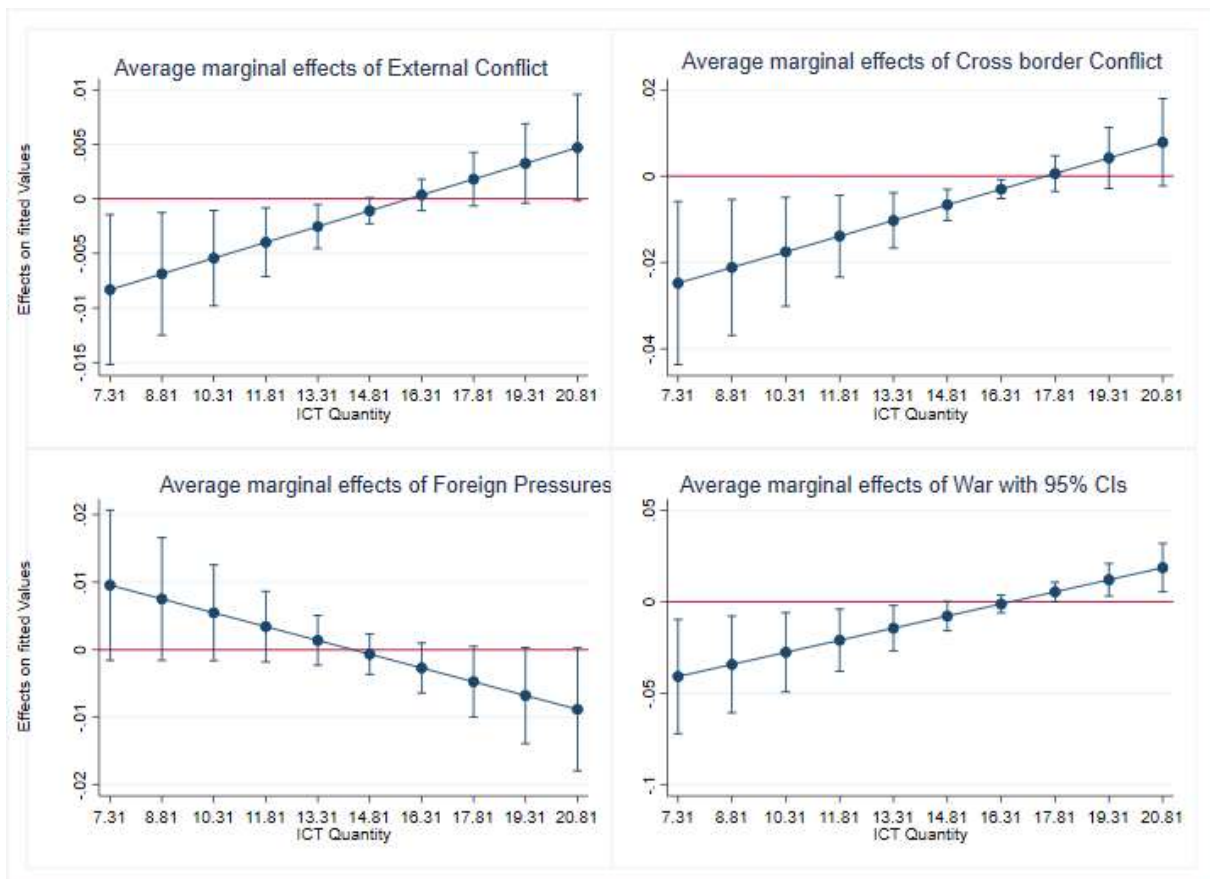
<i>Variables</i>	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>
<i>Social exclusion</i>				
<i>Social exclusion</i> <sup><i>t-1</i></sup>	0.9908*** (0.0031)	0.9962*** (0.0029)	0.9885*** (0.0036)	0.9885*** (0.0048)
<i>External conflicts</i>	-0.0154** (0.0067)			
<i>Cross border conflicts</i>		-0.0425** (0.0175)		
<i>Foreign pressures</i>			0.0195* (0.0109)	
<i>War</i>				-0.0730** (0.0278)
<i>lnICT_quan</i>	-0.0091** (0.0043)	-0.0069** (0.0033)	0.0043* (0.0022)	-0.0161** (0.0062)
<i>External conflicts*lnICT_quan</i>	0.0010** (0.0004)			
<i>Cross border conflicts*lnICT_quan</i>		0.0024** (0.0011)		
<i>Foreign pressures*lnICT_quan</i>			-0.0014* (0.0007)	
<i>War*lnICT_quan</i>				0.0044*** (0.0016)
<i>GDP/Capita</i>	0.0020*** (0.0007)	0.0005 (0.0006)	0.0007 (0.0006)	0.0023*** (0.0008)
<i>Education</i>	-0.0002 (0.0009)	0.0027** (0.0012)	0.0009 (0.0010)	-0.0009 (0.0011)

<i>Unemployment</i>	-0.0004 (0.0003)	-0.0007* (0.0003)	-0.0002 (0.0003)	-0.0011** (0.0005)
<i>Ethnic tensions</i>	-0.0030*** (0.0008)	-0.0015** (0.0007)	-0.0023** (0.0010)	-0.0027** (0.0011)
<i>Constant</i>	0.1459** (0.0652)	0.1165** (0.0511)	-0.0577 (0.0347)	0.2685** (0.1030)
<i>Observations</i>	992	992	992	992
<i>Number of id</i>	85	85	85	85
<i>Number of instruments</i>	34	35	37	39
<i>AR1(P)</i>	0.00962	0.00976	0.0103	0.00963
<i>AR2(P)</i>	0.494	0.524	0.504	0.500
<i>Hansen(P)</i>	0.506	0.819	0.730	0.796

Notes : \*, \*\*, and \*\*\* mean statistical significance at 10 %, 5 % and 1 % levels respectively. (.) : robust standard deviation.

Source : authors elaboration

Figure 3: Average marginal effects on external conflicts



Source: Authors *elaboration*

**Table 7**

Effects of Internal conflicts on Social exclusion, through ICTs quality

<i>Variables</i>	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>
<i>Social exclusion</i>				
<i>Social exclusion</i> <sup><i>t-1</i></sup>	0.9941*** (0.0031)	0.9945*** (0.0073)	0.9957*** (0.0048)	0.9893*** (0.0044)
<i>Internal conflicts</i>	-0.0067** (0.0031)			
<i>Civil war</i>		-0.0390** (0.0154)		
<i>Civil disorder</i>			0.0177* (0.0098)	
<i>Terrorism</i>				-0.0135*** (0.0049)
<i>LnICT_qual</i>	-0.0024* (0.0013)	-0.0043* (0.0023)	0.0029** (0.0014)	-0.0013** (0.0006)
<i>Internal conflicts*lnICT_qual</i>	0.0003** (0.0002)			
<i>Civil war* lnICT_qual</i>		0.0012* (0.0006)		
<i>Civil disorder*lnICT_qual</i>			-0.0011* (0.0006)	
<i>Terrorism*lnICT_qual</i>				0.0006** (0.0002)
<i>GDP/Capita</i>	0.0006 (0.0005)	-0.0008 (0.0010)	0.0009* (0.0005)	0.0010** (0.0005)
<i>Education</i>	-0.0003	0.0053*	0.0002	-0.0011

