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THE 'BROKEN LINK' IN ORGANIZATIONAL TRAINING ROI: A STUDY OF BEHAVIOURAL CHANGE AND BUSINESS IMPACT IN INDIAN MAHARATNA COMPANIES

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ABSTRACT

India's Maharatna Central Public Sector Enterprises (CPSEs) training ecosystem observe a consistent accountability gap, in spite of the substantial investment in human resource development (HRD). This empirical study observe and evaluate the impact of training in seven selected Maharatna companies such as - IOCL, NTPC, ONGC, SAIL, GAIL, HPCL, and POWERGRID, (anonymously M1 to M7) using the Kirkpatrick's Framework of Four-Level Evaluation, namely Reaction, Learning, Behaviour, and Results. Using a quantitative and longitudinal research design, data collected from a stratified sample of 2,520 employees across Junior, Middle, and Senior management levels of these CPSE. Three standardized training interventions were observed—Supervisory Development, Digital Literacy Enhancement, and Effective Communication— where the evaluation was done using pre- and post-training assessments of the participating employees, dual-source of behavioural ratings, and HOD-rated business impact instruments. Statistical analyses for this study included Paired t-tests, One-Way ANOVA, Pearson Correlation, and Exploratory Factor Analysis. These tools were applied to test five primary research hypotheses. Findings confirm that training is highly effective at the knowledge level (Cohen's $d = 3.37$) but at the same time it reveals a statistically insignificant correlation ($r = 0.08$, $p > 0.05$) between supervisor-rated behavioural change stage (Level 3) and HOD-rated business results pr impact (Level 4)—labelled as the 'Broken Link.' Moreover, a 'Senior Learning Slump' was also observed, where the Senior Managers showed the highest overconfidence gap (4.2%) between their self-perception and their supervisor ratings. Diagnostic factor analysis unveiled Training Infrastructure as the dominant systemic variable—the poor facilities produced an effect of 8.5% drop in Overall Training Effectiveness (OTE), while the trainer quality variance was found to be statistically negligible for consideration. The study also concludes with actionable policy recommendations for CPSEs and Maharatna L&D practitioners, emphasizing a shift from activity-based to impact-based training evaluation as the future practice.

Keywords: Kirkpatrick Model, Training Effectiveness, Maharatna CPSEs, Behavioural Change, Training ROI, Public Sector Undertaking, Broken Link Hypothesis, Overconfidence Gap, Organizational Learning, HRD Evaluation

1. INTRODUCTION

Human Resource Development (HRD) is considered as one of the most critical strategic investments in the large public sector organizations in India. The Maharatna Central Public Sector Enterprises (CPSEs) are recognized as the country's most elite organizations and financially autonomous public entities. These organizations, collectively employ more than 36,000 executives and spend sizable annual budgets towards the training and the development. Yet, the fundamental question remains, if these HRD training expenditure brings results for the CPSEs. This puzzle remains largely unresolved in the existing empirical literature of the subject.

The HRD training evaluation, particularly in Indian PSUs are generally confined in evaluating the training metrics such as total man-hours used, total budget spent, and immediate participant feedback on the given training. This approach fails to record the learning transfer, behavioural change, and overall business impact. As India's Maharatnas are gaining key importance in country’s development, digital ambition and ‘Make in India’ endeavour, the findings of organizational actual impact through training becomes strategically significant.

Kirkpatrick's Model (Kirkpatrick & Kirkpatrick, 2006) of Four-Level Evaluation, provides the most reliable and practical framework to assess the training effectiveness. It follows a hierarchical structure—Reaction (1), Learning (2), Behaviour (3), and Results (4), which offer a wide-range evaluation canvas through which the training programs can be evaluated for the ultimate business return of the companies. These methods are applied in over 80% of Fortune 500 organizations globally (Tamkin et al., 2002), but yet to be functionally deployed in its full potential within the Indian PSU framework.

