Interpretive Structural Modeling Approach to Analyze the Interaction among Root Factors of conflict in south Sudan

Yonas Bol deManial (PhD)

ABSTRACT:

This paper aims to identify the most causes factors and determine the interactions of these factors in the conflict in south Sudan. This study is based on the technique Interpretive Structural Modelling (ISM), in order to delineate a hierachy that shows the main cause factors (and their relationships) influencing the conflict in South Sudan. Through a process of modelling it was possible to reach a graphical presentation that shows the sequence of main cause factors in order to understand the logic of their relationship. The final model is a useful tool that can be adopted to optimize decision making process in conflict perspective. The major findings are the power struggle factor has great influent and the following factors are the root causes factors: impunity, militarization, tribalism, lack of inclusiveness, lack of nation building. According to their positions in the driving power and dependence diagram, these factors need serious attenion and consideration in the process of successful settling the conflict in South Sudan.

KEYWORDS: *South Sudan, Interpretive Structural Modeling (ISM), Conflict Factors.*
MICMAC analysis

INTRODUCTION

This paper is written to achieve two objectives. Firstly, it seeks to reexamine the root causes of conflict in South Sudan in order to establish that, although the latest resumption of conflict has largely been enacted along ethnic lines, this is not simply an ethnic conflict. This analysis is done through examining three distinct time periods in the nation's history: the colonial period prior to Sudan's Independence and the 55 years in which the now two nations coexisted as one; the interim period, from the adoption of the 2005 Comprehensive Peace Agreement (2005) until South Sudan's independence on July 9, 2011; and finally, the time period from independence to the present.

2. LITERATURE REVIEW ON CONFLICT MANAGEMENT DETERMINANTS IN SOUTH SUDAN

The causes of the conflicts are as complex as the challenges of resolving them are difficult. But their costs cannot be in doubt. Millions of people has been killed, injured and was forced to migrate due to the devastating impact of conflict in Africa. A case in point on this regard is the horn of Africa. Indeed lately the peace and security outlook for the horn of Africa remains bleak. The conflict appraisal includes protracted state collapse in Somalia, deep hostility between Ethiopia-Eretria, a fragile peace agreement between North and South Sudan, continuing instability in South Sudan. Indeed, South Sudan is currently engulfed by internal instability[4][5]. A confluence of factors including economic, political and the intensification of armed opposition

contributed to the augmentation of war in South Sudan on December 15, 2013[6][9][11][10]. South Sudan has been struggling, since then, with complete absence of law and order. The South Sudanese people have gone through all kinds of misery in the past three and half years. The anarchy, violence and poverty forced many South Sudanese to be displaced, become refugees, and thousands lost their lives. The effects of the general anarchy in South Sudan have not only affected the population of South Sudan, they have also had a spillover effect on the horn of Africa region and the international community. The problem of refugees, the smuggling of small arms and the light weapons and the spreading terrorism are all threats emerging from South Sudan, mainly affecting the horn of Africa and international community in general[13]. Therefore, it would be paramount to investigate what caused the conflict and what significant consequence has been registered as a result of the war so as to draw a lesson for Africa and share the burden of our South Sudanese brothers and sisters. It is with this intention that this paper would opt to look into the cause and consequence of conflict. The paper has four sections. The first section is a brief summary on the context of South Sudanese conflict. Section two discusses causes of conflict in South Sudan while section three deals with the cost of war in South Sudan. The last section contains the conclusion of this paper[3][5][10]. The factors or causes of the conflict in south Sudan as, power struggle, corruption and mismanagment of the economy, patronage, impunity and lack of justice, militarization and arms proliferation, weak institutional capacity, instrumentalization of ethnic identities, lack of inclusiveness and participatory in state apparatus, lack of commitment towards nation building, oil and natural resources and past rift between the dinka and the nuer 1991[8][9][12] [13][14][15].

Author points, that the relationship among conflict management factors (especially those point out above) are a key elements to improve decision making process. Taking account of the above, it appears advisable to commence research on the link between selected factors of conflict management process in south Sudan.

