A Self-Assessment Model for Measuring the Fitness Level of Industrial Engineering Graduates Competence to a Quality Control Job Position

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Abstract. Competence mismatch is a mismatch between the company's job specification and employee competences. Competence mismatch has to be reduced in order to increase employee's satisfaction and motivation to improve company performance which leads to great benefits for both the company and their employees. A measurement tool is required in order to reduce the potential for competence mismatches at an early stage. This paper proposes a self-assessment model to measure the fitness level of Ubaya Industrial Engineering alumni competences. The criteria were collected form job vacancies from 8 companies and categorized as subjective and objective criteria. Criteria reduction was performed using pareto principle and yield 4 objective criteria and 4 subjective criteria. The criteria weights were determined based on the evaluation from 3 experts who provided their scores in preference ordering dan utility values. The experts' evaluation scores need to be unified by transforming to Fuzzy Preference Relations and then aggregated to get the criteria weights. The criteria and their weights will be used in this self-assessment model for measuring the fitness level of candidates in terms of the fitness percentage for the Quality Control job.

INTRODUCTION

Competence mismatch is the discrepancy between the company jobs' requirements for their employees and the employees' competences. Companies often experience difficulties in finding the suitable employees that fit the job specification [1]. However, the average unemployment rate in a country is generally very high. For example, the unemployment rate in Indonesia has climbed from below 5 % to more than 6 % during the coronavirus pandemics [2]. Company's difficulty in getting reliable workers and high level of unemployment indicates the possibility of a

competence mismatch which has negative impacts on companies and their employees as well [3]. Person-job fit increases employee's satisfaction and motivation to improve company performance which leads to great benefits for the company and for their employees [4]. Competence mismatch greatly affects employee productivity, including the productivity of fresh graduates [5].

The number of fields of work requires companies to determine the appropriate selection criteria for each field of work including the Quality Control field. Every growing company always improves the quality of the products since product quality is the main factor that determines the company's competitiveness in various industrial fields [6]. The quality concept is increasingly important, and the application of quality control enables a company to produce higher quality of products, thereby increasing the company's competitiveness [7]. The important role of Quality Control has placed employees in these fields have to be selected carefully. In order to get the person-job fit, companies need to determine the appropriate criteria so as not to cause problems in the Quality Control process and can reduce the potential for competence mismatch.

Rains-bury et al. [8] stated the different point of view between job seekers and people who are already employed. The job seekers are more concerned with soft skills than employees who consider hard skills as more important. In addition, employers have another point of view. They expect basic competence and transferable skill from their employees. Basic competence expected by the employers are computing skills, communication skills, domain knowledge [9], and transferable skills that enable employees to adapt in their jobs such as communication skills, teamwork, IT knowledge, and problem-solving capability [10]. The various points of view above encourage job seekers to realize that they should be able to measure the matching level between their individual competences and companies' job specifications. For this reason, a measuring tool is required to measure the level of suitability before choosing a company so that potential competence mismatches can be reduced as early as possible.

Competence mismatch measurement has been conducted by several researchers. Desjardins R and Rubenson K [11] measured and analyzed the competence mismatch using a direct measure. Allen and van der Velden R [12] investigated the effect of mismatches in education and competence on employees' wages, job satisfaction, and on-the-job search. Van der Velden R and Bijlsma I [13], Pellizzari and Fichen [14] measured the competence mismatch by combining skill proficiency and self-asessment. Although many researchers have conducted research on competence mismatch measurement, these measurements were carried out on the employees after they were already in their work environment. To reduce the potential for competence mismatches, this measurement tool is required more by the job seekers to choose prospective companies with job qualifications that match their individual competencies which is beneficial for both the job seekers and the companies as well.

This research was conducted to build a self-assessment model to measure job seekers fitness in QC position in PT XYZ so that the job seekers can measure whether they match for QC job position in this company. If they get low matching score, they should apply to another company or another position to avoid competence mismatch. In order to get the person-job fit, companies need to determine the appropriate criteria in selecting the best candidate among the applicants. This research aims to build a multiple criteria self-measurement model to measure job seekers' fitness for QC position. The criteria were collected from various QC position job advertisements and the criteria's weights were determined based on the assessment given by 3 experts from the related company.

This model was applied to measure the fitness level of job seekers from industrial engineering graduates of Surabaya University to QC positions at PT XYZ. The rest of this paper is set out as follows. In the following section, theoretical background is presented, and the research methodology is described in next section, followed by the result and discussion of the study. Finally, some conclusions are pointed out.

THEORETICAL BACKGROUND

There were several important concepts used in this study. Pareto Chart was used in criteria reduction, and Fuzzy Preference Relations (FPR) was used to transform various evaluation form in FPR.

