

What values are prioritised in the development of a railway station and its urban surroundings?

A Text-analysis to research the differences between four Western European countries

TIL5060: Master Thesis

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Preface

At the beginning of this year, I contacted Wijnand to inquire if he had any potential thesis topics for me. As luck would have it, he was about to start searching for a master's student interested in writing a thesis on value priorities in railway station development, making use of the text analysis method. The field of research immediately caught my attention, as I have a great interest in public transport, especially railway transport. I was not familiar with the research method, but a reassurance from Wijnand that I did not have to read every single document meticulously got me on board.

At the start of this project, I was introduced to Sebastian, who was already working on this research and provided me with a jump start into the topic. In my second week, I went on a trip to Hamburg to meet with stakeholders involved in the redevelopment project of their second railway station. This helped immensely with understanding the relevance of the research topic and got me excited about the potential of my thesis. It was also a lovely way of getting to know Sebastian.

The hardest challenge for me was to keep the bigger picture in mind during the extensive analysis of the literature, and later on, with the construction of the dictionaries. Both these processes required a lot of focus on the details, which felt quite endless at times. Especially during these phases, speaking about my findings with Wijnand, Manuela, and Sebastian was a great motivator to continue what I was doing and helped me to understand the usefulness of it all. When my results finally arrived and showed clear differences, I enjoyed the finalisation of the research.

I want to thank Manuela for her feedback during the several meetings we had, providing me with insights from a different field than my own. Martijn, thank you for your additional input during my greenlight meeting. I am grateful to Sebastian for giving me the opportunity to join him in his research and for the many exchanges of thought, at times bordering on the philosophical. And finally, a special thanks to Wijnand, not just for providing me with great advice on the direction of my research, but as much for helping me with understanding throughout the whole project and our weekly meetings, which always gave me much energy.

*G.W. (Gijs) Aben
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Summary

Across Western Europe, railway stations are being reimagined not only as transport nodes but as strategic urban places that must balance mobility, development, and public value. While established frameworks such as Node–Place and transit-oriented development (TOD) help articulate that balance, they rarely compare how value priorities are expressed across countries. To address this gap, the thesis researched which values are given priority when European cities develop railway stations and their surrounding urban areas. By answering the following research question:

“What is the relative importance of values that influence the process of urban-surroundings-railway-station development in different European countries?”

This is studied by comparing four national contexts: Germany, the Netherlands, Switzerland and the United Kingdom, and performing a text-analysis on a corpus that includes documents such as planning briefs, masterplans, transport strategies and railway studies.

The study began with a structured literature review to ground the analytical framework and inform both the interviews and the text-analysis. The review follows transparent, reproducible search and reporting practices of PRISMA. An initial Scopus search identified the 200 most-cited papers, which were screened to surface recurring topics. For each topic that was robustly represented in the literature, a perspective-specific search was then carried out, and the ten most-cited, best-fitting papers were reviewed to extract principles, stakeholders and values. Semi-structured expert interviews were conducted after the literature review to validate the emerging framework and reduce literature-driven bias. The interviews aimed to confirm which perspectives matter in practice, identify any missing ones, and clarify associated stakeholders and values.

Drawing on the literature and interviews, the thesis specifies a set of perspectives, each mapped to a main stakeholder and a core value. They include: *Railway transport* (infrastructure managers/undertakings; safety, capacity, punctuality), *Connecting passengers* (municipality; accessibility), *Urban context* (municipality; public values), *Architecture & design* (architects/designers; aesthetic and safety values), *Passenger flow* (station manager; safety/crowd management), *Retail logistics* (station owner/manager; financial/logistics), *Property value* (real-estate developers; financial gain), *Political approval* (municipality; legitimacy), *Process management* (project manager; legitimacy), and *Project accomplishments* (public/private investors; accountability/financial cost). During analysis, *Sustainability*, not part of the initial ten, was added due to its frequent appearance.

The text-analysis combined manual and automated steps: ATLAS.ti was used on a test set to code passages by perspective. In MAXQDA, checks verified that terms consistently appeared with the intended meanings before being added to multilingual dictionaries. Dutch documents were analysed alongside English to keep dictionaries aligned; the German dictionary was built by translating EN/NL terms, then iteratively pruning via context checks. This created comparable, perspective-specific dictionaries for automated counting across the four national corpora.

Because document types influence which perspectives are emphasised, the thesis analyses both the complete corpus and a masterplan subset. This subset of station area development plans yields more comparable coded-word densities across countries and checks that the patterns in the full corpus are not artefacts of composition.

In the complete sets, Germany is dominated by *Railway transport* and *Process management*, together approaching 60% of coded words—reflecting technically detailed procedures and regulatory steps. The Netherlands shows relatively higher shares for *Connecting passengers*, *Architecture & design*, *Political approval*, and also the highest share for *Property value*. Switzerland is an outlier for *Connecting passengers*, which takes nearly half of all coded words, while several perspectives (e.g., *Political approval*, *Project accomplishments*) appear infrequently. The UK distribution is comparatively balanced, with a notable share for *Political approval* and *Urban context*. These patterns broadly persist, though moderated, when focusing on the masterplan subset.

Although the dictionary method simplifies language and can miss nuance, corpora differ in size, type and style; and translation/balancing choices affect counts. The analysis still makes significant differences in values in railway station development empirically visible. Clear cross-country differences are revealed from their appearance in official documents. The perspective framework, the documented corpus, and the multilingual dictionaries together provide a transparent, reproducible basis for comparing value priorities across national contexts. Results should therefore be read as indicative patterns rather than precise measurements, hence the use of the masterplan subset to support interpretation.

Overall, the occurrence of perspectives appears largely driven by legitimacy needs, addressing influential stakeholders and reflecting culturally expected forms of reporting, rather than by direct causation of physical design differences. In this sense, observed value differences primarily structure what is needed to justify these projects, rather than the fundamental configuration of railway stations.

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Nomenclature

Abbreviations

Abbreviation	Definition
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analysis
Railway stations	Railway stations and their urban surroundings
TOD	Transit Oriented Development

1

Introduction

This chapter is an introduction to the topic of railway stations and their urban surroundings from hereafter referred to as railway stations. The first section gives a background in how railway stations came to be the part of the urban landscape that they are today, and what that role includes. section 1.2 mentions some of the prominent topics in the literature leading to the research questions given in section 1.3. Furthermore, the research scope is elaborated in section 1.4 and the relevance of this thesis is explained in section 1.5. Finally, an overview of the report structure is given in section 1.6.

1.1. Background

In the early decades of the railway age, stations were often located outside city centres in order to avoid disrupting the existing urban fabric (UIC, 2013). The new accessibility offered by rail made these sites attractive to commercial and industrial firms, which in turn generated employment and stimulated population growth in their vicinity. In nineteenth-century England and Wales, this dynamic even contributed to significantly higher urbanisation rates in areas near stations (Bogart et al., 2022). From the mid-nineteenth century onwards, railway companies also began to construct larger and more architecturally ambitious stations as a means of attracting financial investment for the growing railway industry (UIC, 2013). These facilities gradually became iconic urban landmarks, embedding themselves as important elements of the city landscape (Lunardon et al., 2023).

