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Factor Analysis of Job Satisfaction in the Construction Industry.

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Abstract: - This paper presents a Factor Analysis (FA) carried out on the responses of the four major construction parties to the questionnaire. Involved are:management, employer's association, employees, and Construction Trade Union. Underlying the dimension (factors) of the responses data for the four parties are compared and findings are discussed. The influence of various contextual factors on some of these relationships and perceptions between/among the four major construction parties is investigated. A number of essential dimensions of workplace variables are identified which form the basis for developing both conceptual and research model. A significant understanding of group'sinsights of workplace communication and industrial relations(IR) is obtained. The purpose of factor analysis is to develop factors which identity the major dimensional differences within the data set. Finally, the study investigates the statistical reliability of the sample data; a reliability scale assessment indicates that results obtained from the statistical analysis are indeed valid.
Keywords: Satisfaction, Management, Employer's Association, Non-Management Employees and Union.

I. INTRODUCTION

The belief that industrial disputes are in some way a natural consequence of job satisfaction in the construction is widely spread among researches and academics. Indeed, job satisfaction theory has even been employed as a criterion to measure the valid of work attitude and success of organizational change.In an attempt to gain insight into this subject, Argyle (1972) asserts that workers who are happy with their job will attend work regularly and permanently. His idea is based on the Human Relations School's over simplicity prescription. Hill and Trist (1955) through their withdrawal theory, explains trends towards absence, turn over, accident, association and employees length of service. However, there are a few writers such as Tiffin McCormick(1996) who hadreviewedrelevant literatures and do not share the same view as other author. They stress the relationship between job satisfaction and absenteeism should not be generalized. In this sense, it is important to understand factors determining job satisfaction, although they are not simplyexact opposite of those contributing to job satisfaction.

Satisfaction and dissatisfaction stem fromvarious roots. Smith, R.and Roth, D. (1991) investigate the following factorsas major causes of job satisfaction; pay, work, promotion, supervision,co-workers including Safety. Maloney and McFellen (1998)explained that satisfaction with intrinsic factor contributes to job satisfaction. They went further to say those job outcomes which are directly related to performing a task can be termed "intrinsic outcomes" and those that are allocated to (by) others signified "extrinsic outcomes". Performing a task requires one to make use ones skills and abilities which provides that intrinsic outcomes. On the other hand, satisfaction is a function of job outcomes both desired and expected. Therefore those workers who achieve the outcomes their expected tend to be satisfied with their work.

II. THE RESEARCH APPROACH

The research Methodology is designed specifically to determine how to improve work communication between employers and employees/ trade union. New South Wales was selected as the area which the data was collected. Mail questionnaires were sent to 42 construction industries defined as Management, 80 non-management employees, 30 employers' Associations defined as Managing Director and Executives and 15 Building and Construction Workers' Union Officials, defined as Union were contacted in New South Wales, Australia as a means of data collection and response were analyzed using a Standard Statistical Package (SPSS) Statistical Package for the Social Sciences; for window.Data was limited to New South Wales because the participant parties are exposed to the same environmental working conditions.

III. FACTOR ANALYSIS

Elementary statistical analysis is concerned with finding the means and standard deviation (scattered) of variable values with discovery the differences between various means. Factor analysis is more radical departure from statistical associated with experimental tradition, in that it does not accept arbitrary choices as to what are important variable in any field. Factor analysis groups numerous possible variables into fewest possible single whole or holistic influences. It offers a comprehensive and sensitive method of expressing quantitative

relations between variables from observation of co- variables. Furthermore, factor analysis is more systematic in that it first groups all variables, estimates their independent functional unities and then predicts their criterion.

IV. RELIABILITY

Reliability assessment is appropriate for multi – item scales such as used in this study. Reliability increases multi –term scales by allowing measurement errors to cover each other.

V. FACTOR ANALYSIS OF RESULTS

The perceptions of each of the four respondent groups wasfactor analyzed using the principal component method with correlation matrix as input. The diagonal elements,initially the squared multiple correlations were iterated by forcing until the maximum change in communality estimates was less than 1 (see table 1.1 below). The Eigen value and cumulative proportion of the total variance were computed and rotations were based on the Oblin - Criterion utilizing normalization.

