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MEASUREMENT OF RELATIONSHIP OF POWER SECTOR REFORMS AND SOCIAL ASPECT OF CORPORATE SUSTAINABILITY OF ELECTRICITY GENERATION OF SRI LANKA - EXPLORATORY FACTOR ANALYSIS

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Abstract

Sri Lanka has monopolistic regulatory electricity sector, which has no competition within the electricity business. Hence the introduction of power sector reforms (PSR) to the electricity sector became important as it allows competition, regulation of the sector and improves the efficiency of the sector. With the enactment of the Sri Lanka Electricity Act, reforms were introduced in 2009. However, it has not been clearly identified or recognized whether we can improve the social aspect of electricity generation in order to improve the corporate sustainability (SACS) through the so introduced sector reforms. Since reforms were introduced way back in 2009, it is vital to understand their impacts. Therefore, in order to study and measure

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the psychometric features of PSR and SACS ($N = 405$), a specialized scale is needed. Under this study, a scale is developed to measure the relationship between PSR and the SACS. The developed scale has 16 items for PSR and 10 items for SACS. This scale will complement the task and can be used to measure the perception of stakeholders.

Introduction

Sri Lanka Electricity Act No. 20 of 2009 was enacted to introduce independent regulatory mechanism to monopolistic Electricity Sector of Sri Lanka. According to Jensen and Berg [13], regulators often focus on issues such as cost, incentives, market structure but service quality, and achieving social objectives are quite vital. As such attention is needed to improve the social aspect of the corporate sustainability of the electricity generation sector. According to Lyimo [21], availability and reliability of energy services is vital for the proper functioning and development of all other economy sectors. Hence the introduction of reforms to the electricity sector is very important as it allows competition, regulation of the sector and improves the efficiency of the sector. However, it has not been clearly identified or recognized whether reforms are caused for improvement of the social aspect of the electricity generation in order to improve the corporate sustainability (CS) of the sector.

Opinion of stakeholders is very important on the implementation of the reforms as most of the time majority of stakeholders oppose the regulations as they have different viewpoints on electricity sector reforms. The development of the measuring scale is pivotal to measure the relationship as most of the research studies, journal articles are based on the secondary data to assess the impacts of the reforms on SACS.

Power Sector Reforms, Corporate Sustainability and People Perception

The scale has been developed to measure the relationship of power sector reforms and social aspect of corporate sustainability. There is a

public debate arguing that power sector reforms introduced to improve the performances (Bacon and Besant-Jones [2]) has to change its direction (Ruet [28]). Collier and Esteban [5] stressed consideration of the stakeholder's interest to be very important and can express interest (Norman and MacDonald [24]) and influence the organization actions (Henriques and Sadorsky [11). In that context, electricity sector stakeholders' preferences can be converted to specific regulatory mechanism for successfulness of the program (Mullins [22]). Changes in ownership structure and structural changes of the sector are important dimensions of the reforms (Kennedy [17]). Utilities are changed significantly (Chester [4]). Shao et al. [31] stressed that accountability of the regulator is the key to ensure proper regulatory mechanism. Independency of the regulator on the decisions, independent process for tariff setting, financing independency (Kennedy [18]) and the requirement of financial autonomy of the regulator (Samarajiva [29]) are necessary. Financial situation (Benn and Bolton [3]) is vital and can be considered as a dimension of the reforms. Slayton [32] explained average production cost, average tariff, average cost recovery as a percentage of generation cost as financial indicators of the sector reforms. Some of the studies discussed about the productivity improvement (Nelson and Wohar [23]), and performance improvement (Bacon and Besant-Jones [2]).

For any organization, sustainability is very important for business and also for its future (Aras and Crowther [1]). Corporate sustainability defined by Marrewijk and Werre [35] says that in any business operation, it is essential to demonstrate the inclusion of social and environmental concerns and their interactions with the stakeholders. Consideration of changes of economic, political and social dimensions to change their goals to achieve the status of being sustainable rather than profit generators is pivotal (Dalmia [8]). Corporate sustainability (CS) defined as meeting the needs of the present stakeholders without compromising needs of the future stakeholders (Dyllick and Hockerts [9]) and future generations will have similar consumption opportunities (Reinhardt [27]).

