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Ranking the Dimensions of Transformational Leadership Using Entropy-Weighted TOPSIS: Evidence from Myanmar's Private Sector

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Abstract

This paper reports a supplementary multi-criteria decision-making (MCDM) analysis and a set of demographic group comparisons drawn from a doctoral study of transformational leadership (TL) in Myanmar's private sector (N = 384), distinct from a companion paper's regression-based hypothesis testing. Using the five TL dimensions of Bass and Avolio's (2004) Full Range Leadership Model Idealized Attributes (IA), Idealized Behaviour (IB), Inspirational Motivation (IM), Intellectual Stimulation (IS) and Individualized Consideration (IC) as alternatives, and the three outcome regression models (Extra Effort, Perceived Effectiveness, Satisfaction with Leadership) as criteria, an entropy-weighted Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS; Hwang & Yoon, 1981) ranked the dimensions as IM (closeness coefficient = .921) > IS (.669) > IB (.557) > IC (.291) > IA (.184), corroborating and sharpening the regression-based evidence through an independent, objective ranking logic. Entropy weights assigned Extra Effort the largest criterion weight (56.9%), reflecting that criterion's discriminating power across the five dimensions. Independent-samples t-tests showed that female employees rated their leaders significantly more favourably than male employees on every TL dimension (d = 0.22–0.30), while one-way ANOVA showed a significant age-group effect on overall TL perception; neither gender nor age significantly affected the three outcome variables, and neither tenure nor education showed significant effects anywhere. The findings offer Myanmar's private-sector organisations a prioritised, demographically robust basis for leadership-development investment.

Keywords: transformational leadership; TOPSIS; entropy weighting; multi-criteria decision-making; demographic moderation; Myanmar; MLQ

1. Introduction

Transformational leadership (TL) has become one of the most extensively validated leadership constructs in management research, and Bass and Avolio's (2004) Full Range Leadership Model, together with its associated Multifactor Leadership Questionnaire (MLQ Form 5X), remains the dominant instrument through which the construct is operationalised. The model identifies five measurable facets of transformational leadership: Idealized Attributes (IA) and Idealized Behaviour (IB), together constituting idealised influence; Inspirational Motivation (IM); Intellectual Stimulation (IS); and Individualized Consideration (IC) (Bass & Avolio, 2004; Bass & Riggio, 2006). A large empirical literature links these dimensions, individually and jointly, to favourable employee outcomes such as extra effort, perceived leader effectiveness and satisfaction with leadership (Garzón-Lasso et al., 2024; Podsakoff, MacKenzie, & Bommer, 1996).

A companion paper drawn from the same doctoral dataset reports the core hypothesis-testing results for a sample of 384 employees of private-sector organisations in Myanmar: three multiple regression models in which the five TL dimensions jointly explain between 77.6% and 83.2% of the variance in Extra Effort, Perceived Effectiveness and Satisfaction with Leadership respectively. Because the five TL dimensions are themselves extremely highly intercorrelated (r = .915 to .958) and carry variance inflation factors between 12.03 and 17.67, the individual regression coefficients reported in that companion analysis are informative but statistically unstable taken one at a time, and because the three outcome models were estimated separately, regression alone cannot generate a single, unambiguous ranking of the five dimensions by their overall contribution across all three outcomes simultaneously.

This is a welcome supplement to the companion regression-based paper and the present paper takes a different empirical reading than that paper.. It reports a supplementary entropy-weighted Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) analysis (Hwang & Yoon, 1981) that triangulates the regression findings through an independent, objective, weight-free multi-criteria decision-making (MCDM) procedure, and it reports the study's demographic group-comparison results — independent-samples t-tests by gender and one-way ANOVA by age group, tenure and educational qualification — neither of which forms part of the companion paper's focus on the central regression models. Together, these two strands of evidence answer a question that pure hypothesis testing of Set I (the TL-to-outcome relationship) cannot answer on its own: which specific facets of transformational leadership are most worth prioritising in Myanmar's private sector, and does the answer to that question, or the underlying perception of leadership itself, vary systematically across employee sub-groups?

Theoretically and also practically, this angle is important. Empirically, it addresses a long-standing methodological concern of the MLQ literature, namely the difficulty of separating the five transformational sub-dimensions of the MLQ (Avolio, Bass, & Jung, 1999; Tejeda, Scandura, & Pillai, 2001), by providing a second, completely different analytical logic distance-based proximity to a distributional ideal profile, rather than partial. regression coefficients to see whether an independent method converges on the same ordering. Practically, it responds directly to the fourth component of the study's conceptual framework, in which employee demographic characteristics (age, gender, tenure and educational qualification) are theorised as potential moderators of how transformational leadership is perceived and experienced. Myanmar's private sector remains comparatively under-researched in the international leadership literature, and no existing Myanmar-based study has combined a large-sample, psychometrically validated TL survey with an entropy-weighted multi-criteria ranking of its constituent dimensions. The present paper fills this specific gap.

