

# The Effect of Personal Factors on Creativity among Research Officers in Malaysia

S. A. Panatik<sup>\*a</sup>, M. F. Katimin<sup>b</sup> and R. Shaari<sup>c</sup>

Faculty of Management, Universiti Teknologi Malaysia, 81310 Johor Bahru UTM, Johor,  
Malaysia

<sup>a,\*</sup>saisyah@utm.my, <sup>b</sup>thefarihin@gmail.com, <sup>c</sup>rozianas@utm.my

**Abstract** – *The subject of employee creativity has been widely discussed in the field of human resource development. A variety of factors that promote creativity among employees have been presented. This study addresses the issue of the development of employee creativity with special attention to creative works among research officers in Malaysia. This study aims to test the effects of individual factors i.e., openness to experience, creative self-efficacy, intrinsic motivation, and positive affect on the components of creativity i.e., fluency, flexibility, originality, and elaboration. A survey was conducted on 400 research officers working at one of Malaysia's largest public research institute, with a return of 286 responses. A check on missing data, outliers, and normality analysis was performed. The results of the hierarchical regression analysis confirmed that only a few of the hypotheses developed earlier were supported. Only three out of 16 direct effects of individual factors on creativity were found significant i.e., openness to experience on fluency, openness to experience on elaboration, and creative self-efficacy on originality. It is confirmed that in the Malaysian context, level of creativity is high among research officers, however only certain individual factors found to influence creativity. This suggests that there are several factors based on the Malaysian culture that influence the results which are different from the expected results from the literature. This study also discusses the implication of this study toward understanding the personal factors that affect creativity. Copyright © 2016 Penerbit Akademia Baru - All rights reserved.*

**Keywords:** Creativity, Openness to experience, Creative self-efficacy, Intrinsic motivation, Positive affect, Research officer

## 1.0 INTRODUCTION

Continual innovations and resourcefulness have become necessary for the growth of many modern economies [16], because in this modern environment, organisations are facing upward changes in social and economic, as well as increased competition to move in a fast pace in order to remain competitive [40]. The quest for employee creativity and increased organisational innovation has gradually been more recognised as a key factor to long-term organisational survival and success especially in products, services, systems, and work processes [19,40]. Therefore, organisations need to continuously develop and exercise their people to perform and innovate. To perform and innovate, they must come up with ideas, and the flowing of ideas is part of creativity. Creativity is essential for innovation [29] and necessary for organisational development and advancement [27]. Creativity also functioned as the source of strength in performance [5], and gives competitive advantages [65]. Therefore, it

is a major requirement for most of the organisations to promote creativity among employees from time to time in order to perform and innovate.

The subject of employee creativity has been widely discussed in the field of human resource development, with scholars such as Amabile [4,6] arguing and presenting variety of factors that promote creativity among employees. Research suggests that one of the major factors influencing employees' creativity is the employees' individual factors. Some of the individual factors that have significant relation with creativity and received so much attentions by researchers including openness to experience [24,25,26], creative self-efficacy [28,31,58] positive affect [7,12,27,37], and intrinsic motivation [3,8,17,20,32,45,53,54].

The research of creativity is very fascinating, especially when it describes how a person is different from others. As in organisation, creativity could be the benchmark of each of the employee to perform at their best by presenting variety of ideas. In order for employees to perform at their best, they must perform creatively by suggesting novel and useful products, ideas, or procedures that provide the organisation with important raw material for subsequent development and possible implementation [4,56,64]. Unfortunately, it is still unclear which among four factors within the individual employee proposed (i.e. openness to experience, creative self-efficacy, positive affect, and intrinsic motivation) may trigger their creativity. Consequently, this resulted to insufficient ways in deciding exactly how the employee are considered to be creative. In fact, from the progressive readings of the literature, it has been found that all the individual factors proposed were never been mutually studied before [24,32,58]. To shed light onto this matter, this study was designed to pool these four types of individual factors and observe their effects on creativity.

