

# Adaptive Conjoint Analysis of Professionals' Job Preferences

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**Abstract**—Job preferences are a well-developed research field. Many studies analyze the preferences using simple ratings with a sample of university graduates. The current study analyzes the preferences with a mixed method approach of a qualitative preliminary study and adaptive conjoint-analysis. Preconditions of accepting job offers are clarified for professionals in the industrial sector. It could be shown that, e.g. wages above the average are critical and that career opportunities must be seen broader than merely a focus on formal personnel development programs. The results suggest that, to be effective with their recruitment efforts, employers must take into account key desirable job attributes of their target group.

**Keywords**—Conjoint analysis, employer attractiveness, job preferences, personnel marketing.

## I. INTRODUCTION

THE research on employee preferences for jobs with certain criteria has already been at the focus of science for several decades [1]. Especially in times with a shortage of qualified professionals, detailed knowledge of the target groups' needs are strategically important for successful positioning in the relevant labour markets and synchronising of the employer's job offer with the target groups [2]. An understanding of why employees prefer one organisation's job offer over that of another is strategically significant for organisations and influences their future economic success [3], [4].

The research on employees' preference structure with regard to job attributes has a long tradition. In this research, the preferences for characteristics were initially examined in smaller samples [5] in order to validate them with large data samples [6] and analyse them according to differences in gender, education, age and country [7]-[10]. On the one hand, these studies show uniform preference structures with a strong consensus regarding the importance placed on the type of work, the wages and relationships with colleagues. On the other hand, differences appear when individual groups are examined more closely. For example, career opportunities are especially significant during the younger years. Or differences are revealed regarding the level of education, especially in the case of groups with a lower level of education highly valuing job security.

Instead of applying the previous approach that analyses the

preference assessments with mostly univariate statistics or using simple rating methods, we employed a two-stage process. In a first step, the relevant job attributes are determined from the perspective of professionals – instead of university graduates – in a qualitative study. In a second step, these attributes are subject to an adaptive conjoint analysis. This results in the relative importance of the attributes, as well as the calibrated total utility values. These results will be discussed with regard to employer attractiveness.

## II. OBJECTIVE AND THEORETICAL BACKGROUND

### A. Preference Order of Job Attributes

Job preferences are related to the value that individuals attribute to various workplace characteristics [9]. They represent a reflection about an evaluation process in which a person positively or negatively rates characteristics. Job characteristics and preferences are mostly collected through quantitative surveys in which respondents are asked to rank characteristics “in terms of what is most important to you in a job” [11].

The characteristics can be differentiated – following an earlier study by Herzberg et al. [5] – into intrinsic and more extrinsic factors. Intrinsic factors are those job attributes that are related to the activity itself. They satisfy needs for growth, competence and self-determination [12]. Extrinsic characteristics are job aspects that satisfy material or social needs [13]. Although this classification is useful, it is difficult to categorise the individual aspects of work. For example, promotion prospects can provide access to interesting work and also help in achieving more prestige and status. As a result, there is no consistent bundling of job attributes for intrinsic and extrinsic factors.

A large number of researchers have studied job attributes in recent years. For a 30-year time span (1946–1975), during which he examined job applicants of a public utility company in the USA and had them rank 10 job attributes according to their attractiveness, Jurgensen [6] was able to show that job preferences are surprisingly constant over the years. The most important change resulted from a continuously higher valuation for the type of work among men (this factor already ranked highly in earlier years among women). Location factors were integrated into the study by Turban et al. [11]. The geographic location is a main aspect for the group that had rejected a job offer.

The study by Lieb [14] was able to show that assessment of how important the individual factors are can differ between surveyed university graduates and the recruiters. The latter overestimated both the importance of workplace autonomy

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and geographic location. The study by Başlevent and Kirmanoğlu [15] examines job preferences by using data from the fifth European Social Survey in 2011. Those who had already been previously unemployed rated job security as particularly important.