Where railway stations traditionally functioned as essential nodes in the multi-modal transportation, nowadays they have a more complex role within urban areas (Triggianese et al., 2018). Railway stations are a point of reference within the city for the traveller who arrives in the city, but they also serve as key hubs for residents and various other users (Esteban-Oliver et al., 2023). Beyond their transportation function, railway stations play a significant role in shaping urban environments and contributing to economic activity (Triggianese et al., 2018). As cities grow and mobility needs evolve, the development and modernisation of railway stations have a huge potential in ensuring accessibility, sustainability, and efficient land use (Lunardon et al., 2023). The significance of railway station development can be observed in the Netherlands, where the majority of important railway stations have undergone extensive redevelopment in the past two decades, with ongoing renovations in Amsterdam's two largest railway stations (Nederlandse Spoorwegen, 2025)

To conclude, the contemporary railway station can be defined as both infrastructure and an urban environment. It is a place that attracts urban growth, often acting as a secondary city centre, generating commercial and social activity around it (Baron et al., 2025). Therefore, railway stations are increasingly seen as assets—spaces where economic value is created through real estate development, retail, and service provision (Baron et al., 2025). At the same time, they are being reimagined as ecological and systemic objects, aiming for resilience and frugality, in line with the increasingly popular circular economy principles. A railway station could have potential responsibilities for energy use, environmental impact, and urban sustainability (Baron et al., 2025). This multidimensional character makes railway station development a complex endeavour where transport, spatial, economic, and societal objectives converge and often compete.

1.2. Railway stations in the literature

One of the most influential conceptual frameworks for analysing railway station areas is the node–place model developed by Luca Bertolini (1996). In this model, the ‘node’ dimension reflects the role of the station within the transport network, while the ‘place’ dimension refers to the accumulation of urban functions and activities in the surrounding area (L. Bertolini, 2008). Redeveloping station areas, therefore, requires balancing these two roles, a task made more complex by the involvement of multiple actors and often conflicting interests. The model has been widely applied to examine the relationship between transport supply and urban development, for example, in studies of Dutch urban regions (L. Bertolini, 2008) and in case studies such as ‘s-Hertogenbosch, where alignment between the municipality and the railway company was shown to be crucial for project success (Peek et al., 2008).

Closely related to this line of research is the concept of transit-oriented development (TOD), a mixed-use planning approach that places transit stations at the centre of dense, multifunctional urban areas. Introduced by Peter Calthorpe in *The Next American Metropolis* (1993), but with earlier roots in the New Town movements in Japan and Scandinavia in the mid-twentieth century, TOD seeks to promote sustainable mobility while also stimulating ridership, investment, and urban integration (Berawi et al., 2020; Derakhti et al., 2020; Renne et al., 2019). Its popularity is reflected in the large body of research it has generated—over 1,500 citations by 2018 (Renne et al., 2019). At the same time, critical perspectives have highlighted concerns about gentrification, displacement, and social polarisation associated with TOD projects (Derakhti et al., 2020).

The existing literature provides valuable conceptual frameworks, such as the node–place model and transit-oriented development, for understanding how stations integrate transport and urban functions. These conceptual frameworks are often tested on individual case studies, but they seldom compare how values are articulated across different national contexts. Furthermore, many of the same attributes are mentioned repeatedly, while more practical but less academically interesting factors are missed. The aim of this research is to analyse the different priorities in values, utilising a broad spectrum of perspectives in railway station development.

1.3. Research questions

The main research of this thesis is stated as follows:

"What is the relative importance of values that influence the process of urban-surroundings-railway-station development in different European countries?"

In order to answer this question, the following five sub-questions are defined:

1. What are the different perspectives used in the literature to analyse the quality of railway stations and their urban surroundings, and what values do they represent?
2. What do experts consider important perspectives for the urban-surroundings-railway-station development, and are these aligned with the literature?
3. How can the text-analysis method be used to uncover underlying values in the decision-making process?
4. What relative priority of value sets in urban-surroundings-railway-station development can be revealed and classified by text-analysis in different European countries?

1.4. Research scope

In this thesis, a railway station refers to the rail-served building, platforms and railway infrastructure together with their directly connected public spaces, access interfaces (e.g. bus/tram stops, and bicycle and pedestrian infrastructure) and the immediately surrounding neighbourhood that is functionally and spatially linked to the station. The railway station is assessed as a system that integrates passenger flows, connectivity, architectural expression, commercial services, and adjacent urban development dynamics. This wider scope explicitly brings additional stakeholders into view, not only transport authorities, infrastructure managers, and municipalities, but also local residents, neighbourhood businesses, developers, property owners, and social service providers, whose sometimes diverging values shape both the operation of the node and the quality of the place.

The analysis in this research is based on a form of automatic text-analysis on policy documents from Germany, the Netherlands, the United Kingdom, and Switzerland. The available document sets differ in size and composition across countries, which means the dataset is heterogeneous. The analysis makes use of ten perspectives that were identified through a combination of literature review and expert interviews. These perspectives were operationalised into dictionaries and applied in an unweighted Wordscore method (Laver et al., 2003) to assess how frequently each perspective appears in the text corpus of the four countries. Using these perspectives, we attempt to understand the different priorities in values between the four countries.

1.5. Research relevance

Across Western Europe, the role of railway stations is increasingly being reconsidered as part of broader urban development strategies, with growing attention to sustainable mobility, real estate integration, and the creation of high-quality public spaces (Van Acker et al., 2021). Equally important is the contribution of railway stations to the service quality of train travel. Factors include, but are not limited to, providing safe environments, enhancing passenger comfort, and improving accessibility to surrounding areas. The level of service quality plays a significant role in shifting passengers from private to public transport (Eboli et al., 2018).

Against this background, comparative research on the development of railway stations offers

valuable insights into how different practices balance transport efficiency with urban integration. While Western European countries face similar challenges, their institutional and governance arrangements in the railway sector vary considerably (Van de Velde, 2015). Analysing how these differences shape the prioritisation of values in station development projects can contribute to identifying strategies that strengthen both the transport function and the urban role of railway stations

1.6. Report structure

The thesis report is structured as follows. chapter 2 explains the methods used and the overall research approach of this thesis. An extensive literature review is conducted from which the results are presented in chapter 3. In addition to the literature, a couple of experts were interviewed, and the primary outcomes are written down in chapter 4. Utilizing the information from the literature and experts, a list of perspectives is created and further elaborated in chapter 5. How these perspectives are represented in the text corpus used for the text-analysis is reported in chapter 6, and the results of the analysis itself are shown in chapter 7. Finally, the research outcomes and other noteworthy implications are discussed in chapter 8, and the key insights are concluded in chapter 9.

2

Methodology

2.1. Structured literature review

In the first phase of this research, a structured literature review was conducted to better understand railway station development and create a framework for the subsequent expert interviews and the text-analysis. The literature review method is a way to motivate the aim of a study and to test the research questions (Snyder, 2019), making it a good basis for this thesis research. The objective is to eventually create bag-of-words (BOW) representations for all relevant perspectives for railway station development. Traditional text-analysis methods are based on BOW representation to turn texts into vectors that score on different bags (HaCohen-Kerner et al., 2020). The perspectives in the literature are the foundation for the BOW representations and are used in the text-analysis.

2.1.1. PRISMA-S

The PRISMA statement is an extensive 27-point checklist that guides the reporting of systematic reviews, covering all stages from title formulation to discussion (Page et al., 2021). For this research, the methodological elements of the PRISMA checklist are particularly relevant, as they provide a structured approach to designing and documenting the literature search process. PRISMA-S is an extension of the PRISMA statement that focuses specifically on the reporting of literature searches (Rethlefsen et al., 2021), and is therefore especially relevant to this literature review. A transparent, complete, and accurate reporting of the execution of the literature review is essential to enhance the credibility of the review findings (Page et al., 2021). As Rethlefsen et al. (2021) emphasises, literature searches must be robust and reproducible in order to avoid bias and allow for verification and replication. In order to achieve these objectives, the steps relevant for this particular research are selected from both the PRISMA and the PRISMA-s checklists to create the checklist, as can be seen below, which is used to conduct the literature review.

