• Macro Context

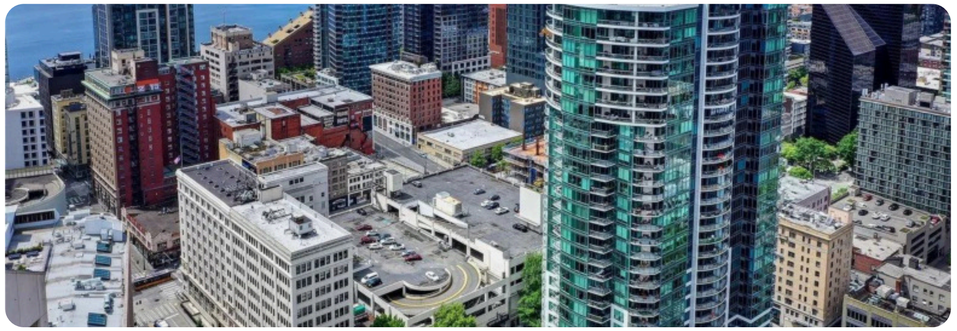
The Hidden Social Costs of Unbuilt Buildings

Moving from 'fight-then-fix' to 'agree-then-build.' In an era of economic uncertainty, pre-construction consensus is vital. We provide a data-driven communication platform that turns subjective conflicts into objective solutions, significantly reducing the social costs of development.

1 UK - VU.CITY

Success Case Study

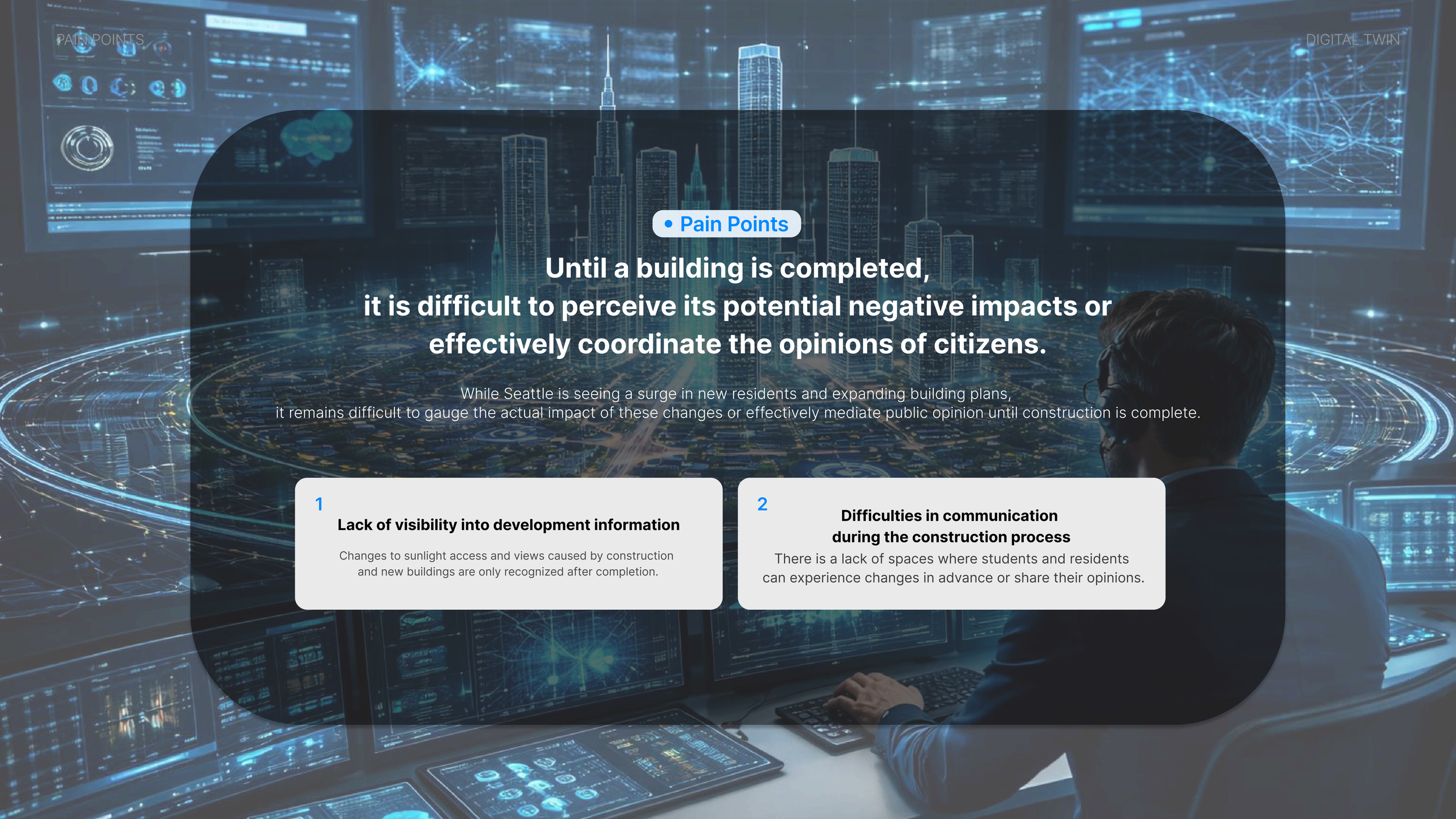
Visualizes a project's real-world impact against London's complex protected-view regulations, enabling faster decisions and reducing costly rework and sunk costs.