For this reason this paper is structured on two research questions which are different from and complementary to those covered in the accompanying regression paper:

RQ1: What overall rank order of the five dimensions of transformational leadership and the three outcome criteria (Extra Effort, Perceived Effectiveness, Satisfaction with Leadership) is obtained when the three criteria are analyzed together, using an objective entropy-weighted TOPSIS procedure; is this rank order confirming or qualifying the results of the regression analysis?

RQ2: Are there significant differences among employees with regard to gender, age group, length of service and education level on transformational leadership as well as on the three outcome constructs, and does such difference exist for the strength of the relationship between the three outcome constructs and transformational leadership?

The contribution of this paper is therefore deliberately narrow and complementary rather than duplicative: it does not re-estimate or re-report the three outcome regression models themselves, which remain the subject of the companion paper, but instead takes those models' standardised coefficients as inputs to an independent ranking procedure, and reports an entirely separate set of analyses — the demographic group comparisons that the companion paper's focus on the central hypothesis-testing results does not cover in detail. In combination, the two papers offer a more complete empirical account of the thesis's findings than either could offer alone: one paper establishes that transformational leadership matters, and by how much; this paper establishes which specific facets of transformational leadership matter most, ranked through a method that does not depend on the stability of individual partial-regression coefficients, and for whom, demographically, the perception of that leadership differs.

The remainder of the paper proceeds as follows. Section 2 reviews the relevant transformational leadership and TOPSIS/MCDM methodological literature. Section 3 summarises the sample, instrument and the entropy-weighted TOPSIS procedure. Section 4 reports the TOPSIS decision matrix, entropy weights, separation distances, final closeness-coefficient ranking, and the demographic group-comparison results. Section 5 discusses these findings in relation to theory and the regression evidence reported elsewhere, and Section 6 concludes with implications, limitations and directions for future research.

2. Literature Review

2.1 Transformational Leadership and the Five-Dimension Structure

The conceptual roots of transformational leadership go back to Burns' (1978) distinction between transactional and transforming political leadership, which was adopted for organisational settings by Bass and Avolio (2004) in the Full Range Leadership Model.. Bass and Riggio (2006) describe transformational leaders as those who motivate followers by articulating a compelling vision, modelling ethical and exemplary conduct, stimulating creative and critical thinking, and attending to followers' individual developmental needs. The model's five empirically measured dimensions Idealized Attributes, Idealized Behaviour, Inspirational Motivation, Intellectual Stimulation and Individualized Consideration — are theorised as conceptually distinct but complementary facets of a single underlying leadership style (Bass & Avolio, 2004).

A substantial empirical literature associates transformational leadership with favourable employee outcomes. Garzón-Lasso et al. (2024), for example, report that the full-range leadership style is significantly associated with leader effectiveness, employee satisfaction and extra effort, echoing the three outcome constructs examined in the present study's dataset. At the same time, a parallel body of methodological literature has long raised a discriminant-validity caution specific to the MLQ's five-dimension structure: Avolio, Bass, and Jung (1999) and Tejeda, Scandura, and Pillai (2001) both note that the TL sub-scales tend to correlate highly with one another across samples, and Antonakis, Avolio, and Sivasubramaniam (2003) similarly scrutinise the factorial structure of the full-range model using the MLQ. This tension between a well-established five-dimension theoretical structure and persistently high empirical intercorrelation among its components — is precisely the backdrop against which a supplementary, non-regression-based ranking technique such as TOPSIS becomes analytically valuable, since it does not require the five dimensions to behave as independent predictors in order to produce an interpretable ordering of their relative contribution.

2.2 TOPSIS and Entropy Weighting as a Multi-Criteria Decision-Making Technique

The Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) was introduced by Hwang and Yoon (1981) as a multiple-attribute decision-making method for ranking a set of alternatives against several evaluation criteria simultaneously. The method sets a hypothetical best and a hypothetical worst alternatives (called positive and negative ideal alternatives) on each criterion and then calculates the Euclidean distance between each alternative and both the best and the worst, and then expresses this distance in a single closeness coefficient between 0 and 1, where the closer the alternative to the best alternative and the further the alternative to the worst alternative, the greater this closeness coefficient. Frequently, TOPSIS is used in conjunction with the Shannon entropy weighting, which is a fully objective and data-driven alternative technique, because criterion weights are required for TOPSIS, and the weights assigned to the criteria by the experts are subjective, adding an extra element of researcher judgment into the ranking process: the criterion values with relatively large differences among the alternatives to be ranked are given larger weights, while the criterion values with relatively small differences are given smaller weights (Hwang & Yoon, 1981). In recent studies, Entropy-weighted TOPSIS is used in organisational and leadership related ranking problems. Altıntaş (2026) applies an entropy-based TOPSIS model to measure and rank innovation performance of selected Balkan economies, demonstrating the capability of the TOPSIS model to rank more than one alternative among the criteria whose relative importance is not known in advance.. Sowmya (2024) develops a TOPSIS-based predictive analytics framework specifically to evaluate ethical leadership outcomes in a higher-education setting, directly paralleling the present paper's use of TOPSIS to rank leadership-related criteria. The Universiti Teknologi MARA (2024) technical report likewise applies the entropy-TOPSIS method to a multi-criteria organisational decision problem — software selection for a private hospital — demonstrating the method's general applicability to ranking problems in which several weighted, objectively measured criteria must be reconciled into a single decision-relevant ordering. None of this prior literature, however, has applied entropy-weighted TOPSIS specifically to rank the sub-dimensions of transformational leadership using regression-derived coefficients as the decision-matrix inputs, nor has it done so within a Myanmar private-sector sample the specific contribution the present paper makes.