3. PROBLEM FORMULATION AND METHODOLOGY

The aim goal of this study is to determine the relationship among key factors of conflict in south Sudan. In this article relationship among selected factors of conflict in south Sudan will be analysed. There is an assumption, proposed by the author, that all variables are interrelated with each other dependence

4. RESEARCH METHOD

The current study tackles a assessment of relationship among selected factors of conflict management process in south Sudanby applying a Interpretive Structural Modelling (ISM). Interpretive Structural Modelling (ISM) is one of the unique management methods that provides a structured method for dealing with complex issues. The concept of ISM was primary introduced by J. Warfield in 1973 and develop by him in the following years (Warfield 1973, 1982).

THIS METHOD CONSISTS OF SEVEN STEPS:

- Identification of the crucial elements that are relevant to the problem.
- Establishing the contextual relationship among elements.
- Developing a structural self-interaction matrix (SSIM).
- Determine the reachability matrix.
- Identify the level partitions.
- Classification of key factors of risk management process based on their driving and dependence power.
- Drawing ISM graph of key factors of conflict management process in south Sudan.

These method have been applied in different studies in many different areas (Attri, Dev, and Sharma, 2013; Jitesh, Arun and Deshmukh, 2008)[1][2]. In this study it was use ISM method procedure describe by Janes (1988) and Alawamleh, Popplewell (2011)[1][2].

5. DESCRIPTION OF THE STUDY SAMPLE

In this study, I concentrate on a key factors referring to a conflict factors in South Sudan. Leading factors of conflict in south Sudan was selected based on literature review. Using the research data collected from respondents, literature reviewed, and following the ISM method steps, the directional graph and ISM are developed.

6. INTERACTION BETWEEN KEY FACTORS OF CONFLICT MANAGEMENT PROCESS IN SOUTH SUDAN- RESULTS OF RESEARCH

Experts judgment are used to describe the contextual relation influence at of all the ten factors. With the use of this methodology, we can identify the direct and indirect relationships between factors of conflict in South Sudan. The results of expert opinion, based on ISM methodology symbols (V,A,X,O), was shown in provide input to structural self-interaction matrix (table 1).

Table 1. Structural self-interaction matrix (SSIM)

	Conflict management determinants	1	2	3	4	5	6	7	8	9	10
1	Power struggle		V	V	A	X	X	V	V	V	O
2	Corruption	A		V	O	X	O	O	O	O	O
3	Patronage	A	A		X	A	A	A	A	A	A
4	Impunity	V	O	X		O	O	X	X	X	X
5	Militarization	X	X	V	O		O	O	O	O	V
6	Weak institutional capacity	X	O	V	O	O		A	A	A	X
7	Tribalism	A	O	V	X	O	V		X	X	V

8	Lack of inclusiveness	A	O	V	X	O	V	X		X	V
9	Lack of nation building	A	O	V	X	O	V	X	X		V
10	Oil & natural resources	O	O	V	X	A	X	V	V	V	

V - the row influences the column; A - the column influences the row; O - there is no relation between the row and the column;

X - row and column influences each other

Source: own study

A converted symbolic structural self-interaction matrix into binary matrix (elements are 0 or 1) provides the reachability matrix (Table 2). Based on initially reachability matrix, driving power and dependence power were calculated for each criterion.

