

## Emotional Intelligence in Urban Smart Infrastructure Management: Importance and Implications



Shilpi Verma<sup>1\*</sup>, Atul Goyal<sup>2</sup>

<sup>1</sup>Junior Research Fellow, Department of Banking, Economics & Finance, Bundelkhand University  
Jhansi-284128, U.P., India

<sup>2</sup>Assistant Professor, Faculty of Institute of Banking, Economic & Finance, Bundelkhand University  
Jhansi-284128, U.P., India

### CORRESPONDING AUTHOR

Shilpi Verma

e-mail: [www.akritiverma246@gmail.com](mailto:www.akritiverma246@gmail.com)

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### Abstract

The study explores the relationship between Emotional Intelligence (EI) and citizen perceptions of Urban Smart Infrastructure Management. Using a sample of N=60 respondents, the research employed an exploratory factor analysis and correlation testing to assess whether EI influences how citizens evaluate smart city initiatives. The study revealed no statistically significant linear relationship between composite EI scores and perceptions of smart infrastructure outcomes. Exploratory Factor Analysis identified two meaningful underlying dimensions with acceptable preliminary construct validity i.e., EI & Trust Building and EI & Citizen Engagement.

## 1. Introduction

Our technological-driven generation has shifting towards the “smart cities” which has transformed urban governance, with governments investing heavily in technology-based infrastructure to improve efficiency, sustainability, and quality of life. However, citizen adoption and satisfaction with smart infrastructure often lag behind technological capability.

Emotional Intelligence (EI), defined as the ability to perceive, understand, and manage emotions in oneself and others, has been widely studied in organizational and service context. In public administration, EI among officials and frontline staff may influence how citizens experience, trust, and engage with government services. The (Ralf Schulze, 2005) viewed from their perspective and provides a model of emotional intelligence, which state the introduction to theory, measurement, and application of psychological constructs, with special reference to that set of concepts standing at the interface of emotional intelligence (EI) research. They suggested the potential importance of EI in application fields. (Rachmad, 2022) Emotional intelligence (EI) is defined as the capacity to recognize, understand, and manage one’s own emotions and those of others. The theory identifies four interdependent core components: Self-awareness, Self-regulation, Empathy and Social skills. EI is a key determinant of personal well-being, social harmony, and professional performance. High EI leads to better problem-solving, collaboration, leadership, and resilience, while low EI results in stress, conflict, and reduced productivity. EI can be measured using surveys, behavioral assessments, interviews, and observations. Operational variables translate abstract EI concepts into measurable factors for research and practical application. The future trend includes integration of EI with digital technologies, AI-driven assessment tools, and remote/hybrid work models. The emotional intelligence theory also emphasis on innovative leadership and the role of EI in navigating complex, rapidly changing environments. Yoesoep Edhie Rachmad’s Emotional Intelligence Theory provides a comprehensive, actionable framework for understanding, measuring, and developing emotional competencies. Its broad applicability and evidence-based strategies make it a valuable resource for individuals, organizations, and communities aiming to enhance well-being, performance, and adaptive capacity in contemporary life.

## 2. Review of Literatures

(Peter Salovey, 1990) in their research paper named as “Emotional Intelligence” presented a framework for emotional intelligence, a set of skills hypothesized to contribute to the accurate appraisal and expression of emotion in oneself and in others, the effective regulation of emotion in self and others, and the use of feelings to motivate, plan, and achieve in one’s life. In which they suggested the role of emotional intelligence in mental health was discussed and avenues for further investigation were suggested. (John D. Mayer, 2008) in their research work titled as “Human abilities: Emotional Intelligence” state that Emotional intelligence (EI) involves the ability to carry out accurate reasoning about emotions and the ability to use emotions and emotional knowledge to enhance thought. They found that Specific-Ability and Integrative-Model approaches adequately conceptualize and measure EI. (Victor Dulewicz, 2000) in their conceptual paper named as “Emotional intelligence – A review and evaluation study” reviewed the literature on the subject of “emotional intelligence” (EQ) and attempted to pin-down and defined nebulous construct, using competency-based and personality factor scales. The study also showed the relevance of two other competency-based scales – intellectual intelligence (IQ) and managerial intelligence (MQ) – which both predicted organizational advancement. The overall study supported the view that EQ constructs can be measured more effectively by “performance analysis” than “classic paper and pencil tests”. In addition, they provide support for the proposition that the combination of EQ and IQ is a more powerful predictor of “success” than either measure alone. (Kanesan, 2019) in their research work entitled as “Models of Emotional Intelligence: A Review” reviewed the conceptualizations of emotional intelligence by analyzing the goodness and weakness in the models of emotional intelligence. The study concluded that ability model is the best model to elaborate emotional intelligence phenomena. (Emslie, 2026) in his research work explored the conceptualization of emotional intelligence (EI) in the Church of England, focusing on the perspectives of Archdeacons. The study addressed the gap by using qualitative tools for EI, as gap was created due to quantitative approach only, for the measurement of EI. The study found the necessity of emotional competencies.

