OUTDOOR BENZENE HIGHLY IMPACTS INDOOR CONCENTRATIONS GLOBALLY

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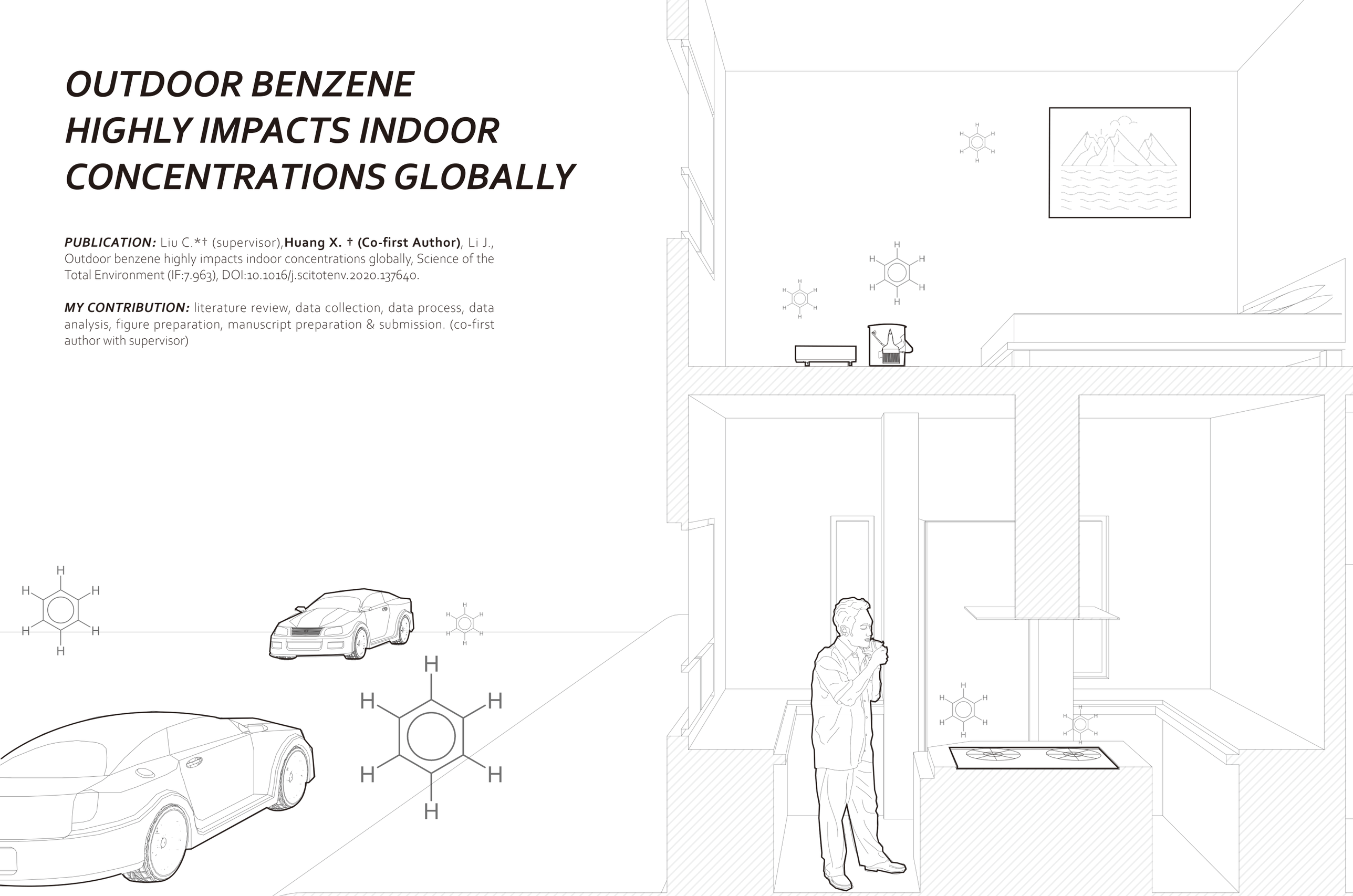
MY CONTRIBUTION: literature review, data collection, data process, data analysis, figure preparation, manuscript preparation & submission. (co-first author with supervisor)



INTRODUCTION

•Benzene is Group 1 carcinogen with severe health threat.

•Benzene mainly arises from indoor and outdoor anthropogenic sources, while the contribution of outdoor sources have not been fully recognized and regulated.

$$C_{in,s} = C_{out} + \frac{E}{Q}$$

Indoor sources $\frac{E}{Q}$

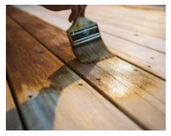
Combustion activities

Smoking

Building materials

Painting

Gas equipment



Varnishes

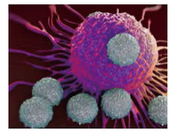
Coal heating

Adhesive

Outdoor sources C_{out}

Vehicles

Industries



Cancer

Health threat

Lack of recognition, quantification, and regulations.

RESEARCH HIGHLIGHTS

• 118 pairs of O-I measurement from 46 studies globally were summarized and analyzed.

• Developing countries/regions showed worse pollution than the developed ones.

• O/I ratio higher than 0.5 suggests a key role of outdoor benzene in indoor exposure.

• Outdoor benzene should be considered in engineering control and policy development.

Global-scale Study
118 measurements
46 studies
23 countries/regions

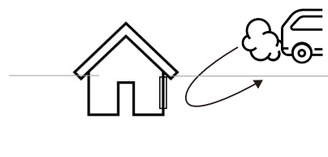
Developing countries/regions:
33 % Outdoor concentrations above guideline
0.69 Median O/I Ratio

Developed countries/regions:
4 % Outdoor concentrations above guideline
0.84 Median O/I Ratio

Significant outdoor contribution

IMPLICATION

Policy Improvement
· More protective guidelines
· Worst-case indoor air quality testing



Engineering Control
· Cleaning unit