Pareto Chart

The Pareto diagram has an important role in quality improvement processes. The principle of the Pareto diagram is the 80/20 rule ie 80% of problems (nonconformities) are caused by 20% of causes. The Pareto chart is a histogram of data that sorts from the largest to the smallest frequency and also calculates the cumulative. This chart helps the

management quickly identify the most critical areas that require special and immediate attention. This can help find the most important problems to be resolved immediately (highest ranking) to problems that do not have to be resolved immediately (lowest ranking).

Fuzzy Preference Relations

According to Chiclana et al [15], Fuzzy Preference Relation (FPR) is pairwise comparison used to present information in decision making problem. A FPR P on a set of alternatives X is a product set $X \times X$ with membership function $\mu_P : X \times X \rightarrow [0, 1]$. The FPR matrix $P = (p_{ij})$ as preference degree of alternative x_i over x_j, in which $p_{ij} = \frac{1}{2}$ means indifference between the two alternatives x_i and x_j, and $p_{ij} > \frac{1}{2}$ means that alternative x_i is preferred to x_j.

In this research, FPR was used in data transformation, data integration and the criteria weighting. Experts provided their preference information in one of the following ways, Preference ordering, Utility values and FPR, therefore it was necessary to transform the information in the same form, FPR.

The transformation function from preference ordering presented by expert-k (O^k) to FPR P with element p_{ij}^k is presented in equation (1) .

$$p_{ij}^k = \frac{1}{2}\left(1 + \frac{o^k(j)}{n-1} - \frac{o^k(i)}{n-1}\right) \quad (1)$$

Utility value expressed by expert-k as $U^k = \{u_i^k, i = 1,2, \dots n\}$, $u_i^k \in [0,1]$, u_i^k is the utility evaluation from expert-k to x_i . The transformation function from Utility value presented by expert-k (u_i^k) is presented in equation (2).

$$p_{ij}^k = \frac{[u_i^k]^2}{[u_i^k]^2 + [u_j^k]^2} \quad (2)$$

RESEARCH METHODOLOGY

The steps used to build the self-assessment model to measure the fitness level of Graduates Competence to quality control job position were as follows:

1. Criteria identification related to the selection of prospective workers in the field of Quality Control job from the job vacancy websites from 8 companies in QC position
2. Criteria grouping and reduction by using Pareto 80/20 principle
3. Criteria weights determination
   a. Elicit the expert's preference in evaluating the criteria resulting from step 2 by using one of three evaluation forms namely: preference ordering, utility values and FPR
   b. Transform, using equation (1) and (2) to unify the experts' evaluation score to FPR
   c. Aggregate the expert's criteria score to form an FPR group score and get the criteria weights
4. Building the self-assessment model to be filled in by the potential candidates
5. Applying the model to measure the fitness level

RESULT AND DISCUSSION

Criteria Identification, Grouping and Reduction

The first thing to do was to identify criteria related to the selection of prospective workers in the field of Quality Control job from the job vacancy websites from 8 manufacturing industry companies, and there were 49 criteria obtained. After obtaining criteria from various job vacancies, the criteria were grouped into objective and subjective criteria. The objective criteria were education, age, GPA, and work experience, while the subjective criteria used the 80/20 Pareto principle as shown in Figure 1 to get the influential criteria.

