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**Article**

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## MANAGEMENT | RESEARCH ARTICLE

# The mediating role of the aesthetic experience between transformational leadership and innovation

Youngkeun Choi<sup>1\*</sup>

**Abstract:** The purpose of this study is to examine the relationship between transformational leadership types and the motivation of software engineers. This study uses full range of leadership as a major theory and investigate how transformational leadership types influence the innovative behaviors of software developers by using a mediator of aesthetic experience. For this, this study surveys 352 software developers working at 35 companies in Korea and analyzes the data using AMOS 24. In the results, first, charisma, inspirational motivation, intellectual stimulation, and individualized consideration increase the aesthetic experience of software developers. Second, the aesthetic experience of software developers affects their innovative behaviors positively. Finally, intellectual stimulation and individualized consideration increase the innovative behaviors of software developers through their aesthetic experience. For theoretical contributions, this study has contributed to academic research by producing the empirical evidence to support the theories of leadership and the innovation of software developers and by confirming the applicability of the theory of aesthetic experience in organization research to explain users' psychological and behavioral reactions to the technological activities.

## ABOUT THE AUTHOR

Youngkeun Choi has published peer-reviewed articles in the areas of social psychology, organizational behavior and management information system. He has conducted assessments and empirical analysis with employees. The information in the current perspective article is important for workplace leadership and innovation. Transformational leadership affect the innovative behaviors of software developers through their aesthetic experience.

## PUBLIC INTEREST STATEMENT

Given the importance of organizational issues to motivate software developers, this study will investigate the relationship between leadership types and the innovative behaviors of software developers. Leaders may influence followers' aesthetic experience by encouraging followers to think critically by using novel approaches, involving followers in decision-making processes, inspiring loyalty, while recognizing and appreciating the different needs of each follower to develop his or her personal potential. This study examines the relationship between transformational leadership types and the motivation of software engineers. In the results, first, charisma, inspirational motivation, intellectual stimulation, and individualized consideration increase the aesthetic experience of software developers. Second, the aesthetic experience of software developers affects their innovative behaviors positively. Finally, intellectual stimulation and individualized consideration increase the innovative behaviors of software developers through their aesthetic experience.

For managerial implications, the managers in software development companies can understand leadership issues for motivating software developers in the perspective of aesthetic experience.

**Subjects:** Work & Organizational Psychology; Business, Management and Accounting; Human Resource Management

**Keywords:** Transformational leadership; aesthetic experience; innovative behavior

## 1. Introduction

In the area of software engineering, motivation models have been used in a classical way as described by operations managers and management scientists. That is, it is possible to explore the possible consequences of an action before taking action, or to use the model as an embedded part of a system that supports routine decision-making (Checkland, 1981; Madni & Sievers, 2018; Shahri et al., 2019).

Relevant research focuses primarily on personal issues that affect the motivation of software developers and focuses on the motivation of open source developers to do voluntary actions and work on small teams (Couger & Ishikawa, 1995; Hertel et al., 2004). However, in reality, most software developers work in large organizations rather than small teams, so they need to manage by organization rather than take voluntary actions. Therefore, the organizational problem of the motivation of software developers cannot be over emphasized. And most studies have suggested sales as a major result of motivated or less motivated software developers, but some studies have reported that productivity improvements or quality improvements are affected by motivational developers (Beecham, Baddoo, Hall, Robinson, & Sharp, 2008; Shahri et al., 2019). However, because of the constant changes in the market and technology of the software industry, software companies were able to think of various ways and strategies for gaining competitive advantage in the market, so innovation should be considered by software companies as a way of competitive advantage. At the heart of every organizational innovation is a unique idea, created and promoted, discussed, modified and realized by an individual or group of individual employees (Lenberg & Feldt, 2018; Scott & Bruce, 1994). As a result, software companies must drive innovative behavior for software developers.

And, some of the key process activities of software engineering require a lot of team effort, group discussion and innovation. Leaders may influence followers' aesthetic experience (AE) by encouraging followers to think critically by using novel approaches, involving followers in decision-making processes, inspiring loyalty, while recognizing and appreciating the different needs of each follower to develop his or her personal potential. Organizational theorist Chester Barnard (1938) said that organizational research adopted a scientific realistic approach, although management was not as logical and better described in terms such as emotion, judgment, and sensation. Efficiency search. Ottensmeyer (1996) pointed out that although we aesthetically experienced and commented on the organization consistently, it did not approach it that way academically. Recognizing that aesthetic meanings are around us in our daily lives and relying on aesthetic meanings that lead to behaviors, thoughts, and actions as we rely on rational, logical, and instrumental reasoning, we also recognize that aesthetic meanings are popular in the work environment (Nuttavuthisit, 2014). We create all sorts of meanings based on our sensory experience of life, and our organization is rich in aesthetics, but it is largely lacking in organizational research (Strati, 1999, 2000a, 2000b, 2000c).