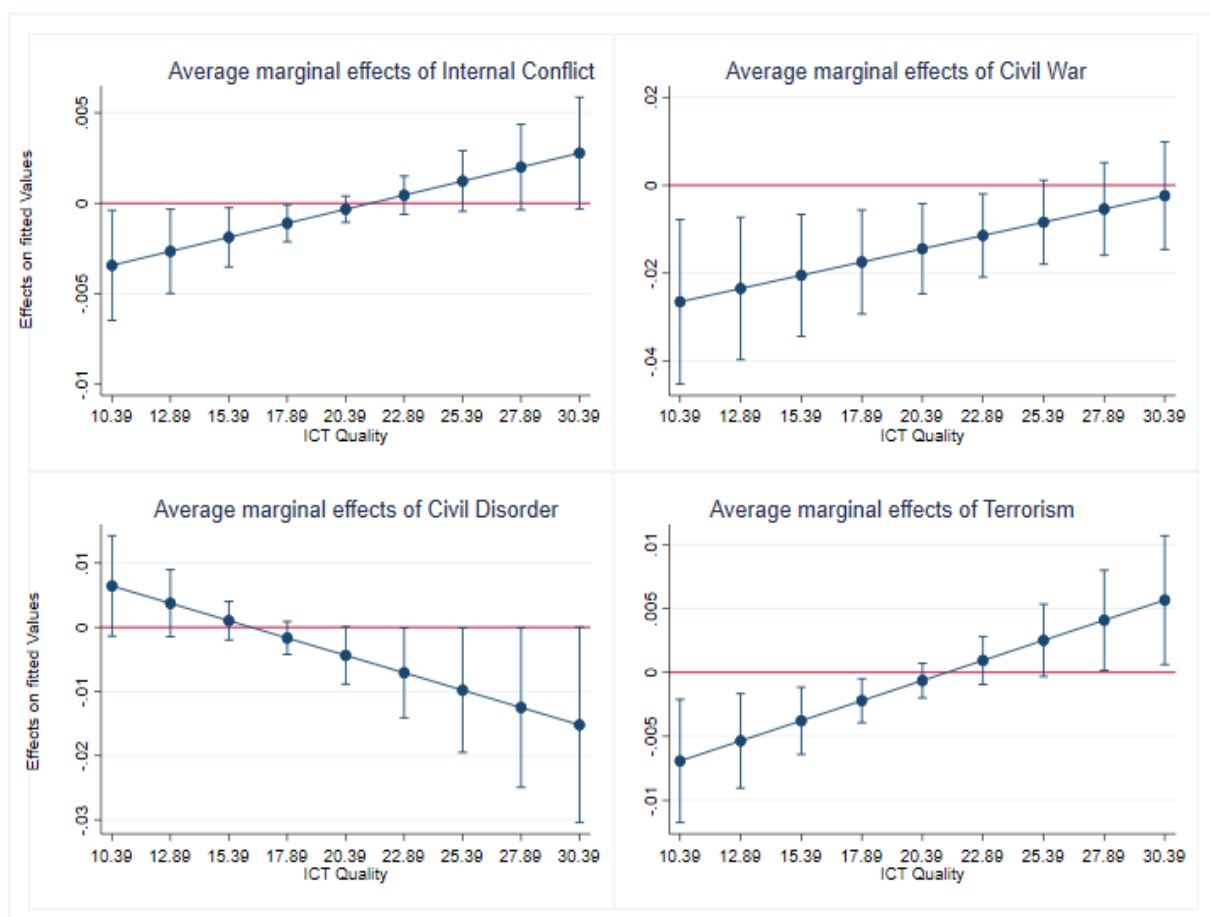
	(0.0008)	(0.0027)	(0.0009)	(0.0007)
<i>Unemployment</i>	-0.0002	0.0011	0.0002	-0.0001
	(0.0003)	(0.0008)	(0.0004)	(0.0003)
<i>Ethnic tensions</i>	-0.0015**	0.0009	-0.0015	-0.0021**
	(0.0007)	(0.0015)	(0.0011)	(0.0009)
<i>Constant</i>	0.0558*	0.1216**	-0.0490**	0.0377**
	(0.0294)	(0.0528)	(0.0244)	(0.0153)
<i>Observations</i>	992	992	992	992
<i>Number of id</i>	85	85	85	85
<i>Number of instruments</i>	34	29	33	33
<i>AR1(P)</i>	0.00985	0.00905	0.00904	0.00975
<i>AR2(P)</i>	0.526	0.676	0.532	0.514
<i>Hansen(P)</i>	0.441	0.946	0.624	0.827

Notes : \*, \*\*, and \*\*\* mean statistical significance at 10 %, 5 % and 1 % levels respectively. ( ) : robust standard deviation.

Source : authors elaboration

Figure 4: Average marginal effects of internal conflicts

source: authors



Finally, when ICT quality and quantity values are higher than 16.31(war), 17.81 (cross-border conflicts), 20.39 and 22.89(terrorism), 22.89 (civil war), ICTs mitigate the effect of conflict on social exclusion. These results are reported in graphics (3, 4, 5 and 6). As a result, the results converge with the optimistic view of the contribution of ICTs in mitigating the security fragility of countries.

**Table 8**

Effects of Internal conflicts on Social exclusion, through ICTs quantity

<i>Variables</i>	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>
<i>Social exclusion</i>				
<i>Social exclusion</i> <sup><i>t-1</i></sup>	0.9891*** (0.0038)	0.9892*** (0.0073)	0.9971*** (0.0049)	0.9882*** (0.0029)
<i>Internal conflicts</i>	-0.0078** (0.0035)			
<i>Civil war</i>		-0.0530** (0.0240)		
<i>Civil disorder</i>			0.0306** (0.0146)	
<i>Terrorism</i>				-0.0291*** (0.0063)
<i>lnICT_quan</i>	-0.0037* (0.0020)	-0.0090* (0.0052)	0.0059** (0.0025)	-0.0041*** (0.0011)
<i>Internal conflicts*lnICT_quan</i>	0.0005** (0.0002)			
<i>Civil war*lnICT_quan</i>		0.0025* (0.0014)		
<i>Civil disorder*lnICT_quan</i>			-0.0023** (0.0010)	
<i>Terrorism*lnICT_quan</i>				0.0019*** (0.0004)
<i>GDP/Capita</i>	0.0009 (0.0006)	-0.0003 (0.0012)	0.0007 (0.0006)	0.0013** (0.0006)

<i>Education</i>	0.0005 (0.0010)	0.0057** (0.0026)	0.0017 (0.0012)	-0.0012 (0.0007)
<i>Unemployment</i>	-0.0004 (0.0003)	0.0010 (0.0008)	0.0004 (0.0004)	-0.0003 (0.0004)
<i>Ethnic tensions</i>	-0.0026*** (0.0009)	-0.0006 (0.0014)	-0.0018* (0.0010)	-0.0026*** (0.0009)
<i>Constant</i>	0.0690** (0.0341)	0.1756** (0.0867)	-0.0842** (0.0383)	0.0737*** (0.0178)
<i>Observations</i>	992	992	992	992
<i>Number of id</i>	85	85	85	85
<i>Number of instruments</i>	34	29	33	34
<i>AR1(P)</i>	0.00990	0.00958	0.00865	0.00974
<i>AR2(P)</i>	0.522	0.663	0.572	0.508
<i>Hansen(P)</i>	0.437	0.938	0.625	0.717

Notes : \*, \*\*, and \*\*\* mean statistical significance at 10 %, 5 % and 1 % levels respectively. ( ) : robust standard deviation.

Source : authors elaboration

With regard to the quantity of TICs, for values less than or equal to 16.31, average marginal effects of cross border conflicts and war increase social exclusion. However, this is from values above 14.81, the average marginal effects increase social exclusion (Figure, 5).

Based on these results, it is clear that Social exclusion is not just a lack of material resources; it is also an insufficiency, or even total absence, of participation in social, economic, political and cultural life. It violates the dignity of the human person, and constitutes a denial of their fundamental rights. It can also come from a political conflict. Political conflict is defined in two ways: The first consists of developing the idea of politics to determine the relationship between politics and conflict. This method distinguishes politics from politics, the idea of politics from political life in the current sense of the term. The distinction can be made in two opposite ways. Firstly, by positing the determination of enemy and friend as properly political; then, by defining as political the intersubjective bond established by joint action. The second method consists of immediately questioning our experience of political conflicts. This method works in a way the opposite of the first.

It draws on common political experience to reflexively derive an understanding of politics. His reflection will not consider the difference between politics and politics as given a priori. It will preferably look at the two meanings of politics: on the one hand, political activity and life (politics); on the other hand, the definition of a line and a method of action (policy). Thus, political conflicts oppose groups in the most general sense of the term: classes or social strata, ethnic or confessional communities, nations and nationalities, political organizations (parties, States, associations of States) whose cooperation or non-cooperation by actors in the conflict may or may not increase social exclusion.

