EFFECT OF JOB SATISFACTION ON ORGANIZATIONAL COMMITMENT

Azman ISMAIL
Universiti Kebangsaan Malaysia
Email: azisma08@gmail.com

Mohd Ridwan ABD RAZAK
Universiti Kebangsaan Malaysia
Email: mohdridwan76@gmail.com

Abstract:
The purpose of this research is to evaluate the association between job satisfaction and organizational commitment. This research was conducted at Fire and Rescue Department of Malaysia. The findings of this research discovered three significant findings. These are, job satisfaction was significantly associated with organizational commitment, intrinsic satisfaction was significantly associated with organizational commitment, and extrinsic satisfaction was significantly associated with organizational commitment. This findings confirms that when employees satisfied with intrinsic satisfaction and extrinsic satisfaction from his or her job condition may lead to greater organizational commitment in the studied organizations. Further, this research offers discussion, implications and conclusion are presented in the succeeding sections.

Keywords: job satisfaction, intrinsic satisfaction, extrinsic satisfaction, organizational commitment.

1. Introduction
Job satisfaction is a crucial issue that has been discussed in many organizations (James et al., 2007; Ipek, 2009; Miguel et al., 2014). It is often defined as employees’ positive emotional, resulting from his or her evaluations towards their job situations and job experiences (Jacob et al., 2010; Nick, 2012; Davis & Thomas 2012; Dimitrios et al., 2015; Hyun-Woo et al., 2015) and employees' attitudes towards his or her working conditions or environments that is influenced by perceived relationship between what he or her want and what perceive offering by the organization (Kasim & Ghaffar, 2012; Nahid 2012; Damiano & Nunzia, 2014). Research by various scholars such as Loreta & Aukse (2009), Patrick et al. (2009); Elizabeth & Zakkariya, (2015), Dimitrios et al., (2015), Linda & Michael (2014), revealed that employees who are gratified with his or her job are more likely to prove a worthy attitude and contributed more efforts to share his or her skill and knowledge with the organization.

According to many scholars, job satisfaction has been given more attention in today's organization because job satisfaction will help organization to retain experienced, trained and competent employees (Ahmad et al., 2012; Damiano & Nunzia, 2014; Elizeberth & Zakkariya,
2015; Nanjundeswaraswamy, 2013; Abu, 2013; Sarlaksha & Mangadu, 2014; Chih-Cheng et al., 2015). In addition, job satisfaction enhances the level of motivation among employees and its direct impact on the quality of the job and productivity level of employees (Ahmad et al., 2012; Seema & Maryam, 2013; Aaron et al., 2015). Additionally, job satisfaction creates loyalty, confidence and commitment to the organization (Kasim & Ghaffar, 2012). It’s led to the improvement of productivity and avoid negative behavior such as absenteeism and turnover (Linda & Michael, 2014).

An analysis of current literature pertaining organizational behavior, highlights that job satisfaction has two salient features: intrinsic satisfaction and extrinsic satisfaction (Kasim & Ghaffar, 2012; Ahmad et al., 2012; Elizabeth & Zakkariya, 2015). According to many scholars such as Ning-Kuang et al. (2009) Ahmad et al., (2012), Seyed & Fatemeh, (2011) and Nanjundeswaraswamy (2013) broadly define intrinsic satisfaction as the situation where employees acquire job satisfaction from internal jobs factor. It also refers to the motivation factors (recognition, achievement, opportunity to use and develop human capacities, advancement and responsibility). If an employee satisfied with these, they will be motivated to do their job effectively and efficiently. But, if an employee did not satisfy with these, they will be demotivated and leads to the inefficient and ineffective in doing their job (Ning-Kuang et al., 2009; Ahmad et al., 2012; Seyed & Fatemeh, 2011). In contrast, extrinsic satisfaction is often defined as external job factors and working environment that affecting employee attitudes and behavior. Extrinsic satisfaction is also called as hygiene factors, where it refers to compensation, interpersonal relations, supervision, policy and administration, safe and healthy, the opportunity for continued growth, social integration, constitutionalism in the work organization, work and total life space, social relevance of work life, status and job security (Nanjundeswaraswamy, 2013; Elizabeth & Zakkariya, 2015). If an employer’s failed to create good work related factors and working environment, employees will not satisfy with his or her work. In contrary, if an employer implements good working environment, employees tend to be motivated in doing their job (Ning-Kuang et al., 2009; Kasim & Gharfar, 2012; Seyed & Fatemeh, 2011).