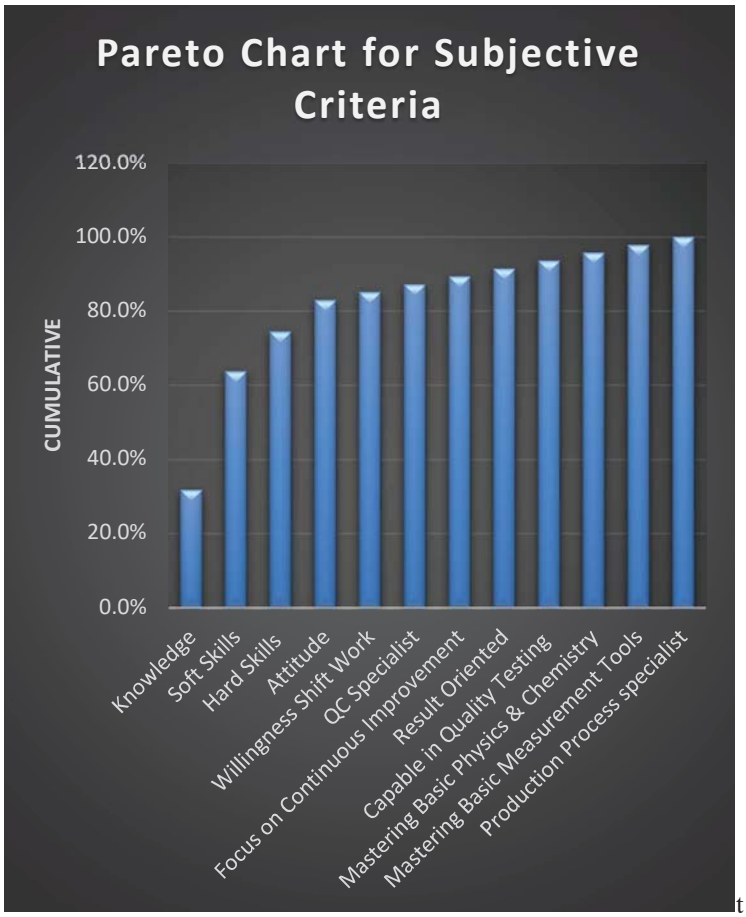

Figure 1. Pareto Diagram for Subjective Criteria

Criteria Weights Determination

After determining the criteria used for QC Job position, the next step was criteria weight determination for a specific company, PT XYZ based on the related expert's preference in evaluating the resulting criteria. Expert-1 and Expert-2 provide the evaluation in preference ordering and expert-3 provide his preference by utility values. The resulting Subjective and Objective Criteria and the expert's score on criteria is presented in Table 1. After getting the evaluation score from the experts, the preference ordering and the utility values had to be transformed to FPR. The FPR objective criteria matrice for expert-k (P^{Ok}), the FPR subjective criteria matrice for expert-k (P^{Sk}) and the FPR group for each criteria (P^{O} and (P^{S}) are presented in Table 2. The transformation of preference ordering to matrix P were conducted using equation (1), and the transformation of utility values to matrice P were performed using equation (2). The FPR group for each criterion was obtained by aggregating the individual FPR of all experts in related criteria by the average values of the FPRs. The examples below show how to transform the preference ordering between Objective Criteria *Last Education* and *Age* from Expert-1 (p_{12}^{O1}) and Expert-3 (p_{12}^{O3}) and FPR Group for Objective criteria (p_{12}^{O}).

$$p_{12}^{O1} = \frac{1}{2}\left(1 + \frac{2}{4-1} - \frac{1}{4-1}\right) = 0.667$$

$$p_{12}^{O3} = \frac{[0.80]^2}{[0.80]^2+[0.75]^2} = 0.532$$

$$p_{12}^{O} = \frac{1}{3}(0.667 + 0.167 + 0.532) = 0.455.$$

TABLE 1. The Criteria and The Experts' Score

Objective Criteria	Preference Orderings		Utility Values
	Expert-1	Expert-2	Expert-3
C_1^O: Last education	1	4	80 %
C_2^O: Age	2	2	75 %
C_3^O: GPA	4	3	85 %
C_4^O: Work experience	3	1	90 %
Subjective Criteria	Preference Orderings		Utility Values
	Expert-1	Expert-2	Expert-3
C_1^S: Knowledge	2	3	90 %
C_2^S: Soft skills	3	2	85 %
C_3^S: Hard skills	4	4	70 %
C_4^S: Attitudes/behaviors	1	1	95 %

TABLE 2. The FPR Form of Objective and Subjective Criteria

	Objective Criteria	Subjective Criteria
Expert-1	$P^{O1} = \begin{bmatrix} 0.500 & 0.667 & 1.000 & 0.833 \\ 0.333 & 0.500 & 0.833 & 0.667 \\ 0 & 0.067 & 0.500 & 0.333 \\ 0.167 & 0.333 & 0.667 & 0.500 \end{bmatrix}$	$P^{S1} = \begin{bmatrix} 0.500 & 0.667 & 1.000 & 0.833 \\ 0.333 & 0.500 & 0.833 & 0.667 \\ 0 & 0.167 & 0.500 & 0.333 \\ 0.167 & 0.333 & 0.667 & 0.500 \end{bmatrix}$
Expert-2	$P^{O2} = \begin{bmatrix} 0.500 & 0.167 & 0.333 & 0 \\ 0.833 & 0.500 & 0.667 & 0.333 \\ 0.667 & 0.333 & 0.500 & 0.167 \\ 1.000 & 0.667 & 0.833 & 0.500 \end{bmatrix}$	$P^{S2} = \begin{bmatrix} 0.500 & 0.333 & 0.667 & 0.167 \\ 0.667 & 0.500 & 0.833 & 0.333 \\ 0.333 & 0.167 & 0.500 & 0 \\ 0.833 & 0.667 & 1.000 & 0.500 \end{bmatrix}$
Expert-3	$P^{O3} = \begin{bmatrix} 0.500 & 0.532 & 0.470 & 0.441 \\ 0.468 & 0.500 & 0.438 & 0.410 \\ 0.530 & 0.562 & 0.500 & 0.471 \\ 0.559 & 0.590 & 0.529 & 0.500 \end{bmatrix}$	$P^{S3} = \begin{bmatrix} 0.500 & 0.529 & 0.623 & 0.473 \\ 0.471 & 0.500 & 0.596 & 0.445 \\ 0.377 & 0.404 & 0.500 & 0.352 \\ 0.527 & 0.555 & 0.648 & 0.500 \end{bmatrix}$
FPR Group	$P^O = \begin{bmatrix} 0.500 & 0.455 & 0.601 & 0.425 \\ 0.545 & 0.500 & 0.646 & 0.470 \\ 0.399 & 0.354 & 0.500 & 0.324 \\ 0.575 & 0.530 & 0.676 & 0.500 \end{bmatrix}$	$P^S = \begin{bmatrix} 0.500 & 0.510 & 0.708 & 0.324 \\ 0.490 & 0.500 & 0.699 & 0.315 \\ 0.292 & 0.301 & 0.500 & 0.117 \\ 0.676 & 0.685 & 0.883 & 0.500 \end{bmatrix}$