A further methodological attraction of the entropy-weighted TOPSIS approach, specific to the present application, is that it offers a principled way of synthesising evidence from several separately estimated regression models without requiring the five TL predictors used to construct those models to be statistically independent of one another. Ordinary least squares regression penalises highly intercorrelated predictors by inflating their standard errors, a well-documented consequence of multicollinearity (Field, 2018), but TOPSIS operates on the already-estimated coefficients as fixed inputs and evaluates each alternative's geometric distance from ideal reference points rather than attempting to partition shared variance among correlated criteria. This makes it a useful complementary technique specifically in settings such as the MLQ's five-dimension structure — where the discriminant-validity of the underlying predictors is itself in question (Avolio, Bass, & Jung, 1999; Tejeda, Scandura, & Pillai, 2001), since the ranking it produces does not depend on resolving that discriminant-validity question first.

2.3 Demographic Characteristics and the Perception of Leadership

Another line of research concerns the moderation of both perceptions of transformational leadership and the downstream outcomes by the employee demographic characteristics. Cultural and contextual factors such as power distance are known to shape how subordinates perceive and report on their leaders (Hofstede, 2001), and Fischer and Mansell (2009) note that affective and evaluative responses to authority can vary systematically across cultural and demographic sub-groups, a consideration of particular relevance in Myanmar's high-power-distance, collectivist private-sector workforce. Whether such variation in perception also disturbs the strength of the leadership–outcome relationship itself, or is confined to the perception of leadership alone, is an empirical question this paper addresses directly for gender, age group, tenure and educational qualification.

A related consideration, bearing directly on the demographic comparisons reported in this paper, is the risk of common-method bias in single-source, self-report survey data of the kind the MLQ relies upon (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Because both the leadership-perception items and the outcome items in the underlying dataset were collected from the same respondent at the same point in time, any demographic difference observed in the perception measures could, in principle, partly reflect a general response-style difference between demographic groups rather than a genuine difference in the leadership behaviour being rated. This consideration does not invalidate the demographic comparisons reported below, since independent-samples t-tests and ANOVA remain the appropriate techniques for testing mean differences across naturally categorical groups regardless of the measurement design, but it does counsel some caution in attributing the observed gender and age differences in TL perception to leadership behaviour alone, rather than partly to differences in how different demographic groups use self-report rating scales.

Taken together, the literature reviewed here identifies a clear gap that the present paper is positioned to close: an entropy-weighted TOPSIS ranking of the MLQ's five transformational leadership dimensions, triangulating a regression-based analysis, combined with a systematic demographic comparison of leadership perceptions and outcomes, within a large-sample, psychometrically validated survey of Myanmar's private-sector workforce.

3. Methodology

3.1 Research Design, Sample and Instrument

The study from which this paper's results are drawn adopted a positivist, deductive, cross-sectional survey design (Saunders, Lewis, & Thornhill, 2019). Data were collected between 2022 and 2025 from employees of private-sector organisations in Myanmar using a modified 36-item version of the Multifactor Leadership Questionnaire (MLQ Form 5X; Bass & Avolio, 2004), comprising 20 items across the five TL dimensions (IA, IB, IM, IS, IC), 12 items across three employee-outcome constructs (Extra Effort [EE], Perceived Effectiveness [EFF], and Satisfaction with Leadership [SAT]), and four demographic items (age group, gender, highest educational qualification, and tenure with the current organisation). All substantive items were rated on a five-point Likert scale and then scored as subscale means. To determine required sample size, a formula for an unknown population was used (Cochran 1977; $n = Z^2PQ/E^2 \approx 384$ at the 95% confidence level and 5% margin of error), and no cases were found with any missing data, resulting in 384 valid cases following listwise deletion of incomplete responses.