Defining the dimensions or the key abilities of creativity is also very crucial in strengthening the outcome of the research. It is to provide a more in-depth explanation on which aspect of creativity can be conveyed. Goff and Torrance [30] measured four norm-referenced abilities of creativity in their Abbreviated Torrance Test for Adults: (1) fluency, ability to produce numerous ideas relating to the activity; (2) flexibility, ability to interpret similar stimulus in different ways; (3) originality, ability to produce ideas which are not generally produced; and (4) elaboration, ability to embellish ideas relating to the activity. These four abilities have been initiated by Guilford [33] when he first introduced the dimensions of divergent thinking. Torrance [61] also applied these abilities in his Torrance Test of Creative Thinking. Again, in this new era of competitive business environments, creativity of an employee is not merely being perceived on the level of creativity itself. It should be described through some traits possess by individual in order to portray the actual potential of creative practices that he or she has. For instance, the creativity of an idea generation can be measured on how rare or original the idea is. If the idea never comes across all this while, then it should be considered as a creative idea.

Creativity is a very broad concept. In order to have a more in-depth understanding about creativity, it should be studied and operationalised dimensionally. However, majority of the researches that have been conducted over the years found only studied employee creativity in general, not dimensional [25,31,32,68]. By not study dimensional creativity, employees' creative potential will not be discovered and further cannot be trained. This study is intended to investigate the dimensional creativity in order to find the actual potential, ability, or which criteria of creativity that one possess that makes he or she a creative person. This will ultimately

provide substantial insight into the creativity of employee by providing strength outcomes as well as a more in-depth explanation.

Researchers in the field of organisational creativity often addressed engineers, scientists, research personnel, managers, and designers as part of the context of their research [38,68]. It is due to the fact that these kinds of jobs are requiring high level of creativity to be carried out. For instance, a curious scientist will drives questions and then develop a new research, and with that research ideas are born to ignite scientist's creativity to create or invent something new. Rowe [48] in his Creative Potential Profile also proved that a creative scientist is curious and innovative. Therefore, this research is employing scientists and research officers in the public research institutes in Malaysia as the sample of the research. It is because the public research institutes in Malaysia do lots of research and development especially in finding new substances to invent new products, testing new products. Malaysia too is a country that rich with its natural sources. Therefore scientists play an important role to do research when there is new finding and to fully utilise the local resources. Furthermore, the fact that this kind of research never been carried out in Malaysia, it will provide useful information as well as fill up the creativity research gap in Malaysia.

This study addresses the issue of the development of employee creativity with special attention to the Malaysian workforce that engage with creative works such as research officers. Public Services Commission of Malaysia [46] described research officers working in public research institutes as those who can: (a) conduct research and development (R&D) activities in certain fields; (b) conduct fundamental and applied researches; (c) provide expert consultations; (d) spread the information regarding related technologies in the country; (e) conduct researches on quality control; and (f) conduct research and transfer of science and technology as well as the development and training courses for domestic consumers.

## **2.0 LITERATURE REVIEW**

### **2.1 Openness to Experience**

A complete list of characteristics associated to creative people were compiled by Barron and Harrington [13], e.g., "high valuation of aesthetic qualities in experience, broad interests, attraction to complexity, high energy, independence of judgment, autonomy, intuition, self-confidence, ability to resolve antinomies or to accommodate apparently opposite or conflicting traits in one's self-concept, and finally, a firm sense of self as 'creative' " (p. 453). The creative individuals sought to be located by the current study within the framework of the Five-Factor Model (FFM) of personality. In the FFM [41], openness to experience is the trait visible for the most part of Barron and Harrington's list of characteristics and is a personality trait related with individual creative performance in organisations [26,64]. In a meta-analysis study performed by Feist [22] across 26 studies comparing personalities among creative scientists and less creative scientists found that creative scientists are more open to new experiences than their less creative peers. Another study by George and Zhou [26] hypothesised that when the situation allows for the expression of the trait's influence, openness to experience may serve to foster creativity. They proved it in a sample of employees from a petroleum drilling company and found that employees' highest creativity was when employees who were high in openness to experience. Following both theoretical and empirical evidences, it can be hypothesised that:

H1: Employee openness to experience is positively associated with employee creativity.

H1a: Openness to experience is positively influences fluency.

H1b: Openness to experience is positively influences flexibility.

H1c: Openness to experience is positively influences originality.

H1d: Openness to experience is positively influences elaboration.

