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Does Ambidexterity in Leadership Strategies Influence Public Sectors' KM Readiness in Terms of SECI Processes?

Abstract

The aim of this study is to investigate two different leadership strategies that contribute to knowledge management (KM) readiness in Malaysian public sector. Grounding on Nonaka and Takeuchi's knowledge creation theory, this study defines intention to be involved in knowledge management in terms of socialization, externalization, combination, and internalization (SECI) processes. A total of 212 questionnaires are accepted for data analysis from top managers, deputy directors, assistant directors, and executives of public sectors. Partial least squares-structural equation modeling (PLS-SEM) approach is used for assessing measurement and structural models. The findings suggest that transformational leadership strategy positively influences intention to be involved in KM processes. Interestingly transactional leadership strategy is associated with intention to be involved in KM processes, except internalization process. The findings imply that there should be a trade-off between transformational and transactional leadership amongst public sectors in Malaysia, proposing ambidexterity in leadership strategies. Finally, considering the demographic factors as a categorical moderating variable, applying PLS-Multi group analysis, this study finds that the intention to be involved in KM processes differ amongst employees with distinct age and year-of-experience. Implications, contributions, and limitations are discussed.

Key Words: Transformational leadership; transactional leadership; ambidexterity; socialization; externalization; combination; internalization; public sector

Introduction

Knowledge management (KM) means doing what is needed to get the most out of knowledge resources (Shahriza Abdul Karim *et al.*, 2012, Valaei and Ab Aziz, 2011). In an organizational context, KM means, any intentional and systematic process or practice of acquiring, capturing, sharing and using productive knowledge, wherever it resides, to enhance learning and performance in organizations (Shahriza Abdul Karim *et al.*, 2012). Evidence from literature indicates that organizations tend to pursue efforts in KM conceptualization and initiatives through either human (personalization)

or system approach (codification) (Grover and Davenport, 2001). KM research addressing the human approach has the tendency to focus on tacit knowledge through knowledge sharing and socialization activities, and research focusing of system or codification has given more emphasis on the explicit aspect of knowledge, which is translated into the manuals, system or technology. Building from the work of earlier research on KM process such as (Choi and Lee, 2002, Choi *et al.*, 2008, Lee and Choi, 2003, Lee and Lee, 2007), this study seeks to investigate the effect of organizational leadership factors on KM processes.

In addition, measurement on KM processes is found not well developed and verified in KM literature. Shahriza Abdul Karim *et al.* (2012) have established measurement framework using the groundwork of Nonaka *et al.* (1994) and the works of Choi and Lee (2002) and Lee and Choi (2003). Shahriza Abdul Karim et al. (2012) seek to measure individual intention to be involved in KM using the four dimensions of SECI processes. On this basis, the authors have further enhanced the use of the measurements in exploring the influence of organizational factors on the KM process intention.

Leadership can be transformational and transactional (Bass, 1991). Leadership is a critical factor in organizations for nurturing knowledge culture at all stages and facilitates its processes. Hülsheger *et al.* (2009) examine the positive role of leadership on knowledge sharing and creation. Several researchers have studied role of leadership in KM processes (Singh, 2008, Srivastava *et al.*, 2006) and organizational processes (Liang *et al.*, 2007). Martín-de Castro *et al.* (2011) consider the way that knowledge-oriented leadership can impact KM practices. This study proposes that ambidexterity in leadership strategies can influence intention to be involved in KM. Even though the research is abundant on SECI processes and its enablers, a few attempts were made to address the role of organizational leadership in general, and public sector in particular. However, this research aims to address this gap.

Literature review and hypothesis development
The SECI processes were proposed by Nonaka (1994), Nonaka *et al.* (1996) based on four different modes of knowledge conversion: (1) tacit knowledge to another tacit

knowledge (socialization), (2) from tacit knowledge to explicit knowledge (externalization), (3) from explicit knowledge to another explicit knowledge (combination), and (4) from explicit knowledge to tacit knowledge (internalization). The socialization mode refers to conversion of tacit knowledge to new tacit knowledge through social interactions and shared experience among organizational members (Alavi and Leidner, 2001). While the externalization process involves techniques that help to express ideas or images as words, concepts, visuals, or figurative language (e.g. metaphors, analogies, and narratives), and deductive or inductive reasoning or creative inference (Nonaka, 1994). In the combination process, explicit knowledge is collected from inside or outside the organization and then combined, edited, or processed to form more complex and systematic explicit knowledge (Nonaka and Toyama, 2003). Finally, in internalization process, the explicit knowledge may be embodied in action and practice, so that the individual acquiring the knowledge can re-experience what others go through (Becerra-Fernandez and Sabherwal, 2001). Becerra-Fernandez and Sabherwal (2001) explain that Nonaka (1994)'s SECI process describes the ways in which knowledge is shared through the interaction between tacit and tacit knowledge, tacit and explicit, and explicit and explicit knowledge. Alavi and Leidner (2001) have the same argument. Based on the above discussion, it can be concluded that knowledge creation and sharing are outcome of the SECI process. Hence, in this study, the perceived intention to be involved in KM process was measured based on SECI process.

Intensive review of KM literature reveals that there are several organizational factors that can be considered as pre-conditions (Gold *et al.*, 2001) for successful KM process implementation. Lee and Choi (2003) term these capabilities as KM enablers, while diverse terms have been used in the KM literature by different authors to categorize similar kinds of factors, for example, KM infrastructure (Becerra-Fernandez *et al.*, 2004), KM capabilities (Lee and Lee, 2007), critical factors (Hung *et al.*, 2005), and knowledge infrastructure capability (Gold *et al.*, 2001) within which they have exhibited organizational leadership as a key to successful KM process implementation. Figure 1 shows the theoretical model of this study. Both leadership strategies are considered as KM enablers and their relationships to the intention to be involved in KM are examined through SECI processes.

Figure 1: Theoretical model

Transformational leadership

Transformational leaders are those that motivate and inspire their followers and empower them in the process of decision-making. Crawford and Strohkirch (2002) claim that transformational leadership promotes knowledge creation. In addition, Martín-de Castro *et al.* (2011) and (Politis, 2001) state that this type of leadership is more related to knowledge processes than transactional leadership style. Drawing on a sample of 1046 graduate students, Crawford (2005) finds a positive relationship between transformational leadership and KM behavior. Using a sample of 432 Korean organizations, Hoon Song *et al.* (2012) finds that there is a positive relationship between transformational leadership and organizational knowledge creation. The results of study conducted by Podsakoff *et al.* (1990) indicate that there is no direct relationship between transformational leadership and organizational citizenship behavior. Further investigation is required on the consequences of transformational leadership within organizations. Therefore, following hypotheses are developed examining the positive role of transformational leadership and intention to be involved in KM processes:

H1: There is a positive relationship between transformational leadership strategy and SECI processes.

H1a) There is a positive relationship between transformational leadership and socialization process, **H1b)** externalization process, **H1c)** combination process, and **H1d)** internalization process.

Transactional leadership

This type of leadership emphasizes on the role of rewards and punishments toward organizational members. Transactional leadership theories emphasize the role of leadership and follower in terms of benefits, rewards, and self-interest (Von Krogh *et al.*, 2012). Bryant (2003) clearly states that transactional leadership is more effective in KM processes at organizational level. The author states that Steve Jobs, former Apple Inc.'s CEO, followed a transactional leadership style for knowledge creation in all levels of organization. Studying the impact of transactional leadership on behavioral skills and traits of knowledge acquisition, Politis (2001) finds a positive

relationship between transactional leadership behavior and personal traits ad organization of Australian high-tech enterprises. Even though Bryant (2003) states that organizations can utilize both leadership styles to manage KM processes, his study does not include the role of transactional leadership in knowledge creation but transformational leadership in knowledge creation and sharing. Current literature still lacks on the positive consequences transactional leadership may have within organizations and a few attempts were made to examine the possible impact transactional leadership style may have on organizational knowledge creation. Thus, following hypotheses are established:

H2: There is a positive relationship between transactional leadership and SECI processes.

H2a) There is a positive relationship between transactional leadership and socialization process, **H2b)** externalization process, **H2c)** combination process, and **H2d)** internalization process.

