

Exploring Roles of Females in Contemporary Socio-Politico-Economic Governance: An Association Rule Approach

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Abstract

Undeniably, the engagement of females in socio-politico-economic activities of most countries in the world, especially in developing economies, is far less than males. Although females form the majority in most developing countries, they are rarely engaged in the discourse of cogent developmental issues. The rising interest of females in political and socio-economic discourse, especially in the western world, has sparked female interest in the governance structure of developing countries. Subsequently, with an increased penetration of the Internet and social media, the contribution of females to governance has even assumed a new level. Using primary data collected from six Sub-Saharan African (SSA) countries, the paper identifies relationships of females' interest in socio-politico-economic governance on the countries surveyed. This paper equally digested a repertoire of data from relevant secondary sources on female involvement in the political landscape of SSA countries. To unravel some key relationships amongst the variables of interest in the study, we have used association rules (data mining technique). One of our key findings appears to indicate that the interest of females in political discourse is highly associated with the level of trust respondents have in the governance and leadership of the countries.

Keywords: Association rules, Data mining, Economic governance, Females, Political governance, Social governance, Sub-Saharan Africa

1. Introduction

Social, political and economic governance of most countries is often a male-directed, male-oriented and male-dominated enterprise. Even though females in the western world are legally equal politically to males, the difference in political

participation is quite enormous (Andersen, 1975). Kim et al (1974) unearthed that the level of concentration of political, social and economic participation in the ambit of men varies greatly among countries such as the U.S., India, Japan, Nigeria, and Austria. It has also been argued widely and empirically demonstrated that the political socialization of females tends to produce a lack of concern with the sphere of politics, a sense of distance between one's daily concerns and political event (Lowndes, 2004). Krador (1965), posits that irrespective of the concurrence of the idyllic nature of females, suffragists and anti-suffragists confronted the issue of how females can use their power of moral superiority to influence politics in different spheres. The suffragists conclude that females will exert a positive impact on the conduct and content of electoral politics. The anti-suffragists however, have a contradictory position, that female suffrage is very dangerous and will bring social disorder, political disaster and women's loss of position as society's moral arbiter and enforcer (Kraditor, 1965).

Over the past couple of years, females' involvement in the public sphere of life has tremendously shot up (Wolbrecht & Campbell, 2007). This has provided women with political resources and an in-depth increase in their political and economic influence in governments and international organisations. This, however, has not closed the gap between men and women's level of political engagement in a number of key areas of political life. Atkeson (2003) suggests that political or contextual factors, rather than resources or socialization are pillars to these differences. Two tangent contextual factors important to female political engagement are interest and a competitive female candidate (Atkeson, 2003). A number of studies have found that females are largely less interested (Inglehart, 1981; Jennings and Niemi, 1981; Christy, 1987; Verba et al., 1995; Inglehart and Norris, 2003) and less knowledgeable compared to men in politics (Carpini, 1996). According to Inglehart and Norris, (2003) differences in resources, psychological placement and exposure in politics are key factors that explain sex differences in political activity. However, there is no clear factor influencing the less interest of women in politics. Burns et al. (2001) says that the gap between men and women in political interest remains even after social, institutional, and legislative resource favour.

Although women appear to be less interested and less engaged in politics than men, some authors believe that the involvement of women as political candidates, in the campaign process and as public office holders can excite political engagement among women (Karp and Banducci, 2008; Nabareseh and Osakwe, 2014). Verba et al. (1997), in studying the U.S political context, stipulates that the presence of female candidates and representatives increases women's political knowledge. Other authors' also indicated that the female presence in public activity increases political interest and engagement, economic interest, social developmental discourse (Hansen, 1997; Atkeson, 2003), and political discussion (Campbell and Wolbrecht, 2006). In this paper, we use a cross-national approach to investigate how females in six Sub-Saharan Africa countries (Ethiopia, Ghana, Kenya, Nigeria, Zambia and Zimbabwe) are interested in the socio-politico-economic activities in the development of the sub-region. We analyze secondary data on legislative representation of females in the sub-region as presented in a world ranking. The paper also uses the association rule mining to find interesting patterns in the responses collected. The impact of trust of political and governmental leaders in the interest of females in contributing to the social-political-economic development of the countries is also presented.