Given the importance of organizational issues to motivate software developers, this study will investigate the relationship between leadership types and the innovative behaviors of software developers. In particular, this study will explore the mediating role of aesthetic experience between transformational leadership types and the motivation of software engineers. Researches have shown how leadership styles can influence innovation in firms (Gumusluoglu &

Ilsev, 2009; Nemanich & Keller, 2007; Rosing, Frese, & Bausch, 2011). This discovery supports the need for corporate leaders to meet the needs of innovation in their leadership style and to increase the likelihood of optimal success. There has been research on the relationship between leadership style and innovation, but research has not covered everything. Matzler, Schwarz, Deutinger, and Harms (2008) pointed out that research opportunities exist in understanding the relationship between leadership style and innovation in various industries, such as the commercial software industry. Given the high failure costs and high innovation spending costs of a commercial software company (Jaruzelski & Dehoff, 2008), researching the relationship between leadership and innovation in commercial software companies can benefit the industry (Creswell, 2005; Gollar, 2012).

This study will suggest some important theoretical contributions. First, this study will contribute to academic research by producing the empirical evidence to support the theories of leadership and the innovation of software developers. Second, this study will represent one of the first attempts to systematically examine the role of aesthetic experience in the software engineering context and incorporate aesthetic experience into the innovation model. The study will also provide significant managerial implications. Namely, top managers in software development companies will be able to understand leadership issues by motivating software developers to avoid barriers and increase the likelihood of getting the results they want.

This study organizes the article as follows: based on previous research on aesthetic experience, this study will develop the research hypotheses for this study. Then, this study will present details regarding the method and specifications of the hypothesis testing with structural equations modeling using data of a customer survey. This is followed by an overview and discussion of the results. Finally, this study will conclude with a summary of the findings outlining implications and limitations of the current study.

## 2. Theoretical background

The theoretical framework of this study is the FRL (full range leadership) framework and instrument developed by Bass and Avolio (1994, 1995). FRL distinguishes three groups of leaders that leaders can appear: innovative leadership, trades, and laissez-faire. In this study, I focus on transformational leadership for two main reasons. First, many empirical studies have shown that transformational leadership is positively related to the same job-related attitudes and behaviors of the same job satisfaction, employee commitment, trust, job performance, and low turnover (Avolio, Gardner, Walumbwa, Luthans, & May, 2004). Second, innovative leadership has been scrutinized more thoroughly in organizational science literature than all other leadership theories of the last two decades (Lowe & Gardner, 2000). Therefore, there is a knowledge system that can draw the hypotheses.

Bass & Avolio's conceptualization (1994) of transformational leadership comprises four components: charisma, inspirational motivation, intellectual stimulation, and individualized consideration. Charismatic leaders gain respect, pride, trust, and confidence of their followers by transmitting a strong sense of vision and mission (Gardner & Avolio, 1998). They excite, arouse, and inspire their followers such that the relationship between the leader and follower is based on personal understanding as opposed to formal, institutional rules, regulations, rewards, or punishments (Bass, 1985a). Their communication style is effective because it encompasses powerful nonverbal tactics that mobilize followers into action by linking current behaviors to past events (Shamir, House, & Arthur, 1993). Inspirational motivation is concerned with a leader's setting higher standards, thus becoming a sign of reference (Bass, 1985b). Inspirational leaders behave in ways that motivate and inspire those around them by providing meaning and challenge to followers' work (Bass, 1985b). Intellectually stimulating leaders challenge followers to think critically. They provide followers with challenging new ideas and encourage them to break away from old ways of thinking (Avolio, 1999). This charge to seek new ways to approach their jobs motivates followers to become more involved in their jobs, resulting in higher levels of performance, commitment, and satisfaction (Avolio et al., 2004). Individualized consideration involves developing

followers by coaching and mentoring (Bass & Avolio, 1994). A leader displaying individualized consideration pays special attention to each individual's abilities, aspirations, and needs to enhance followers' confidence in responding to problems facing them and their organizations (Avolio et al., 2004).

