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THE INFLUENCE OF PERSONALITY TRAITS AND QUALITY OF LMX RELATIONSHIP ON THE JOB PERFORMANCE OF ENGINEERS IN MALAYSIA

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Abstract
This research studies how personality traits affect the job performance of engineers in Malaysia and how the quality of Leader-Member exchange (LMX) relationship moderates this relationship. A sample of engineers working in Electrical and Electronics based companies in Malaysia were studied and the results showed that Extraversion and Openness were positively correlated to Job Performance while Agreeableness and Neuroticism were negatively correlated. The quality of LMX was however found to negatively moderate both the relationships between Extraversion to Job Performance and Openness to Job Performance. This finding goes counter to the traditional LMX theory which suggests that a stronger emotional attachment between leader and member lead to higher job performance. Possible reasons for this finding are discussed in this paper.

Research paper

Keywords: Job Performance; LMX Relationship; Personality; Engineers; Five-Factor Model

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Introduction

The importance of Human Capital Development in an organization cannot be over-stated (Becker, 2011). To succeed, an organization needs to hire, develop and retain a high performing workforce. From a hiring perspective, Barrick and Mount (1991) suggested that personality traits could predict job performance, leading to the use of personality scorecards during recruitment exercises.

From a development perspective, Graen & Uhl-Bien (1995), proposed the Leader-Member exchange (LMX) theory which states that leaders made distinctions between members and gave more attention and resources to selected members who were most likely to succeed. The selected members in return respond with greater effort, leading to an upward spiral of job performance.

The target of this research is firstly to help managers develop higher performing engineers based on their personality profiles and secondly to understand how the quality of a manager - subordinate working relationship can influence job performance.

Problem Statement

Industry 4.0 uses disruptive technologies like artificial intelligence, augmented reality, additive manufacturing, big data analytics and the internet-of-things (IOT) to drive higher efficiencies. Industry 4.0 is expected to reduce production cost and widen profit margins to the tune of USD 25-45B per year by 2030 for countries in Southeast Asia alone (Tonby, Ng and Mancini, 2014). Over 1 million Malaysians, involved in manufacturing con-

tribute 23% of its GDP, would need to develop new skills to thrive in Industry 4.0. Engineers are expected to play a large role in this transition (Motyl, Baranio, Uberti, Speranza and Filippi (2017). The target of this research is to help managers develop higher performing, adaptable engineers to keep Malaysian factories competitive in the Industry 4.0 era.

Research Gap

Most Personality – Job Performance studies were done in western countries, with only limited studies done in Malaysia. This poses a gap, as it has been shown that cultural perspectives do affect Occupational Citizenship Behavior which is a dimension of Job Performance (Fahr, Zhong & Organ, 2004). Besides cultural factors, none of the studies in Malaysia have covered engineering professionals. In fact, there have been very few studies done on the Personality – Job Performance relationship on engineers across the globe. This dearth of information on engineering professionals in Malaysia provided the motivation for this study.

Literature Review

The study of key variables of this research are presented in the following sections.

Job Performance

Job performance has traditionally been linked to task performance (Wen, Muthuveloo and Ping, 2017). It is a measure of how effectively an individual performs the activities contributing to the economic well-being of the organization. Job Performance is a multi-dimensional construct and

Viswesvaran and Ones (2000) suggested that it comprises of Task Performance (getting the job done), Contextual Performance (Organizational Citizenship Behavior) and Counterproductive Work Behavior (CWB). CWB can take the form of deliberate acts of sabotage or subtler forms, like failing to do the job correctly or failing to follow instructions (Muthuveloo, Basbous, Ping, and Long, 2013).

Personality Traits

Personality is defined as a consistent pattern of behaviors demonstrated by an individual as a result of his or her personal values, experience, feelings and desires derived over time (Salamzadeh et al., 2013, 2014; Revelle, W, Condon, D.M., 2015). In this study, the Five Factor model was chosen to describe personality as it is widely used, allowing data comparison with other studies when necessary. The personality traits described by the Five Factor model are as follows:

Conscientiousness is a trait of being cautious and vigilant. It implies a desire to perform a task well and takes seriously the obligation to others. Extraversion captures an individual's comfort level with relationships. People high in extraversion enjoy activities that involve large social gatherings and tend to work better in groups (Estiri et al., 2018; Khajeheian et al., 2018). Agreeableness refers to an individual's likeability or ability to accommodate the needs of others. Neuroticism measures a person's ability to withstand stress. People with high neuroticism tend to express negative feelings and fear, while people with low neuroticism are self-confident, se-

cure and calm. People high in openness to experience tend to be aware of their own feelings, are intrinsically curious and open to changes.

