

# The Romanian Employee Motivation: an empirical analysis of Herzberg model

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**Abstract**—The paper aims to apply Herzberg’s two-factor theory to employee motivation in the Romanian companies. The proposed theory model was tested using data from 402 employees. The main purpose of the study is to determine empirically the motivator-hygiene factors that have a significant impact on the overall level of Romanian employee job satisfaction, using the technique of principal components analysis, in order to build a multinomial logistic regression model for the prediction of the job satisfaction behavior based on the component scores.

The results show that a motivation-hygiene theory with three principal components (achievement, company policy and administration and interpersonal relationships) best explains the process of motivating employees. The study also indicates that achievement and the company policy have a significant impact on the overall level of employee job satisfaction, suggesting that managers need to focus more on these factors to better motivate employees.

**Keywords**—employees’ motivation, Herzberg model, estimation of job satisfaction, principal components analysis, multinomial logistic regression.

## I. INTRODUCTION

The management of people at work is an integral part of the management process. To understand the critical importance of people in the organization is to recognize that the human element and the organization are synonymous. A well-managed organization usually sees an average worker as the root source of quality and productivity gains. Such organizations do not look to capital investment, but to employees, as the fundamental source of improvement. In order to make employees satisfied and committed to their jobs in the companies, there is need for strong and effective motivation at their various levels, departments, middle and top management.

Employee motivation is one of the major issues faced by every organization. It is the major task of every manager to motivate his subordinates or to create the ‘will to work’ among the subordinates. It should also be remembered that a worker may be immensely capable of doing some work; nothing can be achieved if he is not willing to work. A manager has to make appropriate use of motivation to enthuse the employees to follow them.

## II. LITERATURE REVIEW

“Managers, supervisors, human resource specialists, employees, and citizens in general are concerned with ways of improving job satisfaction” [14]. Lastly, Rosnowski and Hulin[44] submitted that the most informative information to have about an employee in an organization was a valid measure of their overall level of job satisfaction.

Some theories of job satisfaction included discrepancy theory [32], equity theory [39] and the motivator-hygiene theory [21].

The motivator-hygiene theory was credited with propelling and advancing research on job satisfaction [50]. The premise of the motivator-hygiene theory [21] was that jobs had specific factors which were related to job satisfaction or dissatisfaction.

The five factors thought to facilitate job satisfaction (“motivators”) were achievement, recognition, work itself, responsibility, and advancement. The five factors identified by Herzberg et al.([21]-[26]) as determinants of job dissatisfaction (“hygienes”) were company policy and administration, supervision, salary, interpersonal relations, and working conditions.

Determining the type of measure which constituted a valid assessment of job satisfaction was yet another issue. Smith, Kendall, and Hulin [48] developed the “Job Description Index” which assessed satisfaction with coworkers, pay, promotion opportunities, supervision, and the work itself.

Brayfield and Rothe [10] developed the “Job Satisfaction Index” to measure overall job satisfaction when all aspects of the job were considered. The “Job Satisfaction Index” consisted of 18 items with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

Researchers seeking to measure overall job satisfaction in recent years have contested the use of multi-item scales [46]. Scarpello and Campbell [39] suggested that their “one-item, five-point global rating of overall job satisfaction is reliable and inclusive, and that the whole, represented by this global measure, is more complex than the sum of the presently measured parts” (p.15).

### III. RESEARCH METHODOLOGY

#### III.1. Data collection

The target population of the study were employees who live in urban area, who work in companies with at least 10 employees (including autonomous administration and corporations), who have a management position (general manager, manager, department manager, supervisor) and also who have at least 5 subordinates.

The sample size included 402 employees from small, medium and large sized Romanian companies. The questionnaire was been applied on individual employees, 21% of those working in trade activities, 32% in production activities and 47% in the service area.

The sample has been draw using the random systematic selection based on the random generation of phone numbers through CATI system (Computer Assisted Telephone Interviewing).

The study was performed in the period 11-22 June 2009 and the sample is considered representative for the examined collectivity, with an error limit of  $\pm 4.9\%$  at 95% probability.

#### III.2. Variable measurements

The questionnaire was specifically designed to accomplish the objectives of the study. The first section collected information about the company in which the employee works (number of employees, judicial regime, main area of activity and the amount of turnover in the previous year).

