

Factor Analysis of Job Motivation in the Construction Industry

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ABSTRACT: The purpose of this study is to present a factor analysis carried out on the responses to the mail questionnaires sent to the four construction parties involved in the study. The respondents are the four major construction parties: the management, employers' associations, employees and union. 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. Fifteen motivation related variables were examined and items derived were measured on five Likert point scales. SPSS (Statistical Package for the Social Science for Windows) was used for data analysis. The results showed very little difference across all variables in the scores. The outcome of the study showed that the majority of construction crews do not enter the industry because of monetary motivation but for personal skill development.

KEYWORDS: Motivation, Management, Employers' Associations, employees and union.

I. INTRODUCTION

It is a common belief that motivation factors have moral and direct influences on relationships to personal productivity. Productivity in the construction industry depends upon the effort of the performance or effort of construction parties. In an attempt to gain insight into this subject, Maloney (1981) conducted a review of factors of job motivation of factors of job motivation in the construction industry. Similarly, Maloney and McFillen (1988) presented a model of construction crews' motivation, performance and satisfaction, including results from other studies that support the validity of their model. In the model, motivation was defined as a function of a worker's expectancy, which provides a means of understanding and assessing worker's level of performance, instrumentality and satisfaction.

Expectancy means a work team can serve to clarify or modify worker's perceptions of the objective they are pursuing. A work team can have a significant impact upon worker's perceptions that an organization gives reward for specific kinds of performance. Work team can also constitute their own source of social and extrinsic reward for their team members and thereby create their own instrumentalities between behaviour and team administered out comes. In addressing the subject of motivation in the construction industry, there are a number of factors considered to be most effective job motivators. Beside monetary reward, there are other important factors such as challenging work, job recognition, and a sense of achievement and a feeling of personal growth. Indirectly, all these factors affect moral and thus have direct relationship to personal productivity. Daniel (1993) comments; "an increase in motivation and personal productivity is more likely to occur and be derived from the work environment and the work itself". A review of relevant literatures in order to examine various aspects of motivation shows that interest of workers and management are normally the same?

The aim of this paper is to identify major motivation related variable which have dimensional differences within the data set, examine the statistical reliability of sample data with reliability scale assessment and compare the factor – analysis results of the party's perceptions of job motivation in the construction industry.

Table 1 Major factors or Variables of job motivation in the construction Industry.

Worker's expectancy	A work team
Social and extrinsic reward	Challenging work
Job recognition	A sense of achievement
Filling of personal growth	Salary
Fringe Benefit	Incentive Schemes
Social relations	Work group
Recognition	Interest

Factor analysis of Job Motivation

The perceptions of each of the four respondents were analyzed using principal components method with correlation matrix as input. Tables 2 -6 present the maximum factor loadings and communality coefficients obtained from an analysis of variable scores of the simple management employees, non-employment employees, employers' associations and union official representatives on job motivation related variables. Table 2 presents factor loadings and communality coefficients extracted from factor analysis of management perceptions of job motivation, collectively accounting for approximately 74.6% of the total variance, while Figure 1 illustrates the three dimensional plot loadings of the first three factors and screen plot of the total variance (Eigen value) associated with each factor. Factor 1 in the Table 2 comprises four items regarded as representing both intrinsic and extrinsic motivation with minimum influence. Job Autonomy (JA) scores high while Their Salary (TS) scores low on factor 1. It appears that extrinsic motivation is associated with professional aspect of motivation, that is, professionally conferred role reward. Professionally conferred role rewards include TS which scored the lowest on factor 1. However, the level of salary appears to be tolerable in the context of other professionally conferred items. Factor 2 also consists of the three items related to intrinsic motivation. Factor clearly symbolizes role professional rewards. Factor 3 comprises four items which can be regarded as indicating internal motivation associated with team management. Factor 3 can be depicted as internal social aspects of job motivation, that is, a socially conferred role reward relating to dynamic process. Factor 4 consists of only one item with high loading. This factor can be described as a symbol of power or recognition.