2. Methodology

2.1 Association rule mining

The association rule mining is a method in data mining used for discovering interesting relations between variables in a dataset (Piatetsky-Shapiro, 1991; Agrawal et al, 1993; Agrawal and Srikant, 1994). An association rule is an implication where $X \rightarrow Y$. The X and Y variables are separate items, where X is an antecedent (Premise) of the rule and Y a consequent (Conclusion) of the rule. Association rule mining is often referred to as basket analysis (Agrawal and Srikant, 1994). In basket analysis, customers are associated with items purchased or likely to be purchased together. This assists retailers to diagnose the purchasing pattern of customers, redesigning store layouts, promotional sales, and catalogue design.

The association rule, a data mining technique, has been employed in many disciplines. Hristovski et al (2001) used association rule mining to support discovery in medicine, Oliveira and Zaiane (2003) balanced privacy and knowledge discovery using association rules, Chen et al., (2010) used association rule mining to evaluate regional environments while Mobasher et al (2001) used association rule discovery for effective personalization. Interesting rules are selected based on some measures of assessment of the effectiveness of the association rule process. These measures include confidence, support and lift (Agrawal and Srikant, 1995; Zaki et al., 1997; Adamo, 2001; Zhang and Zhang, 2002; Han et al., 2004; Pang-Ning et al., 2006). The confidence represents the ratio of the number of transactions/itemset in the consequent as well as the antecedent linked to the itemset in the antecedent. Support represents the number of itemset

(sometimes expressed as a percentage) in the antecedent and consequent parts of the rule (i.e. itemsets contained in X and Y). Finally, the lift represents the ratio of the confidence of the rule and the expected confidence of the rule.

In this paper, the association rule mining is adapted to identify the interestingness in patterns between variables and itemsets used in the study. The paper analyses data from 246 respondents from six Sub-Saharan Africa Countries selected with two countries each from Southern, East and West Africa. The RapidMiner data analysis tool and SPSS are used to do the analysis. Questionnaires were formulated and administered both personally and electronically to respondents.

3. Case Study

The study surveyed 246 females on a random basis from Ethiopia, Ghana, Kenya, Nigeria, Zambia and Zimbabwe. The variables of interest in the questionnaire included age group, academic qualification, level of trust in their governments, interest in contributing to socio-politico-economic development of the country. One of the main goals of the present study is to examine females interactions with their political representatives and the medium used as well as how the Internet influences their level of participation in the socio-politico-economic discourse of their countries.

3.1 2013 democracy ranking

Out of the 115 countries studied by Campbell et al (2013) for the democracy improvement ranking by Freedom House, not so surprising, there were only two Sub-Saharan Africa countries - Zambia and Kenya among the top twenty countries. These top twenty nations were adduced to have performed creditably well (see table 1). The ranking took into consideration political rights, civil liberties, gender gap, press freedom, corruption perception, improvement on democratic policies, and female participation in political and socio-economic issues. Two of the countries (Zimbabwe and Ethiopia) were missing in the ranking).

Table 1: Democracy improvement ranking

Rank of Democracy Improvement	Country	Rank Gain/Loss	Democracy Gain/Loss score
6	Zambia	+5	4.6
9	Kenya	+5	3.8
27	Nigeria	-1	2.0
34	Ghana	0	1.4

Source: Campbell et al (2013)

3.2 Female representation in the legislature

The data in the Table 2 below have been compiled by the Inter-Parliamentary Union (IPU) on the basis of information provided by National Parliaments as of 1/05/2014. Forty-seven sub-Saharan Africa countries are sieved from 189 countries classified in descending order of the percentage of women in the lower or single House. Out of the 189 classified countries, only six Sub-Saharan African countries are located in the first 20. With 63.8% of female representation in the 80 seat parliament for the lower house, Rwanda continues to lead the world in women's representation in the legislature. The countries used in this study are highlighted. In Table 3, 22.9% of females are represented in a single house of parliament only a little more than Asia, Arab States and Pacific countries.

