

Identification of Personality Traits for Recruitment of Unskilled Occupations using Kansei Engineering Method

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Abstract—Job recruitment portals become the main recruitment channel in most of the organizations nowadays because they offer many advantages to recruiters and job applicants. An outstanding recruitment system should be able to filter and recommend the best potential candidates for a job vacancy so that it can avoid hiring of inappropriate individuals or miss out the good candidates. Nevertheless, most of the existing job portals do not cover the unskilled job sectors. Matching unskilled jobs to applicants is challenging because the selection criteria can be very subjective and difficult to specify in terms of professional qualifications. In this paper, Kansei Engineering (KE) Model is applied to find the most prominent personality traits that are preferred by employers in different unskilled job categories in Malaysia. We have identified most prominent 20 Kansei words related to personality traits that are important to six main industries of unskilled workers. The six unskilled sectors involved are construction, hotel, manufacturing, restaurant, sales, and service. 60 employers from the six sectors were interviewed to rank the 50 personality traits identified. Those ranked personality traits can potentially be used for recruitment selection and filtering of unskilled job applicants.

Index Terms—E-recruitment; Kansei Engineering; Personality Traits; Unskilled Occupation.

I. INTRODUCTION

The advancement of information and communication technology has transformed how organizations and recruitment agencies recruit employees. E-recruitment is the process of using web-based platform for identifying, attracting, and selecting potential job applications from online database for an employment [1]. E-recruitment benefits both human resource recruiters and job seekers because of its cost effectiveness, time savings, and accessibility. Thus, it becomes a popular choice of Human Resource Management (HRM) practitioners.

However, automated candidates job matching is a notoriously challenging task. It requires both filtering and ranking of applicants. On one hand the recruiters should identify the relevant criteria for the selection and once that are available those criteria are to be weighted in terms of their importance to a job. Traditional online recruiting portal normally apply only simple Boolean operations to compare the requirements from both employer and candidates [5]. However, this simplistic method returns many false hits.

Based on the *Malaysia Standard Classification of Occupation 2008*, an unskilled occupation only needs workers to perform simple and repetitive duties [3]. Unskilled

job categories include all the elementary occupations, such as promoter, driver, cleaner, general worker, cashier, clerk, waiter, waitress, operators etc. Currently, only handful of job recruitment portals offer recruitment of unskilled job categories. One of the possible explanations is that it is difficult to objectively evaluate unskilled workers for different job positions since there is no fixed evaluation criteria can be specified unlike in skilled professions. For example, skilled professions have certificated qualification and formal resume while those are not necessary needed for most unskilled workers.

Nevertheless, unskilled occupation is important as well in recruitment and selection. Most of the temporary and high turnover jobs is from the unskilled occupations, for instance part time promoters for some events and road shows. Large numbers of unskilled workers are needed by some job sectors like manufacturing and construction. Therefore, it is necessary to include the unskilled jobs in job portals so that it is easy for unskilled job sectors to recruit suitable job candidates.

One of the methods to evaluate unskilled workers is based on the personality traits since they are related to job performance. For example, the big-five personality traits are amongst the commonly used for job candidate evaluation criterion. Knowing the personality traits requirements of a job can help to filter and rank the unskilled applicants. However, a particular job would need evaluation based on multiple requirements on personality traits, thus, Fuzzy Multiple Criteria Decision Method is needed to effectively score an applicant based on the criteria specified. The aim is to rank and filter the unskilled job applicants based on the different weightages given to each of the personal traits requirement. In this study, the Kansei Engineering (KE) method is used to identify personality traits relevant to the recruitment of unskilled workers in different sectors. By using the KE model, we can calculate the Kansei words (i.e. traits) preferences by the employers.

II. BACKGROUND

A. Current Issues of Job Recruitment

Companies are facing recruiting obstacles ascending from acute working tasks, short of workers, competition for job applicants, workforce diversity, and turnover job [1]. E-recruitment system has given huge impacts on both employers and job hunters. Due to technology advancements, competitions between organizations and limited labour

market, most companies have started to design their own recruitment system on their own website. For instance, there is a navigation button to bring interested applicants to the web page for submission of their resume. Nevertheless, much manual works is still needed to process data provided by the job applications. This is because it is difficult to develop a well-defined uniform structure and formats which enables for the diffusion, migration and automation of analysing applicants' resume. In addition, an effective matching between job offers and job applicants based on multi-criteria are difficult to evaluate. Therefore, research on job matching is still an active research in the literature. For instance, Md Saad, et al. implemented the fuzzy set theory in Hamming Distance Method for job matching [2]; Violeta and Turskis used the analytic hierarchy process method on job matching for the Chief Accountant Officer job [3]; Baležentis, et al employed the Fuzzy MULTIMOORA to perform job matching in order to improve the human resource recruitment [4].