Demographic factors as categorical moderators

Studying antecedents of employees' perception of knowledge sharing culture, Connelly and Kevin Kelloway (2003) find gender as a moderating factor in the relationship between employees' perception of management support for knowledge sharing and employees' perception of knowledge sharing culture. They also found that age and organizational tenure does not moderate this relationship. Studying 314 Taiwanese students with work experience, Lin (2008) find that gender moderates the relationship between organizational citizenship behavior and knowledge sharing in workplace. Furthermore, surveying 454 bloggers, the results of study conducted by Chai *et al.* (2011) indicate that the positive impact of reciprocity, strength of social ties, and trust on bloggers' knowledge sharing in social networks are moderated by gender factor.

It is noteworthy to investigate the way the impact of organizational leadership on knowledge creation processes varies across distinct demographic groups. A few attempts were made to examine the role of demographic factors on the relationship between organizational leadership and knowledge creation processes. In this study, merely employees' gender, age, and years of work experience are examined as

categorical moderating variables because there is a huge discrepancy in sample distribution of education, ethnic group, and position subgroups (see Table 1). Therefore, it is hypothesized that:

H3a) The impact of organizational leadership on knowledge creation processes vary across distinct gender factor.

H3b) The impact of organizational leadership on knowledge creation processes vary across distinct age group.

H3c) The impact of organizational leadership on knowledge creation processes vary across year of work experience.

Methodology

Data was collected from organizations in Malaysian public sector. The survey questionnaire has been issued amongst organizations in public sector. 5-level Likert scales from strongly disagree to strongly agree were applied. A total of 500 questionnaires were distributed amongst the top managers, deputy directors, assistant directors, and executives of public sectors and 227 were returned. To treat the missing values, expectation maximization (EM) algorithm is applied. This algorithm considers the missing values randomly. Little's MCAR test (Little, 1988) is needed to show that data values are missing randomly before imputing the data with EM algorithm. To test the null hypothesis, the Little's MCAR test: Chi-Square = 895.518, DF = 844, Sig. = .106 show that we can reject the null hypothesis and data values are missing randomly. A total of 212 responses were considered acceptable for data analysis. Table 1 shows the background information about gender, age, year of work experience, education, ethnic group, and their position in the organization.

Table 1: Sample characteristic

Since the survey questionnaire is self-administered, the results are prone to common method bias (CMB). To address the CMB, Harman's one-factor test (Harman, 1976) is used to test the CMB. Using SPSS Software, all constructs are included into one principal component factor analysis and the extraction method of principal component of one fixed factor with none rotation method is used. The results of this analysis indicate that merely one factor emerges and it explains below 50% of the variance

(32.517%). However, it appears that CMB is not a concern in this research. Finally, PLS-SEM is applied for examining measurement model's validity and reliability using Smart PLS version 3.2 (Ringle *et al.*, 2014). The software is also used to examine structural model and conducting PLS-MGA.

Results

Reliability and validity

To test the reliability of measurement model, both composite reliability and Cronbach's Alpha values are examined. In PLS approach, Cronbach's Alpha value more than 0.7 indicates good reliability (Tenenhaus *et al.*, 2005). All constructs obtained Alpha values more than 0.857. Composite reliability of all constructs are more than 0.913. This confrms that the constructs are reliable. In addition, the variance inflation factor (VIF) of all items are below the threshold of 0.5, indicating no collinearity issue.

Table 2: Measurement model

Validity of the constructs are examined through convergent validity, Average Variance Extracted (AVE) and discriminant validity. Convergent validity is examined through indicator loadings. Depicted in Figure 2, all item loadings are between 0.788 and 0.974, establishing the convergent validity. Table 2 also shows the AVE values of all latent variables. AVE values equal or more than 0.5 are acceptable (Hair Jr *et al.*, 2013, Henseler *et al.*, 2009). The table indicates that all AVE values are between than 0.724 and 0.947.

Figure 2: PLS Results

To assess the discriminant validity, Fornell-Larcker criterion, loading and cross-loading criterion, as well as Heterotrait-Monotrait (HTMT) ratio of correlations are examined. Tables 3, Table 4, and Table 5 show the discriminant validity criteria according to Fornell-Larcker criterion, loading and cross-loading criterion, and HTMT ratio of correlations respectively. In Table 3, the off-diagonal values are the correlations between the latent variables and diagonal are square values of AVEs.

Square values of AVEs indicate that AVEs on its own variable are higher than all of its loadings with other latent variables.

Furthermore, as tabulated in Table 4, the loadings across the columns show that an indicator's loading on its own variable is higher than all of its cross loadings with other variables. Finally, Henseler *et al.* (2015) claim that in addition to Fornell-Larcker criterion and cross loadings, HTMT ratio of correlations is required for assessing discriminant validity in PLS approach. The critical value for HTMT is below 0.9 (Teo *et al.*, 2008). Table 5 shows that all HTMT values are below the critical point of 0.9. Shown in Appendix A, the results of bootstrapping for HTMT ratio of correlations show that the upper confidence intervals is below 1, which indicates the discriminant validity of variables.

Table 3: Discriminant validity – Fornell-Larcker criterion
Table 4: Discriminant validity – Loading and cross-loading criterion
Table 5: Discriminant validity – Heterotrait-Monotrait Ratio

Structural model

For hypothesis testing the bootstrapping technique with 5000 resampling is applied to examine the significance level of the hypothesized paths. Figure 3 depicts the paths' significance level and Table 6 shows the results of hypotheses testing in detail. According to Table 6, all hypotheses except H2d are supported. H1a hypothesizing Transformational leadership → Socialization with path coefficient of 0.194, standard error of 0.090 and t-value of 2.151, H1b hypothesizing Transformational leadership → Externalization with path coefficient of 0.197, standard error of 0.094 and t-value of 2.100, H1c hypothesizing Transformational leadership → Combination with path coefficient of 0.348, standard error of 0.073 and t-value of 4.792, and H1d hypothesizing Transformational leadership → Internalization with path coefficient of 0.358, standard error of 0.096 and t-value of 3.729 were supported.

H2a hypothesizing Transactional leadership → Socialization with path coefficient of 0.242, standard error of 0.093 and t-value of 2.593, H2b hypothesizing Transactional leadership → Externalization with path coefficient of 0.253, standard error of 0.095

and t-value of 2.655, H2c hypothesizing Transactional leadership → Combination with path coefficient of 0.226, standard error of 0.079 and t-value of 2.846 were supported. However, H2d hypothesizing Transactional leadership → Internalization with path coefficient of 0.157, standard error of 0.102 and t-value of 1.539 was rejected.

Figure 3: Bootstrapping Results

Table 6: Hypothesis testing

Table 6 shows the R^2 and Q^2 values for endogenous latent variables. It is interesting to learn that each KM process indicators are predicted with reasonably modest R^2 value. R^2 values for socialization, externalization, combination, and internalization are 0.148, 0.158, 0.259, and 0.214 respectively. This suggests that both leadership strategies have higher prediction on combination process. In addition, blindfolding procedure is applied to examine another predictive accuracy criteria of a model i.e., its predictive relevance of Q^2 values (Stone, 1974) and Hair *et al.* (2013) indicate a Q^2 value of higher than 0 as a good indicator of predictive relevancy. Shown in Table 7, Q^2 values indicate that both leadership strategies have predictive relevancy to SECI processes. Furthermore, the variations in R^2 when exogenous construct/s are removed from the model (f^2 effect size) are significant as well. Similar to f^2 effect size, the relative impact of predictive relevance (Q^2) can be examined through q^2 effect size. Table 8 indicates the f^2 effect sizes of exogenous constructs and q^2 effect sizes for endogenous constructs.

Table 7: Results of R^2 and Q^2 values

Table 8: Results of f^2 and q^2 effect size

PLS-MGA

Differentiating different groups of respondents is useful from a practical and theoretical perspective and lack of reporting heterogeneity can lead to erroneous conclusions (Becker *et al.*, 2013). In this research, due to heterogeneity in sample characteristics, all demographic factors are examined as categorical moderating variables. Only gender, age, and years of work experience are examined as categorical

moderating variables because there is a huge discrepancy in sample distribution of education, ethnic group, and position subgroups (see Table 1). For instance, majority of respondents are bachelor holders (83%) and it is not applicable to apply PLS-MGA for this factor due to singular matrix error (Hair *et al.*, 2013).

Differences in gender, age, and years of work experience can shed more light on how distinct individuals with different demographic groups realize the role of leadership strategies on SECI processes. Therefore, this study uses PLS-MGA applying percentile bootstrapping method to find out the group differences in aforementioned demographic factors.