Table 2: Women in National Parliaments

World Classification-Sub-Saharan Africa Countries									
Rank	Country	Lower or single House				Upper House or Senate			
		Elections	Seats*	Women	% W	Elections	Seats*	Women	% W
1	Rwanda	9 2013	80	51	63.8%	30.11.2	26	10	38.5%
5	South Africa	4 2009	400	179	44.8%	4 2009	53	18	34.0%
6	Seychelles	9 2011	32	14	43.8%	---	---	---	---
7	Senegal	7 2012	150	65	43.3%	---	---	---	---
14	Mozambique	10 2009	250	98	39.2%	---	---	---	---
19	Angola	8 2012	220	81	36.8%	---	---	---	---
22	United Republic of Tanzania	10 2010	350	126	36.0%	---	---	---	---
23	Uganda	2 2011	386	135	35.0%	---	---	---	---
29	Algeria	5 2012	462	146	31.6%	12 2012	144	10	6.9%
30	Zimbabwe	7 2013	270	85	31.5%	7 2013	80	38	47.5%
33	Cameroon	9 2013	180	56	31.1%	4 2013	100	20	20.0%
35	Burundi	7 2010	105	32	30.5%	7 2010	41	19	46.3%
39	Tunisia	10 2011	217	61	28.1%	---	---	---	---
40	Ethiopia	5 2010	547	152	27.8%	5 2010	135	22	16.3%
44	Lesotho	5 2012	120	32	26.7%	6 2012	33	9	27.3%
46	South Sudan	8 2011	332	88	26.5%	8 2011	50	5	10.0%
51	Namibia	11 2009	78	20	25.6%	11 2010	26	7	26.9%
54	Mauritania	11 2013	147	37	25.2%	11 2009	56	8	14.3%
58	Sudan	4 2010	354	86	24.3%	5 2010	29	5	17.2%
60	Equatorial Guinea	5 2013	100	24	24.0%	5 2013	75	8	10.7%
67	Malawi	5 2009	193	43	22.3%	---	---	---	---
69	Guinea	9 2013	114	25	21.9%	---	---	---	---
79	Kenya	3 2013	350	67	19.1%	3 2013	68	18	26.5%
81	Burkina Faso	12 2012	127	24	18.9%	---	---	---	---
82	Mauritius	5 2010	69	13	18.8%	---	---	---	---
85	Sao Tome and Principe	8 2010	55	10	18.2%	---	---	---	---
86	Togo	7 2013	91	16	17.6%	---	---	---	---
97	Gabon	12 2011	120	18	15.0%	1 2009	102	17	16.7%
98	Chad	2 2011	188	28	14.9%	---	---	---	---
102	Somalia	8 2012	275	38	13.8%	---	---	---	---
103	Guinea-Bissau	4 2014	102	14	13.7%	---	---	---	---
106	Niger	1 2011	113	15	13.3%	---	---	---	---
111	Djibouti	2 2013	55	7	12.7%	---	---	---	---
113	Sierra Leone	11 2012	124	15	12.1%	---	---	---	---

117	Liberia	10 2011	73	8	11.0%	10 2011	30	4	13.3%
118	Ghana	12 2012	275	30	10.9%	---	---	---	---
119	Zambia	9 2011	158	17	10.8%	---	---	---	---
121	Democratic Republic of the Congo	11 2011	498	53	10.6%	1 2007	108	6	5.6%
126	Botswana	10 2009	63	6	9.5%	---	---	---	---
"	Mali	11 2013	147	14	9.5%	---	---	---	---
127	Cote d'Ivoire	12 2011	254	24	9.4%	---	---	---	---
"	Gambia	3 2012	53	5	9.4%	---	---	---	---
131	Benin	4 2011	83	7	8.4%	---	---	---	---
133	Congo	7 2012	136	10	7.4%	10 2011	72	10	13.9%
134	Nigeria	4 2011	360	24	6.7%	4 2011	109	7	6.4%
135	Swaziland	9 2013	65	4	6.2%	10 2013	30	10	33.3%
144	Comoros	12 2009	33	1	3.0%	---	---	---	---