Unexpectedly, existent studies in job satisfaction reveal that an employees satisfied with intrinsic satisfaction and extrinsic satisfaction, this may lead an enhanced organizational commitment (Ebru et al., 2010; Baek-Kyoo & Joo, 2010; Chih-Cheng et al., 2015; Dimitrios et al., 2015; Hyun-Woo et al., 2015; Kasim & Ghaffar, 2012; Linda & Michael, 2014; Matthew et al., 2012). In an organizational behavior perspective, organizational commitment is often defined as the level of employees’ feeling of responsibility towards the organization (Baek-Kyoo & Joo, 2010; Ebru et al., 2010; Hyun-Woo et al., 2015; Kasim & Ghaffar, 2012). In addition, according to Davis & Thomas (2012), Dimitrios et al. (2015) and Matthew et al. (2012) described organizational commitment as a psychological attachment that created a remarkable relationship between an employee and the organization. Furthermore, according to Elizeberth & Zakkariya (2015), Armenio & Miguel (2008), Nahid (2012) and Hyun-Woo et al. (2015), organizational commitment has three components as follows: first,
affective commitment (i.e. emotional connection to the organization). Second, continuance commitment (i.e. perceived costs associated with leaving the organization). Third, normative commitment (i.e. feeling of obligation towards organization).

Within a job satisfaction model, many scholars assume that intrinsic satisfaction, extrinsic satisfaction and organizational commitment are distinct constructs, but highly interrelated. For example, the ability of administrators to provide high order job satisfaction (i.e., intrinsic and extrinsic satisfactions) may lead to high level of organizational commitment (Chih-Cheng et al., 2015; Hyun-Woo et al., 2015; Linda & Michael, 2014; Kasim & Ghaffar, 2012; Ahmad et al., 2012; Dev et al., 2011; Dev & Dhruba, 2010). Therefore, it motivates the researchers to fill in the gap of literature by quantifying the effect of administration of job satisfaction on organizational commitment.

2. Purpose Of The Research
This research has two objectives as follows: firstly, to examine the relationship between intrinsic satisfaction and organizational commitment. Secondly, to examine the relationship between extrinsic satisfaction and organizational commitment.

3. Literature Review
3.1. Job satisfaction and organizational commitment
Many previous studies used a direct effects model to examine the relationship between job satisfaction and organizational commitment using different samples, such as 621 employees from various sectors in Belgium (Caroline et al., 2015), 327 employees from a social work organization (Jonathan et al., 2010), 214 individual from 22 non-profit organizations in a Midwestern State of the USA (Hyenjin et al., 2012) and 730 employees from retail sectors (Miguel et al., 2014). These studies found that the ability of managers to appropriately provide what employees want in the working environment had been an important determinant of organizational commitment (Caroline et al., 2015; Jonathan et al., 2010; Hyenjin et al., 2012; Miguel et al., 2014). Thus, it was hypothesized that:

H1: There is a positive relationship between job satisfaction and organizational commitment.

3.2. Intrinsic satisfaction and organizational commitment
Several recent studies were conducted using a direct effects model to research intrinsic satisfaction based on different samples, such as perceptions of 434 graduate and postgraduate distance learning students (Enache et al., 2013), 337 bank employees from private and public banks in Kerala, India (Elizerberth & Zakkariya, 2015), 352 nurses form private hospital in Damascus, Syria (Ali & William, 2014) and 180 critical nurses from three hospital in Amman, Jordan (Ahmad et al., 2012). These studies found that the ability of an organization’s administrator to providing employee’s intrinsic satisfaction had been an important determinant of intrinsic satisfaction (Enache et al., 2013; Elizerberth & Zakkariya, 2015; Ali & William, 2014; Ahmad et al., 2012). Thus, it was hypothesized that:

H1a: There is a positive relationship between intrinsic satisfaction and organizational commitment.
satisfaction and organizational commitment.