Currently Malaysia recruitment systems are still largely based on outdated information retrieval techniques [5]. Due to its simplicity, most of the existing recruitment systems are still using exact-match retrieval mechanism to perform the database search. This directly causes return of a huge number of job applicants and might missed many qualified candidates. For examples, JobMalaysia and JobStreet are using the traditional simple rule-based approach [7].

While the e-recruitment system is becoming more important for graduate students and as their numbers keep increasing every year [8], the size of unskilled labour is accounted for about 40-50% (2011) of the labour market in Malaysia. From there, the largest would be the service sector. However, the labour market that is always ignored and forgotten by the public is the non-professional workers or unskilled workers. They are mostly from SPM leavers and even some of them do not own a certificate. There is less than 3 out of 11 existing job portal website in Asia that provide the unskilled workers job categories. This shows the ignorance of the unskilled workers in public. On the other hand, it is hard to evaluate and judge the unskilled workers whether they are matched to the job offer criteria as they do not have any proper certificates, resume or CVs to submit. Therefore, unskilled occupation is important as well in recruitment and selection so that unskilled workers can find the jobs whereas the employers can hire the unskilled workers for their business, for instance cleaner, driver and sales promoter. In a nutshell, implementation of fuzzy multi criteria method in job candidate filtering and ranking specially for unskilled occupation is the solution to solve the current job recruitment problem.

B. Unskilled Workers

Unskilled workers are those who perform only a simple and routine task and has no or little judgement skills required [6]. Comparing with skilled and semi-skilled occupations, time needed for cramming their skill is shortest. According *Malaysia Standard Classification of Occupation 2008*, unskilled workers normally take one month or less to completely gain the ability for the works [6]. However, some of the unskilled jobs have specific requirements such as to have strong physical strength or good body coordination.

Most of the unskilled works are temporary jobs, such as the part time cleaner or promoter during certain events. These

part-time or temporary jobs are only needed for brief period of time based on demand which is differed from the permanent jobs in which the workers are employed between 2 to 5 years. Therefore, the unskilled occupations have high turnover rate. Employers would need to recruit new workers from time to time based on the demand, ad-hoc or planned events.

Many local employers opted to post poster or recruitment banner at their shops or at the roadside billboards to attract and recruit unskilled workers. That is because they feel that it is not cost effective for them to get the unskilled candidate from the recruitment agency (personal communications). However, this method is ineffective as it fails to attract the job seekers. In addition, it can only reach out to a limited number of applicants.

C. Kansei Engineering Model

Kansei is the Japanese word which describes personal subjective feelings from an artefact, surroundings or circumstance implantation of each senses [9]. The senses include vision, smell, hearing, taste, recognition, and sense of equilibrium [9]. Kansei is the receptivity of a sense receptor where feeling is stimulated by stimuli from the environment [10]. Lokman stated that Kansei is the consequence of perception and five senses [11]. In short, it is an unconscious psychological process which acts as high-level process in the brain. The progression of Kansei starts with collecting the sensory inputs, for instance sensation, sentiment and instinct, through the medium of each human sense [11].

Kansei Engineering (KE) is a technique that combines Kansei and engineering methodology to develop products which are able to bring the happiness and satisfaction of users towards the products [12]. It is also a method to translate the human feelings and emotions into the design of a product [13] that makes human feels happy and content [14].

There are eight KE schemes which are focused on different aspects [11]. Figure 1 shows the KE model proposed by Schütte [13] which consisted of six stages.