Indeed, when the actors involved in the conflict favor cooperation and not non-cooperation, they ask for a “political solution”, that is to say a solution through discussion and not through violence. In this cooperative game, in the presence of external conflicts, the actors strengthen social cohesion while a non-cooperative game promotes social exclusion. The results converge with those of the conflict theory of Sherif (1966), as well as with the work of Haavelmo (1954) and Grossman (1995). In the same vein, from the physiocrats to the classical school, the thinkers of the liberal movement demonstrate a clear aversion to war situations. They are almost unanimous as to its unfortunate consequences on the social order in general and the economic order in particular.

### 4.3. Robustness analysis

To test the robustness of our results, we consider three additional variables, in particular Corruption, a governance variable, is calculated by the World Bank (WGI) according to citizens' perception of it. It is produced by the ICRG database. This variable is continuous and truncated taking values between 0 and 6, with 0 as a country facing serious corruption problems, and 6 as a country not experiencing a corruption problem. So, for example, a score of 4 reflects very low corruption in the country considered (is calculated by the World Bank (WGI) according to citizens' perception of it) and institutional variables (guarantees contracts, strengthens property rights and good governance). Institutional variables refers to the vector of control variables. Recent empirical analyses have typically considered three broad measures of institutions. The first is the quality of governance, including corruption, political rights, public sector efficiency, and regulatory burdens.

The second is the legal protection of private property and law enforcement. Indeed, these are institutional variables whose objective is to create a legal space that guarantees contracts, strengthens property rights and good governance (North, 1991). The last, reduce transaction costs and risk, therefore, encourage official economic activities. The data come from a database of WDI (2021) and ICRG (2021). Thus, we use a Social exclusion, come from the Penn World Table (Hilbert, 2019). Global Governance Index (WGI, 2021). Two robustness tests are carried out. The first test is to observe the direct effects of these control variables, including, corruption and institutional variables on Social exclusion. The second test is to observe the mixed effects of these variables in the presence of ICT diffusion. Overall, the results support the memory effect. Past observed Social exclusion is statistically influenced by past levels of Social exclusion (Tables 9 and 10).

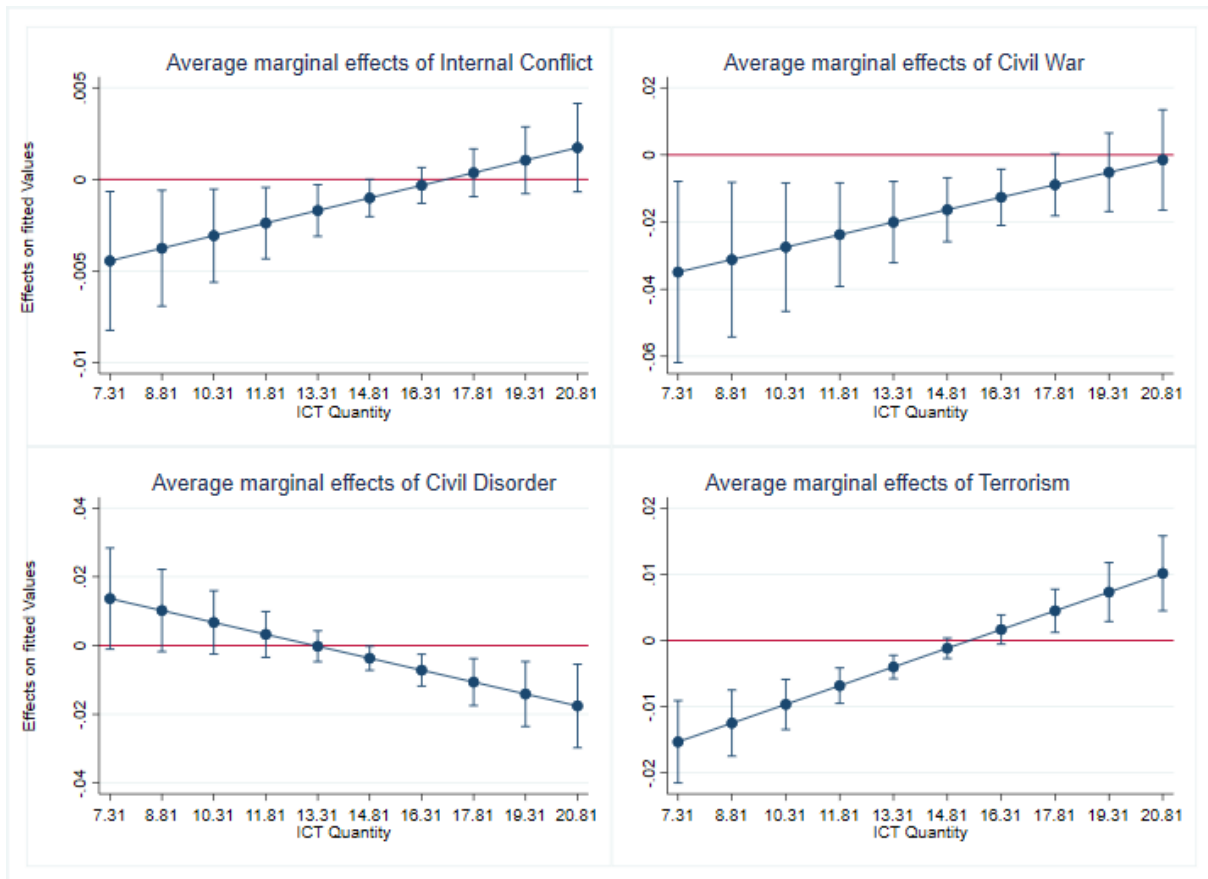
In Table 9 and 10, show that corruption has negative signs in most specifications and statistically significant effects on Social exclusion in the developing countries in the use of ICT. The coefficients are all negative and significantly at threshold of 1% and 5% (Tables, 9 and 10). In these countries, corruption is a real obstacle to development. Intuitively, the first impression may be that the observed signs of these variables are only the result of a juxtaposition of these different variables in the specifications. Or effects conditioned by ICT measurements. corruption reduces the Social exclusion when associated with mobile phone, internet, fixed phone and broadband. Two major approaches emerge for the impact of corruption. According to pessimist approach, corruption is the main obstacle to economic and social development in the world. While, optimistic approach think that corruption has long been presented as an element making it possible to compensate for the deficient functioning of public institutions (Leff, 1964). Thus, corruption would be a means of “oiling the wheels” of economic life in countries characterized by a slow and meddlesome bureaucracy. The basic assumption of the “wheel oil” theory, that corruption can accelerate an overburdened bureaucracy, can be dismantled. For example, Myrdal (1968) believes that corrupt officials may cause delays that would not otherwise occur, simply to give themselves the opportunity to extort bribes. Thus, instead of improving efficiency, corruption add distortions and raise the total cost.

With regard to governance indicators, in recent years, governance has given rise to several studies whose results are both convergent and contradictory. The results show that in developing countries institutions contribute more to social exclusion than to social inclusion and social cohesion. All coefficients are negative and significant at the thresholds of 1%, 5% and 10%. These results are indeed appreciated in Tables 9 and 10. Without claiming to be exhaustive, five major justifications are put forward: Firstly, corruption and lack of transparency: institutions can be marred by corruption, which limits equitable access to services and resources, favoring the privileged over the most vulnerable. Secondly, economic inequalities: economic disparities are often very stark, creating barriers to access to education, health and employment for certain groups, particularly minorities and rural populations. Thirdly, inadequate legislation: laws and policies may exist, but their implementation is often insufficient or biased, making it difficult to include marginalized groups. Fourth, Culturalism and discrimination: Prejudice and stereotypes can influence institutional practices, thereby excluding certain communities on the basis of ethnicity, gender or social class. Finally, limited institutional capacity: In many cases, institutions lack the resources and capacity to meet the needs of all, leading to a fragmented and often uneven approach to

services. And Low citizen participation. In this wake, some are in favor of questioning the institutional architecture in favor of market mechanisms and competition for inclusive and sustainable social balance. The results corroborate those of Hugon (2006) and Bonanate (1979).