3.3. Extrinsic satisfaction and organizational commitment.
Further extant studies used a direct effects model to examine the relationship between extrinsic satisfaction and organizational commitment using different samples, such as 108 managers of four and five stars hotels in Aegean region of Turkey (Ebru et al., 2010), 418 police officers from Korean National Police Agency (Matthew et al., 2012), 547 members of Institute of Certified Public Accountants of Uganda (ICPAU) (Samuel & Twaha, 2014) and 200 fresh graduates in Malaysia who has been employed for less than two years (Mazuki et al., 2011). These studies found that the ability of organization’s administrator to properly design and administer job related and working environment that provide extrinsic satisfaction to the employees had increased employee’s commitment to the organization (Ebru et al., 2010; Matthew et al., 2012; Samuel & Twaha, 2014; Mazuki et al., 2011). Thus, it was hypothesized that:

H1b: There is a positive relationship between extrinsic satisfaction and organizational commitment.

4. Methodology
4.1. Research Design
A cross-sectional research design was used in this research in order to allow the researcher to combine the literature of job satisfaction and the actual survey as a key procedure to collect data. Utilizing this data collection method may assist the researcher collect precise data, minimize bias and enhance quality of data being collected (Cresswell, 1998; Sekaran, 2003). This research was conducted at Malaysian fire and rescue departments. At the early stage of this research, a survey questionnaire was prepared based on the job satisfaction literature. After that, a back translation method was used to translate the survey questionnaires into English and Malay versions in order to intensify the validity and reliability of the research findings (Cresswell, 1998; Sekaran, 2003).

4.2. Measures
The survey questionnaire consists of three parts: first, intrinsic satisfaction had three items adapted from job satisfaction literature (Ahmad et al., 2012; Elizeberth & Zakkariya, 2015; Jacob et al., 2010). Second, extrinsic satisfaction had five items adapted from job satisfaction literature (Patrick et al., 2009; Ahmad et al., 2012; Elizeberth & Zakkariya, 2015). Finally, organizational commitment had five items adapted from organizational commitment literature (Appelbaum, 2013; Elizeberth & Zakkariya, 2015; Nick, 2012). All these items were determined using a 7-item scale stretching from “strongly disagree/dissatisfied” (1) to “strongly agree/satisfied” (7). Demographic variables were employed as controlling variables because this research emphasizes on employee attitudes.

4.3. Sample
This research employed a convenient sampling techniques to collect 100 usable survey questionnaires from the employees who work at different job categories and levels in the organizations. This sampling technique was applied because the management of the organization had not given the list of their employees to the researchers and this situation prevent the researchers
to use a random technique in choosing respondents for this research. The survey questionnaires were answered by participants based on their consents and on a voluntary basis.

4.4. Data Analysis

The SmartPLS was used to evaluate the validity and reliability of the instrument and test the research hypotheses. The major advantage of utilizing this method may provide latent variable scores, prevent small sample size problems, assess every complex model with many latent and manifest variables, hassle stringent assumptions about the distribution of variables and error terms, and handle both reflective and formative measurement models (Henseler & Chin, 2010; Ringle et al., 2005). The SmartPLS path model was used to evaluate the path coefficients for the structural model utilizing the standardized beta (β) and t statistics. The value of R² is used as an indicator of the overall predictive strength of the model. The value of R² is considered as follows: weak (0.19), moderate (0.33) and substantial (0.67) (Henseler & Chin, 2010; Chin, 2001). As an additional assessment of model fit in PLS analysis, we carried out a test of predictive relevant using blindfolding (Q² statistic) as suggested by Geisser (1975) and (Stone, 1974). According to Chin (2001), the Q² statistic is a jackknife version of the R² statistic. It represents a measure of how well observed values are reconstructed by the model and its parameter estimates. Model with Q² greater than zero are considered to have predictive relevant. The value of Q² is considered as follows: 0.02 (small predictive relevance for an endogenous construct), 0.15 (medium predictive relevance for an endogenous construct), and 0.35 (large predictive relevance for an endogenous construct) (Hair et al., 2014).