TABLE 3. The Objective Criteria Weights Calculation

	C_1^O	C_2^O	C_3^O	C_4^O	Total	Weight
C_1^O	0.5	0.455	0.601	0.425	1.981	0.248
C_2^O	0.545	0.5	0.646	0.470	2.161	0.270
C_3^O	0.399	0.354	0.5	0.324	1.577	0.197
C_4^O	0.575	0.530	0.676	0.5	2.281	0.285
				Total	8	1

TABLE 4. The Subjective Criteria Weights Calculation

	C_1^S	C_2^S	C_3^S	C_4^S	Jumlah	Weight
C_1^S	0.5	0.510	0.708	0.324	2.042	0.255
C_2^S	0.490	0.5	0.699	0.315	2.004	0.250
C_3^S	0.292	0.301	0.5	0.117	1.211	0.151
C_4^S	0.676	0.685	0.883	0.5	2.744	0.343
				Jumlah	8	1

After obtaining the FPR Group, then the criteria weights can be obtained by averaging the element matrice value for each row, and the criteria weight were obtained by normalizing each row of the FPR Group as shown in Table 3 and Table 4.

The Self-Assessment Model

The self-assessment model consists of 2 parts, the Objective part and the Subjective part. In each part, the criteria weights resulted from Table 3 and Table 4 were used to integrate candidate scores. The objective part of the assessment model is presented in Table 5. Each criterion has criteria categories and criteria weight. The values of each criteria category were assigned after discussing with the company's experts. Each candidate had to choose the criteria categories that were suitable for them, and the total objective score for a candidate should be the total score obtained by aggregating the score from all criteria. The subjective parts of this model are shown in Table 6. In this part, each criterion has several sub criteria. The candidate should fill in the scores by choosing a Likert scale of 1-5, and the values of each sub criteria were assigned as 20, 40 60,80, 100 if the Likert scale were 1,2,3,4,5 respectively. The total subjective score for a candidate should be the total score obtained by aggregating the score from all criteria.

TABLE 5. The Objective Part of Self-Assessment Model

Criteria	**Criteria Categories**	**Criteria Weights**	**Values**	**Scores**
Age	22-24 years	0.248	100	
	25-30 years		80	
	31-35 years		60	
	>35 years		0	
Last education	D3	0.270	60	
	S1		80	
	S2		100	
GPA	< 2.00	0.197	0	
	2.00 ≤ x < 2.49		25	
	2.50 ≤ x < 2.99		45	
	3.00 ≤ x < 3.24		60	
	3.25 ≤ x < 3.50		70	
	3.50 ≤ x < 3.89		90	
	3.90 ≤ x < 4.00		100	
Work experience	*Fresh graduate*	0.285	60	
	≥ 1 years		70	
	2 years		80	
	3 years		90	
	>3 years		100	
Total Objective Score				

TABLE 6. The Subjective Part of Self-Assessment Model

Criteria	Sub Criteria	Criteria Weights	Values	Scores
Knowledge	How well do you know about Quality Control ?	0.255		
	How well do you understand Quality Management ?			
	How well do you understand Quality Control SOP ?			
	How well do you understand the Military Standard Method?			
	How well do you understand Corrective and Preventative Actions (CAPA)?			
	How well do you know Statistical Process Control (SPC)?			
Soft Skills	How good is your level of Leadership?	0.250		
	How good are your communication skills?			
	How well can you work in a team?			
	How good are your analytical skills?			
	How good are your problem solving skills?			
	How well do you have high work motivation?			
Hard Skills	How good are your English skills?	0.151		
	Microsoft Office mastery level? (min. Word and Excel)			
Attitude	Are you Firm?	0.343		
	Are you disciplined?			
	Are you conscientious?			
Total Subjective Score				

Model Application

The assessment model was created by using Ms. Excel. The model was divided into 2 parts, namely the objective part and the subjective part. The last semester Industrial Engineering students and the alumni of University of Surabaya were asked to be the candidates and answer in the created model. An example of the application of the model is in Table 7 and Table 8, the comparison of candidate's fitness value is presented in Table 9, and the comparison of the candidate's ranking based on the fitness levels is shown in Table 10.