These results are also consistent with those of the basic model. Contributive variables to results are security fragility, GDP/capita, education, unemployment and ethnic tensions. They influence social exclusion, due to the rising market failures and institutional failures that hampers competition, and consolidates inter and intra-state conflicts in developing countries.

Figure 5: Average marginal effects of internals composition



source: authors

**Table 9:** The effects of External conflict on Social exclusion: addition of new control variables

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	ICT quantity index					Dependent variable : Social Exclusion					
						ICT quality index					
Social exclusion <sub>t-1</sub>	0.9871*** (0.0037)	0.9865*** (0.0033)	0.9912*** (0.0047)	0.9883*** (0.0029)	0.9855*** (0.0042)	0.9782*** (0.0066)	0.9910*** (0.0030)	0.9919*** (0.0027)	0.9923*** (0.0036)	0.9927*** (0.0040)	0.9915*** (0.0044)
External conflicts	-0.0179** (0.0086)	-0.0222** (0.0090)	-0.0250** (0.0105)	-0.0173** (0.0085)	-0.0191* (0.0097)	-0.0209** (0.0099)	-0.0106** (0.0046)	-0.0115** (0.0055)	-0.0111* (0.0057)	-0.0131** (0.0058)	-0.0126* (0.0065)
ICT	-0.0101* (0.0053)	-0.0128** (0.0056)	-0.0146** (0.0066)	-0.0096* (0.0051)	-0.0106* (0.0060)	-0.0121* (0.0062)	-0.0043* (0.0022)	-0.0048* (0.0026)	-0.0050* (0.0027)	-0.0054** (0.0026)	-0.0051* (0.0030)
External conflicts*ICT	0.0011** (0.0005)	0.0014** (0.0006)	0.0015** (0.0007)	0.0011** (0.0005)	0.0012* (0.0006)	0.0013* (0.0006)	0.0005** (0.0002)	0.0006** (0.0003)	0.0006** (0.0003)	0.0006** (0.0003)	0.0006** (0.0003)
Control_of_Corruption	-0.0025*** (0.0005)						-0.0021*** (0.0004)				
Government_Effectiveness		-0.0035*** (0.0008)						-0.0035*** (0.0006)			
Political_Stability			-0.0059*** (0.0019)						-0.0047*** (0.0014)		
Regulatory_Quality				-0.0021*** (0.0008)						-0.0024*** (0.0005)	
Rule_of_Law					-0.0027*** (0.0006)						-0.0024*** (0.0005)
Voice_and_Accountability						-0.0044*** (0.0013)					
Constant	0.1669** (0.0828)	0.1980** (0.0865)	0.2293** (0.1015)	0.1575* (0.0809)	0.1742* (0.0931)	0.1971** (0.0948)	0.0946** (0.0452)	0.0966* (0.0528)	0.0958* (0.0556)	0.1179** (0.0556)	0.1128* (0.0624)
Initials controls variables	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	924	813	813	813	813	813	924	813	813	813	813
Number of id	84	83	83	83	83	83	84	83	83	83	83
Instruments	32	31	31	31	31	31	32	31	31	31	31
AR1(P)	0.00989	0.00956	0.00943	0.00970	0.00977	0.00969	0.00991	0.00963	0.00936	0.00985	0.00996
AR2(P)	0.491	0.485	0.478	0.496	0.489	0.475	0.493	0.486	0.491	0.490	0.486
Hansen (P)	0.888	0.940	0.745	0.893	0.893	0.811	0.919	0.940	0.875	0.894	0.883

Notes: \* significance at the 10%, 5% and 1% thresholds respectively. ( ) : robust standard deviation

**Table 10:** Effects of Internal conflict on Social exclusion: addition of new control variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	ICT quantity index					Dependent variable : Social Exclusion					
						ICT quality index					
Social exclusion <sub>t-1</sub>	0.9779*** (0.0045)	0.9781*** (0.0043)	0.9755*** (0.0061)	0.9797*** (0.0043)	0.9778*** (0.0045)	0.9691*** (0.0052)	0.9950*** (0.0040)	1.0025*** (0.0058)	0.9953*** (0.0021)	0.9919*** (0.0037)	0.9946*** (0.0038)
Internal conflicts	-0.0244** (0.0109)	-0.0214* (0.0111)	-0.0244** (0.0112)	-0.0191* (0.0109)	-0.0210* (0.0111)	-0.0221* (0.0119)	-0.0131** (0.0056)	-0.0087* (0.0048)	-0.0050** (0.0023)	-0.0120** (0.0054)	-0.0119** (0.0055)
ICT	-0.0121** (0.0061)	-0.0106* (0.0061)	-0.0127** (0.0063)	-0.0094 (0.0060)	-0.0104* (0.0062)	-0.0111* (0.0066)	-0.0049** (0.0023)	-0.0035* (0.0020)	-0.0015 (0.0010)	-0.0047** (0.0023)	-0.0044* (0.0023)
Internal conflicts*ICT	0.0014** (0.0006)	0.0013* (0.0006)	0.0015** (0.0007)	0.0011* (0.0006)	0.0012* (0.0006)	0.0013* (0.0007)	0.0006** (0.0003)	0.0004** (0.0002)	0.0002** (0.0001)	0.0006** (0.0002)	0.0006** (0.0003)
Control_of_Corruption	-0.0026*** (0.0006)						-0.0014* (0.0008)				
Government_Effectiveness		-0.0042*** (0.0009)						-0.0028* (0.0014)			
Political_Stability			-0.0029 (0.0030)						0.0002 (0.0007)		
Regulatory_Quality				-0.0026*** (0.0009)						-0.0022*** (0.0006)	
Rule_of_Law					-0.0028*** (0.0006)						-0.0020** (0.0008)
Voice_and_Accountability						-0.0047*** (0.0008)					
Constant	0.2173** (0.1026)	0.1826* (0.1034)	0.2194** (0.1046)	0.1694 (0.1020)	0.1863* (0.1044)	0.1962* (0.1114)	0.1093** (0.0522)	0.0604 (0.0454)	0.0378* (0.0211)	0.1018** (0.0507)	0.0976* (0.0514)
Initials controls variables	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	813	813	813	813	813	813	813	813	924	813	813
Number of id	83	83	83	83	83	83	83	83	84	83	83
Instruments	31	31	31	31	31	31	31	37	41	31	31
AR1(P)	0.0107	0.0105	0.0106	0.0105	0.0105	0.0105	0.0103	0.0106	0.0101	0.0102	0.0102
AR2(P)	0.553	0.537	0.527	0.550	0.543	0.533	0.551	0.524	0.525	0.549	0.545
Hansen (P)	0.841	0.896	0.691	0.834	0.870	0.878	0.122	0.501	0.897	0.417	0.149

notes: \* significance at the 10%, 5% and 1% thresholds respectively. ( ) : robust standard deviation

### 4.5. Mediation tests

In this sub-section, we carry out a mediation analysis. Two main mediators are used : ICT quality and ICT quantity. Therefore, ICT quantity measures the number of subscriptions in ICT services, and it is a scale in per capita, while ICT quality information on the average quality of subscriptions and then includes bandwidth in kbps. The data come from a database of Hilbert (2019). Our approach shown in Figure. 6 is inspired by Ang (2013), also used by Ndoya et al. (2023). The approach involves the subsequent estimation of two regression equations as described below :

$$\text{Model 1: } Mediators_{it} = \alpha_1 + \beta_1 StateSecurity\_fragility_{it} + \phi'X_{it} + \mu_{it} \quad (11)$$

Model 2:  $Social\_exclusion_{it} = \alpha_1 + \beta_2 StateSecurity\_fragility_{it} + \beta_3 Mediators_{it} + \phi'X_{it} + \mu_{it}$   
 (12)

In this system of equations, a compound effect can be seen as follows: indirect effect ( $\beta_1 * \beta_3$ ); a direct effect ( $\beta_2$ ) and the total effect  $(\beta_1 * \beta_3) + \beta_2$ . These are derived from the equation system presented above. In the first step, we estimate Model (1), which is the effect of security fragility on the mediators (ICTs quality and quantity index) ;  $\beta_1$  is the parameter describing this effect. The second step is to estimate Model (2), in which we regress social exclusion on security fragility while controlling for mediators. The magnitude of this effect is given by the coefficient of social media ( $\beta_2$ ). The indirect effect is obtained from the product of  $\beta_1$  and  $\beta_3$ , where  $\beta_3$  measures the strength of the correlation between social media and mediators in Model (2). Which essentially depends on the extent to which security fragility affects mediators ( $\beta_1$ ) and the extent to which mediators influence social exclusion ( $\beta_3$ ).