The theory of AE, developed by Dewey (1934), suggests that AE is a pathway to finding meaningful connections that should not be confined to personal interests and behavior-museum experiences that are highly respected and distant arts experiences (Hyun, Park, Ren, & Kim, 2018; Nardi, 2010). AE can occur in everyday life and should be understood as more than a sensory experience such as visual beauty or sensory stimulation (Bronowski, 1978). Sandelands and Buckner (1989) argue that a work can have similar characteristics to art, and that these characteristics can function similarly to AE. Taylor (2002) argues that organizational management practices require managers to consider employees "AEs in a way that creates work-related activities and creates meaning for employees' personal lives. Although the concept of AE was developed in the arts and philosophy area, the scientific value explaining the mechanism of capturing and engaging in innovation has been reported in a variety of fields such as game research (Nardi, 2010), Human-computer interaction (Jennings, 2000), marketing (Nuttavuthisit, 2014). This study acknowledged that AE reflects a user's state of mind that is essential for positive computer-human interactions and that understands the implications of interacting with information systems (McCarthy & Wright, 2004).

Based on existing literature on AE, I identify three dimensions that define AE: meaning, self-expansion, and active discovery. First, meaning refers to the extent to which an individual comes to understand the meaning of an activity. AE reflects a state of mind that focuses on the intentional domain of action to achieve the intended outcome (Bronowski, 1978). AE is defined by the perception of the relationship between work environment and self. In the AE state, people are constantly aware of the context in which a given task is performed. Second, self-expansion, refers to the extent to which an individual's sense of self has expanded by knowing things or broadening his or her perspective. AE extends beyond specific moments, reflecting a sense of accomplishment that can be felt even after the experience ends. AE is represented by the ongoing evolution of experience (Beardsley, 1970). Third, active discovery refers to the extent to which an individual feels he or she is actively seeking answers or resolutions to cognitive challenges to achieve his or her personal goals. AE is manifested by self-awareness in the process of being accomplished through the medium of action (Jennings, 2000). In the AE state, people feel that they are actively discovering new ways of doing activities and exercising their power to solve environmental problems (Jennings, 2000). Thus, AE reflects the individual's perception of how to proceed and what is considered to be the realization of the goals and objectives pursued within the information system.

### 3. Hypotheses development

Transformational leadership theory emphasizes the role of empowerment as a central mechanism of building commitment to the organization's objectives (Avolio, 1999; Bass, 1999; Yukl, 1998). Lowe, Kroeck, and Sivasubramaniam (1996) argued that transformational leaders transform their followers' aspirations, identities, needs, preferences, and values such that followers are able to reach their full potential. Followers of transformational leaders are expected to identify with their leaders and therefore are expected to have greater feelings that they can have an impact on their organization, through enhancements to their psychological empowerment (Laschinger, Finegan, & Shamian, 2001). In a software engineering context, charisma encourages developers to set new goals and encourages them to challenge harder tasks through which developers feel a sense of self-expansion. The theory of AE suggests that a strong sense of self-expansion that balances the self and the object is essential to AE (Bronowski, 1978; Kerviler de & Rodriguez, 2019). Accordingly, the greater charisma, the more meaningful the engagement will be. Therefore, leaders' charisma is likely to play a role in S/W developers' AE. Thus, I make the following hypothesis.

*H1-1 Charisma will affect software developers' AE positively.*

Transformational leaders get followers involved in envisioning an attractive future and inspire them to be committed to achieving that future. They build team spirit through their enthusiasm, high moral standards, integrity, and optimism and provide meaning and challenge to their followers' work, enhancing followers' level of self-efficacy, confidence, meaning, and self-determination. Indeed, previous studies suggest that followers or employees who work with leaders exhibiting high moral standards and expectations, integrity, and optimism feel more comfortable and empowered to do the activities required for successful task accomplishment (Avolio, 1999; Bass & Avolio, 1994; Filstad, Traavik, & Gorli, 2019; Luthans & Avolio, 2003; Walumbwa, Avolio, Luthans, May, & Gardner, 2004). In a software engineering context, when developers understand why they should be committed to achieve that future, they perceive their interaction with the leaders to be meaningful. Accordingly, the greater S/W developer feels inspirational motivation, the more meaningful engagement he or she will experience. Therefore, leaders' inspirational motivation is likely to play a role in S/W developers' AE. Thus, I make the following hypothesis.