So, this particular study fills the critical empirical gap by applying the end-to-end Kirkpatrick framework for Indian CPSEs. An important finding was the hypothesized 'Broken Link', which explains the disconnect between behavioural change at Level 3 and measurable business impact at Level 4. Whereas the theoretical model suggests the linear chain from Level 1 to Level 4, the practical use cases mostly stops at Level 1 and Level 2 due to bureaucracy, decision delay, vision disconnect, KPI confusion and infrastructural deficits.

The study also revealed the 'Senior Learning Slump,' that suggests lesser learning gains for the senior batch and the 'Overconfidence Gap,' suggesting the seniors often overestimates their improvements, whereas their superiors rate them lower than their self-ratings.

1.1 Research Objectives

This study covers the following specific objectives: (i) to evaluate overall training effectiveness at all four Kirkpatrick levels of evaluation across seven Maharatna CPSEs; (ii) to evaluate the statistical relationship between behavioural change (at Level 3) and business results or impact (at Level 4); (iii) to examine the 'Senior Learning Slump' and the associated “Overconfidence Gap” of seniors; (iv) to recognize systemic variables—the 'Mischief Makers' of the system—that moderate Overall Training Effectiveness (OTE); and (v) to propose evidence-based scholarly recommendations for improving training ROI in Indian Maharatna organizations.

1.2 Research Hypotheses

Five primary research hypotheses were framed for the empirical testing: H1: Training significantly improves knowledge and skills across all programs (Pre-test vs. Post-test); H2: Learning gains differ significantly across the three training programs—Supervisory Development, Digital Literacy, and Effective Communication; H3: Positive behavioural change (Level 3) is significantly correlated with improved Business Results (Level 4); H4: There is a significant difference between participants' self-ratings and supervisors' ratings of behavioural change—the 'Overconfidence Gap'; H5: There is a significant difference in Overall Training Effectiveness (OTE) based on the quality of training infrastructure, including facility conditions and trainer performance.

2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Kirkpatrick's Four-Level Evaluation Framework, originally introduced in 1959 and subsequently refined (Kirkpatrick & Kirkpatrick, 2006, 2016), remains the gold standard for assessing corporate training effectiveness. The Framework suggests four successive levels, those are Reaction, Learning, Behaviour, and Results; which are interconnected in an evaluation chain. Here the learning satisfaction in Level 1 is evaluated in Level 2 and then the gained knowledge is applied in Level 3, which finally impacted the business in Level 4.

Kirkpatrick Model is further modified and extended by the New World Kirkpatrick Model (2016), adding important indicators and also checking backward from the desired organizational impact to expected training transfer to expected learning gain and finally the learning facility and planning. This model works really well in Indian PSU context, where the national strategic goals and digital missions can be backtracked to the training transfer, evaluation and learning.

Empirical research on the training effectiveness in Indian Maharatna PSUs presents a fragmented landscape. Sahni (2020) evaluated time management training among 136 middle-level PSU managers using Kirkpatrick Levels 1 and Level 2, reporting high satisfaction and a 57% knowledge gain after the training. Yadav and Dabhade (2013) highlighted performance management challenges in BHEL, indirectly underscoring the need for the training-performance alignment and the overall effectiveness context. Rao et al. (2014) measured training needs across the PSU hierarchies but did not rank key competencies by managerial level, leaving a critical gap in level-specific training program design.

A recurring limitation in existing literature on this context, is the absence of full four-level evaluation implementation. Most PSU-focused studies conclude at Level 2 (Learning), citing the measurement challenges linked with Level 3 and Level 4 (Twitchell et al., 2000). The Level 3-Level 4 corridor—where the precise location of the hypothesized 'Broken Link' exist—remains particularly under-researched. Furthermore, no comparative study has ever examined intra-company (across hierarchical levels) and inter-company (across different Maharatna organizations) training effectiveness using a unified quantitative evaluation framework. This study directly addresses these identified gaps.

3. METHOD

3.1 Research Design

This study employed a Descriptive and Explanatory quantitative research design technique with a longitudinal aspect. Levels 1 and 2 (Reaction and Learning) were evaluated immediately before and after the training (pre-post training), while Levels 3 and 4 (Behaviour and Results) were evaluated after 3-6 months and 6-12 months post-training respectively. This longitudinal approach enabled the causal examination of training inputs against organizational outcomes while governing the managerial hierarchy and organizational context across the seven Maharatna CPSEs: IOCL, NTPC, ONGC, SAIL, GAIL, HPCL, and POWERGRID.

