Supplementary Materials

6.1 Details of the initial paper searching and selection

6.1.1 Enrich the meaning of ‘demand-responsive station areas’ and establish the first theme for literature searching

Since overcrowding and emptiness are very particular issues that are barely addressed by any existing spatial design research, therefore if directly using ’railway station area’ + ‘demand-responsive’ as the keywords for searching, hardly any relevant papers can be found, and no heuristics can be gained. An enriched meaning of ‘demand-responsive station areas’ is needed to serve as a basis for literature selection. This paper enriches the term’s meaning by reinterpreting the identities of ’railway station areas’ and the nature of ’overcrowding’ and ‘emptiness.’

The identities of railway stations: According to Bertolini and Spit (1998), ‘railway stations’ are ‘nodes’ of the transport networks and ‘places’ of the cities, so stations are fundamentally ‘transport infrastructures’ for transportation activities and ‘public spaces’ for other leisure activities.

‘Station areas’ include the ’station buildings’ and the outdoor ‘spaces,’ therefore, ‘open/urban/public space’ and ‘landscape’ are relevant. ‘Overcrowding’ can be seen as a type of ‘risk’ to the station system, which can be addressed by ‘resilience’ as a quality of the system. ‘Emptiness’ is a lack of use of public spaces, therefore ‘flexible’ use can be helpful. Both ‘resilience’ and ‘flexible’ mean a system that is capable of changing, and similar words can include ‘dynamic,’ ‘adaptive,’ ‘robust,’ ‘moveable,’ ‘reconfigurable,’ ‘multi-functional (in the time dimension),’ ‘temporary,’ ‘kinetic’, and so on. The combination of these concepts facilitates this paper in finding relevant literature (See the main text, Section 2.5.2 Literature, the first theme of searching) and cases.

6.1.2 Paper selection criteria

The papers that used as the heuristics for research-by-design meet at least one of the following criteria: 1) The papers are related to design aspects, including design qualities, programming/functions, layouts, spaces, elements, and so on. 2) The papers deal with demands and users in station areas. 3) The papers’ knowledge is preferably applicable on both building and outdoor spaces, otherwise too specific and not generalizable. In paper selection, we excluded plenty of papers that are purely about planning, or managerial solutions, which can hardly be transformed to spatial interventions.

6.1.3 Initial papers selected through each searching strategy and their relevance to the layouts and elements of design principles

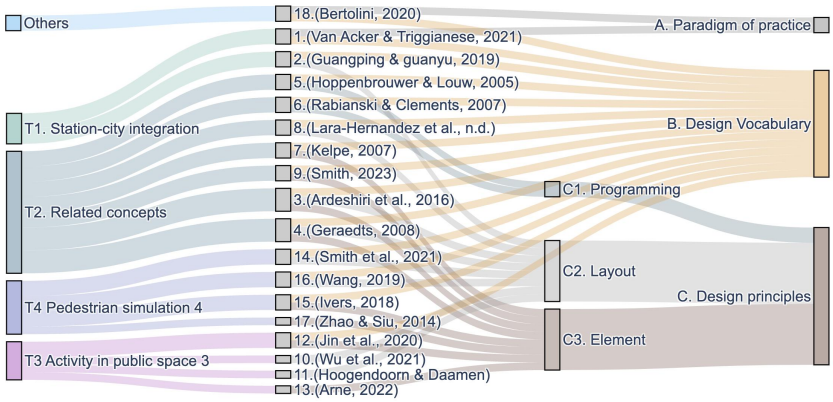

Figure 47: The literature selected and the relevance to the research findings

6.2 The validation of the research by design method

To some readers who deal with more science-related and quantitative research, this research by design (RbD) method may raise the concern of bias, but in this paper we argue that it is not an issue. This research is for developing mean-end knowledge for designers; As design-related research, it is not about true or false (and therefore the main quality criteria is not heavily rely on validity, reliability, and generalizability, as in quantitative research (Leung, 2015)), but about useful/practical or not (Zwart and de Vries, 2016; Nijhuis and Bobbink, 2012).

Design iterations seem arbitrary as it can iterates numerous times, while the minimum requirement is to iterate until requirements (design objectives) are met. RbD is useful as long as one effective solution is successfully found.

To further make the data processing clear and transparent, we documented the case comparisons we made in detail, so that readers can check to what extent have we explored with the selected cases, and how much still remain unexplored.

We reflected our outcomes internally by checking all the criteria with each principle, and we did expert interviews to further externally reflect on principles' limitations.

6.3 The diagrams of station areas

As shown in the following diagrams, and the on-site visits, the station areas are hardly perceivable (by vision) outside the 250m range.