Convenience and snowball sampling were used to recruit the respondents from LinkedIn, HR networks in over 100 private-sector organisations, and through professional referral chains, and the sample was even split by gender (192 female, 192 male), skewed to the 26 to 35 age band (47.4%), were predominantly graduate educated (62.2%) and were most concentrated in the 1 to 3 year tenure band (31.8%).The instrument demonstrated excellent reliability overall (Cronbach's $\alpha = .987$ for all 36 items) and at the level of each of the eight constituent subscales (α ranging from .954 to .975).

3.2 Entropy-Weighted TOPSIS Procedure

The TOPSIS ranking reported in this paper treats the five TL dimensions as the alternatives to be ranked and the three outcome regression models (EE, EFF, SAT) as the three evaluation criteria. The decision matrix was constructed using the absolute value of each TL dimension's standardised regression coefficient ($|\beta|$) from the three multiple regression models reported in the companion paper, in which each outcome variable was regressed simultaneously on all five TL dimensions. Using the absolute value of a negative, non-significant coefficient (specifically, IC's $\beta = -.010$ in the Extra Effort model) follows standard TOPSIS convention and does not indicate measurement error.

Shannon entropy weights for the three criteria were computed following Hwang and Yoon (1981). For $m = 5$ alternatives and a given criterion j, the entropy of that criterion is calculated as $ejj = -k \Sigma_i p_{ij} \ln(p_{ij})$, where p_{ij} is alternative i's proportion of the column total for criterion j and $k = 1/\ln(m)$ normalises the entropy to the [0,1] interval; the degree of diversification is $d_j = 1 - e_j$, and the final entropy weight is $w_j = d_j / \Sigma d_j$. A criterion whose $|\beta|$ values vary substantially across the five TL dimensions therefore receives a proportionally larger weight than a criterion whose values are relatively uniform across dimensions, since the former carries more discriminating power for distinguishing the alternatives.

The decision matrix was then vector-normalised to remove scale differences among the three criteria, producing a normalised matrix R, which was multiplied by the entropy weights to produce a weighted-normalised matrix V. The positive ideal solution (A^+) was defined as the vector of maximum values achieved on each criterion within V, and the negative ideal solution (A^-) as the vector of minimum values. Each TL dimension's Euclidean separation distance from the positive ideal (S^+) and from the negative ideal (S^-) was computed, and the closeness coefficient for each dimension was derived as $CC = S^- / (S^+ + S^-)$, a value bounded between 0 and 1 in which values closer to 1 indicate a profile closer to the ideal best solution across all three weighted criteria simultaneously.

3.3 Demographic Group-Comparison Procedures

Independent-samples t-tests were used to compare mean scores on the five TL dimensions, the overall TL composite (TL_Mean) and the three outcome variables between female and male respondents, with effect sizes expressed as Cohen's d and classified as small (≥ 0.20), medium (≥ 0.50) or large (≥ 0.80) (Cohen, 1988). Proceeding with the comparisons, the mean scores of TL_Mean and the three outcome variables were compared across the age group and the three levels of tenure and highest educational qualification, respectively, using one-way ANOVA. All of the analyses were performed using IBM SPSS Statistics Version 26, and the criterion for statistical significance was set at $p < .05$ (two-tailed). The equality of variances underlying each t-test comparison was assessed using Levene's test, and the effect size for ANOVA comparisons was interpretable against conventional benchmarks of small (ETS $\geq .01$), medium (ETS $\geq .06$) and large (ETS $\geq .14$) (Cohen, 1988) which are consistent with the general analytical framework reported in the companion regression paper.

4. Results

4.1 Decision Matrix and Entropy Weights

Table 1 presents the TOPSIS decision matrix structure; the absolute standardised regression coefficients of the five TL dimensions for each of the three outcome criteria in the three regression models reported in the companion regression-based paper.

Table 1 TOPSIS Decision Matrix (|β| Values from the Three Outcome Regression Models)

TL dimension	EE criterion	EFF criterion	SAT criterion
Idealized Attributes (IA)	.084	.020	.134
Idealized Behaviour (IB)	.209	.168	.200
Inspirational Motivation (IM)	.370	.276	.110
Individualized Consideration (IC)	.010	.255	.212
Intellectual Stimulation (IS)	.245	.211	.276

Using k = 1/ln(5) = .6213, the Shannon entropy and degree of diversification for each criterion were computed, yielding final entropy weights of w(EE) = .569, w(EFF) = .330 and w(SAT) = .101. The Extra Based on the entropy weight, therefore, Effort criterion had the highest value (56.9%), followed by Effectiveness (33.0%) and Satisfaction (10.1%). This pattern directly reflects the wide range of |β| values given in Table 1, with the five dimensions' |β| values for the criterion of Extra Effort ranging from .010 (IC) to .370 (IM) and is very discriminating between the five alternatives, but the criterion Satisfaction's |β| values are comparatively more similar, ranging from .110 to .276, making it less discriminating and therefore more lightly weighted. A high entropy weight for a criterion does not imply that the criterion has more of an influence on the five TL dimensions on this particular dataset, but rather that the criterion has statistical power to differentiate across the five TL dimensions.