*H1-2 Inspirational motivation will affect software developers' AE positively.*

Transformational leaders also use intellectual stimulation to challenge their followers' thoughts and imagination, creativity, and recognition of their values, beliefs, and mindset. This involves leaders getting their followers to re-examine traditional ways of doing things, while encouraging them to try novel and creative approaches to solving problems and performing work (Bass & Avolio, 1994). Such leaders focus on coaching and mentoring followers to prepare them to assume more responsibility, and ultimately to develop followers into leaders (Bass, 1985b; Yukl, 1998). Through the use of feedback, encouragement, and support, a follower's belief in his or her capability to perform activities is expected to be enhanced (Hughes, Ginnett, & Curphy, 1999; Rahman, Mannan, Hossain, Zaman, & Hassan, 2018). In a software engineering context, this intellectual stimulation supports developers' sense of self-efficacy by stimulating them to seek answers or resolutions actively to cognitive challenges to achieve their personal goals. Accordingly, the greater S/W developer feels intellectual stimulation, the more meaningful engagement he or she will experience. Therefore, leaders' intellectual stimulation is likely to play a role in S/W developers' AE. Thus, I make the following hypothesis.

*H1-3 Intellectual stimulation will affect software developers' AE positively.*

Transformational leaders exhibit individualized consideration by listening attentively and paying close attention to their followers' needs for achievement and growth by acting as mentors or coaches, while encouraging them to take on increasingly more responsibilities in order to develop their full potential (Avolio, 1999; Bass & Avolio, 1994; Kark & Shamir, 2002). In a software engineering context, providing developers with greater opportunities for decision latitude, challenges, responsibility, as well as self-determination, is expected to result in developers who are more likely to reciprocate with higher levels of meaningful engagement. Accordingly, the greater S/W developer feels individualized consideration, the more meaningful engagement he or she will experience. Therefore, leaders' individualized consideration is likely to play a role in S/W developers' AE. Thus, I make the following hypothesis.

*H1-4 Individualized consideration will affect software developers' AE positively.*

Individual innovations operate in a variety of ways. For example, composition has been thought in terms of personality traits (Hurt, Joseph, & Cook, 1977). Others took a behavioral perspective (Janssen, 2000). According to Midgley and Dowling (1978), an individual's innovation is the



individual's openness to new ideas and decisions to adopt innovation without being influenced by the experience of other employees. This definition provides a more accurate interpretation of innovativeness because it is intuitively and directly presented in this study. Individual speaking and innovation begins with activities with employees who come up with new ideas. Ideas often come from resolving absurdities and discontinuities in the workplace (Kanter, 1988). Scott and Bruce (1994) defined individual innovative behaviors through the perspective of Kanter (1988). Kanter (1988) said innovation is a multi-step process. From this perspective, innovation begins with awareness of issues and perceptions, and in the next phase, innovative individuals find sponsorship and advocate ideas. Kleysen and Street (2001) defined 289 innovative and creative-related activities, including extensive literature review and opportunity exploration, generativity, modeling, championship, and application for 28 studies, defining five key areas of innovative behavior.

Although software engineering requires a lot of innovation, there are few studies that investigate what motivates innovative behaviors of software developers. This study suggests that three dimensions of AE capture the extent of meaningful engagement S/W developers experience while developing S/W innovatively. The first dimension, meaning, refers to the extent to which an individual comes to understand the meaning of an activity (Bronowski, 1978). Given that transformational leadership provides developers with information on themselves, developers can reflect on their activities by developing S/W, thereby facilitating a personal connection between developers and S/W development. The second dimension, self-expansion, refers to the extent to which an individual's sense of self has expanded by knowing things or broadening his or her perspective (Bronowski, 1978). Self-expansion is related to self-growth (Beardsley, 1970). Within a transformational leadership, developers track their performance and achieve milestones, which enable the developers to experience personal growth (Deterding, 2014). The third dimension, active discovery, refers to the extent to which an individual feels he or she is actively seeking answers or resolutions to cognitive challenges to achieve his or her personal goals. Transformational leadership enables users to set new goals and level up their status when achieving their personal goals, during which users experience self-progress. Together, these three dimensions create the overall extent to which a developer feels AE while interacting with transformational leader. Therefore, organizations interested in increasing AE, seen as a desirable form of engagement, might consider it seriously now simply because it has the potential to significantly influence software developers' innovative behaviors which is one of positive work-related behaviors their organizations desire. In a software engineering context, software developers' AE to their organization is likely to play a role in their innovative behaviors. Thus, I make the following hypothesis.

