Study on relevance of SHRM practices in achieving TQM objectives

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Abstract

In prevailing open economy and competitive market scenario implementation of Total Quality Management (TQM) principles is mandatory for organizations that wish to flourish, perform and establish brand image. But to achieve the objectives of TQM the human resources must be managed strategically. So this study attempts to explore the synergistic role of SHRM (Strategic Human Resource Management) practices in achieving the objectives of TQM. The primary data is collected through questionnaire survey of about 90 respondents from different organizations. Reliability and validity of questionnaire tested through Cronbach's alpha and exploratory factor analysis. Besides Descriptive statistics, Canonical Correlation, Hypothesis testing and ANOVA are utilized for drawing conclusions. The findings of this paper bring out the influence of Strategic HRM practices in achieving TQM objectives. This study explores the effect of SHRM practices on employees' commitment, motivation, perception and morale for success of TQM in organizations. This paper provides guidelines for future researchers to design an HR information system based on SHRM principles, corporate strategy and business unit strategy oriented towards TQM.

Keywords: Canonical Correlation, SHRM, TQM

1. Introduction

A pilot study based on several responses from different organizations e.g. IBM, ORACLE, IOCL, PNB etc. revealed that well performing organizations provide high quality products/services and follow a sound HR strategy. It was also recognized that such organizations follow Strategic HRM practices to implement TQM principles. Therefore, it is important to investigate the relationships among variables of SHRM and objectives of TQM.

2. Objective of the Study

Evaluation of importance of SHRM practices for fulfillment of TQM objectives.

2.1 Problem Formulation/ Hypothesis

Various researchers across the world have established that the HR practices must be aligned with corporate strategy and business strategy to improve efficiency and managerial effectiveness. In present competitive market scenario TQM principles must be included in corporate, business and operational strategies. Extensive research works are found on SHRM and its implications on various aspects of organizational efficiency and effectiveness, e.g. financial performance, employee turnover etc. But very few published research papers are found which examine the extent to which the SHRM practices can influence achievement of the objectives/goals of Total quality management. Hence, based on literature review following hypothesis can be stated:

H1: SHRM practices significantly influence achievement of TQM objectives.

2.2 Experimental Design

With deference to Awolusi Olawumi Dele et al the seven dimensions of SHRM practices can be summarized as below:

1. Integration of HRM with Corporate Strategies (X1)
2. Delegation of HR practices to Line/operational managers (X2)
3. Innovative and rigorous Recruitment and Selection system (X3)
4. Training and Development system (X4)
5. Logical and Fair Performance appraisal system (X5)
6. Compensation/Reward System (X6)
7. Sound Career Planning System (X7)

From extensive literature review TQM objectives can be summarized as improvement of following dimensions:

1. Customer satisfaction and customer oriented process (Y1)
2. Continuous Improvement (Y2)
3. Organizational culture for Quality improvement by employee empowerment (Y3)
4. Increase Productivity and Profitability by cost reduction (Y4)
5. Establish Brand Image by improving quality of products/services (Y5)

With due consideration to above-mentioned dimensions of SHRM and TQM a questionnaire survey was done for collection of responses from 90 employees, executives, managers of different organizations. The number of usable responses was 65 and response rate was 72%. The questionnaire was designed on 5-point Likert scale based on conceptual model at Fig.1. The questionnaire for measurement of SHRM practices comprised 35 questions and was anchored such that the SHRM variables relate to fulfillment of TQM objectives. The questionnaire for measurement of extent of fulfillment of TQM objectives contained 05 questions which relate to effect of SHRM practices. The scale values for responses were: 5- completely agree, 4- agree, 3- undecided, 2- disagree, and 1- completely disagree.