The Kaiser – Meyer – Olkin (KMO) method measures the sampling adequacy and comparesthe magnitudes of the partial correlations coefficients. These analyses were used to simplify the results to make them more meaningful and less difficult to interpret. All interpretations of factor loadings were based on individual items of 0.5 and above (see Table 1.1 below).

VI. FACTOR ANALYSIS OF JOB SATISFACTION.

The results of factor analysis of items on the questionnaire for the simple individuals relating to job satisfaction appears in the table 1.1 and figures 1.1 below. Factors identified were based on factor loading 0.5 and above. All factor loadings which appear in the tables are positive. Positive loadingsallow more simple interpretations.In this regard it helps researchers to have a clear view of overall results. The extent to which the employees' factor grouping differs from management, employers' associations and union perception will indicate the extent to which is hypothesized.

Table 1.1 below shows the factor loading and communality coefficients extracted from the analysis of 15 items shown on the questionnaire for management employees' perception of job satisfaction. Only four factors had factor loading in excess of 0.5 and above and account for approximately 72.6% of the total variance obtained from management responding group. They are arranged according to the size of loading. The three dimensional plot of the loadings of the first three factors appear in figure 1.1.

Factor 1, clearly indicates a self-managing team with minimum supervision.

Factor 2 is associated with analytical techniques. An analytical skill is considered as ability to

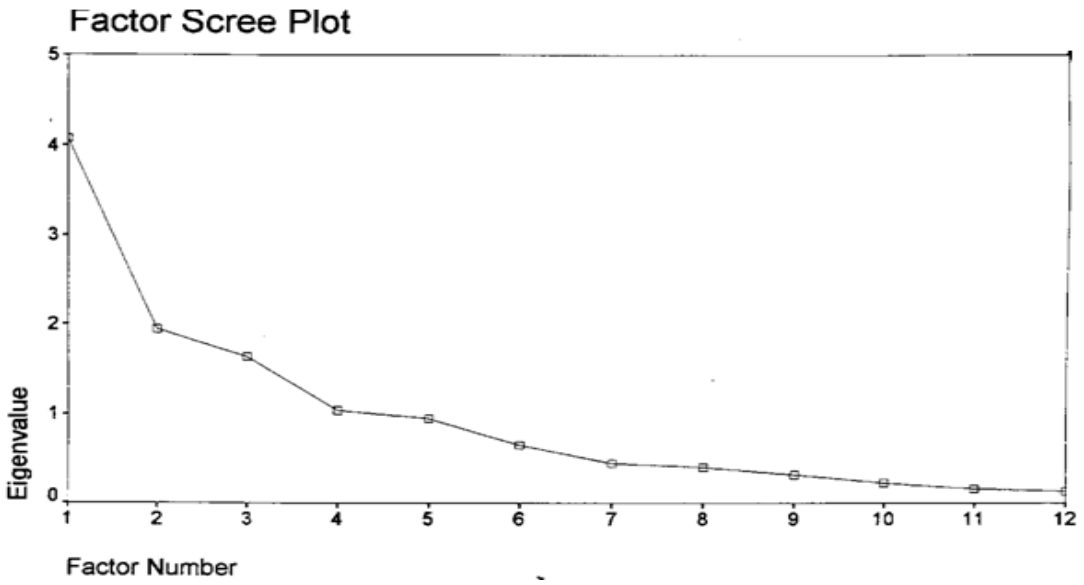
workindependently with minimum supervision. Management respondent who scored highly on factor believe that employee satisfaction is related to analytical skills. Factor 3 has four items and is associated with internal satisfaction, described as responsibility. Factor4 comprise two items and appears to be associated with external satisfaction. It is defined as directionality accuracy. It seems that these four factors are associated with trust of minimum supervision. The responses of management indicate that job satisfaction goes with self-management under minimum supervision. However, the result shows that, for management respondents, job satisfaction is associated with group commitment, minimum supervision and self – management within a team.