The second section contained the following items:

- ✚ Job and salary satisfaction levels were measured using a 5-point response scale in which '1' indicated 'very dissatisfied' and '5' indicated 'very satisfied'. Higher scores indicated greater levels of satisfaction.
- ✚ The motivator-hygiene factors were measured using 25-item four-point Likert type scale with responses varying from 1 (strongly agree) to 4 (strongly disagree). Lower scores indicated greater satisfaction regarding the job factors.
- ✚ Ten items were used to evaluate the main motivating factors from the employee point of view. Each of these items used a 5-point scale ranging from '1'='least important' to '5'='very important'. Higher scores indicated the most important motivating factors.
- ✚ In the third section of the questionnaire, demographic variables (such as age, gender, years of service, years of service on the actual position, number of subordinates, basic profession, salary) were statistically controlled due to their potential relationships with the variables of study. The age, years of service, years of service on the actual position, number of subordinates and salary were measured using 5-point scales. The basic profession was measured using a 4-point scale. Gender was coded as a binary variable (0=male and 1=female).

#### III.2.1. The Multinomial Logistic Regression (MLR)

The Logistic Regression (LR) method is used to model the relationship between a dichotomous (binary) dependent variable and a set of  $k$  predictor variables  $\{x_1, x_2, \dots, x_k\}$ , which are either categorical (factors) or numerical (covariates). As the binary dependent variable can be always interpreted as the occurrence or not of an event  $E$ , the logistic regression model is

$$\text{an expression of } \log\left(\frac{\text{prob}(E)}{1 - \text{prob}(E)}\right) = b_0 + \sum_{i=1}^k b_i \cdot x_i \quad (1)$$

where: the  $b_i$  's denote the unknown logistic regression coefficients ( $b_0$  is the intercept) while  $\text{prob}(E)$  denotes the probability that event  $E$  will occur. The quantity on the left side of equation (1) is called a *logit*. So, the simple LR model can be used for predicting the probability of an event occurrence.

The model can be generalized in the case where the dependent variable is polytomous, i.e. its values are more than two categories. Suppose that a dependent variable (DV) has  $M$  categories. One value (typically the first, the last, or the value with the highest frequency) of the DV is designated as the reference category. The probability of membership in other categories is compared to the probability of membership in the reference category.

For a DV with  $M$  categories, this requires the calculation of  $M-1$  equations, one for each category relative to the reference category, to describe the relationship between the DV and the independent variables (IVs).

Hence, if the first category is the reference, then, for  $m = 2 \dots M$ ,

$$\log\left(\frac{P(Y_i = m)}{P(Y_i = 1)}\right) = \alpha_m + \sum_{k=1}^K b_{mk} \cdot x_{ik} = Z_{mi} \quad (2)$$

Hence, for each case, there will be  $M-1$  predicted log odds, one for each category relative to the reference category. (Note that when  $m = 1$  you get  $\ln(1) = 0 = Z_{11}$ , and  $\exp(0) = 1$ .)

When there are more than 2 groups, computing probabilities is a little more complicated than it was in logistic regression. For  $m = 2, \dots, M$

$$P(Y_i = m) = \frac{\exp(Z_{mi})}{1 + \sum_{h=2}^M \exp(Z_{hi})} \quad (3)$$

For the reference category,

$$P(Y_i = 1) = \frac{1}{1 + \sum_{h=2}^M \exp(Z_{hi})} \quad (4)$$

In other words, you take each of the  $M-1$  log odds you computed and exponentiate it.

After estimating the coefficients of the model (2) by the method of maximum likelihood, we can readily calculate the logits and therefore the probabilities of each one of the categories. The final prediction is the category with the maximum probability.

## IV. RESEARCH RESULTS

## IV.1. Sample profile

Of the 402 respondents, the majority were male employees (60.9%, n=245). Females had been in their current position for 5 to 10 years. Males had been in their current position for 1 to 3 years.

Respondents who were 36–45 years old (30.1%) comprised the largest age group. One-third of the respondents (37.3%) are engineers, while only 27% of the interviewed persons state that they are economists. Regarding the years of service, 40% of employees state that they have over 10 years old in the company.

About one-third of respondents confess that they have over 10 years of experience in management position. As regards, the number of subordinates, 51.7% of respondents coordinates up to 49 persons. A detailed sample profile of respondents is presented in table 1(appendix).

## IV.2. Descriptive analysis

The mean scores for each measurement item, which indicated the extent to which each measurement item was perceived by employees, are presented in table 3. Based on a five point Likert type scale with responses ranging from very dissatisfied (1) to very satisfied (5), the overall level of job satisfaction was 3.80 (n = 402) (Table 1). The overall level of job satisfaction for females (n = 157) was 3.78 and 3.82 for males (n = 245). Measured like the level of job satisfaction, the salary satisfaction overall level was 3.47, for males higher than for females. The degree of satisfaction was moderate in both cases, the Romanian employees being indifferent to at most satisfied with their jobs and wages.