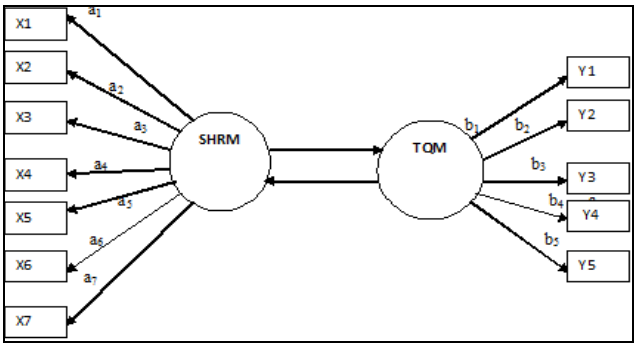

Fig 1: Graphical Illustration of Correlation between SHRM and TQM variables

Here two Canonical Variates are: (i) $CV_X = a_1X1 + a_2X2 + a_3X3 + a_4X4 + a_5X5 + a_6X6 + a_7X7$
(ii) $CV_Y = b_1Y1 + b_2Y2 + b_3Y3 + b_4Y4 + b_5Y5$

3. Methodology

The reliability of the items in the questionnaire was ensured by Cronbach's alpha which was found to be more than 0.7. The face validity of the questionnaire was ensured through expert's opinion. To realize the objectives of this study it was intended to evaluate inter-relationships among variables of two groups namely SHRM and TQM. Since maximization of the correlation between the variables is essential to identify the effect of one set of variables on the other, so, Canonical correlation among the two sets of variables were found with the help of statistical package SPSS 20. Bartlett's Sphericity and Kaiser-Meyer-Olkin (KMO) tests confirmed the inter-correlation among the variables, degree of common variance and sampling adequacy. Exploratory factor analysis was done for drawing inferences on construct validity.

3.1 Computational Experiments

With the help of NCSS 11.0.7 statistical software package internal consistency of the items in the questionnaire was tested based on responses of sample of 65 respondents from various organizations. The Cronbach's alpha values for SHRM variables X1, X2, X3, X4, X5, X6, X7 are presented at Table-1 below

Table 1: Cronbach's Alpha for SHRM variables

Item Analysis Report							
Dataset F:\...\Analysis\IMS\FINAL_IMS\data_IMS.txt							
Reliability Section							
--------- Item Values ----------			**---------- If This Item is Omitted ----------**				**R2**
Variable	**Mean**	**Standard Deviation**	**Total Mean**	**Total Std. Dev.**	**Coef Alpha**	**Corr Total**	**Other Items**
X1	40.8	5.108816	223.0769	31.10683	0.8841	0.7059	0.5461
X2	35.87692	6.469901	228	30.49795	0.8917	0.6237	0.5177
X3	39.6	5.833095	224.2769	30.82385	0.8883	0.6507	0.4752
X4	38.4	5.981221	225.4769	30.5538	0.8850	0.6807	0.4912
X5	36.76923	6.907354	227.1077	29.19339	0.8718	0.7889	0.6929
X6	35.69231	7.055413	228.1846	29.12843	0.8732	0.7782	0.6473
X7	36.73846	6.750641	227.1385	29.82023	0.8825	0.7036	0.6339
Total			263.8769	34.90143	0.8977		
Cronbach's Alpha 0.897705 Std. Cronbachs Alpha 0.898883							

Similarly the Cronbach's alpha values for TQM variables Y1, Y2, Y3, Y4, Y5 are found and presented at Table-2:

Table 2: Cronbach's Alpha for TQM variables

Item Analysis Report							
Dataset F:\...\Analysis\IMS\FINAL_IMS\data_IMS.txt							
Reliability Section							
--------- Item Values ----------			**---------- If This Item is Omitted ----------**				**R2**
Variable	**Mean**	**Standard Deviation**	**Total Mean**	**Total Std.Dev.**	**Coef Alpha**	**Corr Total**	**Other Item**
Y1	38.76923	7.182377	150.4615	23.28027	0.8207	0.7043	0.5009
Y2	38.30769	7.617667	150.9231	23.43362	0.8431	0.6216	0.4062
Y3	35.53846	7.295283	153.6923	22.88348	0.8070	0.7554	0.5724
Y4	42.61538	4.428926	146.6154	25.81647	0.8525	0.6252	0.4184
Y5	34	8.803409	155.2308	21.58614	0.8113	0.7515	0.5922
Total			189.2308	28.79386	0.8581		
Cronbach's Alpha 0.858075 Std. Cronbachs Alpha 0.866650							