Considering gender as a categorical moderating variable, the male vs. female group differences are examined. Considering age as a categorical moderating variable, employees with age differences between 26 and 30, between 31 and 35, between 36 and 40, between 46 and 50, and above 50 are examined. Other age subgroups are excluded due to their small sample size that causes singular matrix error in PLS-SEM (Sarstedt *et al.*, 2011). Further, examining year of work experience as a categorical moderating variable, employees with year of experience below 5, between 6 and 10, between 11 and 15, and above 25 are considered. Similar to age group, other year of experience subgroups are excluded due to their small sample size that result in singular matrix error.

Following the principles stated by Henseler *et al.* (2009), "a result of a path is significant at 5% error level if percentages are smaller than 0.05 and higher than 0.95". Further, Henseler *et al.* (2009) indicate that the percentile below "0.05" shows that the bootstrapping results of group 1 is higher than group 2 and percentiles higher than "0.95" show that the bootstrapping results of group 2 are higher than group 1. Table 9 and Table 10 show the results of PLS-MGA. Table 9 addresses hypotheses H3a and H3b and Table 10 addresses H3c.

The results of Table 9 indicate that there are no significant differences in path coefficients of gender groups. Therefore, H3a is rejected. Table 9 also shows the results of PLS-MGA for age subgroups that have significant differences and those non-significant group differences are discarded from table. Bold values in Table 9

indicate significant differences between subgroups. For instance, comparing age group between 26 and 30 with age group between 46 and 50, the path coefficients of Transactional Leadership → Combination and Transactional Leadership → Externalization are stronger for employees with age group between 46 and 50. Further, the path coefficient of Transformational Leadership → Combination is stronger for employees with age group between 26 and 30.

Comparing age group between 31 and 35 with age group between 46 and 50, the path coefficients of Transactional Leadership → Combination is stronger for employees with age group between 46 and 50. The path coefficient of Transformational Leadership → Combination is stronger for employees with age group between 31 and 35. Finally, comparing age group above 50 with age group between 46 and 50, the path coefficient of Transactional Leadership → Combination is stronger for employees with age group between 46 and 50. Therefore, H3b is supported and some of age factor's subgroups show significant differences in results.

Table 9: PLS-MGA results (H3a and H3b)

The results of Table 10 show that there are significant differences in path coefficients of year of experience groups, supporting H3c. To reduce the length of the table, only groups with significant differences are illustrated. Comparing the group with year of experience below 5 with the group with year of experience between 11 and 15, the path coefficients of Transactional Leadership → Externalization and Transactional Leadership → Socialization are stronger for those employees with year of experience between 11 and 15. Comparing the group with year of experience between 6 and 10 with the group with year of experience between 11 and 15, the path coefficient of Transactional Leadership → Socialization is stronger for those employees with year of experience between 11 and 15.

Table 10: PLS-MGA results (H3c)

Importance-Performance Map Analysis (IPMA)

IMPA is a technique considering the performance of each latent variable on a target variable. This analysis aids mangers and decision makers to emphasize on their decision-making activities (Rezaei *et al.*, 2016). This analysis uses latent variable scores (Völckner *et al.*, 2010) derived from PLS-SEM algorithm. For example, considering the socialization as the target variable, IPMA computes the total effects of structural model (importance) with the average values of the latent variable scores (performance) to represent the significant areas for the improvement of management activities. Table 11 shows the results of IPMA for four target variables of this study. Surprisingly, according to table 11, transactional leadership has the highest importance and highest performance on all SCEI processes.

Table 11: IPMA results

Discussion and conclusion

This study provides profound theoretical findings about the role of organizational leadership on intention to be involved in KM processes in Malaysian public sector. The research model applied in this study can be used for future researches in other disciplines as well. Results of PLS-SEM indicate that transformational leadership positively influences all SECI processes. Transactional leadership was found to be conducive to socialization, externalization and externalization and it had no effect on internalization process. Therefore, the more coercive leadership/rewards and punishment style is practiced the less likely the intention to be involved in converting explicit knowledge to tacit knowledge.

Evidently each country has its specific culture. In addition, it is argued that each organization has its unique culture as well. It is crucial for organizations to consider those organizational characteristics that favor employees. The results of this study suggest that Malaysian employees in public sector are more interested in ambidextrous leadership styles (both transactional and transformative). This might be different in western countries as they may favor more transformative leadership style rather than transactional. Overall culture of each nation decides on these matters and ambidexterity of leadership styles indicates the distinctive culture of Malaysia.

Leaders are central to knowledge creation activities and they play a significant role in transforming the organizational knowledge to competitive advantage (Bryant, 2003). Since knowledge work is team-based, the future of leadership will be an amalgamation of vertical and shared leadership (i.e., ambidextrous leadership style) (Pearce, 2004). The theoretical contribution of this study is the inclusion of transactional leadership style in SECI processes. Therefore, the findings of this study is similar with other studies that have examined the positive impact of transactional leadership on dependent variables (Politis, 2001). Another contribution of this study is the consideration of transformational leadership in SECI processes and the findings of this study are in line with previous research (for example, Crawford, 2005, Bryant, 2003, Hoon Song *et al.*, 2012). Finally, in contrary to the findings of Connelly and Kevin Kelloway (2003), Lin (2008), and Chai *et al.* (2011), the findings of this study imply that gender does not moderate the relationship between organizational leadership and knowledge creation processes. Rather, employees' age and years of work experience does moderate this relationship.

Managerial implications

The findings of this study imply an ambidextrous leadership style for knowledge creation processes within public sector organizations and managers should consider a shared leadership style rather than overemphasis on a particular leadership style. Top management team can prioritize their managerial actions based on the results of IPMA. Interestingly, managers should note that transactional leadership has the highest importance and performance on SECI compared with the results of transformational leadership. This indicates that one point increase in the performance of transactional leadership is expected to increase the performance of socialization, externalization, combination, and internalization processes by total effects of 0.234, 0.235, 0.220, and 0.153 respectively.

Additionally, based on the results of PLS-MGA managers can find which demographic information can be more involved in knowledge creation processes. For instance, transactional leadership style influences more on those employees with age group between 46 and 50 in combining different types of explicit knowledge (Transactional Leadership → Combination). But transformational leadership style influences more on those employees with age group between 26 and 30 as well as 31

and 35 in combining their explicit to explicit knowledge (Transformational Leadership → Combination). Transactional leadership style also showed more effect on age group between 46 and 50 in their crystallization of tacit knowledge to explicit knowledge (Transactional Leadership → Externalization) when compared with those employees with age group between 26 and 30.

In addition, managers also can also examine which leadership strategy is conducive to knowledge creation amongst experienced employees. Transactional leadership style showed more effect on employees who have work experience between 11 and 15 years in their tacit to tacit knowledge transfer (Transactional Leadership → Socialization) when compared with those employees with work experience below 5 years as well as those employees with work experience between 6 and 10 years. Finally, transactional leadership style also showed more effect on employees who have work experience between 11 and 15 years in their tacit to explicit knowledge conversion (Transactional Leadership → Externalization) when compared with those employees with work experience below 5 years.

Future research

The nature of human being is geared with complexity and change. One of main challenges in social science researches is examining the factors that shape human behaviors the way they react to stimuli. Even though the abundant researches were conducted on the effects of transformational leadership in organizations, the research still lacks on the impacts of transactional leadership style. Noting the cross-cultural differences, further investigation is required to examine whether ambidextrous leadership styles can lead to positive organizational outcomes in general and KM activities in particular.