4.2 Normalization and Separation Distances

The weighted values on EE and EFF criteria were the maximum for A+, and the minimum for A−, to get the positive and negative ideal solutions A^+ = (.4226, .1968, .0640) and A^- = (.0114, .0143, .0255), respectively, for Inspirational Motivation and Intellectual Stimulation on the same two criteria, and on the SAT criterion for A− and A+ for Idealized Attributes and Individualized Consideration, respectively. The separation distance in the Euclidean sense for each TL dimension to both of the ideal points is reported in Table 2.

Table 2 Separation Distances from the Positive and Negative Ideal Solutions

TL dimension	S^+ (distance from ideal best)	S^- (distance from ideal worst)
Idealized Attributes (IA)	.3757	.0847
Idealized Behaviour (IB)	.2001	.2515
Inspirational Motivation (IM)	.0385	.4499
Individualized Consideration (IC)	.4117	.1692
Intellectual Stimulation (IS)	.1501	.3034

Inspirational Motivation sits closest of all five dimensions to the positive ideal solution ($S^+ = .0385$) and furthest from the negative ideal ($S^- = .4499$), while Individualized Consideration sits furthest from the positive ideal ($S^+ = .4117$), even further than Idealized Attributes ($S^+ = .3757$).

4.3 Final TOPSIS Ranking

Each TL dimension has its closeness coefficient, $CC = S^- / (S^+ + S^-)$, which incorporates both separation distances into a single final ranking score, as shown in Table 3.

Table 3 Final Entropy-Weighted TOPSIS Ranking of the Five Transformational Leadership Dimensions

Rank	TL dimension	Closeness coefficient (CC)
1	Inspirational Motivation (IM)	0.921
2	Intellectual Stimulation (IS)	0.669
3	Idealized Behaviour (IB)	0.557
4	Individualized Consideration (IC)	0.291
5	Idealized Attributes (IA)	0.184

The TOPSIS analysis places Inspirational Motivation decisively first (CC = 0.921), far ahead of the second-ranked Intellectual Stimulation (CC = 0.669), with Idealized Behaviour a more moderate third (CC = 0.557), Individualized Consideration fourth (CC = 0.291), and Idealized Attributes last (CC = 0.184). Inspirational Motivation's top rank reflects its dominant role as the strongest single predictor in both the Extra Effort model ($\beta = .370$, the largest coefficient in that model) and the Effectiveness model ($\beta = .276$), even though it was not a significant predictor of Satisfaction: because the heavily entropy-weighted Extra Effort criterion rewards Inspirational Motivation's outsized contribution there, its overall multi-criteria profile outranks dimensions that are more consistently, but less dramatically, significant across all three outcomes. Intellectual Stimulation's second-place rank is consistent with it being the only dimension significant in all three regression models; its balanced, consistently moderate-to-strong contribution across all three criteria earns it a strong, broadly based TOPSIS score even though no single one of its coefficients is as large as Inspirational Motivation's peak coefficient.

Idealized Attributes' last-place rank corroborates the regression finding that it was not a significant predictor in any of the three outcome models, despite being the single most favourably rated TL dimension in the study's purely descriptive statistics ($M = 3.9629$, the highest of the five composite means). Individualized Consideration's fourth-place rank offers a useful refinement to the simpler regression picture: although it was a significant predictor in two of the three regression models (Effectiveness and Satisfaction), its essentially null, slightly negative Extra Effort coefficient ($\beta = -.010$) the single lowest value on the most heavily weighted criterion pulls its overall multi-criteria closeness score down substantially, placing it fourth rather than third.

4.4 Demographic Group Comparisons

4.4.1 Gender

Given the perfectly balanced gender composition of the sample (192 female, 192 male), independent-samples t-tests examined whether female and male respondents differed in their mean ratings of the five TL dimensions, the overall TL composite, and the three outcome variables. Table 4 reports these results.

Table 4 Independent-Samples t-Test Results by Gender (N = 384; female n = 192, male n = 192)

Variable	Female M (SD)	Male M (SD)	t(382)	P	Cohen's d	Significant?
IA_Mean	4.1432 (1.050)	3.7826 (1.314)	2.971	.003	0.303	Yes
IB_Mean	4.0872 (1.024)	3.8242 (1.316)	2.185	.029	0.223	Yes
IM_Mean	4.1133 (1.043)	3.7565 (1.343)	2.907	.004	0.297	Yes
IC_Mean	4.0313 (1.066)	3.7526 (1.316)	2.280	.023	0.233	Yes
IS_Mean	4.0872 (1.046)	3.7643 (1.318)	2.659	.008	0.271	Yes
EE_Mean	4.0729 (1.093)	3.8516 (1.299)	1.807	.072	0.184	No
EFF_Mean	4.0221 (1.145)	3.8021 (1.309)	1.753	.080	0.179	No
SAT_Mean	4.0104 (1.174)	3.8060 (1.357)	1.579	.115	0.161	No
TL_Mean	4.0924 (1.011)	3.7760 (1.298)	2.664	.008	0.272	Yes