Source: IPU, 2014 (Organized by authors)

Table 3: Regional representation

Regional Representation	Single or lower House	Upper House or Senate	Both Houses
Nordic countries	42.1%	---	---
Americas	25.7%	26.4%	25.8%
Europe - OSCE member countries including Nordic countries	25.3%	22.8%	24.8%
Europe - OSCE member countries excluding Nordic countries	23.7%	22.8%	23.5%
Sub-Saharan Africa	22.9%	19.8%	22.5%
Asia	19.0%	14.3%	18.5%
Arab States	17.8%	7.7%	15.9%
Pacific	13.4%	38.6%	16.2%

Source: IPU, 2014 (Organized by authors)

3.3 Survey Results

246 females from six Sub-Saharan African countries were surveyed for the study. The distribution of respondents from the various countries surveyed are indicated in Table 4 below. Table 5 also indicates the age group of respondents to indicate that respondents are fully qualified to vote and be voted for based on the age classification of respondents' countries.

Table 4: Citizenship of respondents

Citizen	Frequency	%	Cumulative %
Ethiopian	1	.4	.4
Kenyan	2	.8	28.5
Zimbabwean	16	6.5	100.0
Nigerian	52	21.1	49.6
Ghanaian	67	27.2	27.6
Zambian	108	43.9	93.5
Total	246	100.0	

Table 5: Age distribution of respondents

Age group	Frequency	%	Cumulative %
18-30	155	63.0	63.0
31-35	3	1.2	64.2
31-45	57	23.2	87.4
46+	31	12.6	100.0
Total	246	100.0	

An effective democratic society or country largely depends on the trust and confidence citizens repose in their government (Braithwaite and Levi, 1998). Payment of taxes (Scholz, 1998), contribution to economic debates and macroeconomic growth of the country are some of the areas citizens embrace when there is a higher amount of trust in government. Additionally, compliance with social service programs, investments in the economy, acceptance of legislative and judicial decisions, and support of military objectives also helps to deepen trust in government (Braithwaite and Levi, 1998; Hardin, 1998; Tyler, 1998). Trust is an important facilitator of democratic governance (Malik and Awadallah, 2013). In their article titled *“The economics of the Arab Spring”*, Malik and Awadallah (2013), suggests that the absence of trust in social, political and economic governance triggers the insurgence on the laws of a country by citizens. The voluntary representation of capable, well-read, confident and experienced citizens to serve in a non-trusted government is too minimal. According to Terjesen et al (2009), the presence of women in such a government is often negligible.

In figure 1 below, we present the level of trust the respondents have in their political and administrative leaders from a scale of 0-10 (lower to higher). It is clearly seen in the result that the majority of the respondents have virtually no trust in their governmental authorities. Not a single respondent chose 10, a 100% trust in the authorities. It must be indicated that some female governmental leaders were included in the survey, hence so intriguing that these respondents do not have full trust in their own government and governance.

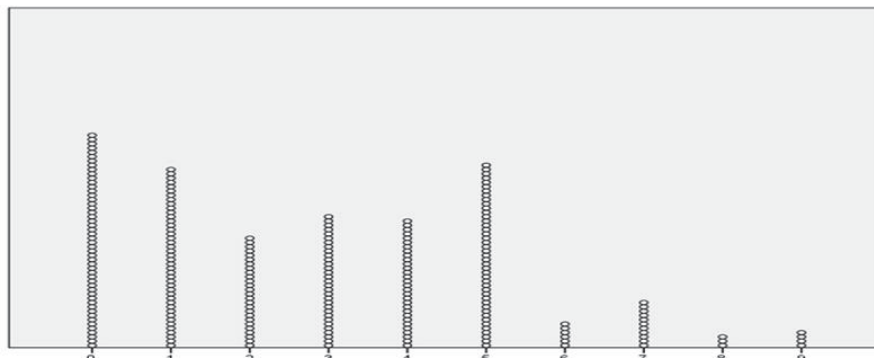


Figure 1: Level of trust on political and governmental leaders

3.4 Interest in socio-politico-economic activities

The interest of females in the surveyed area was elicited. Using a clustered bar chart as shown in Figure 2 below, the interest of females in participating in bills and/or legislative amendments that promote good governance and more inclusive representation in line with the interest in contributing to the socio-economic development of the respective

countries was analyzed. It is clearly seen that respondents are very interested in the legislature of the countries and fully interested in contributing to socio-politico-economic development of the countries.