#### *B. Open Questions and Further Required Research*

The following conclusions can be drawn from previous studies:

- 1) Preference structures of employees prove to be relatively constant over the years with regard to the assessment of especially important characteristics.
- 2) Despite this finding, detailed studies show major differences in preference structure with regard to subgroups such as different levels of education, age segments and regions.
- 3) The previous studies frequently always examine the same characteristics, which is why there is hardly any research available on additional aspects such as the significance of regional factors, as well as a more differentiated research on aspects that can be determined beyond the development opportunities.
- 4) The investigated population is limited to university graduates in a multitude of studies.
- 5) Most studies focus on large companies.
- 6) The methodological approach is hardly differentiated.

**Consistent preference structures.** The previous studies show a strong consensus with regard to the most important job attributes across temporal and regional differences. For example, the type of work ranks in the upper preference tiers in many studies [3], [6], [11]. Factors such as pleasant colleagues, attractiveness of the company, the wages and promotion prospects were repeatedly rated as very important in a slightly differing order.

**Group-specific preference structures.** Despite a high correspondence concerning the general ranking of preference characteristics in the various studies, detailed analyses found major differences in relation to job preferences depending on the context. For example, career opportunities generally rank very highly for younger employees and then continually decrease later in professional life. This means that a tendency toward over-assessing the importance of career opportunities in many studies on the preference structure of job attributes among university graduates must be accepted. Moreover, education-specific differences were found in addition to age-specific differences. Job security plays a smaller role in the more educated groups, but the type of works ranks higher. Especially when considering possible influencing factors on the preference structure such as gender, age and level of education, almost no differentiated studies on specific occupational groups or industry sectors exist. This greatly restricts the perspective on possible characteristics that guide actions.

**Examined population.** Most studies examine the preference structures of university graduates. Especially SMEs frequently look for skilled employees with years of work experience [16]. However, there are hardly any studies that specifically

investigate the expectations of professionals who already work in the relevant industry.

**Focus on large companies.** SMEs also differ from large companies in the area of human resources management [17]. They often have informal HR practices [18]. But for precisely this reason, the capabilities of ensuring competitive job offers and appropriate continuous development opportunities are considered critical factors in an effective and efficient operative management of SMEs [19]. There is a lack of studies that also integrate this difference of working environments into the aspects from the examined lists of characteristics. For example, it would be interesting to pursue the question of how the area of personnel development can be designed in SMEs against the background that SMEs can rarely offer employees traditional prospects for promotion due to their flat hierarchies. There is a lack of studies in this regard that capture the broader human resource development needs and also include criteria that have a greater effect within the context of SMEs such as increased responsibility or an internal change of duties. As another differentiating characteristic compared to large companies, SMEs often buffer cyclical fluctuations in market activity and the resulting fluctuating order situation through flexible working hours for their workforce [20]. In times of order peaks, they often have additional overtime and weekend work. This leads to the question of how important the work-life balance is for employees with regard to the aspects of acceptable workload and regulated conditions of working time.

**Methodical limitations.** In particular, a weak point of these studies is the fact that they primarily use individual ratings of all job preferences on Likert scales. This can result in many attributes appearing important to employees, but provide no insight into the weighting of job profiles in which the combinations of attributes are weighed against each other. Even more recent studies mostly use ratings on the level of individual items e.g. [21], [22], which can lead to rating a majority of items as important.

Other studies work with a hierarchical order of attributes by asking respondents to rank the order for a number of given attributes [23]. This has the advantage that attributes must be weighed against each other in respective pairs. However, it is not possible to make any statements on what effect they have within an overall offer.

The current study closes a number of gaps. Instead of analysing the preference assessments with univariate statistics (which is inappropriate for recording multi-factor job preferences) or using a simple rating method (which is ineffective with large sets of attributes [24]), we employ a conjoint analysis. In this process, persons must specifically weigh the different preferences in relation to each other. The examined population is drawn from employed professionals and not university graduates. The question arises for this group as to which conditions they must encounter in order to decide upon a specific job.