*H2 Software developers' AE will increase their innovative behaviors.*

## 4. Methodology

### 4.1. Sample

The first objective of the study was to identify the relationship among transformational leadership types, the role of AE and innovative behavior in software companies based on empirical analysis. The survey research method is very useful in collecting data from a large number of individuals in a relatively short period of time and at better cost. Hence, for the current study, the questionnaire survey was chosen for data collection.

This study is based on responses from software developers working in Korea. Out of 431 responses collected from 35 companies, 352 responses from 34 companies were usable for analysis. Among the participants, 264 (75.0 percent) were men and 88 (25. percent) women. The percentages of software professionals responding broke down as follows: from the large-scale group, 156 (44.3 percent), from the small and medium-size enterprises, 91 (25.8 percent), and from multinational companies, 105 (29.8 percent).

Prior to measure validation and model testing, the responses were analyzed in order to identify response set (Rennie, 1982). A response set is the tendency among subjects to respond to questions in a particular way independently of the content of the items (Kerlinger, 1973). No cases of response set were detected. Additionally, two tests of common methods variance were employed. First, Harman's one factor test of common methods was conducted with satisfactory results. An additional test of partial correlation was also conducted (Podsakoff & Organ, 1986). This procedure stipulates that the first factor from the principal components analysis should be introduced into the PLS model as a control variable. This is based on the assumption that the first factor is the most likely to approximate CMV (if any bias exists). If the factor produces changes in variance, it is assumed that CMV is present (Podsakoff, Mackenzie & Lee et al., 2003). As anticipated, there were no significant changes in explained variance. Thus, it appears that common methods bias is not problematic.

#### **4.2. Measurement**

The present study involves the measurement of five latent constructs, including charisma, inspirational motivation, intellectual stimulation, individualized consideration, aesthetic experience and innovative behavior. These constructs were measured as follows.

##### **4.2.1. Transformational leadership**

Transformational leadership ratings were obtained using twenty items from the Multifactor Leadership Questionnaire (Bass & Avolio, 1995). There were four scales measuring transformational leadership: charisma, inspirational motivation, intellectual stimulation, and individualized consideration.

##### **4.2.2. Aesthetic experience**

Based on earlier conceptualizations (Beardsley, 1970; Berlyne, 1971; Bronowski, 1978; McCarthy & Wright, 2004), three reflective measures of AE were identified: self-expansion, meaning, and active discovery.

##### **4.2.3. Innovative behavior**

This study used a modified version of Scott and Bruce (1994) measure of innovative behavior to examine the innovativeness of nursing employees. More specifically, the questions (items) were rephrased to provide a better fit for examining software developers.

Scales ranged from 1 to 5 but the anchors varied depending on the question. An additional eight questions were included for collecting demographic information such as gender, age, tenure, and job title.

#### **5. Results**

Gefen, Rigdon, and Straub (2011) suggested that the validity and reliability of the measures were assessed prior to hypothesis testing. Because the model included formative constructs, a components-based approach to structural equation modeling was taken

##### **5.1. Analysis of reflective measures**

Tests were conducted to evaluate the convergent and discriminant validity and the reliability of reflective measures. To begin, factor loadings were used to establish convergent validity. Loadings in excess of 0.70 on their respective factors are interpreted to indicate convergent validity (Straub, Boudreau, & Gefen, 2004). A second indicator of convergence was also employed. Here, a value above 0.50 for the average variance extracted (AVE) for each construct is assumed to indicate sufficient convergence. Tests results indicate that both of these conditions have been met.

Discriminant validity is demonstrated when the square root of the AVE is greater than the correlations between constructs (Bollen, 1986; Henseler, Ringle, & Sarstedt, 2014; MacKenzie, Podsakoff, & Podsakoff, 2011). (The square rooted AVEs for AE and innovative behavior are 0.7666 and 0.7514, respectively; their inter-construct correlation is 0.2119). For a second test of



discriminant validity individual items may be assumed to possess sufficient discriminant validity if they load higher on their own respective construct than on any other latent variable (Gefen et al., 2011; Straub et al., 2004). This was true for all items. Based on both tests, the measures possess sufficient discriminant validity. Reliability is established by examining the internal consistency measure for each construct. Constructs which exceeded the 0.70 level are judged to possess sufficient reliability (Fornell & Bookstein, 1982).