Table 1. Means and Standard Deviations for Overall Job Satisfaction

Variable	Total employees		Female		Male	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
<b>Overall Job Satisfaction</b>	3.80	1.047	3.78	1.046	3.82	1.049
<b>Wage Satisfaction</b>	3.47	1.057	3.32	1.014	3.56	1.076

Based on a four point Likert type scale with responses ranging from strongly agree (1) to strongly disagree (4), Romanian employees provided the following mean satisfaction scores with the job motivator and hygiene factors: achievement, 1.53; advancement, 2.64; recognition, 1.69; responsibility, 1.48; work itself, 1.27; interpersonal relations, 1.18; policy and administration, 1.5; salary, 2.31; supervision, 1.85; and working conditions, 1.60 (table 2).

Job motivators	Mean	S.D.	Job hygienes	Mean	S.D.
<b>Achievement</b>	1.53	0.64	<b>Interpersonal Relations</b>	1.18	0.83
<b>Advancement</b>	2.64	2.05	<b>Policy</b>	1.5	0.76
<b>Recognition</b>	1.69	0.84	<b>Salary</b>	2.31	1.54
<b>Responsibility</b>	1.48	0.81	<b>Supervision</b>	1.85	1.08
<b>The work itself</b>	1.27	0.47	<b>Work conditions</b>	1.60	0.89

Table 2. Means and Standard Deviations for Job Motivator and Hygiene Factors

Notes: Composite scores for each variable were obtained by averaging scores across items representing that measure.

Correlations were calculated to describe the relationships between overall level of employee job and wage satisfaction and selected demographic variables. The coefficients were negligible: age,  $r = -.02$ ; gender,  $r = -.02$ ; years of service,  $r = .02$ ; years of service in current position,  $r = .02$ ; basic profession,  $r = .03$ .

Correlations were calculated to describe the relationships overall level of employee job satisfaction and the job motivator and hygiene factors (Table 3). Correlation coefficients ranged were moderate: advancement,  $r = .20$ ; achievement,  $r = .30$ ; recognition,  $r = .34$ ; responsibility,  $r = .22$ ; work itself,  $r = .18$ ; working conditions,  $r = .35$ ; salary,  $r = .40$ ; supervision,  $r = .21$ ; policy and administration,  $r = .29$ ; salary,  $r = .25$ ; and interpersonal relations,  $r = .03$ .

Table 3. Relationships between Overall Job Satisfaction and Selected Job Factors

Job motivators	Job hygienes		
<b>Achievement</b>	0.30*	<b>Interpersonal Relations</b>	0.03
<b>Advancement</b>	0.20*	<b>Policy</b>	0.29*
<b>Recognition</b>	0.34*	<b>Salary</b>	0.25*
<b>Responsibility</b>	0.22*	<b>Supervision</b>	0.21*
<b>The work itself</b>	0.18*	<b>Work conditions</b>	0.35*

\* Correlation is significant at the 1% level (2-tailed).

## IV.3. The principal components analysis of employee job satisfaction level

The main objective of this work is to determine empirically the motivator-hygiene factors that have an impact on the satisfaction of Romanian workers, using the technique of principal components analysis, in order to derive a more parsimonious set of factors which serve as independent variables in facet-satisfaction investigations. Additionally we can use the component scores for each respondent to build a logistic regression model in order to predict job satisfaction behavior based on component scores.

Analyzing the intercorelations of selected job factors we can conclude that: recognition is positively correlated with supervision (.62) and working conditions (.45), policy with

working conditions (.70), achievement with responsibility and working conditions. The statistical tool we used in our analysis is the SPSS package.

Because in the component matrix, the first component is strongly correlated with indicators like recognition, achievement, responsibility, policy, supervision, working conditions, it is difficult to interpret. Therefore, for a more relevant and a more realistic interpretation, it is recommended the usage of an rotation axes option that have like purpose obtaining correlation coefficients as low as possible on one or two principal components. One of most used rotation technique is "Varimax".

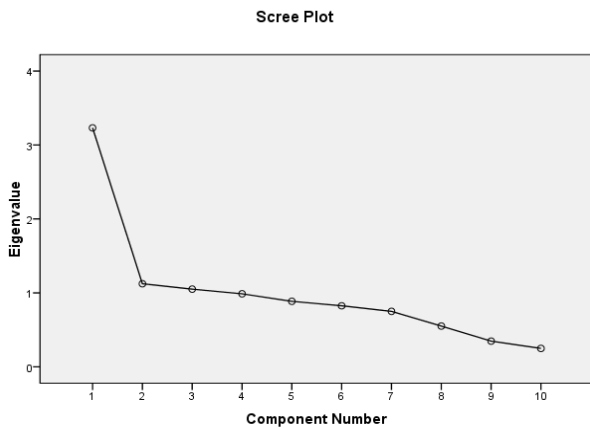


Fig.1. Scree Plot

From the scree plot we determine the optimal number of components- three component.