Figure 48: The Utrecht Central Station area - 250m vs 500m. (Image source: by authors)

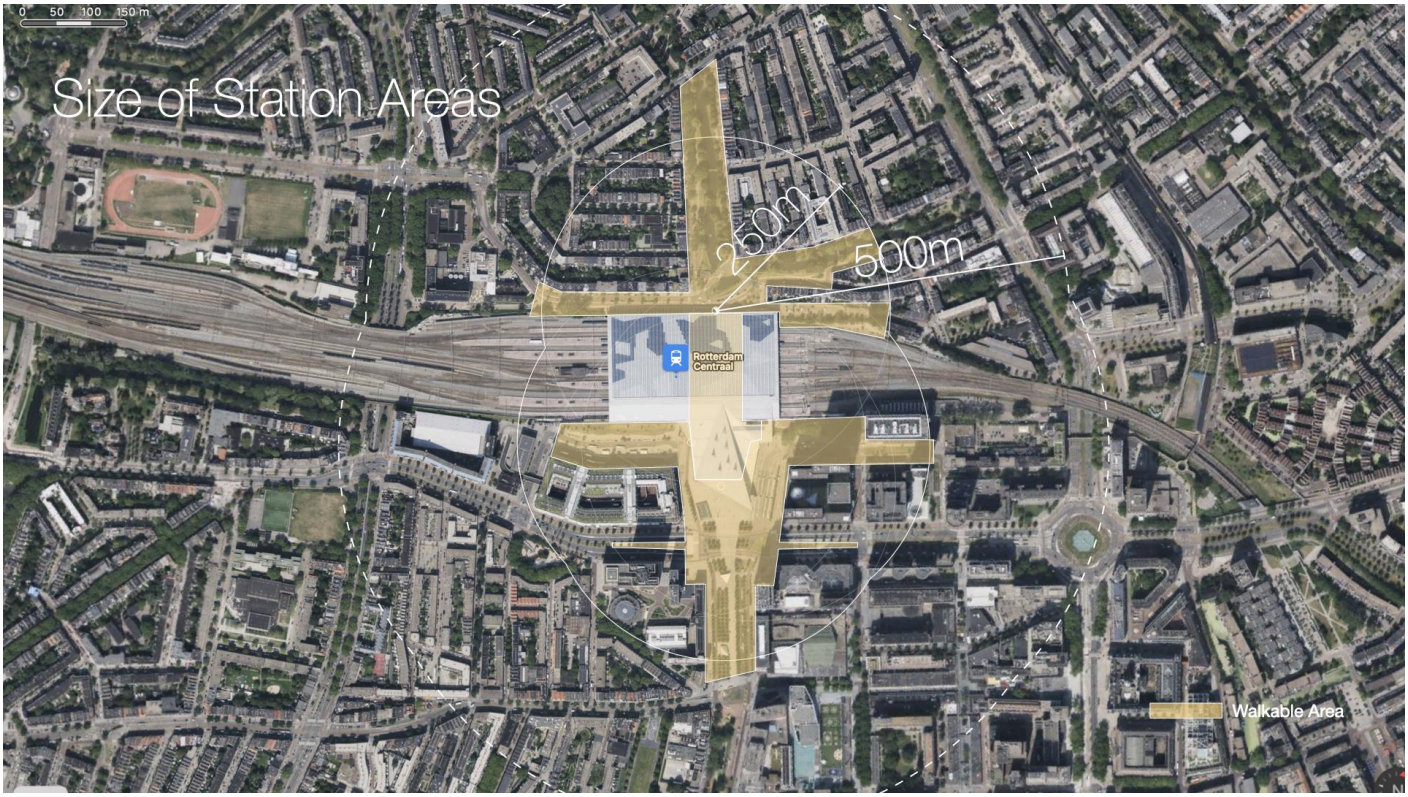

Figure 49: The Rotterdam Central Station area - 250m vs 500m. (Image source: by authors)

Figure 50: The Beijing West Railway Station area - 250m vs 500m. (Image source: by authors)

6.4 Initial station cases selected

Table 1: Cases selected

Stations	Size	Demand fluctuation	Performance for fluctuation	Nation
Beijing West RS	Large	Large	Poor	China
Beijing South RS	Large	Large	Poor	China
Shanghai RS	Large	Large	Good	China
Rotterdam Central Station	Large	Middle	Good	The Netherlands
Utrecht Central Station	Large	Middle	Good	The Netherlands
Bijlmer Arena RS	Middle	Large	Good	The Netherlands
Zandvoort Station	Small	Large	Good	The Netherlands