Table 2. Reachability matrix table

	Conflict management determinants	1	2	3	4	5	6	7	8	9	10	Driver
1	Power struggle	1	1	1	0	1	1	1	1	1	0	8
2	Corruption	0	1	1	0	1	0	0	0	0	0	3
3	Patronage	0	0	1	1	0	0	0	0	0	0	2
4	Impunity	1	0	1	1	0	0	1	1	1	1	7
5	Militarization	1	1	1	0	1	0	0	0	0	1	5
6	Weak institutional capacity	1	0	1	0	0	1	0	0	0	1	4
7	Tribalism	0	0	1	1	0	1	1	1	1	1	7
8	Lack of inclusiveness	0	0	1	1	0	1	1	1	1	1	7
9	Lack of nation building	0	0	1	1	0	1	1	1	1	1	7
10	Oil & natural resources	0	0	1	1	0	1	1	1	1	1	7
	Dependence	4	3	10	6	3	6	6	6	6	7	

The rules of transformed the SSIM table into the initial reachability matrix: if in the SSIM is V, then the entry in the reachability matrix becomes 1; if in the SSIM is A, then the entry in the reachability matrix becomes 0; if in the SSIM is X, then the entry in the reachability matrix becomes 1; if in the SSIM is O, then the entry in the reachability matrix becomes 0.

Source: own study

Partitioning the reachability matrix

Next step after getting the final reachability matrix is the level partition used to find the hierarchy of each practice. Warfield (1974) suggested that the reachability and antecedent set for each variable is obtained from the final reachability matrix. The reachability set for a particular variable consists of the variable itself and the other variables, which it may help to achieve.

Similarly, the antecedent set consist itself and other variables which helps in achieving it. Subsequently, the intersection between reachability and the antecedent set is attained. If the membership in reachability and the intersection completely agrees than the top priority is assigned and the variable is excluded from the subsequent iteration, likewise procedure leads to final iteration leading to the lowest level. Table 1 shows the first iteration where "patronage" is found at level I, therefore, it would be positioned at the top of the ISM hierarchy. Similarly, iterations are repeated till the level of each variable is obtained. Results for iterations 1–5 are summarised in Table 3. The identification levels aids in building the digraph and the final model of ISM which is discussed as under

Conflict factors level iteration 1

conflic facors	Reachability set (R)	Antecedent set (A)	Intersection set (R)∩(A	Level
1	1,2,3,5,6,7,8,9	1,4,5,6	1,5,6	
2	2,3,5	1,2,5	2,5	
3	3,4	1,2,3,4,5,6,7,8,9,10	3,4	I
4	1,3,4,7,8,9,10	3,4,7,8,9,10	3,4,7,8,9,10	
5	1,2,3,5,10	1,2,5	1,2,5	
6	1,3,6,10	1,6,7,8,9,10	1,6,10	
7	3,4,6,7,8,9,10	1,4,7,8,9,10	7,8,9,10	
8	3,4,6,7,8,9,10	1,4,7,8,9,10	4,7,8,9,10	
9	3,4,6,7,8,9,10	1,4,7,8,9,10	4,7,8,9,10	
10	3,4,6,7,8,9,10	3,4,5,6,7,8,9,10	3,4,6,7,8,9,10	

Conflict factors level iteration 2

conflic facors	Reachability set (R)	Antecedent set (A)	Intersection set (R)∩(A	Level
1	1,2, ,5,6,7,8,9	1,4,5,6	1,5,6	
2	2, ,5	1,2,5	2,5	II
4	1 ,4,7,8,9,10	7,8,9,10	7,8,9,10	
5	1,2,5,10	1,2,5	1,2,5	
6	1,6,10	1,6,7,8,9,10	1,6,10	II
7	6,7,8,9,10	1, 7,8,9,10	7,8,9,10	
8	6,7,8,9,10	1, 7,8,9,10	7,8,9,10	
9	6,7,8,9,10	1, 7,8,9,10	7,8,9,10	
10	6,7,8,9,10	5,6,7,8,9,10	6,7,8,9,10	

Conflict factors level iteration 3

conflic facors	Reachability set (R)	Antecedent set (A)	Intersection set (R)∩(A	Level
1	1, 5, 7,8,9,10	1,4,5	1,5	
4	1 ,4,7,8,9,10	4,7,8,9,10	4,7,8,9,10	
5	1, 5,10	1, 5	1, 5	
7	4, 7,8,9,10	1,4, 7,8,9,10	4,7,8,9,10	III
8	4, 7,8,9,10	1, 4,7,8,9,10	4,7,8,9,10	III
9	4, 7,8,9,10	1, 4,7,8,9,10	4,7,8,9,10	III
10	4, 7,8,9,10	1,4,7,8,9,10	4,,7,8,9,10	III