3.2 Sample and Sampling Procedure

Stratified Random Sampling was done to ensure satisfactory representation across the organizations and all three hierarchical levels. The population was stratified by (i) organization—such as seven Maharatna CPSEs, and (ii) management level—such as Junior, Middle, and Senior. A total sample of 2,520 executives were taken, providing 95% confidence at less than 2% margin of error, with 840 participants at each hierarchical level (33.3% each). Three standardized training interventions were evaluated—Supervisory Development (P1), Digital Literacy Enhancement (P2), and Effective Communication Skills (P3)—each with 840 participants. The content of each program was stratified by hierarchical level to ensure appropriate difficulty level and contextual relevance.

For longitudinal phases, stratified sub-samples were taken: Level 3 (Behaviour) utilized a 30% stratified sample (n = 756) with matched-pair self and supervisor ratings which were collected 3-6 months post-training; whereas Level 4 (Results) utilized a 20% sample (n = 504) with dual-source HOD and supervisor ratings at 6-12 months post-training.

Table 1: Demographic Profile of the Sample

Stratification Variable	**Category**	**Frequency (n)**	**Percentage (%)**
Organization	IOCL	360	14.3
	NTPC	360	14.3
	ONGC	360	14.3
Stratification Variable	Category	Frequency (n)	Percentage (%)
	SAIL	360	14.3
	GAIL	360	14.3
	HPCL	360	14.3
	POWERGRID	360	14.3
Management Level	Junior	840	33.3
	Middle	840	33.3

	Senior	840	33.3
Training Program	Supervisory Development (P1)	840	33.3
	Digital Literacy (P2)	840	33.3
	Effective Communication (P3)	840	33.3

Table 1: Stratified distribution of participants across organizations, management levels, and training programs (N = 2,520)

3.3 Data Collection Instruments

Four separate instruments were designed and standardized per the Kirkpatrick Framework. The Level 1 Reaction Assessment Scale comprised 20 items on a 5-point Likert scale (Cronbach's $\alpha = 0.72$) capturing satisfaction parameters such as content, schedule, faculty, and facilities. The Level 2 Learning Assessment used program-specific pre-training and post-training Multiple Choice Questions (20 items per assessment), where the Learning Index calculated as [(Post Score - Pre Score) / Max Score] × 100. Hake's Normalized Gain formula was additionally applied to control for the ceiling effect among high-baseline training participants.

The Level 3 Behaviour Assessment Scale used the 20-item dual-rater instrument for capturing self-ratings (Participant, 40% weight) and supervisor ratings (60% weight), which then yield a composite Behaviour Index on a 0-100 scale (Cronbach's $\alpha = 0.918$). This weighted structure was designed to correct for the leniency bias which is inherent in self-assessments evaluation. The Level 4 Business Results Impact Scale comprised 30 items evaluated by the Departmental Heads (HOD, 60% weight) and the immediate supervisors of the participants (40% weight), which then assessing business results, team impact, and finally the organizational contribution (Cronbach's $\alpha = 0.950$). The Overall Training Effectiveness (OTE) was then computed as: $OTE\ (\%) = (0.10 \times L1) + (0.25 \times L2) + (0.30 \times L3) + (0.35 \times L4)$.

3.4 Statistical Analysis

Data were coded and analyzed using Python (Pandas) and MS Excel. The following statistical methods were used: (i) Descriptive Statistics for baseline profiling and distribution assessment; (ii) Paired t-tests for H1 (pre-post learning gains) and H4 (self vs. supervisor rating differences); (iii) One-Way ANOVA with Tukey HSD post-hoc tests for H2 (program-wise and level-wise learning comparisons) and H5 (infrastructure and trainer impact on OTE); (iv) Pearson Correlation Analysis for H3 (L3-L4 relationship); and (v) Exploratory Factor Analysis using Principal Component Analysis to validate construct independence of diagnostic factors.