KMO and Bartlett's Test[a]

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.894
Bartlett's Test of Sphericity	Approx. Chi-Square	523.145
	df	66
	Sig.	.000

a. Based on correlations

Communalities

	Initial	Extraction
X1	1.000	.612
X2	1.000	.498
X3	1.000	.548
X4	1.000	.494
X5	1.000	.686
X6	1.000	.716
X7	1.000	.648
Y1	1.000	.638
Y2	1.000	.581
Y3	1.000	.642
Y4	1.000	.500
Y5	1.000	.682

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component
	1
X1	.783
X2	.706
X3	.740
X4	.703
X5	.828
X6	.846
X7	.805
Y1	.799
Y2	.762
Y3	.801
Y4	.707
Y5	.826

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.245	60.373	60.373	7.245	60.373	60.373
2	.850	7.086	67.460			
3	.713	5.942	73.402			
4	.642	5.348	78.750			
5	.471	3.923	82.673			
6	.464	3.865	86.538			
7	.415	3.459	89.997			
8	.357	2.977	92.974			
9	.295	2.457	95.432			
10	.254	2.121	97.552			
11	.168	1.404	98.956			
12	.125	1.044	100.000			

Extraction Method: Principal Component Analysis.

Table 3: Factor Analysis of SHRM & TQM variables

Factor analysis of SHRM and TQM variables were done through SPSS 20 to ascertain validity. Factor analysis output at Table-3 also reports the Kaiser-Meyer-Olkin (KMO) test of sampling adequacy and Bartlett's Sphericity test to check whether the correlation matrix is an identity matrix (i.e. all correlations are zero for the dataset).

To investigate the correlation among variables of two groups namely SHRM and TQM, canonical correlation analysis was done with SPSS 20 and the results are presented at Table - 4.

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Table 4: Canonical Correlation Analysis of SHRM and TQM variables

The default error term in MANOVA has been changed from WITHIN CELLS to WITHIN+RESIDUAL. Note that these are the same for all full factorial designs.

** * * * * * * * * * * A n a l y s i s   o f   V a r i a n c e * * ********

65 cases accepted.
0 cases rejected because of out-of-range factor values.
0 cases rejected because of missing data.
1 non-empty cell.

1 design will be processed.

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* * * * * A n a l y s i s   o f   V a r i a n c e -- Design 1 * * * * * *

EFFECT.. WITHIN CELLS Regression
Multivariate Tests of Significance (S = 5, M = 1/2, N = 25 1/2)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillai's	1.31105	2.89398	35.00	285.00	.000
Hotelling's	6.73978	9.89785	35.00	257.00	.000
Wilk's	.08493	5.13311	35.00	225.38	.000
Roy's	.86111				

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Eigenvalues and Canonical Correlations

Root No.	Eigenvalue	Pct.	Cum. Pct.	Canon Cor.	Sq. Cor
1	6.20010	91.99264	91.99264	.92796	.86111
2	.25540	3.78946	95.78209	.45105	.20344
3	.19851	2.94528	98.72738	.40697	.16563
4	.07079	1.05027	99.77765	.25711	.06611
5	.01499	.22235	100.00000	.12151	.01476

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Dimension Reduction Analysis

Roots	Wilks L.	F	Hypoth. DF	Error DF	Sig. of F
1 TO 5	.08493	5.13311	35.00	225.38	.000
2 TO 5	.61153	1.19597	24.00	189.59	.250
3 TO 5	.76771	1.01987	15.00	152.23	.438
4 TO 5	.92010	.59518	8.00	112.00	.780
5 TO 5	.98524	.28473	3.00	57.00	.836

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EFFECT .. WITHIN CELLS Regression (Cont.)
Univariate F-tests with (7,57) D. F.

Variable	Sq. Mul. R	Adj. R-sq.	Hypoth. MS	Error MS	F	Sig. of F
Y1	.66494	.62379	313.61693	19.40737	16.15968	.000
Y2	.56142	.50755	297.85885	28.57604	10.42338	.000
Y3	.53954	.48300	262.53880	27.51548	9.54150	.000
Y4	.52735	.46930	94.57449	10.40988	9.08507	.000
Y5	.66716	.62629	472.73196	28.96274	16.32207	.000

Raw canonical coefficients for DEPENDENT variables
Function No.