CS is a broader term which includes many other terms such as corporate social responsibility and corporate governance (Saratun [30]). It has no precise definition (Marrewijk and Werre [35]). CS is a wider area which captures several areas including economic, social and environmental aspects. Further regulatory mechanism helps to develop situation of symmetry in information (Johannsen [14]). It was highlighted that proper environmental management can improve stakeholder relationships and prevent costly stakeholder conflicts (Hull and Rothenberg [12]). Dash and Sangita [7] stressed the appearance of stakeholders' role in decision making process. Lameira et al. [19] stressed the actions of the governance to improve performance, to achieve objectives and to deliver service for the society and emphasized the social acceptance with the status of harmony between a corporation's value system and that of society (López et al. [20]). Further, Aras and Crowther [1] stressed that governance is highly influential for performance. Sullivan et al. [33] explained customer interruption costs due to outages under various circumstances and also customers' value of service, service reliability and power quality as indicators.

Scale Development Methodology

The scale has been formulated to get the opinions from the customers as a stakeholder group of the electricity sector. The items have been included to measure the constructs of PSR and SACS. Prior to the circulation of the questionnaire among the customers, it was referred to experts in the electricity sector to get their feedback on the adequacy of the items in questionnaire to ensure the content of the questionnaire and to generate additional items and to determine whether additional dimensions of PSR and SACS would emerge. Based on the literature and experts' opinions explanation to measure the opinion of customers on PSR, 26 items were identified under five dimensions and 19-items were identified to measure the social aspect of CS under three dimensions. To measure the opinion of PSR dimensions are electricity sector structural changes, regulator accountability, regulatory independence, financial status of the utility

and productivity improvement. The three dimensions to measure the opinions of customers on SACS are institutional values, governance and inclusion/consultation. The dimensions of each aspect and the conceptual framework are as Figure 1.

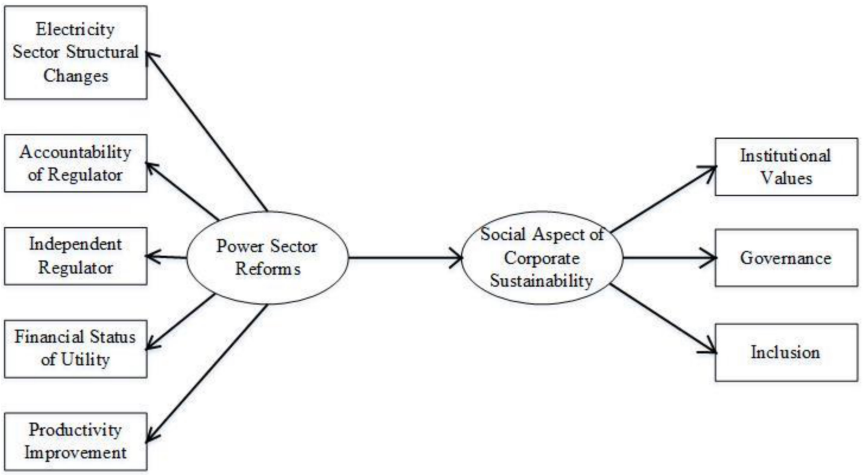

Figure 1. Conceptual framework.

To do the pilot study to check the validity and the reliability of the scale and also to identify the factors of the respondents, the sample was selected randomly. The key aspects of exploratory factor analysis are factor extraction method, rules of retaining factors, factor rotation strategies and sample size (Osborne et al. [25]). Further, Osborne et al. [25] have analyzed the sample size and items for sample size in previous studies and pointed out that 1:2 to 1:5 is reasonable. Comrey and Lee [6] suggested that more than 300 sample is good for EFA. The sample size of this study is 405. The data collected from electricity customers have been used for exploratory factor analysis.