### 5.2. Analysis of formative measures

Alternative tests of validity and reliability were conducted on the formative constructs: charisma, inspirational motivation, intellectual stimulation, and individualized consideration (Bass & Avolio, 1995). In order to assess convergent and discriminant validity, patterns of correlation between items and latent variables are depicted in a modified multi-trait, multi-method (MTMM) matrix (Loch, Straub, & Kamel, 2003).

Convergent validity is assessed via examination of item construct correlations (Chin, 1995). If items load significantly on their corresponding constructs, convergent validity is demonstrated. The results indicate that item weights are significant at a 0.05 level of significance, with the exception of six indicators. The six non-significant items were further analyzed according to prescriptions for interpreting formatively measured construct results (Cenfetelli & Basselier, 2009).

The prescriptions developed by Cenfetelli and Basselier (2009) distinguish between the relative and absolute contribution of an indicator to its construct. Relative contribution is the relation between an indicator and a criterion while holding other predictors constant. It is the importance of an indicator compared to other indicators of the same construct. Absolute contribution is the relation between an indicator and a criterion, ignoring other predictors. In some instances it is necessary to consider both perspectives, in order to develop a more accurate picture of an indicator's influence. For instance, an indicator may have a low or non-significant relative contribution to the construct. Despite this, it may still have an important absolute contribution. It is therefore recommended that when relative contribution (measured in terms of indicator weights) is low, absolute contribution (represented by item loadings) should also be considered.

Because six items in this study have a low relative contribution, it is necessary to consider their unique relations with their associated constructs. The absolute contributions for six items are significant. Their values are 0.744, 0.732, 0.741, 0.738, 0.767 and 0.726, respectively. Thus, although the contributions of the indicators are relatively low compared to other indicators, they have a strong, bivariate relation to their respective constructs (Nunnally & Bernstein, 1984). Furthermore, there did not appear to be any patterns in wording, polarity, or content among the items that would account for the differences and no conceptual issues regarding the construct definitions were salient. Thus, there was no theoretical justification for removing the items and rather than discarding the items and changing the meaning of the constructs, it was determined that the items should be retained. Finally, evidence of discriminant validity is presented when items correlate higher with their respective construct measures than with other construct measures and their composite values (Loch et al., 2003).

### 5.3. Structural modeling

Since the model was comprised of reflective and formative constructs, this study used bootstrap sampling to test the proposed relationships among the constructs (Gefen et al., 2007). Path coefficients and t-values were obtained through this procedure, and are depicted in Table 1. First, the results show that all paths are significant at the  $p < 0.05$  level of confidence. Charisma ( $\beta = 0.3161$ ,  $p < 0.01$ ), inspirational motivation ( $\beta = 0.3110$ ,  $p < 0.05$ ), intellectual stimulation ( $\beta = 0.2919$ ,  $p < 0.05$ ) and individualized consideration ( $\beta = 0.2119$ ,  $p < 0.05$ ) among the all of sub-factors of transformational leadership increase software developers' AE. Second, software developers' AE ( $\beta = 0.3212$ ,  $p < 0.05$ ) increases their innovative behaviors.

To ensure that AE mediates the relationship between each of transformational leadership types and innovative behavior, this study followed Baron & Kenny's (1986) steps. Table 2 shows the results. First, it was established that charisma ( $\beta = 0.3221$ ,  $p < 0.05$ ), inspirational motivation ( $\beta = 0.1823$ ,  $p < 0.05$ ), intellectual stimulation ( $\beta = 0.2793$ ,  $p < 0.05$ ), and individualized consideration ( $\beta = 0.2822$ ,  $p < 0.05$ ) are correlated with innovative behavior. Second, as explained in Table 1, All of the sub-factors of transformational leadership were positively related to AE and AE was found to be positively related to innovative behavior. Finally, all of the sub-factors of transformational leadership were then entered into the model, but some paths coefficients decreased or other path were statistically insignificant. Namely, AE mediates the relationship between intellectual stimulation ( $\beta = 0.2459$ ,  $p = 0.02$ ) and individualized consideration ( $\beta = 0.2556$ ,  $p = 0.02$ ) among the sub-factors of transformational leadership and innovative behavior. However, AE does not mediate the relationship between charisma ( $\beta = 0.2995$ ,  $p = 0.12$ ) and inspirational motivation ( $\beta = 0.1569$ ,  $p = 0.13$ ) among the sub-factors of transformational leadership and innovative behavior.