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Von Krogh, G., Nonaka, I. and Rechsteiner, L. (2012), "Leadership in organizational knowledge creation: A review and framework", *Journal of Management Studies,* Vol. 49 No. 1, pp. 240-277.
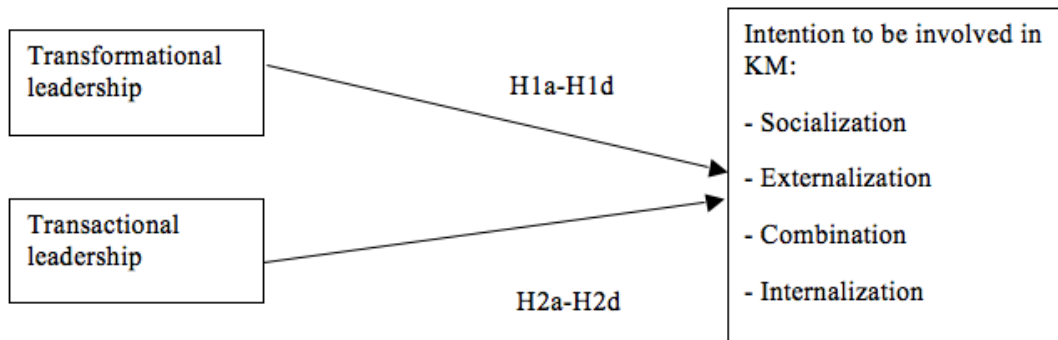
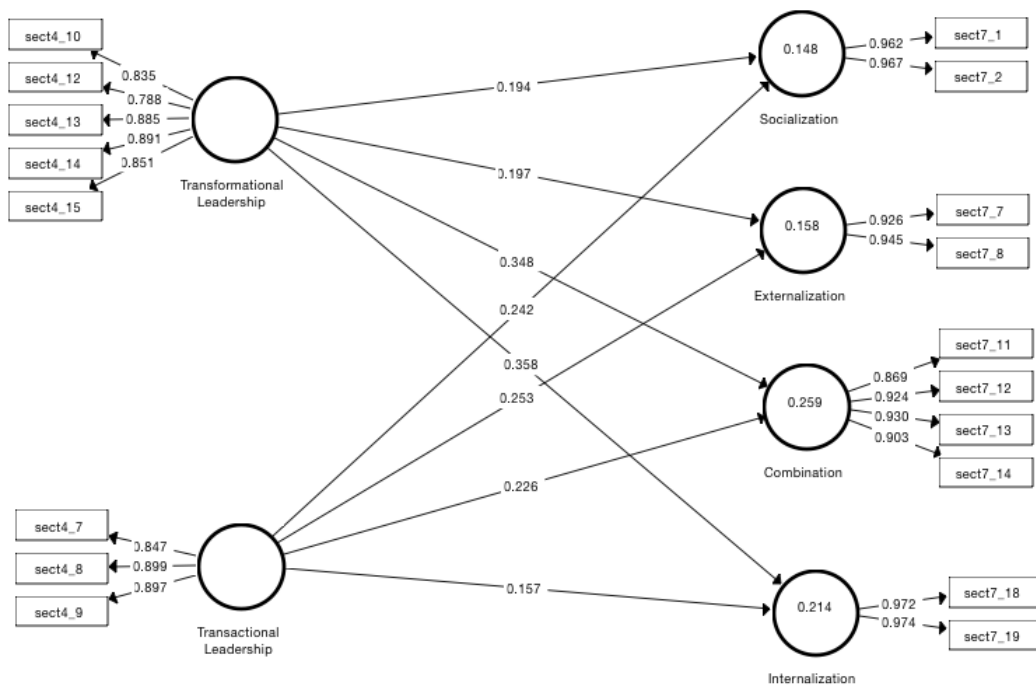**Figure 1:** Theoretical Framework

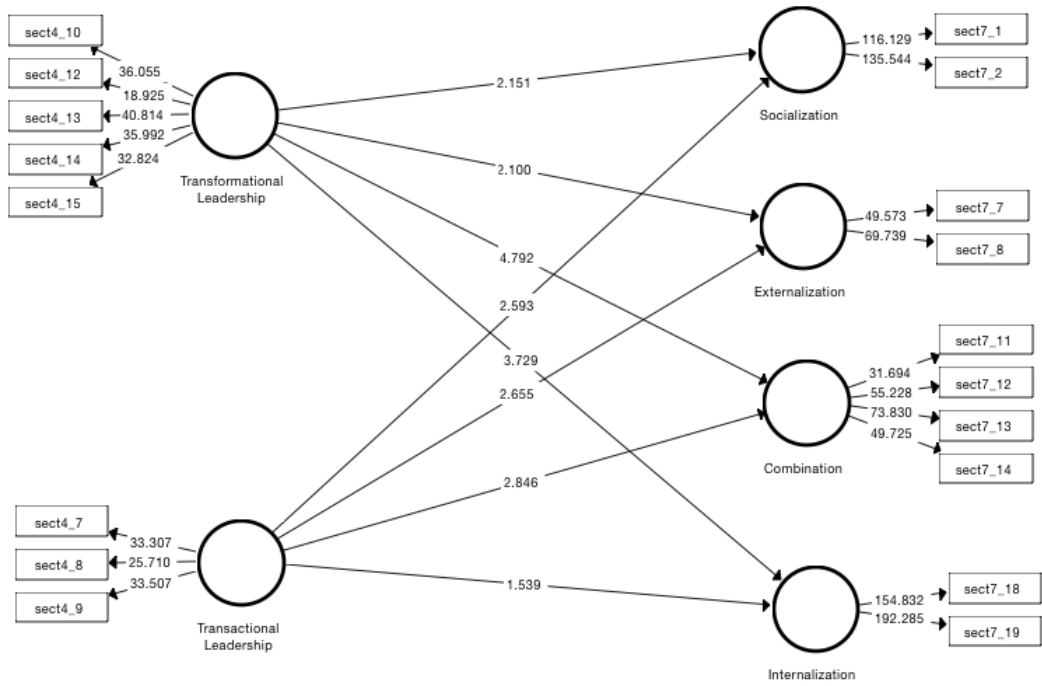**Figure 2:** Measurement Model

Figure 3: Bootstrapping Results

Table 1: Sample characteristics (*N*=212)

	Characteristic	Frequency	Percent
Gender	Male	101	47.6
	Female	111	52.4
Age	Below 25	4	1.9
	Between 26 and 30	83	39.2
	Between 31 and 35	55	25.9
	Between 36 and 40	22	10.4
	Between 41 and 45	10	4.7
	Between 46 and 50	19	9
	Above 50	19	9
Years of Work Experience	Below 5	89	42
	Between 6 and 10	57	26.9
	Between 11 and 15	19	9
	Between 16 and 20	13	6.1
	Between 21 and 25	14	6.6
	Above 25	20	9.4
Education	Certificate	2	0.9
	Diploma	1	0.5
	Bachelor	176	83
	Master	29	13.7
	PhD	4	1.9
Position in the Organization	Top Management	2	0.9
	Director	13	6.1
	Deputy Director	14	6.6
	Assistant Director	142	67
	Executive	41	19.3
Ethnic Group	Malay	185	87.3
	Chinese	4	1.9
	Indian	10	4.7
	Others	13	6.1

Table 2: Measurement model

Construct	Item	Loading	Item[a] VIF	AVE[b]	Composite[c] Reliability	Cronbach's Alpha
Transformational Leadership	sect4_10	0.835	2.094	0.724	0.929	0.904
	sect4_12	0.788	1.867			
	sect4_13	0.885	3.641			
	sect4_14	0.891	3.918			
	sect4_15	0.851	2.710			
Transactional Leadership	sect4_7	0.847	1.620	0.777	0.913	0.857
	sect4_8	0.899	3.331			
	sect4_9	0.897	3.203			
Socialization	sect7_1	0.962	3.843	0.930	0.964	0.925
	sect7_2	0.967	3.843			
Externalization	sect7_7	0.926	2.298	0.875	0.933	0.858
	sect7_8	0.945	2.298			
Combination	sect7_11	0.869	2.758	0.823	0.949	0.928
	sect7_12	0.924	3.805			
	sect7_13	0.930	4.357			
	sect7_14	0.903	3.746			
Internalization	sect7_18	0.972	4.962	0.947	0.973	0.944
	sect7_19	0.974	4.962			

a. Full Collinearity, variance inflation factor (VIF); acceptable if <= 5
b. Average variance extracted (AVE) = (summation of the square of the factor loadings)/[(summation of the square of the factor loadings) + (summation of the error variances)]
c. Composite reliability = (square of the summation of the factor loadings)/[(square of the summation of the factor loadings) + (square of the summation of the error variances)]

Table 3: Discriminant validity – Fornell-Larcker criterion

Construct	Combination	Externalization	Internalization	Socialization	Transactional Leadership	Transformational Leadership
Combination	**0.907[a]**					
Externalization	0.784	**0.936**				
Internalization	0.736	0.718	**0.973**			
Socialization	0.686	0.659	0.662	**0.964**		
Transactional Leadership	0.417	0.361	0.353	0.349	**0.882**	
Transformational Leadership	0.473	0.336	0.444	0.327	0.549	**0.851**

a. The off-diagonal values are the correlations between the latent constructs and diagonal are square values of AVEs.