Variable	1	2	3	4	5
Y1	.05356	-.05639	.10071	-.14966	-.01575
Y2	.03741	-.04954	-.13154	-.02007	.08638
Y3	.00650	.07135	-.06421	.00624	-.18615
Y4	.05596	-.21774	.06049	.18054	-.02940
Y5	.03067	.12759	.03995	.05500	.09898

Standardized canonical coefficients for DEPENDENT variables

Variable	Function No. 1	2	3	4	5
Y1	.38469	-.40501	.72331	-1.07494	-.11315
Y2	.28496	-.37734	-1.00203	-.15292	.65804
Y3	.04739	.52053	-.46846	.04553	-1.35799
Y4	.24786	-.96435	.26793	.79960	-.13022
Y5	.26998	1.12323	.35168	.48414	.87138

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Correlations between DEPENDENT and canonical variables

Variable	Function No. 1	2	3	4	5
Y1	.86297	-.03964	.26484	-.41879	-.09048
Y2	.76072	-.09455	-.60098	-.11692	.19370
Y3	.77090	.26398	-.23577	.07299	-.52451
Y4	.74672	-.34445	.16633	.52427	-.14577
Y5	.85057	.42617	.14566	.22601	.15037

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Variance in dependent variables explained by canonical variables

CAN. VAR.	Pct Var DEP	Cum Pct DEP	Pct Var COV	Cum Pct COV
1	63.97491	63.97491	55.08963	55.08963
2	7.60928	71.58418	1.54805	56.63767
3	10.71575	82.29993	1.77483	58.41250
4	10.40639	92.70633	.68793	59.10043
5	7.29367	100.00000	.10769	59.20812

Raw canonical coefficients for COVARIATES

COVARIATE	Function No. 1	2	3	4	5
X1	.05447	-.17030	.02935	.01070	-.02932
X2	.03111	.06040	.08699	-.12795	-.07393
X3	.02922	.03690	.00066	.04250	-.13793
X4	-.01649	-.04878	-.16935	.08005	-.02952
X5	-.00217	.20519	-.08487	-.05764	.02064
X6	.03931	-.12851	-.06141	-.04449	.13876
X7	.06109	.01927	.16604	.11471	.03377

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Standardized canonical coefficients for COVARIATES

COVARIATE	CAN. VAR. 1	2	3	4	5
X1	.27828	-.87004	.14995	.05466	-.14980
X2	.20126	.39080	.56285	-.82779	-.47830
X3	.17047	.21523	.00384	.24789	-.80456
X4	-.09861	-.29174	-1.01291	.47880	-.17654
X5	-.01502	1.41733	-.58624	-.39812	.14259
X6	.27738	-.90668	-.43326	-.31392	.97901
X7	.41238	.13009	1.12086	.77436	.22795

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Correlations between COVARIATES and canonical variables

Covariate	CAN. VAR. 1	2	3	4	5
X1	.79592	-.26003	-.10177	-.14545	-.20349
X2	.69687	.04771	-.04184	-.55020	-.31323
X3	.73470	.03393	-.11046	.24129	-.46320

X4	.60567	.02751	-.61152	.22285	-.23227
X5	.78704	.44681	-.31279	-.05610	.18319
X6	.86622	-.10221	-.22076	-.14049	.34062
X7	.83488	.22976	.12562	.41266	.20368

- -

Variance in covariates explained by canonical variables

CAN. VAR.	Pct Var DEP	Cum Pct DEP	Pct Var COV	Cum Pct COV
1	50.34493	50.34493	58.46495	58.46495
2	.97268	51.31761	4.78112	63.24607
3	1.32648	52.64410	8.00883	71.25490
4	.59017	53.23427	8.92760	80.18250
5	.12636	53.36063	8.55838	88.74088

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Regression analysis for WITHIN CELLS error term
--- Individual Univariate .9500 confidence intervals