6.5 Data processing

(Data processing for developing Design Principles)

				Design **Objectives**										Spatial or Managerial **Dimensions**									
				Problem-oriented (Macro-level)						User-based (Micro-level)				Spatial				Managerial-Spatial?					
																		Access		Events		Others	
				Has **Overcrowding** phenomena?	Has interventions that (potentially) **reduce Overcrowding**?	Has **Emptiness** phenomena?	Has interventions that (potentially) **reduce Emptiness?**	**Add City Value?**	**Reduce Conflicts of Use** between the station and the city?	Related to **Safety** (Overcrowding or Eyes-on-the-Street)	Related to **Speed**	Related to **Ease** (of Wayfinding)	Related to **Comfort** (of Facilities and Weather-Protected areas)	Related to (Visual) **Experience**	Related to **different Sizes (Scales)?**	Related to **Layout - Element?**	Related to **Path/Flow?**	Related to **Programming?**	Related to **Access/Flow Regulation?**	Has **Spatial relevance?**	Feasible to **add Events?**	Has **Spatial relevance?**	**Other** managerial aspects	Has **Spatial relevance?**
Cases	Inital cases	1	**Beijing West**	√ (Problem Statement)	√- (Problem Statement)	√ (Problem Statement)	√- (Design Principle 22, 23)	○	○	√- (Non-peak-time Emptiness)	√- (Design Principle 13)	√- (Hard wayfinding in Complex Gigantic buildings; Underground spaces)	○	○	–	√ (Design Principles 22, 23)	√- (Design Principles 22, 23)	○	√ (Path Regulations during peak times; The Time period allowed for entering)	○	√- (Design Principles 6, 7)	√ (Design Principles 6, 7)	○	○
		2	**Shanghai**	○	√+ (Design Principle 5)	○	√+ (Design Principle 22)	√+ (Design Principle 22, 23)	○	○	○	√- (Design Principle 5 - Limitations)	○	○	–	√ (Design Principle 5)	√+ (Design Principles 22, 23)	○	√ (Path Regulations during peak times; The Time period allowed for entering)	○	√+ (Design Principle 7)	√ (Design Principle 7)	○	○
		3	**Rotterdam**	○	√+ (Design Principles 8, 10)	○	√+ (Design Principles 1, 6, 7, 16, 20, 21, 25)	√+ (Design Principle 20, 21, 22, 23)	○	○	√ (Different priorities for different modes)	○	○	○	–	√ (Design Principles 7, 8, 10, 25)	√ (Design Principles 20, 21, 22, 23, 25)	○	○	○	√+ (Design Principles 6, 7)	√ (Design Principles 6, 7)	○	○
		4	**Utrecht**	○	√+ (Design Principles 3)	○	√+ (Design Principles 1, 7, 16, 20, 21, 25)	√+ (Design Principle 20, 21, 22, 23)	○	○	√ (Different priorities for different modes)	○	○	○	–	√ (Design Principle 3, 25)	√ (Design Principles 20, 21, 22, 23, 25)	○	○	○	√+ (Design Principles 24)	√ (Design Principles 24)	○	○
		5	**Bijlmer**	√	√+ (Design Principles 8, 21)	√	√+ (Design Principle 22)	√+ (Design Principle 21, 22)	○	√- (Peak-time Overcrowding)	○	○	○	○	–	○	√ (Design Principles 21, 22)	○	√ (In the building, flow separation by crowd control line, during peak times)	○	√+	√	○	○
	Other cases (added during iterations)		Zandvoort										√ (Lack of weather-protected areas during peak times)		–	○					√+	○	√ (Schedule more trains during peak times)	○
			Beijing South	√							√+ (Design Principle 13)				–		√+ (Design Principle 13)							
			Guangzhou		√+ (Design Principle 12)										–			√ (Design Principle 12)						
			Shanghai South												–				√ (Design Principle 15 - Increase ticket-checking machines during peak times)					
			Allianz Arena	○	√+ (Design Principle 18)	√	√- (Design Principle 18 - limitations)	○	○	○	√- (Design Principle 18 - limitations)	○	○	○	–	√ (Design Principle 18)		○	○	○	○	○	○	○
Case Comparisons (Any differences or commons considering the different objectives / dimensions?)		1	Beijing West vs Beijing South									√- + (Design Principle 13)			○		√							
		2	**Beijing West vs Shanghai**	√+ ○	√- + (Design Principles 5, 22)	√	√	√- + (Design Principle 21, 22)	○	√- + (Design Principle 5)	○	√+ - (Hard wayfinding in Underground spaces)	○	○	○	√ (Design Principle 5)	√ (Design Principle 21, 22, 23)	○	√ (Path Regulations during peak times; The Time period allowed for entering)	○	√- + (Design Principle 7)	√ (Design Principles 6, 7)	○	○