Table 1.1 Factor analyses of items relating to management perceptions of job satisfaction.Factor Loading

Items	Loadings 1	Items	Loadings 2	Items	Loading 3	Items	Loading 4
TSI	.84525	EN	.80463	RE	.84609	MS	.84375
IN	.72526	SR	.77724	RES	.81833	ST2	.61144
IA	.59797	WG	.64545	ICME	.67452		
WG	.55370			ST2	.52834		
IEPMD	.60859						

ITEM	COMMUNITY COEFFICIENTS	FACTOR	EIGEN VALUE	CUM PCT
WG	.72762	1	4.07812	34
IN	.82971	2	1.94710	50
EN	.73574	3	1.63966	63.9
SR	.71534	4	1.04258	72.6
IEPMDM	.68076			
RE	.83459			
ICME	.62595			
MS	.73649			
ST2	.67136			
JA	.71860			
TSI	.73600			

CUM = CUMMULATIVE
PCT = PERCENTAGE



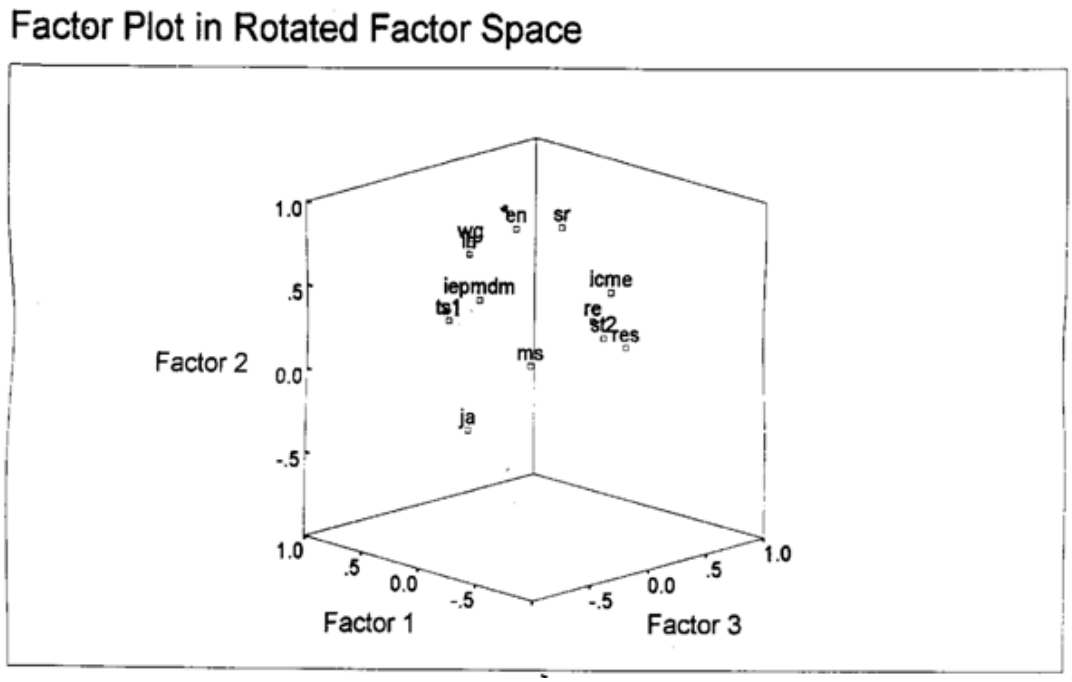


Figure 1.1 Rotated eigenvalue and varimax (3D) factor plot relating to management perceptions of job satisfaction.

Table 1.2 presents factor loading of items and communality coefficients obtained from employee's perceptions of job satisfaction while figure 1.2 shows the three dimensional plot of the loading of the first factors and a screen plot of totalvariance (Eigen value) associated with each factor. Four factors were identified and items included in them, all have positive loading together accounting for approximately 75.6% of the total variance obtained from the group. Factor 1 comprises five items related to extrinsic satisfaction. Factor 1 clearly relates to an external influence associated with maximum supervision and is considered as denoting directionality and mobility aspiration. Factor2 consist of six items considered to be related to internal job satisfaction with minimum supervision. Factor 2 is spotted to signify self – managing teams. It can be tagged responsibility and directionality. Factor3 includes two items clearly indicating social satisfaction. These elements are related to trust. Factor 3 is defined as commitment or loyalty. Factor 4 consists of two items related to internal satisfaction with minimum supervision. These are considered to be mobility, aspiration and directionality. Factor 4 is branded role of professionalism and appears to be connected with skills and experience. These four factors identified in the analysis of employees' perception of job satisfaction is related to work place communication. These factors are closely related to factors identified in equivalent factor analysis for management (table 1.1).