## **2.2 Creative Self-Efficacy**

Creativity typically involves an individual's strong internal belief of his/her ability to successfully participate in creative behaviours [2,11,23,58]. Strong beliefs of self-efficacy for creativity might be necessary for assisting individuals to persevere in creative strivings, especially in complicated or challenging situations [58]. Ford [23] in his theory of creative individual action, suggests that the motivation to innovate among employees is derived by the core component of the employees' efficacy beliefs. For employees to be more creative in their job, Ford also notes that they must have early expectations that they can do it successfully. It is due to the fact that level of self-efficacy influences task-related attraction, initiation, and sustenance [11]. The levels of efficacy are expected to affect the extent to which employees enjoy creativity-relevant activities, began to take creative action, along with sustaining actual creative levels in their performance. Prior studies also have established that creative self-efficacy is related to creativity [14,47,58]. Employees with a better sense of efficacy for marketing skills were producing more advanced creative work on subsequent marketing tasks as has been prove in an early study by Redmond and colleagues [47]. In two samples of employees from a manufacturing division and an operation division, Tierney and Farmer [58] found that creative self-efficacy significantly predicted supervisors' ratings of employee creativity. In a study by Tierney and Farmer [59] involving an R&D unit of a chemical company, a similar relationship was found. A study by Carmeli and Schaubroeck [14], verified that in a sample of two financial service organisations, self-reported creative work involvement was predicted by creative self-efficacy. Thus, findings from a work context indicate that creative self-efficacy is an important antecedent of employee creativity. Therefore, it can be hypothesised that:

H2: Employee creative self-efficacy is positively associated with employee creativity.

H2a: Creative self-efficacy is positively influences fluency.

H2b: Creative self-efficacy is positively influences flexibility.

H2c: Creative self-efficacy is positively influences originality.

H2d: Creative self-efficacy is positively influences elaboration.

## **2.3 Intrinsic Motivation**

Creativity also requires some level of sustaining internal energy that makes individuals to persevering in the face of existing challenges to creative work [51]. Many studies of individual creativity have focused on the importance of intrinsic motivation (i.e., their feelings of capability and freedom on a given task) for creativity [4,50,51,52]. Componential theory of creativity [4,6,9] predicted that intrinsic motivation should be positively related to creativity. Amabile and Mueller [9] hypothesised that people are most creative when they feel motivated regularly by the satisfaction, pleasure, interest, and challenge of the work itself. In a study of

the relationship between intrinsic motivation and creativity among 109 researchers working in laboratories by Perry-Smith [45], it is confirmed that intrinsic motivation was significantly related to creativity. Another study by Dewett [17] among 165 R&D personnel and their supervisors also provide evidence that intrinsic motivation significantly influenced creativity. Following theory and empirical evidences presented above, it can be hypothesised that:

H3: Employee intrinsic motivation is positively associated with employee creativity.

H3a: Intrinsic motivation is positively influences fluency.

H3b: Intrinsic motivation is positively influences flexibility.

H3c: Intrinsic motivation is positively influences originality.

H3d: Intrinsic motivation is positively influences elaboration.

#### **2.4 Positive Affect**

Programme of laboratory studies for a relation between positive affect and creativity by Isen [35,36] have become the larger scope of empirical support. These studies stated that positive mood was caused by several different stimuli, which includes condition in which the researcher giving respondents a gift or treat, showing video clip like comedy, or an extract of a meaningful song. The most constant finding of these experiments has been that driven positive mood leads to higher levels of performance-related dimensions of creativity. It have been shown by other studies as well, that subjects in happy moods exhibit better fluency, producing more feedbacks and more divergent feedbacks than subjects in sad moods or are neutral [34,62]. A longitudinal study by Amabile and colleagues [7] of daily work creativity has examined self-reports, other ratings, and daily diary data from 222 workers in seven companies over the length of an entire project, directly addressing the question of whether negative versus positive affect would enhance creativity. This study found a tough linear relationship between higher positive mood and creativity in organisations. The effect of positive affect on creativity also found lasted up to two days after the positive mood had been felt. In other field study conducted by Madjar, Oldham, and Pratt [39] also found facilitative effects for positive mood on creative performance work by showing that positive moods mediated the relationship between the support employees get for creative work and their actual creative performance. Generally, a positive relationship between positive affect and creativity is supported by most research. Therefore, it can be hypothesised that:

H4: Employee positive affect is positively associated with employee creativity.

H4a: Positive affect is positively influences fluency.

H4b: Positive affect is positively influences flexibility.

H4c: Positive affect is positively influences originality.

H4d: Positive affect is positively influences elaboration.