		3	**Beijing West vs Rotterdam**	√ + ○ (Research objective)	√- + (Design Principles 8, 21)	√ ○	√- + (Design Principles 6, 7, 21, 22, 23, 25)	√- + (Design Principle 21, 22, 23, 25)	○	√- + (Design Principle 8)	√- + (Design Principle - Human scale)	○	○	○	(Station Typology implied)	√ (Different flow patterns, paths, and layouts)		○	√ (With/Without security checks)	○	√- + (Design Principle 6)	√ (Design Principle 6)	○	○
		4	Beijing West vs Utrecht																		√ - + (Design Principle 24)	√ (Design Principle 24)		
		5	Beijing West vs Bijlmer																					
		6	Beijing West vs Zandvoort																					
		7	Beijing South vs Shanghai																					
		8	Beijing South vs Rotterdam																					
		9	Beijing South vs Utrecht																					
		10	Beijing South vs Bijlmer																					
		11	Beijing South vs Zandvoort																					
		12	**Shanghai vs Rotterdam**	○	○	○	√ + + (Design Principle 22)	√ + + (Design Principles 22, 23)	○	○	√ - + (Security checks)	○	○	○	○	√ (Different flow patterns, paths, and layouts)		○	○	○	√ - + (Design Principle 6)	√ (Design Principle 6)	○	○
		13	Shanghai vs Utrecht																		√ - + (Design Principle 24)	√ (Design Principle 24)		
		14	Shanghai vs Bijlmer																					
		15	Shanghai vs Zandvoort																					
		16	Rotterdam vs Utrecht																					
		17	Rotterdam vs Bijlmer																					
		18	Rotterdam vs Zandvoort																					
		19	Utrecht vs Bijlmer																					
		20	Utrecht vs Zandvoort																					
		21	Bijlmer vs Zandvoort																					
			Utrecht new vs Utrecht old	√ ○ +	√ + - (Design Principles 3, 21, 22)	○	√ + - (Design Principles 23, 24, 25)	√ + - (Design Principles 22, 23)	√ + - (Design Principles 3, 21)	√ + - (Design Principle 18)	○	√ + - (Design Principle 3)	○	○	–	√ (Design Principles 3, 25)	√ (Design Principles 21, 25)	○	○	○	○	○	○	○
			Rotterdam new vs Rotterdam old	√ ○ +	√ + - (Design Principles 8, 18)	○	√ + - (Design Principles 6, 7, 25)	○	○	√ + - (Design Principle 8)	○	√ + - (Image of the station building)	√ + - (Seatings)	√ + - (Design Principle 7)	–	√ (Design Principles 7, 25)	√ (Design Principle 25)	○	○	○	√ + - (Design Principle 7)	√ (Design Principle 7)	○	○
Literature		1	(Van Acker & Trigianese, 2021)	○	○	○	○	○	○	○	○	○	○	√	(Spatial Scale of Stations)	○	○	○	○	○	○	○	○	○
		2	(Guangping & guanyu, 2019)	○	○	○	○	○	○	○	○	○	○	○	○	√ (Design Principle 2)	○	○	○	○	○	○	○	○
		3	(Ardeshiri et al., 2016)	○	○	○	○	○	○	○	○	○	○	√ (Design Principle 7)	○	○	○	○	○	○	○	○	○	○
		4	(Geraedts, 2008)	○	○	○	○	○	○	○	○	○	○	○	○	√ (Design Principles 14, 15)	○	○	○	○	○	○	○	○
		5	(Hoppenbrouwer & Louw, 2005)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	√ (Design Principle 1)	○	○	○	○	○	○
		6	(Kelpe, 2007)	○	○	○	√ (Design Principle 16, 17)	○	○	○	○	○	○	○	○	√ (Design Principle 17)	○	○	○	○	○	○	○	○
		7	(Smith, 2023)	○	○	○		○	○	○	○	○	○	○	○	√ (Design Principles 14, 15)	○	○	○	○	○	○	○	○
		8	(Hoogendoorn & Daamen)	√	√ (Design Principle 19)	○	○	○	○	○	○	○	○	○	○	√ (Design Principles 18, 19)	○	○	○	○	○	○	○	○
		9	(Jin et al., 2020)	√	√ (Flow regulation)	○	○	○	○	√ (Flow regulation)	√ (Flow regulation, with longer distance)	○	○	○	○	√ (Design Principles 11, 18)	○	○	√ (Guide pedestrian for more even distribution)	○	○	○	○	○
		10	(Arne, 2022)	–	–	–	–	–	–	–	–	–	–	–	–	–	√ (Paths of passengers)	–	–	–	–	–	–	–
		11	(Smith et al., 2021)	○	○	○	√ (Add Event)	√ (Add Event)	○	○	○	○	○	√ (Add Event)	○	○	○	○	√ (Event typology)	√ (Relate the Event Typology to Design Principles)	√ (Event typology)	√ (Relate the Event Typology to Design Principles)	○	○
		12	(Ivers, 2018)	○	○	√	√ (Design Principles 16, 17, 26)	○	○	○	○	○	○	√ (Design Principles 16, 17, 26)	○	√ (Design Principles 16, 17, 26)	○	√ (Design Principles1, 12)	○	○	○	○	○	○