Quality of LMX relationship

The leader-member exchange (LMX) theory describes a two-way, partnership between leaders and subordinates using a relationship based approach. Leaders develop an exchange with each subordinate and the quality of this exchange is defined by the level of trust, respect, responsibility, resourcing and coaching that is given to a subordinate. In a high quality relationship, the leader provides more challenges and resources to help the subordinate while in a low quality relationship, the leader is less trusting and less likely to withhold resources needed for success.

Underpinning Theories

To study how personality influences job performance and how the quality of a leader-subordinate working relationship influences the latter's career development, two underpinning theories were used.

Firstly, the Trait-Activation Theory was used to define the linkage between personality traits and job performance This theory states that when an employee demonstrates behavioral traits that improve job performance they receive positive reinforcement which encourages further display of such behavior forming a virtuous cycle of excellence. This is supported by the I-TOP Strategic Agility model proposed by Muthuveloo, R., & Ping, T. A., (2013).

Secondly, the LMX theory posits that managers distinguish among subordinates and forms special working relationships with select subordinates, providing them different levels of attention and responsibilities. The subordinates in return choose to reciprocate this relationship by working harder and forming a stronger emotional attachment to their mentor manager. Thus the quality of this relationship influences the effectiveness of a subordinate's job performance.

Research Model

Based on the research gap and underpinning theories, the following conceptual framework was proposed. Applying the Trait Activation Theory, Job Performance was proposed as the dependent variable while Personality an independent variable. Applying the LMX theory, the quality of the LMX relationship was proposed as a moderator between Personality and Job Performance. The conceptual framework for this research is shown in Figure 1.

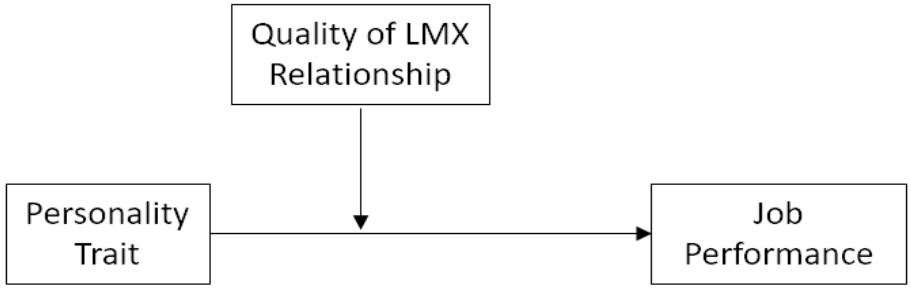

Figure 1. Conceptual Framework used.

Research Hypotheses

The relationship between key variables and appropriate hypotheses are formulated as below:

Relationship between Personality traits and Job Performance

Based on the trait activation theory, an individual with a given set of personality traits is best suited for a given job type. Barrick and Mount (2005) posits that personality affects motivation by influencing how much effort is put into work. When an individual's personality is aligned to the job needs, job performance improves. This gives rise to the following hypothesis.

Hypothesis #1: *Personality has a positive significant correlation to Job Performance*

Relationship between the quality of an LMX relationship, Personality traits and Job Performance

The LMX theory posits that a close working relationship between manager and subordinate provides more coaching and support, thus increasing the subordinate's job performance. Based on the above, the quality of an LMX relationship was assessed as a moderator in the Personality – Job Performance relationship, leading to the following hypothesis.

Hypothesis #2: *The quality of an LMX relationship moderates positively and significantly the relationship between Personality and Job Performance.*

Research Methodology

The research methodology used in this study is described in the following sections.

Research Design

This research utilized a quantitative, cross-sectional, correlational study conducted one time, using a hypothesis testing approach to study the relationship between Personality, quality of LMX relationship and Job Performance. A questionnaire was designed and pre-tested before starting the main survey. The survey results were checked for validity and then used to determine the structural model path coefficients. These coefficients were then used for hypotheses testing. Following this, the moderating effect of quality of LMX was assessed.

Population and sample size

The population studied were professionals working in engineering roles in electrical and electronics (E&E) based companies in Malaysia. Their engineering roles include research & development, design, manufacturing, equipment & process maintenance, technical staff and project management and sales & service support. The E&E sector was chosen as it is the leading manufacturing sector in Malaysia, contributing to 36.6% of the country's exports and providing 25.3% of its employment. (MIDA, Malaysian Investment Development Authority, 2016).