TABLE 7. The Objective Part of Self-Assessment Model Application

Criteria	Criteria Categories	Criteria Weights	Values	Scores
Age	22-24 years	0.248	100	19.81
	25-30 years		80	
	31-35 years		60	
	>35 years		0	
Last education	D3	0.270	60	27.01
	S1		80	
	S2		100	
GPA	< 2.00	0.197	0	19.71
	2.00 ≤ x < 2.49		25	
	2.50 ≤ x < 2.99		45	
	3.00 ≤ x < 3.24		60	
	3.25 ≤ x < 3.50		70	
	3.50 ≤ x < 3.89		90	
	3.90 ≤ x < 4.00		100	
Work experience	*Fresh graduate*	0.285	60	17.11
	≥ 1 years	0.285	70	
	2 years		80	
	3 years		90	
	>3 years		100	
Total Objective Score				83.64

TABLE 8. The Subjective Part of Self-Assessment Model Application

Criteria	Sub Criteria	Criteria Weights	Values	Scores
Knowledge	How well do you know about Quality Control ?	0.255	80	19.69
	How well do you understand Quality Management ?		80	
	How well do you understand Quality Control SOP ?		60	
	How well do you understand the Military Standard Method?		80	
	How well do you understand Corrective and Preventative Actions (CAPA)?		60	
	How well do you know Statistical Process Control (SPC)?		100	
	How well do you know about 7 waste concept ?		80	
Soft Skills	How good is your level of Leadership?	0.250	60	18.37
	How good are your communication skills?		80	
	How well can you work in a team?		80	
	How good are your analytical skills?		60	
	How good are your problem solving skills?		60	
	How well do you have high work motivation?		80	
Hard Skills	How good are your English skills?	0.151	80	13.62
	Microsoft Office mastery level? (min. Word and Excel)		100	
Attitude	Are you Firm?	0.343	80	29.72
	Are you disciplined?		100	
	Are you conscientious?		80	
Total Subjective Score				**81.40**

TABLE 9. The Comparison of Candidate's Fitness Values

No.	Name	Objective Score	Objective Score	Fitnes Value	Rank
1	VA	76.76	81.32	79.04	6
2	MA.	76.76	79.76	78.26	7
3	MG	75.77	76.95	76.36	9
4	NA	81.58	72.38	76.98	8
5	FE	78.73	85.17	81.95	5
6	RT.	76.76	94.02	85.39	2
7	DA	80.70	90.22	85.46	1
8	IM	82.67	86.84	84.75	3
9	CL	74.79	72.38	73.58	10
10	EL	81.68	86.84	84.26	4

The company assigned the same weights for the subjective score and the objective score, then the fitness value of the candidate was obtained using equation (3) with 82.52.

$$\text{The fitness values} = \alpha.\,\text{Total Objective Score} + (1-\alpha).\,\text{Total Subjective Score} \quad (3)$$

TABLE 10. The Candidate's Ranking Based on Fitness Values

No.	Candidate	Ranking of candidate										
		α=0	α=0.1	α=0.2	α=0.3	α=0.4	α=0.5	α=0.6	α=0.7	α=0.8	α=0.9	α=1
1	VA	6	6	6	6	6	6	6	7	7	7	6
2	MA.	7	7	7	7	7	7	7	8	8	8	6
3	MG	8	8	8	8	8	9	9	9	9	9	9
4	NA	10	9	9	9	9	8	8	6	6	4	3
5	FE	5	5	5	5	5	5	5	5	5	5	5
6	RT.	1	1	1	1	1	2	4	4	4	6	6
7	DA	2	2	2	2	2	1	1	2	3	3	4
8	IM	3	3	3	3	3	3	2	1	1	1	1
9	CL	9	10	10	10	10	10	10	10	10	10	10
10	EL	3	4	4	4	4	4	3	3	2	2	2

Table 9 shows that the best candidate for PT XYZ was DT since she had the highest Fitness value. If the weights of objective and subjective criteria were changed, a different best candidate would be selected as shown in Table 10. IM was the candidate with the highest GPA. Therefore, if the objective values were the focus, she would become the best. RT was the candidate with the highest subjective value. He would become the first rank if the company focused on the subjective criteria.