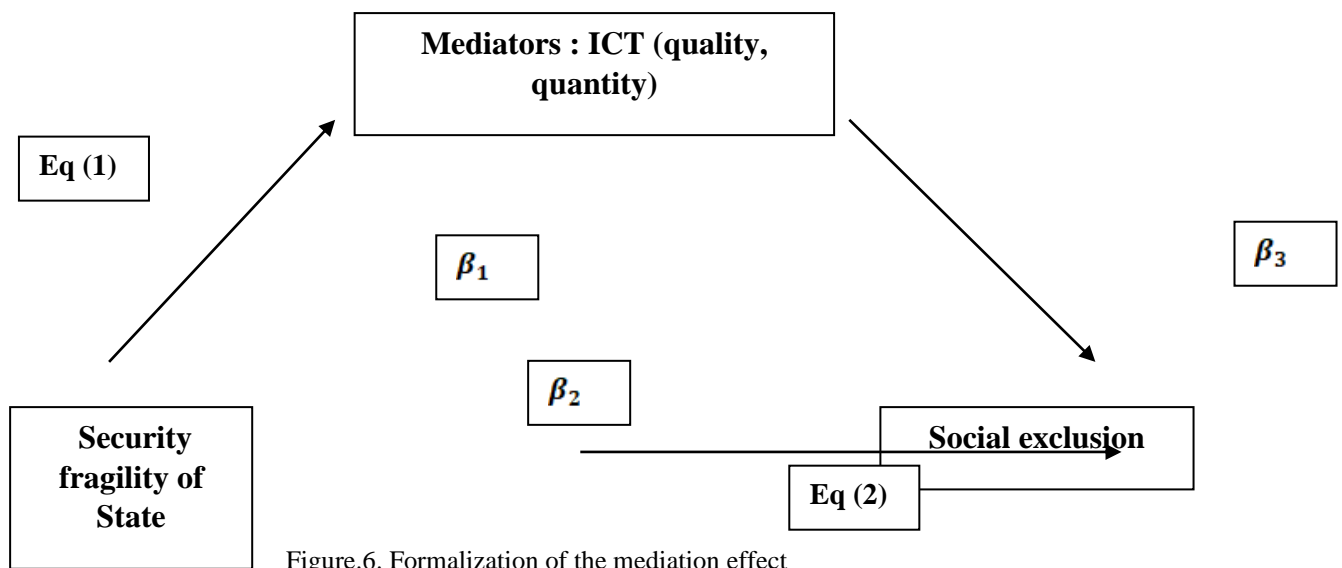


Figure.6. Formalization of the mediation effect

Source : Authors elaboration, from Ang (2013)

Referring to the transmission channels highlighted in the literature, we proceed by the interaction variables through the estimation of equations 11 and 12. Regarding the mediation tests carried out, the results reported in Table 11 shows that the fragility of states affects social exclusion. The coefficients of the different models are positive and significant at the 1% level

The results are reported in Tables 11. Overall, the same table also shows that the two ICTs measures have a positive and significant effect at the thresholds of 1%. This reflects the idea that access to and use of ICTs creates employment opportunities and facilitates the sharing of new techniques, strengthens exchange spaces, reduces transaction costs and stimulates social cohesion. In the light of these conclusions, we can suggest that the effect of state fragility on social exclusion may be moderated when ICTs (quality and quantity) are taken into account. To deepen our analysis, table 11 below proposes a series of statistical tests to validate the choice of transmission channel used. The Sobel test presents coefficients for both ICTs (quality and quantity index) measures with probabilities all below the 5% threshold. This shows that the null hypothesis of no mediation can be rejected. The results are similar when alternative tests (Delta and Monte Carlo) are used. With regard to conflict, the results also show that the ICTs quantity and ICT quality contribute to the relationship between conflict and social exclusion. In view of these results, we can say that the percentage of mediation of the effect of ICTs is 33% and 24% between external conflicts and social exclusion. The percentage of mediators effects is 28% and 25% in the relationship between internal conflicts and social exclusion.

As a result, Mediators can be a real tool for social inclusion and development, and this corroborates the study by the World Bank (2016), which shows that ICTs promote development in three main ways through inclusion,

efficiency and innovation. In this vein, several studies have looked at the impact of network externalities on economic growth and vice versa (Pradhan et al., 2014a). In addition, Tønnesson et al. (2021) further found that the spread of ICTs and social media are tools for armed struggle, control, intelligence, denunciation of traitors and attacks against adversaries in Myanmar, contributing to mitigating security fragility. Other work argues that increased investment in ICTs will contribute to economic growth through two channels: the emergence of new job-creating sectors and a catalyst for productivity at the firm level (Brynjolfsson and Hitt, 2003). Then, ICTs do not only have a positive side, as the expansion of terrorism, cybercrime. In addition, the current developmentalist emphasizes that the high penetration of ICT in families is correlated with changes in behavior, habits and lifestyles that decrease or increase social exclusion.

**Table 11:** Effects of Security fragility on Social exclusion through ICT quality and quantity mediation

Variables	(1) ICT Quality	(2) Social exclusion	(4) ICT Quality	(5) Social exclusion	(7) ICT quantity	(8) Social exclusion	(10) ICT quantity	(11) Social exclusion
External conflicts	-0.643*** (0.089)	-0.019*** (0.006)						
Internal conflicts			-0.563*** (0.082)	-0.026*** (0.006)	-0.339*** (0.054)	-0.018*** (0.007)		-0.355*** (0.049)
ICT Quality		-0.007*** (0.002)		-0.009*** (0.002)				
ICT quantity						-0.012*** (0.004)		-0.014** (0.004)
GDP/Capita		0.013 (0.011)		0.014 (0.011)		0.011 (0.011)		0.012 (0.011)
Education		-0.022 (0.026)		-0.019 (0.025)		-0.020 (0.027)		-0.016 (0.024)
Unemployment		-0.026*** (0.006)		-0.020*** (0.007)		-0.026*** (0.006)		-0.020*** (0.006)
Ethnic tensions		-0.060*** (0.005)		-0.052*** (0.006)		-0.061*** (0.006)		-0.053*** (0.006)
Constant	27.171*** (0.902)	1.026*** (0.094)	25.784*** (0.739)	1.028*** (0.087)	19.205*** (0.539)	1.062*** (0.101)	18.985*** (0.438)	1.079*** (0.093)
Observations	992	992	992	992	992	992	992	992
<b>Mediation test</b>								
	<b>Mediation of ICT Quality</b>		<b>Mediation of ICT Quantity</b>		<b>Mediation of ICT Quality</b>		<b>Mediation of ICT Quantity</b>	
Delta	0.005*** (0.001)		0.005*** (0.002)		0.004*** (0.001)		0.005*** (0.002)	
Sobel	0.005*** (0.002)		0.005*** (0.002)		0.004*** (0.001)		0.005*** (0.002)	
Monte Carlo	0.005*** (0.002)		0.005*** (0.002)		0.004*** (0.001)		0.005*** (0.002)	
<b>Composition of the effect</b>								
Indirect effect	0.005		0.005		0.004		0.005	
Direct effect	0.019		0.026		0.018		0.025	
Total effect	0.014		0.021		0.014		0.020	
% of the total effect mediated	33%		24%		28%		25%	

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0

## 5. Conclusion

This article aims to examine, first, the impact of security fragility of State on the social exclusion in developing countries. Secondly, to show that the effect of security fragility of State on the social exclusion is mediated by the diffusion of ICT. Two main facts have helped to refine our problem. Firstly, the recurrence of crises and major economic and social challenges such as recession, unemployment, growing budget and current account deficits, inflation and high external public debt (Hmida, 2021) have profoundly affected the stability of States and markets in developing countries. Secondly, industrial restructuring, company relocations, the decentralization of production and the segmentation of the labor market accentuated by neo-liberalism are calling into question certain achievements of the welfare state. In addition, the partiality of certain state policies in terms of the distribution of resources fosters the social divide between groups and contributes to the escalation of violence and conflict (Stiglitz, 2001). The spread of ICTs has progressed rapidly in developing countries over the last three decades, and the main beneficiaries have been countries in fragile security situations.

