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Implementing Supplier Relationship Management in the Manufacturing Sector of Ghana: A Factor And Principal Component Analysis

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Abstract

This study investigated how to implement Supplier Relationship Management to the manufacturing sector of Ghana; using selected manufacturing companies the in Eastern and Volta regions of Ghana as case study. Accelerated product cycles, vastly more sophisticated supply chains, rapid pace of process and systems change, and the need to work seamlessly with offshore suppliers have made effective supplier relationship management more demanding and more critical than ever before. However in Ghana, it has remained an uncharted territory for most manufacturing firms in Ghana. It was therefore important to assess how to implement SRM in the manufacturing sector of Ghana. The case studies for this study were the management of Volta Star Company Ltd, Akosombo Textiles and the Intravenous infusions Limited. Based on the simple random, purposive, and quota sampling techniques 60 managers from these companies were sampled. Their views were analysed with Factor Analysis and Principal Component Analysis. These tools were used to establish the relative importance of the SRM elements in their applicability to the manufacturing sector of the country. The relative importance of the elements of SRM to the Ghanaian manufacturing sector appeared in the following order: Resourcing, Technology, Segmentation, Accountability, and Process and governance. This is the order of priority that must be given to the SRM elements in the implementation plans of manufacturing firms in Ghana.

Keywords: SRM, Resourcing, Accountability, Process and Governance, Segmentation

1.0 Introduction

Changes that have occurred in the business context have been phenomenal. Along with the changes in companies' external supply environments, there have also been appreciable changes in the procurement function as well as in procurement practices, processes, and systems. In many companies, the procurement function, traditionally the owner of transactional purchasing, has taken on a broader role leading the business through application of strategic sourcing and outsourcing in category after category, spreading procurement best practices. In addition, several companies have adopted best practice models for strategic sourcing and many have used procurement systems to facilitate the sourcing process and streamline on-going purchasing activities.

Accelerated product cycles, vastly more sophisticated supply chains, rapid pace of process and systems change, and the need to work seamlessly with offshore suppliers have made effective supplier relationship management more demanding and more critical than ever before.

Companies that will excel in the new competition will be those who adopt Supplier Relationship Management (SRM) as a means of adopting to the changes that have occurred in the business context. SRM is a discipline of working collaboratively with those suppliers that are vital to the success of your organization, to maximise the potential value of those relationships.

2.0 Review Of Literature

In this paper a comprehensive literature review on how to implement Supplier Relationship Management have been carried out.

2.1 Components of Supplier Relationship Management

Martinson (2005) notes that, the components of Supplier Relationship Management (SRM) include supplier segmentation, Supplier Accountability, Process and Governance, Technology and resourcing

2.1.1 Supplier segmentation

According to Martinson (2005), in order to establish or enhance SRM, a company has to implement a supplier segmentation mechanism that considers the internal needs of the business, spend, and also accounts for all risk and business critical factors.

Gardener (2004) presents four categories of traditional segmentation:

Commodity: This is where little or no SRM activity is undertaken as the suppliers provide infrequent one off products or services

Performance Management: This is where emphasis is placed on cost and service levels as the supplier is providing off the shelf goods or short to mid term services that are not strategically important and are provided from a competitive market environment

Development: This is where focus is placed upon continuous improvement to service levels and cost as the arrangements are middle to long term, with some strategic value

Partner: This is where strategic long term goods and / or service suppliers are managed to secure supply and drive collaborative engagement with shared benefits (Gardener, 2004)

According to Timmons (1999) an added part of Segmentation relates to evaluating the 'Power Dependency' of a relationship where approach, strategy, engagement and messaging techniques can be identified for certain types of suppliers.

2.1.2 Accountability

Executive involvement is vital to the success of aligning the respective organisations strategic objectives and forms the basis of building a partnership and ultimately unlocking value for both the buyer and the seller. The main challenge is who owns the supplier relationship, with over 9 ownership types having been identified. Procurement functions must take a pivotal role in coordinating and integrating supplier relationships, whilst owning and co-ordinating the process, governance and technology. (Timmons, 1999)

2.1.3 Process and governance

According to Gardener (2004), Organisations have ‘pockets of excellence’ of clearly articulated processes and roles often led by the IT function. Organisations often view process and governance in a ‘one size fits all’ approach and are

yet to tailor processes and roles and responsibilities to the different supplier segments. Companies need to devote adequate attention on developing appropriate rules and procedures which outline buyer-supplier relationships.