### III. METHODOLOGY

#### A. Sample

The study was conducted among professionals in Germany, Austria and Switzerland who currently work in the industrial and commercial sector. In addition to employment, the selection criteria included those who completed vocational training and/or had a university degree. A total of 353 professionals (107 in Germany, 184 in Switzerland and 62 in Austria) participated in the survey: 45% with vocational training and 55% with a university (of applied sciences) degree. Of the respondents, 43% worked at an SME; the average work experience was six years. The last active job search took place on average four years ago (the range of responses was from 0 to 22 years, whereby 9.9% of respondents had actively searched for a new job within the past six months and 55.5% of respondents had done so in the past four years). The sample has a ratio of 72% men and 28% women. The age was collected in categories and exhibited the following distribution: 4.5% under 24 years, 26.4% for 25 to 34 years, 22.1% for 35 to 44 years, 37.8% for 45 to 55 years and 9.1% older than 55 years.

#### B. Data Collection and Methodology

The contact to the professionals occurred through a panel provider and was also supplemented through partner companies of this research project in Switzerland (see note). The survey was performed as an adaptive conjoint analysis. For the selection of attributes and characteristic values, which serve as the basis of the conjoint analysis, qualitative interviews were conducted in advance and their statements were categorised [25]. The methodological mixture of qualitative preliminary study and adaptive conjoint analysis was realised through a three-stage research design. The introductory survey by means of expert interviews with HR managers at SMEs ( $N=32$ ) was followed by a qualitative survey by means of guideline-based interviews with professionals ( $N=124$ ). In conclusion, the third survey phase was conducted by means of a quantitative survey ( $N=353$ ) that is reported here. The survey was developed on the basis of the two preceding survey phases and conducted as an online survey.

The decision criteria for employer selection that were identified in the qualitative survey phase served as the basis for the conjoint analysis. The objective was to find the decisive preferences from the multitude of identified characteristics that determine the attractiveness and selection of an employer and depict them in a statistically informative preference structure.

The conjoint analysis is the appropriate method for this purpose [26]. This type of analysis enables an explanation of the individual assessment and decision-making processes through a special survey procedure. The conjoint analysis was first scientifically published in its essential mathematical features in 1964 and has been especially used in market research since the mid-1990s [27], [28]. In recent years, this survey method has been increasingly applied in empirical

social research [29] and extensive questions such as job selection by MBA students [30]. New variations of conjoint analysis also make it possible to integrate a relatively large number of attributes into preference measurements. Since a multitude of attributes were identified in the qualitative survey phases that could be decisive in employer selection, an adaptive-conjoint analysis was selected. This enables an analysis with a high number of attributes (e.g. type of work) that are relevant for evaluation and their characteristics (e.g. direct customer contact) [31]. The procedure is called "adaptive" because the computer-aided interview process is controlled through five differently designed survey phases in such a way that the sequence of the survey adapts itself to the respondents' response behaviour (for a description of the process see section 9 in [32]). The employees surveyed here were asked to make preference assessments on a total of over 35 characteristic values, which can be grouped into 10 attributes.

### IV. RESULTS

For the evaluation of the adaptive conjoint analysis, initial usefulness parameters were identified for each respondent separately and an individual preference model was estimated for each respondent. Then the results of the individual analysis were aggregated by mean value calculations. For additional analysis and data interpretation, three different findings from different phases of the analysis are interesting. These findings will be presented in the following section.

#### A. Relative Importance Values

The relative importance values are presented first. These are determined following the initial three survey phases on the level of characteristics and supply information on what contribution this variation provides in an attribute's structuring as a preference assessment.

The relative importance of an attribute indicates what contribution an attribute can make to a change of preferences: The higher the relative importance of an attribute, the greater its utility in the sense of a preference decision. Therefore, the relative importance of an attribute provides valuable information with regard to the composition possibilities of a job offer. For attributes with a high relative importance, a variation in structure can be significantly useful when making a decision about a position. As can be seen in Fig. 1, the wages represent an important basis of decision-making for all respondents. It appears that pay is a basic requirement; if satisfied to an above average extent, this has a particularly beneficial influence on the preference assessment. Furthermore, professionals especially include the career opportunities and human resource development, the possible work-life balance with regard to workload and the type of work in their decision-making process. However, the explanatory power in the relative importance of attributes is limited because no information can be found here regarding decision-relevant characteristic values. This information is provided by total utility values in the following section.