Table 1.2 Factor analyses of items relating to employees' perception of job satisfaction.

Items	Loadings 1	Items	Loadings 2	Items	Loading 3	Items	Loading 4
REC	.78336	WG	.80499	IEPMD	.78667	MS	.87256
IS	.78144	IN	.75873	ICME	.75526	RES	.61669
FB	.77901	SR	.75462				
ST	.71916	FI	.69866				
YS	.70860	EN	.59596				
		JA	.56836				

COMMUNITY	COEFFICIENTS	FACTOR	EIGEN VALUE	CUM PCT
REC	.80594	1	7.53139	50.2
IS	.78821	2	1.60017	60.9
FB	.77032	3	1.14400	68.5
ST	.70407	4	1.06891	75.6
YS	.65045			
WG	.74426			
IN	.78808			
SR	.76694			
FI	.70560			
EN	.73660			
JA	.76693			
IEPMD	.79182			
ICME	.76213			
MS	.84016			
RES	.71298			

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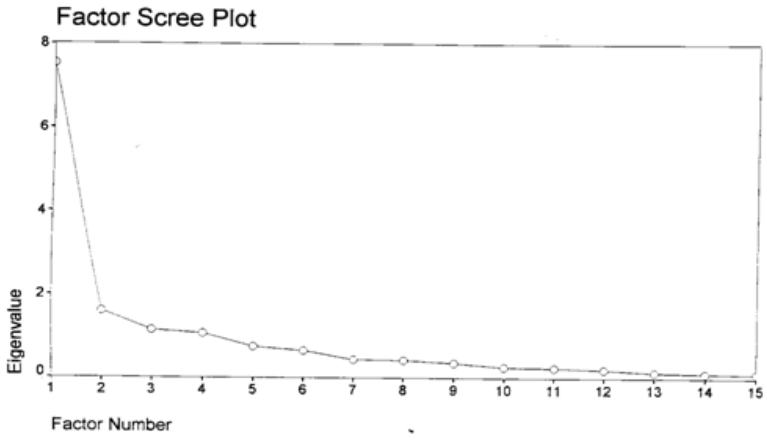

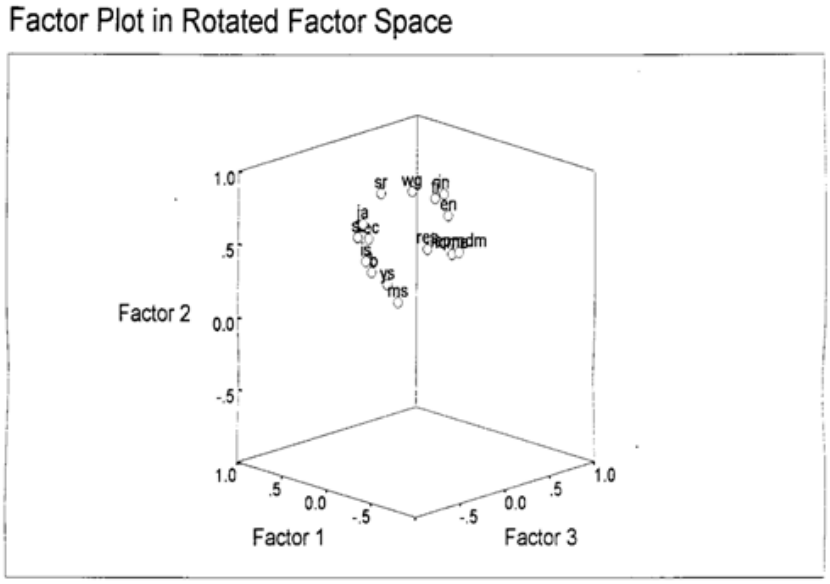

Figure 1.2 Rotated varimax (3D) factor plot and eigenvalue relating to employee perceptions of job satisfaction