4. RESULTS AND DISCUSSION

4.1 Hypothesis H1: Overall Learning Effectiveness

The Paired t-test comparing pre-training and post-training scores across 2,520 participants resulted a mean gain of 3.20 points (Pre-Test mean = 13.05, SD = 2.14; Post-Test mean = 16.25, SD = 1.88), representing a 16% improvement on the 20-point assessment scale. The t-statistic of 53.15 ($df = 999$, $p < 0.001$) established that the gain was statistically significant at the high level of confidence. The effect size (Cohen's $d = 1.68$) was classified as extremely large, affirming the substantive educational impact was seen out of the training programs. Hypothesis

H1 was therefore Accepted. However, a detailed analysis by Cohen's d across the full available dataset yielded an overall effect size of 3.37, suggesting that the employee training programs were highly effective in establishing the knowledge transfer at the classroom level.

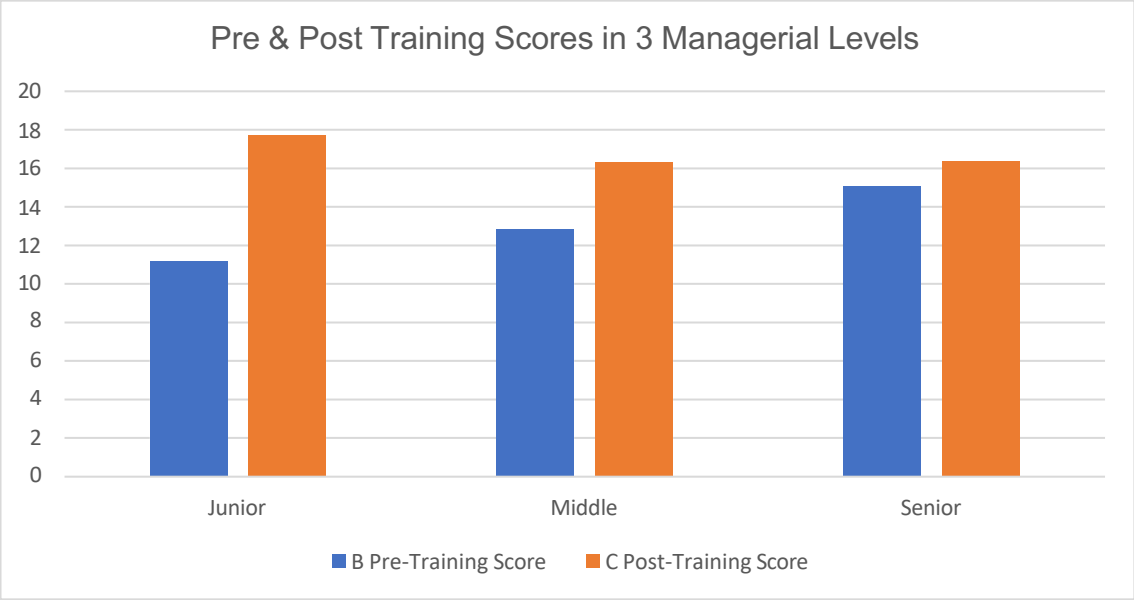
The One-Way ANOVA helped us to understand an inverse relationship between the management level and the learning gain ($F = 145.2$, $p < .001$). Junior Managers recorded the highest Learning Index (58.3%), started from a lower baseline score (Pre-Test mean = 11.20). Middle Managers achieved a Learning Index of 42.5%, while Senior Managers got the lowest gain (23.7%) started from their highest entry baseline score (15.10). This pattern is not indicating as poor performance of Seniors, rather a 'Ceiling Effect', which denotes limited room for improvement due to their experience and pre-existing knowledge.