Table 4: Discriminant validity – Loading and cross-loading criterion

Item	Combination	Externalization	Internalization	Socialization	Transactional Leadership	Transformational Leadership
sect4_10	0.455	0.329	0.476	0.318	0.561	**0.835[a]**
sect4_12	0.379	0.251	0.361	0.269	0.370	**0.788**
sect4_13	0.424	0.289	0.356	0.298	0.465	**0.885**
sect4_14	0.381	0.290	0.338	0.300	0.467	**0.891**
sect4_15	0.349	0.254	0.330	0.182	0.446	**0.851**
sect4_7	0.416	0.303	0.371	0.373	**0.847**	0.499
sect4_8	0.298	0.318	0.251	0.259	**0.899**	0.448
sect4_9	0.371	0.334	0.294	0.272	**0.897**	0.494
sect7_1	0.631	0.594	0.637	**0.962**	0.333	0.293
sect7_2	0.690	0.674	0.639	**0.967**	0.339	0.336
sect7_11	**0.869**	0.716	0.675	0.585	0.335	0.411
sect7_12	**0.924**	0.682	0.653	0.607	0.400	0.450
sect7_13	**0.930**	0.749	0.658	0.674	0.393	0.442
sect7_14	**0.903**	0.702	0.689	0.620	0.383	0.410
sect7_18	0.710	0.690	**0.972**	0.622	0.323	0.432
sect7_19	0.723	0.708	**0.974**	0.665	0.364	0.432
sect7_7	0.715	**0.926**	0.718	0.628	0.306	0.301
sect7_8	0.751	**0.945**	0.633	0.607	0.366	0.326

a. Bold values are loadings for each item, which are above the recommended value of 0.5; and an item's loadings on its own variable are higher than all of its cross-loadings with other variable.

Table 5: Discriminant validity – Heterotrait-Monotrait Ratio

Construct	Combination	Externalization	Internalization	Socialization	Transactional Leadership
Externalization	0.879				
Internalization	0.788	0.802			
Socialization	0.739	0.739	0.708		
Transactional Leadership	0.459	0.418	0.385	0.383	
Transformational Leadership	0.510	0.376	0.474	0.351	0.612

Note: The criterion for HTMT is below 0.90 (Teo *et al.*, 2008, Gold and Arvind Malhotra, 2001)

Table 6: Structural relationships and hypothesis testing

Hypothesis	Path	Beta	STERR	T-Statistics	Decision
H1a	Transformational Leadership -> Socialization	0.194	0.090	2.151**	Supported
H1b	Transformational Leadership -> Externalization	0.197	0.094	2.100**	Supported
H1c	Transformational Leadership -> Combination	0.348	0.073	4.792***	Supported
H1d	Transformational Leadership -> Internalization	0.358	0.096	3.729***	Supported
H2a	Transactional Leadership -> Socialization	0.242	0.093	2.593***	Supported
H2b	Transactional Leadership -> Externalization	0.253	0.095	2.655***	Supported
H2c	Transactional Leadership -> Combination	0.226	0.079	2.846***	Supported
H2d	Transactional Leadership -> Internalization	0.157	0.102	1.539	Not Supported

Note: for two-tailed tests: *1.65 (10% significance level), **1.96 (5% significance level), ***2.57 (1% significance level) (Hair Jr *et al.*, 2013, p. 171)

Table 7: Results of R^2 and Q^2 values*

Endogenous constructs	R^2	Q^2
Socialization	0.148	0.129
Externalization	0.158	0.132
Combination	0.259	0.210
Internalization	0.214	0.191

*Q^2 Value   Effect Size
  0.02 =   Small
  0.15 =   Medium
  0.35 =   Large

Table 8: Results – f^2 and q^2 effect size[a]

	Socialization		Externalization		Combination		Internalization	
	f^2	q^2	f^2	q^2	f^2	q^2	f^2	q^2
Transformational Leadership	0.031	0.028	0.032	0.024	0.114	0.086	0.114	0.093
Transactional Leadership	0.048	0.040	0.053	0.043	0.048	0.035	0.022	0.016

a. Assessing q^2 and f^2:
Value   Effect Size
  0.02 =   Small
  0.15 =   Medium
  0.35 =   Large

Table 9: PLS-MGA results for age and gender demographic group (H3a and H3b)

	P-Value (Male vs. Female)	P-Value (G1 vs. G4)	P-Value (G2 vs. G4)	P-Value (G5 vs. G4)
Transactional Leadership -> Combination	0.214	**0.991**[a]	**0.996**	**0.962**
Transactional Leadership -> Externalization	0.924	**0.976**	0.914	0.836
Transactional Leadership -> Internalization	0.433	0.645	0.474	0.463
Transactional Leadership -> Socialization	0.680	0.675	0.403	0.402
Transformational Leadership -> Combination	0.926	**0.016**	**0.009**	0.153
Transformational Leadership -> Externalization	0.104	0.054	0.137	0.430
Transformational Leadership -> Internalization	0.856	0.505	0.464	0.862
Transformational Leadership -> Socialization	0.275	0.488	0.576	0.752

Note: G1 (Age between 26 and 30), G2 (Age between 31 and 35), G3 (Age between 36 and 40) G4 (Age between 46 and 50), G5 (Age above 50).
a. The bold values indicate significant differences between groups.

Table 10: PLS-MGA results for year-of-experience demographic group (H3c)

	P-Value (G1 vs. G3)	P-Value (G2 vs. G3)
Transactional Leadership -> Combination	0.367	0.739
Transactional Leadership -> Externalization	**0.965**[a]	0.817
Transactional Leadership -> Internalization	0.873	0.819
Transactional Leadership -> Socialization	**0.984**	**0.971**
Transformational Leadership -> Combination	0.697	0.580
Transformational Leadership -> Externalization	0.159	0.441
Transformational Leadership -> Internalization	0.209	0.188
Transformational Leadership -> Socialization	0.069	0.238

Note: G1 (Year of experience below 5), G2 (Year of experience between 6 and 10), G3 (Year of experience between 11 and 15), G4 (Year of experience above 25).
a. The bold values indicate significant differences between groups.

Table 11: IPMA Results

Construct	Socialization		Externalization		Combination		Internalization	
	Importance	Performance	Importance	Performance	Importance	Performance	Importance	Performance
Transactional Leadership	0.234	65.393	0.245	65.393	0.220	65.393	0.153	65.393
Transformational Leadership	0.188	63.480	0.191	63.480	0.339	63.480	0.350	63.480

Note: Importance = total effects of structural model, Performance = average values of latent variable scores (Hair Jr *et al.*, 2013).

Appendix A: HTMT Confidence Intervals

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
Externalization -> Combination	0.879	0.878	0.799	0.943[a]
Internalization -> Combination	0.788	0.788	0.695	0.875
Internalization -> Externalization	0.802	0.800	0.698	0.892
Socialization -> Combination	0.739	0.738	0.653	0.818
Socialization -> Externalization	0.739	0.737	0.612	0.839
Socialization -> Internalization	0.708	0.706	0.579	0.814
Transactional Leadership -> Combination	0.459	0.463	0.333	0.599
Transactional Leadership -> Externalization	0.418	0.424	0.272	0.583
Transactional Leadership -> Internalization	0.385	0.385	0.210	0.550
Transactional Leadership -> Socialization	0.383	0.387	0.239	0.526
Transformational Leadership -> Combination	0.510	0.514	0.389	0.635
Transformational Leadership -> Externalization	0.376	0.379	0.237	0.525
Transformational Leadership -> Internalization	0.474	0.476	0.336	0.607
Transformational Leadership -> Socialization	0.351	0.354	0.224	0.479
Transformational Leadership -> Transactional Leadership	0.612	0.611	0.452	0.746

a. The criterion for HTMT upper confidence intervals is below 1 (Henseler, Ringle, and Sarstedt, 2015)