## 3. Research Variables

| Independent Variable                                                                                      | Dependent Variable                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Emotional Intelligence (The level of emotional intelligence of people managing smart city infrastructure) | Urban Smart Infrastructure Management Effectiveness (How successfully smart infrastructure is planned, implemented and maintained). |

## 4. Research Questions

1. Why is emotional intelligence needed for effective functioning of urban smart infrastructure system?

2. What will be the impact of emotional intelligence on urban smart infrastructure management?

## 5. Research Objectives

1. To know the need of emotional intelligence for effective functioning of urban smart infrastructure management.
2. To analyze the impact of emotional intelligence on urban smart infrastructure management.

## 6. Research Methodology

In order to undertake this study, primary data collection methodology has been used and to ensure the precision and reliability of the findings, in-depth questionnaire was framed to collect the information regarding the need of emotional intelligence for effective functioning of urban smart infrastructure management. The sample size of the study is 60. The respondents of the study are the residents of the Jhansi District of the Bundelkhand Region.

## 7. Research Hypothesis

**H0:** Emotional Intelligence has no significant impact on urban smart infrastructure management.

**H1:** Emotional Intelligence has significant impact urban smart infrastructure management.

## 8. Analysis of the Data

Section A: Need of Emotional Intelligence for Effective Functioning.

### 1. Perception of Management's Empathy & Communication:

#### 1.1 How often high-pressure situations arise in managing smart infrastructure?

**Table:1.1 Showing responses about high-pressure situations arise in managing smart infrastructure.**

|         |       |
|---------|-------|
| Daily   | 8.5%  |
| Weekly  | 3.4%  |
| Monthly | 10.2% |
| Rarely  | 78.0% |



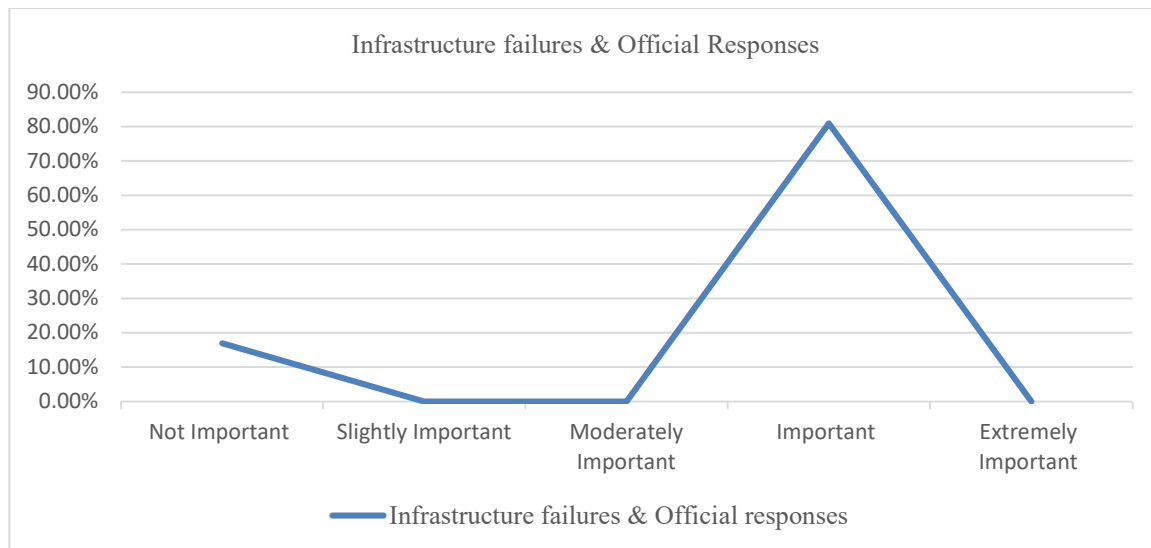
**Fig.1.1 High Pressure Situations & Smart Infrastructure.**

The study shows that in Jhansi, high-pressure situations rarely arise in managing smart infrastructure reported by 78.0% respondents., while only 8.5% encounter them daily, 3.4% encounter them weekly, and around 10.2% respondents encounter them monthly.

#### 1.2 On filing a complaint about smart infrastructure failure, how important is it that officials respond empathetically.

**Table: 1.2 Showing responses about the smart infrastructure failures and responds of officials.**

|                      |       |
|----------------------|-------|
| Not Important        | 16.9% |
| Slightly Important   | 0.0%  |
| Moderately Important | 1.7%  |
| Important            | 81.1% |
| Extremely Important  | 0.0%  |