The use of this self-assessment tool enables the Job seekers to measure their fitness level to QC position at PT XYZ before applying the QC Job in this company. If they have a low score, they should search for another field or another company so that the potential competence mismatches can be reduced as early as possible.

CONCLUSION

In this study, a self-assessment tool was developed to reduce the potential of mismatch competence between job seekers' competence and the company's requirement. Forty-nine acceptance criteria for QC job position were collected from 8 manufacturing companies. The acceptance criteria for general QC Jobs was categorized to 4 objective criteria, and many subjective criteria were reduced to 4 subjective criteria. These acceptance criteria applied to QC job position in PT XYZ, and the criteria weights were assigned based on the preferences from the related expert in this company.

The resulting model was applied to measure the fitness values of job seekers from industrial engineering graduates of Surabaya University to QC positions at PT XYZ. If they have a low score, they should search for another field or another company so that potential competence mismatches can be reduced as early as possible.

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REFERENCES

[1] Ulrich D. HR at a crossroads. Asia Pacific Journal of Human Resources. 2016 Apr;54(2):148-64.

[2] Kasnelly FA. Meningkatnya Angka Pengangguran Ditengah Pandemi (Covid-19). Al-Mizan: Jurnal Ekonomi Syariah. 2020 Jun 21;3(1):45-60.

[3] Kohnová L, Papula J, Papulová Z, Stachová K, Stacho Z. Job mismatch: The phenomenon of overskilled employees as a result of poor managerial competences. Entrepreneurship and Sustainability Issues. 2020 Sep 1;8(1):83.

[4] Hambleton A, Kalliath T, Taylor P. Criterion-related validity of a measure of person-job and person-organization fit. New Zealand Journal of Psychology. 2000 Dec 1;29(2):80-5.

[5] Radermacher A, Walia G, Knudson D. Investigating the skill gap between graduating students and industry expectations. InCompanion Proceedings of the 36th Int. Conf. on Sftwr Eng. 2014 May 31 (pp. 291-300).

[6] Judi HM, Genasan D, Jenal R. Quality control implementation in manufacturing companies: Motivating factors and challenges. INTECH Open Access Publisher; 2011 Apr 26.

[7] Blanco-Encomienda FJ, Rosillo-Díaz E, Muñoz-Rosas JF. Importance of quality control implementation in the production process of a company. European Journal of Economics and Business Studies Articles. 2018;10:248-52.

[8] Rainsbury E, Hodges D, Burchell N, Lay M. Ranking Workplace Competencies: Student and Graduate Perceptions. Asia-Pacific Journal of Cooperative Education. 2002;3(2):9-18.

[9] Crebert G, Bates M, Bell B, Patrick CJ, Cragnolini V. Ivory Tower to Concrete Jungle Revisited. Journal of Education and Work. 2004 Mar 1;17(1):47-70.

[10] Bennett R. Employers' demands for personal transferable skills in graduates: A content analysis of 1000 job advertisements and an associated empirical study. Journal of Vocational Education and training. 2002 Dec 1;54(4):457-76.

[11] Desjardins R, Rubenson K. An Analysis of Skill Mismatch Using Direct Measures of Skills. OECD Publishing; 2011 Oct 17.

[12] Allen J, Van der Velden R. Educational mismatches versus skill mismatches: effects on wages, job satisfaction, and on-the-job search. Oxf Econ Pap. 2001 Jul 1;53(3):434-52.

[13] Van der Velden R, Bijlsma I. Effective skill: A new theoretical perspective on the relation between skills, skill use, mismatches, and wages. Oxf Econ Pap. 2019 Jan 1;71(1):145-65.

[14] Pellizzari M, Fichen A. A new measure of skill mismatch: theory and evidence from PIAAC. IZA J Labor Econ. 2017 Dec;6(1):1-30.

[15] Chiclana F, Herrera F, Herrera-Viedma E. Integrating three representation models in fuzzy multipurpose decision making based on fuzzy preference relations. Fuzzy Sets Syst. 1998 Jul 1;97(1):33-48.

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ROOM 2 (INDUSTRIAL ENGINEERING)

Design of mechanical quality of yarn as a result of dyeing process based on Taguchi multi responses with Vikor method

Ali Parkhan; I. D. Widodo

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SWOT analysis in determining the development strategy of crude palm oil (CPO) using QSPM method in PT. XYZ palm oil

Atyanti Dyah Prabaswari; Dwi Putra Sandika

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Indonesia's energy policy: A SWOT analysis and effectiveness measure

J. Sulistio; B. Wirjodirdjo; P. D. Karningsih

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The design of yarn quality with the TOPSIS method

Ali Parkhan; Muchamad Sugarindra

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User preferences for video conferencing using the analytical hierarchical process (AHP)