2.1.4 Technology

According to Ishakawa (2008) Supplier relationship management (SRM) software enables businesses to manage the relationship between buyers and suppliers. Procurement officials use SRM software to define replenishment strategies, manage contracts, evaluate suppliers, and establish strategic sourcing relationships. Event management tools are used to help minimize inventory stock-outs and stockpiles. Collaborative planning tools enable managers to exchange order forecasts with vendors and maintain a supplier scorecard with historical data.

2.1.5 Resourcing

Gardener (2004) presents three key skills required for procurement officials to implement successful SRM:
Market & category knowledge
Cross-functional working
Commercial & contractual expertise.
The current SRM role is viewed as a task to be performed in addition to the 'day job' and a lot of organisations have yet to implement a Supplier Account Management structure with dedicated resources and set roles and responsibilities. (Gardener, 2004)

2.2 SRM Implementation Models

Several models have been applied to Supplier Relation Management implementation. Some of these models include the Total Quality Management (TQM), Supplier Engagement Model and the Value Model. The principles of TQM when applied to SRM implementation says that suppliers must be given the same importance as companies give to their customers. The Supplier Engagement Model indicates that in implementing SRM, companies should not use a one-size fit all approach. Instead suppliers must be engaged in the order of their importance to the company. They should be more collaborative with strategic suppliers and more demanding with less important suppliers. The Value Measurement Model uses scorecards to evaluate the performance of suppliers. It is based on the premise that suppliers must provide value which can be a basis for competitive advantage. (Atherton, 2010)

3.0 Methodology

3.1 Objective of the Study

To identify the relative importance of the SRM elements in their application to the manufacturing sector of Ghana.

3.2 Sources of Data: The research design for the study is exploratory in nature. The researcher depended heavily on primary data. The required data were collected from three manufacturing companies in Ghana namely Akosombo Textiles Limited, Volta Star Company Limited, and Intravenous Infusions Limited. The study was conducted during the period between May and July 2012 through a structured questionnaire.

3.3 Sampling Size and Procedure: The sample size covered 60 experts in the manufacturing sector of Ghana who were spread through out the Eastern Region of Ghana. This included all the 12 top managers of the companies, 24 procurement managers, 12 IT managers, 6 marketing managers and 6 accountants.

The quota sampling technique ensured that the non top managers selected occurred in the ratio 4:2:1:1 respectively. The ratio indicated the level of involvement of these managers in Supplier Relationship Management. Those who were more involved in SRM and adequately knowledgeable had greater representation in the sample.

3.4 Variables

Participants were asked to evaluate the importance of 35 variables, identified from the literature on the importance of the elements of Supplier Relationship Management by making five choices for every one of the 35 variables: "extremely important" for the variables which were considered to have the highest importance to the manufacturing sector and "not important" for the variables considered to having no influence on the sector.

4.0 Results And Discussions

Factor Analysis: Kaiser-Meyer-Olkin Measure of Sampling Adequacy is employed to examine the appropriateness of the data for factor analysis. High values (between 0.5 and 1) indicate that the factor analysis is appropriate. Further, Bartlett's Test of Sphericity is a test statistics used to examine the hypothesis that the variables are uncorrelated in the population. From table 4.1 it is clear that the data used for the study is conducive for performance factor analysis. It is also evident from **Table 4.1** that the variables are significantly related to the population.

