

## EFFECTIVE RECRUITMENT METHOD FOR THE MARKETING DEPARTMENT OF A METALLURGICAL ENTERPRISE

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This paper presents some solutions to recruit staff for the Marketing Department of a metallurgical enterprise. Our goal is to present the psychological characteristics of a certain category of employees on a sample of 107 employees and to evaluate the relationship between the motivation to work and those characteristics. In order to realize such evaluation we used the linear mixed effects model in the statistical software program R. The results showed that a significant effect on work motivation have factors like work climate and the employee agreeability.

*Key words:* metallurgical enterprise, marketing, motivation to work, descriptive statistics, linear mixed effects model

### INTRODUCTION

In order to use the human resource properly, one has to give a special attention to the employment of people that have characteristics suitable to each job position. To achieve this goal, it is necessary to make a detailed analysis of the consistencies that exist between the characteristics of the employees and the characteristics of the job position. There are many studies on this subject in the specialized literature. Some of these studies focus on the identification of the *statistical relations* established between the employees' personality and their performances at work [1, 2]. Another category of studies focuses on the importance of knowing the characteristics of the relations established between an organization and its employees [3, 4]. The last category of studies shows the effects of the employees' characteristics on the degree of job satisfaction [5-7]. Concerning the relations between the organization and the characteristics of the employees, several researchers Barrett and Hambleton have shown in their studies that the relations depend on a correct understanding of the tasks or the way the individual is motivated and stimulated by the organization to perform the tasks accordingly [8, 9]. Given these issues, it was considered necessary to create a tool to help select those common characteristics of the employees in order to obtain a profile of the survey interviewer. Among these tools, the most appropriate was the questionnaire which identifies the employees' characteristics.

By conducting this survey, we will try to obtain the necessary statistical data in order to make the profile for a certain category of employee, namely the profile of the survey interviewer.

### RESEARCH METHOD

One of the objectives of this study was to see the effects of the survey interviewer psychological characteristics on the motivation to work. In order to achieve this, we used statistical data obtained following an investigation in the department of the survey operators. Knowing the dimensions of the problem, we established two categories of variables. The first category is represented by factors such as (*Climate*) and the salary level (*Salary*) which can influence the motivation of survey interviewers to perform their tasks as well as possible, and the second category is determined by survey interviewers psychological characteristics.

The respondents were asked to evaluate with grades from 1 to 5 the satisfaction degree for the present situation (1-very dissatisfied, 2-rather dissatisfied, 3-Yes and No, 4-rather satisfied, 5-very satisfied) regarding the remuneration system and the working climate. The second category of variables refers to the psychological characteristics of the respondents: conscientious (*Conscientious*), agreeable (*Agreeable*), extroverted (*Extroverted*), emotionally stable (*Emotionally Stable*).

Those characteristics were identified based on information from the research literature [10-12]. Thus, a survey interviewer must be friendly, honest, calm, conscientious, independent, responsible and sociable. We observe that a survey interviewer may have a large number of characteristics. For this reason, we established a smaller number of features to represent the basic dimensions of survey interviewer personality using a model such as the Big Five [13]. Therefore the psychological characteristics of a survey interviewer were determined by four dimensions: conscientiousness, extraversion, agreeableness and emotional stability.

The profile of the employees in the sample was: young people (20 – 24 years) (62,6 %), of which 44,9 %

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attended a university, 88,8 % are female, 46,7 % have a 6 months - 1 year working period with a very high staff fluctuation (60 %). In this situation, in order to conduct the survey we opted for the *face - to - face* interview.