### 3.0 METHODOLOGY

#### 3.1 Sample and Procedures

Sample was drawn from research officers working at one of the largest public research institute in Malaysia. Cross-sectional design was used and questionnaire was sent to 400 potential respondents. The questionnaire were returned within two weeks with 301 responses obtained. 15 outliers were deleted based on the Mahalanobis distance test, leaving a final sample of 286. From the 286 respondents, the tabulation of data receives almost equal distribution, which is 52.4% for male and 47.6% for female. For age group, the highest number of respondents are below 30 years old (143, 50%), followed by 31-40 years old age group (90, 31.5%). Respondents in this study are mainly from those who have less than 5 years of job tenure (146, 51%), whereby the least group is more than 20 years of service (10, 3.5%). Majority of the respondents are Bachelor's degree holders (188, 65.7%), followed by Master's degree holders (58, 20.3%), and doctoral degree holders (40, 14%). With respect to their position, 69.9% are research officers, 23.1% are senior research officers, and remaining 7.3% are principal research officers.

#### 3.2 Measures

*Openness to experience.* Openness to experience was measured using the openness to experience subtest adapted from NEO Five-Factor Inventory (NEO-FFI) developed by Costa and McCrae [15]. NEO-FFI is the shortened version of the renowned Revised NEO Personality Inventory (NEO-PI-R) which was also developed by Costa and McCrae [15]. The openness domain of NEO-PI-R has facet scales for openness to fantasy, aesthetics, feelings, actions, ideas, and values [15]. However the shortened version does not cover off the facets but still provides a quick, reliable, and accurate measure of the domain [15]. It has 12 items with five-point response scale, ranging from 'disagree' to 'agree' with seven of it are reversed score items. The sample items are 'I don't like to waste my time daydreaming' and 'I often enjoy playing with theories or abstract ideas'. Higher score indicates higher level of openness to experience. It is reported in the manual that this subtest has a good internal consistency,  $\alpha = .80$ .

*Creative self-efficacy.* Creative self-efficacy was measured using a self-rated instrument to measure creative self-efficacy developed by Tierney and Farmer [58]. It is a four-item scale of creative self-efficacy. Instructions of this instrument require the respondents to rate the extent to which they agree with the statements pictured about them using a five-point scale ranging from 'strongly disagree' to 'strongly agree'. The sample items are 'I feel that I am good at generating novel ideas' and 'I have a knack for further developing the ideas of others'. Higher score indicates higher level of creative self-efficacy. The advantage of this scale is that the efficacy construct is specific to work creativity by integrating research findings on self-efficacy and creativity [58]. It has an acceptable internal consistency,  $\alpha = .76$  [59].

*Intrinsic motivation.* Intrinsic motivation was measured using the intrinsic motivation scale adapted from Work Preference Inventory that was developed by Amabile and her colleagues [8]. It has 15 items with four-point response scale, ranging from 'never or almost never true of me' to 'always or almost always true of me'. Sample items are 'I enjoy trying to solve complex problems' and 'I'm more comfortable when I can set my own goals'. Higher score indicates higher level of intrinsic motivation. The instrument aimed to capture the major elements of intrinsic motivation which are self-determination, competence, task involvement, curiosity,



enjoyment, and interest [8]. Instructions of this instrument require the respondents to point out how true each of the statement for them. The advantage of the instrument is that the scores are related in meaningful ways to other questionnaire and behavioural measures of motivation, as well as personality characteristics, attitudes, and behaviours [8]. It has an acceptable internal consistency,  $\alpha = .75$  with 6 months test-retest reliability of .89 [8].

*Positive affect.* In the context of Malaysian employee, positive affect was measured using the 5-item positive affect subscale of the International Positive and Negative Affect Schedule (PANAS) Short Form (I-PANAS-SF) developed by Thompson [57]. According to the instructions of this survey, the respondents are asked to point out to what extent they feels a certain emotion or feeling such as alert, inspired, active, etc. Respondents have to specify the most suitable answer to each item on a scale ranging from 1 to 5 (1- Never, 5- Always). Higher score indicates higher level of positive affect. The advantage of this questionnaire is that respondent can answer the questions according to specific time frames, though it is intended for personality analysis. For instance, respondents can specify the emotions or feelings they feel at the moment, in the previous week, or in general. Thus, positive affect can be learnt to a certain circumstances and not just as a general personality trait [63]. By answering the questions about feelings “in general”, positive affectivity can be learnt as a personality trait [63]. By answering the questions about feelings “at this moment”, situational positive affect can be learnt as a reaction to a certain situation [63]. The items of the scale or the feelings that respondents should rate towards are alert, inspired, determined, attentive, and active. This scale has a good psychometric properties with internal consistency,  $\alpha = .84$  and 8 weeks test-retest reliability at .68 [57].