Based on the three major facts, we were able to mobilize theoretical and empirical developments, which were investigated using several variants of models estimated by the Ordinary Least Squares method and the Generalized Moment System method (S-GMM) on the basis of a sample of 91 developing countries over the period 2001 to 2019. The originality of the study compared to the existing literature was to propose, on the one hand, the analysis of transmission channels showing that the effect of conflicts on social exclusion is favoured by the ICT channel, specifically by fibre optic connectivity in terms of quantity and quality. On the other hand, the analysis of mediation made it possible to determine the level of involvement of each transmission channel in this process of reducing social exclusion (Thai-Ha Le et al., 2022).

Two main results emerge: (i) re-emergence of conflicts significantly increases social exclusion in developing countries. Controlled by three sub-dimensions of internal conflicts (civil war, civil disorders, terrorism cross-

border) and external conflicts (foreign pressures, war, cross-border conflicts), our results remain overall statistically significant, robust and stable; (ii) the mediation analysis shows that the effects of internal and external conflicts on the social exclusion are mediated by Information and Communication Technologies in developing countries. (iii) External conflicts, and in particular border conflicts and war, increase social cohesion while internal conflicts increase social exclusion. These results are consistent with those of the empirical literature (Thai-Ha Le et al. 2022; Raeymaekers, 2013).

On the basis of these main findings, a few non-exhaustive suggestions for economic policy recommendations can be made with a view to mitigating the intensity of security fragility on social exclusion in developing countries. Firstly, strengthening ICT legislation must make it possible to set up a traceability system for controlling the volume of information and channeling them as much as possible towards peaceful strategies.

Secondly, consolidate internal and external security to preserve peace in developing countries, reduce cybercrime and increase states ability to promote d optimistic digital culture.

Thirdly, an improvement in property rights and the rule of law, in particular equal opportunities for all, as well as training in human capital and skills, would encourage households to be more proactive in the face of risks, and would enable them to take real ownership of the game and the stakes involved in ICTs, leading to a better digital culture

Over and above the relevance of the results mentioned, this article opens up the prospects for research in the context of a sample that includes both developed and developing countries.

## References

- Aasland, A., F. (2001). Ethnicity and Social Exclusion in Estonia and Latvia, *Europe - Asia Studies* 53(7): 1023–4920
- Absolon, K. E. (2016) Wholistic and ethical : Social inclusion with indigenous peoples, *Social Inclusion*, 4, 1. DOI : 10.17645/si.v4i1.444
- Acemoglu, D, Hasan T, Tahoun, A. (2017). The Power of the Street: Evidence from Egypt's Arab Spring. *The Review of Financial Studies*, 31(1), 1–42
- Acemoglu, D, Robinson, J (2006) Economic backwardness in political perspective. *American Political Science Review*, 100(1), 115–131.
- Ajide F M (2021) Shadow economy in Africa: How relevant is financial inclusion? *Journal of Financial Regulation and Compliance*, 29(3), 297–316.
- Akerlof, G, Yellen, J. (1990). The Fair Wage-Effort Hypothesis and Unemployment, *Quarterly Journal of Economics*.
- Ang, J., B. (2013) Are modern financial systems shaped by state antiquity? *Journal of Banking et Finance*, 37, 4038-4058
- Arellano, M, Bond S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, 58, 277-297
- Arellano M, Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68(1), 29-51
- Asaloko, P. P., S. Asongu, C. M. Kalemasi, T. G. Niyonzima. (2025). “Do Renewable Energies Moderate the Effect of Climate Vulnerability on Women's Socio-Economic Well-Being? Evidence From African Countries.” *Social Responsibility Journal* 21, no. 3 : 549–571.
- Asik A, Kose S, Yangin E G, Seferoglu G, Pereira R, Ekiert, M. (2019). ICT integration in English language teacher education: insights from Turkey, Portugal and Poland. *Computer Assisted Language Learning*, 33(7), 708-731.
- Asongu, S.A., Nwachukwu, J.C., Tchamyu, V.S. (2016a). Information asymmetry and financial development dynamics in Africa. *Review. Development. Financial*. 6 (2), 126–138
- Asongu, S.A., Roux, S.L., 2017. Enhancing ICT for inclusive human development in sub- Saharan Africa. *Technol. Forecast. Soc. Change* 118, 44–54.
- Atkinson, T. (1989). *Poverty and social security*, New York, Harvester Wheatsheaf
- Atkinson, A. B. and Marlier, E. (2010). *Analysing and Measuring Social Inclusion in a Global Context*, New York, NY : United Nations Publications
- Bakker, V. and Van Vliet, O. (2022). Social investment, employment and policy and institutional complementarities : A comparative analysis across 26 OECD countries, *Journal of Social Policy*, 51, 4, 728–750. DOI : 10.1017/S0047279421000386

- Banque Mondiale (2016) Rapport sur le Développement dans le monde.
- Barro, R. J. (2002). Education as a Determinant of Economic Growth », in Lazear E. P. (ed.), Education in the Twenty-first Century, Palo Alto, The Hoover Institution, 9-24
- Barro, R. J., Lee, J.W. (2001). International data on educational attainment: Updates and implications, *Oxford Economic Papers*, 53(3), 541-563
- Berghman, J. (1995). Social exclusion in Europe: Policy context and analytical framework. In G. Room (Ed.), Beyond the threshold: the measurement and analysis of social exclusion. Bristol : Policy Press
- Bilal, M, Aamir, M, Abdullah, S, Khan, A.W. (2024). Impacts of crude oil market on global
- Birh A, Pfeffrkor N R (2001) L'exclusion. Les enjeux idéologiques et théoriques d'un « nouveau paradigme » sociologique », in *Revue des Sciences Sociales*, n° 28, 123-128
- Blundell, R, Bond S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87, 115-143.
- Bonanate, L. (1979). Some Unanticipated Consequences of Terrorism, " *Journal of Peace Research*, 16(3), 197-211.
- Brynjolfsson, E., Hitt, L., M (2003). Computing productivity: Firm-level evidence. *Review of Economic and Statistics*, 85(4), 793-808.
- Buhaus, H., Gleditsch, K. (2008). Contagion or Confusion? Why Conflicts Cluster in Space." *International Studies Quarterly*, 52(2), 215-233
- Burchardt, T, Le Grand., J, Piachaud, D. (2002). Degrees of Exclusion: Developing a Dynamic, Multi-Dimensional Measure." In Understanding Social Exclusion, edited by John Hills, Julian Le Grand, and David Piachaud. Oxford, England : Oxford University Press
- Burchardt, T. (2000). Social Exclusion : Concepts and Evidence. In D. Gordon, & P. Townsend (Eds.), Breadline Europe. The Measurement of Poverty. Bristol : Policy
- Cederman Lears E, Buhaus, H, Rod J. (2009) Ethno-Nationalist Dyads and Civil War: A GIS-Based Analysis, *Journal of Conflict Resolution*, 53(4), 496-525
- Chatman, E., A. (2000). Framing social life in theory and research. *The new Review of Information Behaviour Research*, 1, 3-17
- Collier, P. (1999). On the Economic Costs of Civil War. *Oxford Economic Papers*, 51(1), 168-183.
- Conway, M. (2017). Determining the role of the internet in violent extremism and terrorism: Six suggestions for progressing research. *Studies in Conflict & Terrorism*, 40(1), 77-98
- Coser, L., C. (1982). Les fonctions du conflit social, Paris, PUF.
- Cox, D. (1987). Motives for Private Transfers, *Journal of Political Economy*, 95(3), 508-546
- Crenshaw, M. (2000). The Causes of Terrorism : Comparative Politics 13, no. 4 (1981): 383. Also see Martha Crenshaw, "The Psychology of Terrorism : An Agenda for the 21st Century," *Political Psychology* 21(2), 405-20.
- Davidson, J. (2000). *Econometrics Theory*. Blackwell, Oxford.454
- Dlodlo, N. (2009) Access to ICT education for girls and women in rural South Africa: A case study. *Technology in Society*, 31, 168-175
- Duclos, J., Y., Sahn, D., E, Younger, D., S. (2011). Partial Multidimensional Inequality Orderings, *Journal of Public Economics*, 95 (3-4), .225-228
- Essama, P. (2008). Tax system and corruption: an economic analysis applied to the case of Cameroon, PhD thesis in Economics, University of Yaoundé II Soa.
- Ferraro, A., Cerciello, M., Agovino, M., Garofalo, A. (2019). The role of cultural consumption in reducing social exclusion : empirical evidence from Italy in a spatial framework. *Economia Politica*, 36 (1), 139-166.
- Girardi, S., Pulignano, V. and Maas, R. (2019). Activated and included? The social inclusion of social assistance beneficiaries engaged in public works. *International Journal of Sociology and Social Policy*, 39(9/10), 738-751.
- Gohdes, A.R. (2017). Studying the Internet and Violent conflict. *Conflict Management and Peace Science*, 35(1), 89-106
- Grosse, M, Harttgen; K, Klasen, S. (2008). Measuring Pro-Poor Growth in Non-Income
- Gross-Manos, D. (2017). Material well-being and social exclusion association with children's subjective Well-Being: CrossNational analysis of 14 countries. *Children and Youth Services Review*, 80, 116-12
- Gubrium, E. K., Leibetseder, B., Dierckx, D. and Raeymaeckers, P. (2017). Investing in work: exclusionary inclusion in Austria, Belgium and Norway. *International Journal of Sociology and Social Policy*, 37(9/10), 605-622.