Dependent variable .. Y1

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t	Lower -95%	CL- Upper
X1	.3519360249	.2503316631	.15998	2.19984	.032	.03158	.67230
X2	.3432891052	.3092355707	.12255	2.80115	.007	.09788	.58870
X4	-.2792413768	-.2325419974	.12907	-2.16343	.035	-.53771	-.02078
X7	.3860398617	.3628348302	.13482	2.86338	.006	.11607	.65601

Dependent variable .. Y2

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t	Lower -95%	CL- Upper
X6	.4026387276	.3729202702	.15948	2.52472	.014	.08329	.72199

Dependent variable .. Y4

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t	Lower -95%	CL- Upper
X1	.3018363974	.3481716842	.11717	2.57608	.013	.06721	.53646
X7	.2898239764	.4417544257	.09874	2.93523	.005	.09210	.48755

Dependent variable.. Y5

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t	Lower -95%	CL- Upper
X7	.6078433278	.4661072037	.16470	3.69064	.001	.27804	.93765

* * * * * * * * * A n a l y s i s o f V a r i a n c e -- Design 1 * * * * * * *

EFFECT .. CONSTANT
Multivariate Tests of Significance (S = 1, M = 1 1/2, N = 25 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.41360	7.47640	5.00	53.00	.000
Hotellings	.70532	7.47640	5.00	53.00	.000
Wilks	.58640	7.47640	5.00	53.00	.000
Roys	.41360				

Note.. F statistics are exact.

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Eigenvalues and Canonical Correlations

Root No.	Eigenvalue	Pct.	Cum. Pct.	Canon Cor.
1	.70532	100.00000	100.00000	.64312

- -

EFFECT .. CONSTANT (Cont.)
Univariate F-tests with (1,57) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
Y4	271.56557	593.36317	271.56557	10.40988	26.08729	.000

Case Processing Summary

Cases Used in Analysis	65

Iteration History

	Loss	Fit	Difference from the Previous Iteration
0[a]	1.685294	.314706	
85[b]	.091575	1.908425	.000008

a. The loss of iteration 0 is the loss of the solution with all single variables treated as numerical (with loss difference 0.0001 and maximum number of iterations 50).
b. The iteration process stopped because the convergence test value was reached.

Component Loadings

Set		Dimension 1	Dimension 2
1	X1[a,b]	.468	.464
	X2[a,b]	.580	.242
	X3[a,b]	.645	.076
	X4[a,b]	.538	.072
	X5[a,b]	.506	.540
	X6[a,b]	.837	-.102
	X7[a,b]	.825	-.256
2	Y1[a,b]	.530	.580
	Y2[a,b]	.574	.498
	Y3[a,b]	.747	.222
	Y4[a,b]	.812	-.438
	Y5[a,b]	.884	-.123

a. Optimal Scaling Level: Ordinal
b. Projections of the Single Quantified Variables in the Object Space

Summary of Analysis

		Dimension 1	Dimension 2	Sum
Loss	Set 1	.025	.066	.092
	Set 2	.025	.066	.091
	Mean	.025	.066	.092
Eigenvalue		.975	.934	
Fit				1.908

Weights

Set		Dimension 1	Dimension 2
1	X1	.184	.423
	X2	.080	.603
	X3	.191	.351
	X4	-.072	-.407
	X5	.082	.743
	X6	.402	-.609
	X7	.460	-.510
2	Y1	.114	.470
	Y2	.140	.466
	Y3	.216	.232
	Y4	.279	-.869
	Y5	.504	.018