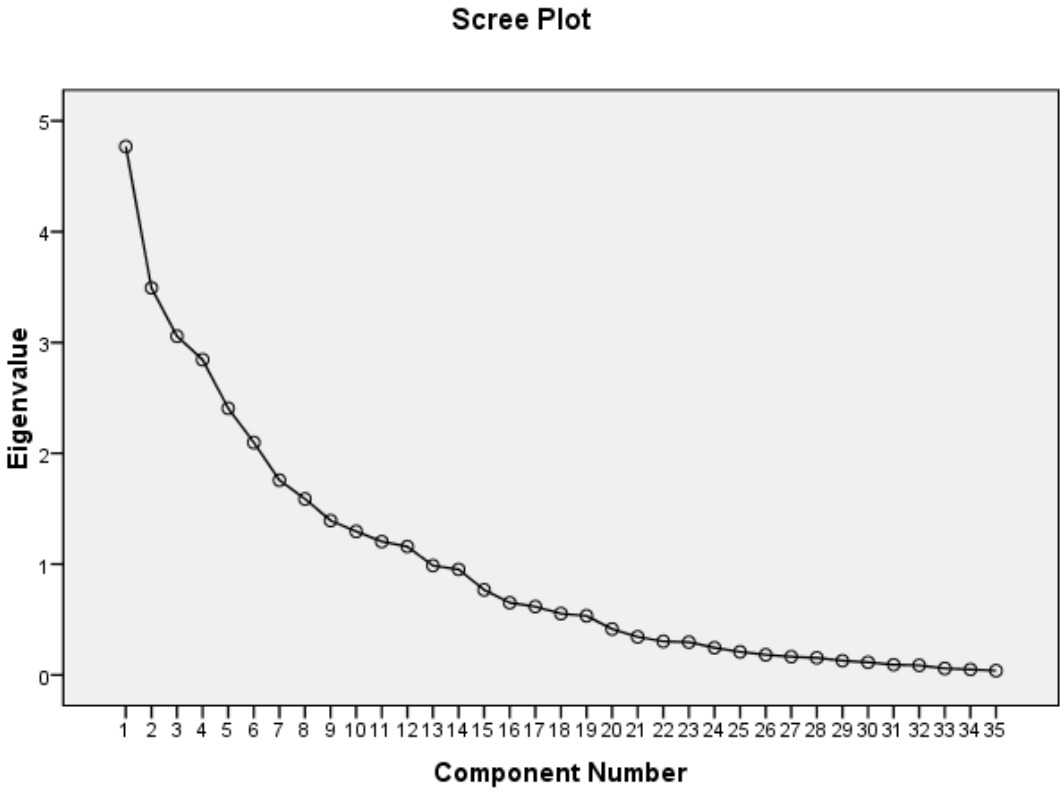
Table 4.1: KMO and Bartlett's Test

KMO and Bartlett's Test

Table 4.1

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.547
Bartlett's Test of Sphericity	Approx. Chi-Square	2.154E3
	Df	595
	Sig.	.000

Source: Results from factor analysis



Source: Results from factor analysis Figure 4.1

The scree plot is to show components acceptable with an eigenvalue of 1. An eigenvalue of 1 shows that 12 components out of 35 components can be adopted. The elbow is not obvious in this scree plot so the choice of 12 is from the eigen value of 1.

Table 4.2: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.769	13.626	13.626	4.769	13.626	13.626
2	3.493	9.979	23.605	3.493	9.979	23.605
3	3.057	8.734	32.339	3.057	8.734	32.339
4	2.845	8.129	40.468	2.845	8.129	40.468
5	2.406	6.875	47.344	2.406	6.875	47.344
6	2.097	5.992	53.336	2.097	5.992	53.336
7	1.758	5.023	58.359	1.758	5.023	58.359
8	1.588	4.537	62.895	1.588	4.537	62.895

9	1.393	3.980	66.876	1.393	3.980	66.876
10	1.295	3.700	70.576	1.295	3.700	70.576
11	1.204	3.439	74.015	1.204	3.439	74.015
12	1.158	3.309	77.324	1.158	3.309	77.324

(full table can be found in the appendix)

Source: Results from PCA

The eigenvalue represents the total variance explained by each factor. The eigenvalue was used to select factors that recorded high variances. The higher the variance, the more important the factor is. In essence, the eigen value was used to rate the importance of the elements of SRM. This means that managers must place more importance on the factors or elements that recorded higher scores than those that recorded lower scores.

From the results of the total variance explained, it can be seen that only 12 out of the 35 components can be examined. This was because the rest had no extraction sums of squared loadings.

Selection of values above 0.6

From the principal component analysis in the appendix, the following factors were found to be the most important factors of SRM. A value of 0.6 indicates a high level of importance for the elements of SRM.

Table 4.4 Summary of results from PCA

What is the importance of supplier segmentation in the managing of supplier relations in the Ghanaian manufacturing sector?	.753
How important is SRM'S resourcing systems necessary in tackling corruption in the supplier selection and management process?	.693
What is the importance of supplier accountability systems in the managing of supplier relations in the Ghanaian manufacturing sector?	.664
What is the importance of SRM'S resourcing systems in the managing of supplier relations in the Ghanaian manufacturing sector?	.804
How important are the benefits associated with resourcing to the manufacturing sector of Ghana?	.644
What level of concentration should manufacturing firms dedicate to SRM technologies?	.777
What level of focus and energies should manufacturing firms dedicate to designing and maintaining appropriate guidelines and procedures?	.634

RATING THE SRM ELEMENTS

Inferring from the above table, the ratings of the SRM elements appear in the following order of importance:

1. Resourcing
2. Technology
3. Segmentation
4. Accountability
5. Process and governance

Conclusion:

Out of the total 35 variables, it is found out that the SRM elements appear in the following order of importance: Resourcing, Technology, Segmentation, Accountability, Process and governance. This order of importance of the SRM elements determines how stakeholders must dedicate energies and resources in order for a successful implementation of SRM in Ghana's manufacturing sector.