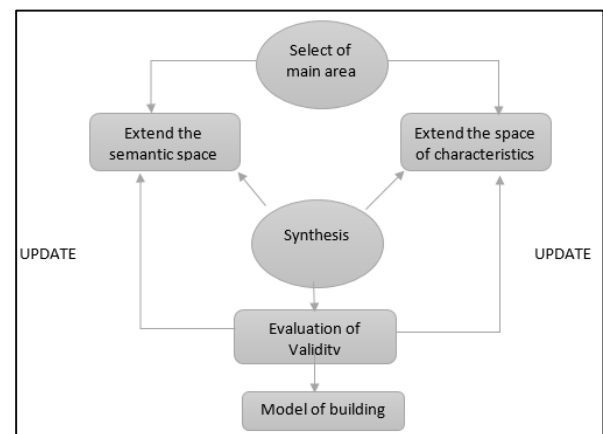


Figure 1: KE model adapted from Schütte [13]

The first stage is the selection of main area. This stage involves the segmentation of market, targeting the group and finding the definition of product [11]. It needs to choose the objective group, and specification of products before starting to collect the product samples which are related to the main area. According to Shafieyoun and Maiocchi, the selection of objective group depends on certain products and markets [12]. The identified target group will enable us to obtain

suitable KWs. The tasks in this stage are to identify the main area and product samples collection. Samples are gathered from internet and market, such as the door handles samples were collected from online catalogues. All the samples need to undergo the screening process before going to the next stage. Therefore, the selection of domain is to select the main product or domain which needs to be inspected.

Next, the remaining samples which fit the requirement of the target criteria are used to define the attributes in the extending of semantic space stage. Measuring of Kansei is the main task of this stage [12]. Those samples are categorized according to their attributes/characteristics. Then different KWs are collected based on the attributes of the product samples. Collection of KWs can be obtained by interviewing the domain experts. Magazine, internet sources, and literature are other possible sources as well [12]. Therefore, the main task at this stage is to collect both positive and negative KWs which can define the domain.

After that, extending the space properties is similar to extending of semantic space stage [12]. Both of them need to undergo collect, select and compile of the product samples. The main difference of this stage is to find out the most important properties among the KWs. Before processing to synthesis stage, a research questionnaire is needed to investigate the users' preferences to the product samples under the KW. The questionnaire uses the 5 levels of Likert scale to let user rate the product samples based on each KW.

After that the evaluation of validity takes place. This stage integrates both extending semantic space and extending the space of properties [12]. The data collected from the questionnaire is then calculated by the mean which enables us to identify the preference attributes of a product by the users. The last stage is the model building. Once satisfactory results are obtained, a new model or design of a product will be proposed based on the results obtained from the survey.

D. Existing E-Recruitment System

We have identified 29 popular job recruitment website portals in Asia (see Table 8 in appendix). They are JobStreet, Springasia, Naukri, JobMalaysia, Looking4Job, BestJob Malaysia, Jobcentral, Monster, KareerKo, Jenjobs, indeed, Maukerja, Recruit.net, mystarjob, CareerJet, SPA, bdJobs, Glass Dour, Malaysia Job, Jobcity, Charkri, Jobhouse, Kerjaya org, Startup Job, Daijob, Jobspot, Zip Recruiter, JobsDB and GigaJob. These job portals are mainly different in terms of features offered, job recommendation methods, and candidate ranking implementation.

Job recommender system is a component in an e-recruitment system to recommend the most relevant opening jobs that matches an applicant profile and preferred criteria. However, only 5 out of the 29 job portals implemented the candidate ranking and recommender system (i.e. JobStreets, Monster, KareerKo, Recruit.net, and ZipRecruiter). On the other hand, candidate ranking system functions to rank potential job applicants according to criteria specified by the employers. Those 5 job portals use the Boolean operations method to filter and rank the candidates [7]. The matching between job positions and applicants is based on common keywords found in both the applicant profile and job requirement/description. The ranking score is given manually by his/her former employer. There is 0 score for ranking, if the former employers do not give the ranking to a job candidate.

III. METHODOLOGY

In the following we present the KE method to determine the personal traits most relevant to different sectors of unskilled workers.

A. Select the Product Domain

We view the job applicants as the product domain in the understanding of preferences of candidates or alternatives in recruitment by the human resource managers. Recruiters are the main domain in this study.

B. Collection of Personality Traits and Kansei Words

50 personality traits in workspace and recruitment were collected from dictionary search [15], journal articles [16], and interview with existing unskilled workers and employers. The big five personality traits are also included as part of the KWs.

We interviewed 6 human resource managers that are working in sales, restaurant, and services, 2 recruiters from two local private recruitment companies, and 2 experts in human resources from the Universiti Malaysia Sarawak to screen traits which are unrelated to unskilled occupations. From there 20 personality traits are short-listed.