Table 2: Pre-Training vs. Post-Training Learning Outcomes

Management Level	**Pre-Test Mean (SD)**	**Post-Test Mean (SD)**	**Mean Gain**	**Learning Index (%)**	**t-value**	**Cohen's d**
Junior (n=840)	11.20 (1.85)	17.72 (1.42)	6.52	58.3	48.21***	3.92
Middle (n=840)	12.85 (1.96)	16.32 (1.65)	3.47	42.5	32.15***	1.89
Senior (n=840)	15.10 (1.68)	16.40 (1.52)	1.30	23.7	15.67***	0.81
Overall (N=2,520)	**13.05 (2.14)**	**16.25 (1.88)**	**3.20**	**41.6**	**53.15***	**1.68**

***p < 0.001; Learning Index = [(Post-Pre)/(Max Score-Pre)] × 100; Max Score = 20*

Table 2: Pre- and post-training learning outcomes by management level (20-point assessment scale)



4.2 Hypothesis H2: Program-Wise Effectiveness Differences

One-Way ANOVA compared the Learning Index across all the three training programs and found a difference ($F = 35.78$, $p < 0.001$). Supervisory Development Programme (P1 scored the highest Learning Index (68.15%, SD = 19.62), followed by Digital Literacy Enhancement (P2) (58.18%, SD
= 17.36) and Effective Communication Skills (P3) (57.26%, SD = 17.98). Therefore, the Hypothesis H2 was Accepted in the study.

These findings are important to design corporate policy and training programs for the Maharatnas. The Supervisory Development Programme (P1) helped the participants to develop managerial skills. Digital Literacy Enhancement (P2) and Effective Communication Skills (P3) observed marginal learning gain, as the base line proficiency was found higher during pre-test scores. This denotes a program specific tailoring is needed while designing the training modules.

Table 3: Program-Wise Learning Comparison

Training Program	**n**	**Pre-Test Mean (SD)**	**Post-Test Mean (SD)**	**Learning Index (%)**	**ANOVA F-value**	**Post-hoc (Tukey HSD)**
Supervisory Development (P1)	840	12.10 (2.10)	17.85 (1.55)	68.15	F = 35.78***	P1 > P2, ***P1 > P3***
Digital Literacy (P2)	840	13.45 (1.95)	16.85 (1.80)	58.18		P2 vs P3 (ns)
Effective Communication (P3)	840	13.60 (2.05)	16.25 (1.92)	57.26		

***p < 0.001; ns = non-significant*

Table 3: Comparative learning effectiveness across the three training interventions

4.3 Hypothesis H4: The Overconfidence Gap

The Paired t-test, compared the self-ratings and supervisor ratings of behavioural change at Level 3. The finding revealed a difference of 3.97%, between Self-mean which was 71.29% and Supervisor-mean 67.32%. This denotes a "Overconfidence Gap" in self-perception of the participants. Hence, the Hypothesis H4 was Accepted.

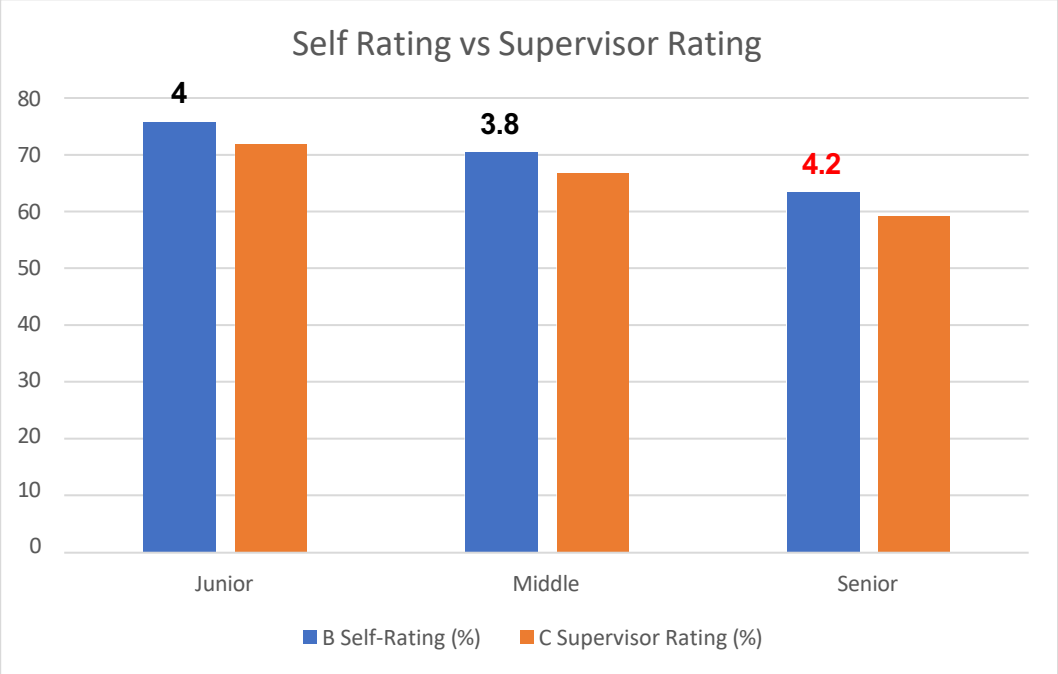
Table 4: The Overconfidence Gap – Self vs. Supervisor Ratings