Fit

Set		Multiple Fit Dim 1	Multiple Fit Dim 2	Multiple Fit Sum	Single Fit Dim 1	Single Fit Dim 2	Single Fit Sum	Single Loss Dim 1	Single Loss Dim 2	Single Loss Sum
1	X1*	.039	.188	.227	.034	.179	.213	.005	.009	.014
	X2*	.011	.369	.381	.006	.364	.370	.005	.005	.010
	X3*	.040	.130	.170	.037	.123	.160	.003	.007	.010
	X4*	.012	.178	.190	.005	.166	.171	.006	.012	.019
	X5*	.011	.564	.576	.007	.552	.558	.005	.013	.018
	X6*	.165	.377	.543	.161	.371	.532	.004	.006	.010
	X7*	.217	.270	.487	.212	.260	.472	.005	.010	.016
2	Y1*	.013	.221	.234	.013	.221	.234	.000	.000	.000
	Y2*	.024	.218	.242	.020	.217	.237	.004	.001	.005
	Y3*	.047	.054	.101	.047	.054	.101	.000	.000	.001
	Y4*	.078	.755	.833	.078	.755	.833	.000	.000	.000
	Y5*	.254	.001	.255	.254	.000	.254	.000	.001	.001

a. Optimal Scaling Level: Ordinal

Table 5: Non-Linear Canonical Correlation Analysis of SHRM and TQM variables

The linear canonical correlation analysis shown at Table - 4 assumes a linear relationship among the variables which rarely happens in practice. Hence non-linear canonical analysis (NCCA) was done with SPSS 20 to determine how similar are the data representing the variables in two sets namely SHRM and TQM. Also through NCCA it is attempted to establish the similarity between the sets by simultaneously comparing linear combinations of the variables in each set to an unknown set — the object scores. The output of NCCA is presented at Table – 5.

4. Results and Discussions

i. Reliability and Cronbach's Alpha: It is seen in Table - 1 & 2 that the Cronbach's alpha value for SHRM and TQM variables are 0.89 and 0.86 respectively. Therefore the questionnaire items are internally consistent and reliable as alpha values of both are more than 0.7.

ii. KMO and Bartlett's Sphericity: It is seen in Table – 3 that the KMO test value for SHRM & TQM variables is 0.894. So sampling adequacy for all are meritorious (KMO value between 0.8 – 0.89) and bordering on marvelous i.e. the degree of common variance among the variables are meritorious and the factors extracted account for substantial amount of variance. The Bartlett's sphericity test results for both SHRM and TQM variable dataset show significance = 0.000 ($p < 0.05$), hence we can reject null hypotheses that the correlation matrices of SHRM & TQM variables are Identity matrices. Hence, we can accept our alternate hypothesis that the SHRM variables have statistically significant influence on achievement of TQM objectives.

iii. Factor Analysis: The initial solution of factor analysis (Total variance explained) at Table - 3 shows that only one factor (first factor) has Eigen value more than 1 (i.e. 7.245). So the first factor explains 7.245 times as much variance than a single variable. The % variance explained by this factor is 60.373%. Since the Eigen values of other 11 factors are less than 1, so the initial solution suggests that the final solution should extract not more than one factor. The component matrix indicates the correlation of SHRM and TQM variables with the extracted factor. The factor loading of variable X6 (compensation/reward system) is highest 0.846 and that of variable X4 (Training and Development system) is lowest 0.703. The 12 factors are reduced to one factor that explains 60.37% variance and the communalities shared by each variable in this factor ranges from low 0.494 to high 0.716.

iv. Linear Canonical Correlation Analysis: The SPSS output of Linear canonical correlation analysis (Table – 5) shows the general fit of the model reporting Pillai's, Hotelling's, Wilk's and Roy's multivariate criteria and we find that all of these tests are significant with $p<.05$. The commonly used test is Wilk's lambda which is low enough (0.08493) to conclude that the two groups SHRM and TQM are tightly formed whose dispersion is very small compared to unclassified dataset. The squared canonical correlation (R^2 = 0.8611) indicates that 86.11% variability in all the dependent variables (Y1, Y2, Y3, Y4,Y5) together can be accounted for by the independent variables (X1, X2, X3, X4, X5, X6, X7) together. The first canonical correlation coefficient is 0.92796 with an explained variance of the correlation of 91.99% and an Eigen value of 6.20. Thus indicating that our hypothesis is correct – SHRM scores and the TQM scores are positively correlated. From dimension