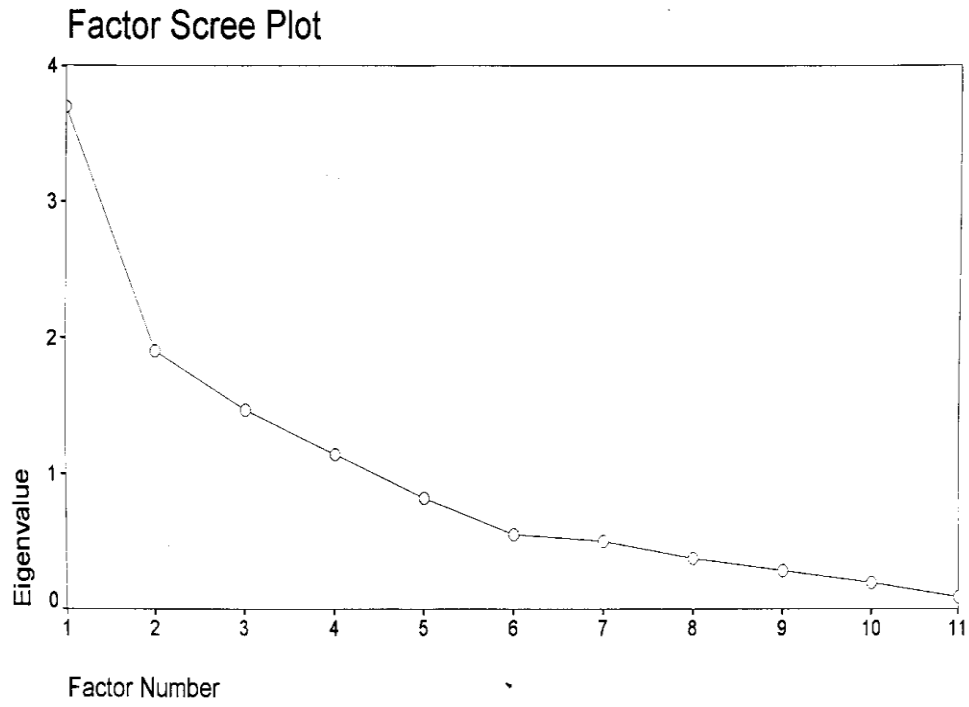
Table 2: Factor analysis of items relating to management perceptions of job motivation.

Factor Loading

Items	Loading 1	Items	Loading 2	Items	Loading 3	Items	Loading 4
JA2	.83694	ENV	.84095	RES	.83109	ST3	.92089
FI2	.70264	INT	.82425	ICME	.79815		
MS2	.69869	WGR	.73390	REC	.70687		
TS2	.50653			IEPMDM2	.64149		

Items	Communality Coefficients	Factor	Eigenvalue	CumPct
JA2	.73579	1	3.69413	33.6
FI2	.56372	2	1.90025	50.9
MS2	.59552	3	1.46960	64.2
ENV	.85166	4	1.14202	74.6
INT	.71687			
WGR	.80121			
RES2	.76005			
ICME2	.84967			
REC	.76579			
IEPMDM2	.79007			
STR3	.77565			