Table 4. Rotated Component Matrix

	Component		
	1	2	3
achievement	.194	<b>.717</b>	.004
recognition	.310	.605	.443
responsibility	.358	.533	-.059
work_itself	-.044	.686	-.094
relationships	.017	-.190	<b>.736</b>
policy	<b>.836</b>	.158	-.083
advancement	.481	-.051	.190
salary	.535	.143	.088
supervision	.166	.523	.606
working_conditions	<b>.799</b>	.312	.022

Component	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.231	32.313	32.313	3.231	32.313	32.313	2.146	21.464	21.464
2	1.123	11.233	43.546	1.123	11.233	43.546	2.089	20.891	42.355
3	1.050	10.505	54.051	1.050	10.505	54.051	1.170	11.696	54.051
4	.888	8.876	63.927						
5	.866	8.657	72.783						
6	.825	8.249	81.033						
7	.750	7.499	88.531						
8	.551	5.509	94.041						
9	.347	3.474	97.515						
10	.249	2.485	100.000						

Extraction Method: Principal Component Analysis.

Fig 2. Total Variance Explained

The Total column gives the eigenvalue, or amount of variance in the original variables accounted for by each component. The % of Variance column gives the ratio, expressed as a percentage, of the variance accounted for by each component to the total variance in all of the variables.

The Cumulative % column gives the percentage of variance accounted for by the ten components. Because we have requested that eigenvalue greater than 1 is extracted, so the first three principal components form the extracted solution, explaining nearly 54% of the variability in the original ten variables.

Adjusting the points cloud by a single factorial axis (accepting only a single synthetic indicator), it explain 32.31% of total variance; then, adjusting the points cloud by two factorial axes (accepting two synthetic indicators) we recover 43.54% of total variance, a total of 43.54% of this variance. If we require three factorial axes (three synthetic indicators) we explain 54.05% of total variance.

Component Plot in Rotated Space

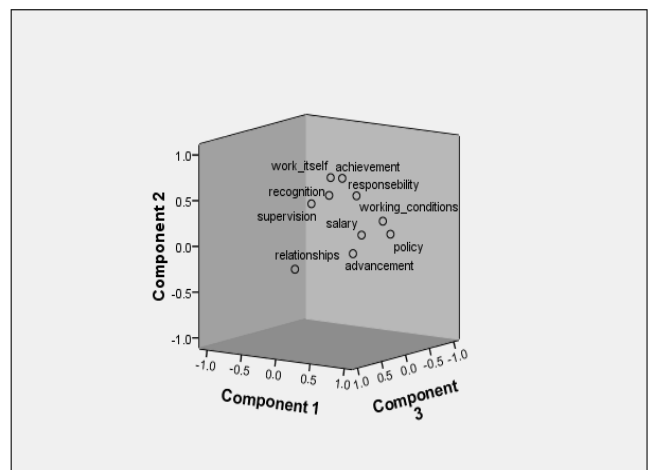


Fig. 3. Component Plot in Rotated Space

The rotated component matrix helps to determine what the components represent. The first component is most highly correlated with policy and administration and working

conditions. Policy and administration is a better representative, however, because it is less correlated with the other two components. The second component is most highly correlated with achievement. The third component is most highly correlated with interpersonal relations.

Further, our purpose is to use the three component scores in order to build a multinomial regression model to predict job satisfaction behavior of Romanian employees.

IV.4. The results of multinomial regression model

The dependent variable used in the model is the job satisfaction level that was measured using a 5-point Likert scale where 1=very dissatisfied and 5=very satisfied. We transform this variable and we allow having only three categories: 1=dissatisfied, 2=indifferent 3=satisfied. The independent variables are three component scores resulted from the principal components analysis. We consider the last category (satisfied) as the reference category for our model.

After building a model, you need to determine whether it reasonably approximates the behavior of data.

Table 5. Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	619.216	620	.501
Deviance	475.575	620	1.000

Table 6. Model Fitting Information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	532.799			
Final	482.419	50.380	6	.000

Pearson and Deviance goodness-of-fit measures presented in table 6 reveal the fact that the model adequately fits the data, the significance value being greater than 0.05. So we can say that the data are consistent with the model assumptions. The likelihood ratio test (table 6) shows whether the model fits the data better than a null model. Since the significance level of the test is less than 0.05, you can conclude the Final model is outperforming the Null.