C. Design of Questionnaire

Questionnaire was designed to determine human resource managers and recruiters' preferences for the 20 KWs in job recruitment process. The questionnaire was constructed by using the 5 scores Likert scale with 1 is definitely disagree, 2 is disagree, 3 is neutral, 4 is agree, and 5 is definitely agree.

D. Data Collection

We have conducted interviews with 60 managers or recruiters using purposive sampling method. We targeted managers working in the six unskilled job sectors. There are 10 participants from each job sectors. During interview, we asked the respondents to express their requirements and prominence of personality traits that they emphasize during the recruitment of unskilled job workers.

E. Data Analysis

The collected data were analysed by using statistical mean method [17]. Statistical mean calculates the subsequent rating for each of the KWs. The subsequent rating is used to determine how the target group values different KWs that make up the perfect domain. It is a technique for weighting different product concepts (Kansei words) to identify which KW is preferred and favoured by the certain target group (unskilled job employers). The formula to calculate the mean average score is shown in equation (1) [17].

$$\mu(y_j) = \frac{1}{n} \sum_{i=1}^n x_i, j=1, \dots, 20 \quad (1)$$

where: $\mu(y_j)$ = Rating for y_j Kansei word (1 to 5 scale),
 n = No of participants interviewed for evaluation of the KWs (i.e. 10 for each sector), and $x_i = i$ th participant's score for KW y_j .

IV. RESULTS

Data collected from 60 employers in 6 different sectors of industries has been summarized in Table 1. The ratings of preference scores are calculated based on different industries respectively (Table 2 to 7).

In Table 1, the results are calculated by using the mean average in equation (1). Each of the total score of KW is divided by the total sample size of 60 employers from all unskilled industries. The 20 KWs are arranged based on the ratings of preference scores. Figure 2 shows the ratings of 20 KWs for all the industries. It is clear to see the most prominent KW of all the six sectors is “responsible” whereas the least preference of KW for all industries is “experience”.

Table 1
Ratings of 20 Kansei words for all Industries

KW	Preference Score	Ratings
Responsible	259	4.32
Honest	257	4.28
Cooperative	252	4.20
Independent	251	4.18
Diligent	250	4.17
Easy going	245	4.08
Friendly	244	4.06
Cost	242	4.03
Efficient	240	4.00
Punctuality	240	4.00
Confidence	237	3.95
Approachable	237	3.95
Flexibility	237	3.95
Cheerful	235	3.92
Energetic	235	3.92
Procedural	233	3.88
Curiosity	232	3.87
Patient	228	3.80
Intuitive	227	3.78
Experience	213	3.55

Table 2
Ratings of 20 Kansei words for Construction

KW	Preference Score	Ratings
Cost	46	4.60
Independent	44	4.40
Easy going	43	4.30
Cooperative	41	4.10
Diligent	41	4.10
Curiosity	41	4.10
Responsible	41	4.10
Efficient	40	4.00
Energetic	40	4.00
Confidence	40	4.00
Honest	40	4.00
Flexibility	39	3.90
Punctuality	39	3.90
Patient	39	3.90
Friendly	39	3.90
Approachable	37	3.70
Cheerful	37	3.70
Procedural	36	3.60
Intuitive	36	3.60
Experience	31	3.10

Table 3
Ratings of 20 Kansei words for the Hotel sector

KW	Preference Score	Ratings
Responsible	45	4.50
Friendly	45	4.50
Approachable	44	4.40
Honest	44	4.40
Punctuality	43	4.30
Efficient	41	4.10
Easy going	41	4.10

Diligent	41	4.10
Cooperative	41	4.10
Procedural	40	4.00
Cheerful	39	3.90
Confidence	39	3.90
Cost	39	3.90
Patient	38	3.80
Independent	38	3.80
Energetic	38	3.80
Curiosity	38	3.80
Flexibility	37	3.70
Intuitive	37	3.70
Experience	31	3.10

Table 4
Ratings of 20 Kansei words for the manufacturing section

KW	Preference Score	Ratings
Responsible	42	4.20
Approachable	41	4.10
Curiosity	41	4.10
Honest	41	4.10
Cooperative	40	4.00
Diligent	40	4.00
Flexibility	40	4.00
Friendly	40	4.00
Procedural	39	3.90
Experience	39	3.90
Independent	39	3.90
Energetic	39	3.90
Easy going	39	3.90
Cheerful	39	3.90
Intuitive	38	3.80
Patient	37	3.70
Efficient	37	3.70
Confidence	37	3.70
Cost	36	3.60
Punctuality	36	3.60