- Guo, S, An, J. (2022). Does terrorism make people pessimistic? Evidence from a natural experiment. *Journal of Development Economics*, 155, 102817
- Haas, E B. (1970). The Study of Regional Integration: Reflections on the Joy and Anguish of Pretheorizing. *International Organization*, 24(4)
- Haavelmo, T. (1954). *A Study in the Theory of Economic Evolution*, Amsterdam: North-Holland
- Hagan, J., McCarthy, B. (1998). *Mean Streets : Youth Crime and Homelessness*, New York, NY : Cambridge University Press
- Hashem, M. (1996). *Goals for Social Integration and Realities of Social Exclusion in the Republic of Yemen*, Edition IIES, Geneva
- Hilbert, M. (2019). Digital Data Divide database. Social Science Research Network, Rochester, NY. Available at SSRN 3345756. <https://osf.io/gyagv/>.
- Hmida, K. (2021). Tunisie : Le besoin d'un nouveau Modèle de Développement. *Revue Française d'Economie et de Gestion*, 2(11), 67-85.
- Horsell, C., 2006. Homelessness and social exclusion: A Foucauldian perspective for social workers. *Australian Social Work*, 59(2), 213–225.
- Hugon, P. (2006). Conflits armés, insécurité et trappes à pauvreté en Afrique. *Afrique contemporaine*, 218(2), 33-47.
- Jefferson, T. (2007). The use of ICTs in regional conflicts, war, and terrorism. *VINE*, 37(1), 14-17.
- Jipp, A. (1963). Wealth of nations and telephone density. *Telecommunication Journal*, 30, 199-201.
- Kabeer, Naila (2006), 'Social Exclusion and the MDGs: The Challenge of "Durable Inequalities" in the Asian Context', DfID Topic Paper 4, Parallel Group 3A, Asia 2015 conference, March 2006
- Kammerman, S.(2005). Child policy glossary, New York [http:// www.childpolicyintl.org/glossary](http://www.childpolicyintl.org/glossary). Accessed Jan 2018
- Karla, H, Walsh, J. (2018) The Whys of Social Exclusion : Insights from Behavioral Economics. *The World Bank Research Observer* 33 (1), 1–33
- Khan, S., Combaz, E., McAslan Fraser, E. (2015) *Social exclusion : Topic guide (Revised edition)*, Birmingham, United Kingdom : GSDRC, University of Birmingham, <https://gsdrc.org/wp-content/uploads/2015/08/SocialExclusion.pdf>
- Khine, M. M. and Langkulsen, U. (2023) The implications of climate change on health among vulnerable populations in South Africa: A systematic review, *International Journal of Environmental Research and Public Health*, 20, 4, 3425. DOI : 10.3390/ijerph20043425
- Kiaga A, Leung V (2020) The transition from the informal to the formal economy in Africa. *Global Employment Policy Review*, Background Paper, (2)
- Klein J L (1999) Les TIC et le développement local : facteur structurant ou inhibiteur ? *Le Géographe canadien/The Canadian Geographer*, 43 (2), 204-20/
- Koehler D (2014) German right-wing terrorism in historical perspective: A first quantitative overview of the 'database on terrorism in Germany (right-wing extremism – DTGrwx) project. *Perspectives on Terrorism*, 8(5), 48-58.
- Koller, D. and Stoddart, K. (2021) Approaches that address social inclusion for children with disabilities: A critical review, *Child & Youth Care Forum*, 50, 4, 679–699. DOI : 10.1007/s10566-020-09589-8
- Koller, D., Pouesard, M. L. and Rummens, J. A. (2018) Defining social inclusion for children with disabilities: A critical literature review, *Children & Society*, 32, 1, 1–13. DOI : 10.1111/chso.12223
- La Free, G. (1998) Social institutions and the crime bust of the 1990s, *Journal Criminal Law & Criminology*, 88, 1325. DOI : 10.2307/1144258.
- La, H A, Xu., Y. (2017) Remittances, Social Security, and the Crowding-Out Effect: Evidence from Vietnam. *Journal of Asian Economics*, 49, 42-59.
- La Porta R, Shleifer, A. (2008). The unofficial economy and economic development. *Brooking Papers on Economic Activity*, 39, 275-363.
- Lachaud, J P. (1993) *Le marché du travail et l'exclusion sociale en Afrique Subsaharienne*, édition IIES, Genève
- Lenoir, R (1974) *Les Exclus : Un français sur dix*, édition du Seuil, Paris.
- Levitas, R. (2006) The Concept and Measurement of Social Exclusion, *Poverty and Social Exclusion in Britain*, 123–60.
- Liebow, E. (2003) *Tally's Corner : A Study of Negro Streetcorner Men*, Boston, MA : Little, Brown & Company
- Lischer, S. K. (2007) Causes and consequences of conflict-induced displacement, *civil war*, 9(2), 142-155