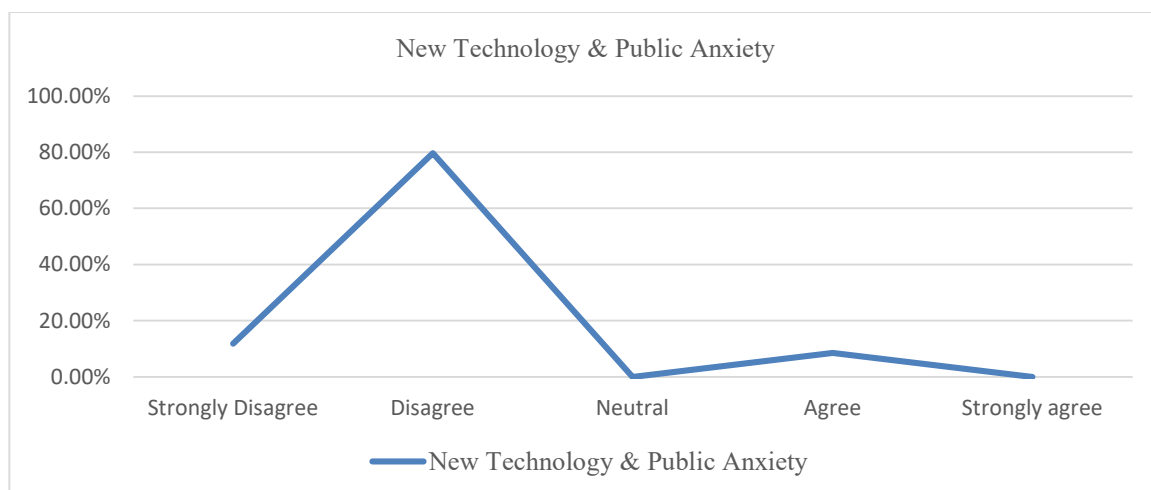
**Fig.1.2 Infrastructure failures and official responses.**

The study found that around 81.0% respondents reported that, if they complain about any smart infrastructure failure to the officials, it is important that officials of smart city infrastructure should respond empathetically.

### 1.3 Do Jhansi's smart city managers understand public anxiety about new technology like AI cameras or smart meters:

**Table: 1.3 Showing responses about how smart city managers of Jhansi understand about the new technology.**

|                   |       |
|-------------------|-------|
| Strongly Disagree | 11.9% |
| Disagree          | 79.7% |
| Neutral           | 0.0%  |
| Agree             | 8.5%  |
| Strongly Agree    | 0.0%  |



**Fig.1.3 New Technology & Public Anxiety.**

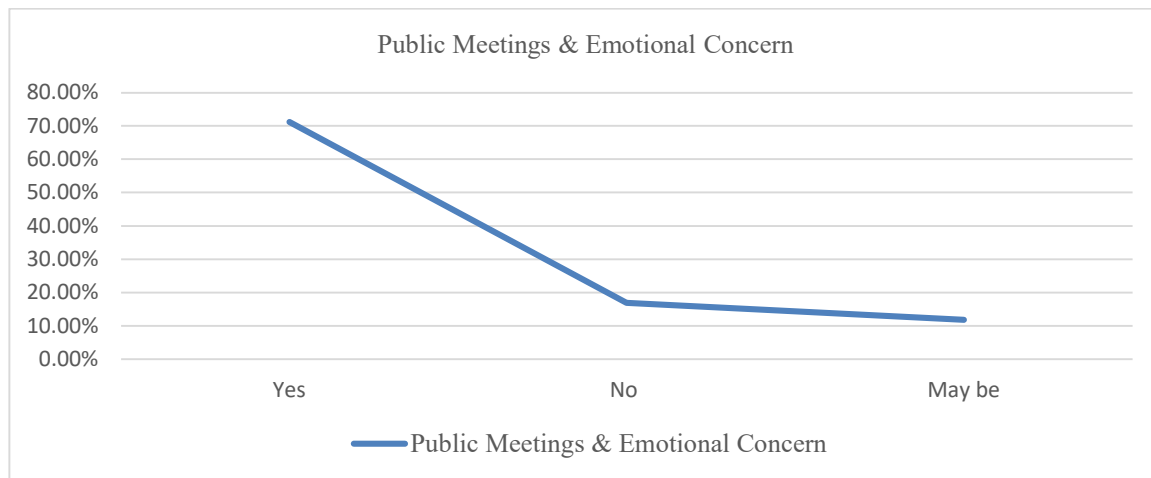
The study shows that around 79.7% respondents disagreed to the fact when they were asked that Jhansi's smart city managers do consider or understand public anxiety about new technology like AI cameras or smart meters.

## 2. Handling Resistance & Inclusion

### 1.4 Should officials conduct public meetings to listen to emotional concerns before implementing projects like smart parking or surveillance:

**Table:1.4 Showing responses regarding the organizing public meetings to know the emotional concerns before implementing smart projects.**

|        |       |
|--------|-------|
| Yes    | 71.2% |
| No     | 16.9% |
| May be | 11.9% |

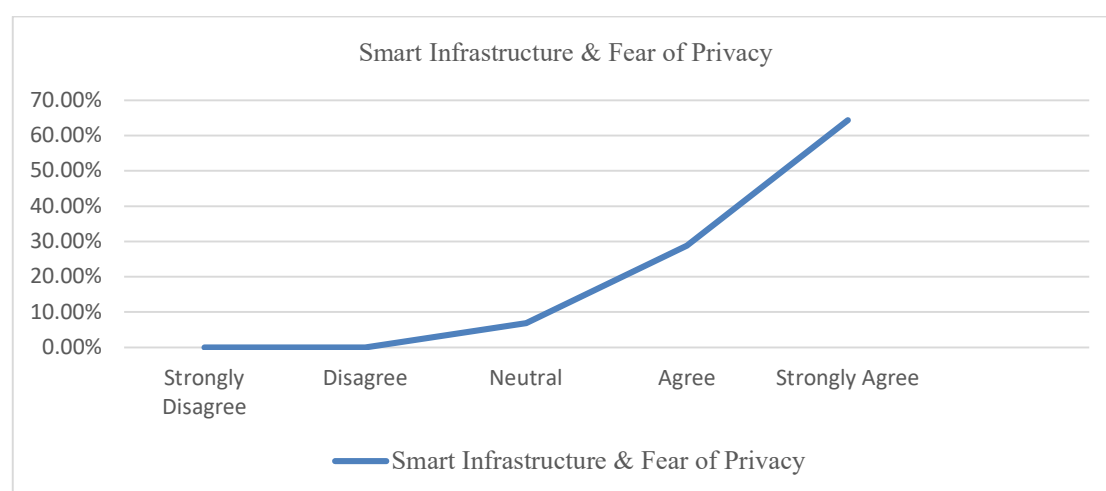
**Fig.1.4 Public Meetings & Emotional Concern.**