Table 1.3 shows the factor loadings and communality coefficients obtained for employers Associated respondents in regard to job satisfaction variables in the questionnaire. Figure 1.3 illustrates three dimensional plot of the loading of the first three factors and screen plot of totalvariance(Eigen value) associated with each factor. Three significant factors were identified collectively they stand for 77% of the total variance obtained from the respondent group. Factor 1 includes five items considered to relate to a team satisfaction and self-managing with minimum supervision. These items are clearly associated with team performance and collaboration. Therefore factor 1 is labeled as directionality andinfluence. Factor 2 consists of three items considered to denote internal satisfaction which can be described as work role habit. High scores on work role habit in the construction industry indicate a clear failure on management side to provide employees with clear directives and means of completing a task. Role work habit also can be interpreted as both management and employees'behaviour towards one another. Factor 2 clearly signifies role ambiguity. The third factor has only intrinsic and extrinsic job satisfaction. These factors denote employees' ability to work independently with minimum supervision. Factor 3 can be described as indicating mobility aspiration and accuracy.

These factors undoubtedly represent workplace communication.

Table 1.3 Factor analyses of items relating to employers association perception of job satisfaction

Items	Loadings 1	Items	Loadings 2	Items	Loading 3
WG	.84978	REC	.88557	FB	.78815
IEPMD	.81048	ICME	.80591	MS	.72792
IN	.80029	SR	.78139	FI	.67198
RES	.78857				
EN	.75825				

ITEM	COMMUNITY COEFFICIENTS	FACTOR	EIGEN VALUE	CUM PCT
WG	.76964	1	5.42416	49.3
IEPMD	.81096	2	1.64042	64.2
IN	.74130	3	1.40859	77.0
RES	.81650			
EN	.78082			
REC	.85365			
ICME	.69706			
SR	.84120			
FB	.80689			
MS	.67228			
FI	.68292			

CUM = CUMMULATIVE
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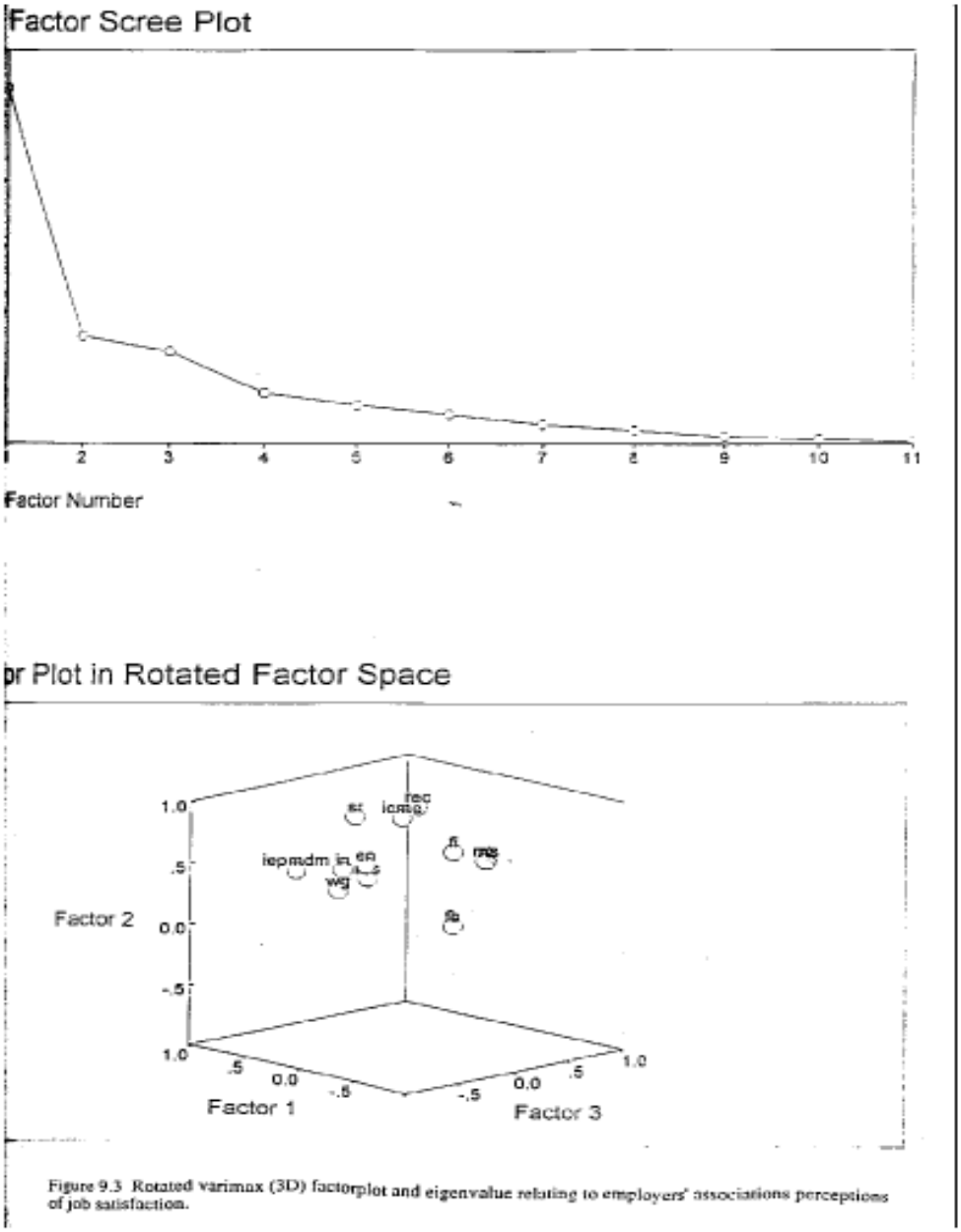