*Creativity.* Creativity was measured using the Abedi Creativity Test developed by Auzmendi, Villa, and Abedi [10]. It is a multiple choice self-rating scale on which participants rate themselves on a three-point scale on 56 questions that assessed four key abilities of fluency, flexibility, originality, and elaboration. Items include questions such as, “how many sentences could you come up if they all would have to begin with the same word?” with response options of “I could come up with only a few sentences”, “I could come with several sentences”, and “I could come up with many sentences”. Higher score indicates higher level of creativity. From the four subscales, it is reported that the internal reliabilities ranging from 0.61 to 0.75 (average = 0.66) [1].

#### 4.0 RESULTS AND DISCUSSION

Multiple regressions has been used to analyse the main effects of individual factors, i.e. openness to experience, creative self-efficacy, intrinsic motivation, and positive affect on creativity components, i.e. fluency, flexibility, originality, and elaboration. Preliminary analyses were conducted to ensure there was no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. All these assumptions were satisfied in this study. Table 1 displays the results of the hierarchical regression of fluency, flexibility, originality, and elaboration on openness to experience, creative self-efficacy, intrinsic motivation, positive affect, perceived organisational support, supervisor support, and workgroup support.

**Table 1:** Hierarchical regression of creativity on individual factors

Predictor variables	Fluency		Flexibility		Originality		Elaboration	
	B	p-value	$\beta$	p-value	$\beta$	p-value	$\beta$	p-value
Openness to experience	0.283	0.000	0.071	0.350	0.024	0.743	0.341	0.000
Creative self-efficacy	0.058	0.316	-0.020	0.744	0.176	0.003	-0.057	0.331
Intrinsic motivation	0.039	0.584	-0.066	0.377	0.086	0.240	-0.115	0.110
Positive affect	-0.083	0.147	0.008	0.895	0.093	0.115	-0.019	0.748
$\Delta R^2$	0.093		-0.010		0.046		0.067	
F	8.317		0.268		4.456		6.131	

*Note.* n = 286. \*p<0.05; \*\*p < 0.01; \*\*\*p<0.001. Estimates are standardised regression coefficients.

For fluency, the results in Table 1 show that openness to experience, creative self-efficacy, intrinsic motivation, and positive affect together explained 9.3% of the variance in fluency. Openness to experience ( $\beta = 0.283$ ) were significantly related to fluency. This result indicated that high openness to experience related to high level of fluency. This result supports Hypothesis 1a. Nevertheless, with no significant relations found between creative self-efficacy and fluency, between intrinsic motivation and fluency, and between positive affect and fluency indicating that Hypotheses 2a, 3a, and 4a were not supported.

For flexibility, the results in Table 1 show that that openness to experience, creative self-efficacy, intrinsic motivation, and positive affect together explained 1% of the variance in flexibility. The results indicated that there are none of the individual factors that were related to flexibility. Therefore, Hypotheses 1b, 2b, 3b, and 4b were not supported, and can be concluded that individual factors such as openness to experience, creative self-efficacy, intrinsic motivation, and positive affect are not related to flexibility.

For originality, the results in Table 1 show that that openness to experience, creative self-efficacy, intrinsic motivation, and positive affect together explained 4.6% of the variance in originality. Creative self-efficacy ( $\beta = 0.176$ ) were significantly related to originality. This result indicated that high creative self-efficacy related to high level of originality. This result supports Hypothesis 2c. Nevertheless, with no significant relations found between openness to experience and originality, between intrinsic motivation and originality, and between positive affect and originality indicating that Hypotheses 1c, 3c, and 4c were rejected.

For elaboration, the results in Table 1 show that openness to experience, creative self-efficacy, intrinsic motivation, and positive affect together explained 6.7% of the variance in elaboration. Openness to experience ( $\beta = 0.341$ ) were significantly related to elaboration. This result indicated that high openness to experience related to high level of elaboration. This result supports Hypothesis 1d. However, with no significant relations found between creative self-efficacy and elaboration, between intrinsic motivation and elaboration, and between positive affect and elaboration indicating that Hypotheses 2d, 3d, and 4d were rejected.