PRISMA based checklist

- Define inclusion/exclusion criteria for adding papers to the review
- Specifying the use of databases
- Write down the extensive search strategy for each database, specifying the limitations (date, language, study design)
- Add the exact search strings used to the report

- List and define all outcomes for which data was sought
- Describe the method to decide when a paper meets the inclusion criteria
- Describe the process of extracting data from the selected paper

2.1.2. Initial search

The initial search explored which perspectives are written about in the literature. In the Scopus database, with the use of the PRESS guideline, a carefully composed search string was constructed to obtain all relevant literature about railway stations and their urban surroundings. McGowan et al. (2016) provides the PRESS guideline for the peer review of electronic search strategies, which includes a checklist that supports the careful selection of keywords and the construction of effective search strings. Such tools contribute to the transparency and quality of the review process (Harari et al., 2020). The construction of the search string included a few iterations to filter out as many non-relevant papers, with the final search string is included in section 3.1. From the results of this search, the 200 most cited papers were included in the initial literature review. These papers were clustered based on a title-abstract scan in order to identify recurring topics. Perspectives were created for each topic relevant in the field of railway stations and their urban surrounding, which included ten or more papers. These perspectives were included in the next stage of the literature review.

2.1.3. Extensive perspective review

For each of the perspectives found in the initial search, a new search string was constructed to perform a focused search in the Scopus database. The ten most cited papers that accurately represent the perspective were used for the extensive literature review. These papers will be scanned for principles that apply to railway stations, stakeholders involved, and values that are important. For each of these perspectives, an overview is made of the general representation in the literature, which is reported in section 3.2.

2.2. Expert interviews

To validate the literature review and find potential additional perspectives, semi-structured interviews were conducted. This method is the balance between strictly constructed closed question interviews and the relaxed approach of a focus group (Adams, 2015). Semi-structured interviews require a clear understanding of the topic discussed, emphasising the importance of the literature review in phase one, and giving the opportunity to ask open-ended questions about complex systems (Adams, 2015). To prepare for the interviews, it is important to make a guideline with topics, questions that will be addressed, and the order in which they will be brought up. Because of these requirements, the interviews will be conducted after the literature review is finished, when more knowledge about the topic of railway stations is obtained. Furthermore, an interview protocol was drafted for this study, which can be viewed in Appendix A. Constructing this protocol required some time and reiterations to get to the final draft. The added value of expert interviews in this research is to address potential biases and gaps in the literature. Since the review focuses on the most cited publications, there is a risk that it reflects dominant academic perspectives while overlooking less visible but equally important themes. Citation patterns often favour established topics, which may lead to a disconnect between the literature and the realities of practice. Expert interviews will help to bridge this gap by providing contemporary, practice-based insights that may not be well represented in the published literature. This combined approach strengthens the validity of the research by integrating both documented knowledge and experiential understanding. The results of the expert interviews are reported in chapter 4.

2.3. Text-analysis

The text-analysis phase of the research is the part where the actual results of this study were generated. To get a better understanding of what is meant by text-analysis, this will be explained in subsection 2.3.1. subsection 2.3.2 elaborates on the process of document collection and the inclusion criteria. The way the manual text-analysis is applied to create dictionaries is explained in subsection 2.3.3. Finally, the implementation of the automated text-analysis is briefly explained in subsection 2.3.4.

2.3.1. Text-analysis method research

Text-analysis in the literature can be referred to by many names, such as 'Bag-of-Words Text Applications', 'Text-as-Data Methods', and 'Automated Content Analysis' (De Vries et al., 2018; Gilardi et al., 2020; Alla et al., 2018). Different text-analysis approaches have the practical aspect that they allow researchers to conduct more efficient research (Gilardi et al., 2020). Furthermore, these methods can be used to accurately reflect on perceived positions of individuals and groups (Alla et al., 2018).

Text analysis methods vary widely in complexity, from simple word-counting techniques to advanced machine learning models. At the most basic level, approaches like Wordscore (Laver et al., 2003) assign scores to words to rank documents based on specific perspectives. Despite its simplicity, Wordscore remains one of the most widely used methods in political science (Alla et al., 2018). On the more advanced end of the spectrum, Named Entity Recognition (NER) is a Natural Language Processing technique that identifies key entities—such as names, locations, and organisations—within text (Roy, 2021). Unlike dictionary-based approaches, NER relies on machine learning, which means that specific concepts are recognised by a model using linguistic rules and bag-of-words information from the word contexts of these concepts (Gilardi et al., 2020).

To determine the right approach, several factors need to be considered. First of all, the method needs to be fitting for this specific application. Text-analysis has a range of capabilities, these are three different applications of text-as-data methods according to (Gilardi et al., 2020): concept identification, classification and discovery.

- **Concept identification:** Extracts specific pieces of text that refer to predefined concepts. Methods include dictionary-based approaches (matching keywords) and Named Entity Recognition (NER), which uses machine learning to detect entities like names, locations, and organisations.
- **Classification:** Assigns texts to predefined categories using supervised learning models. Requires manually coded training data and applies algorithms like Naïve Bayes, Support Vector Machines, and Maximum Entropy to classify documents or estimate category proportions.
- **Discovery:** Identifies latent structures in text data without predefined categories. Techniques like topic modelling and scaling methods help uncover hidden themes, ideological positions, or semantic structures within large text corpora.

A common denominator in most text-analysis is the necessary preparations to be able to conduct the text-analysis. Gilardi et al. (2020) defines two major steps in the preparation, which are equal for different text-as-data methods. Firstly, building a text corpus for which data needs to be gathered, which in itself can be a very difficult process. Secondly, the text preparation, which includes standardisation of the text, translation of the text, and cleaning the text from so-called 'stop words'. De Vries et al. (2018) concludes that machine translators such as Google Translate give very similar results to expert translations and therefore are a useful tool in what

they call Bag-of-Words text applications.

2.3.2. Document collection

The collection of documents is a time-consuming process. PhD candidate Sebastian Ropers had already begun collecting material before the start of this thesis, and during the thesis, the strategy was to keep gathering virtually all accessible documents by approaching various stakeholders involved in ongoing railway-station projects. To build mutual trust, stakeholders were approached with clear intentions of interest in their processes, while explicitly addressing concerns about potential criticism of project progression or outcomes. This proved especially important, as rail projects are often heavily scrutinised in the media, which can make stakeholders reluctant to share documentation. Collecting documents from older projects was also challenging. Unlike current documentation, these are usually no longer confidential and often contain less sensitive information. However, they are rarely stored in an organised or accessible way, as no central database exists. Once a project is completed, the documents tend to lose value for stakeholders and are therefore not systematically preserved, making them difficult to trace.

The resulting corpus consists of a wide range of document types related to railway station development, including planning briefs, railway studies, and comprehensive development plans. In addition, documents not strictly focused on station area development, such as those on broader urban or city development, public transport strategies, or railway planning, were included because of their notable similarities. For these documents in particular, it is essential to evaluate how their inclusion affects the occurrence of perspectives. An imbalance in the types of documents could amplify particular perspectives while diminishing others.

Because of the difficulty of obtaining documents, the approach was to include as many as possible, treating all available material as valuable. Ideally, the four document sets would be balanced, avoiding overrepresentation of certain types that might skew the results. At the same time, the availability of certain types of documents may itself indicate which values are prioritised. However, it is never possible to be sure that the collection is complete or a faultless representative of a project, let alone a whole country.