Development of Scale for Constructs of Power Sector Reforms and Social Aspect of Corporate Sustainability

The questionnaire developed based on the literature survey was circulated among the randomly selected approximately 550 electricity

customers. A total of 405 questionnaires were returned back from the customers which had the response rate of 73.5%. The data analysis was done using the statistical data analysis software, SPSS.

The data were collected from the domestic electricity customers. Domestic electricity customers consume 30% of electricity generated by the utility (CEB, 2019). The questionnaire was prepared in English and translated into Sinhala and Tamil. In Sri Lanka, under the category of domestic customers, the electricity consumers pay a subsidized price for electricity usage and some of them pay more than the cost of the utility for service. According to the tariff structure customers who use less than 110 kWh/month pay subsidized tariff. In the study there are 224 (55% of the sample) respondents who pay subsidized rate and the rest 181 (45%) pay the rate which is higher than that of the utility cost of the service. According to Osborne et al. [25], more than 60% of researchers used principle component analysis as the factor extraction method. The popular method used for determination of number of factors to retain is the Kaiser [16] criterion of eigenvalues greater than 1.0.

Development of Scale for PSR

To assess the reliability of each variable, the Cronbach's alpha was measured and findings are as follows:

Table 1. Reliability statistics for initial items of PSR

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.920	0.925	26

In Table 1 of Appendix 1. The items of PSR3, PSR4, PSR5 and PSR12 have no significant item correlation 0.3 and removed from the scale. The Cronbach's alpha is more than 0.700 which indicates the high reliability of the scale and close relationship of the set of items are as a group. To ensure further reliability, factor analysis was done. The results are given.

Development of Scale for SACS

Again to test the Cronbach's alpha for the scale of SACS is more than 0.700 which indicates the high reliability of the scale and close relationship of the set of items as a group. To ensure further reliability, factor analysis is performed. The results are given in Table 2 of Appendix 1.

There are some items which have no significant factor loading, hence removed the items of CSSA4, CSSA5, CSSA6, CSSA13, CSSA15, CSSA17 ad CSSA19. The reliability checking of the scale to measure the CSSA was conducted using SPSS. The results are given in Table 2.

Table 2. Reliability statistics of the variable of SACS

	Cronbach's alpha based on standardized items	N of items
0.698	0.738	19

Exploratory Factor Analysis (EFA)

There are two variables to perform the exploratory factor analysis (EFA), where all the items under each dimension are rotated to ensure the validity of the questionnaire.

Table 3. KMO and Bartlett's test

Kaiser-Meyer-Olkin measure of sampling adequacy		0.718
Bartlett's test of sphericity	Approx. chi-square	14469.150
	df	561
	Sig.	0.000

According to the above table, the KMO value is more than 0.500 (0.718) and Bartletts test of sphericity α is < 0.05. Hence, EFA is considered as an appropriate technique for further analysis of the data. The results of the rotated component of PCA under the EFA are given in Table 3 of Appendix 1. As per the results of EFA, there are 4 dimensions in PSR and 3 in SACS variable. Accordingly, factors of each dimension have been provided in Table 4.

Table 4. Summary of the factor loading rotated component matrix

Component	1	2	3	4	5	6	7	8
PSR26	0.843							
PSR25	0.791							
PSR9	0.756							
PSR20	0.722							
PSR10	0.675							
PSR19	0.632							
PSR13		0.800						
PSR7		0.772						
PSR16		0.621						
PSR22		0.515						
PSR8		0.513						
PSR18		0.500						
CSSA3			0.791					
CSSA1			0.722					
CSSA12			0.665					
PSR11				0.801				
PSR15				0.765				
CSSA8					0.836			
CSSA9					0.811			
CSSA10					0.716			
CSSA11					0.608			
CSSA16						0.769		
CSSA14						0.699		
CSSA18						0.628		
PSR1								0.662
PSR2								0.645

Extraction method: Principal component analysis.

Rotation method: Varimax with Kaiser normalization.

Rotation converged in 12 iterations.

In the third stage of this scale development process, reliability and validity were tested for the new 4 factors of power sector reforms and 3 factors of social aspect of CS.

