

Bayesian Modeling Approach to Analysis of Work Orientations

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This study is concerned with the analysis of work orientations, which can be interpreted as motivation factors, satisfaction influencing factors and general work-related values. The current issue is of special interest in organizational research for elaboration of effective strategies on the managerial level. However, the character of data (survey-based categorical (Likert scale) and nominal variables) often poses a certain set of limitations to reliable statistical analysis. This study represents the special approach to the analysis of categorical indicators, which makes possible to identify dependencies assuming the qualitative character of data.

The analysis is conducted around 6 groups of factors, assuming 3-9 factors in each groups (43 factors in total) and reflecting: (1) time-valuing (the best way of spending time); (2) general attitude to work (thinking of work as); (3) payment criteria estimations (on the base of different personal characteristics); (4) work-related values (motivation factors, their importance); (5) work-absence related stress (stress determinants); (6) real work characteristics (perceived advantages). One non-group factor reflected the overall degree of work satisfaction. In addition, 6 classification variables were tested in the analysis: country, sex, age, marital status, number of household members and personal income. The current data structure makes possible to investigate the interrelations of different work orientations factor groups (best predictors), as well as test the differences of work orientation factors by classifying characteristics.

Bayesian modeling is viable alternative to traditional frequentistic statistical techniques, which is designed for discrete categorical variables (no multivariate normality and linearity assumptions), analyzing both linear and non-linear dependencies and having no limit for minimum sample size. The Bayesian dependence network is a representation of probability distribution over a set of random variables, consisting of directed acyclic graph, with the nodes corresponding to domain variables and the arcs define a set of independence assumptions that allow the joint probability distribution for a data vector to be factorized as a product of simple conditional probabilities. Both Bayesian classification modeling (BCM) (searching for the best predictors for group memberships) and Bayesian dependence modeling (BDM) were applied in this study. For current analysis B-course software tool was used. With the large amount of data used (about 8000 data rows), the current analysis lead to interesting implications concerning interdependencies of different work orientations factors and their relation to so-called steady factors, as income group and certain personal characteristics. Bayesian network graphs and probability tables aren't presented here for economy of space.

Bayesian classification modeling results

Among the classification variables the main factors predicting differences in work orientations were: (1) marital status (with the highest classification accuracy) (difference by 20 factors), (2) sex (23 factors), (3) overall satisfaction from work (12 factors), (4) country (32 factors), (5) number of household members (21 factors), (6) income (9 factors), (7) age (2 factors). So, differences of work orientations were related to marital status of the person, his sex, country (data from 6 countries is analyzed), number if household members and income. Age factor, with the smaller classification accuracy, hadn't been an important determinant of differences in work orientations in this study. The factor of overall work satisfaction estimation was used both as classification variable and group factor, resulting in differences in work orientations for some groups.

Marital status influenced mainly pay criteria estimations time-valuing components, but also another group factors. As, married persons didn't tend to think of work as just a way of

earning money. For married persons loss self-confidence as stress factor when loosing the job was less important. Sex of the respondents influenced mainly differences in work motivation factors, as well as differences in existing job characteristics estimations. In general, female respondents tended to estimate possibility to help another people as more important factor of motivation. For male respondents the important of the possibility to work independently was of more importance, as well as the significance of income as a motivation factor. Flexible working hours was more important factor for female respondents. In general, the persons which estimated their job as interesting and with the high opportunities for advancement tended to be more satisfied by their work (compared, for example, to the factor of higher income, or the possibility of being useful to society). For the persons with the higher degree of satisfaction the possibility to have more leisure time after work (as a motivation factor), was less important. Country factor influenced mainly motivation factors importance (independent work, leisure time, job security, interesting work), overall work estimations (more precisely, thinking of work as just a way of earning money), as well as time-valuing characteristics (time to relax and time for doing household work importance). As well, the number of household members was important for high income and security as the motivation factors. Age variable influenced differences in losing job experience as stress factor. Persons with the higher income tended to estimate the work to be the person's most important activity and to propose the quality of work as payment criteria.

Bayesian dependence modeling results

In Bayesian network models the relations between real job characteristics and degree of satisfaction, motivation and stress factors, degree of satisfaction and different personal characteristics, income and motivation factors, as well as other dependencies were analyzed. Some of the results of the analysis can be presented as follows. In general, persons with similar motivation factors estimations didn't tend to have the same stress variables reported. The notion of "interesting work" was positively related to the possibility to work independently, the possibility to help other people and having high possibilities for advancement. The people with the higher income tended to estimate their job as more secure. Female respondents were more satisfied by their job, younger people were in general less satisfied by their job. For respondents with the higher income the security of job was of the smaller importance, and the factor of interesting job of more importance. At the same time, the dependencies between stress factors and income were weak. The people who estimated that they could work even with no need of money tended to have more possibilities of advancement at work. In contrary, persons estimating the work as only the way on earning money didn't have, in general, good possibilities of advancement. Presented results is only a part of this study. Additional models' characteristics are available from the author by request.

References

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