## DATA ANALYSIS METHOD

As we wanted an analysis concerning the influence of psychological characteristics of the survey interviewer on the motivation to work, we selected for analysis only the variables of interest. It was necessary for us to describe the statistical relations between a response variable and the covariance data grouped according to one or more factors that is why we used the *linear mixed effects* models. Using this type of models we want to evaluate the relationship between a dependent variable (the motivation to work) and independent variables (psychological characteristics of the survey interviewer). If we deal with complex structures, statistical data recorded for homogeneous groups within groups but independently appearing at each level, are considered as a sub-population of the mother population. Linear mixed effects models are using a new causal variable whose values are modified for different levels. The model which will be estimated for this case has the general form [14]:

$$y_{ijk} = X_{ijk}\beta + Z_{i,jk}b_i + Z_{i,j,k}b_{ij} + Z_{ijk}b_{ijk} + \varepsilon_{ijk}, \quad (1)$$

$$i = 1, \dots, M, \quad j = 1, \dots, M_p, \quad k = 1, \dots, M_{ij}$$

where:

- $y_{ijk}$ : dependent variable;
- $b_i, b_{ij}, b_{ijk}$ : random effects;
- $Z_{i,jk}, Z_{i,j,k}, Z_{ijk}$ : regressor matrices;
- $\varepsilon_{ijk}$ : error within groups.

To develop a model as described by equation (1) it was checked if the structure of fixed effects and of the random effects are appropriate to describe the analyzed data.

## RESULTS

In order to create such a model we based on the multiple regression model. We took into account the observations of the studied phenomenon considered as being causal relations between more different, independent, identically distributed variables which belong to a single population. The linear mixed effects models allow us to avoid this problem by introducing a causal variable whose values change for different levels. Given these observations on mixed effects models, the results for the estimated model are presented in Table 1.

The obtained results show that the values of p-value are lower than 0,05 (or very close to 0,05) for the variables *Climate* and *Agreeable* but not for the other variables. Thus, we proposed ourselves to eliminate those variables that do not have a significant effect on the motivation to work.

Table 1 The estimation of the mixed effects model

Variables	Estimated Coefficient	Standard Error	Test t Value	p-value
(Intercept)	1,392	1,610	0,864	0,389
Salary	0,000	0,001	0,735	0,4638
Climate	0,271	0,117	2,320	0,022
Conscientious	-0,030	0,232	-0,13	0,896
Extroverted	0,236	0,192	1,223	0,224
Agreeable	-0,422	0,181	2,325	0,022
Emotionally Stable	0,030	0,174	0,171	0,863
AI C	385,931	$\sigma_u$		1,171
B IC	409,377	$\sigma_e$		0,439
Lo gProb	-183,965	$\rho$		0,877

In order to see which variables should be eliminated from the estimated model we used the ANOVA method (Table 2).

Table 2 ANOVA results

Variables	F-value	p-value
(Intercept)	391,1387 <	,0001
Salary	0,0002	0,9888
Climate	4,9455	0,0284
Conscientious	0,3109	0,5784
Extroverted	0,0251	0,8744
Agreeable	5,4963	0,0210
Emotionally Stable	0,0295	0,8639

The obtained results from Table 2 show that the p-value for F-test is higher than 0,05 for variables like *Salary*, *Conscientious*, *Extroverted* and *Emotionally Stable*. Thus it is confirmed the fact that some of the terms could be eliminated from the model. The terms were eliminated one by one until we obtain a suitable model as in Table 3.