Cum Pct = Cumulative Percentage



Factor Plot in Rotated Factor Space

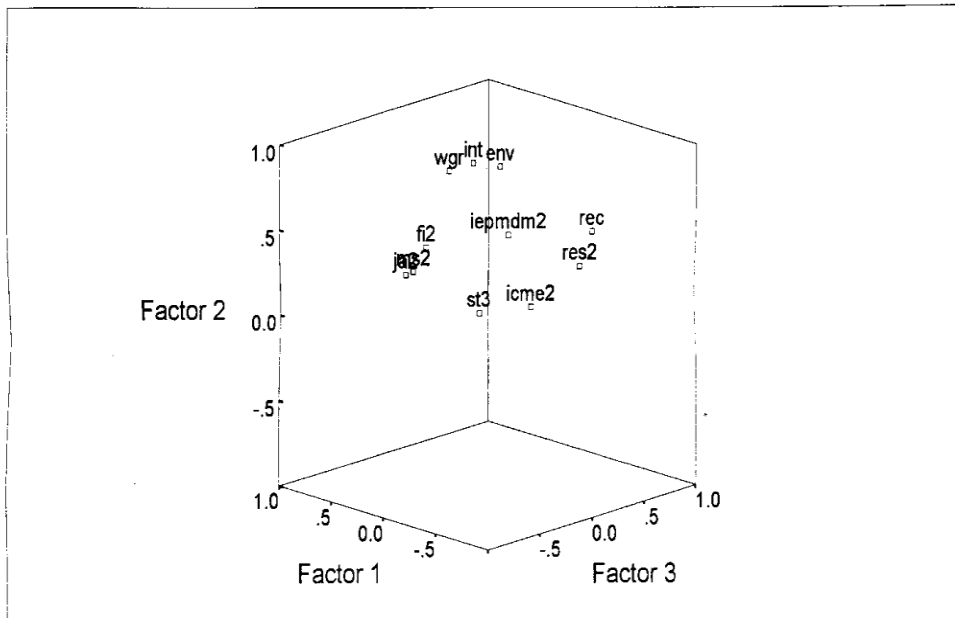


Figure 1.0 Rotated Eigenvalue and Varimax (3D) factor plot relating to management perceptions of job motivation

Table 3 presents the factor loadings and communality coefficients obtained from the analysis of sample scores of employees' perceptions of variables of job motivation. These factors collectively account to approximately 68.8% of the total variance obtained from the respondent groups. Figure 2 shows the three dimensional plot and a scree plot of total variance (Eigen value) associated with each factor.

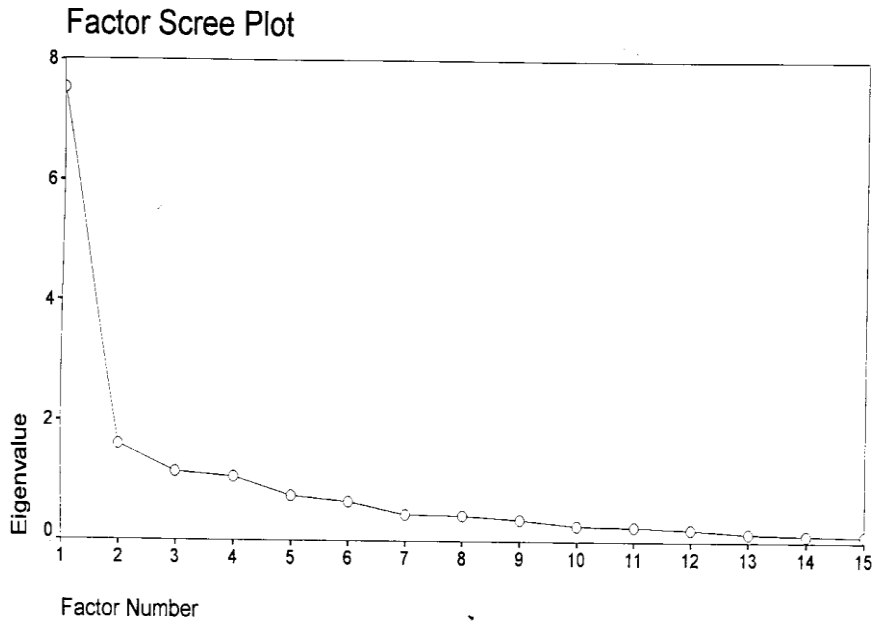
Factor 1 comprises seven items representing both intrinsic and extrinsic job motivation. Factor 1 is characterized by motivation with regard to salary, fringe benefits, incentive schemes, social relations, work group recognition and interests. Respondents seem to be motivated by these items. Factor 1 can be linked to high salary and career progress. Factor 2 consists of four items which can be described as internal motivation derived from intrinsic factors. These factors cannot be controlled by external decision or influenced by external action, by management or others. Thus factor 2 represents work expectation or desire. Factor 3 includes four items, instruction, participation, communication and environment. These items can be considered as indicating employee tasks, directionality, accuracy, feedback, mobility aspiration and trust.