### B. Calibrated Total Utility Values

The calibrated total utility values, which are calculated after concluding all of the five survey phases for every characteristic attribute (across all characteristics), allow for establishing a ranking order across all attributes with regard to their contribution to the preference assessment. Consequently, the ranking order must be interpreted in such a way that characteristic attributes at the beginning of the ranking order provide the greatest contribution to the preference assessment, i.e. that the existence of these attributes is particularly crucial in terms of deciding on a position. In order to highlight the distance within the ranking order, the conjoint values were transformed to a percentage scale (up to 100). For this purpose, the rank of 1 was set to 100. The results can now be read as percentage values in the sense that a value of 30, for example, leads to a 30 times higher probability of opting for this position. The Top 10 at the start of the ranking order for the overall 35 characteristic attributes are shown in Table II.

The existence of these attributes is especially influential in respondents deciding on a position. The ranking order illustrates that especially workplace-related aspects affect the decision for a job. Characteristics of the “type of work” attribute are particularly relevant since three of five

characteristics (rank 5, rank 8 and rank 9) are in the Top 10. There is no significant difference with regard to the ranking order between the various socio-demographic groups. In general, it can be concluded that an above average wage as well as personnel career opportunities are classified more important than reputation of a company.

TABLE I  
RANKING OF TOP10 CHARACTERISTICS AFTER THE CONTRIBUTION OF AN ATTRIBUTE TO THE PREFERENCE ASSESSMENT WITH REGARD TO AN EMPLOYER (N=353)

Ranking	Characteristic	Calibrated total utility values	Percentage value
1	Wages and benefits above average	0.165	100
2	Internal opportunities for changing to a different area of responsibility	0.087	53
3	Good relationship with superiors	0.087	53
4	Good image of the products	0.084	51
5	Professionally challenging work assignment	0.080	48
6	Normal hours of workload	0.078	47
7	Pleasant work climate	0.078	47
8	Direct customer contacts	0.076	46
9	Broad spectrum of work duties	0.076	46
10	Economic success of the company	0.075	45

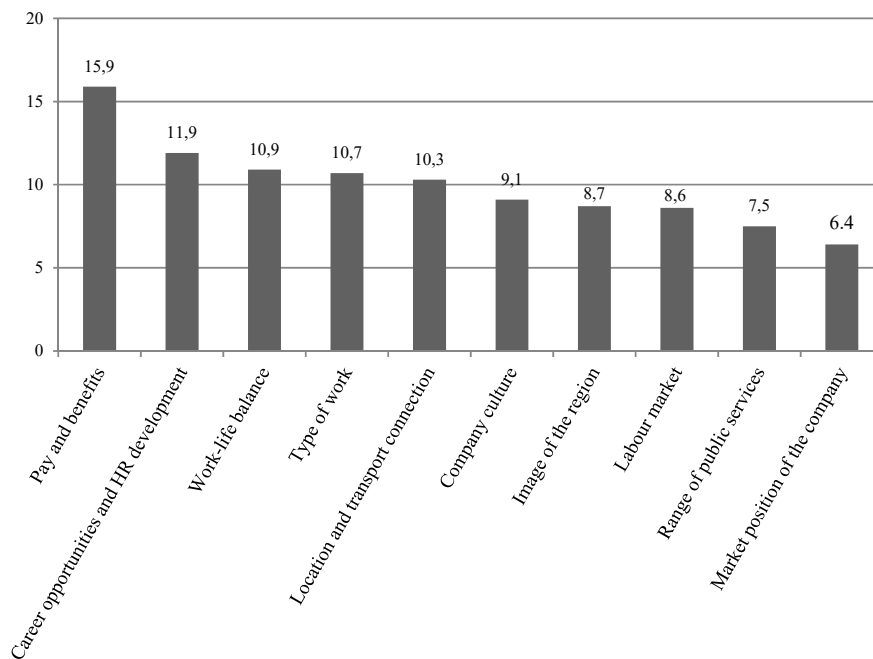


Fig. 1 Overview of the relative attribute importance during job selection in per cent of the total sample (N=353)