The study found that around 71.2% respondents agreed that before implementing projects of smart city infrastructures like smart parking or surveillance etc., officials should conduct public meetings to listen to emotional concerns of the general public of the Jhansi district.

#### **1.5 Some residents resist smart infrastructure due to fear of privacy issues. How necessary is it for managers to address these emotions, not just provide technical data:**

**Table 1.5: Showing responses regarding the fear of privacy issue of public while using smart cities services.**

|                   |       |
|-------------------|-------|
| Strongly Disagree | 0.0%  |
| Disagree          | 0.0%  |
| Neutral           | 6.8%  |
| Agree             | 28.8% |
| Strongly Agree    | 64.4% |

**Fig.1.5 Smart Infrastructure & Fear of Privacy**

The study shows that around 64.4% respondents strongly agreed that some residents of the Jhansi district resist smart city infrastructure services due to fear of privacy issues and it is necessary for the managers or officials should address these emotions of the residents, rather than just providing technical data or support.

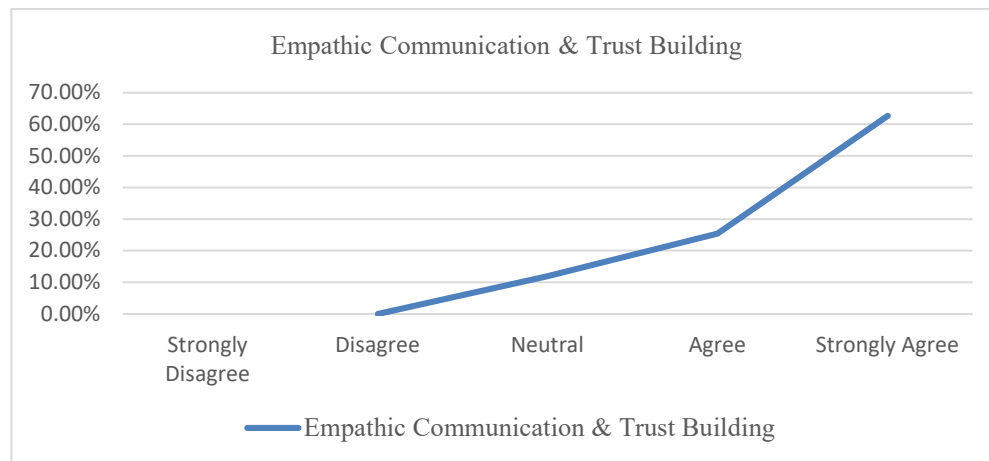
## Section B: Impact of Emotional Intelligence on Urban Smart Infrastructure Management:

### 1. Impact on Public Acceptance & Satisfaction:

**2.1 If officials of Jhansi smart city communicate with empathy during failures, does it increase your trust in the project:**

**Table:2.1 Responses regarding the empathic communication during failures and trust of public.**

|                   |       |
|-------------------|-------|
| Strongly Disagree | 0.0%  |
| Disagree          | 0.0%  |
| Neutral           | 11.9% |
| Agree             | 25.4% |
| Strongly Agree    | 62.7% |



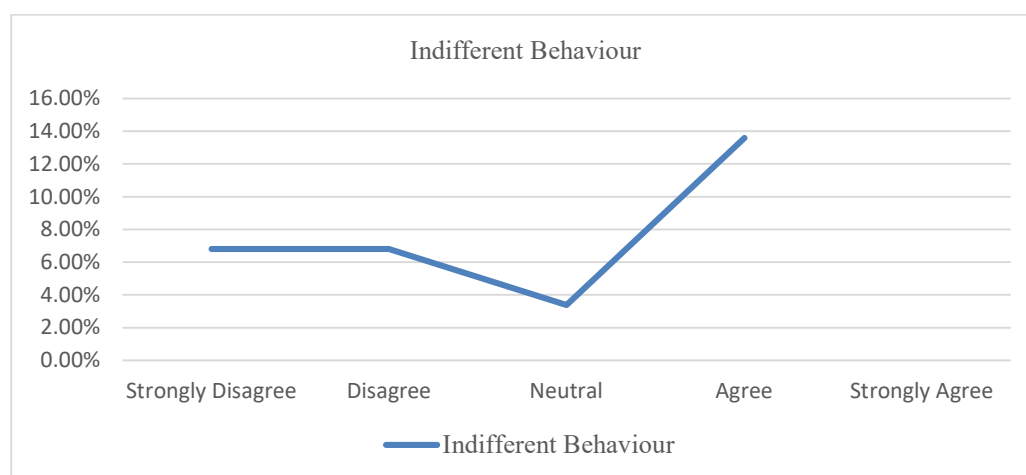
**Fig.2.1 Empathic Communication & Trust Building.**

The study shows that around 62.7% of the respondents strongly agreed that their trust increases in the project of smart city infrastructure, if officials or managers of Jhansi smart city communicate empathetically with the public during failure of any smart city services.