Table 5
Ratings of 20 Kansei words for the restaurant sector

KW	Preference Score	Ratings
Cooperative	47	4.70
Honest	46	4.60
Independent	45	4.50
Cheerful	45	4.50
Responsible	44	4.40
Punctuality	44	4.40
Easy going	43	4.30
Flexibility	43	4.30
Friendly	43	4.30
Procedural	42	4.20
Energetic	42	4.20
Efficient	42	4.20
Diligent	42	4.20
Cost	41	4.10
Confidence	40	4.00
Approachable	40	4.00
Patient	39	3.90
Curiosity	37	3.70
Intuitive	36	3.60
Experience	36	3.60

Table 6
Ratings of 20 Kansei words for the sales sector

KW	Preference Score	Ratings
Independent	45	4.50
Diligent	45	4.50
Responsible	43	4.30
Honest	43	4.30
Punctuality	43	4.30
Efficient	43	4.30
Cooperative	42	4.20
Confidence	42	4.20
Procedural	42	4.20
Intuitive	41	4.10
Cost	41	4.10

Flexibility	40	4.00
Easy going	40	4.00
Experience	40	4.00
Energetic	39	3.90
Curiosity	39	3.90
Approachable	38	3.80
Patient	38	3.80
Friendly	37	3.70
Cheerful	37	3.70

Table 7
Ratings of 20 Kansei words for the service sector

KW	Preference Score	Ratings
Responsible	44	4.40
Honest	43	4.30
Friendly	41	4.10
Diligent	41	4.10
Cooperative	41	4.10
Independent	40	4.00
Intuitive	39	3.90
Cost	39	3.90
Easy going	39	3.90
Confidence	39	3.90
Cheerful	38	3.80
Flexibility	38	3.80
Approachable	37	3.70
Efficient	37	3.70
Energetic	37	3.70
Patient	37	3.70
Experience	36	3.60
Curiosity	36	3.60
Punctuality	35	3.50
Procedural	34	3.40

Tables 2 to 7 are calculated by summation of the total score of each KW which were scored by 10 employers in each job sector, respectively. The 20 KWs are arranged based on the ratings of preference scores. It is observed that, different job sectors have different preferences of KWs.

From Table 2, it is clearly shown the “cost salary” is the most prominent KW but the “experience” is the least relevant for the construction sector. The construction employers normally need a large pool of unskilled worker for the position like general worker. Therefore, the “cost salary” becomes the most prominent factor for employer to hire the unskilled worker in construction. The more workers that employer hire, the more funds that employer needs for the workers. The workers in construction do not need much of experience as the daily job in construction is simple but it requires the workers to be physical strong.

Based on Table 3, the most favorable KW of the hotel sector is “responsible” whereas the least preferable one is “experience”. Those results are similar to the overall results shown in Table 1. Responsible attribute is important for unskilled worker in hotel sector because it affects the sales and reputation of a hotel. Irresponsible workers would increase the complaint rate of hotel customers. The “experience” is least preferable as the daily job for unskilled worker in hotel is easy to learn. The unskilled worker can learn the required skills for the job in less than a day.

Table 4 shows the ranking of KWs for the manufacturing sector. Again “responsible” is the most prominent one, whereas the “punctuality” is the least preferable. In manufacturing sector, the daily task for unskilled workers is repetitive work. Therefore, they need to be “responsible” in confirming their work by carrying out their task properly not causing any problem to other departments. The “punctuality” is the least preferable KW as the salary for unskilled worker in manufacturing is based on the total hours recorded in their

own punch card. Therefore, the unskilled workers need to go to the workstation in time if they need to get the full amount of salary for that month.

The most favorable KW as shown in Table 5 for restaurant workers is “cooperative” whereas the least preferable is “experience”. The positions for unskilled workers in a restaurant are waiters, waitresses, food stall helpers, and cashiers. The “cooperative” is important for them as their jobs are connected to each other. Once the waiter or waitress get an order from a customer, they need to pass the order to food stall helpers. Therefore, cooperation between the workers are important to a restaurant operation to run smoothly. “Experience” is not needed for restaurant workers as they only need to get a short training to be able to grasp the job-related tasks.