Legend:

	Initial literature/cases/comparisons of cases
	(Cases/comparisons that) have not been examined
–	Not relevant regarding this aspect
○	Examined but no relevant findings
√	Has relevant findings
√+	Has relevant and positive findings
√-	Has relevant and negative findings
√+ +	In the comparison, has (relevant,) positive and positive findings
√+ -	In the comparison, has (relevant,) positive vs negative findings
√- +	In the comparison, has (relevant,) negative vs positive findings
√- -	In the comparison, has (relevant,) negative and negative findings
√ ○ +	In the comparison, has (relevant,) non significant vs positive findings
√ ○ ○ (Text in the bracket)	Relevant content derived from this case/literature

Abbreviations of stations:

Beijing West — Beijing West Railway Station
Beijing South — Beijing South Railway Station
Shanghai — Shanghai Railway Station
Rotterdam — Rotterdam Central Station
Utrecht — Utrecht Central Station
Bijlmer — Bijlmer Railway Station
Zandvoort — Zandvoort Railway Station
Guangzhou — Guangzhou Railway Station
Zandvoort — Zandvoort Railway Station
Utrecht new — the new Utrecht Central Station
Utrecht old — the old Utrecht Central Station
Rotterdam new — the new Rotterdam Central Station
Rotterdam old — the old Rotterdam Central Station

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Figure 51: Examine relevance and compare cases

6.6 The table for internal evaluation of design principles

(Internal evaluations of Design Principles)

Index	Names of Design Principles	Meet **Design Objectives**?									Have **Spatial Relevance** ?
		Problem-oriented (Macro-level)				**User (Passenger)-based** (Micro-level)					
		Reduce Overcrowding ?	**Reduce Emptines ?**	**Add city value** ?	**Reduce conflicts** of use between the station and the city?	Improve **Safety** (Overcrowding or Eyes-on-the-Street)	Improve **Speed**	Improve **Ease** (of Wayfinding)	Improve **Comfort** (of Facilities and Weather-Protected areas)	Improve (Visual) **Experience**	
1	**Flexible use**	√#	√#	√#	○	√#	#	#	√#	√+	√ (Programming)
2	**Suitable general layouts of the station and city**	√#	√#	√#	√#	√#	√#	√#	√#	√#	√ (Spatial Layout)
3	**Set apart non-transport function**	√+	○	○	√+	√#	○	√+	○	√#	√ (Spatial Layout)
4	**Vibrate city environment by scattered mobility nodes**	○	√+	√+	○	○	√–	√–	○	○	√ (Spatial Layout)
5	**Increase accommodating capacity by scattered mobility nodes**	√+	○	○	○	√+	√–	√–	○	○	√ (Spatial Layout)
6	**Make events visible by aligning main paths and open spaces**	○	√+	○	○	○	○	○	○	√+	√ (Spatial Layout; Path/Flow)
7	**Human-oriented spaces**	○	√+	○	√+	○	○	○	○	√+	√ (Spatial Layout; Flow)
8	**Connect with neighborhoods**	√#	○	√#	√#	√+	○	○	○	○	√ (Layout)
9	**Smooth level changes by landscape design (District level)**	○	√+	○	○	○	○	○	○	○	√ (Spatial Element [District level])
10	**Smooth level changes by landscape design (Building level)**	○	√+	○	○	√+	○	○	○	○	√ (Spatial Element [Building level])
11	**Adaptive redundant spaces with path regulation**	√+	√+	○	○	√+	√+	○	○	○	√ (Spatial Layout; Path/Flow)
12	**Programming considering the time dimension**	√+	√+	√+	○	○	○	○	○	○	√ (Programming)
13	**Shortcuts or optimizing paths**	○	○	○	√+	√–	√+	√–	○	√–	√ (Spatial Layout; Path/Flow)
14	**Flexible buildings**	√+	√+	○	○	○	○	○	○	○	√ (Spatial Element [District level])
15	**Flexible building components**	√+	√+	○	○	○	○	○	√#	√#	√ (Spatial Element [Building level])
16	**Add installations and facilities**	○	√+	○	○	○	○	○	√+	√+	√ (Spatial Element)
17	**Reconfigurable elements**	○	√+	○	○	○	○	○	○	○	√ (Spatial Layout)
18	**Redundant spaces**	√+	√–	○	○	√+	√–	○	○	√–	√ ([District level] Spatial Layout)
19	**Set apart bottlenecks**	√+	√–	○	○	√+	√–	○	○	○	√ ([Building level] Spatial Layout)
20	**City passage**	○	√+	√+	○	○	√#	○	○	○	√ (Spatial Element; Path/Flow)
21	**Position city passages**	√#	√+	√+	√#	○	○	○	○	○	√ (Spatial Layout; Path/Flow)
22	**Reduce barriers to ease flow (District level)**	√#	√+	√+	√#	○	○	○	√+	○	√ ([District level] Spatial Element; Path/Flow)
23	**Reduce barriers to ease flow (Building level)**	√#	√+	√+	√#	○	○	○	√+	○	√ ([Building level] Spatial Element; Path/Flow)
24	**Stairs as stages or seats**	○	√+	○	○	○	○	○	○	√+	√ (Spatial Element)
25	**City axes**	√#	√+	√+	○	○	○	√+	√+	○	√ (Spatial Layout; Path/Flow)
26	**Reconfigurable spaces**	○	√+	○	○	○	○	○	○	√+	√ (Spatial Element)