2 Seattle - Escala Condo Dispute

Conflict / Failure Case Study

A proposed hotel tower next door triggered privacy and view-right concerns; the dispute caused major delays and significant financial losses.



• Pain Points

Until a building is completed, it is difficult to perceive its potential negative impacts or effectively coordinate the opinions of citizens.

While Seattle is seeing a surge in new residents and expanding building plans,
it remains difficult to gauge the actual impact of these changes or effectively mediate public opinion until construction is complete.

1

Lack of visibility into development information

Changes to sunlight access and views caused by construction and new buildings are only recognized after completion.

2

Difficulties in communication during the construction process

There is a lack of spaces where students and residents can experience changes in advance or share their opinions.

• How Might We

Could we efficiently build a construction system for everyone through digital twins?

PERSONA

basic information

Name: Han Seo-joon

Age: 32

Gender: Male

Occupation: IT enterprise developer

Residence: Apartments near downtown Bellevue

Hobbies/interests: Home interior, real estate

Personality

- Logic and prudence: trust accurate data and visual evidence rather than vague words.
- PERSONAL SPACE IMPORTANT: Taking home rest and privacy as important values in life.
- Avoiding uncertainty: Hates unpredictable situations where the value of one's assets (home) could fall.

  Rational communication preference: want to communicate opinions efficiently through the system rather than through emotional fights.

a major objective

Protecting the right to view and the right to sunlight: Check and defend my house's view and mining damage caused by the construction of high-rise buildings in advance

- Protecting property values: Sensitive to surrounding development issues to prevent real estate prices from falling
- Pleasant living environment: Maintaining a life without construction noise or invasion of privacy while working from home

challenge

- Limitations of Visualization: Difficult to experience changes in the actual window landscape with only 2D drawings or bird's eye views
- Absence of communication channel: No official channel to effectively communicate residents' opinions to the construction company or city hall
- Information asymmetry anxiety: vague anxiety as we don't know how the building will be built until it's completed

PERSONA

basic information

Name: Amy

Age: 43

Gender: Female

Occupation: General Manager of Bellevue Campus Operations and Community Management

Residence: a residential complex west of Bellevue

Hobbies/interests: Study data visualization, participate in tennis, smart city conferences

Personality

• Analytical: Prefers understanding overall patterns through statistics and heatmaps rather than reading through thousands of individual complaints.

• Solution-oriented: Goes beyond simple apologies for complaints by identifying root causes (e.g., building exterior reflections) and immediately developing concrete solutions.

• Communication bridge: Seeks data-based transparent communication between residents and companies.

• Multitasking: Excels at simultaneously monitoring multiple buildings' conditions, surrounding road situations, and public sentiment trends for coordination.

a major objective

• Complaint Heatmap Analysis: View residents' 'sticky note' (opinion) location data on the app to instantly identify where reflective light or shading issues are concentrated.