Three factors of social aspect of corporate sustainability are as follows:

Factor 1 of SACS

Table 5. Reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.759	0.769	3

Table 6. Item-total statistics

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
CSSA3	5.08	3.514	0.728	0.548	0.548
CSSA12	4.50	2.894	0.614	0.486	0.664
CSSA1	4.56	3.946	0.470	0.252	0.804

The Cronbach's alpha of the Factor 1 of the items of SACS given in Table 5 is 0.769. It is greater than 0.700. Table 6 gives the Cronbach's alpha values if the item is deleted. Accordingly, the item CSSA1 can be removed to increase Cronbach's alpha up to 0.804. However, even with the inclusion of three items, the reliability of the factor is in an acceptable level. Hence, it was decided to keep these three items for the study.

Factor 2 of SACS

The reliability of the items loaded to the Factor 2 was checked. Results are given in Table 7 and Table 8.

Table 7. Reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.783	0.786	4

Table 7 gives that the Cronbach's alpha value is 0.786 which indicates reasonable reliability among the items loaded to the Factor 2.

Table 8. Item-total statistics

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
CSSA8	5.76	3.544	0.741	0.559	0.646
CSSA9	5.72	3.413	0.597	0.368	0.737
CSSA10	6.12	4.278	0.551	0.376	0.748
CSSA11	6.15	4.655	0.505	0.304	0.771

According to Table 7, the Cronbach's alpha of the Factor 2 of the scale is 0.780 which is greater than 0.700. Further Table 8 shows that there is no single item which can be removed to get enhanced value for Cronbach's alpha.

Factor 3 of SACS

Table 9. Reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.602	0.635	3

According to Table 9, the Cronbach's alpha of Factor 3 is less than 0.700, however, for exploratory factor analysis, this can be considered and kept in the scale for further analysis.

Under Factor 3, there are 3 items remained and the Cronbach's alpha is 0.602. If the item CSSA18 is deleted, then the figure can be improved up to the value of 0.632. Since this is exploratory factor analysis, it was decided to improve Cronbach's alpha while removing the item from the scale. Accordingly, the Cronbach's alpha statistics has been checked again. The result is given in Table 10. Further, Table 11 shows that there is no item to remove to improve Cronbach's alpha.

Table 10. Reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.632	0.659	2

Table 11. Item-total statistics

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
CSSA16	4.00	2.505	0.571	0.332	0.351
CSSA14	3.91	2.130	0.389	0.241	0.544
CSSA18	4.00	2.238	0.334	0.159	0.632

In accordance to Table 10, the Cronbach's alpha is 0.659. It is close to 0.700. No item is to be deleted to improve the value. The remaining items are listed in Table 11. Accordingly, only the items of CSSA16 and CSSA14 remain in the scale with Factor 3 of SACS.

Reliability analysis for variable of power sector reforms Factor 1

According to Table 12, the Cronbach's alpha is 0.903 for Factor 1. According to Table 13, no item can be removed to improve the Cronbach's alpha.

Table 12. Reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.903	0.906	6

Table 13. Item-total statistics

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
PSR9	13.32	31.960	0.675	0.529	0.894
PSR10	13.24	30.992	0.662	0.587	0.896
PSR19	13.03	29.058	0.743	0.715	0.885
PSR20	12.94	27.569	0.815	0.734	0.873
PSR25	13.46	32.615	0.755	0.609	0.886
PSR26	13.59	30.524	0.795	0.654	0.877

Reliability analysis for variable of power sector reforms Factor 2

According to Table 14, the Cronbach's alpha is 0.853 for Factor 2. No item is removed to improve the Cronbach's alpha as per Table 15.

Table 14. Reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.853	0.852	6

Table 15. Item-total statistics

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
PSR13	15.84	25.364	0.809	0.716	0.795
PSR16	15.68	24.965	0.752	0.680	0.805
PSR18	15.58	25.110	0.692	0.548	0.819
PSR22	16.42	28.160	0.609	0.460	0.834
PSR7	15.99	29.943	0.481	0.379	0.856
PSR8	16.52	31.825	0.515	0.334	0.850

Reliability analysis for variable of power sector reforms Factor 3

According to Table 16, the Cronbach's alpha is 0.743 for Factor 3. No item is removed to improve the Cronbach's alpha as per the values given in Table 17.