To summarise, openness to experience were related to fluency and elaboration, creative self-efficacy were only related to originality, and no effects of intrinsic motivation and positive affect were found on all creativity variables. It can be established that the most dominant individual factor that influences creativity is openness to experience, with two significant relations found between openness to experience. Said relations are between openness to experience and fluency, as well as between openness to experience and elaboration. With regards to relation between creative self-efficacy and originality, it can be also concluded that only three out of 16 main effects' hypotheses were supported.

## **5.0 DISCUSSION AND CONCLUSION**

Creativity has been established as an important factor in order for companies to survive the fast changing business environment [6,26]. In order to increase creativity in the workforce, it is crucial to understand the different factors that lead to creativity. Previous studies have implied the effects of various individual and environmental factors on creativity. However, little have been known about this kind of study been conducted in Malaysia. The purpose of the current study was to examine the effects of individual factors on creativity among Malaysian research officers. A model that illustrated the effects of individual factors on creativity among a sample of Malaysian research officers has been tested. The model hypothesised the effects of individual factors such as openness to experience, creative self-efficacy, intrinsic motivation, and positive affect on four components of creativity i.e., fluency, flexibility, originality, and elaboration.

Modern world count on creative engineers and scientists to invent new gadgets that can change the way people lives; and to discover the new scientific theories and philosophies that can change the way people view the world. This is all depends on how creative they are. In the context of the current study, the use of the Abedi Creativity Test to measure the components of creativity i.e., fluency, flexibility, originality, and elaboration found that the sample of research officers possess high level of fluency, high level of flexibility, high level of originality, and high level of elaboration. Cumulatively, they possess high level of creativity. This result imply that the high level of creativity among research officers is proof of the ability to produce high-impact researches by the institute.

This then come to a question of why they possess high level of creativity? One of the reason is because they are all experts in their field, every research officers doing a research must be an expert in what they are doing. They gain experiences and they learn what they study throughout their whole life. They carry this experience and learning with them. When they tap into this expertise, they can then apply it to any situation to help overcome issues, solve problems, or achieve new results. It is their own expertise that drives their capacities to be more creative. Another reason is because of the nature of the job itself. Every research officers are responsible in conducting experiments, recording and analysing data, developing original solutions to problems, as well as keeping up to date with relevant scientific and technical development, to name a few. They must be the one who experienced the success and failure of the researches they run. Therefore, in the process of doing experiments and tests, they will found new discoveries, either from the process of the research or outcome of the research that may be useful for future research or for the benefit of the user.

The formation of the Innovative and Creative Circle (ICC) among Malaysian government agencies is also another possible reason of high level of creativity among research officers working in Malaysian public research institute. ICC refers to a small group of employees from the same unit across departments who meet regularly to identify, select and analyse problems associated with work, and proposed to management for consideration to carry out the suggestion. This kind of circle which provides space and opportunities for the members of organisation to express a view in problem solving, or to propose any innovation ideas, further improve the system of service delivery. When members of organisation are constantly being exposed to this kind of culture, it is not impossible to see the meteoric of the creativity level among them. This verified that it is very important for any research institutes or organisations to have high creative research personnel and organisations should hire them to drive any research efforts to the highest peak.

In presenting the results of the main effects of openness to experience, creative self-efficacy, intrinsic motivation, and positive affect, the cross-sectional analyses is discussed here. The main effects of openness to experience, creative self-efficacy, intrinsic motivation, and positive affect are inconsistent with those obtained in previous studies. There are only three hypotheses were supported from total of 16 main effects' hypotheses formulated. The findings showed that openness to experience was positively associated with fluency among research officers in Malaysia. This result is consistent with previous study by Silvia, Nusbaum, Berg, Martin, and O'Connor [55] . They also proved that openness to experience has an effect on fluency indicating that high levels of openness were linked with high levels of fluency. Openness to experience was also found to positively associate with elaboration, signifying that high levels of openness were linked with high levels of elaboration. However, there are no findings from previous researches that can be related to this result. The other two effects of openness to experience on flexibility and originality were not established in this study. Majority of previous researches proved that openness has an effect on creativity. The problem is they do not specify which components of creativity that were affected by openness because creativity was studied generally. That is why, it is important to conduct in depth study to distinguished different aspects of creativity that may be affected by openness to experience. Therefore this study make a contribution by establishing the relationship between openness to experience and the components of creativity which are fluency and elaboration. Openness has been described as the degree to which a person is imaginative [43] and curious [42], thus it is promising for one that is open to achieve more ideas, patterns, and combinations, which then correlates to elaborate the ideas thoroughly to solve problems as well as creating new and innovative products and services. Openness did not have a relationship with originality because when employees are open to experience, the ideas that they produced may be countless and were affected by many factors that make them cliché and unoriginal. Same goes to flexibility, the ideas produced are being affected by different factors that makes it hard to be curved flexibly.