To deal with this uncertainty, all documents were catalogued in a database that records the location, document name, author, type of document, year, and word count. The 'type of document' field distinguishes both the subject (e.g., station area, station railway, city-wide) and the document format (e.g., planning brief). The full database is provided in Appendix B. This database offered a practical overview during the text-analysis, supporting subgroup identification for additional analyses, ensuring transparency in reporting, and facilitating interpretation of the results

Some documents were excluded, such as narrowly focused environmental reports, railway route-placement studies, specific policy documents, and non-urban development future visions. These had too little connection with railway station development as defined in this research. Since the dictionaries were not constructed for these topics, including them risked producing misleading results, such as inflated scores on one or two perspectives, thereby distorting the analysis.

2.3.3. Creating dictionaries

This section elaborates on the method used to manually create dictionaries for the text-analysis in this thesis. In this step, text-analysis is applied for concept identification, using the prede-

finer perspectives derived from the literature review and expert interviews. ATLAS.ti was first used to build a dataset of codes that could identify each perspective. Subsequently, MAXQDA was employed to verify whether these sets appeared in the correct context and could therefore be included as dictionary entries for each perspective. The results of this analysis and how the dictionaries capture the perspectives is discussed in chapter 6.

The process began with a manual text-analysis in ATLAS.ti, using a small sample of British documents. Sections of text were coded according to their alignment with the perspectives. Intentionally, larger sections of text were coded rather than isolated words, to ensure sufficient material for later analysis. A relatively broad definition of each perspective was also applied, so as to capture as much material as possible. With a large and diverse set of codes, it became easier to identify patterns in the policy documents and determine which words best represented each perspective.

Once the coding was complete, the coded data was analysed in ATLAS.ti to organise and refine the material. For each perspective, the most frequently occurring words, together with other terms judged to be strong indicators, were identified and tested on another set of documents. This validation step was carried out in MAXQDA, using its 'keyword-in-context' function. This tool lists all occurrences of a word within its immediate textual surroundings, making it possible to quickly check whether the words appeared in contexts that genuinely reflected the intended perspective. During this process, the broader text passages representing a perspective were also reviewed, which revealed additional potential terms. These candidate words were subsequently re-examined in their own contexts, making dictionary development an iterative process of refinement. Words that consistently represented their perspective were then added to the dictionaries.

To avoid the dictionaries being shaped disproportionately by the English-language documents, a number of Dutch documents were also analysed in MAXQDA. When unique Dutch terms were identified without direct equivalents in English, the English dictionary was revisited to ensure that both dictionaries remained as similar as possible. Here too, the same iterative procedure was applied: new Dutch terms identified in context were added to the candidate list and subsequently re-checked in their own contexts before being included. This process helped to maintain comparability across languages, recognising that the dictionaries would inevitably not capture every aspect of each perspective. Achieving complete coverage would exceed the scope of this research; thus, building dictionaries that are equal in intent and structure across languages was considered the most feasible and valid approach.

The German dictionary was constructed by translating both the English and Dutch dictionaries using online translation tools. To compensate for more limited knowledge of the German language, the initial version of the German dictionary was constructed broadly, with multiple alternatives for many English or Dutch words. These were then tested in MAXQDA with the 'keyword-in-context' function to check whether they occurred in the documents and whether they appeared in the appropriate contexts. Words that were absent or provided an incorrect representation were subsequently removed. To the contrary, English and Dutch words that lacked a suitable initial German translation were further examined to determine whether alternative translations could provide valid occurrences in the correct context.

It should be noted that Dutch and German differ from English in how they form compound words. This often required adding a greater number of entries to these dictionaries, even when representing the same concepts. Although the dictionaries may not appear balanced in terms of word count, the aim was to ensure that equivalent meanings were represented equally across languages. In some cases, a concept expressed with a single word in one language re-

quired multiple words in another. Moreover, certain direct translations were not included in all dictionaries, as their contextual use varied across languages and could lead to misrepresentation. The complete word lists are provided in Appendix C, together with additional explanation of how the dictionaries yield results in MAXQDA.

2.3.4. Execution

In the execution phase, several reiterations of the previous research steps were carried out until the results produced satisfactory outcomes. The final step before collecting the results was to identify and address potential outliers. For each perspective, the code frequency overviews were examined to determine how often the codes occurred within the documents. Particular attention was given to documents with unusually high frequencies, especially when the number of codes for a specific perspective was disproportionately large compared to the total number of coded sections in the document. These outliers were checked for irregular patterns, such as very high frequencies caused by repeated appearances of a single word in titles, captions, or names. When such cases were identified, the corresponding coded sections were manually removed to prevent distortion of the results. Once this cleaning process was completed, the results were compiled and transferred to Excel, where tables and visualisations were created to support the analysis.

2.4. Choice of included countries

The research will be comparing the differences in the station-development process in four Western European countries, namely: Germany, the Netherlands, Switzerland, and the United Kingdom. The choice for these specific countries has to do with the availability of data - policy documents, project reports, and other such documents - and the possibility of planning interviews with stakeholders in these countries, especially for further research. This is, for the most part, because of the connections of PhD candidate Sebastian Ropers and his experience working in these countries. Such an extensive collection of data would not have been possible if the research solely relied on my position in this field of work and the limited time of this thesis project.

Regardless, it is important to substantiate the relevance of comparing these four countries from a scientific perspective. The four countries have a lot of similarities, such as a GDP that is relatively comparable in height and recent trend (World Bank, 2023) and a population density which is nearly the same - The Netherlands being the odd one out with almost double the density of the other three countries (Our World in Data, 2025). Furthermore, all four countries have a rich railway history and still have an extensive railway network with railway stations in all major cities (OpenStreetMap Foundation, 2025). However, these countries also encompass notable differences in both the design in which the railway sector is structured (Van de Velde, 2015) and the perception of users on travelling by train (European Commission, 2018). Combined, the multitude of similarities and notable differences make it interesting to compare these countries for this thesis research.

3

Structured literature review

The objective in this research is to eventually create bags-of-words that can be used for the text-analysis in the succeeding part of this research. For these bags-of-words, a clear understanding of the range of perspectives on station development is needed. The structured literature review will be the foundation to identify the relevant perspectives and also understand how these topics are represented in the literature. In this chapter will be explained how the perspectives were found in section 3.1 and then elaborated in section 3.2 on what is written about each perspective in the literature.

3.1. Initial search

To include as many potential perspectives as possible in the initial literature review, the search string consists of keywords that describe the railway station and area around it, and excludes some keywords used in research that are not relevant to the study on railway stations. The search string used for the title-abstract scan is the following:

```
1 TITLE ( "rail* station" OR "train station" OR "station area" OR "transit
   station" OR ( "station" AND ( rail* OR train ) ) )
2 OR KEY ( "rail* station" OR "train station" OR "station area" OR "transit
   station" OR ( "station" AND ( rail* OR train ) ) )
3 AND PUBYEAR > 1999 AND PUBYEAR < 2026
4 AND NOT ( TITLE ( "radio" OR "power" OR "robot*" OR "computer" OR "
   underground" OR "seismic" OR "shaking" OR "air quality" OR "particulate
   matter" OR "airborne" OR "excavation" OR "electric vehicle" OR ( "
   subway" AND "fire" ) ) )
5 OR KEY ( "radio" OR "power" OR "robot*" OR "computer" OR "underground" OR
   "seismic" OR "shaking" OR "air quality" OR "particulate matter" OR "
   airborne" OR "excavation" OR "electric vehicle" OR ( "subway" AND "fire
   " ) ) )
6 AND LANGUAGE ( english )
```

The search string yielded a total of 8,076 papers. The 200 most cited papers were used for the title-abstract scan. Six perspectives were identified as having sufficient representation to form the basis of this literature review. These are summarised in Table 3.1. Besides these perspectives, the literature search still included a significant amount of noise, as railway stations are frequently used as settings for a wide range of studies, including social research, investigations into virus transmission, and various other unrelated topics. A large number of papers focused specifically on subway systems, which are not always directly applicable to the

station development addressed in this research. However, some studies on transit-oriented development (TOD) around subway stations may still offer relevant insights, so excluding all papers on subways comes at a risk of overlooking valuable contributions. Notably, there appeared to be a lack of papers addressing train station design, architecture, or the business aspects of station retail.