Hasan Mastrisiswadi; Berty Dwi Rahmawati; Astrid Wahyu Adventri Wibowo

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Employee performance improvement using clustering method: A case study in PT. XYZ

Mohammad Arsyad Fathurrohman; Khairunnisa Nurul Istiqomah; Rizha Syukrillah; Annisa Uswatun Khasanah

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W. Tripiawan; W. M. Frestikawati

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Human resources analysis using NASA-TLX methods, full time equivalent (FTE), and SWOT analysis with case study in the production section of PT. ABCD

Atyanti Dyah Prabaswari; Muhammad Ilham Mahfudhi

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ROOM 3 (INDUSTRIAL ENGINEERING)

Application of system dynamics simulation in food supply chain: Review and bibliometric analysis

Putri Amelia; Budisantoso Wirjodirdjo; Ratna Sari Dewi

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Rangga Primadasa; Dina Tauhida; Elisa Kusrini

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Risk analysis on water distribution using failure mode and effect analysis (FMEA) approach and fishbone diagram

Rofi Brianpratama Windarto; Roaida Yanti; Qurtubi; Muchamad Sugarindra

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Ergonomic and innovative infusion monitoring system design to increase usability

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Analysis of work posture and proposed design of slondok printing machines at slondok MSMEs in Yogyakarta

Agus Mansur; Elanjati Worldailmi; Syafa Thania Prawibowo; Almuzani

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Rela Adi Himarosa; Nurvita Risdiana; Muhammad Budi Nur Rahman; Rahmad Kuncoro Adi; Wahyu Sekar Hidayat

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Production process analysis using six sigma approach and failure mode effect analysis to reduce sheet break on core board paper products PT. Indonesian Papertech, Subang

Apsari Dita Indah Rahayu; Abdullah 'Azzam; Heri Susilo; Rizky Alditama; Fahrul Triyulianto Rusli

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ROOM 5 (INDUSTRIAL ENGINEERING)

Development of communication tools for deaf and mute people using design thinking method

Khairunnisa Nurul Istiqomah; Rizky Alditama; Salma Salsabila; Abdullah 'Azzam

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The characterization of coal waste by Paiton power plant

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Simulated comparison between different roof's construction materials "a study to find best roof material for energy consumption efficiency in residential buildings"

Saad F. Al-Nuaimi

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Influence of friction pressure and friction time interaction on the joint strength of friction welded ST 41 steel

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ROOM 7 (MECHANICAL ENGINEERING)

Introducing new CNC machining strategy for thin-walled structure (case study on acrylic machining for butterfly jewellery frame master)

Paryana Puspaputra; Risdiyono; Rahmat Riza

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Paryana Puspaputra; Risdiyono; Rahmat Riza

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Implementation of lean tools as waste assessment method in a coil spring manufacturing

Rabiatul Syuhada Binti Hasan; Muhammed Nafis Bin Osman Zahid

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ROOM 8 (CHEMICAL ENGINEERING)

Process simulation of fixed bed downdraft gasifier for rice husks and sawdust

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Extraction of bioactive compound from mangosteen peel (*Garcinia mangostana L.*) using ternary system solvent

Nurhayati Rahayu; Setiyo Gunawan; Hakun Wirawasista Aparamarta

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Utilization of mangosteen pericarp extract (*Garcinia mangostana* L.) as herbal medicine using microwave-assisted extraction (MAE) method

Surya Iryana Ihsanpuro; Setiyo Gunawan; Arief Widjaja; Tri Widjaja; Dwi Santoso; Abdul Malik Al Mulki; Hakun Wirawasista Aparamarta

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Cashew nut shell liquid (CSNL) as a renewable adhesive

Eni Budiyati; Edi Santoso; Putri Maharani Budi

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Utilization of styrofoam type waste into fuel oil by pyrolysis method

T. K. Dhaniswara; Y. T. Rahkadima; M. A. Fitri; Z. Azizah; D. Oktawila

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Synthesis and characterization of poly-lactic acid (PLA) biocomposites reinforced with rice husk and clay

Samira Kayla Biyanti; Dela Ramadhini Hertiana; Tika Paramitha

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ROOM 9 (INFORMATICS)

A proposed prototype of TRIZ mobile application in business and management

Kholid Haryono; Ikhwan Alfath Nurul Fathony; Reza Cahya Nugraha

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Sunardi; G. G. Faniru Desak; Rudi Bachtiar; Christianna Wulan Sari

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Septia Rani; Irving V. Paputungan; Dhomas H. Fudholi; Sheila N. Huda; Zainudin Zukhri

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Sunardi; G. G. Faniru Pakuning Desak; Immanuel Revelino; Jusman Sitohang

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Dina Tri Utari; Yunanda Mustofa Putri