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APPENDIX A

TABLE 4.3 COMPONENT MATRIX

	Component											
	1	2	3	4	5	6	7	8	9	10	11	12
The importance of supplier segmentation in the Ghanaian manufacturing sector	-.080	.253	.069	-.011	.647	.032	.306	-.081	.074	.194	-.094	.364
The required level of management attention that should be given to supplier segmentation	-.156	-.371	.136	-.125	-.150	-.184	.162	.124	-.014	-.310	.526	.222
The required level by which SRM'S supplier segmentation systems can be used to curtail corruption in the supplier selection process	.219	-.439	.181	.457	-.063	-.029	-.260	-.092	-.146	.255	.125	-.186
The importance of SRM'S supplier segmentation systems in tackling corruption in the supplier selection and management process	.314	-.433	.254	.310	-.206	-.328	.052	-.106	-.268	.229	-.164	.028

The importance of supplier segmentation in the managing of supplier relations in the Ghanaian manufacturing sector	.753	-.076	.173	.021	.052	.005	-.131	-.202	-.032	.005	.032	-.013
The importance of the benefits associated with supplier segmentation to the manufacturing sector of Ghana	.548	.339	-.190	.022	-.410	-.412	.094	.155	-.094	-.075	.120	.127
Rating how the benefits associated with supplier segmentation compare with the associated challenges	.180	.578	-.386	.545	-.180	.053	.130	-.155	-.025	.055	-.027	.114
The importance of accountability in the manufacturing sector of Ghana	-.193	.396	-.530	.463	-.102	-.083	.110	-.292	-.153	-.072	-.042	.259
The level of accountability needed in the manufacturing sector of Ghana	.016	-.112	.058	.103	.535	-.296	.395	.167	.361	-.197	.058	-.248
The importance of SRM'S accountability systems necessary in tackling corruption in the supplier selection and management process	.037	.522	.508	.337	-.043	.254	-.244	.023	.082	-.009	.083	-.076
The level required for SRM'S accountability systems to be used to curtail corruption in the supplier selection process	.557	-.175	-.101	-.185	-.045	.343	-.084	-.323	.145	.167	.339	-.015
The importance of supplier accountability systems in the managing of supplier relations in the Ghanaian manufacturing sector	.664	.214	.029	.109	-.228	-.155	.224	.388	.013	-.182	-.191	.001
The importance of the benefits associated with supplier accountability to the manufacturing sector of Ghana	.433	-.171	-.419	-.329	.250	.147	-.273	.185	-.077	-.069	-.264	-.050
Rating how the benefits associated with supplier accountability compare with the associated challenges	.214	-.009	-.415	-.061	.281	-.480	-.199	-.076	.085	.023	.083	.107
The importance of appropriate process & governance requirements in the supplier relations management of manufacturing firms of Ghana	.145	.093	-.333	-.103	-.317	.093	.458	.229	-.043	.542	.046	.075

The level of focus and energies that manufacturing firms should dedicate to designing and maintaining appropriate guidelines and procedures	-.240	-.024	-.190	.634	.044	-.047	.075	-.159	.366	.046	-.160	-.139
The importance of SRM'S process and governance systems necessary in tackling corruption in the supplier selection and management process	.440	-.188	-.428	.229	.075	.269	.314	-.030	-.211	-.243	.123	-.088
The level needed for SRM'S process and governance systems to be used to curtail corruption in the supplier selection process	.118	-.257	.024	.376	-.053	.417	-.006	.527	.279	-.034	-.110	.027
The importance of SRM'S process and governance systems in the managing of supplier relations in the Ghanaian manufacturing sector	.388	.291	-.286	-.085	.245	.288	-.267	-.256	.025	-.312	.157	-.135
The importance of the benefits associated with SRM'S process and governance to the manufacturing sector of Ghana	.422	-.023	.373	.216	-.019	-.317	-.006	.145	.264	-.285	.003	.179
Rating how the benefits associated with SRM'S process and governance compare with the associated challenges	-.074	.431	.052	-.301	.012	.266	.493	-.135	-.261	-.224	-.111	-.238
The importance of the use of SRM'S technology systems in the manufacturing sector of Ghana	-.141	.478	.351	.119	-.024	.253	.131	.210	-.111	.134	.470	-.324
The level of concentration which manufacturing firms dedicate to SRM technologies?	.087	-.233	-.248	.777	-.060	.064	-.028	.026	-.016	.006	.228	-.107
The importance of SRM'S technology systems necessary in tackling corruption in the supplier selection and management process	.362	.021	.089	.182	.438	.138	-.360	.209	-.415	.021	.030	.198
The level you perceive SRM'S technology systems can be used to curtail corruption in the supplier selection process	.161	-.283	-.203	.218	.423	.488	.159	.271	-.068	-.072	-.060	.208