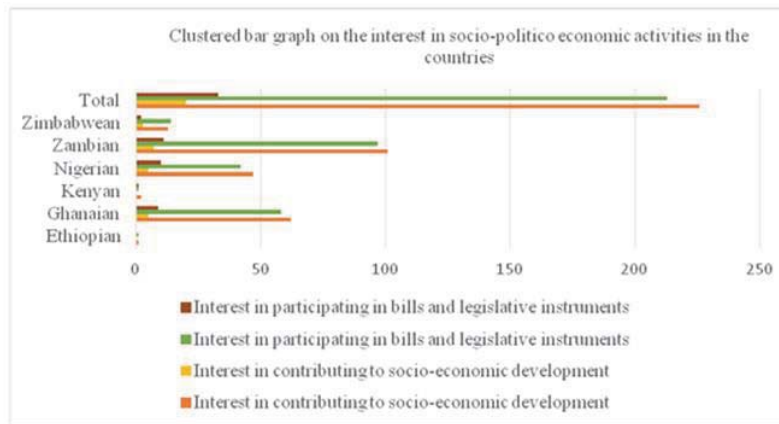


Figure 2: Interest in socio-politico-economic activities

The interest in the socio-politico-economic activities of the countries can be born from the regularity of the persons monitoring or contribution to these issues. To reinforce the interest of respondents, the regularity of them following issues from their country's political and socio-economic events proved that the respondents mostly follow these events everyday as graphed in figure 3 below.

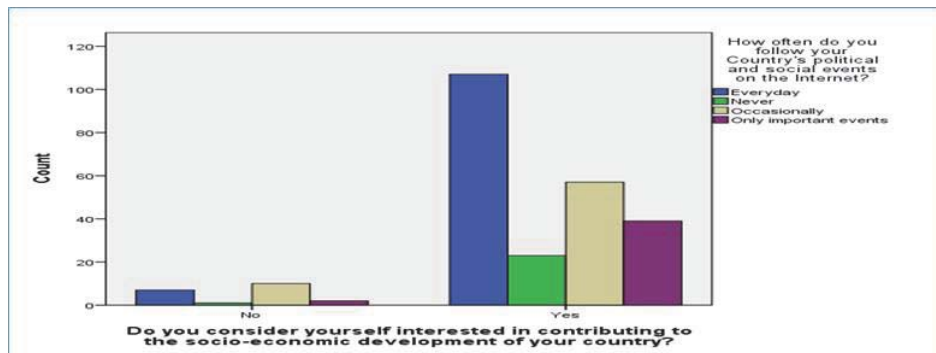


Figure 3: Regularity in following socio-politico-economic events

The interest of participating in bills and legislative instruments to promote good governance had a huge positive response. It is absolutely clear that an overwhelming majority of the sample of females interviewed from the sub-region have an interest in the socio-politico-economic development of their countries. As seen in figure 4, virtual town hall meetings such as using social media, blogs, chat rooms are a preferred mode for their contributions. With the influx of social media and the huge proliferation of mobile devices in Africa, the embrace of the above as the preferred mode of contributing to social, political and economic issues is not far fetched.