5. Findings

5.1. Sample Profile

Table 1 presents that majority of respondents were males (84%), ages from 25 to 34 years old (51%), Malaysia Certificate of Education holders (70%), clerical and supporting staff (65%), working experiences from 5 to 14 years (40%), permanent staff (99%), monthly salary between Malaysian Ringgit RM2500 to 3999 (49%), and married employees (75%).

<table>
<thead>
<tr>
<th>Respondent characteristic (n = 100)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respondent</strong></td>
<td><strong>Sub Profile</strong></td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
</tr>
<tr>
<td></td>
<td>Female</td>
</tr>
<tr>
<td>Age (years)</td>
<td>&lt; 25</td>
</tr>
<tr>
<td></td>
<td>25 – 34</td>
</tr>
<tr>
<td></td>
<td>35 – 44</td>
</tr>
<tr>
<td></td>
<td>45 – 54</td>
</tr>
<tr>
<td></td>
<td>&gt; 55</td>
</tr>
<tr>
<td>Education Level</td>
<td>LCE / SRP</td>
</tr>
<tr>
<td></td>
<td>MCE / SPM</td>
</tr>
<tr>
<td></td>
<td>HSC / STPM</td>
</tr>
<tr>
<td></td>
<td>Diploma</td>
</tr>
</tbody>
</table>
5.2. Validity and Reliability of the Instrument

The results of confirmatory factor analysis are presented in Tables 2 and 3. Table 2 presents the results of convergent and discriminant validity analysis. All constructs had the values of AVE higher than 0.5, representing that they had met the acceptable standard of convergent validity (Barclays et al., 1995; Fornell & Larcker, 1981; Henseler & Chin, 2010). Furthermore, all constructs had the values of heterotrait-monotrait ratio were less than critical values of 0.85, indicating that the constructs met the validity discriminant criterion (Henseler & Chin, 2010; Fornell & Larcker, 1981; Barclays et al., 1995).

Table 3 present the validity and reliability of all constructs. The association between items and factors had higher loadings than other items in the different constructs, as well as the loadings of variables were larger than 0.70 in their own constructs in the...
model are considered adequate (Henseler & Chin, 2010). In addition, the values of composite reliability for all constructs were larger than 0.80, representing that the instrument used in this research had high internal consistency (Henseler & Chin, 2010; Nunally & Bernstein, 1994).

### Table 2

**The Results of Convergent and Discriminant Validity Analysis**

<table>
<thead>
<tr>
<th>Construct</th>
<th>AVE</th>
<th>Intrinsic Satisfaction</th>
<th>Extrinsic Satisfaction</th>
<th>Organizational Commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrinsic Satisfaction</td>
<td>0.613</td>
<td>0.783</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extrinsic Satisfaction</td>
<td>0.519</td>
<td>0.650</td>
<td>0.774</td>
<td></td>
</tr>
<tr>
<td>Organizational Commitment</td>
<td>0.592</td>
<td>0.533</td>
<td>0.598</td>
<td>0.769</td>
</tr>
</tbody>
</table>

### Table 3

**The Results of Factor Loadings and Cross Loadings for Different Constructs, and Composite Reliability**

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Cross Factor Loading</th>
<th>Composite Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrinsic Satisfaction</td>
<td></td>
<td>0.826</td>
</tr>
<tr>
<td>1) The amount of responsibility you are given.</td>
<td>0.768</td>
<td></td>
</tr>
<tr>
<td>2) The attention paid to suggestions you make.</td>
<td>0.803</td>
<td></td>
</tr>
<tr>
<td>3) The variety in your job.</td>
<td>0.776</td>
<td></td>
</tr>
<tr>
<td>Extrinsic Satisfaction</td>
<td></td>
<td>0.882</td>
</tr>
<tr>
<td>1) The physical working condition.</td>
<td>0.743</td>
<td></td>
</tr>
<tr>
<td>2) The recognition you get for good work.</td>
<td>0.750</td>
<td></td>
</tr>
<tr>
<td>3) Your immediate supervisor.</td>
<td>0.828</td>
<td></td>
</tr>
<tr>
<td>4) The way your organization is managed.</td>
<td>0.830</td>
<td></td>
</tr>
<tr>
<td>5) Your job security.</td>
<td>0.711</td>
<td></td>
</tr>
<tr>
<td>Organizational Commitment</td>
<td></td>
<td>0.879</td>
</tr>
<tr>
<td>1) I enjoy discussing about my organization with</td>
<td>0.715</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.757</td>
<td></td>
</tr>
</tbody>
</table>
2) This organization has a great deal of personal meaning to me.
3) It would be very hard for me to leave my organization right now, even if I wanted to.
4) I am loyal to this organization because my values are largely its values.
5) This organization has a mission that I believe in and am committed to.