Conflict factors level iteration 4

conflic facors	Reachability set (R)	Antecedent set (A)	Intersection set (R)∩(A	Level
1	1, 5	1, 5	1,5	IV
4	1 ,4	4,7,8,9,10	4,7,8,9,10	
5	1, 5	1, 5	1, 5	IV

Conflict factors level iteration 5

conflic facors	Reachability set (R)	Antecedent set (A)	Intersection set (R)∩(A	Level
4	4	4	4	V

Summary of Levels 3

Number of the Facors at level	Facors a the level	level
3	Patronage	I
2	Corruption , Weak institutional Capacity	II
7,8,9,10	Tribalism, Lack of inclusiveness, Lack of nation building, Oil & natural resources	III
1,5	Power struggle, Militarization	IV
4	Impunity	V

Table   . Level Of Elements (Partioning Of Reachability Matrix Based On 5 Iterations)

Factor	Reachability	Antecedent	Intersection	Level
3	3,4	1,2,3,4,5,6,7,8,9,10	3,4	I
2	2, ,5	1,2,5	2,5	II
6	1,6,10	1,6,7,8,9,10	1,6,10	II
7	4, 7,8,9,10	1,4, 7,8,9,10	4,7,8,9,10	III
8	4, 7,8,9,10	1, 4,7,8,9,10	4,7,8,9,10	III
9	4, 7,8,9,10	1, 4,7,8,9,10	4,7,8,9,10	III
10	4, 7,8,9,10	1,4,7,8,9,10	4,,7,8,9,10	III
1	1, 5	1, 5	1,5	IV
5	1, 5	1, 5	1, 5	IV
4	4	4	4	V

Conical Matrix:
Based On The Level Partions(Reachability Matrix), Conical Matrix Was Developed As Shown Below:

	3	2	6	7	8	9	10	1	5	4	Driving power
3	1									1	2
2		1							1		2
6			1				1	1			3
7				1	1	1	1			1	5
8				1	1	1	1			1	5
9				1	1	1	1			1	5
10				1	1	1	1			1	5
1								1	1		2
5								1	1		2
4										1	1
	1	1	1	3	3	3	5	3	3	6	

Diagraph and ISM:

The following graph (Figure 1) was generated to portray the relationship among selected factors of conflict management process in South Sudan. The structural model is generated from the final reachability matrix. The Figure 1 portrayed both the direct and the indirect relationships between key factors of conflict management process in South Sudan. It can be seen in Figure 2 that basic elements of conflict management process are presented.
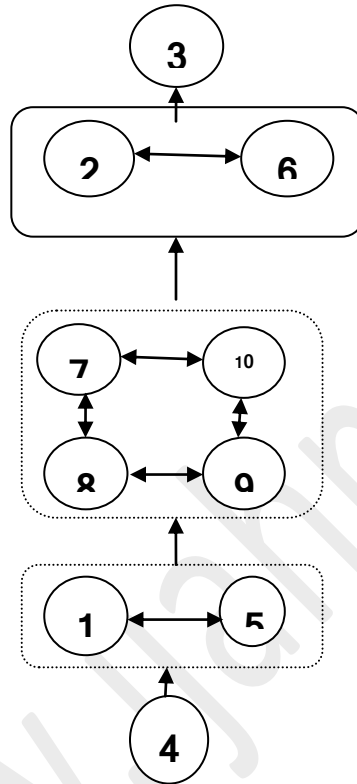