Across every one of the five TL dimensions and the overall TL composite, female respondents rated their leaders significantly more favourably than male respondents did, with Cohen's d values ranging from 0.223 (IB) to 0.303 (IA) — small-to-medium effects by Cohen's (1988) conventions. By contrast, none of the three downstream outcome variables showed a statistically significant gender difference (EE: p = .072; EFF: p = .080; SAT: p = .115), with correspondingly smaller effect sizes (d = 0.184, 0.179 and 0.161 respectively). There is thus a small but significant difference between women and men in their ratings of their leader's transformational behaviours, which does not manifest in the performance of extra effort, leadership effectiveness, or satisfaction ratings by gender.

4.4.2 Age Group, Tenure and Education

One-way ANOVA was performed to determine if the mean ratings for TL_Mean, EE_Mean, EFF_Mean and SAT_Mean were different across the age group, tenure, and highest educational qualification category. Table 5 reports these results.

Table 5 One-Way ANOVA Results by Age Group, Tenure, and Education

Dependent variable	Age group F(4, 379)	P	Tenure F(4, 379)	p	Education p
TL_Mean	3.047	.017 (significant)	0.415	.916	.321
EE_Mean	1.990	.095	0.415	.797	.481
EFF_Mean	1.244	.292	0.532	.712	.163
SAT_Mean	1.764	.135	1.764	.844	.111

Note. Results significant at the 0.05 level. TL_Mean's Education F-statistic is not included in the original SPSS output, only p = .321 is available. The Tenure F-value of 1.764 for SAT_Mean is exactly the same as in the source output, and the presence of this value is identical to the Age-group F-statistic for SAT_Mean likely represents a transcription artefact in the original reporting of this F-value rather than a separate error in calculation.

Just one of these 12 ANOVA tests is conventionally statistically significant: TL_Mean has significantly different means among the 5 age groups, F(4, 379) = 3.047, p = .017. The other 11 comparisons fail to reach the .05 level of significance: EE_Mean, EFF_Mean or SAT_Mean by age group; TL_Mean, EE_Mean, EFF_Mean or SAT_Mean by tenure; or EE_Mean, EFF_Mean or SAT_Mean by education. The single significant age-group finding must, however, be read with an important caveat: the oldest age bracket (56–65 years) contains only a single respondent, which makes standard post-hoc pairwise comparisons (e.g., Tukey's HSD) unreliable for any comparison involving that group. The substantively safer conclusion is that age is associated with modest variation in aggregate TL perception among the four substantially populated age groups, rather than that any specific pair of age groups can be shown to differ. Tenure and education are not significantly related to TL perception anywhere in Table 5 or with any of the three outcome variables.

4.5 Summary of the Results

The entropy-weighted TOPSIS analysis and the results from the demographic group-comparison analysis yield one clear and consistent empirical picture, which is different but fully consistent with the results of the regression analysis presented in the accompanying paper. The independent, weight-free TOPSIS ranking, Inspirational Motivation (CC = .921) > Intellectual Stimulation (.669) > Idealized Behaviour (.557) > Individualized Consideration (.291) > Idealized Attributes (.184), confirms and focuses the regression evidence to one final decision-relevant ordering. The demographic comparisons reveal that gender and age significantly influence perceptions of transformational leadership, without significantly influencing any of the three outcome measures related to the downstream variables, and that tenure and educational qualification are not significantly related anywhere in the data..

5. Discussion

5.1 What the TOPSIS Ranking Adds to the Regression Evidence

The central contribution of this entropy-weighted TOPSIS analysis is to answer, in a completely new analytical logic, a question that the three regression models can answer individually, but not directly together: What is the most useful dimension of TL as a whole, based on the three outcome criteria? To have both two different methods — one based on partial regression coefficients computed under considerable multicollinearity, and the other method based on a distance measure that requires neither linearity nor independence assumptions — arriving at broadly the same ordering (Inspirational Motivation and Intellectual Stimulation at the top, and Idealized Attributes at the bottom) is a noteworthy finding, one that indicates that the differentiation between the five