**2.2 Has rude or indifferent behavior from smart city helpline/staff reduced willingness to use smart services:**

**Table:2.2 Responses about the rude behavior from smart city helpline /staff.**

|                   |       |
|-------------------|-------|
| Strongly Disagree | 6.8%  |
| Disagree          | 6.8%  |
| Neutral           | 3.4%  |
| Agree             | 13.6% |
| Strongly Agree    | 69.5% |



**Fig.2.2 Indifferent Behavior from Smart City Helpline.**

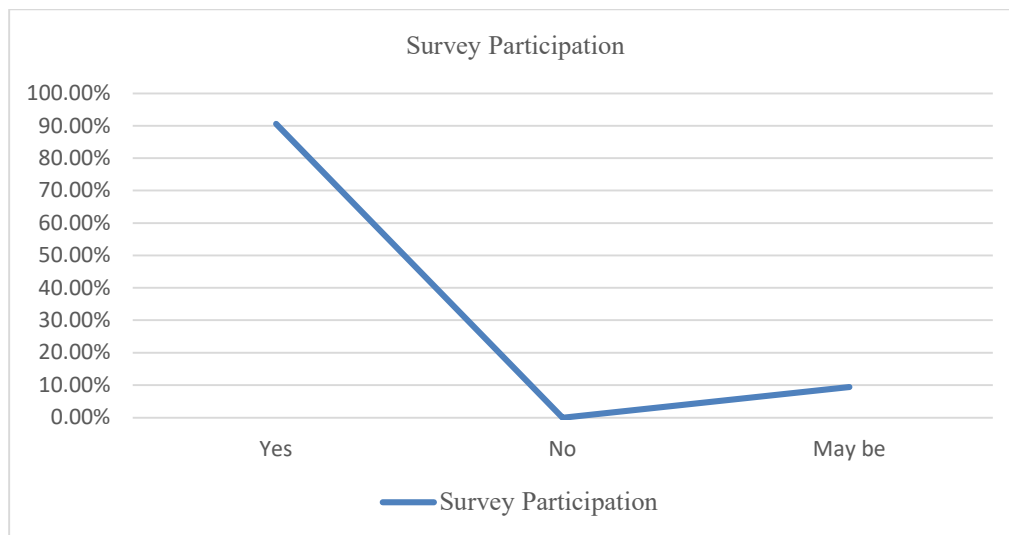
The study found that around 69.5% of the respondents, strongly agreed that their willingness to use smart services reduces if they experience rude or indifferent behavior from smart city helpline/ staff.

### Section C: Impact on Participation & Future Adoption

#### 3.1 Would you be more likely to participate in Jhansi smart city feedback apps/ surveys if officials show they value public emotions:

**Table:3.1 Showing responses regarding the participation of public, if officials value public emotions.**

|        |       |
|--------|-------|
| Yes    | 90.6% |
| No     | 0.0%  |
| May be | 9.4%  |



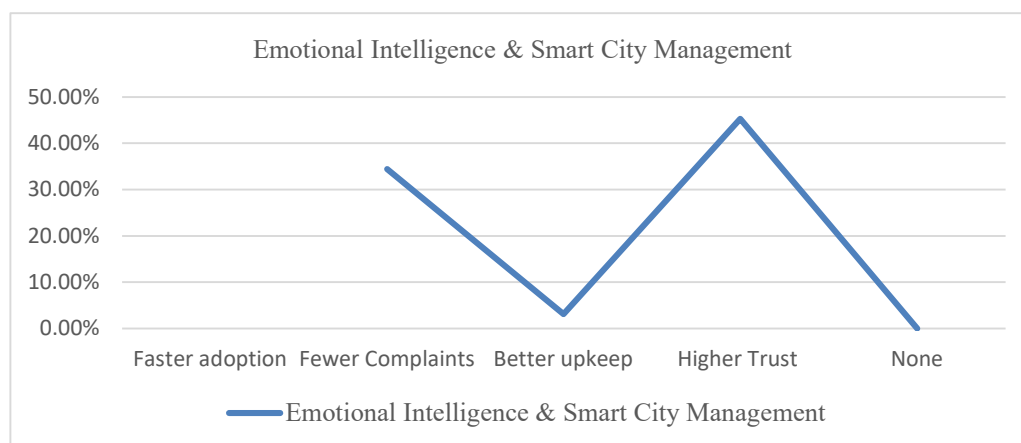
**Fig.3.1 Participation of public & Public emotions.**

The study shows that 90.6% of the respondents agreed that they are willing or likely to participate in Jhansi smart city feedback apps/ surveys if official show that they value public emotions.