The model's explanatory power was considered by observing the  $R^2$  of endogenous constructs (Chin, 1995). As shown in Figure 1, the model accounts for 58.7% of the variance in AE and 47.7% of the variance in innovative behavior. All of the hypotheses are supported and mediation effect is partially mediated. And, several factors were introduced as controls. They include job title, organization tenure, length of career, gender, age, training recency, format of training, and total number of employees at current location. It was found that organization tenure and training recency were significant ( $\beta = 0.1813$ ,  $p < 0.05$  and  $\beta = 0.2771$ ,  $p < 0.05$ , respectively).

## 6. Discussion

### 6.1. The summary of the results

The purpose of the present study was to examine the linkage between transformational leadership and innovative behavior by focusing on AE. This study illuminated transformational leadership associated with full range leadership and to clearly identify how this leadership type influence the motivation of software developers. Agreeing to the characteristics of

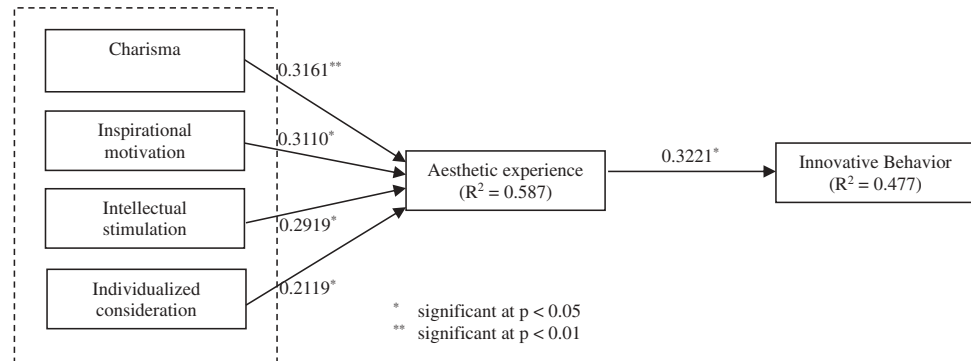
**Table 1. Path coefficients and their t-values**

Hypothesis	Path coefficient ( $\beta$ )	t-value	Significance	Outcome
H 1-1	0.3161	2.374	$p < 0.010$	Supported
H 1-2	0.3110	2.898	$p < 0.050$	Supported
H 1-3	0.2919	2.526	$p < 0.050$	Supported
H 1-4	0.2119	2.818	$p < 0.050$	Supported
H 2	0.3212	2.328	$p < 0.050$	Supported

**Table 2. Testing mediation effects of aesthetic experience**

	Dependent variables: Innovative behavior	Dependent variables: Aesthetic experience	Dependent variables: Innovative behavior (Mediator: Aesthetic experience)
Charisma	$\beta = 0.3221$ , $p < 0.05$	$\beta = 0.3161$ , $p < 0.01$	$\beta = 0.2995$ , $p = 0.12$
Inspirational motivation	$\beta = 0.1823$ , $p < 0.05$	$\beta = 0.3110$ , $p < 0.05$	$\beta = 0.1569$ , $p = 0.13$
Intellectual stimulation	$\beta = 0.2793$ , $p < 0.05$	$\beta = 0.2919$ , $p < 0.05$	$\beta = 0.2459$ , $p = 0.02$
Individualized consideration	$\beta = 0.2822$ , $p < 0.05$	$\beta = 0.2119$ , $p < 0.05$	$\beta = 0.2556$ , $p = 0.02$

**Figure 1. Results.**



transformational leadership and considering the characteristics of software developers, I propose four sub-factors of transformational leadership which increase their AE affecting their innovative behaviors positively in turn. The findings suggest three main conclusions. First, all of the sub-factors of transformational leadership increase software developers' AE. Second, software developers' AE increases their innovative behaviors. Finally, the intellectual stimulation and individualized consideration among the sub-factors of transformational leadership increase software developers' innovative behaviors through their AE. The sample of this study consisted of software developers. Therefore, since software developers are growth-oriented, and enjoy learning new skills (Chelsom et al., 2005), they prefer the intellectual stimulation and individualized consideration of their leaders for their growth and learning new skills which increase their AE for their innovative behaviors. However, since charisma and inspirational motivation among the sub-factors of transformational leadership are not related to growth-oriented and learning new skills but related to mental and psychological energy, two factors are not shown to increase their innovative behaviors through their AE.