dimensions is an actual feature of the way in which Myanmar private-sector employees experience their leaders, and not an artefact of either method used alone. The TOPSIS ranking also reveals the importance of a certain nuance that a predictor-by-predictor analysis of the regression tables may not pick up: Despite being a powerful predictor in two of the three regression models, Individualized Consideration ranked fourth on the TOPSIS list. As the most discriminating criterion in this set (w = .569) and with essentially no contribution to the specific criterion (β = -.010), the overall multi-criteria profile of the criterion Individualized Consideration is pulled down considerably relative to where a simple count of "how many regression models was this dimension significant in" would place it. This illustrates a general strength of entropy-weighted MCDM methods applied to leadership-dimension ranking problems: the weighting is derived directly from the discriminating power actually observed in the data, rather than from a researcher's or expert panel's a priori judgement about which outcome criterion matters most (Hwang & Yoon, 1981), a property that recommends the technique for similar ranking problems in other leadership-research contexts, as illustrated by its recent application to innovation-performance ranking (Altıntaş, 2026) and to ethical-leadership outcome evaluation (Sowmya, 2024).

This triangulated ordering is also broadly consistent with the wider empirical literature linking the full-range leadership style to effectiveness, satisfaction and extra effort (Garzón-Lasso et al., 2024), in the specific sense that vision-oriented and intellectually engaging leadership behaviours have repeatedly been found, across different national and organisational settings, to carry more of the explanatory weight for follower effort and performance perceptions than the more attribution-based idealised-influence facet. Beyond this general consistency, the present entropy-weighted TOPSIS analysis provides a quantitative statement of how much more weight Inspirational Motivation and Intellectual Stimulation carry in this particular sample of the private sector in Myanmar compared to Idealized Attributes, in this case a closeness coefficient of almost five times greater for Inspirational Motivation (0.921) than for Idealized Attributes (0.184), rather than a qualitative impression that some dimensions "matter more" than others. The decidedly high rank of Inspirational Motivation (CC = 0.921) is easily understood in terms of what it is thought to activate, namely a leader who communicates a vision that is both compelling and emotionally engaging, and who communicates high expectations, both of which are factors of the Extra Effort criterion, which is included at a much higher weight in the overall ranking. The second-place ranking of Intellectual Stimulation is a result of a different, more even profile: Not as strong on any single criterion, but consistently good to strong weighted values on all three criteria, which is enough, according to the entropy weighting scheme, to yield the second strongest overall closeness coefficient. Idealized Attributes' last-place ranking is the most salient example of a dimension that on its own has a high rating by employees but that contributes the least uniquely and discriminatingly to the outcomes of their organizations in the overall results of the study (in a manner that is genuinely educative about the ways in which a leadership quality is perceived favourably, as opposed to its real value for differentiating between leaders' contributions to an organization's outcomes).

5.2 Demographic Selectivity in the Perception of Leadership

The demographic results present a selective rather than a uniform pattern, and this selectivity is itself informative. Female employees rated their leaders significantly more favourably than male employees did on every one of the five TL dimensions and on the overall TL composite, with small-to-medium effect sizes (d = 0.223 to 0.303). Age group was significantly associated with the overall TL composite. Yet neither gender nor age significantly affected any of the three downstream outcome variables, and neither tenure nor education showed any significant association anywhere in the analysis. This pattern is consistent with a view in which demographic characteristics shape the lens through which leadership itself is perceived and evaluated plausibly reflecting different relational expectations or sensitivities to particular leadership behaviours, a possibility consistent with the broader literature on how cultural and demographic characteristics shape responses to authority in high-power-distance settings (Hofstede, 2001; Fischer & Mansell, 2009) without that perceptual variation being large enough in magnitude to produce a statistically detectable shift in the ultimate behavioural and attitudinal outcomes that organisations ultimately care about.

This has a direct implication in practice, in that interventions focused directly on TL-driven outcomes for employees (effort, effectiveness, satisfaction) will not necessarily require demographically distinct interventions in their design, although perceptual surveys of TL style might report slight demographically patterned differences in reporting, most notably by gender. The point must however be extended with the additional stipulation that the oldest age group in the sample actually achieved yielded only one member; the substantively defensible finding is that age correlates with a modest aggregate variation in the perception of leadership in the four substantively defensible groups.

5.3 Integrating the Ranking and Demographic Evidence

The TOPSIS ranking and the demographic comparisons taken together offer a single coherent view of the interpretive conclusion, which goes beyond merely reiterating the conclusions from the regression analysis presented in the companion paper. The relative importance of the five TL dimensions — Inspirational Motivation and Intellectual Stimulation clearly ahead of Idealized Behaviour, Individualized Consideration and especially Idealized Attributes is a robust, method-triangulated feature of this dataset, and it appears to hold regardless of which demographic sub-group is being considered, since none of the demographic comparisons reported here examined whether the TOPSIS ranking itself differs by sub-group but the underlying regression coefficients from which it is built were shown, in the companion analysis, to be unmoderated by tenure or education and only modestly moderated by gender and age at the level of overall perception rather than outcome. This suggests that leadership-development investment prioritising Inspirational Motivation and Intellectual Stimulation is likely to be broadly applicable across Myanmar's private-sector workforce, rather than requiring separate prioritisation schemes for different demographic segments of that workforce.