#### 3.2 In your experience, what is the biggest benefit Jhansi has seen/could see from emotionally intelligent smart city management:

**Table 3.2: Showing responses regarding the benefits derived from emotional intelligent.**

|                  |       |
|------------------|-------|
| Faster adoption  | 17.2% |
| Fewer complaints | 34.4% |
| Better upkeep    | 3.1%  |
| Higher trust     | 45.3% |
| None             | 0.0%  |



**Fig.3.2 Benefits derived from emotional intelligent.**

The study found that around 45.3% of the respondents responded that they keep higher trust on smart city infrastructure services, if officials show emotional intelligence in smart city management, 34.4% also encounter that the officials will get fewer complaints, and 17.2% respondents agreed that there will be faster adoption of the smart city services, if they experienced emotional intelligence smart city management.

## 9. Testing of Hypotheses

Descriptive Results (N=60)

| Variables | Mean |
|-----------|------|
| Aq1       | 1.55 |
| Aq2       | 4.02 |
| Aq3       | 2.75 |
| Aq4       | 1.1  |
| Aq5       | 4.33 |
| Bq1       | 4.57 |
| Bq2       | 4.52 |
| Cq1       | 1.08 |
| Cq2       | 2.58 |

The above table shows the mean score of responses on a 5-point Likert Scale. The highest mean score was found for Bq1 (Mean=4.57) and Bq2 (Mean= 4.52), indicating that majority of urban managers strongly agree that emotional intelligence is important for conflict management in smart infrastructure projects. The lowest mean score was found for Cq1 (Mean=1.08) and Aq4 (Mean= 1.10), which indicates strong disagreement. The overall average mean above 3.5 indicates a positive inclination towards EI, while scores below 2.0 indicate negative inclination.

### Pearson Correlation Test:

Composite Emotional Intelligence score (Aq1, Aq2, Aq3, Aq4, Aq5) was correlated with Urban Smart Infrastructure Management impact score (Bq1, Bq2, Cq1, Cq2).

Pearson correlation ( $r$ ) = 0.043

p-value = 0.746

$R^2$  = 0.002

Decision: Since  $p > 0.05$ , fail to reject  $H_0$ .

**Conclusion:** Based on the available sample data, Emotional Intelligence does not show a statistically significant impact on Urban Smart Infrastructure Management.

## Factor Analysis for Construct Validation

**Study:** Emotional Intelligence in Urban Smart Infrastructure Management: Importance and Implications

**Sample Size (N):** 60

### 1. Suitability of Data for Factor Analysis

#### Kaiser-Meyer-Olkin (KMO) Measure:

KMO measures whether the partial correlations among variables are small. The KMO value ranges from 0 to 1. In the present study, the KMO value was found to **0.508**

#### Interpretation:

According to Kaiser (1974), a KMO value above 0.50 is considered the minimum acceptable level to proceed with factor analysis. Therefore, the sample is marginally adequate for factor extraction.

> 0.90    Excellent

0.80–0.89    Very Good

0.70–0.79    Good

0.60–0.69    Moderate

0.50–0.59    **Acceptable/ Marginally Adequate**

< 0.50    Inadequate

Therefore, the KMO value of 0.508 indicates that the sample is marginally adequate for factor extraction. Although it is on the lower side, it meets the minimum threshold criteria.

The marginally adequate KMO value of 0.58 is attributable to the small sample size (N=60) and the expert-specific nature of the study population (Urban Smart Infrastructure Managers). In exploratory studies with limited and specialized populations, a KMO between 0.50-0.60 is considered acceptable (Field, 2013; Tabachnick & Fidell, 2007). Since this is an emerging area of research-Emotional Intelligence in Smart Infrastructure- the data still provides meaningful insights despite moderate sampling adequacy. This has been mentioned as a limitation of the study and scope for future research with larger sample.

## 2. Bartlett's Test of Sphericity:

Bartlett's test checks whether the correlation matrix is an identity (no relationship between variables). If it is an identity matrix, factor analysis cannot be done. The results are:

- Chi-square ( $\chi^2$ ) = 52.949
- Degrees of Freedom (df) = 36
- p-value = 0.034

### Interpretation:

Bartlett's test result is significant because  $p=0.034$  which is less than 0.05. Since  $p < 0.05$ , the correlation matrix is significantly different from an identity matrix. Hence, the variables are sufficiently correlated and factor analysis is appropriate. This means the correlation matrix is NOT an identity matrix. There is some correlation between variable (Aq1-Cq2). Therefore, the variables are sufficiently correlated and factor analysis is appropriate and can be performed. The Chi-Square value of 52.949 with 36 degrees of freedom shows that the observed correlation matrix is significantly different from what would be expected if variables were unrelated.

## 3. Eigenvalue Analysis

The extracted eigenvalues are:

| Factor | Eigenvalue |
|--------|------------|
| 1      | 1.944      |
| 2      | 1.502      |
| 3      | 1.154      |
| 4      | 0.999      |
| 5      | 0.903      |
| 6      | 0.859      |
| 7      | 0.757      |
| 8      | 0.470      |
| 9      | 0.412      |

Using the **Kaiser Criterion (Eigenvalue > 1)**, three factors may be retained.