reduction analysis it is evident that of the five possible roots only the first root is significant with $p<0.05$. The correlation between dependent variables and canonical variables show that the factor loadings for all (Y1, Y2, Y3, Y4, and Y5) are more than 0.3, hence significant. From variance in dependent variables explained by covariates report it is seen that 55.089% of the covariance in the dependent variables is explained by each independent variable or covariate. So, Redundancy or strength of casual relationship between dependent variable and the independent variates is 55.089%. The "Pct Var Dep" indicates the goodness of fit for the dependent latent factors i.e. 63.97% of the covariance in the dependent variable is accounted for by each dependent latent factor. Also the correlation between covariates and canonical variables show that factor loadings for all (X1, X2, X3, X4, X5, and X7) are more than 0.3, hence meaningful. The goodness of fit for the independent latent factors is found 0.5846 (Pct Var Cov) i.e. 58.46% of the covariance is accounted for by each independent latent factor. Next, in the regression analysis of each dependent variable, the insignificant covariates (sig. of $t > 0.05$) have been omitted due to space constraint. It is found that for dependent variable Y1, the covariates X1, X2, X4, X7 are significant, for Y2 only X6 is significant, for Y3 no covariate is significant, for Y4 only X1 and X7 are significant and for the last dependent variable Y5 only covariate X7 is significant. The B coefficients are non-zero and the respective beta values indicate how strongly the independent variables influence the criterion (dependent) variables. The raw and standardized canonical coefficients ($a_1, a_2, \ldots\ldots, a_6, a_7$ and $b_1, b_2 \ldots\ldots b_5$ at Fig.1) indicate the strength of associations within the two canonical variates defined by weighted sum of variables of each sets SHRM and TQM.

v. Non-Linear Canonical Correlation Analysis: The output of non-linear canonical correlation analysis with optimal scaling is presented at Table -5. In summary of analysis it is found that average loss over sets is 0.092 and the loss for second dimension is more than that for the first. This loss value represents the proportion of variation in the object scores that cannot be accounted for by the weighted combination of variables in the set. The fit value accounted for by the first dimension is 0.975/1.908= 51.1% and 0.934/1.908= 48.95% by the second dimension. The sum of Eigen values of two dimensions, 1.908 is the total fit out of maximum possible fit value 2 (number of dimensions). So, considering the low average loss value and high fit value, we can conclude that the relationship is fairly close to perfect. The canonical correlation for the first set is $\rho_1 = [(2*0.975)-1] = 0.95$ and that for the second set is $\rho_{2=} [(2*0.934)-1] = 0.868$. As no variable in two sets is multiple nominal, we can compute the multiple correlation (R) value by multiplying the weight and component loading of each variable within each set, adding these products, and taking the square root of the sum. Thus, for the first set we get R_1= 0.987(Dimension-1), R_2 = 0.966 (Dimension-2) and for the second set R_1= 0.987(Dimension-1), R_2= 0.966 (Dimension-2). Therefore the strength of association is very high. Finally, from the partitioning fit loss table it is found that the single fit and multiple fit are almost equal for both dimensions, which means that the multiple coordinates are almost on a straight line in the direction given by the weights.

5. Conclusion

Based on results and findings following conclusions can be drawn

a) SHRM practices considerably influence achievement of TQM objectives. To improve customer satisfaction level and to establish customer oriented process it is essential to integrate HR management with corporate objectives; line/operational managers should be empowered to exercise HRM practices to achieve customer satisfaction; training and development processes should be designed to solve customer problems and there should be a sound career planning system for the employees to motivate them to address customer issues proactively.

b) Continuous improvement of products/services/processes significantly depend on compensation/reward system. But contribution of SHRM practices to create organizational culture for quality improvement is not statistically significant.

c) Increase in Profitability and Productivity significantly depends on integration of HR strategy with corporate strategy and devising a sound career planning system for the employees.

d) To improve brand image through improvement of quality of products/services it is important to devise and implement a sound career planning system.

e) From above-mentioned conclusion, inference can be made that attainment of TQM objectives significantly depends on employees' moral, motivation and perception. This is because employees' involvement in achieving TQM objectives are motivated by compensation/rewards, career prospects and HR policies/strategy aligned to corporate strategy/goal which can influence their perception of self-importance in the organization.

6. References

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