Table 3.1: Perspectives on railway station from the literature

Perspective	Number of papers
Property value	16
Trip generation	42
Land use	24
Railway transportation	22
Passenger flow	17
Passenger experience	14

3.2. Perspective specific search

In this section, the results of the six individual literature reviews - each addressing a different perspective - are presented. For each perspective, the corresponding search string is provided, along with an overview of the reviewed papers and a summary of how the topic is represented in the literature.

Property value

The first perspective identified in the literature is focused on the effects of railway stations on the nearby residential and commercial property value. From the initial title-abstract scan, a total of 16 papers were designated to this category, revealing an interest in the literature on this specific topic. The search string below was used and found 61 papers, of which ten were on topic, and the most cited papers were selected. In Table 3.2, the ten reviewed papers are listed.

```

1 TITLE ( "rail* station" OR "train station" OR "station area" OR "transit
   station" OR ( "station" AND ( rail* OR train ) ) )
2 OR KEY ( "rail* station" OR "train station" OR "station area" OR "transit
   station" OR ( "station" AND ( rail* OR train ) ) )
3 AND TITLE-ABS-KEY ( "property value" OR "land value" )
4 AND PUBYEAR > 1999 AND PUBYEAR < 2026
5 AND LANGUAGE ( english )

```

The reviewed literature on the relationship between urban rail transit and property values shows a particular attention to metro and light rail systems within single-city contexts. Notably, nine out of the ten studies analysed originate from either China or the United States, highlighting a significant geographic gap in the literature, particularly regarding European cases.

Methodologically, nearly all studies apply a hedonic pricing model to estimate the impact of rail transit on property values. These models commonly include variables such as proximity to the station, accessibility to key destinations - such as the central business district, land-use density, and property type (residential or commercial). Among these, proximity to the station emerges as a central and consistently significant variable (Debrezion et al., 2007). It is considered a key proxy for accessibility and has been shown to affect property values within a range of up to three miles from the station (Bowes et al., 2001).

However, the impact of rail proximity on property value is not uniformly positive. Negative

Table 3.2: Included papers for property value

Author(s)	Year	Researched country	Topic
Bowes et al.	2001	United States	Impact of rail transit stations on residential property values
Debrezion et al.	2007	United States	The effect of railway stations on commercial and residential property value
Hess et al.	2007	United States	The impact of proximity to light rail transit stations on residential property values
Cervero et al.	2002	United States	The effects of proximity to light and commuter rail stations on commercial land values
Knaap et al.	2001	United States	The effects of light rail plans on land values in station areas
Diao et al.	2017	China	The implications of high-speed-rail station locations for the urban development
T. Xu et al.	2016	China	The impact of urban rail transit on commercial property value
Sun et al.	2015	China	The capitalization of subway access in home value
Dziauddin	2019	Malaysia	Estimating land value uplift around light rail transit stations
Duncan	2011	United States	The synergistic influence of light rail stations and zoning on home prices

externalities, such as noise and traffic congestion, often depress property values for homes located immediately adjacent to stations (Bowes et al., 2001; Diao et al., 2017). These effects are especially pronounced in higher-income neighbourhoods, where residents may be more sensitive to such nuisances (Dziauddin, 2019). Additionally, increased crime rates associated with station areas have been identified as another factor lowering property values (Bowes et al., 2001; Hess et al., 2007).

An important rationale behind this research is that the increase in property value reflects the capitalisation of travel time savings made possible by rail access (Debrezion et al., 2007; Duncan, 2011). These gains are often used as an argument for both public and private investment. For instance, developers and transit agencies view rising property values as a basis for joint development opportunities, while municipalities may benefit through increased property tax revenues and political support for public transport infrastructure (Cervero et al., 2002; Sun et al., 2015).

Beyond investment motivations, the literature also emphasises the policy relevance of quantifying transit-related property value changes. These estimates are seen as valuable for supporting zoning decisions (Duncan, 2011) and for guiding transit-oriented development strategies that align with broader planning and housing goals. Furthermore, they offer municipalities and policymakers a tool to more effectively leverage transit infrastructure in pursuit of urban development and fiscal sustainability (Dziauddin, 2019; T. Xu et al., 2016).

Trip generation

The second identified perspective is trip generation, which emerged strongly in the initial search with 42 relevant papers. These studies share a focus on identifying attributes of the station area that influence transit ridership. Using the search string below found 463 papers were found. The ten most cited papers that align with the topic of trip generation were selected and are presented in Table 3.3.

```

1 TITLE ( "rail* station" OR "train station" OR "station area" OR "transit
  station" OR ( "station" AND ( rail* OR train ) ) )
2 OR KEY ( "rail* station" OR "train station" OR "station area" OR "transit
  station" OR ( "station" AND ( rail* OR train ) ) )
3 AND TITLE-ABS-KEY ( "ridership" OR "trip" )
4 AND PUBYEAR > 1999 AND PUBYEAR < 2026
5 AND NOT ( "property value" OR "land value" )
6 AND LANGUAGE ( english )

```

Table 3.3: Included papers for trip generation

Author(s)	Year	Researched country	Topic
Loo et al.	2010	United States & Hong Kong	TOD characteristics influencing ridership
Ding et al.	2019	United States	Effects of built environment variables on station boarding
P. Zhao et al.	2017	China	The determinants of cycling as a transfer mode
Gan et al.	2020	China	Relationship between built environment and metro ridership
Rietveld	2000	The Netherlands	The role of bicycles to access the railway station
S. Li et al.	2020	China	Impact of built environment factors on the rail transit ridership
Sung et al.	2014	South Korea	Impacts of land use, rail service coverage, and rail station accessibility on rail transit ridership
Kim et al.	2007	United States	Impacts of individual, built environment, and crime characteristics on transit access
J. Zhao et al.	2014	China	Factors affecting rail transit ridership at both station level and station-to-station level
Keijer et al.	2000	The Netherlands	Accessibility of railway stations as determinant of railway use

The studies reviewed from the perspective of trip generation examine how characteristics of the built environment influence transit ridership, particularly at the level of individual railway or metro stations. Two primary orientations emerge across the literature: one focused on land use patterns and the other on the accessibility of the station.

Within the land use-oriented studies, residential and commercial density as well as land use mix are recurrent themes. Higher densities are generally associated with increased ridership, as they concentrate potential users within the station's catchment area (Gan et al., 2020). S. Li et al. (2020) goes further by distinguishing a wide variety of urban functions - such as

education, culture, and sport - and specifying different residential land use types, offering a more nuanced understanding of the trip generation potential. Some studies also examine additional built environment features that positively influence ridership. These include the presence of green areas near stations, which can improve the attractiveness of the station area and encourage walking or cycling to transit (P. Zhao et al., 2017), as well as adequate lighting, which contributes to perceptions of safety and comfort, particularly during off-peak hours (Kim et al., 2007).