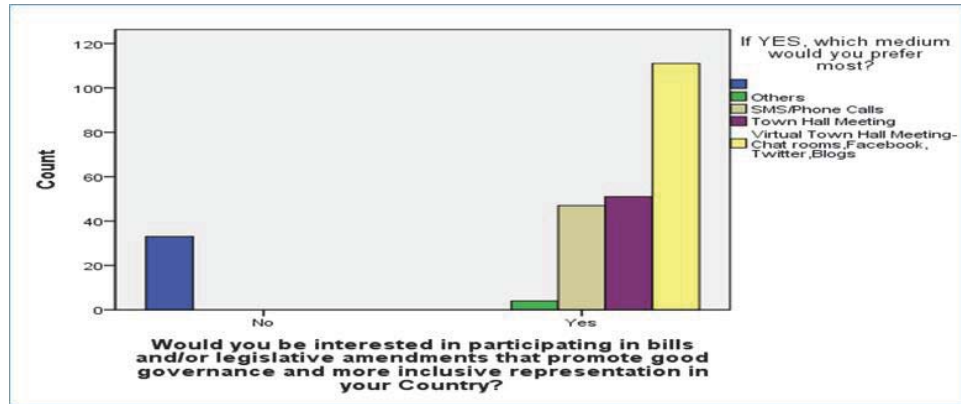


Figure 4: Medium of contributing to legislature

3.5 Association rule mining

The RapidMiner data mining tool was used to generate the association rules between the chosen variables. Using a minimum support of 0.6, a confidence of 0.8 and a lift of 0.8, a model was created to generate interesting rules. The model (see figure 5) was generated from RapidMiner using the variables of interest to create the rules. Figure 6 indicates the frequent itemset using the Frequent Pattern Growth (FP-Growth). In the FP-Growth, the algorithm first counts the number of times an item has occurred in the data and stores as header. The tree removes items of instances that do not meet the minimum support, lift and confidence. The itemset in figure 6 ranges from one to three with a support of 0.919 to 0.650 respectively. This indicates that 91.9% of itemset is contained in both the Premise and Conclusion in size 1 as seen in Figure 6. There is the support of 65% of all itemsets in the antecedent and consequent seen in size 3 of figure 6. This indicates that a respondent who considers herself as interested in contributing to socio-politico-economic development of the country, would be interested in contributing to the legislative instruments of the country, but equally has a high mistrust in the present leadership as well as the day-to-day running of the country affairs. It is interesting in the sense that such people may nurture all these interests because they may either want to contribute to regain the trust of the people or to possibly join the fray. Using the FP-Growth, the rules are then generated as seen in figure 7.