### C. Final Total Utility Values

The last step is looking at the final total utility values, which are calculated after the pairwise comparisons (4<sup>th</sup> survey step) and compare characteristic attributes within an attribute with regard to their utility for the preference assessment. The detailed analysis makes it possible to exactly determine the attractiveness value of the individual characteristic attributes and the utility increase that one

characteristic can yield in comparison to another characteristic attribute. The main emphasis here lies on the attributes of “career opportunities and human resource development,” “work-life balance” and “company culture” since they received special attention in the studies that were presented above.

With regard to the attribute of “career opportunities and human resource development,” the relevant criterion for job

selection consists especially of hierarchical promotion opportunities, as well as formalized human resource development and career planning. However, the support of advanced training has no effect on the selection of a position (see Table I). For the characteristics of the “work-life balance” attribute, all of the respondents especially value a low mental workload/low amount of pressure from responsibility. On the other hand, a flexible design of working hours and location is less decision-relevant for all respondents. Lastly, it appears that a good relationship with superiors, a cooperative management style and short decision-making paths in the company for the attribute of “company culture” positively support the preference assessment. In contrast, the work climate is less decision-relevant.

## V. DISCUSSION

The current study’s objective was a detailed presentation of the relevant factors for employer selection from the professionals’ perspective. The preferences of professionals with regard to job selection were comprehensively analysed and detailed analyses of demographic subgroups will follow.

Of the job attributes that were gained from a qualitative preliminary study and integrated into an adaptive conjoint analysis, especially job-related and operational characteristics are included in the preference assessments in the process of selecting an employer. This analysis shows the particularly high importance of aspects related to the type of work (e.g. comprehensive, diverse and professionally challenging work) and development opportunities, which is mostly congruent with the results of other studies [6], [8], [11], [33]. In relation to development opportunities, it is interesting that employees do not primarily focus on linear advancement but often prefer horizontal changes (e.g. change in area of responsibility or increasing responsibility on the same hierarchy level). Above all, this could also represent a competitive advantage for SMEs.

Appropriate wages appear to be especially important. This means that a wage level customary for the sector is seen as a basic requirement that must be satisfied for the position to even make it on the shortlist. After this, especially, a good relationship with superiors, internal opportunities to change into a different area of responsibility, a good image of the products, professionally challenging work and normal hours of workload influence the choice of employment. This also reveals important reference points for SMEs: It is interesting that many employees do not exclusively associate development opportunities with hierarchical advancement, but that a majority prefers horizontal opportunities of change or an expansion of their areas of work and responsibility – precisely the factors that SMEs are good at covering. A utility increase also results from short decision-making paths, which can also be considered typical for SMEs [34]. However, a majority of surveyed employees also value a low degree of pressure from responsibility, which would in turn contradict with the prevalent generalist work at SMEs and can put special requirements on working-time models (cf. [35]-[37]). It was possible to demonstrate differences with regard to the

preference structure of employees in the three surveyed countries.

### A. Methodological Critique

An adaptive conjoint analysis formed the core of this study and provides many advantages (such as the interesting interview and possibility of integrating many attributes), but also needs to be discussed critically. The pairwise comparison – of two job offers in this case – which forms the basis for the final utility values, has been criticized as not being very realistic. This perception is not shared by the surveyed employees (information from pre-test interviews). A second point of criticism refers to the exclusion of attributes. This facilitates an adaptive survey process, but it possibly influences the predictive accuracy or implies a loss of information. Due to the exclusion of characteristics, there is a risk that the relative importance of other characteristic attributes is (artificially) increased and this could cause a distortion of the results. In the current study, this issue could have led to the fact that the attribute of “wages” was rated as more important compared to other attributes because this attribute was not excluded by any respondent in the first phase of the survey. However, the advantages of the adaptive conjoint analysis predominate on the whole. The integration of 35 characteristic attributes facilitated the detailed analysis of the preference assessments with a reasonable effort from employees. With regard to the sample, we can state that a representative survey of employees in the industrial-commercial sector was the aim and was controlled by quotas concerning education, gender and age. However, it can be determined that employees under 24 years and over 55 years of age are slightly underrepresented, which could be a consequence of the sample acquisition (panel and direct approach in companies). Systematic differences between the samples due to the acquisition were not found. In general, these socio-demographic control variables indicate a homogeneous sample, which makes it possible to model the sample via a mutual conjoint analysis. The risk of majority fallacy remains (cf. [38]).