Based on Table 6, “independent” is the most prominent KW for sales workers but “cheerful” is the least preferable. The normal positions for unskilled workers in sales are promoters, merchandisers, cashiers, and cleaner. The “independent” is the most favourable as the employers required them to perform their job independently without keep reminding them. For example, the salesperson need to replenish goods on a shelf if there is empty space.

Table 7 shows that the most favorable KWs in the service sector is “responsible” whereas the least preferable is “procedural”. The normal task of unskilled workers in the service sector is to serve customers. “Responsible” is important as the workers need to do their assigned tasks well and be accountable. Different customers have different characteristics therefore employers do not need their workers to follow only a way to serve all different customers.

In a nutshell, it can be concluded that “experience” is not a vital requirement for unskilled job categories. Most of the employers are willing to accept the unskilled workers who do not have “experience” but he or she must be a “responsible” worker.

V. CONCLUSIONS

In this paper, a method of obtaining the KWs that can be used for the recommender or selection component in an e-recruitment system is presented. More specifically to be used as linguistic variables for Fuzzy Multiple Criteria Decision Method in unskilled job applicants ranking. The KE framework provides a suitable method for us to identify KWs that describe preferences of the personality traits of workers in different unskilled sectors. Our future work is to use the top KWs to model the personality traits profiles and attributes of the job applicants. We would employ the F-TOPSIS method with the KWs as the fuzzy linguistic terms.

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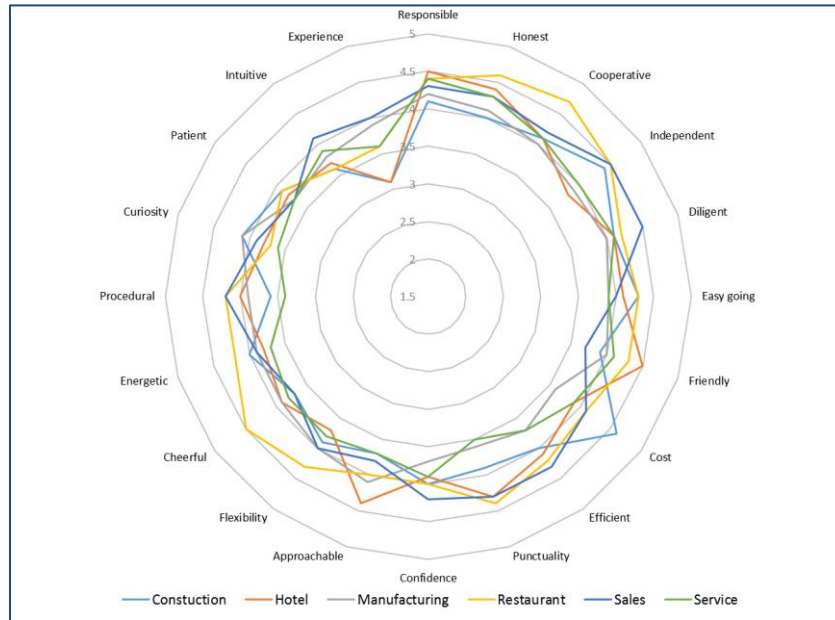


Figure 2: The importance of each Kansei Word towards different industries

APPENDIX

Table 8
Review of Existing Job Portals in Asia

No	Job Portals	Skilled	Semi-skilled	Unskilled
1	JobStreets	✓	✓	
2	SpringAsia	✓	✓	
3	Naukri	✓	✓	
4	JobMalaysia	✓	✓	
5	Looking4Job	✓	✓	
6	BestJob Malaysia	✓	✓	
7	JobCentral	✓	✓	✓
8	Monster	✓	✓	
9	KareerKo	✓	✓	
10	JenJobs	✓	✓	
11	Indeed	✓	✓	
12	MauKerja	✓	✓	✓
13	Recruit	✓	✓	
14	MystarJob	✓	✓	
15	CareerJet	✓	✓	
16	SPA	✓	✓	
17	bdJobs	✓	✓	
18	GlassDour	✓	✓	
19	Mjob	✓	✓	
20	JobCity	✓	✓	
21	Charkri	✓	✓	
22	JobHouse	✓	✓	
23	Kerjaya	✓	✓	
24	Startup Job	✓	✓	
25	Daijoob	✓	✓	
26	Jobspot	✓	✓	
27	Zip Recruiter	✓	✓	
28	JobsDB	✓	✓	
29	GigaJob	✓	✓	

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