Figure 9.3 Rotated varimax (3D) factorplot and eigenvalue relating to employers' associations perceptions of job satisfaction.

Table 1.4 shows the factor loadings and communality coefficients extracted from the analysis of 16 items relating to the questionnaire for the total sample of union officials while the Figure 1.4 presents the three dimensional plot of the loadings of the first three factors and a scree plot of total variance (Eigen value) associated with each factor. Only three had Eigen value in excess of 0.5 and above and collectively accounting for roughly 87.3% of the total variance obtained from the related group.

Factor 1 comprises six items representing intrinsic job satisfaction, gained by doing a particular job in a manner determined by employees themselves. These items are connected to specialist term management with minimum management control.Factor 1 can be considered denoting directionality accuracy and influence.Factor 2 consists of six items relating to social satisfaction. These items are plainly internally and externally conferred attributes such as salary, status and responsibility. Factor 2 can be viewed as indicating directionality andmobility aspiration.

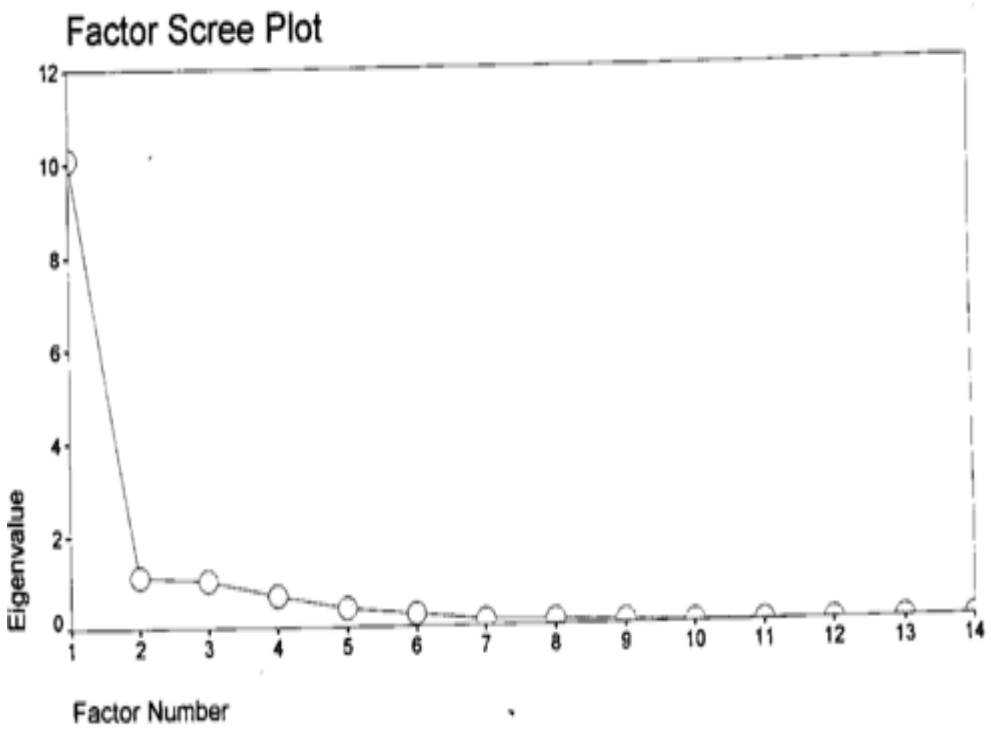
Factor 3 comprises two items connected to extrinsic job satisfaction related to rewards. Sometimes rewards demand accuracy of information and maximum supervision. In this regard, employee's satisfaction can only be measured by monetary reward. Factor 3 is evidently related to role accuracy information and "the role maximum supervision" variables. Incentive scheme (IS) and fringe benefit (FB) are associated with lack of trust. In summary these factors can be explained as role accuracy information, role overload andfeedback, all related to workplace communication and industrial relations problems in the construction industry.