When considering the other main determinant of ridership - station-level accessibility - the literature discusses a range of access modes. Most emphasis is placed on pedestrian access as walking is the most important mode of reaching the railway station for distances up to 1.2 km (Rietveld, 2000), making walkability within the station's catchment area a key influence on the likelihood of rail use (Sung et al., 2014; Loo et al., 2010). Beyond walking, bicycle-rail integration is also highlighted, with ridership shown to increase when adequate bicycle parking, bicycle rental or sharing options, and a safe bicycle environment - preferably with dedicated bicycle lanes - are provided (Rietveld, 2000; P. Zhao et al., 2017). The availability and quality of connecting public transport, especially bus services, further enhance station accessibility and support higher ridership levels (Ding et al., 2019; J. Zhao et al., 2014). Lastly, park-and-ride facilities also have a positive impact on ridership, particularly in North American cities (Ding et al., 2019).

The findings across these studies underline the value of understanding how the built environment shapes transit use. This knowledge can support policymakers and urban planners in designing policies and developing station areas that promote transit ridership (Gan et al., 2020). Such strategies not only help reduce car congestion (Loo et al., 2010), but also contribute to the success of Transit-Oriented Development (TOD), which facilitates more sustainable urban growth (S. Li et al., 2020).

Land use

This perspective again focuses on the built environment surrounding the railway station, but differs from the previous perspectives, which addressed property value and trip generation. The land-use literature highlights research concerned with the quality and integration of the urban area around the station. An initial search identified 24 relevant papers, and a broader search using the string below yielded 201 results. From these, ten studies were selected for inclusion in the literature review, as shown in Table 3.4.

```

1 TITLE ( "rail* station" OR "train station" OR "station area" OR "transit
   station" OR ( "station" AND ( rail* OR train ) ) )
2 OR KEY ( "rail* station" OR "train station" OR "station area" OR "transit
   station" OR ( "station" AND ( rail* OR train ) ) )
3 AND TITLE-ABS-KEY ( "land use" )
4 AND PUBYEAR > 1999 AND PUBYEAR < 2026
5 AND NOT ( "property value" OR "land value" OR "ridership" OR "trip" )
6 AND LANGUAGE ( english )

```

Table 3.4: Included papers for land use

Author(s)	Year	Researched country	Topic
Vale	2015	Portugal	TOD, integration of land use and transport, and pedestrian accessibility
Lyu et al.	2016	China	Developing context-based TOD typology
Higgins et al.	2016	Canada	Method for classifying and evaluating the performance of station area TOD
Monajem et al.	2015	Iran	The evaluation of the spatial integration of station areas
Lee et al.	2015	Japan	Development of the compact city index and its application
L. Bertolini	2008	The Netherlands	Enhancing insight in the development dynamics of station areas in urban regions
Appleyard et al.	2019	United States	Evaluation of urban quality performance related to transportation land-use coordination
Caset et al.	2018	Belgium	Assessment of railway stations in terms of transport and land use characteristics
Niu et al.	2019	Singapore	Land use characteristics of rail transit TOD sites in new towns
Ke et al.	2021	Japan	Comparison of typical TOD stations in the context of sustainability

A widely adopted analytical framework in the land use studies is the node-place model, originally developed by Luca Bertolini (1996). This model has proven to be a flexible tool and is frequently adapted or extended in the reviewed research. For instance, Vale (2015) incorporates a walkability index to account for the quality of the pedestrian environment, while Monajem et al. (2015) applies spatial indices such as closeness and betweenness to capture the structural integration of street networks. Others have expanded the model to include a more nuanced representation of node and place characteristics, as demonstrated by Caset et al. (2018).

Central to many of these studies is the emphasis on integrating land use and transportation planning as a key strategy to improve the performance of station areas (Vale, 2015; Caset et al., 2018; L. Bertolini, 2008). This aligns closely with the objectives of the frequently cited concept of Transit-Oriented Development (TOD), which promotes high-quality, compact, and accessible urban forms centred around transit stations. Within the TOD framework, high density and land use diversity are often highlighted as essential principles for creating sustainable and efficient urban environments (Lee et al., 2015; Ke et al., 2021; Niu et al., 2019).

Another recurring theme is the critical importance of walkability. Several studies underscore the role of a well-connected and comfortable pedestrian environment in enhancing access to and from stations, and in supporting TOD outcomes more broadly (Vale, 2015; Caset et al., 2018). Walkability not only influences transit ridership but also contributes to the vitality and attractiveness of station areas.

To support planning and development efforts, researchers frequently propose typologies of station areas based on factors such as density, functional mix, land use, and pedestrian con-

nectivity (Higgins et al., 2016; Lyu et al., 2016). These classifications provide a basis for more targeted interventions and context-sensitive policy strategies. As Lyu et al. (2016) note, understanding the different types of TOD is especially important for actors such as policymakers, planners, developers, and designers, enabling them to craft strategies appropriate to the specific characteristics of each location.

In terms of implementation, several studies highlight mechanisms aimed at balancing public and private interests. These include Transit Joint Development (TJD), where cost- or revenue-sharing agreements facilitate cooperation between transit agencies and developers (Vale, 2015), and inclusionary zoning policies that help ensure the provision of affordable housing in TOD areas (Appleyard et al., 2019). Such tools are increasingly viewed as necessary to ensure that the benefits of TOD — such as accessibility, sustainability, and economic vitality—are distributed equitably across different segments of society (Appleyard et al., 2019).

Railway transportation

The perspective of railway transportation focuses on the technical challenges and solutions related to rail operations in and around railway stations. This includes topics such as scheduling, traffic control, and train routing. From the initial set of 200 papers, 22 were identified as relevant to this perspective. An additional search using the search string provided below yielded 342 papers, from which the ten most cited and thematically relevant studies were selected for review. These are listed in Table 3.5.

```

1 TITLE ( "rail* station" OR "train station" OR "station area" OR "transit
   station" OR ( "station" AND ( rail* OR train ) ) )
2 OR KEY ( "rail* station" OR "train station" OR "station area" OR "transit
   station" OR ( "station" AND ( rail* OR train ) ) )
3 AND TITLE-ABS-KEY ( ( "platform" AND "schedul*" ) OR "train traffic" OR "
   timetabl*" OR ( "train" AND "routing" ) )
4 AND PUBYEAR > 1999 AND PUBYEAR < 2026
5 AND LANGUAGE ( english )

```

As Table 3.5 reveals, this body of literature is largely composed of European studies, reflecting the region's busy and complex railway networks (Carey and Carville, 2003). European stations are often characterised by varied and intricate layouts, including combinations of through platforms, dead-end platforms, and sub-platforms with differing lengths (Carey and Carville, 2003). These complex configurations contribute to railway stations being identified as bottlenecks within highly utilised rail systems (Caimi et al., 2012).

A range of operational challenges is examined across the reviewed literature. These include dwell time conflicts, where scheduled stopping times overlap and cause inefficiencies (Carey and Crawford, 2007); the routing of trains through the station both as part of the timetable and for post-service activities called shunting (Zwaneveld et al., 2001; Freling et al., 2005); the knock-on effects of delays (Carey and Carville, 2000); and responses to disruptions, such as blockages in parts of the network that necessitate short-turning of trains at alternative railway stations (Ghaemi et al., 2018).

Central to addressing these issues are operational constraints, such as minimal station headway, avoiding conflicting trains, and other safety requirements that must be upheld when scheduling and dispatching trains (X. Zhou et al., 2007). At the same time, railway operations at stations are expected to meet objectives that relate to optimising station capacity and ensuring a high level of service. This includes facilitating cross-platform transfers and maintaining a timetable that supports convenient connections (Zwaneveld et al., 2001; X. Zhou et al., 2007).