Table 3: Factor Analysis of Items relating to Employees' Perceptions' of Job Motivation
Factor Loading

Item	Loadings 1	Item	Loadings 2	Item	Loadings 3
YS2	.81051	RES2	.88531	F12	.82727
FB2	.83998	MS2	.78631	IEPMDM2	.53670
IS2	.83072	ST2	.74319	ICME2	.69073
SR2	.69901	JA2	.71936	EN2	.62544
WG2	.68264				
REC	.65634				
IN2	.53974				

Items	Communality Coefficient	Factor	Eigenvalue	Cum pct
YS2	.72303	1	7.67838	51.2
FB2	.76473		2 1.55290	61.5
IS2	.79270		3 1.09382	68.8
SR2	.56284			
WG2	.56526			
REC2	.71352			
IN2	.61113			
RES2	.85465			
MS2	.74788			
ST2	.74417			
JA2	.69106			
FI2	.73664			
IEPMDM2	.48432			
ICME2	.67719			
EN2	.65595			

Cum Pct = Cumulative Percentage



Factor Plot in Rotated Factor Space

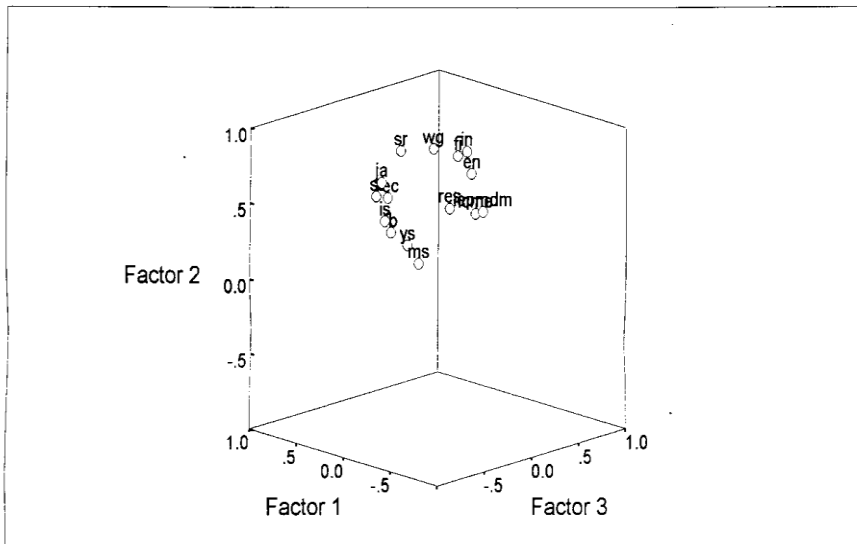


Figure 2 Rotated Eigenvalue and Varimax (3d) factor plot relating to employee perceptions of job motivation.

Table 4 presents the factor loadings and Communality coefficients obtained from scores of employers associations' perceptions relating to job motivation, jointly accounting for approximately 76% of the total variance obtained from the respondent group. Figure 3 illustrates the three dimensional plot of loadings of the first three factors and a scree of total variance (Eigen value) linked with each other. Factor 1 comprises six items believed to represent intrinsic and extrinsic motivation. In this case, internal motivation is seen not to be controlled by external action such as remuneration. Factor 1 can be labeled as socially conferred rewards. Factor 2 is also associated with both intrinsic and extrinsic motivation. However, in this case, external action can play an important role. Factor 3 contains only two items both to denote extrinsic motivation. This type of motivation is driven by external action associated with maximum supervision. Factor 3 can be labeled as a modality of choice. Modality of choice is connected to preference in the individual method of communication, written, oral, and face and so on.