- Lollivier S, Verger, D. (1999). Pauvreté d'existence, monétaire et subjective. Facteurs de persistance et corrélation sur données de panel", *Revue économique*, 50 (3), 431-450
- Magazzino C, Alola A A, Schneider, N. (2021). The trilemma of innovation, logistics performance, and environmental quality in 25 topmost logistics countries : A quantile regression evidence. *Journal of Cleaner Production*, 322, 129050.
- Mahler D, Nishant Yonzan C, Lakner A, Castaneda, Haoyu ; Wu. (2021). Updated estimates of the impact of COVID-19 on global poverty : Turning the corner on the pandemic, Data Blog, Washington DC : World Bank.
- Meierrieks, D, Schneider, F. (2021). Terrorism and international economic policy, *European Journal of Political Economy*, 102011
- Merton, K.R., Barber. E. (1976). *Sociological Ambivalence and Other Essays*, New York, The Free Press
- Moumié, M. E. (2021). The Impact of ICT on Terrorism in African Countries. *Asian Journal of Economics, Business and Accounting*, 21(10), 1-16
- Ndoya H, Okere D, Belomo M L, Atangana M (2022) Does ICTs decrease the spread of informal economy in Africa? *Telecommunications Policy*, journal homepage
- Ndumbe, J. A, Cole, B. (2005). The Illicit Diamond Trade, Civil Conflicts, and Terrorism in Africa. *Mediterranean Quarterly*, 16(2), 52-65
- North, D. C. (1991) Institutions. *Journal of Economic Perspectives*, 5, 97–112.
- OCDE (2017) : États de fragilité 2016 : comprendre la violence, éd. OCDE, Paris, p. 204
- Olson, M. J., 1962. Review of the calculus of consent, by Buchanan, J. M. and Tullock, G, *America economic Review*, 52, 1217-8
- Ongo Nkoa, B. E, Song, J. S. (2023). How digital innovation affects women's entrepreneurship in Africa ? An analysis of transmission channels, *The International Journal of Entrepreneurship and Innovation*, 1-6. sagepub.com/journals-permissions DOI : 10.1177/14657503231162288
- Ordóñez, S. and Sánchez, C. (2017). Latin American "neo-developmentalism," state action and supranational realignment: What consequences to multipolarity?, *World Review of Political Economy*, 8, 3, 365–389. DOI : 10.13169/worldreviewpoliecon.8.3.0365
- Oxoby, R. (2009). 'Understanding Social Inclusion, Social Cohesion, and Social Capital', *International Journal of Social Economics* 36(12) : 1133–52
- Paugam, S. (1991). *La déqualification sociale : essai sur la nouvelle pauvreté*. Paris, Presses universitaires de France
- Peksen D, Early B (2019) Internal Conflicts and Shadow Economies. *Journal of Global Security Studies*, 0(0), 2019, 1-15.
- Piazza JA (2021) Fakes news : the effects of social media disinformation on domestic terrorism. *Dynamics of Asymmetric Conflict*,
- Piketty, T. (2013). *Le Capital au XXIe siècle*, le Seuil. share
- Pradhan, R.P., Arvin, M.B., Norman, N.R., Bennett, S.E. (2016). Financial depth, internet penetration rates and economic growth: country-panel evidence. *Applied. Economics.*, 48 (4), 331–343
- Robeyns, I. (2001) Sen's Capability Approach and Feminist Concern, intervention lors de la Conférence Justice and poverty : Examining Sen 's capability approach, 5-7 juin 2001, New Hall, St. Edmund's College, and Cambridge, Lucy Cavendish College
- Rodrik, D. (1999) Where did all the growth go ? External shocks, social conflict, and growth collapses. *J. Econ. Growth* 4 (4), 385–412
- Roodman, D. (2009). How to do xtabond2? An introduction to difference and System GMM in Stata. *The Stata Journal*, 9(1), 86-136.
- Rostow, W.W. (1960). *The Stages of Economic Growth : A non-communist manifesto*.
- Roy S(2008B) De l'exclusion à la vulnérabilité : continuité et rupture », dans CHÂTEL, V. et S. ROY (dir.), *Penser la vulnérabilité : visages de la fragilisation du social*, Québec, Presses Universitaires du Québec. 13-34
- Sageman, M. (2011). *Leaderless Jihad : Terror networks in the twenty-first century*. Philadelphia : University of Pennsylvania Press.
- Sen, A. K. (1999). *Development as Freedom*, A. Knopf Inc. ; trad. fr. de Michel Bessières, *Un nouveau modèle économique : développement, justice, liberté*, Paris, Odile Jacob, 2000.
- Sen, A. K. (2001) *Economic Development and Freedom*, Discours prononcé devant l'Observatoire Français des Conjonctures Economiques, Paris, 29 mai

- Sen, A., (1998). Social exclusion and economic measurement. Paper presented at the 25th General Conference of the International Association for Research in Income and Wealth. Cambridge
- Sherif, M. (1966). *In common predicament*, Boston, Houghton Mifflin
- Shirodkar, V., Nayyar, R., Varma, S. (2024). Institutional fragility and internationalization of Indian firms: Moderating effects of inward FDI and linkages, *Journal of World Business*, 59(3), 101502.
- Silver, H. (1994). Social Exclusion and Social Solidarity : Three Paradigms, *International Labour Review*, 133(6) 531-578
- Song J S, Yamben MFH, Atanga Okere, D. F. (2024). Security fragility in developing countries : Do ICT matter ? *Structural Change and Economic Dynamics*, 69, 259-280
- Stewart, F., V. Fitzgerald. (2001). *War and Underdevelopment: The economic and social consequences of conflict*. Oxford : Oxford University Press
- Tchamyou, V.S, Erreygers, G., Cassimon, D. (2019). Inequality, ICT and financial access in Africa. *Technological Forecasting and Social Change*, 139, 169-184
- Thai-Ha Le, Manh-Tien Bui., Gazi Salah, U. (2022). Economic and social impacts of conflict: A cross-country analysis, *Economic Modelling*, 115, 105980
- Thies, C. (2005). War, Rivalry, and State Building in Latin America. *American Journal of Political Science*, 49(3), 451-465
- Todaro, MP. (1969). A Model of Labour Migration and Urban Unemployment in less Developed Countries. *American Economic Review*, 59(1), 138-148.
- Tønnesson, S, Oob M Z, Aung, N. L. (2021). Pretending to be States : the use of Facebook by Armed Groups in Myanmar. *J. Contemp. Asia*. <https://doi.org/10.1080/00472336.2021.1905865>.
- Townsend, P. (1997). « Deprivation », *Journal of Social Policy*, 16(2). 125- 146.
- Tsakoglou P (2002) Identifying populations groups at high risk of social exclusion: Evidence from the ECHP. In R. Muffels (Ed.), *Social exclusion in European welfare states*. 135–169.
- Von-Behr A, Edwards C, Gribbon, L. (2013). *Radicalization in the digital era : The use of the internet in 15 cases of terrorism and extremism*. Santa Monica, CA : Rand Corporation
- Walsh, K., O’Shea, E. and Scharf, T. (2020) Rural old-age social exclusion : A conceptual framework on mediators of exclusion across the lifecourse, *Ageing & Society*, 40, 11, 2311–2337. DOI : 10.1017/S0144686X19000606
- Wei, S., SU, Z., Ahlstrom, D., WU, Z. (2023) State fragility and informal entrepreneurship : The moderating effects of human capital under varying temporal orientations.
- Wiener N., 1948. *Cybernetics or Control and Communication in the Animal and the Machine*. Technology Press.
- Wolff, F. (2018) De l’inévitabilité rationnelle de l’idéalisme à la nécessité logique du réalisme, *Dans choses en soi*, 183 -200.
- World Bank (2011). *World Development Report 2011: Conflict, Security, and Development*
- Wotherspoon, T. (2018). Migration, boundaries and differentiated citizenship: Contested frameworks for inclusion and exclusion, *Social Inclusion*, 6, 3, 153–161. DOI : 10.17645/si.v6i3.1692.
- Yamben, M, F, H. and Tenlep, A, M. (2025). Conflicts and the Global Competitiveness of Developing Countries : The Moderating Role of ICT. *Journal of the Knowledge Economy*. [Doi.org/10.1007/s13132-024-02525-4](https://doi.org/10.1007/s13132-024-02525-4)
- Zaidi, A. (2012). Exclusion from material resources : poverty and deprivation among older people in Europe, dans T. Scharf et N. Keating (dir.), *From Exclusion to Inclusion in Old Age. A Global Challenge*, Bristol, The Policy Press, 71-88
- Zeitsoff, T. (2017). How Social Media Is Changing Conflict. *Journal of Conflict Resolution*, 1-2 Pohlen, Laura. (2019). Unemployment and Social Exclusion. *Journal of Economic Behavior Organization* 164 (August) : 273–99. <https://doi.org/10.1016/j.jebo.2019.06.006>