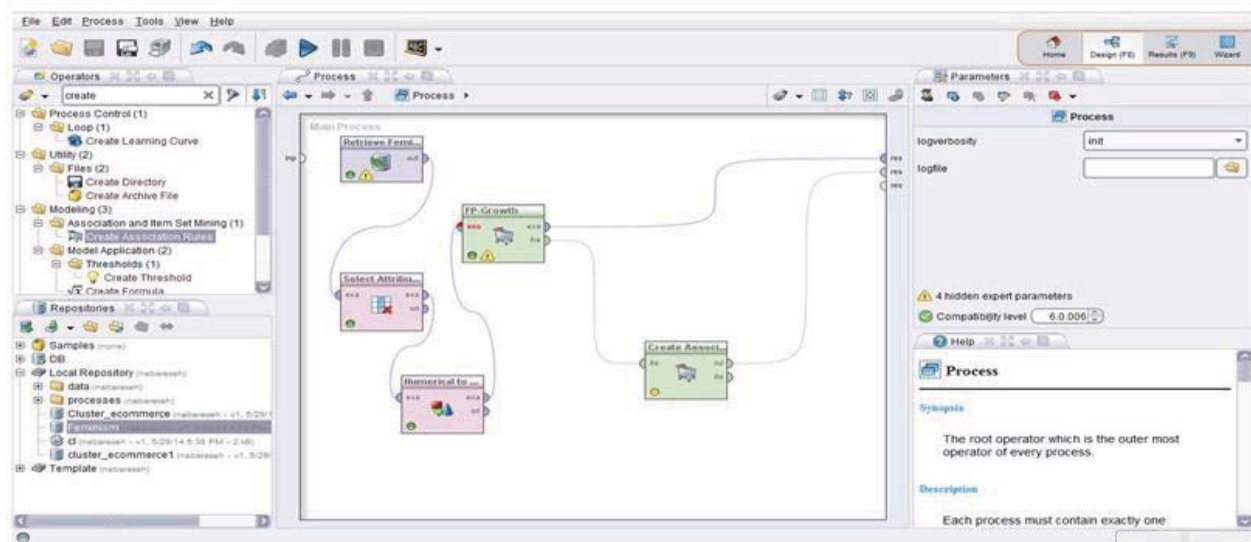


Figure 5: model for association rules

No. of Sets: 7	Size	Support	Item 1	Item 2	Item 3
Total Max. Size: 3	1	0.919	Do you cons		
	1	0.866	Would you b		
Min. Size: <input type="text" value="1"/>	1	0.797	Using a Sca		
Max. Size: <input type="text" value="3"/>	2	0.817	Do you cons	Would you b	
Contains Item: <input type="text"/>	2	0.732	Do you cons	Using a Sca	
	2	0.695	Would you b	Using a Sca	
<input type="text"/>	3	0.650	Do you cons	Would you b	Using a Sca

Figure 6: Frequent itemset

The association rules as generated in Figure 7 have a minimum support of 0.6, a minimum confidence of 0.8 and with a minimum lift of approximately one (1). These rules are generated on three variables based on the support, confidence and lift. These variables are the level of trust in the leadership and governance, the interest in the legislative framework and interest in social and economic issues of the country. For an example, rule number 6 has a 91.8% confidence that the items in the premise as well as the conclusion are linked to the itemset in the Conclusion. In interpreting the rule, there is a 91.8% confidence, 73.2% support and a lift of 100% that when there is a lower level of trust in the governance and leadership of the country, then there is a higher interest in contributing to the social and economic issues of the country. It can therefore be concluded that female interest soars up when they have a lower trust in leadership. Females may want to step into such a situation to correct the system as is a natural instinct of them. The association rule graph as seen in Figure 8 shows the mapping between itemsets in the instances with the support and confidence.

When a female with an interest in contributing to legislative instruments, rule one concludes with a 80.3% confidence and a 69.5% support that the person has a lower trust in the leadership and governance of the country. Even though some of these rules might appear debatable, it is plausible to state that females within the SSA region, albeit based our sample survey, have decided to become more active within the socio-politico-economic landscape in the SSA region. By and large, our results appear to show the rise of the female 'digital' voice in SSA and one who is poised on challenging the status-quo and possibly correcting certain inequalities in the various societies of the SSA region. The generated rules as seen in Figures 7 and 8 are the strong and interesting patterns based on the data collected and analyzed.

No.	Premises	Conclusion	Support	Confid.	LaPl.	Gain	p-s	Lift	Conv.
1	Would you be interested in participating in	Using a Scale of 0 to 10, how much level o	0.695	0.803	0.908	-1.03	0.005	1.008	1.031
2	Using a Scale of 0 to 10, how much level o	Do you consider yourself interested in con	0.650	0.816	0.919	-0.94	-0.00	0.999	0.996
3	Using a Scale of 0 to 10, how much level o	Would you be interested in participating in	0.695	0.872	0.943	-0.89	0.005	1.008	1.052
4	Do you consider yourself interested in con	Would you be interested in participating in	0.650	0.889	0.953	-0.81	0.017	1.027	1.207
5	Do you consider yourself interested in con	Would you be interested in participating in	0.817	0.889	0.947	-1.02	0.022	1.027	1.213
6	Using a Scale of 0 to 10, how much level o	Do you consider yourself interested in con	0.732	0.918	0.964	-0.86	-0.00	1.000	0.996
7	Would you be interested in participating in	Do you consider yourself interested in con	0.650	0.936	0.974	-0.74	0.012	1.018	1.264
8	Would you be interested in participating in	Do you consider yourself interested in con	0.817	0.944	0.974	-0.91	0.022	1.027	1.443