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ROOM 10 (INFORMATICS)

Online attendance system implementation in pandemic era using ITIL CSI

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Luthfi Anggy Kurniawan; Hanson Prihantoro Putro

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Muhammad A. Salamun; Fadhlan Z. Muttaqin; Nur R. Rosyid

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ROOM 11 (ELECTRICAL ENGINEERING)

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Alvin Sahroni; Pramudya Rakhmadyansyah Sofyan; Nur Widiasmara; Isnatin Miladiyah

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Handy Wicaksono; Roche Alimin; Handry Khoswanto; Jonathan Aditya Wijaya; Wendy Wibisono

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Fitri Juwita Inayati; Yesiana Arimurti; Yudi Rinanto; Dewanto Harjunowibowo

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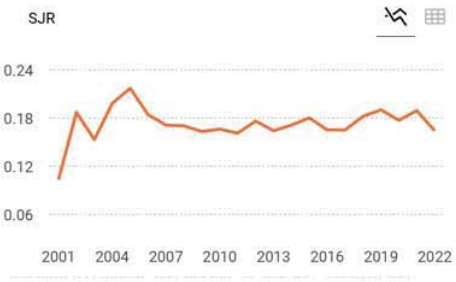

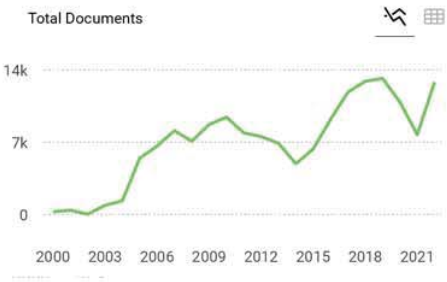

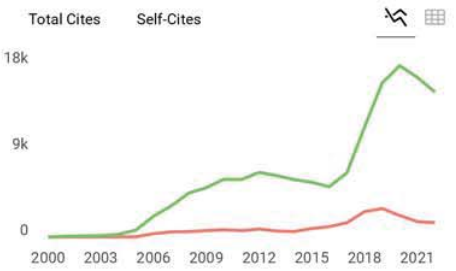

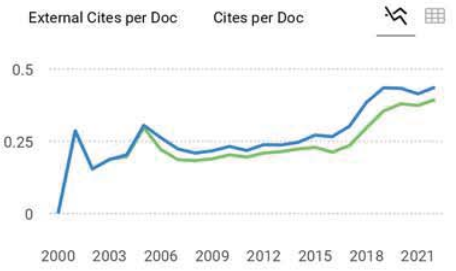

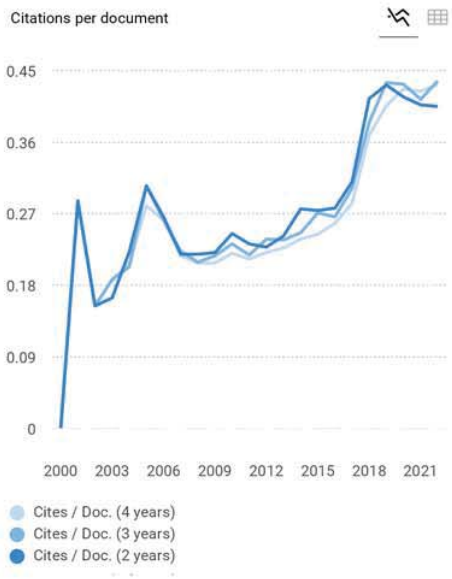

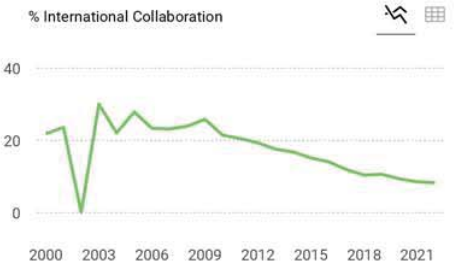

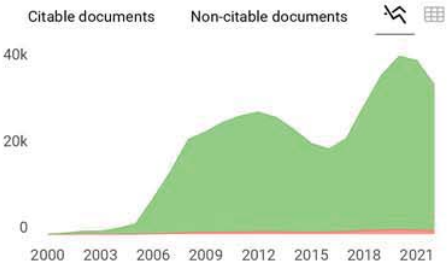

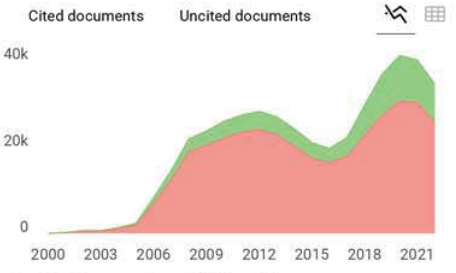

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