Figure 1. The Interaction Among Key Factors Of Conflict In South Sudan – Digraph
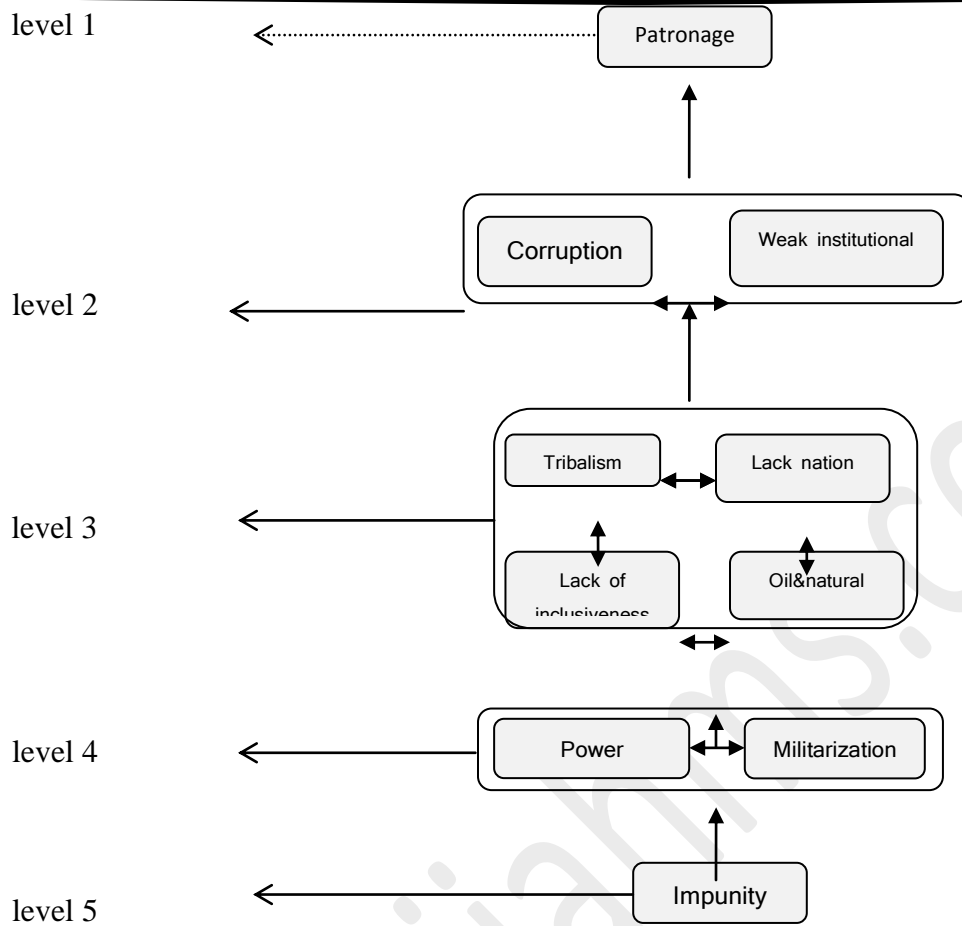
Figure 2. The Interaction Among Key Factors Of Conflict In South Sudan - ISM model
Source: own study

MICMAC Analysis:

The objective of the MICMAC analysis is carried out o classify the conflict facors into various clusters based on the driving power and dependence of each conflict factor that influence the conflict in South Sudan. Figure 3 shows the dependence and the driving power of factors. The facors in the first cluster are called 'Autonomous' or *'Excluded'* factors that have weak driving power and weak dependence. In the present study there are two factors [2,5] are classified into this category. The second cluster is a group of Dependence factors that have weak driving power and strong dependence. In our case [3,6] are fall in this cluster. The third cluster is a group of Linkage factors that have strong driving power and strong dependence. These factors are very influent and very dependent at the same time. They are otherwise known as *'Relay'* factors. These factors are very important factors as they have a significant impact on the other factors and threrefore a change in these factors could have a tripple effect on all the other factors. In our case these [4,7,8,9,10] are in this cluster. The forth and last cluster is a group of Independent or *'Determinant'* factors that have strong driving power and weak dependence. These factors are altogether very influent and little dependent. Most of the factors causing the conflict in South

Sudan thus depend on these factors. These factors condition the rest of the system. These influent factor is the most crucial element since it can act on the system depending on how much we can control it as a key factor. The analysis reveals that one factor [1] is rank as independent factor as it has maximum driving power. This implies that this factor is key factor for the conflict in South Sudan.