Table 3.5: Included papers for railway transportation

Author(s)	Year	Researched country	Topic
X. Zhou et al.	2007	China	Single-track train timetabling problem
Carey and Carville	2003	United Kingdom	Scheduling and platforming trains at busy complex stations
Carey and Crawford	2007	United Kingdom	Scheduling trains on a network of busy complex stations
Zwaneveld et al.	2001	The Netherlands	Routing trains through a railway station
Yuan et al.	2007	The Netherlands	Optimizing capacity utilization of stations by estimating knock-on train delays
Caimi et al.	2012	Switzerland	Predictive control approach for rescheduling in complex central railway station areas
Mannino et al.	2009	Italy	Automated traffic control system to operate trains in metro stations
Freling et al.	2005	The Netherlands	Shunting passenger train units in a railway station
Carey and Carville	2000	United Kingdom	Schedule performance and reliability for train stations
Ghaemi et al.	2018	The Netherlands	Multiple-station short-turning model in case of complete railway blockages

However, these operational objectives can often be in conflict. For instance, maximising capacity may come at the expense of timetable reliability, particularly under conditions of high utilisation (Yuan et al., 2007). Moreover, differing priorities among stakeholders further complicate the planning process. Railway undertakings, providing the train service and infrastructure managers, typically responsible for the final scheduling and operational decisions, may pursue opposing goals (Carey and Carville, 2003). While customer satisfaction is important for the railway undertaking, this can come at a cost for the operational feasibility and infrastructure efficiency, which are prioritised by the infrastructure manager.

Passenger flow

This perspective focuses on the flow of passengers within the railway station. In the initial literature review, 17 papers were identified that addressed this topic. Using the search string below, 668 papers were found, from which ten were more extensively reviewed, and these are presented in Table 3.6.

```

1 TITLE ( "rail* station" OR "train station" OR "station area" OR "transit
  station" OR ( "station" AND ( rail* OR train ) ) )
2 OR KEY ( "rail* station" OR "train station" OR "station area" OR "transit
  station" OR ( "station" AND ( rail* OR train ) ) )
3 AND TITLE-ABS-KEY ( ( "passenger" AND "crowd" ) OR "passenger flow" OR "
  pedestrian flow" )
4 AND PUBYEAR > 1999 AND PUBYEAR < 2026
5 AND LANGUAGE ( english )

```

Table 3.6: Included papers for passenger flow

Author(s)	Year	Researched country	Topic
Y. Li et al.	2017	China	Forecasting short-term subway passenger flow under special events scenarios
Asano et al.	2010	Japan	Microscopic pedestrian simulation model for evaluating pedestrian flow
X.-Y. Xu et al.	2016	China	Capacity-oriented passenger flow control under uncertain demand
Shiwakoti et al.	2017	Australia	Likely behaviours of passengers under emergency evacuation
Lei et al.	2015	China	Simulation of pedestrian crowds' evacuation in a huge transit terminal subway station
Jiang et al.	2009	China	Crowding in platform staircases of a subway station during rush hours
Yang et al.	2021	China	Short-term prediction of passenger volume for urban rail systems
M. Zhou et al.	2019	China	Optimization of crowd evacuation with leaders in urban railway transit stations
Zhang et al.	2019	China	Short-term passenger flow forecasting in urban rail transit
Elhamshary et al.	2016	Japan	Crowd-sensing system for automatic enrichment of transit stations indoor floorplans

Passenger flow has emerged as a popular topic in railway station research; these studies are especially interested in situations where spatial constraints and high user volumes coincide. Underground or subway stations are therefore often the context, due to their clearly defined capacity limitations and the frequent emergence of bottlenecks at critical points such as stairs, exits, and fare gates (Lei et al., 2012; Jiang et al., 2009). These bottlenecks become particularly problematic during peak hours or in emergency situations, where the safe and timely movement of passengers is essential (Shiwakoti et al., 2017; M. Zhou et al., 2019). Notably, passenger flow studies are often conducted in China due to the high density and volume of its subway systems. Cities like Beijing face recurring challenges related to overcrowding and insufficient facility capacity, which can pose safety risks and operational inefficiencies (Jiang et al., 2009; Y. Li et al., 2017). Studies emphasise the importance of understanding how passenger density and flow patterns evolve, particularly during peak hours and special events, in order to guide control strategies and infrastructure planning (X.-Y. Xu et al., 2016).

A central concept in these studies is the Level of Service (LOS), which is used to assess and manage crowding within stations. Maintaining a sufficient LOS is critical to avoid two conditions: significant travel time delays and accidents due to excessive crowd density (Asano et al., 2010). LOS is typically assessed in relation to station capacity to determine how many passengers can be accommodated while maintaining safe and functional flow conditions (X.-Y. Xu et al., 2016). Passenger safety is especially at risk when the station's service capacity is exceeded, leading to conditions where people can be pushed into dangerous zones such as the tracks (X.-Y. Xu et al., 2016). Furthermore, multiple papers study emergency evacuation scenarios revealing specific passenger behaviours, such as the tendency to avoid escalators or tunnels and choose the least crowded exits (Shiwakoti et al., 2017; Lei et al., 2012). The

role of station staff is highlighted as essential in guiding passengers and executing evacuation plans effectively. Tools like designated evacuation leaders and clear signage improve the efficiency and safety of emergency responses (M. Zhou et al., 2019).

Forecasting passenger flow has become a prominent strategy for improving station performance. Short-term passenger flow prediction supports operators in allocating staff, managing inflows, and guiding passengers in real time (Y. Li et al., 2017; Yang et al., 2021; Zhang et al., 2019). These forecasts also help identify vulnerable areas within the station and inform preventive crowd control measures. Finally, passenger flow analysis is useful to evaluate and inform station layout design. Elements such as staircase width, the number of exits, location of fare gates, and the configuration of waiting zones directly influence pedestrian flow rates and boarding/alighting efficiency (Jiang et al., 2009; X.-Y. Xu et al., 2016). In this context, detailed knowledge about passenger movement patterns—such as in queuing, route choice, or boarding behaviour—supports both safe design and efficient operation (Tang et al., 2017; Elhamshary et al., 2016).

Passenger experience

This perspective combines a selection of studies under the collective term of passenger experience. These studies address topics such as passenger anxiety, thermal comfort, and perceived safety — subjects that were less commonly found in the 200 papers reviewed. A total of 14 relevant studies were identified in the initial search. Using the search string below, 466 papers were found, from which ten were selected and are listed in Table 3.7.

```

1 TITLE ( "rail* station" OR "train station" OR "station area" OR "transit
   station" OR ( "station" AND ( rail* OR train ) ) )
2 OR KEY ( "rail* station" OR "train station" OR "station area" OR "transit
   station" OR ( "station" AND ( rail* OR train ) ) )
3 AND TITLE-ABS-KEY ( "passenger" AND ( "comfort" OR "safety" OR "perception
   *" OR "experience" ) )
4 AND PUBYEAR > 1999 AND PUBYEAR < 2026
5 AND NOT ( "evacuation" OR "passenger flow" OR "subway" )
6 AND LANGUAGE ( english )

```

The reviewed literature on passenger experience encompasses a broad spectrum of research fields. This body of work includes studies on the physical and environmental conditions of stations, as well as less tangible aspects such as passenger perception and anxiety.

Bissell (2009) explores the tension between facilitation and encumbrance, especially when passengers navigate with “mobile prosthetics” like luggage, strollers, or wheelchairs. Design flaws such as narrow ticket barriers and limited lift access reflect infrastructural bias toward an ‘ideal’ body, excluding those with different mobility needs. Another key element affecting passenger comfort is the thermal environment, particularly in waiting areas where people often spend extended periods. Research has shown that thermal comfort is essential for overall well-being and can be improved through tailored design solutions and the efficient use of energy systems (Liu et al., 2016; Deb et al., 2010). Closely related to this is air quality, especially in enclosed or underground environments. Fine particulate matter in subway stations has been identified as a significant concern, necessitating the installation and maintenance of effective ventilation and filtration systems (Nam et al., 2020; Marzouk et al., 2014).