Table 7. Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	665.660	183.241	2	.000
FAC3_1	483.141	.723	2	.697
FAC1_1	520.116	37.697	2	.000
FAC2_1	495.588	13.169	2	.001

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

Likelihood ratio tests (table 7) check the contribution of each effect to the model. Since the significance value of the first two component scores are less than 0.05, we can say that policy and administration and achievement has a significant effect on the job satisfaction level of the Romanian employees. It is important to mention that the third component score-interpersonal relations, has not a significant effect on the overall job satisfaction.

Table 8. Parameter Estimates

job_satisfaction <sup>a</sup>		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Multumit	Intercept	-2.058	.206	99.595	1	.000			
	FAC3_1	.075	.175	.185	1	.667	1.078	.765	1.521
	FAC1_1	.918	.193	22.663	1	.000	2.504	1.716	3.654
	FAC2_1	.415	.183	5.146	1	.023	1.514	1.058	2.168
Indiferent	Intercept	-1.268	.149	72.795	1	.000			
	FAC3_1	-.091	.158	.330	1	.566	.913	.671	1.244
	FAC1_1	.849	.168	25.510	1	.000	2.338	1.682	3.252
	FAC2_1	.464	.139	11.159	1	.001	1.590	1.211	2.086

a. The reference category is: Multumit.

The first two component scores have statistically significant coefficients. Parameters with significant negative coefficients decrease the likelihood of that response category with respect to the reference category. Parameters with positive coefficients increase the likelihood of that response category.

Table 9. Classification

Observed	Predicted			
	Unsatisfied	Indifferent	Satisfied	Percent Correct
Unsatisfied	0	7	26	.0%
Indifferent	0	11	60	15.5%
Satisfied	0	4	229	98.3%
Overall Percentage	.0%	6.5%	93.5%	71.2%

The classification table shows the practical results of using the multinomial logistic regression model. The model classifies correctly the most of the people who state that they are satisfied with their jobs (229 of 273 employees). Only 11 of the 86 people who are indifferent are classified correctly and no one of the employees that are dissatisfied with their jobs is correctly classified. Further, one of the recommendations is to eliminate this category from the model.

Overall, 71.2% of the cases are classified correctly. This compares favorably to the "null" or intercept-only model, which classifies all cases as the modal category. According to the case processing summary, the modal category is satisfied, with 69.1% of the cases. Thus, the null model classifies correctly 69.1% of the time.

Using the Multinomial Logistic Regression Model, you have constructed a model for predicting the job satisfaction behavior of the Romanian employees, using the component scores of the principal components analysis.

## V. CONCLUSIONS

The paper applies Herzberg's two-factor theory to employee motivation in the Romanian companies. The proposed theory model for motivation was tested using data from 402 employees.

The main purpose of the study is to determine empirically the motivator-hygiene factors that have a significant impact on the overall level of Romanian employee job satisfaction, using the technique of principal components analysis, in order to build a multinomial logistic regression model for the prediction of the job satisfaction behavior based on the component scores.

The results show that a motivation-hygiene theory with three principal components (achievement, company policy and administration and interpersonal relationships) best explains the process of motivating employees.

The study also indicates that achievement and the company policy have a significant impact on the overall level of employee job satisfaction, suggesting that managers need to focus more on these factors to better motivate employees.

## APPENDIX

### TABLES

Table 1. Respondents profile

	Frequency(N=402)	
	N	%
<b>Gender</b>		
Male	245	60.9
Female	157	39.1
No response	0	0
<b>Age</b>		
26 years old and below	29	7.2
26-35 years	93	23.1
36-45 years	121	30.1
46-55 years	108	26.9
55 years old and above	48	11.9
No response	3	0.7
<b>Basic profession</b>		
Engineer	150	37.3
Economist	110	27.4
Jurist	16	4
Other	89	22.1
No response	37	9.2
<b>Years of service</b>		
1 year old and below	23	5.7
1-3 years	58	14.4
3-5 years	58	14.4
5-10 years	100	24.9
10 years old and above	162	40.3
No response	1	0.2
<b>Years of experience in management position</b>		
1 year old and below	42	10.4
1-3 years	57	14.2
3-5 years	37	9.2
5-10 years	82	20.4
10 years old and above	116	28.9
No response	68	16.9
<b>Number of subordinates</b>		
5-9	123	30.6
10-49	208	51.7
50-249	55	13.7
250 and over	11	2.7

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- \*\*\* SPSS package.