

Smart-City Visibility Gap across Settlement Sizes: Youth Perceptions and Local Connectivity in Slovakia

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INTRODUCTION & AIM

The European smart-city model integrates mobility, energy, and public services into citizen-oriented systems — and provides an authentic context for AI literacy and human–AI partnership in education. In smaller settlements, smart-city interventions may remain less visible to young residents.

THE GAP

Smaller places may already have smart features, yet residents do not perceive or recognise them. This 'visibility gap' is understudied, especially among youth.

RESEARCH QUESTION

Does settlement size and local internet quality predict the perceived absence of smart-city elements among Slovak secondary-school students?

Parallel territorial analysis on the same SmartCityExplorer dataset as the companion paper on curriculum exposure (Kóna, 2026).

METHOD

Study Design & Sample

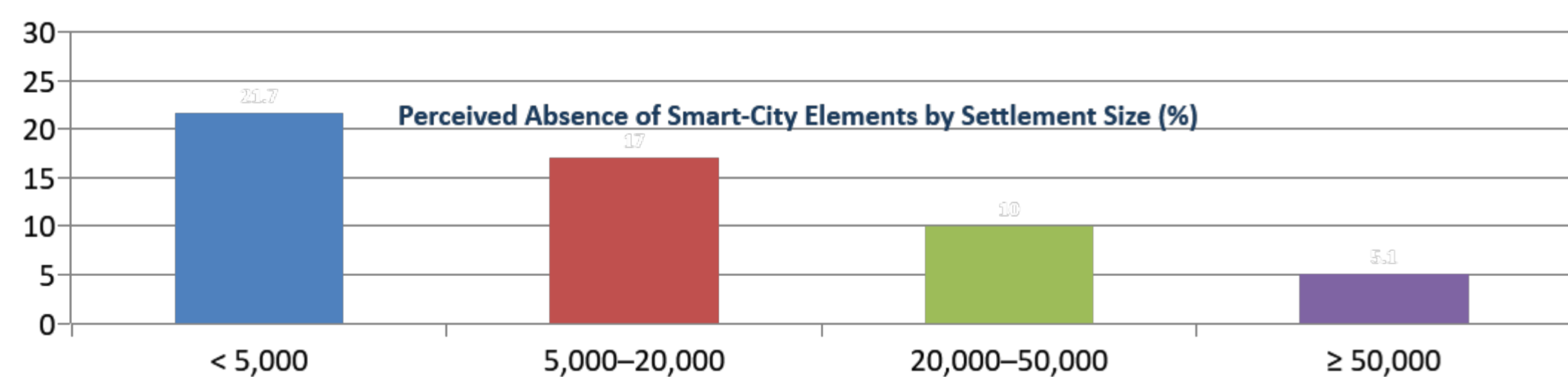
Cross-sectional online survey conducted in 2025 via SmartCityExplorer.sk. Total dataset N = 419 Slovak secondary-school students; analytic n = 412 for this model after listwise deletion (companion paper: n = 383 for a different outcome).

Outcome

Binary: "My municipality has no smart-city elements" (yes/no). Distinct from the companion paper's curriculum-exposure outcome.

Predictors & Analysis

Municipal population (log, 2022 census); local internet quality (1–5 Likert); gender adjusted. Binary logistic regression. Descriptives match companion paper: school M=2.59, home M=3.89, municipality M=2.46.



16.0%
of all respondents perceived their municipality as having NO smart-city elements

21.7% vs 5.1%
Small municipalities (<5 000) vs Large cities (≥50 000) absence rate perceived

OR = 0.67
per log-population unit (p=0.015) settlements = LOWER odds of perceived absence

RESULTS & DISCUSSION

Key Finding

A systematic smart-city visibility gap exists across settlement sizes in Slovakia. Students in smaller municipalities are significantly more likely to report that their municipality lacks smart-city elements (OR=0.67 per log-population unit, p=0.015) — even though smart features may be present but invisible.

Connectivity Dimension

Better local internet is associated with reduced perceived absence (OR=0.75, p=0.062). The school–home connectivity gap (school M=2.59 vs. home M=3.89) constrains where digital engagement can happen.

Logistic Regression Results

Predictor	95% CI	p-val	OR
log(Population)	[0.48 – 0.93]	0.01	0.67
Municipal internet quality	[0.55 – 1.02]	0.062	0.75

Internet Quality Ratings (mean, 1–5 scale):

School internet: 2.59 / 5
Home internet: 3.89 / 5
Municipality internet: 2.46 / 5
OR < 1 = lower odds of perceiving absence. p < 0.05 = Statistically significant.

Policy Implications

- Communication campaigns in smaller municipalities to make existing smart initiatives visible
- School-linked pilot actions: youth participation in local smart-city projects
- Visible, citizen-oriented services aligned with the European integrated smart-city model
- Address territorial inequalities in both infrastructure and smart-city awareness

CONCLUSION

1. A smart-city visibility gap exists: students in smaller municipalities are significantly more likely to perceive their hometown as having no smart-city elements (OR=0.67 per log-population unit, p=0.015).
2. Municipal internet quality shows a marginal protective association (OR=0.75, p=0.062): connectivity moderates smart-city awareness.
3. On the same dataset, the companion paper finds digital readiness predicts curriculum exposure to smart-city / AI content (OR=1.34/SD), with a 14.0 pp gender gap — territorial and educational visibility gaps reinforce each other.
4. European smart-city strategies should combine digital infrastructure with visible, citizen-oriented services and youth participation to support equitable human–AI partnership in education.

FUTURE WORK / REFERENCES

Future work

Expand the model with additional municipal characteristics and compare perceived visibility with the actual presence of smart services.

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