0.774
0.803
0.794

5.3. Analysis of the Constructs
Table 4 presents the results of Collinearity and Descriptive Statistics. The means for all constructs were from 5.10 to 5.17, signifying that majority respondents perceived that the levels of intrinsic satisfaction, extrinsic satisfaction and organizational commitment stretching from high (4) to highest level (7) in the organizations. Whereas, the values of VIF for the association between the independent variable (i.e., intrinsic satisfaction and extrinsic satisfaction) and the dependent variable (i.e., organizational commitment) were less than 5.0, signifying that the data were not affected by serious collinearity problem (Hair et al., 2014). These findings further prove that the instrument employed in this research has met the satisfactory standards of validity and reliability analysis.

Table 4
The Results of Collinearity and Descriptive Statistics

<table>
<thead>
<tr>
<th>Construct</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Variance Inflation Factor (VIF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrinsic Satisfaction</td>
<td>5.10</td>
<td>.58</td>
<td>1.732</td>
</tr>
<tr>
<td>Extrinsic Satisfaction</td>
<td>5.15</td>
<td>.58</td>
<td>1.732</td>
</tr>
<tr>
<td>Organizational Commitment</td>
<td>5.17</td>
<td>.59</td>
<td></td>
</tr>
</tbody>
</table>
5.4. Outcomes of Testing Hypotheses 1

Figure 1 presents the findings of testing a direct effect model using SmartPLS path model. The value of $R^2$ was employed as an indicator to the overall predictive strength of the model. The value of $R^2$ was deemed as follows: 0.19 (weak), 0.33 (moderate), and 0.67 (substantial) (Henseler & Chin, 2010; Chin, 1998). This model shows that the inclusion of job satisfaction in the analysis had explained 39 percent of the variance in the dependent variable. Specifically, the results of testing the research hypothesis showed that job satisfaction is significantly correlated with organizational commitment ($\beta = 0.628; t = 7.765$), thus $H1$ is supported. Therefore, the result confirms that job satisfaction is as an important determinant of organizational commitment.

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Satisfaction</td>
<td>Organizational Commitment</td>
</tr>
<tr>
<td>$\beta = 0.628$ ($t = 7.765$)</td>
<td>$R^2 = 0.394$</td>
</tr>
</tbody>
</table>

As an extension, a test of predictive relevance for the reflective endogenous latent variable was further conducted based on Stone-Geisser's formula: $Q^2 = Q^2_{included} - Q^2_{excluded} / 1 - Q^2_{included} = 0.216$, indicating that it was greater than zero for the reflective endogenous latent variable. This result has predictive relevance.

5.5. Outcomes of Testing Hypotheses 1a and 1b

Figure 2 presents the results of testing a direct effect model using SmartPLS path model. The value of $R^2$ was used as an indicator to the overall predictive strength of the model. The value of $R^2$ was deemed as follows: 0.19 (weak), 0.33 (moderate), and 0.67 (substantial) (Henseler & Chin, 2010; Chin, 1998). This model shows that the inclusion of intrinsic satisfaction and extrinsic satisfaction in the analysis had explained 39 percent of the variance in the dependent variable. Specifically, the results of testing the research hypothesis showed two significant findings as follows: first, intrinsic satisfaction is significantly associated with organizational commitment ($\beta = 0.248; t = 2.673$), thus $H1a$ is supported. Second, extrinsic satisfaction is significantly associated with organizational commitment ($\beta = 0.437; t = 4.222$), thus $H1b$ is supported. Therefore, the result confirms that intrinsic satisfaction and extrinsic satisfaction is as an important determinant of organizational commitment.
Further, a test of predictive relevance for the reflective endogenous latent variable was further conducted based on Stone-Geisser's formula: 

\[ q^2 = Q^2_{\text{included}} - Q^2_{\text{excluded}} / 1 - Q^2_{\text{included}} \]

\[ q^2 = 0.210 \]

indicating that it was greater than zero for the reflective endogenous latent variable. This result has predictive relevance.