### B. Implications

The employee preferences with regard to job selection were examined from the perspective of several groups of professionals and managers. Gradual differences to existing studies were detected in the preference structure of the surveyed employees. Information can be derived from this for a differentiated and targeted address, e.g. for job advertisements. Especially SMEs that are less publicly known and perceived as less attractive employers by professionals can derive information for targeted personnel marketing and integrate the respective preference structures into their communication. For example, this could include presenting possible perspectives for continued development within a job or highlighting the existence of standardized human resource development programs. The targeted address can especially support SMEs in more effectively positioning themselves by simple means within the employment market for the

acquisition and retention of highly qualified employees.

TABLE II

LIST OF ALL ATTRIBUTES AND CHARACTERISTICS FOR THE CONJOINT ANALYSIS

Attributes	Characteristic
Location and transport connection	<ul style="list-style-type: none"> <li>• Location close to the board (FL, CH, A and D)</li> <li>• Bigger cities in the vicinity</li> <li>• Traffic connection within the region</li> <li>• Traffic connection beyond the region</li> </ul>
Labour market	<ul style="list-style-type: none"> <li>• Opportunity to change job within the region</li> <li>• Job opportunities for the partner in the region</li> </ul>
Public range of services	<ul style="list-style-type: none"> <li>• Close proximity of daycare centres</li> <li>• Close proximity of schools</li> <li>• Close proximity of one or more universities</li> </ul>
Image of the region	<ul style="list-style-type: none"> <li>• High-tech location</li> <li>• Rural family environment</li> <li>• Leisure opportunities in natural environment</li> <li>• Professionally challenging work assignment</li> <li>• Broad spectrum of work duties ("generalist" in demand)</li> </ul>
Type of work	<ul style="list-style-type: none"> <li>• Autonomy and decision-making freedom</li> <li>• Direct customer contact</li> <li>• International environment</li> <li>• Hierarchical advancement opportunities</li> <li>• Increased responsibility without hierarchical advancement</li> </ul>
Career opportunities and human resource development	<ul style="list-style-type: none"> <li>• Internal opportunities for changing to a different area of responsibility</li> <li>• Standardized human resource development / career planning</li> <li>• Support of advanced training</li> </ul>
Wages, benefits (e.g. holidays, company preschool, incentive wages)	<ul style="list-style-type: none"> <li>• Wages and benefits above average</li> <li>• Wages and benefits average</li> <li>• Wages and benefits below average</li> </ul>
Work-life balance	<ul style="list-style-type: none"> <li>• Low degree of responsibility pressure / low mental workload</li> <li>• Flexible working hours of job location</li> <li>• Normal hours of workload</li> </ul>
Position of company in the market	<ul style="list-style-type: none"> <li>• Good image of the company</li> <li>• Good image of the products</li> <li>• Economic success of the company</li> <li>• Pleasant work climate</li> </ul>
Company culture	<ul style="list-style-type: none"> <li>• Cooperative management style</li> <li>• Good relationship with superiors</li> <li>• Short decision-making paths</li> </ul>

For the scientific discussion, this study was able to expand existing studies on job preferences by the target group of employees. In this process, a total preference assessment was surveyed and made it possible to consider a total of 35 job characteristics. It became apparent here that job attributes (1) are still a relevant subject of research and (2) that it is worthwhile to examine job attributes with a broader focus.

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