6. Conclusion, Implications, Limitations and Future Research

6.1 Conclusion

This paper has reported two bodies of evidence that extend the companion regression-based paper's central finding that transformational leadership, treated as a composite construct, strongly predicts Myanmar private-sector employees' extra effort, perceived leader effectiveness and satisfaction with leadership — into a more granular and decision-relevant form. First, an entropy-weighted TOPSIS multi-criteria analysis independently ranked the five TL dimensions as Inspirational Motivation (CC = 0.921) > Intellectual Stimulation (0.669) > Idealized Behaviour (0.557) > Individualized Consideration (0.291) > Idealized Attributes (0.184), corroborating and refining the regression evidence through an objective, weight-free ranking logic rather than restating it Second, there was no significant difference in any of the three downstream variables for the gender or aggregate variable (age) when used in comparisons of demographic groups, but there was significant differences in the perceived effect of the three variables when compared among the demographic groups and there was no significant association between the three variables across any of the demographic groups.

6.2 Theoretical and Practical Implications

Theoretically, the convergence of two independent analytical techniques regression and entropy-weighted TOPSIS on the same overall ordering of the five TL dimensions lends additional confidence to a differentiated reading of the Full Range Leadership Model in this context: not all five theorised facets of transformational leadership carry equal weight in shaping Myanmar private-sector employees' effort, effectiveness judgements and satisfaction, and Idealized Attributes in particular appears to function more as a shared perceptual "halo" correlated with the other dimensions than as an independently influential lever, a pattern consistent with the discriminant-validity caution long raised in the broader MLQ literature (Avolio, Bass, & Jung, 1999; Tejeda, Scandura, & Pillai, 2001).

The TOPSIS ranking practically gives the Myanmar (private-sector) organisations a clear sequence and a single focus on where to invest in leadership development – first build capabilities (Inspirational Motivation & Intellectual Stimulation), then develop the Idealized Behaviour (Ethical, Consistent), and finally develop the Individualized Consideration and Idealized Attributes – but Individualized Consideration and Individualized Attributes development should not be seen as the primary levers for achieving the three outcomes examined here.

The demographic findings add a second, complementary practical implication: because the leadership–outcome relationship itself does not appear to be significantly moderated by gender, age, tenure or education, organisations can reasonably treat the TOPSIS-derived prioritisation as broadly applicable across demographic sub-groups, while remaining attentive to the more modest finding that female employees and employees of different age groups may perceive the same leadership behaviours somewhat differently in degree, if not in kind.

6.3 Limitations

Several limitations bear directly on the findings reported in this paper. The TOPSIS decision matrix was constructed from the absolute standardised regression coefficients of a set of five predictors shown, in the companion analysis, to suffer from severe multicollinearity (variance inflation factors of 12.03 to 17.67); although TOPSIS does not require predictor independence in the way ordinary least squares regression does, the decision-matrix inputs themselves inherit whatever instability characterises the underlying beta weights, and the TOPSIS ranking should accordingly be read as a robustness check on, rather than a wholly independent re-estimation of, the regression evidence. The demographic comparisons rely on a non-probability convenience and snowball sample, which limits the extent to which the observed gender and age effects can be generalised to Myanmar's private-sector workforce as a whole, and the single-case oldest age bracket (56–65 years) makes the age-group finding in Table 5 and Section 4.4.2 inherently imprecise. Finally, both the TOPSIS inputs and the demographic comparisons rest on cross-sectional, single-timepoint, self-report data, which precludes any claim that the ranking or the demographic patterns observed here would remain stable over time or would hold under an alternative measurement design that paired employee self-report with supervisor-rated or objective performance data.

6.4 Future Research

The results reported here suggest three possible directions for future research. First, the aggregate-sample used in this paper was employed to rank the five TL dimensions by entropy-weighted TOPSIS. The results of this paper cannot answer the question whether a different relative ordering of the five dimensions would occur if decision matrices were developed for each sub-sample, based on different demographic sub-groups, such as female v male respondents or various age cohorts. Second, future studies should test different combinations of the five dimensions to see if they yield a different relative ranking of the six dimensions, which this paper's results cannot answer. Second, given the discriminant-validity concerns raised by the high inter-dimension correlations underlying the regression coefficients used as TOPSIS inputs, future research should apply confirmatory factor analysis or structural equation modelling to formally test the five-dimension measurement model before further refining dimension-specific rankings. Third, replicating the entropy-weighted TOPSIS procedure with a larger, probability-based sample, and with an adequately powered older-age cohort, would allow the ranking reported here to be validated with greater statistical confidence and would permit the currently underpowered age-group comparison to be resolved more precisely than the present single-case oldest-age-bracket allows.

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