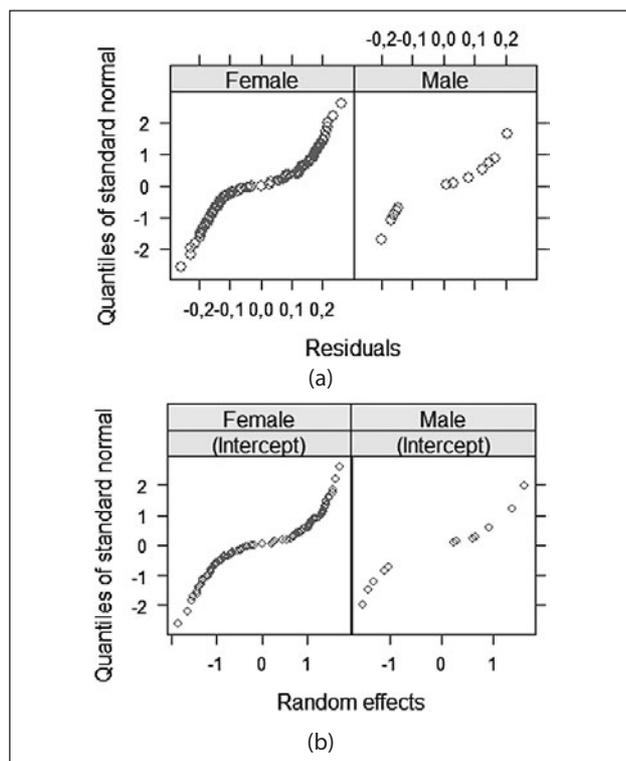
In this table, the calculation of t-test shows that they are all significant at  $p < 0,05$ . The regression coefficient for the *Climate* of the marketing department is 0,236. The negative value of *Agreeable* is negative and means that the average of work motivation goes down with 0,267 points. This does not seem very much, but for a survey interviewer this characteristic is very important.

Table 3 The estimation of the second model

	Estimated Coefficient	Standard Error	Test t Value	p-value
(Intercept)	2,570	0,720	3,567	0,000
Climate	0,236	0,111	2,115	0,036
Agreeable	-0,267	0,135	-1,981	0,050
AI C	363,897	$\sigma_u$		1,161
B IC	377,119	$\sigma_e$		0,435
Lo gProb	-176,948	$\rho$		0,931

Comparison of the other results between the two models shows that the variance component goes down from 1,171 in the first model to 1,161 in the second model. Apparently, the second model explains some of the variation for survey interviewer gender. The AIC criterion also goes down, which indicated that the second model fits better than the previous model.

Before validating the chosen model we have to check if certain requirements are met: intra-group errors



**Figure 1** The distribution of errors and of the random effects into groups according to gender

have to be independent identically distributed, having the average 0, the variance  $\sigma^2$  and the random effects are normally distributed having average 0 and are independent for different groups. To evaluate the validity of these assumptions, the most used methods are the graphical representations of the residuals distribution, the random effects estimation and the testing of certain hypotheses. In this case we opted for a graphical representation of the distribution of errors (Figure 1 a, b).

From the graphs obtained in Figure 1 we observe that, the errors are symmetrical distributed around the expected value zero and the normality distribution assumption is not violated inside each group according to gender. We also noticed that the requirement of normality is met for both distributions of random effects, although there is a slight asymmetry.

## CONCLUSIONS

The results showed that the agreeable people are more motivated to perform the tasks of the survey interviewer. Besides the psychological characteristics of a survey interviewer, the motivation to work is influenced by variables such as the work climate within the department. The results showed that agreeable people are more motivated to perform the tasks of the survey interviewer employed by the Marketing Department of a metallurgical enterprise. Generally, an agreeable employee is generous, pleasant, friendly, nice and operational. He can easily resolve conflicts and help their colleagues.

Also, taking into account that the activity of a survey interviewer implies the achievement of tasks like find-

ing the respondents and getting their cooperation, preparing and motivating the respondents to answer, offering explanations, recording and verifying incomplete answers, it is very important the insurance of proper working environment in a marketing department of metallurgical company.

Knowing the main forms of motivation and the psychological characteristics of the people within a group, it is possible to develop new strategies that help us to organize the effectiveness of labor in general. It has often been noticed that there is a contrast in the organizational environments. The emphasis is no longer on incentives that can lead to motivation but on being motivated to achieve A, B or C. In this context, the organization, through its programs and practices, can motivate the employee in one sense or another.

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**Note:** Responsible person for English Language M. Coanca, English language teacher at Romanian-American University, Bucharest.