The interesting study revealed the following classifications of conflict factors in South Sudan:

[1] Driver conflict factor(strong drive power and weak dependence) *[Power Struggle]*

[2]Autonomous conflict factors (weaker drive power and weak dependence*)[Currption& Maliterlaization]*

[3] Linkage conflict factors (stronge drive power and strong dependence) *[Impunity,Tribalism, Lack of Inclusiveness, Lack of Nation Building and Oil&Natural resources]*

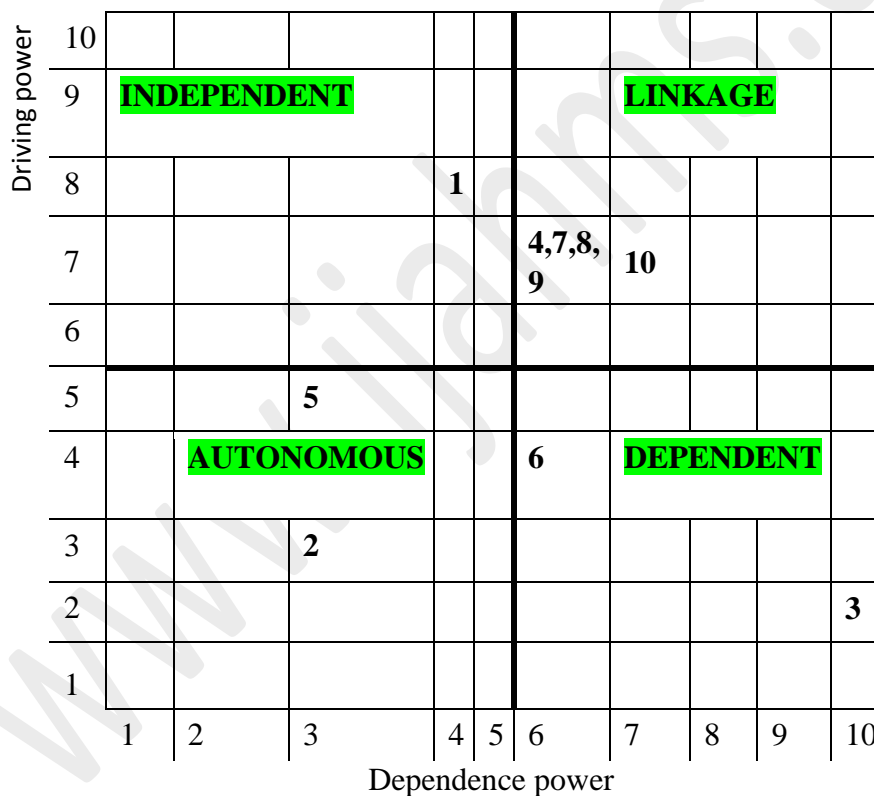[4] Dependent conflict factors (weak drive power and strong dependence) *[Patrnage& Weak Institutional Capacity]*

Figure 3. Driver power - dependence diagram Source: own study

	Driving Power	Dependence Power
Autonomous	**Low**	**Low**
Linkage	**High**	**High**
Independent	**High**	**Low**
Dependent	**Low**	**Low**

Legend	
	Conflict Factors
2	Corruption
5	Militarization
3	Patronage
6	Weak institutional capacity
4	Impunity
7	Tribalism
8	Lack of inclusiveness
9	Lack of nation building
10	Oil and natural resources
1	Power struggle

7. Limitation of this study

While this study contributes to fill a gap on the knowledge of conflict factors in south Sudan, some limitations open up avenues for further research. First, study on conflict factors in south Sudan, especially on determinants of this process is undoubtedly a multidimensional concept. In this study are investigated only selected factors of conflict in South Sudan. There are many other areas of challenges in this area and future research should investigate the relationships between other dimensions of this conflict. Second, this research aimed to identify factors in an exploratory way and the ISM methodology was developed using the knowledge of experts, which represents an element of bias. Also, as the research focuses on specific factors of the conflict in South Sudan, the findings are not universally applicable across different countries.