Legend:

○	No relevance
√	Has relevance
√+	Has relevance, with Positive effects
√–	Has relevance, with Negative effects
√#	Has relevance, and the effects depend on the contexts
#	Uncertain

Figure 52: The table of internal evaluation of design principles

6.7 Relate design principles to an event typology

Events are an important aspect of this research, as they are the causes of fluctuations in station areas and are a solution to solve emptiness. As part of the exploration of design solutions, we investigated the relationship between event types and design principles.

In this research, we adopted an event typology developed by Smith et al. (2021). This typology is framed based on access and mobility, including nine types of events, including E1) large indoor arenas, E2) concerts and screenings, E3) pleasure gardens, E4) parades and street races, E5) roadshows, E6) markets and fairs, E7) mass gatherings, E8) micro-performances, and E9) marches and street parties. Two events - E4 and E9, primarily happen on streets, which are irrelevant for most spaces in railway stations, so we excluded (×) them (fig. 53).

The relationships between event types and design principles, are explained as follows (Note: 'E' stands for Event types, and 'D' stands for Design principles):

- Large open-air events with concentrated distributions, including E2, E3, and E7, need large coherent outdoor spaces and should not block city passages. Therefore, these events have relevance to design principles (DPs) (11) Adaptive redundant spaces with path regulation, (7) Human-oriented spaces, and (21) City passages' positioning. (Links: E2-D7, E3-D7, E6-D7; E7-D7; E2-D11, E3-D11, E6-D11, E7-D11; E2-D21, E3-D21, E6-D21, E7-D21)
- For large events with performances - E2, (24) Stairs as stages or seats can be used. (Link: E2-D24)
- Small spaces are common in a scattered layout (D4), and small events - E8 can be held in these small spaces. (15) Flexible building components can also be the small spaces to hold small events. (Links: E8-D4, E8-D15)
- For events that require user participation and are open-access, including E7, E5, E6, and E8, it is necessary to (6) Make events visible by aligning main paths and open spaces. (Links: E7-D6, E5-D6, E6-D6, E8-D6)
- Small performances and markets can help promote a vibrant environment, and it is a prerequisite to (23) Reduce barriers to ease flow at the building level. (Links: E6-D23, E8-D23)
- Large indoor arenas can be Flexible buildings (14). Flexible and Shared use between arenas and stations can be realized if the station areas are Programmed considering the time dimension. The arenas should located in Suitable general layouts of the station and city (2). (Links: E1-D2, E1-D14, E1-D12)
- In events E3 and E6, it is necessary to (16) Add installations and facilities, which can be (17) Reconfigurable elements. (Links: E3-D11, E6-D11; E3-D16)
- For all possible events happening in railway stations, the event spaces should support flexible use and be configurable, and pedestrians should be able to walk smoothly to the event spots. Therefore, several design principles are relevant, including (22) Reduce barriers to ease flow at the district level, (25) City axes, (1) Flexible use, (26) Reconfigurable spaces. (Links: All-D25, All-D22, All-D26, All-D1)