Supplementary file for review

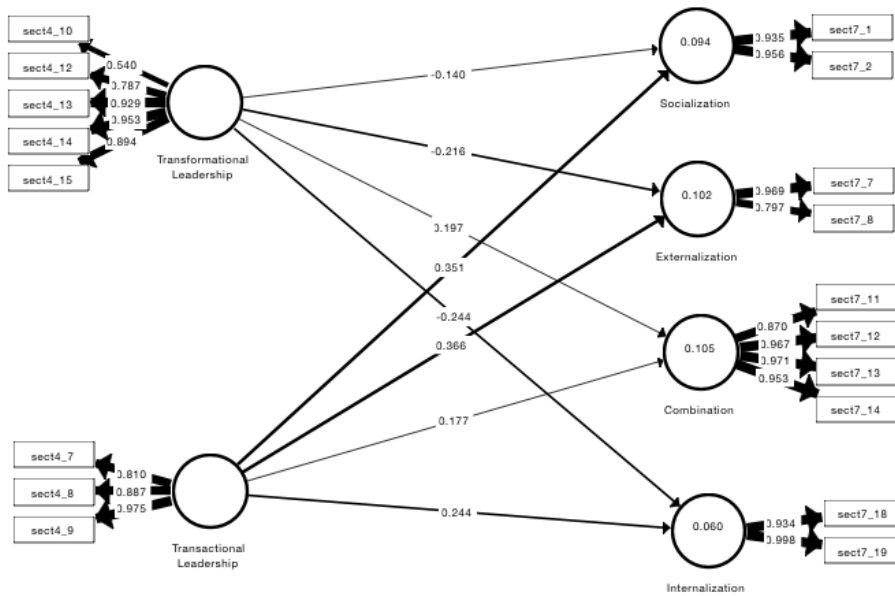PLS MGA for Age group 26-30
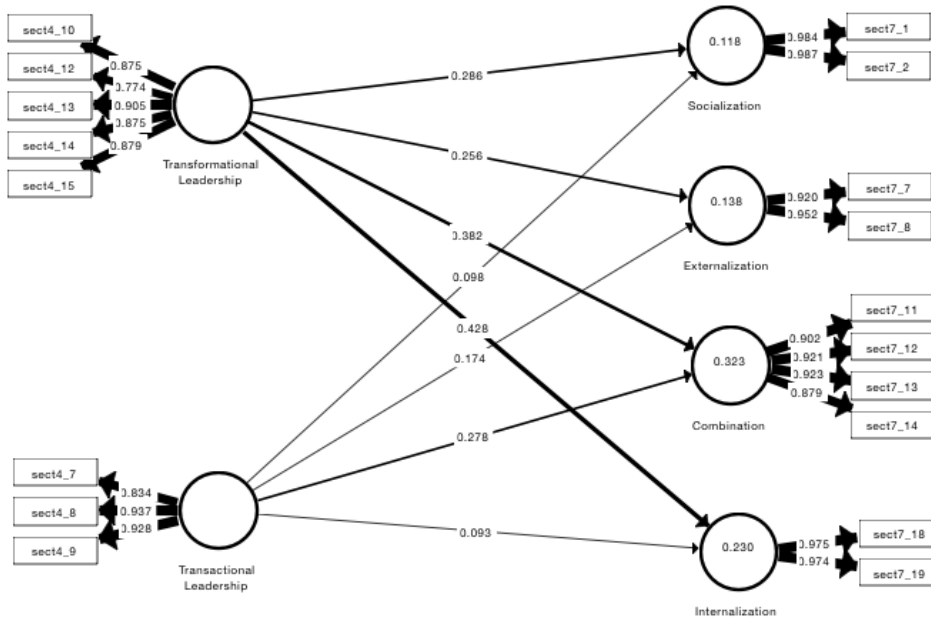
PLS MGA for Age group 31-35
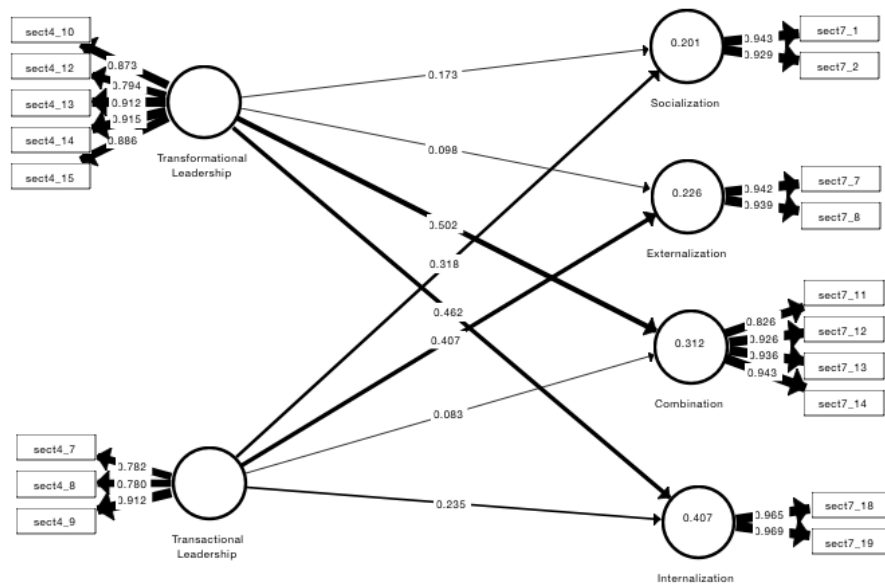
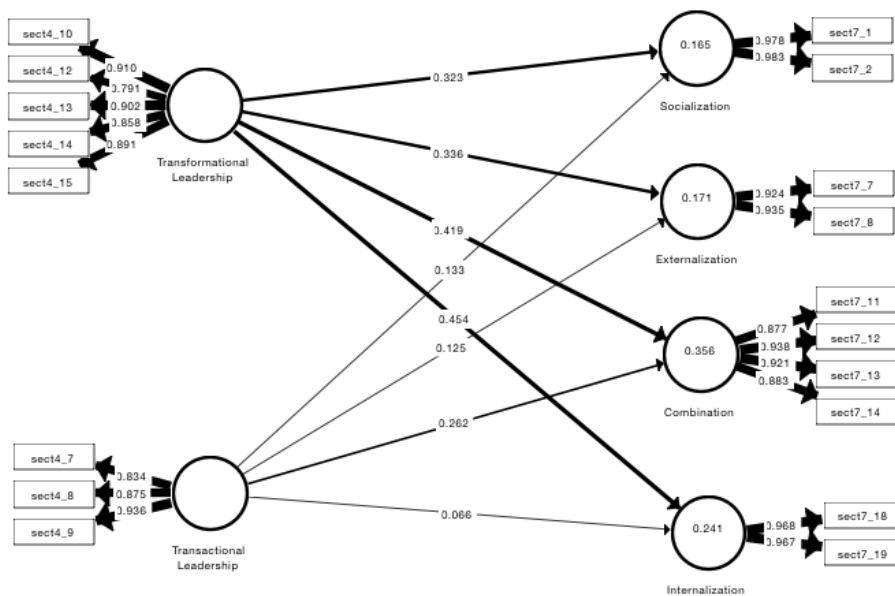PLS MGA for Age group 36-40
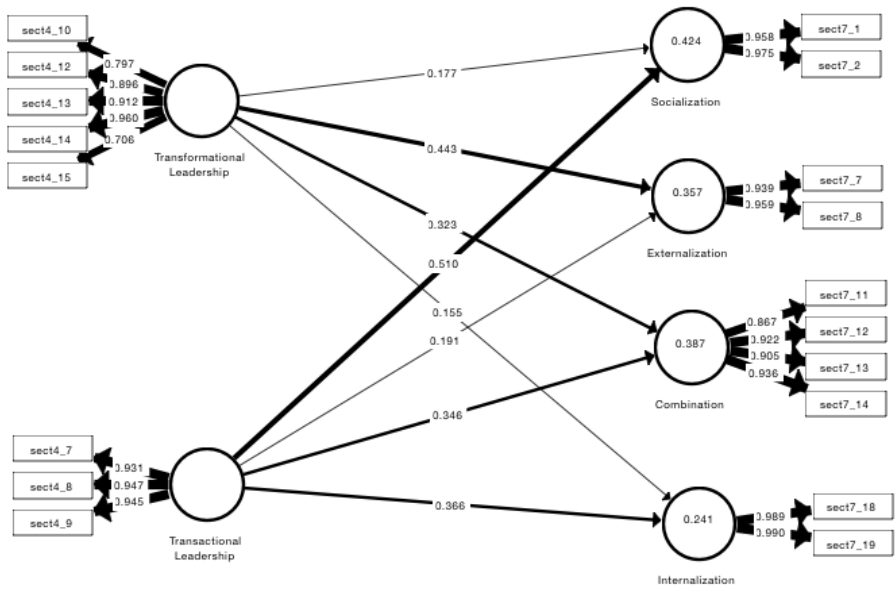
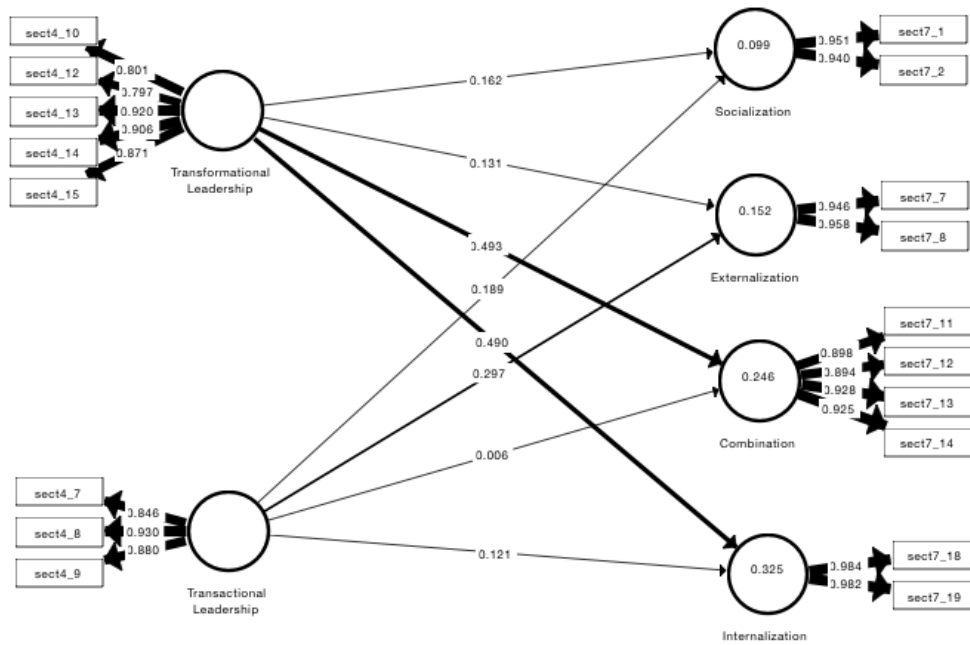PLS MGA for Age group 46-50
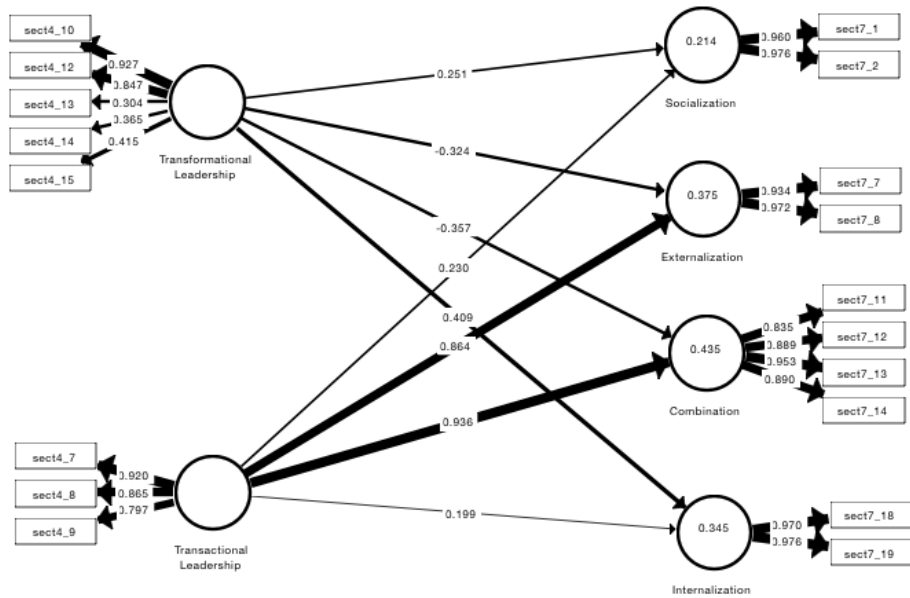
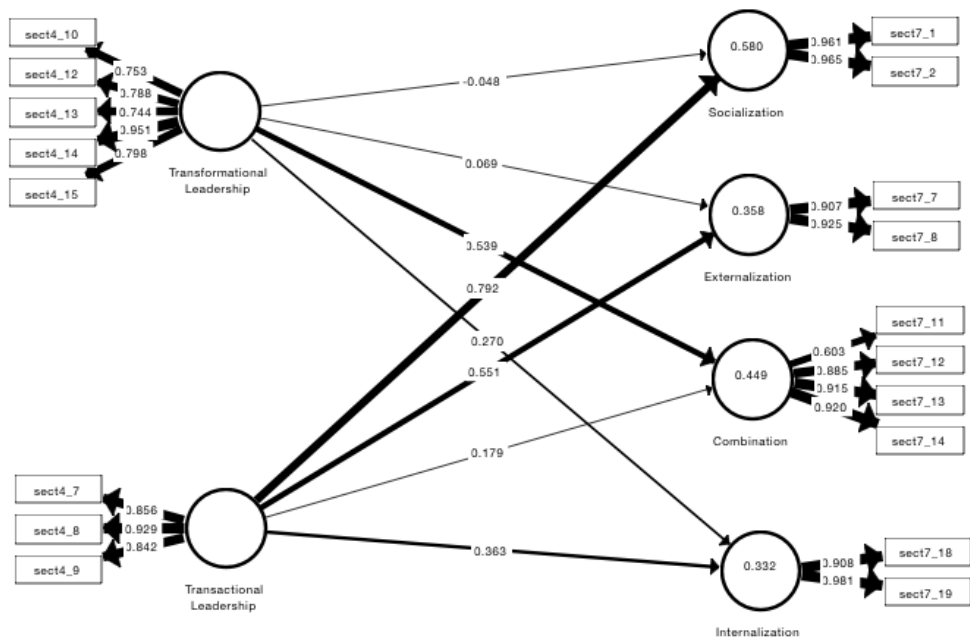## PLS MGA for Age above 50