Creative self-efficacy was positively associated with originality, but not with the other three components of creativity. Previous studies by Tierney and Farmer [58,59] found that creative self-efficacy was positively associated with creativity without specifically pointing to which components of creativity. Therefore this study make a contribution by establishing the relationship between creative self-efficacy and the component of creativity which is originality. There are some reasons that can explain why creative self-efficacy only affecting originality, but not fluency, flexibility, or elaboration. Originality is an ability to produce ideas that are unique, unusual, and not generally produced. This concept is tailored to the specific application of Bandura's conceptualisation of self-efficacy as a targeted perception of capacity. Bandura

[11] explained that creative self-efficacy is a self-assessment of one's creative potential that specifically involves seeing oneself as being good in generating novel and exceptional ideas.

There were no effects of intrinsic motivation and positive affect on all components of creativity. These results were contradicted with previous studies as majority of previous studies proved that intrinsic motivation and positive affect were positively associated with creativity. In light of this contradiction, it may be assumed that in the context of Malaysian culture that is high in power distance, employees may be punished if they are not performed in their job i.e. be creative. An employee, although not intrinsically motivated, still performed in his/her job because it is what he/she is supposed to do ritually. It is also can be assumed that employees appreciate extrinsic rewards more than intrinsic rewards that motivate them to be creative and performed. For instance, as long as employees get a good pay, they will perform well although their ritual work is boring. Intrinsic motivation not influence creativity also because the absences of a third variable, such as support from organisation or supervisor as a moderator to stimulate the relationship. Organisational support is necessary due to guide employees to be more creative with the regulation of appropriate systems or mechanisms for encouraging and developing creative ideas. On the other hand, positive affect still did not established any relationship with creativity. It can be referred back to the Malaysian working environment that are high in power distance, employees used to work under pressure. Any kind of good mood or energy does not make any difference in their performances.

Future research on employee creativity should also incorporated multiple measures of creativity including others' perceptions, subjective measures of creative potential, as well as the possible objective measures of creative output. For instance, having supervisors rate the creativity of their employees is most commonly used in field studies [69]. Currently in the literature, four different rating scales have been identified that have been used to have supervisors rate the level of creativity of their employees. According to Zhou and Shalley [69], these four scales are: (a) George and Zhou's 13-item scale (3 of the 13 items were adapted from Scott & Bruce [49], [26,27,66]); (b) Oldham and Cummings' [44] 3-item scale; (c) Scott and Bruce's [49] 6-item scale; and (d) Tierney, Farmer, and Graen's [60] 9-item scale (4 of these 9 items were adapted from Ettlle & O'Keefe [21]). Systematic investigations are needed to examine the extent to which these four scales converge, and whether different scales are more suitable for studies with different jobs, types of industries and employees, at different stages of the creative process, as well as onto different cultures.

Some field studies have also used objective measures such as the number of patents, patent disclosures, research papers and technical reports, and ideas submitted to employee suggestion programmes [44,49,60]. Zhou and Shalley [69] argued that articles reporting these studies usually have included some discussion of whether these objective measures are the same as creativity. Obviously, whether to use these objective measures depends on whether it makes sense in studying different populations. For example, number of patents or patent disclosures, research papers and technical reports may be relevant indicators of creative performance for employees working in research and development. However, they are not relevant indicators of creativity for employees working on jobs that potentially involve some level of creativity (e.g., nursing) but do not normally involve producing patents and research papers.

In conclusion, it is confirmed that in the Malaysian context, level of creativity is high among research officers, but only certain individual factors found to influence components of creativity (i.e., openness to experience on fluency, openness to experience on elaboration, and

creative self-efficacy on originality). This research of employee creativity is hoped to be the steppingstone for more research on employee creativity to be conducted and developed in Malaysia.

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