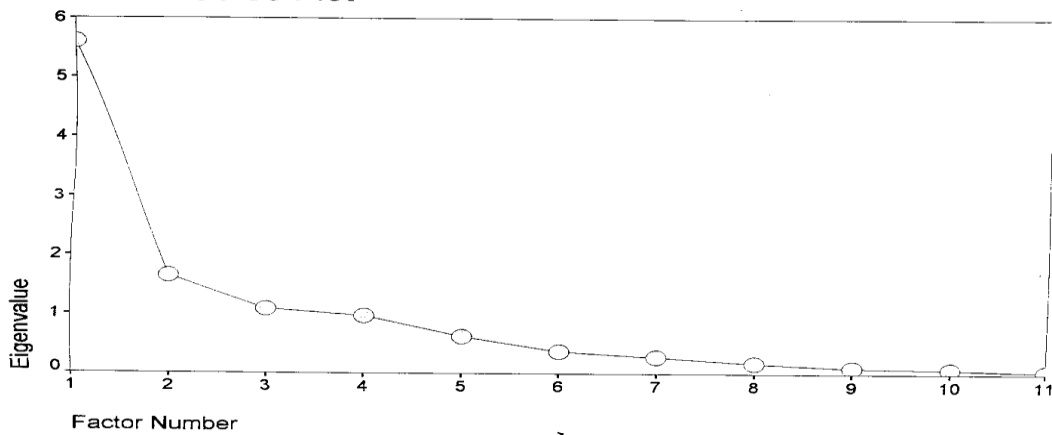
Table 3: Factor Analysis of Items relating to Employers Associations' Perceptions of Job Motivation

Items	Loadings 1	Items	Loadings 2	Item	Loadings 3
WG2	.91489	RS2	.82364	FI2	.90892
REC2	.87672	FB2	.81206	REC2	.68564
SR2	.82587	MS2	.60509		
ENV	.79703	TS2	.54618		
IN2	.64951	IN2	.51168		
FI2	.59728				

Items	Communality Coefficient	Factor	Eigenvalue	CumPct
WG2	.85618	1	5.61293	51.0
REC2	.86334	2	1.65524	66.1
SR2	.89776	3	1.09289	76.0
ENV	.75652			
IN2	.83938			
FI2	.62242			
RES2	.78786			
FB2	.71810			
MS2	.50122			
TS2	.70889			
ST2	.80929			

CumPct = Cumulative Percentage

Factor Scree Plot



Factor Plot in Rotated Factor Space

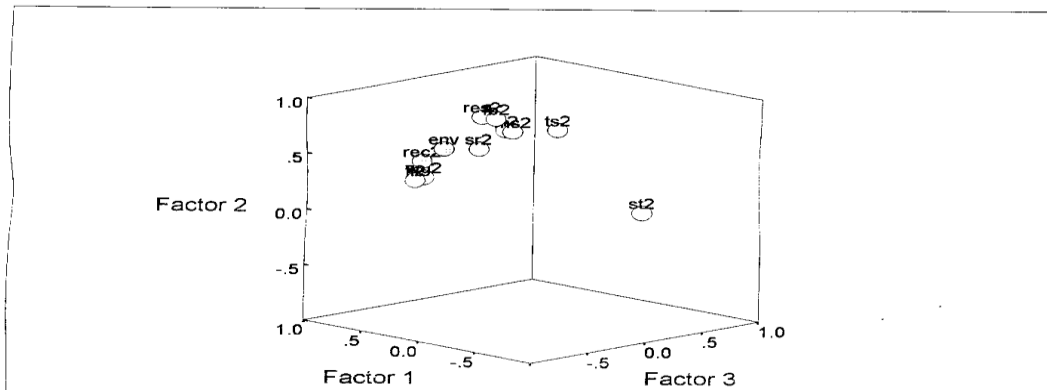


Figure 1.3 Rotated Eigenvalue and Varimax (3D) factor plot relating to employers association perceptions of job motivation.

Table 4 presents the factor loadings and communality coefficients obtained from the sample of building and construction union officials or representatives showing their perceptions of job motivation, collectively accounting for approximately 83.5% of the total variance obtained from the respondent group. Figure 4 shows the two dimensional plot of the loadings of the first two factors and scree plot of the total variance (Eigenvalue) associated with each factor. Only two factors were obtained. Factor 1 comprises nine items and is related to both intrinsic and extrinsic motivation. They are equally associated with both internal and external social aspects of job motivation that is, socially conferred rewards. Factor 1 appears to reflect personal attributes and a dynamic process is a process which consciously or unconsciously affects the cognition of another through an organization. Factor 2 consists of five items and is related to intrinsic motivation. This type of motivation can not be controlled or influenced by external factors. Factor 2 can be depicted as tasks performed through self motivation.