Management Level	**Self-Rating Mean (%)**	**Supervisor Rating Mean (%)**	**Mean Gap (Self – Supervisor)**	**t-value**	**Cohen's d**
Junior (n=252)	75.8	71.8	4.0	8.45***	0.53

Middle (n=252)	70.5	66.8	3.8	7.92***	0.50

Management Level	**Self-Rating Mean (%)**	**Supervisor Rating Mean (%)**	**Mean Gap (Self – Supervisor)**	**t-value**	**Cohen's d**
Senior (n=252)	63.4	59.2	4.2	9.01***	0.56
Overall (n=756)	**71.3**	**67.3**	**3.97**	**184.31***	—

Management Level Self-Rating Mean (%) Supervisor Rating Mean (%) Mean Gap (Self – Supervisor) t-value Cohen's d
Senior (n=252) 63.4 59.2 4.2 9.01*** 0.56
Overall (n=756) 71.3 67.3 3.97 184.31* —
**p < 0.001; Weighted composite scores (Self 40%, Supervisor 60%)
Table 4: Self-supervisor discrepancy in behavioural change ratings across management levels



The study then further goes deeper in managerial levels to observe the patterns. The rating gaps in Junior Managers are 4%, Middle Managers are 3.8% and Senior Managers are 4.2%. The Senior Managers showed largest gap between self-perception and supervisors' ratings, which indicates the lowest behavioral transfers among all three managerial levels. This pattern is called "Senior Blind Spot", which refers as the Seniors progress in their career ladder, their self-perception is overrated. This finding also relates with the Dunning-Kruger effects.

4.4 Hypothesis H3: 'Broken Link' between Behaviour and the Business Results

A Pearson Correlation test was done on supervisor ratings of behavioural change (L3) and HOD ratings business impact (L4), and it revealed that correlation coefficient r = 0.087 (p = 0.052, n = 504), which is not significant at 0.05 range. Therefore, the Hypothesis H3 was Rejected, and confirmed that the 'Broken Link' is present between skill level and impact level.

A participant scoring 90% on behavioural improvement was no more likely to receive a high L4 business results rating than a participant with marginal behavioural improvement. This disconnect shows multiple systemic factors: first, the KPI frameworks used by the Maharatna HODs for evaluating the business impact appear insufficiently granular or connected to the individual training outcomes, potentially measuring the broad departmental performance rather than the individual skill application; second, bureaucratic rigidity and the hierarchical inertia in PSU structures may suppress the direct expression of the newly learnt skills in the performance-relevant behaviours; third, the transfer climate—which defined by the degree to which the organizational environment supports post-training application—appears weak across multiple units, thus preventing the L3 to L4 conversion that the Kirkpatrick model establishes.

The company-wise L4 Impact Index showed substantial variance across the seven Maharatna organizations, ranging from 54.50% (M6) to 70.50% (M4). ANOVA confirmed that these inter company differences were statistically significant ($p < 0.05$), also suggested that organizational context is the critical determinant of whether trained behaviour translate into perceived business results. The benchmark performers (M1-ONGC, OTE = 77.15%; M4-NTPC, OTE = 75.17%) showed stronger transfer climates, clearer KPI linkages, and superior infrastructural conditions, while the lowest performers (M6-BPCL, OTE = 44.87%; M2-IOCL, OTE = 53.75%) exhibited systemic failures across multiple enabling variables within the study.