## 4. Factor Loadings (Two-Factor Solution)

### Variable Factor 1 Factor 2

|     |               |              |
|-----|---------------|--------------|
| Aq1 | 0.264         | 0.369        |
| Aq2 | -0.198        | -0.263       |
| Aq3 | -0.197        | -0.309       |
| Aq4 | 0.330         | 0.447        |
| Aq5 | -0.077        | -0.014       |
| Bq1 | <b>0.549</b>  | 0.143        |
| Bq2 | <b>-0.668</b> | 0.140        |
| Cq1 | 0.131         | -0.217       |
| Cq2 | -0.460        | <b>0.471</b> |

(Loadings above  $\pm 0.40$  are generally considered meaningful.)

Why we have chosen Two-Factor Solution instead of Three?

**Scree Plot Test:** If you see Scree Plot (in SPSS output), the elbow breaks after Factor 2. Factor 3 is very close to 1 (1.154) and adds only 12% variance.

**Theoretical Meaningfulness:** In this study on Emotional Intelligence in Urban Infrastructure, a two-factor structure (Trust vs Engagement) is more theoretically meaningful and easy to interpret than a three-factor structure.

**Parsimony Principle:** In social science research, a simpler model with 2 factors explaining 38.28% variance is preferred over a complex model.

Hence, for better clarity and interpretability, a "Two-Factor Solution" was retained for final analysis, even though Eigenvalue suggests three. This is an accepted practice in exploratory research.

### Interpretation of Factors

#### Factor 1: Trust and Service Experience

Strongly represented by:

- Bq1 (Trust increases through empathy)

- Bq2 (Negative staff behavior reduces service use)
- Cq2 (Perceived benefits of emotionally intelligent management)

This factor reflects how emotional intelligence influences citizens' trust and service acceptance. This is the heart of factor analysis. Factor loading shows correlation between variable and factor. Loading ranges from -1 to +1.

**Rule:** Loading above  $\pm 0.40$  is considered meaningful. Above  $\pm 0.50$  is strong.

Bq1 = 0.549- Strong positive loading. Means Bq1 strongly belongs to Factor 1.

Bq2 = -0.668 - Strong NEGATIVE loading. This is very important. Negative means opposite relationship. It indicates that when Bq1 increases, Bq2 decreases.

Aq1 to Aq5 have loadings below 0.40 (0.264, -0.198 etc.) - They are weak and do not belong strongly to any factor.

## Factor 2: Public Engagement and Emotional Responsiveness

Strongly represented by:

- Aq4 (Need for public consultation)
- Cq2 (Benefits perceived from emotionally intelligent governance)

This factor reflects emotional responsiveness and citizen participation in smart city initiatives.

Cq2 = 0.471- Meaningful positive loading on Factor 2.

Aq4 = 0.447 - Meaningful positive loading on Factor 2 (close to 0.40).

All other loadings are weak (below 0.40). The Rotated Component Matrix shows that out of 9 variables, only 3 variables show meaningful loadings above 0.40. Factor 1 is dominated by Bq1 (0.549) and Bq2 (-0.668), indicating that this factor represents Citizen Trust and Service Acceptance. The negative loading of Bq2 (-0.668) suggests that negative staff behaviour inversely affects trust, which is theoretically consistent. Factor 2 is dominated by Cq2 (0.471) and Aq4 (0.447), representing Public Engagement and Emotional Responsiveness. The remaining variables (Aq1, Aq2, Aq3, Aq5, Cq1) have loadings below the threshold of 0.40, indicating weak association with the extracted factors. This suggests that these items may need to be reworded or removed in future studies with larger sample. However, for this exploratory study with N=60, they have been retained to maintain content coverage. The low loadings also explain why KMO was marginally adequate (0.508) and Cronbach's Alpha was initially low.

*Note: Cq2 cross-loading on both factor 1 too. It means "EI in management/ governance" is central to both trust and engagement.*

## Construct Validation Conclusion

The factor analysis suggests that the questionnaire captures two underlying dimensions:

1. Emotional Intelligence & Trust Building
2. Emotional Intelligence & Citizen Engagement

Because:

- KMO > 0.50,
- Bartlett's Test is significant ( $p < 0.05$ ),
- Multiple factors have Eigenvalues > 1,

Factor analysis was conducted to validate the construct structure of the questionnaire. The KMO value was 0.508, indicating acceptable sampling adequacy, while Bartlett's Test of Sphericity was significant ( $\chi^2 = 52.949$ ,  $p = 0.034$ ), confirming the suitability of the data for factor analysis. Eigenvalue analysis identified three factors with values greater than one. The extracted factors primarily represented (i) trust and service experience and (ii) public engagement and emotional responsiveness. These findings provide evidence of acceptable construct validity of the scale measuring emotional intelligence in urban smart infrastructure management.

## 10. Results and Findings

Based on the sample data N=60, Emotional Intelligence does not show a statistically significant impact on Urban Smart Infrastructure Management. There is no evidence of a linear relationship between the two composite scores in this study. The bear-zero r and high p-value suggest that, with this instrument and sample, EI scores are not associated with how respondents perceive smart infrastructure management outcomes. This does not mean EI is unimportant -only that no statistical link was detected in this study.