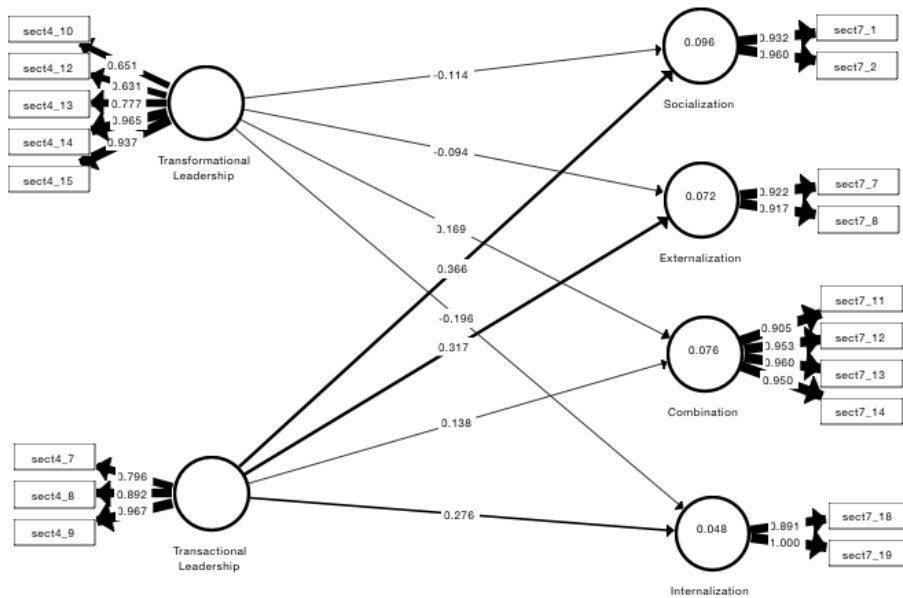## PLS MGA for below 5 years of work experience