Finally, the model has not been statistically validated. Future research could extend this research concept .

8. CONCLUSIONS

The objective of the ISM model in this research is to understanding of the relationships between conflict factors determinants in South Sudan. The model developed in this paper provides the opportunity to understand the relationships among key Conflict factors. The relevant data from the target system were interpreted and analyzed using ISM model and MICMAC analysis. A major finding of this research work is that power struggle which has strong driving power as well as weak dependence and lie at the bottom of the ISM hierachy.

When ISM model and MICMAC analysis results are linked, it has provided a valuable insight to words conflict in South Sudan. The several interesting findings of the study and ISM model suggest that factors group in Linkage cluster have great influence on other factors. They are root cause of the conflict in South Sudan. According to their positions in the driving power and dependence diagram, these factors need serious attenion and consideration in the process of successful settling the conflict in South Sudan.

REFERENCES:

i. Alawamleh, M., & Popplewell, K. (2011). Interpretive structural modelling of risk sources in a virtual organisation. *International Journal of Production Research*, 49(20), 6041-6063.

ii. Attri, R., Dev, N., & Sharma, V. (2013). Interpretive structural modelling (ISM) approach: an overview. *Research Journal of Management Sciences*, 2319, 1171.

iii. Dessalgen, A.Geleta (2017). The causes and consequences of conflict in South Sudan. Academic research journals vol.5(1), pp. 15-21 Janunary.

iv. Ayadera, I. Nyaburi (2019). South Sudan Conflict Between 2013 and 2018: Rethinking the Causes, Situation, and Solutions. Https://www.researchgate.net/publication/333642534.

v. Blackings, Mairi John (2018). The case of South Sudan's Agreement on the Resoluion of the Conflict in South Sudan. Friedrich –Ebert- Stiftung.

vi. Blanchard, Lauren Ploch (2013). Crisis in South Sudan. Congressional Research Service Report.

vii. Brosche, Johan (2019). Ethno- Communal Conflict in South Sudan 37. https://doi.org/10.107/978-981-13-2898-5_49.

viii. Brown, Jeremy Astill (2014). South Sudan's Slide into conflict: Revisiting the past and Reassessing partnerships. African Programme, December 2014. The Royal Institute of Internaional Affairs.

ix. Institute for peace and security;Addis Ababa Universiy report august 2018,vol.2; South Sudan conflict insight siuation analysis.

x.   Jamie, F. Omar Mohammad (2017). The Dynamics of 2013- conflict in South Sudan. https://www.researchgate.net/publication/315628031.

xi.   Karugonjo,B. N. (2014). The violent conflict in South Sudan and its implicaions for regional peace and security: options for a peaceful settlement. Infosheet, No. 2.

xii.   Knopf, Payton. (2018). South Sudan's Civil War and Conflict Dynamics in the Red Sea. United State Instiute of Peace. Special Repor 431, September 2018. www.USiP.org.

xiii.   Koos, C.& Thea Gutschke (2014). South Sudan's Newest war: When two old men divide a nation. German Institute of Global and Area Studies(GIGA) Focus, number 2, issn 2196-3940.

xiv.   Kuntzelman, C. C. (2013). South Sudan: Solutions for moving beyond an"Ethnic Conflict". Internaional Research and Review Journal of Phi Beta Delta Honor society for inernaional scholars, volume 3, number 1, fall 2013.

xv.   Rolandsen, Oystein H. (2015). Another Civil War in South Sudan: the failure of Guerrilla Government? Journal of Eastern Africa Studies, vol. 9, No.1, 163-174.