Figure 7: Association rules generated

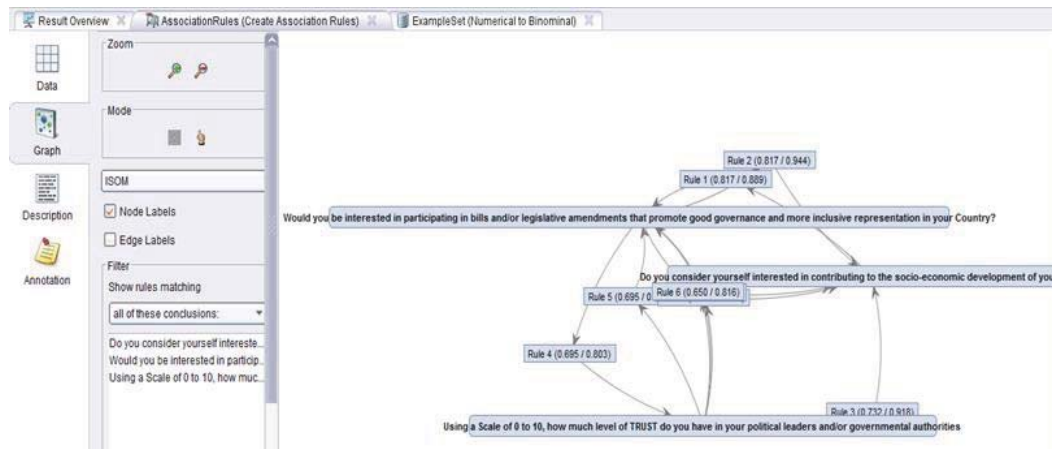


Figure 8: Association rule graph

4. Conclusion and Implications

Based on the findings, females in the sub-region are keen in contributing to the socio-politico-economic development of SSA countries. Although the level of trust in the leadership and governance of the countries covered in our survey is disheartening, to say the least, nonetheless, the interest in stepping in to correct the 'canker' is quite encouraging and worth complimenting. The interest, therefore needs to be elicited by consciously developing programmes that will encourage females to present themselves in the socio-politico-economic development of the sub-region. Although a sample size of 246 for the entire sub-region may not be truly representative, arguably, our sample most likely reveals the ideas and ideals of females in the countries surveyed and portrays an image of the larger perspective.

Female representation in various parliaments across the sub-region is not encouraging. It is, however gratifying to see a host of females, indicating their interest in contributing to bills and other legislative instruments of the countries. This interest, therefore, needs to be nurtured and trained so as to possibly sustain it and in order to empower more females within the SSA region. Incontrovertibly, one basic element that restrains females in actualizing this interest in the sub-region has to do with limited access to educational opportunities. We believe that when more females (both young and old) get access to quality education (formal and informal), they would favourably compete with men. Conceivably, empowered and enlightened females are much more likely to champion 'people-driven' inclusive policies for all in the sub-region compared to their male counterparts.

The proliferation of the Internet and its corresponding impact on issues of governance and economic management is a huge area yet to be fully harnessed in Africa. It is therefore very inspiring that a huge majority of females in the sub-region would prefer addressing national issues through the aid of electronic channels. The influx of social media presents an easier and faster means of communicating with constituents. It presents an avenue for citizens to present their social, political and economic views to their representatives or leaders for consideration. As far as modern communication is concerned in the SSA region, we cannot underscore the fundamental roles of the pervasiveness of mobile devices with its associated communication applications in dramatically changing the socio-politico-economic landscape of the region. We are not oblivion of the fact that dearth of national infrastructure to support ICT development as a whole still remains one of the major challenges in the sub-region. Electronic voting and electronic governance are areas that need full consideration by governments in the sub-region so to reduce the amount of irregularities associated with voting and its precipitated conflicts that constantly endanger the existence of many nations within the sub-region.

The female is mostly associated with good home management skills, we believe such skills can be easily employed in nation building. The 'traditional' belief by the hitherto primitive African society that the place of the woman is in the kitchen is long gone. In the 21st century, the female is more industrious, affluent, businesslike and ready to serve when given the opportunity. Governments must therefore embrace this vast interest from females in the sub-region and engage them in the governance of the various countries. Notwithstanding the limited sample size, we believe this work will contribute significantly to the repository of knowledge. We have equally set the tone for a further intellectual academic discourse on females and socio-politico-economic governance.

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