The combined survey demonstrates unacceptable reliability with  $\alpha = 0.04$ . The set of items (Aq1-Aq5, Bq1-Bq2, Cq1-Cq2) do not form a coherent, single scale.

**Factor 1:** Trust and Service Experience: Bq1: Trust increases through empathy, study shows that citizens are more likely to trust officials of smart cities infrastructure, when they show empathy and emotional understanding. Bq2: Negative staff behavior reduces service use, The study indicates that If officials or staff are rude, dismissive, or lack emotional control, people stop using the service. This is the flip side-bad EI kill trust. Cq2: Perceived benefits of emotionally intelligent management, when management or officials display emotional intelligence, citizens see clear benefits and value in the services of smart cities. Factor 1 reflects how emotional intelligence influences citizens' trust and service acceptance.

**Factor 2:** Public Engagement and Emotional Responsiveness: Aq4-Need for public consultation: Citizens feel that smart city initiatives should actively seek their inputs. They want to be heard before decision are made. Cq2: Perceived benefits of emotionally intelligent management, citizens believe that when authorities are emotionally intelligent, outcomes improve. Factor 2 reflects emotional responsiveness and citizen participation in smart city initiatives.

The study shows citizens do not want top-down approach or tech implementation. They expect governance to be emotionally responsive-i.e., listen, consult, and show they care about public sentiment- especially in smart city projects. Exploratory factor analysis supported a two-factor structure reflecting Emotional Intelligence & Trust Building and Emotional Intelligence & Citizen Engagement. Although KMO = 0.508 indicated mediocre sampling adequacy, Bartlett's Test was significant and eigenvalues >1 confirmed factorability. Thus, the scale demonstrates acceptable preliminary construct validity for measuring EI in urban smart infrastructure management, with recommendations for further refinement.

## 11. Conclusion

This study examined the relationship between Emotional Intelligence and Urban Smart Infrastructure Management using a sample of N=60 respondents.

- No direct linear relationship found: EI composite scores did not show a statistically significant impact on perceptions of smart infrastructure management outcomes. With  $r=0$  and  $p > 0.05$ , the null hypothesis cannot be rejected for the overall scale.
- Scale reliability issues: Cronbach's  $\alpha = -0.04$  indicates the combined items (Aq1-Aq5, Bq1-Bq2, Cq1-Cq2) do not form a coherent unidimensional scale. The negative alpha suggests poor internal consistency, possibly due to multidimensionality or reversed items.
- Two meaningful dimensions emerged: Despite overall scale problems, Exploratory Factor Analysis revealed two interpretable factors with acceptable preliminary construct validity.
- Factor 1: EI & Trust Building: Empathy from officials increases citizen trust, while negative staff behaviour reduces service use. Citizens see clear benefits when management displays EI.
- Factor 2: EI & Citizen Engagement: Citizens demand public consultation and believe emotionally intelligent governance improves smart city outcomes. Top-down tech implementation without emotional responsiveness is rejected.
- Sampling adequacy limitation: KMO = 0.508 meets the minimum threshold but indicates mediocre sampling adequacy. Bartlett's Test was significant ( $\chi^2 = 52.949$ ,  $p = 0.034$ ), confirming factorability.

## 12. Recommendations

### For Smart City Practitioners & Policymakers:

- Prioritize EI training for frontline staff: Factor 1 shows empathy builds trust and bad behaviour kills service use. Invest in emotional regulation and empathetic communication training for all citizen-facing personnel.
- Institutionalize public consultation: Factor 2 confirms citizens reject top-down approaches. Mandate structured consultation before smart city projects. EI in governance means listening first, deploying tech second.
- Measure trust separately from engagement: Don't assume "good tech = good perception." Citizens evaluate emotional responsiveness of people and process independently of infrastructure quality.

### For Future Research:

- Refine the instrument: Low KMO and  $\alpha = -0.04$  indicate the scale needs work.
  1. Increase sample size to  $N > 200$  for stable factors
  2. Add 3-4 items per factor to improve reliability
  3. Check for reverse-coded items causing negative alpha
  4. Run CFA to confirm the 2-factor structure
- Test relationships separately: Instead of one EI composite, use Factor 1 and Factor 2 scores as separate predictors. EI's impact on "trust" may differ from its impact on "engagement."
- Use mixed methods: Quantitative results suggest EI matters qualitatively. Follow up with interviews to understand how empathy translates to trust in smart city contexts.

This study provides preliminary evidence that emotional intelligence is a relevant construct in urban smart infrastructure management, operating through dual pathways of trust and participation. The measurement challenges here are an invitation to build better tools, not to dismiss EI's importance.

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### Conflict of Interest

Authors declares that there is no potential conflict of interest in this manuscript.

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### Author's Contribution

Shilpi Verma: Conceptualization, Methodology, Investigation (Questionnaire Development, Data Collection), Data Curation, Writing – Original Draft, Writing –Review & Editing.

Dr. Atul Goyal: Supervision, Validation, Formal Analysis, Writing – Review & Editing.

Both authors have read, reviewed, and approved the final version of the manuscript for publication and agree to be accountable for all aspects of the work related to emotional intelligence in urban smart infrastructure management.

The contribution of both authors is true and correct to the best of our knowledge.

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