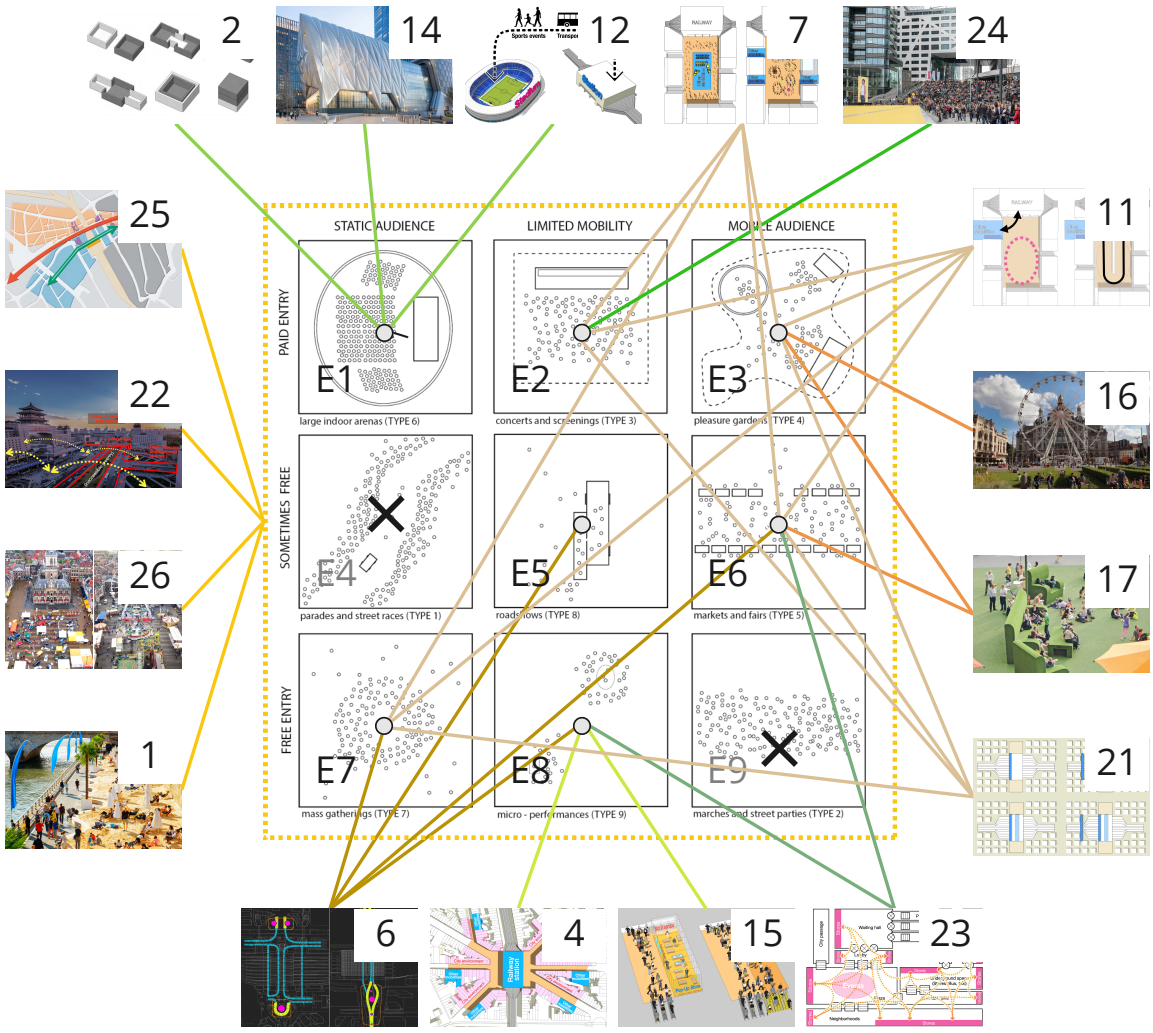

Figure 53: The design principles related to the event typology (Image source: Drawn by authors; The event typology diagram is reused from (Smith et al., 2021);