Table 1.4 Factor analysis of items to union officials perception of job satisfaction.

Items	Loadings 1	Items	Loadings 2	Items	Loading 3
MS	.82732	CMUD	.88832	IS	.88771
JA	.80693	IEPMDM	.77573	FB	.83895
WG	.79158	ICME	.77573		
SR	.78554	TS	.76117		
REC	.69117	RES	.71403		
IN	.61757	ST	.69044		

ITEM	COMMUNITY COEFFICIENTS	FACTOR	EIGEN VALUE	CUM PCT
MS	.87868	1	10.08653	72
JA	.80649	2	1.10659	80
WG	.90354	4	1.03133	87.3
SR	.78285			
REC	.81323			
IN	.77560			
CMUD	.93640			
IEPMDM	.95856			
ICME	.95304			
TS	.95807			
RES	.82893			
ST	.84665			
IS	.92599			
FB	.85636			

CUM = CUMMULATIVE
PCT = PERCENTAGE



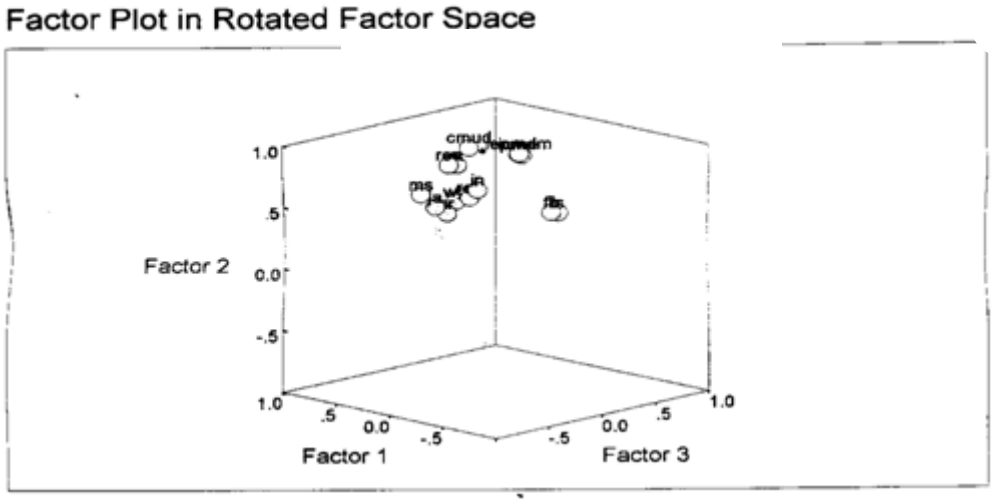


Figure 1.4 Rotated eigenvalue and varimax (3D) factor plot relating to union perceptions of job satisfaction

VII. JOB SATISFACTION COMPARISON

A detailed description of perceptions of the parties, with special reference of job satisfaction is fundamental importance to this study. It appears that management, the employers' associations, non – management employees and the unions have different perceptions of job satisfaction.The results of the factors extracted from the analysis of perceptions of job satisfaction indicate that all factors across the parties are similar with very little difference in the structure of an individual factor. The small difference that are found between the groups relate to the sequencing of the items because of its loadings. The result seems to confirm the third proportions; management, employers association, union and non-management employee (the four construction parties) which will differ in underlying perceptions toward job satisfaction.