Table 16. Reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.743	0.745	2

Table 17. Item-total statistics

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
PSR11	3.54	2.259	0.594	0.353	.
PSR15	3.77	2.703	0.594	0.353	.

Reliability analysis for variable of power sector reforms Factor 4

According to Table 18, the Cronbach's alpha is 0.737 for Factor 3. No item is removed to improve the Cronbach's alpha as per Table 19.

Table 18. Reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.737	0.742	2

Table 19. Item-total statistics

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
PSR1	2.29	1.141	0.589	0.347	.
PSR2	2.33	0.871	0.589	0.347	.

Rename the Factors of Power Sector Reforms

Considering the items loaded into each factor and their relevancy, these factors are renamed as follows:

F1: Regulation; F2: Accountability; F3: Independency;

F4: Institutional changes.

Renaming of the factors of social aspect of corporate sustainability.

F1: Institutional values; F2: Governance; F3: Inclusion.

There are only 10 items which remain under 3 dimensions for the new scale to measure the social aspect of corporate sustainability of the electricity sector as per the domestic customers' point of view.

Further improvement of the reliability

To ensure more reliability of these measures, split-half reliability has been considered. This SPSS output given in Table 20 indicates that all these data were supportive of the reliability of the measurement.

Table 20. Reliability statistics

Cronbach's alpha	Part 1	Value	.782
		N of items	8a
	Part 2	Value	.914
		N of items	8b
	Total N of items		16
Correlation between forms			.773
Spearman-Brown coefficient	equal length		.872
	Unequal length		.872
Guttman split-half coefficient			.848

a. The items are: PSR1, PSR2, PSR9, PSR10, PSR11, PSR7, PSR8, PSR15.

b. The items are: PSR16, PSR18, PSR19, PSR20, PSR13, PSR22, PSR25, PSR26.

Reliability statistics for SACS

Table 21. Reliability statistics

Cronbach's alpha	Part 1	Value	.745
		N of items	5a
	Part 2	Value	.606
		N of items	4b
	Total N of items		9
Correlation between forms			.136
Spearman-Brown coefficient	equal length		.240
	Unequal length		.241
Guttman split-half coefficient			.238

a. The items are: CSSA8, CSSA9, CSSA10, CSSA11, CSSA14.

b. The items are: CSSA1, CSSA3, CSSA12, CSSA16.

Again to ensure the reliability of this scale, composite reliability (CR) and average variance exacted (AVE) were calculated using following equations. The composite reliability indicates the reliability and internal consistency of the variables. A value of $CR \geq 6$ (Fornell and Larcker [10]) is needed for composite reliability of a construct. The average variance extracted indicates the average percentage of variation explained by the measuring items of a construct. According to Fornell and Larcker [10], it is required for a construct to describe the variation explained by the measuring items.

Average variance extracted (AVE) and composite reliability (CR) are calculated by the formulae given below, where k = factor loading of every item, and n = number of items in a model:

$$AVE = \frac{k_2}{n},$$

$$CR = \frac{k_2}{1 + k_2} - k_2.$$

Table 22. AVE and CR values for the factors of power sector reforms

	F1	F2	F3	F4
Average variance extracted (AVE)	0.547	0.400	0.934	0.430
Composite reliability (CR)	0.878	0.790	0.760	0.600

All AVE and CR values in Table 22 indicate good reliability of the scale except the AVE of F2 and F3. However, AVE is the only criterion to be considered. But the scales can be considered for the future measurement.

Table 23. AVE and CR values for the factors of social aspect of corporate sustainability

	F1	F2	F3
Average variance extracted (AVE)	0.530	0.560	0.491
Composite reliability (CR)	0.770	0.834	0.742

Finally, the developed measuring scale to measure the relationship of the variables of power sector reforms and social aspect of corporate sustainability is provided in Appendix 2.