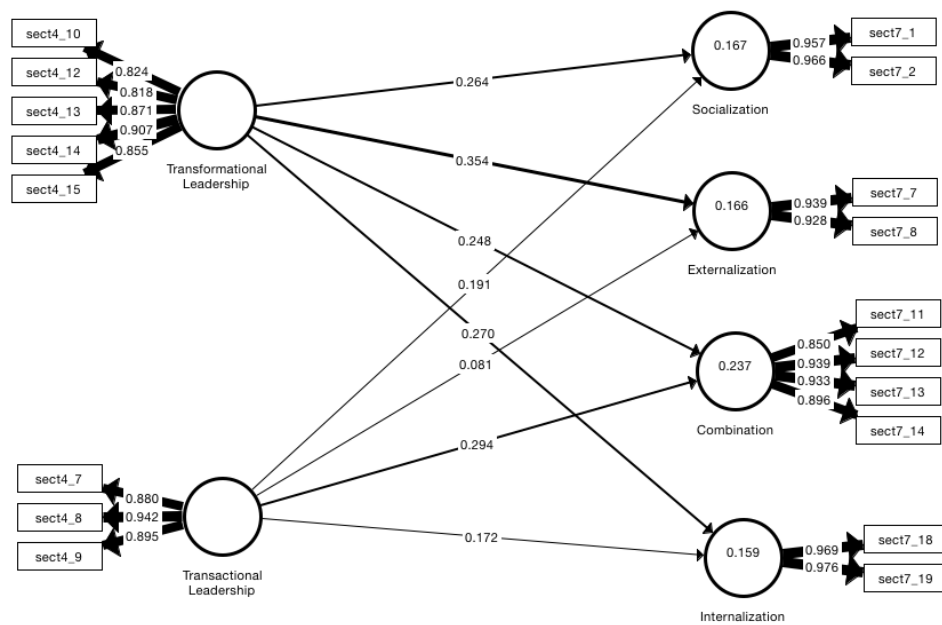## PLS MGA for 6-10 years of work experience

PLS MGA for 11-15 years of work experience
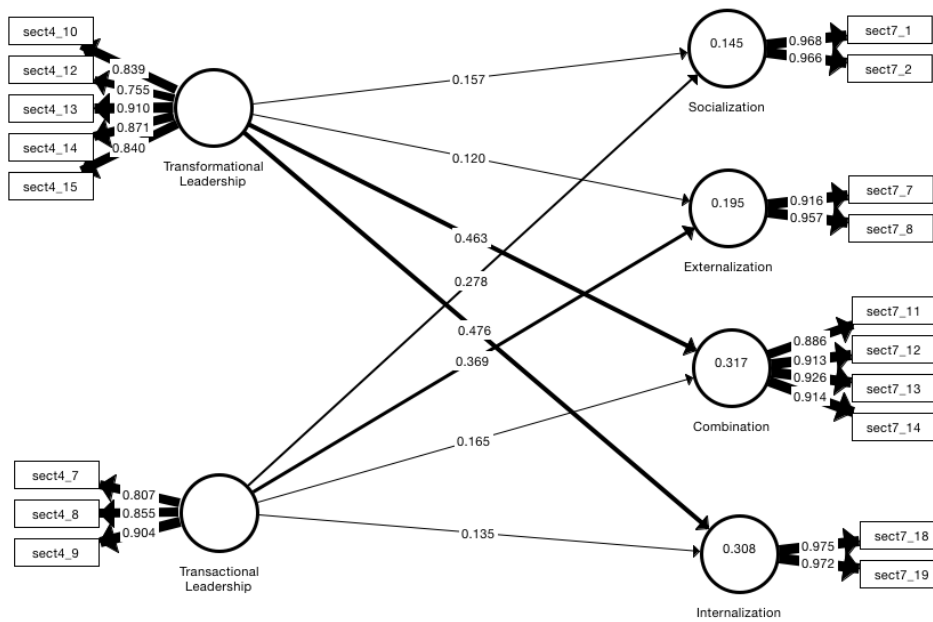
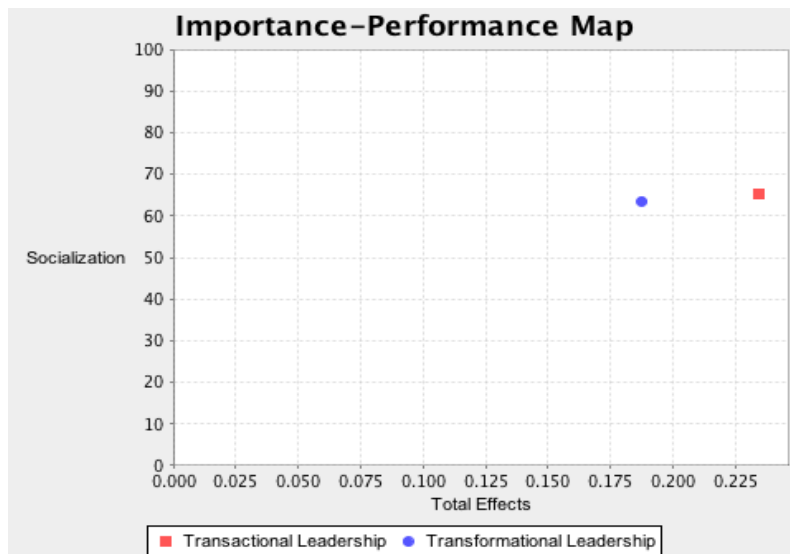## PLS MGA for above 25 years of work experience
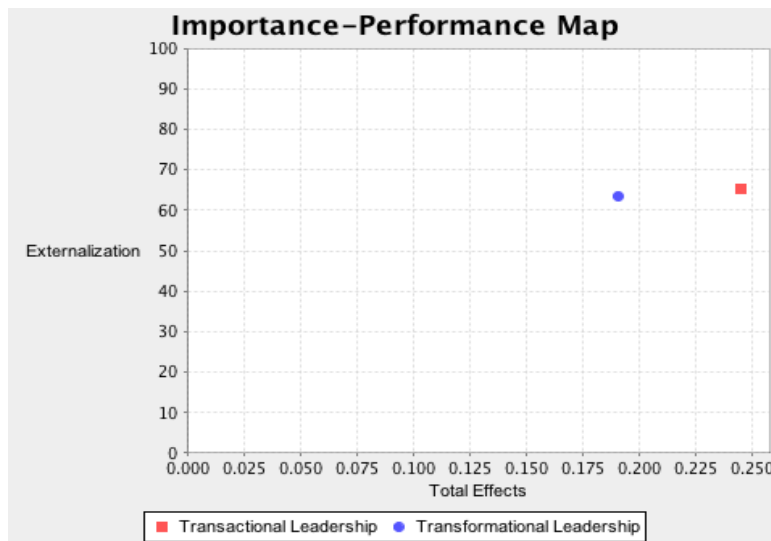

PLS MGA for Male
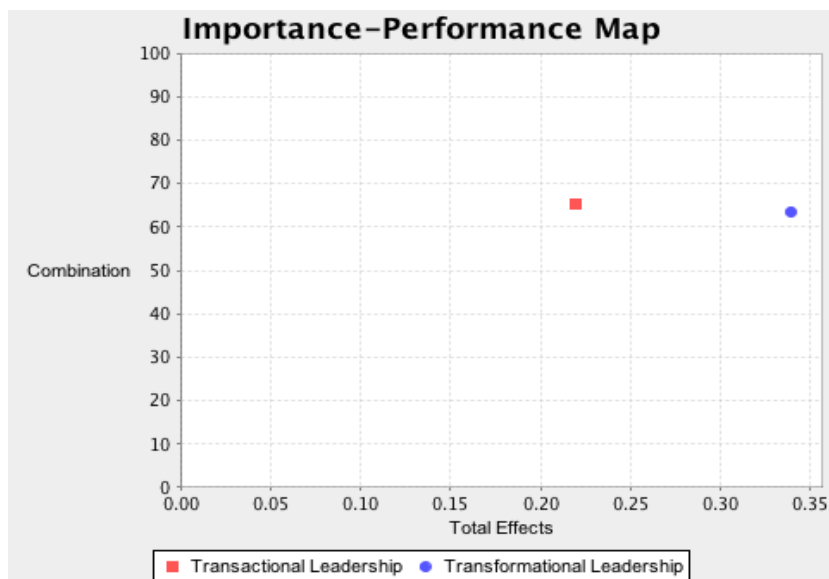
PLS MGA for Female

IPMA for Socialization

IPMA for Externalization

IPMA for Combination

IPMA for Internalization

Importance-Performance Map

Internalization (y-axis: 0 to 100)
Total Effects (x-axis: 0.00 to 0.35)

■ Transactional Leadership ● Transformational Leadership