Table 1.5 compares the factor analysis results of the parties' perceptions towards job satisfaction. Factor 1 indicates the difference in main perception of the parties towards job satisfaction. Management signifiesthatemployee satisfaction can be reached by giving them freedom with minimum supervision. Employee's see job satisfaction as being concerned with directionality and mobility aspirations. The employers association connects job satisfaction with directionality and influence. The unions, like the employers association perceive job satisfaction as involving directionality and accuracy. This shows the basis of power struggle between two parties (employer's association and worker unions). However, the result appears to support the second proposition. The four major construction parties agree that low level participation by employees in the management decision making process will undermine workplace industrial relations reform.

In factor 2, management regards skill and experience as central to job satisfaction; employee's perception of job satisfaction relate to task and responsibilitiesinvolved in their roles. The employers' association recognizes work behaviour as determining job satisfaction. The union sees job satisfactions as being significantly influenced by mobility aspiration. Similarly, in factor 3, management indicates responsibility as central to job satisfaction; employees see job satisfaction as resulting from commitment; employers' association regards mobility aspirations and accuracy as a mode of job satisfaction while union sees monetary reward as a principal job satisfaction. Factor 4 indicates directionality, accuracy, skill and experience as central to job satisfaction for employees and management. Theresults show similarities in the perceptions of the four parties, and clearly show that all the factors identified are related to communication.

Table 1.5 Comparison of factor analysis of parties' job satisfaction variables.

Management	Employees	Employers' Association	Union
Factor 1	Factor 1	Factor 1	Factor 1
Self – managing	Directionality, Mobility,Aspiration	Directionality, Influence	Directionality, Accuracy, Influence
Factor 2	Factor 2	Factor 2	Factor 2
Skill, Experience	Responsibility	Work behavior	Mobility aspiration
Factor 3	Factor 3	Factor 3	Factor 3
Responsibility	Commitment	Mobility aspiration. Aspiration	Monetary reward
Factor 4	Factor 4		
Directionality, accuracy	Skill, Experience		

VIII. RELIABILITY AND VALIDITY MEASURES

The aim of reliability and validity measures is to assess the instrument of measures as being valid if it measures what it is intended to measure. Failure to assess the validity of measures may result in research findings that are best misleading. The necessary conditions for validity are reliability.

It is important to see how reliable the results of statistical analyses are, because the scale of data has been used and choice of sample scale could affect the validity. This study focuses on validity of measurement issues as they apply to the data on satisfaction on construction industry.

The reliability of questionnaire data on job satisfaction is reported in Table 1.6 below, draws on the notion of construct validity. Cronbach's Alpha shown in the table is the basic reliability used here. It is based on internal consistency of the test; that is, is based on average correlation of items within the test, the items are standardized to a standard deviation of 1. The other entry in the table is standardized item alpha value that will be obtained if all the items were standardized to have variance of 1. Since the items on the research study scale have fairlycomparable variance, there is little difference between the twoalphas indicating that all scales obtained are quite reliable.

Table 1.6 Scale reliabilities.

Employers Association		
Scale	Observed Item Alpha	Standardized item Alpha
Management		
Job satisfaction (15 items)	.8079	.8098
Union		
Job satisfaction (15 items)	.9691	.9698
Employees Job satisfaction (15 items)	.9277	.9378

IX. CONCLUSION

The primary objective of this study is to determine if there were any major differences in the perceptions of the four respondent groups towards job satisfaction. His comparison of the four respondent groups at level of factor analysis was fundamentally, important because differences observed in the perceptions show that all respondent groups have not been able to share a common language of operation which is fundamental to the construction industry.

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