Discussion and Conclusion

This study aims to develop a scale to measure the relationship between power sector reforms and social aspect of corporate sustainability. Based on the literature survey and experts' views, 5 dimensions, namely, structural changes, regulator accountability, regulatory independency, financial status of utility and productivity were identified for PSR, and 3 dimensions, namely, institutional values, governance and inclusion were identified to measure the SACS. Accordingly, the number of items identified under 5 dimensions of PSR is 26, while under the three dimensions of SACS, this number is 18. Using the responses from randomly selected domestic electricity customers, the scale had been purified. Accordingly, dimensionality, factor analysis, reliability and validity were examined. Subsequent to this examination, the number of new dimensions of PSR is reduced to 4, namely, regulation, accountability, independency and institutional changes, and the dimensions of SACS remained as it is with the reduction of the items down to 10. Accordingly, 26 items resulted in relationship model of PSR and SACS. This study has contributed to develop a scale to measure the stakeholders' opinion on PSR and SACS. This scale can be used to measure the opinion of other stakeholders though this was developed based on the perception of the domestic customers. Since there is significant number of stakeholders in the electricity sector, this scale can be used to compare the opinions of each stakeholder category of PSR and SACS. However, the confirmatory analysis has to be done with new sample of the electricity customers.

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Appendix 1

Table 1. Item total statistics of PSR

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
PSR1	74.69	386.248	.495	.565	.918
PSR2	74.74	378.063	.626	.679	.916
PSR3	74.54	393.039	.201	.589	.922
PSR4	74.12	392.258	.229	.596	.921
PSR5	74.15	401.474	.028	.759	.926
PSR6	73.43	365.201	.564	.848	.916
PSR7	73.79	387.016	.326	.774	.920
PSR8	74.33	386.101	.475	.742	.918
PSR9	74.41	374.793	.603	.811	.916
PSR10	74.35	372.603	.579	.800	.916
PSR11	73.24	373.635	.457	.723	.919
PSR12	73.60	405.541	-.042	.764	.927
PSR13	73.65	368.414	.659	.828	.915
PSR14	74.03	368.994	.787	.903	.913
PSR15	73.47	362.425	.711	.913	.913
PSR16	73.50	359.426	.760	.919	.912
PSR17	73.71	374.068	.569	.853	.916
PSR18	73.41	360.227	.708	.821	.913
PSR19	74.14	361.519	.742	.850	.913
PSR20	74.04	361.073	.718	.874	.913
PSR21	74.19	365.246	.687	.860	.914
PSR22	74.23	366.691	.725	.798	.914
PSR23	74.23	376.490	.745	.783	.915
PSR24	74.50	381.291	.604	.694	.916
PSR25	74.56	376.302	.674	.862	.915
PSR26	74.69	377.114	.552	.829	.916

Table 2. Item-total statistics of SACS

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
CSSA1	40.51	58.129	.304	.728	.683
CSSA2	40.77	57.817	.370	.823	.678
CSSA3	41.04	56.612	.466	.819	.669
CSSA4	41.05	61.422	.137	.508	.698
CSSA5	40.87	59.687	.245	.816	.689
CSSA6	39.28	60.251	.039	.657	.726
CSSA7	40.46	54.668	.398	.772	.671
CSSA8	40.86	59.034	.332	.835	.682
CSSA9	40.82	56.716	.421	.572	.672
CSSA10	41.24	58.343	.444	.817	.675
CSSA11	41.26	59.224	.415	.587	.679
CSSA12	40.47	55.532	.380	.824	.674
CSSA13	40.35	56.990	.251	.622	.690
CSSA14	40.98	57.724	.341	.728	.680
CSSA15	41.05	60.351	.210	.629	.692
CSSA16	41.06	59.938	.327	.559	.684
CSSA17	40.71	59.198	.096	.520	.715
CSSA18	41.09	58.045	.324	.807	.682
CSSA19	40.74	60.294	.187	.718	.694

