

Supplementary Information:

The research articles for section 2.1 were searched in the following scientific databases: Scopus and Web of Science. Finally, 32 studies are found and 12 studies are finally selected to be reviewed in this study. The inclusion criteria for the selection of publications were as follows:

- Types: articles and conference papers.
- Language: English.
- Keywords: “district renovation” OR “historic district” And “social sustainability”.

**Table S1.** Attributes for socially sustainable renovation.

<b>Factor</b>	<b>Reference</b>
Facilities/Social infrastructure	[11], [12], [13], [14], [15], [22]
Built environment	[22]
Justice and equity	[12]
Heritage protecting	[2], [21]
Cultural identity/Sense of place	[2], [17], [18], [19], [20]
Public engagement/Public participation	[2], [14], [16], [17], [19], [20]

**Table S2.** Pathways for citizen participation.

<b>Factor</b>	<b>Reference</b>
Self-initiated participation	[16]
Lead by Owners Management Committee	[2], [16], [17]
Questionnaire	[16]

The research articles for section 2.2 were searched in the following scientific databases: Scopus and Web of Science. Finally, 25 studies are found and 13 studies are finally selected to be reviewed in this study. The inclusion criteria for the selection of publications were as follows:

- Types: articles and conference papers.
- Language: English.
- Keywords: “district renovation” OR “historic district” And “virtual reality”.

**Table S3.** VR technology applied in urban district renovation

Year	Location	Scale	Test	Reference
2014	Vilnius, Lithuania	City	Environment management	[24]
2015	Germany.	Building	Human behavior	[25]
2016	Naples, Italy	District	Acoustic environment, visual environment	[28]
2018	Naples, Italy	District	Acoustic environment, visual environment, human behavior	[37]
2020	Naples, Italy	City	Visual environment	[38]
2020	Macau, China	City	Visual environment	[39]
2020	Oslo, Norway	Distict	Visual environment	[40]
2020	Boston, USA	City	Human behavior	[36]
2020	Barcelona, Spain	District	Training and learning	[42]
2020	Rome, Italy New	Building	Training and learning	[43]
2021	Rochelle, USA	City	Visual environment	[41]
2022	Seoul, Korea	Street	Training and learning	[44]
2022	Alexandria, Egypt	District	Training and learning	[45]