The importance of SRM'S technology systems in the management of supplier relations in the Ghanaian manufacturing sector	.378	-.073	.471	.100	.121	-.279	.191	-.103	-.356	-.050	-.242	-.337
The importance of SRM'S benefits to the manufacturing sector of Ghana	.549	.467	.048	.022	.209	-.211	-.105	.123	-.239	-.050	.110	.102
Rating how the benefits associated with SRM'S technology compare with the associated challenges	.470	.043	.383	.117	.225	.173	.209	-.064	.027	.202	-.187	-.067
The importance of SRM'S resourcing to the manufacturing sector of Ghana	.499	-.122	-.119	-.243	-.465	.254	-.173	.023	.238	.095	-.229	-.009
The level of resourcing needed by manufacturing firms in their SRM application	.498	.064	.227	-.215	.229	.047	.238	-.353	.176	.255	.110	.187
The importance of SRM'S resourcing systems necessary in tackling corruption in the supplier selection and management process	.693	.068	.045	-.273	-.368	.129	.143	.018	.204	-.106	.072	.031
The level required for SRM'S resourcing systems to curtail corruption in the supplier selection process	.071	.435	-.159	-.155	.313	-.276	-.164	.449	.108	.418	.184	-.112
The importance of SRM'S resourcing systems in the managing of supplier relations in the Ghanaian manufacturing sector	-.036	.804	-.073	.049	-.061	-.038	-.302	.003	.184	-.051	-.185	-.179
The importance of the benefits associated with resourcing to the manufacturing sector of Ghana	.104	.197	.644	.220	-.012	.106	-.029	-.185	.259	-.069	-.008	.321
Rating how the benefits associated with resourcing compare with the associated challenges	-.452	.196	.387	-.022	-.243	.256	-.087	.186	-.276	-.055	-.079	.335

The choice of the PCA was to transform the data set which has a huge dimension to a new data set with a smaller dimension as in Table 4.3.

APPENDIX B

Table 4.2: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.769	13.626	13.626	4.769	13.626	13.626
2	3.493	9.979	23.605	3.493	9.979	23.605
3	3.057	8.734	32.339	3.057	8.734	32.339
4	2.845	8.129	40.468	2.845	8.129	40.468
5	2.406	6.875	47.344	2.406	6.875	47.344
6	2.097	5.992	53.336	2.097	5.992	53.336
7	1.758	5.023	58.359	1.758	5.023	58.359
8	1.588	4.537	62.895	1.588	4.537	62.895
9	1.393	3.980	66.876	1.393	3.980	66.876
10	1.295	3.700	70.576	1.295	3.700	70.576
11	1.204	3.439	74.015	1.204	3.439	74.015
12	1.158	3.309	77.324	1.158	3.309	77.324
13	.986	2.818	80.142			
14	.953	2.723	82.865			
15	.768	2.193	85.058			
16	.652	1.862	86.919			
17	.617	1.761	88.681			
18	.553	1.581	90.261			
19	.533	1.524	91.785			
20	.414	1.182	92.967			
21	.343	.981	93.948			
22	.303	.865	94.812			
23	.296	.845	95.657			
24	.245	.701	96.358			
25	.208	.593	96.951			
26	.182	.519	97.470			
27	.165	.471	97.941			

28	.154	.440	98.381			
29	.129	.367	98.748			
30	.114	.327	99.075			
31	.092	.262	99.338			
32	.086	.247	99.585			
33	.058	.166	99.750			
34	.049	.141	99.891			
35	.038	.109	100.000			

Extraction Method: Principal Component Analysis.