The previous studies argued that leadership theory emphasizes culture, empowerment and knowledge sharing for the organization's objectives such as creativity (Avolio, 1999; Bass, 1999; Hussain, Abbas, Lei, Jamal, & Akram, 2017; Kargas & Varoutas, 2015; Mubarak & Noor, 2018; Yukl, 1998). And, Taylor (2002) argues that organizational management practices require managers to consider employees "AEs in a way that creates work-related activities and creates meaning for employees" personal lives. Although the concept of AE was developed in the arts and philosophy area, the scientific value explaining the mechanism of capturing and engaging in innovation has been reported in a variety of fields such as game research (Nardi, 2010), Human-computer interaction (Jennings, 2000), marketing (Nuttavuthisit, 2014). This study showed that AE reflects employees state of mind that is essential for positive leader-member interactions and that increases their innovative behaviors.

## 6.2. Theoretical contributions

This study resulted in important theoretical contributions. First, this study has contributed to academic research by producing the empirical evidence to support the theories of leadership and the innovation of software developers. Leadership has been overlooked in prior studies. Empirical proof from these findings deepen our understanding regarding the impact of the leadership on the innovation of software developers and complement the growing body of knowledge in this area. Second, the critical research gap I sought to address in this present study was that the very nature of meaningful engagement was not clearly understood and, thus, its role in explaining the innovation for software development could not be modeled. To address this, I explicitly positioned AE as a central concept in the study of the innovation for software development. This study confirmed the applicability of the theory of AE in organization research to explain users' psychological and behavioral reactions to the technological activities. Although the theory of AE highlights the meaningful engagement with an object (i.e., artwork,

technology, or an activity), the experience from the aesthetic perspective has been ignored in organization research. This research breaks new ground in the understanding of meaningful engagement from an AE perspective. This study represents one of the first attempts to systematically examine the role of AE in the S/W engineering context and incorporate the construct, AE, into the innovation model. By empirically showing that AE can serve as a reliable theoretical concept to explain innovative behavior, this study complements existing concepts aimed at facilitating innovative behavior.

### 6.3. Managerial implications

The study also found significant managerial implications. First, software development companies and managers can understand leadership issues by motivating software developers to avoid barriers and increase the likelihood of getting the results they want. Second, the results suggest that software development companies should encourage leaders to show intellectual stimulation and individualized consideration to motivate their software developers' innovative behaviors in the organization. The data from the study revealed that the likelihood of motivating software developers increases when organizations have such leadership attributes. Third, the performance-based human resource system, which many Korean companies claim to use, is thought to have originated from the so-called "best practices" notion employed by leading U.S. companies (Lee & Kim, 2006). Strategic human resource management applies three different theoretical frameworks: universalistic, contingency, and configurational (Yu, Park, & Kim, 2001). The findings reveal the context of Korean software engineering and provide a universalistic perspective by which top managers may motivate their software developers using the leadership style. Finally, this study provides practical implications for managers who seek new ways to promote S/W developers' engagement. It is noteworthy that AE plays a more critical role in predicting innovative behavior of S/W developers

### 6.4. Limitations and future research directions

Although the findings of this study contribute to a better understanding of the motivation of software developers, there is a limitation to this study which is its generalizability. It is difficult to say whether our findings can be generalized to other regions of the world. Since there are few studies on the subject, the extent to which the findings of this study can be generalized depends on its validation and replication in other settings and regions.

There are several paths for the expansion of this study and also future studies. First, the results of this study could be generalized if it were replicated and validated in other regions and context. It is suggested that future study utilize the same model in other developing countries. Second, future researcher need to investigate more theoretical perspectives and core variables. For example, because the technology in the software industry is changing at an unprecedented rate of growth, software developers are not confident with new methodologies. Therefore, their self-efficacy on new methodologies is critically important which can be increased by organizationally learning new technology, methodology and processes in order to keep software developers up-to-date with the latest state of the art practice. It will be a good research question how organizational learning motivates software developer. Finally, this study utilized a survey methodology and cross-sectional sample to collect data. Future scholar could try to conduct a longitudinal study to determine the causal relationships between leadership types and the motivation of software developers.

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