Hair, Sarstedt, Ringle & Mena (2012) proposed a minimum sample size at least ten times larger than the number of variables studied. As there

are 7 independent variables in this study, the minimum number of samples needed would be 70. For good measure, it was decided to obtain at least 200 samples, taking into consideration that some responses may be unusable.

Sampling technique and data collection method

This study used the convenience sampling method which involves samples from a part of the population that is close at hand. While it may not be as representative as a full random sampling method, it is practical and quick. To minimize the effect of biased sampling, data was collected from multiple companies across different geographical regions in Malaysia. Google Forms was used to collect respondent feedback.

Measurement Instruments

To measure job performance, the Individual Work Performance Questionnaire (IWPQ) developed by Koopman, L et. al. (2011) was used. It is based on a three-dimensional conception framework for Job Performance: Task Performance, Contextual Performance and Counter-Productive Work Behavior. The Big Five Inventory (BFI) developed by John and Srivastava (1999) which assessed the 5 personality traits using 44 questions was chosen for this research. The LMX-7 questionnaire developed by Graen, Novak & Sommerkamp (1982) was used to assess the quality of an LMX relationship. It measures the effectiveness of the relationship and the willingness of both parties to understand, address and support each other in resolving work re-

lated problems. All questionnaires selected used a 5-point Likert scale and are widely used and have been proven reliable.

Data analysis techniques

Partial Least Squared (PLS) was used in data analysis. PLS is a Structural Equation Modeling (SEM) technique that uses a prediction-oriented variance based approach that emphasizes endogenous target constructs in the model and maximizes their explained variance (Hair, Sarstedt, Ringle & Mena, 2012). SmartPLS-SEM version 3.2.7 was used for PLS data analysis, while IBM-SPSS Version 24.0 was used for descriptive statistical analysis.

Results

From the 350 invitations sent out, 212 complete responses were received from a wide socio-demographic spread as shown in Table 1.

Table 1. Socio-demographic of respondents

Group	Breakdown			
Gender	**Male**	76%	**Female**	24%
Age	**<30 years**	34%	**30-40 years**	24%
	40-50 years	16%	**>50 years**	26%
Education	**Bachelor**	69%	**Master**	22%
	PhD	7%	**Diploma**	2%
Job Role	**R&D**	31%	**Manufacturing**	26%
	Construction	12%	**Equipment/IT**	11%
	Management	10%	**Sales**	9%
Job Title	**Engineer**	41%	**R&D**	6%
	Manager	38%	**Senior Manager**	15%

Testing Hypothesis #1

As there are 5 factors in Personality, Hypothesis #1 was broken into 5 sub-hypotheses. It was found that Extraversion and Openness were positively correlated to Job Performance while Neuroticism and Agreeableness were negatively correlated. Details are summarized in Table 2.

Table 2. Results of testing Hypothesis #1

Personality	**Correlation to Job Performance**			
	Beta	p-Value	Correlation	Significance
Agreeableness	-0.14	0.02	(-)	Y
Conscientiousness	0.11	0.07	(+)	N
Extraversion	0.25	0.00	(+)	Y
Openness	0.36	0.00	(+)	Y
Neuroticism	-0.29	0.001	(-)	Y

Statistically valid with $p<0.05$

Testing Hypothesis #2

While the quality of LMX relationship was found to moderate the relationship between Extraversion and Openness to Job Performance, it was somewhat surprising that it was negatively moderating. Details are shown in Table 3.

Table 3. Results of testing Hypothesis #2

Personality	**Quality of LMX relationship as moderator between Personality & Job Performance**		
	b	p-Value	Moderator?
Agreeableness	-0.03	0.33	No
Conscientiousness	0.04	0.38	No
Extraversion	-0.19	0.01	Yes (Negative)
Openness	-0.19	0.02	Yes (Negative)
Neuroticism	-0.12	0.07	No

Statistically valid with $p<0.05$

Discussion

The findings of this research are stated as follows:

Correlation between Personality and Job Performance

The positive correlation between Openness and Extraversion and negative correlation between Neuroticism with Job Performance were expected as it has been seen in other work group studied. Somewhat unexpected was the finding that Agreeableness was negatively correlated to engineering Job Performance. This finding departs from the findings of Frei and McDaniel (1997) who found that customer service personnel have high agreeableness and conscientiousness.