Supplementary Material 2 - Sources of figures

Table 2: Sources of Figures

N	Figure and Caption	Source
1	Overcrowding and emptiness in railway stations areas.	Left - https://www.163.com/dy/article/DLED9I020524TFU4.html; Right - https://www.sohu.com/a/386779398_640391
2	A conceptual basic unit of passenger flow.	By authors
3	The mechanism of overcrowding and emptiness in Beijing West railway station area.	By authors
4	Spatial relevance shown by an example case of Beijing West Railway Station.	Original photo sources: Left - https://www.meipian.cn/; Right - https://upload.wikimedia.org/wikipedia/commons/5/5b/Beijing_West_Railway_Station_20170506_124557.jpg. Drawings by authors
5	Temporal scales.	By authors, inspired by (de Jonge and van der Voordt, 2002, p. 38, fig. 13)
6	Spatial scales of station areas.	By authors
7	Architectural and urban design proposals for Amsterdam Sloterdijk station.	Upper - (Triggianese et al., 2019); Lower - (Andrianos, 2023)
8	This paper is part of a PhD project at the intersection of three topics.	By authors
9	The process of developing design principles.	By authors
10	The station at the district and building levels.	By authors
11	The configuration of the station.	By authors
12	Data sources.	By authors
13	An example of research by design.	By authors
14	Sources of heuristics.	By authors
15	The design principles (patterns) within a network.	By authors
16	The design principles viewed from different perspectives.	By authors
17	Flexible use.	https://www.stadsstranden.nl/paris-plages/
18	Different general layouts of the station and city.	(Qi and Lu, 2019)
19	Set apart non-transport function.	https://www.santenco.nl/portfolio_page/stationsplein-oost/
20	Vibrate city environment by scattered mobility nodes (at the district level).	By authors
21	Increase transport capacity by scattered mobility nodes (at the building level).	By authors
22	Alignment between open spaces and main paths.	By authors
23	Human-oriented spaces versus vehicle-oriented spaces.	By authors
24	The old and the new Rotterdam central stations.	Upper-left - https://commons.wikimedia.org/wiki/File:Nieuw_Centraal_Station_in_Rotterdam_aangetast,_Bestanddeelnr_908-5455.jpg; Upper-right -https://internaathetposthuis.nl/raldus.html; Lower-left -https://indebuurt.nl/rotterdam/nieuws/salsa-doe-gratis-mee-met-deze-gigadans-voor-rotterdam-centraal~311821/; Lower-right https://mvsa-architects.com/en/news/nos-rotterdam-central-receives-a-score-of-8-and-is-the-most-popular-large-train-station/
25	Connect with neighborhoods.	By authors
26	Smooth level changes by landscape design at the district level.	https://m.thepaper.cn/newsDetail_forward_5348462
27	Smooth level changes by landscape design at the building level.	https://www.unstudio.com/en/page/12109/arnhem-central-masterplan
28	Adaptive redundant spaces with path regulation.	By authors
29	Path regulation using reconfigurable elements.	By authors

Table 3: Sources of Figures (continued)

N	Figure and Caption	Source
30	Programming considering the time dimension (for flexible use).	By authors
31	Shortcuts or optimizing paths.	By authors
32	A changeable building - the Shed.	https://www.architecturaldigest.com/story/the-shed-finally-opens-new-york-city-hudson-yards
33	Changeable building components.	By authors
34	Add installations and facilities.	https://www.flickr.com/photos/87453322@N00/7561351848
35	Reconfigurable elements.	(Ivers, 2018)
36	Reconfigurable spaces.	Left - https://www.shutterstock.com/image-photo/view-delft-market-square-nieuwe-kerk-1206141775; Right - https://nl.pinterest.com/pin/546342998538754823/
37	Redundant spaces or setting apart bottlenecks at the district level.	By authors
38	Redundant spaces or setting apart bottlenecks at the building level.	By authors
40	Position city passages (at the district level).	By authors
41	The city passages (at the building level).	https://www.amsterdam-viptours.com/blog/cuypers-passage/
42	Barriers that hinder the flow at the district level.	By authors
43	Reduce barriers to ease flow at the building level.	By authors
44	Stairs as stages or seats.	https://architectenweb.nl/nieuws/artikel.aspx?id=43948
45	Two city axes were planned during the redevelopment of the Utrecht Central Station area.	Structuurplan, Stationsgebied Utrecht, December 2006
46	Station typology implied by the cases.	By authors
48	The Utrecht Central Station area - 250m vs 500m.	By authors
49	The Rotterdam Central Station area - 250m vs 500m	
50	The Beijing West Railway Station area - 250m vs 500m.	By authors
47	The literature selected and the relevance to the research findings.	By authors
51	Examine relevance and compare cases.	By authors
52	The evaluation of design principles.	By authors
53	The design principles related to the event typology.	By authors