Table 4: Factor Analysis of Items relating to Union’s Perceptions of Job Motivation

Factor Loading			
Item	Loadings 1	Item	Loadings 1
ST2	.90241	EN2	.89204
ICME2	.86469	IN2	.81001
CMUD2	.86150	JA2	.80558
IEPMDM2	.82041	MS2	.74684
TS2	.80646	FI2	.69046
REC2	.737246		
RES2	.73769		
WG2	.69989		
SR2	.59716		

Item	Communality Coefficient	Factor	Eigenvalue	CumPct
ST2	.89426	1	10.61312	75.8
ICME2	.90884	2	1.00891	83.0
CMUD2	.85070			
IEPMDM2	.93860			
TS2	.84083			
REC2	.82495			
RES2	.91968			
WG2	.87303			
SR2	.60659			
EN2	.91091			
IN2	.74454			
JA2	.78638			
MS2	.83474			
FI2	.68797			

Cum Pct = Cumulative Percentage

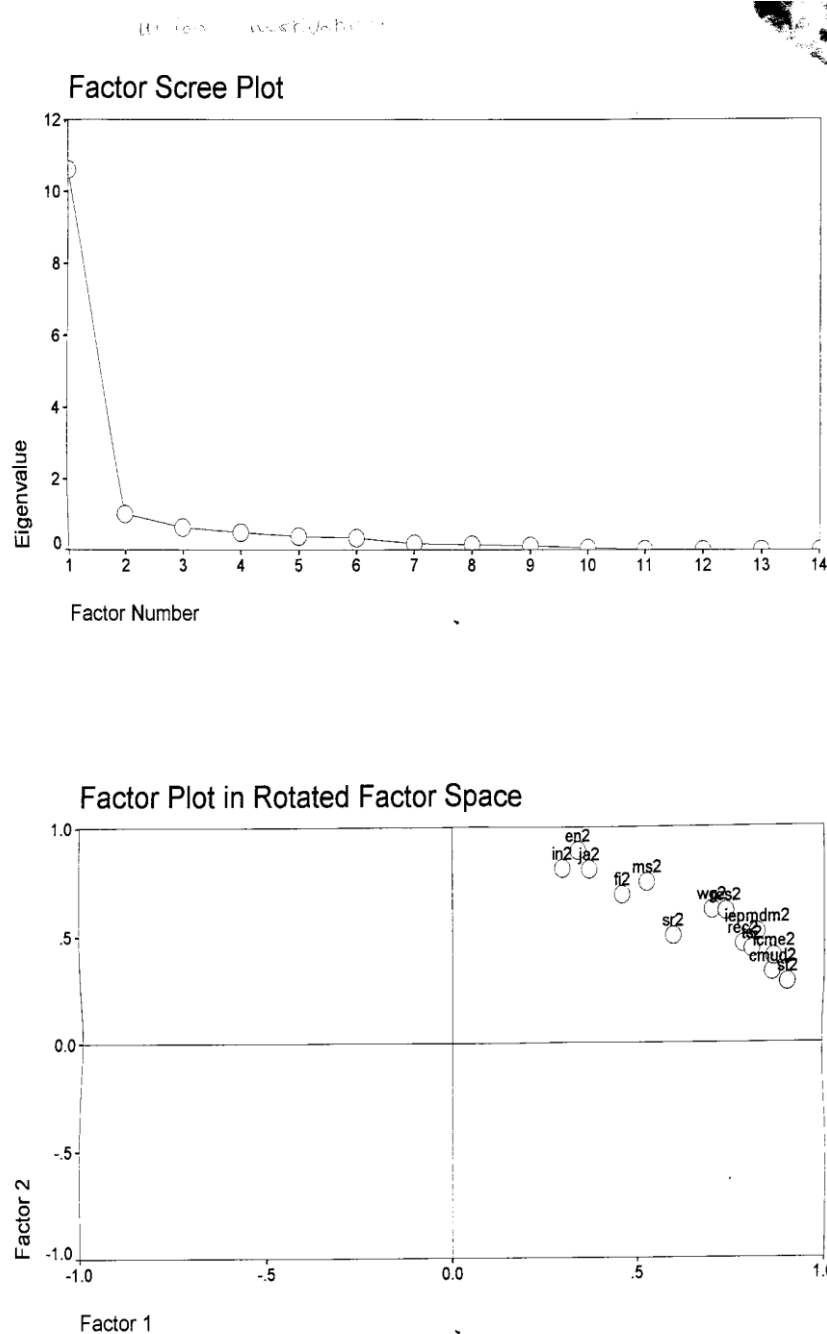


Figure Figure 4 rotated Eigenvalue and Varimax (2D) factor plot relating to union perceptions of job motivation

Comparison of perception of Job Motivation

Table 5 presents the difference in perceptions of job motivation between the parties as revealed by factor analysis. Factor 1 shows substantial similarity between/among management, employees and employer’s associations’ while union stands in the contrast. Employees, management and employers’ associations perceive reward as a source of job motivation, while unions perceive personal attributes and dynamic progress as a source of job motivation. The major reason for this can be linked with union ideology and political beliefs. Factor 2 indicates secondary differences in the parties’ perceptions towards job motivation. Management perceives communication between management and employees a as source of job motivation. Employees indicate work expectations and desire as central to job motivation. The employers’ associations regard moral obligation as central to job motivation and the union regards the type of job or task as a mode of job motivation. In factor 3, management perceives the dynamic process as a source of job motivation. And the employers associations’ regard modality of choice as central to job motivation.

Table 5 also presents the difference in perceptions of job motivation between the four groups of respondents as revealed by Factor Analysis. It appears that all the parties have different opinions about each others' interests. The explanation one can offer here is that union respondents view job motivation as being determined by practical issues or functions that must be fulfilled. The analysis indicates that all factors identified are with workplace communication.