Table 5: Correlation Matrix – Kirkpatrick Levels

Variable	**Level 1 (Reaction)**	**Level 2 (Learning)**	**Level 3 (Behaviour)**	**Level 4 (Results)**
Level 1 (Reaction)	1.00			
Level 2 (Learning)	0.42***	1.00		
Level 3 (Behaviour)	0.31***	0.48***	1.00	
Level 4 (Results)	0.11*	0.14**	**0.087 (ns)**	1.00

***p < 0.001; **p < 0.01; *p < 0.05; ns = non-significant (p = 0.052); n = 504 for Level 4 correlations* Table 5: Pearson correlation matrix among the four Kirkpatrick evaluation levels

4.5 Hypothesis H5: The 'Mischief Makers' within the systems and Diagnostic Factor Analysis

Exploratory Factor Analysis (EFA) was done on Level 1 data, to identify the key factors driving OTE. Four key factors was found, resulting 72.7% total variance, these factors are Trainer Quality (28.5%), Content Relevance (18.2%), Organization Infrastructure (14.6%), and Training Schedule (11.4%). Then the Rotated Component Matrix was performed, to identify that these factors are independent in nature. To give an example, on Q18 (L1), the loading

=0.912 on Component 3 (Infrastructure) and the loading =0.054 on Component 1 (Trainer Quality), shows almost negligible cross loading.

Table 6: Exploratory Factor Analysis – Diagnostic Variables

Factor	**Items**	**Eigenvalue**	**Variance Explained (%)**	**Cumulative (%)**	**Cronbach's α**
Trainer Quality	Q1-Q6	4.28	28.5	28.5	0.89
Content Relevance	Q7-Q12	2.73	18.2	46.7	0.84
Factor	**Items**	**Eigenvalue**	**Variance Explained (%)**	**Cumulative (%)**	**Cronbach's α**
Infrastructure/Facilities	Q13-Q17	2.19	14.6	61.3	0.91
Scheduling/Timing	Q18-Q20	1.71	11.4	72.7	0.76

Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization

Table 6: Factor structure of training diagnostic variables (Level 1 assessment)

ANOVA test shown that Infrastructure is the most impactful factor. Training room with comfortable sitting arrangement, air conditions, shown better OTE than a non-AC training room. Therefore, the Hypothesis H5 was Accepted. The ANOVA also found that the Trainer Quality is not so significant for the OTE. The Intra Company analysis revealed that the OTE differs on company specific parameters. The M2 due to infrastructure lacking scored less OTE, M6 due to system fault scored lowest learning index and M5 due to its irrelevant content scored poorly. This also shows that an Intra Company analysis is a must to understand the underlying patterns.

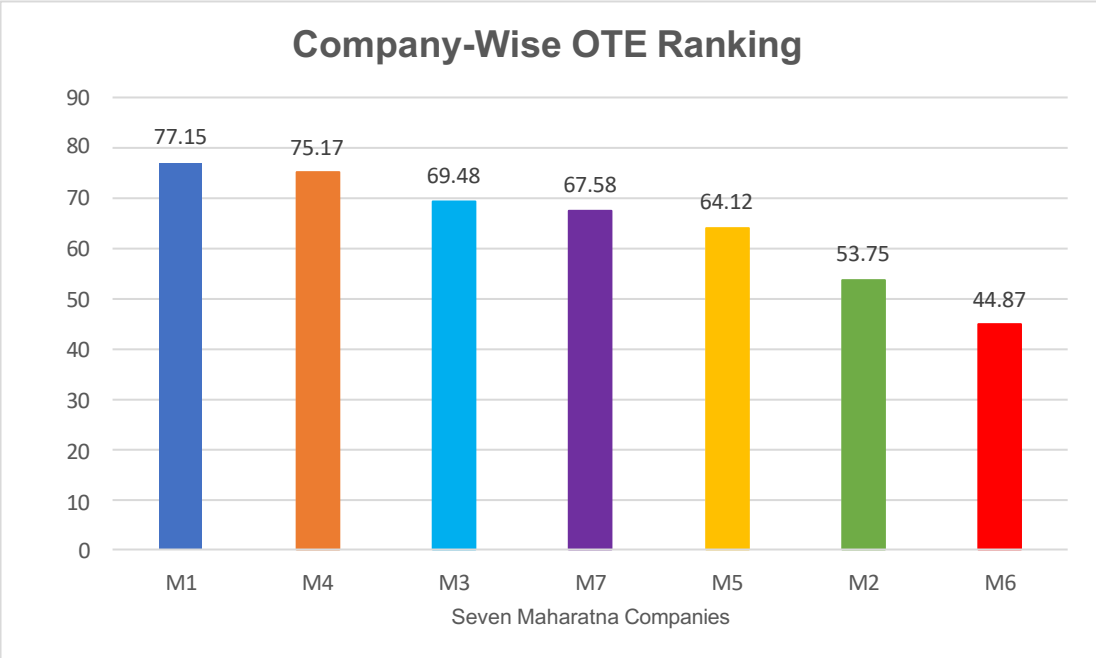
Table 7: Company-Wise Overall Training Effectiveness (OTE)