Table 3

Component	Initial eigenvalues			Extraction sums of squared loadings			
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	% of variance
1	11.226	33.017	33.017	11.226	33.017	33.017	17.511
2	4.196	12.342	45.359	4.196	12.342	45.359	14.292
3	2.820	8.295	53.654	2.820	8.295	53.654	10.184
4	2.505	7.368	61.023	2.505	7.368	61.023	9.683
5	1.993	5.861	66.883	1.993	5.861	66.883	8.913
6	1.409	4.144	71.027	1.409	4.144	71.027	6.799
7	1.245	3.663	74.690	1.245	3.663	74.690	5.930
8	1.206	3.547	78.237	1.206	3.547	78.237	4.925
9	.927	2.726	80.963				
10	.831	2.445	83.408				
11	.674	1.983	85.391				
12	.627	1.843	87.234				
13	.519	1.526	88.760				
14	.495	1.455	90.215				
15	.445	1.309	91.523				
16	.365	1.072	92.596				
17	.347	1.020	93.615				
18	.293	.861	94.476				
19	.270	.795	95.272				
20	.233	.687	95.958				
21	.223	.656	96.614				
22	.194	.572	97.186				
23	.163	.479	97.665				
24	.149	.438	98.103				
25	.130	.383	98.486				
26	.112	.331	98.816				
27	.097	.286	99.103				
28	.066	.193	99.296				
29	.064	.189	99.485				
30	.055	.161	99.646				
31	.042	.124	99.770				
32	.036	.105	99.875				
33	.022	.065	99.940				
34	.020	.060	100.000				

Appendix 2

Table 1. Revised questionnaire to measure the relationship of PSR and SCSSA as a result of EFA

No	Question	SA	A	MA	N	MDA	DA	SDA
		1	2	3	4	5	6	7
	Regulation							
Q.1	Accountability of the regulator ensures by the reforms for expenditures.							
Q.2	PSR has ensured the prevention of regulatory capture.							
Q.3	PSR has ensured the uninterrupted electricity service.							
Q.4	PSR has ensured the minimization of un service cost for customers.							
Q.5	PSR ensures the better allocation of energy sources.							
Dimension: 2 Accountability								
Q.7	Accountability of the regulator ensures by the reforms for following of legal procedures by regulator.							
Q.8	Accountability of the regulator ensures by the reforms for implementation of legal provisions stipulated under the regulation by the reforms.							
Q.9	PSR ensures accessibility of information for any stakeholder.							
Q.10	PSR ensures the functioning of Utility without any Financial burden.							
Q.11	Regulator should minimize the any political interference for power generation, development.							
Q.12	Reforms improve the performance of the employees of the utility.							
Dimension: 3 Independency								
Q.13	Existing regulations allows electricity regulator to work without political interferences.							
Q.14	PSR has ensured adequate legal provisions to regulatory activities of the utility.							
Dimension: 4 Institutional changes								
Q.15	PSR enhanced positive institutional changes in the Utility.							
Q.16	Due to PSR necessary regulatory rules formulated to improve the quality of the service of the utility.							
Social aspect of corporate sustainability								
Dimension: 1 Institutional values								
Q.17	Wellbeing of the electricity sector minimizes frequency of interruption of electricity supply.							
Q.18	Wellbeing of the electricity sector drives utility to ensure the social acceptance of usage of energy resources.							
Q.19	Due to the Wellbeing of the electricity sector utilities that action for mitigation of social impacts due to power generation.							

Dimension: 2 Governance		
Q.20	Electricity purchasing is transparent under the Wellbeing of the electricity sector.	
Q.21	Under the Wellbeing of the electricity sector, electricity purchasing has to be done through competitive method.	
Q.22	Power purchase agreements should be clear enough to perform transaction.	
Q.23	In the achievement of wellbeing of the electricity sector decision making of utility has to be acceptable for the society.	
Dimension: 3 Inclusion		
Q.24	Green energy policy formulation has to be done with adequate general public consultations.	
Q.25	To select energy generation sources under Wellbeing of the electricity sector, need to get views from general public.	
Q.26	For wellbeing of the electricity sector social acceptability is vital for energy sources.	