Table 5: Comparison of Factors of Job Motivation Variables

Management	Employees	Employers' Association	Union
Factor 1	Factor 1	Factor 1	Factor 1
Reward	Rewards, Career, Progress	Socially conferred reward	Personal Attributes, Dynamic progress
Factor 2	Factor 3	Factor 3	Factor 2
Communication	Work expectations or Desires	Moral obligation	Type of Job or Task
Factor 3	Factor 3	Factor 3	Factor 3
Dynamic Progress	Mobility aspirations and Trust	Modality choice	

Reliability and Validity Measures

The purpose of this section is to assess the validity of the instrument of measurement, i.e., if it measures what is intended to measure. A failure to assess the validity of measurement means that the researcher may not be able to confirm the reliability of the research findings. The necessary condition for validity is reliability. In light of this, it is necessary to see how reliable the results of statistical analyses are and because the scaled data that has been used as sample could affect the validity.

Table 6 draws on the notion of construct validity develop by Cronbach's Alpha shown in the Table tells us how much correlation we can expect between observed scales and other possible item scales measuring the same thing. The other entry in the Table is Standard item alpha, i.e. the alpha value that would be obtained if all items on the research study scale tend to have fairly comparable variances. Only slight differences found between the two alphas indicating that all scales are quite reliable.

Table 6: Scale Reliabilities

Scale	Observed Item Alpha	Standardized Item Alpha
Employers' Associations'		
Job Motivation	.8918	.8934
Management		
Job Motivation	.8198	.8264
Union		
Job Motivation	.9734	.9750
Employees		
Job Modification	.9372	.9378

CONCLUSION

A detailed description of perceptions of parties with special references to job motivation was a major concern in this research study. Management perceptions of job motivation have been compared with perceptions of employers' associations' and employees and the union. Underlying these comparisons, there is cultural diversity, with significant difference in workplace job motivation.

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