Company Code	**L1 (%)**	**L2 (%)**	**L3 (%)**	**L4 (%)**	**OTE (%)**	**Rank**
M1	82.5	78.2	74.8	70.2	77.15	1
M4	80.1	76.5	73.2	71.5	75.17	2
M3	75.8	70.2	68.5	65.8	69.48	3
M7	74.2	68.9	67.1	63.4	67.58	4

M5	71.5	65.4	62.8	60.5	64.12	5
M2	62.3	58.2	51.5	48.2	53.75	6
M6	55.2	48.5	45.0	38.5	44.87	7

OTE Formula: (0.10×L1) + (0.25×L2) + (0.30×L3) + (0.35×L4)

Table 7: Comparative Overall Training Effectiveness (OTE) across seven Maharatna CPSEs



4.6 Discussion

The study revealed classroom effectiveness is important for learning gains (Cohen's d = 3.37) and participants satisfaction. The behavioural transfer in Level 3 is observed and its differs in managerial levels, such as Junior Managers performed better during application than their Senior colleagues. The learned skill is failed to create a major impact in business result, a 'Broken Link' is found (Baldwin & Ford, 1988). In Indian PSU environment, the KPI measures are not aligned with the training goals. The infrastructure remains the important factor in determining the OTE. The trainer quality is not so significant for the programs selected, as per the factor loading (Sweller, 1988).

5. CONCLUSION AND RECOMMENDATIONS

This study is one of the first detailed work on Kirkpatrick Framework in Indian Maharatna Central Public Sector Enterprises, involving 2520 executives or samples. The major contribution in the management literature, is the L3-L4 'Broken Link' in the large-scale PSU. Then for Senior Managers it revealed the 'Senior Learning Slump' and the 'Overconfidence Gap', which can be fixed in program design level. Training Infrastructure as a factor of importance than the trainer quality, can help the PSU to allocate budget strategically to improve the infrastructure.

This study will provide a ready reckoner for the Corporate Training Experts and Maharatna Learning and Development Policymakers. First, the Infrastructure Audit is required, with a budget provisioning for the betterment of training facilities. Second, The Level 4 business impact parameters should be mapped carefully with the individual KPI. Third, Senior Managers training should be planned more strategically to address better transfer of knowledge and rating system alignment. Fourth, a Post-Training Transfer Climate Protocol should be institutionalized and followed, requiring departmental HODs to provide structured skill application opportunities within 30 days of training completion and conducting the follow-up coaching sessions at 60 and 90 days post-training. Fifth, the Supervisory Development Programme, identified as the highest-performing intervention (Learning Index = 68.15%), should be codified properly as a Best Practice model and scaled across all Maharatna organizations as a Centre of Excellence (CoE) template. Finally, a centralized Training Effectiveness Dashboard should be developed and submitted quarterly to the HR leadership of the company, integrating OTE scores, L3-L4 gap metrics, and infrastructure audit outcomes to allow evidence-based training governance.

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