One possible explanation may be that while customer service personnel are expected to address customer concerns, engineers are expected to follow relatively rigid rules and logical procedures to ensure that the products and services they provide meet statutory and customer required safety and quality specifications. Engineers frequently work with immutable laws of Physics that may not allow them to be as cooperative nor agreeable with their stakeholders. Engineers have to stand up and disagree when non-practical or non-optimal requests are made of them. This may explain why engineers with high agreeability may have lower job performance.

Another interesting finding is that the statistical significance of the hypothesis that Conscientiousness was positively correlated to Job Performance was marginally lower than the 95% expectation (93% actual). It is counter-intuitive that a personality trait that is described as careful, diligent, dependable, self-disciplined would not be positively correlated to job per-

formance. A possible explanation for this may be related to the work of La-Huis, et al (2005) who identified that personality traits (particularly Conscientiousness) may not have a linear relationship with Job Performance. On the low end of Conscientiousness, an individual is seen as lazy or careless on the job, while on the high end of conscientiousness, an individual may be seen as over-careful and rigid. They posit that individuals with moderate scores of Conscientiousness will provide the best job performance.

The quality of LMX relationship as a moderator between Personality & Job Performance

The study showed that the quality of LMX relationship was negatively moderating the relationship between Extraversion and Openness to Job Performance, versus the theoretical model that predicted it as a positive moderator. The quality of LMX relationship did not moderate the relationship between Agreeableness, Conscientiousness and Neuroticism with Job Performance.

Possible explanations for the quality of LMX relationship being negative moderators of the Extraversion and Openness to Job Performance relationship could be related to the LMX theory itself that stresses individualized two-way (dyadic) relationships between manager and subordinate. Managers have limited time and resources and are unlikely to be able to form high quality relationships with every subordinate (Dienesch & Liden, 1986). This creates a disparity in relationships within a team which could trigger social comparison within a group of employees (Vidyarthi et al., 2010). Employees with weaker LMX relationships feel that they are exclud-

ed or ignored by other team members (Wang & Li, 2018). This disparity also leads to a perceived lack of organizational justice (Scandura, 1999) and this lack of organizational justice is detrimental to the health of a team, leading to lower individual job performance. All the above suggests that too much LMX may lead to lower team and individual performance. This is supported by the findings of Huang & Liu (2012) who pointed out that employee turn-over was lowest when LMX relationship was moderate and higher when LMX relationships were on the low and high end. In summary, job performance is likely to be optimal when the quality of LMX relationships is moderate.

Research Contribution

From a theoretical perspective, this study has proposed and tested a theoretical model linking Personality, Job Performance and quality of LMX relationship. Extraversion and Openness were found to be positively correlated while Agreeableness and Neuroticism were negatively correlated to Job Performance. Secondly, the study demonstrated that the quality of LMX relationship negatively moderates the Extraversion to Job Performance and Openness to Job Performance relationships. This runs counter to the traditional LMX theory, but supports other studies that suggest that the quality of LMX relationship can disrupt organizational justice leading to lower individual and team performance.

From a practitioner's perspective, this study highlighted 2 key learnings. Firstly, individuals with different personality types perform their jobs differently and supervisors can help each of their subordinate adjust their

behaviors to improve Job Performance. Secondly, supervisors and managers should be aware that having quality LMX relationships at the expense of alienating other team members may not increase job performance. Put in other words: too much of a good thing (quality of LMX relationships) can bring negative consequences.

Limitations of Research

Two limitations were identified in this study. Firstly, for practical reasons, this study relied on a self-reporting survey which could add to common method bias. Secondly, the study used a convenience sampling technique which could introduce biased data.

Recommendations for future studies

Based on the limitations listed above, future researchers may want to look into getting 360° responses for personality trait and job performance measurements. Secondly, they could refine the target population to one where a random statistical sampling method can be used.

The findings that Agreeableness being negatively correlated to Job Performance may deserve more study. Similarly, the finding that the quality of LMX relationship negatively moderating the Extraversion – Job Performance and Openness – Job Performance relationships was unexpected and future researchers can delve into which LMX dimension caused this disparity.

Conclusion

The two objectives of determining if there was correlation between Personality and Job Performance among Malaysian engineering professions and if the quality of LMX relationship moderates the relationship between Personality and Job Performance were met.

Firstly, Extraversion and Openness were found to positively correlate to job performance while Neuroticism and Agreeableness were negatively correlated. Secondly, it was shown that the quality of LMX relationship negatively moderated the Extraversion to Job Performance and Openness to Job Performance relationships. The theoretical and practitioner contributions, limitations and areas for further study were also presented.

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