6. Discussion and Implications

The findings of this research prove that job satisfaction highly associate with organizational commitment in the studied organizations. In the context of this research, administrators focus on matters related to employee job satisfaction. Majority respondents view that the levels of intrinsic satisfaction, extrinsic satisfaction and organizational commitment are high. This situation posits that the capability of administrators to provide sufficient intrinsic satisfaction and extrinsic satisfaction may enhance employee commitment to support organizational goals and strategies.

This research offers three main implications: theoretical contribution, robustness of research methodology, and practical contribution. In terms of theoretical contribution, the findings of this research have provided great potential for understanding the intrinsic satisfaction and extrinsic satisfaction in strengthening employees’ commitments of the organizations studied. This result also has supported and extended studies by Ebru et al. (2010), Darwish (2002), Darwish (2000), Bael-Kyoo & Joo (2010), Ahmad et al. (2012), Dev et al. (2011) and Dev & Dhruba (2010).

With respect to the robustness of research methodology, the survey questionnaire employed in this research had adequately met the standards of validity and reliability analyses. This situation could lead to produced precise and reliable research findings.

In regard with the practical contribution, the findings of this research can be used as guidelines by practitioners to enhance the effectiveness of the administration of employee job satisfactions. This objective may be realized if
management pays attention to the following aspects: first, the factors influencing employees’ job satisfaction should identify properly in line with the current situation and employee’s expectations. Improvement in this aspect may help employees to acquire prodigious satisfaction in their job and motivate them to continually support their organizations’ agenda. Second, training content and methods should be updated by concentrating on strengthening administrators’ creativity and problem-solving skills. These skills may stimulate administrators to use intellectuals in executing daily job, respect employees’ needs, upgrade employees’ potentials to reach a better career, learn new problem-solving strategies and share the organization interests with employees. Consequently, it may enhance the capacity of administrators to practice comfortable interaction styles in resolving employees’ complaints, demands and needs. Finally, job satisfaction should be used as an important instrument to develop employees’ potentials and talents. For examples, administrators need to identify employees’ needs, provide material and moral support in building employee’s capabilities, and suggest unconventional ways to improve employees’ wellbeing in the workplace. If these suggestions are heavily considered this may motivate employees to improve their productivity and contribute prodigious commitment to the organization.

7. Conclusion
This research confirms that the ability of administrators to provide intrinsic satisfaction and extrinsic satisfaction in managing employees’ job satisfaction has motivated employees to strengthening employees’ commitments of the organizations studied. This finding has also strengthened and widened job satisfaction research literature, mostly published in western. Thus, current research and practice within job satisfaction model needs to consider the intrinsic satisfaction and extrinsic satisfaction as key driving forces of the job satisfaction domain. This research further suggests that the ability of administrators of the organization to appropriately provide employees’ job satisfaction will strongly induce positive subsequent employee outcomes (e.g., productivity, performance and commitment). Further, these positive outcomes may lead to maintain and supported organizational competitiveness in a global economy era.

This research has some limitations: first, this research is only conducted in Malaysia Fire and Rescue Department. These limitations may decrease the ability or generalizing the results of this research to other organizational settings. Second, this research using cross-sectional research design to gather data at one point of time within one period research. Therefore, it did not capture the developmental issues such as causal connections between variables. Third, this research using a direct effect model to demonstrate the relationship between independent variables and a dependent variable without testing the effects of moderating or mediating variable. Fourth, this research employed a small number of samples and it is exposed to the bias issues.

Future research may improve if researcher consider the following suggestions: first, the findings of this research may produce different results
if this research done in more than one organization. Second, the weaknesses of cross-sectional research design may be overcome by using longitudinal research design to collect data and describe the patterns of change and the direction and magnitude of causal relationships amongst variable. Third, mediating and moderating variables may influence the relationship between independent and dependent variable. Thus, it is recommended to conduct further research and introducing mediating or moderating variable into present model. Fourth, it is recommended to conduct further research using larger sampling to represent the population in order to reduce the biases.

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