• Simulation-based Response: When receiving complaints like "too dark at specific times," immediately check actual sunlight exposure through digital twin and develop countermeasures such as additional lighting or tree repositioning.

• Future Expansion Planning: When adding benches, green spaces, or pop-up stores within campus, run simulations to identify optimal "sunny spots" that receive sunlight throughout all four seasons for strategic placement.

challenge

• Fragmented Complaints: Complaints scattered across email, phone calls, city hall submissions etc., making it impossible to consolidate and analyze data systematically.

• Lack of Verifiable Evidence: When residents misunderstand ("It's not our campus making it dark"), there's no clear visual simulation data to prove otherwise.

• Community Conflict: Repeated environmental issues damage corporate image among local residents, creating significant psychological pressure

“We build a digital twin platform that enables residents to actively participate from the very beginning of the construction planning process.”

Key Problem 1

Citizen input is limited to formal processes and only possible at a late stage.

Key Problem 2

Residents cannot understand or experience construction impacts in advance.

Key Problem 3

Developers lack tools to quantitatively understand and assess citizen responses.

Comparison-based participatory feedback

Allows residents to explain opposition during the design stage, revealing preferred design options.

3D digital twin simulation

Enables realistic simulations of Seattle’s characteristics—such as limited sunlight and high view value—through digital twins.

Impact risk dashboard

Visualizes complaints and feedback as quantitative data, allowing developers to anticipate and address risks in advance.

Hypothesis 1

"The dictionary reduces complaints."

The gist of a hypothesis

4D simulations allow users to avoid future damage (e.g., sunlight and prospect)
in a precise manner
This prevents post-conflict

Verification Method

Work.
"Find and report where your right to sunshine/view has been violated."

A/B group test

New construction on the same Bellevue campus
by design
Group A (2D drawing/ bird's eye view)
Separation into Group B (Web-based 4D digital twins)

Measurement Indicators

precision of cognition

a simple complaint
(ex.I don't think the sun will come out)
Provide a quantitative basis for contrast
(ex. Dec. 2 p.m., South Korean living room on the 5th floor of 101 building reduced by 2 hours)
Ratio

Wrong answer rate:
the percentage of complaints filed incorrectly when compared to actual data

Verification Point

Resolving Information Asymmetry

Subjective anxiety when using digital twins is 'raising objective fact-based issues'
Converted

Result

Group B's problem identification accuracy improves by 3.5 times compared to Group A and reduces complaints by 40% due to unnecessary misunderstanding

Hypothesis 2

"The engagement data is used in the design."

the gist of a hypothesis

"Location + Participant Type + Issue Tag
Structured data becomes data that designers can refer to when making actual changes."

Verification Method

Work
"Specify the most serious conflict zone,

Come up with a workable design change."

Simulate expert decision making

Campus PM and Design Professionals
It provides fragmented civil complaint text and spatial coordinate-based heatmaps

Measurement Indicators

Pattern Identification Time

How long does it take to find a key point of conflict in thousands of complaints

Design Reflection Rate

Where the data points to and the actual proposed alternative
Logical consistency (horizontal layout, building angle adjustment, etc.)

Verification Point

Maximize decision efficiency by identifying 'spatial patterns' at a glance without reading tens of thousands of text complaints from data readability

Result

Reduce problem zone identification time by 62% with heatmaps and double the feasibility of design alternatives

Hypothesis 3

"Web 3D is more engaged than offline."

the gist of a hypothesis

"The web-based platform is time and space
I'm not going to take the restrictions off-line
elicit continued engagement from a variety of stakeholders."

Verification Method

Same project parallel operation

- Offline: Briefing + Paper Survey
- Online: Web3D+Online Survey
- Data comparison for 2 weeks

Measurement Indicators

- Total number of participants compared
- number of opinions per person
- Participant Diversity (Students/Professors/ Staff)
- Satisfaction (1-5 points)

Verification Point

The participation of teleworkers and busy members who have been marginalized due to time and space constraints has increased significantly

Result

2.4x diversification of participating stakeholders compared to offline, Re-connecting and achieving 28% continuous comment rate

• Planning

MVP Design Process