In addition to physical factors, psychological stressors also shape passenger experience. Overcrowding, difficulty locating the correct platform or train, and unclear transfer routes contribute to increased levels of anxiety, particularly during busy travel periods (Cheng, 2010). One identified cause of platform congestion is concentrated boarding, where passengers tend to gather

Table 3.7: Included papers for passenger experience

Author(s)	Year	Researched country	Topic
Khayrullina et al.	2015	The Netherlands	Train-induced wind conditions at an underground railroad passenger platform
Bissell	2009	United Kingdom	Conceptualising differently-mobile passengers: geographies of everyday encumbrance at railway stations
Cheng	2010	Taiwan	Exploring passenger anxiety associated with train travel
Deb et al.	2010	India	Evaluation of thermal comfort in a rail terminal location
Eboli et al.	2018	Italy	Spatial variation of the perceived transit service quality at rail stations
Liu et al.	2016	China	Thermal comfort of passenger at high-speed railway station in transition season
Alawad et al.	2020	United Kingdom	Learning from accidents for safety at railway stations
Marzouk et al.	2014	Egypt	Monitoring indoor environmental quality in subway stations
Nam et al.	2020	South Korea	A proactive energy-efficient optimal ventilation system under outdoor air quality conditions
Oliveira et al.	2019	United Kingdom	Analysing passengers' behaviours when boarding trains

near access points. This can lead to uneven carriage loading and crowding at specific train doors. Providing clear visual information about train stopping positions, along with distributing station amenities more evenly along platforms, has been proposed as a solution to mitigate this problem (Oliveira et al., 2019).

Ultimately, these insights contribute to a better understanding of how to improve the overall quality of service at railway stations. Enhancements in comfort, safety, and clarity are shown to positively impact passenger satisfaction and can increase the attractiveness of public transport (Eboli et al., 2018). This makes the subject particularly relevant for railway operators, station designers, and policymakers seeking to promote sustainable mobility.

4

Expert interviews

Following the literature review presented in chapter 3, an additional round of expert interviews was conducted. The primary findings from these interviews are presented in this chapter. The interviews combined open-ended questions, designed to obtain new insights, with a checklist based on findings from the literature and previous interviews. The complete interview protocol is added in Appendix A. In total, four different experts were interviewed. The interviewees include two academics from the Delft University of Technology, one active in the field of architecture and built environment and the other a professor in the field of technical policy management, both with an expertise in mobility. In addition, a public infrastructure consultant and a former local politician, each with direct involvement in multiple railway station (re)development projects, were interviewed.

4.1. Validation of the literature

The interviews gave an evident confirmation of the prominent stakeholders involved, the railway undertaking, the infrastructure manager, municipality. Real estate developers were also mentioned as important, with the exception of some redevelopment projects where the surroundings of the railway station are not involved. Moreover, local public transport operators, bus, tram and metro, were mentioned by all of the interviewees, suggesting that their role is more prominent than initially thought because of the literature review. Architects and city planners feature a more facilitating role and therefore less eminent in the early stages of the development process.

A key function of the railway station, as highlighted by all interviewees, is to facilitate efficient last-mile transportation to and from the station, providing seamless transfers to the rail services. This encompasses the integration of supportive infrastructure such as bicycle parking facilities and connections with local public transport services, including bus, tram, and metro systems. The ability of passengers to move smoothly between different modes of transport was consistently underscored as essential to the overall functionality and attractiveness of the station area. Furthermore, the interviewees emphasised the importance of aligning railway station development with the specific urban context in which the station is embedded. Rather than applying a one-size-fits-all model, successful station projects are those that respond to the surrounding urban fabric, taking into account local spatial, social, and economic characteristics. This context-sensitive approach is seen as critical in ensuring the relevance and long-term viability of station area developments.

When discussing underlying values, financial considerations were identified as the most prominent. According to the former local politician, most stakeholders involved in station (re)development projects tend to prioritise economic value above other considerations. While values such as sustainability and safety were acknowledged, they were generally assumed to be inherent to the nature of railway transport or embedded in regulatory requirements. Sustainability, for instance, was perceived as implicit in promoting railway transport, which is already seen as a sustainable mode of mobility. Similarly, safety was rarely a focal point in discussions, as it is largely addressed through standard design protocols and existing regulatory frameworks, rather than through active stakeholder negotiation or advocacy.

4.2. Additional perspectives

Several interviewees emphasised that a well-functioning railway station must not only support mobility but also serve as a welcoming and accessible public space. The provision of sufficient space for pedestrian flows, as well as areas where people can dwell or comfortably wait for their train, was highlighted as a key aspect of the railway station. Stations should offer environments where users feel safe, at ease, and encouraged to spend time, rather than functioning solely as points of transit. These spatial qualities are closely linked to the architectural design of the station, which contributes to the overall aesthetic value of the space. In this regard, the station is seen not only as an infrastructural node but also as a landmark within the urban landscape and a place of reference in the city.

Another topic that emerged during the interviews, but was notably absent in the literature review, is the role of retail and commercial services within the station. Retail was described as a significant component of the station environment, enhancing passenger convenience by providing access to shops and amenities. This commercial function contributes to the attractiveness of the station and is generally overseen by the station building owner or manager. In addition to the visible services offered to passengers, the operational logistics that support retail functions—such as waste management and product storage—were also identified as important elements that must be managed effectively. These processes, although largely hidden from public view, are essential to maintaining a clean and efficient station environment.

Beyond spatial and functional values, the interviews also revealed the importance of institutional and procedural legitimacy in the station development process. The professor in technical policy management specifically addressed legitimacy as a core value that operates across multiple levels. Firstly, at the political level, legitimacy involves elected officials maintaining credibility by fulfilling campaign promises related to station development. This is critical for sustaining public trust and political accountability. Secondly, at the wider process level, legitimacy requires that project managers coordinate diverse initiatives and stakeholders while minimising disruption—both in terms of time delays and physical nuisance—for the surrounding urban environment. Lastly, legitimacy is tied to meeting the formal constraints of the development project, particularly financial ones. Adhering to budgetary limitations and satisfying the expectations of investors is necessary to ensure continued support and approval for the project.

5

Perspectives

Based on the data presented in the previous two chapters, a total of ten perspectives have been identified for use in the text analysis. These perspectives are primarily grounded in the literature review, with the expert interviews serving to validate and expand upon them. For the purposes of this study, each perspective is aligned more closely with one or two specific stakeholders, in contrast to the literature. This approach helps to make the perspectives more distinguishable, in order to get more distinctive results from the text-analysis. Furthermore, this provides a clearer understanding of the values underlying each perspective, as different stakeholders often represent distinct sets of values. In Table 5.1, an overview of the perspectives is shown. In this chapter, each of the perspectives will be briefly explained.

Table 5.1: Perspectives included in the text-analysis

Perspective	Main stakeholder(s)	Values
Property value	Real estate developers	Financial gain values
Connecting passengers	Municipality Local public transport	Sustainability values, Accessibility value
Urban context	Municipality	Public values
Railway transport	Infrastructure manager, Railway undertaking	Safety values, Punctuality values, Capacity values
Passenger flow	Station manager	Safety values
Retail logistics	Station manager	Financial gain values
Architecture and design	Architects & Designers	Aesthetic values, Safety values, Cultural values
Political approval	Municipality	Legitimacy values
Process management	Project manager	Legitimacy values
Project accomplishments	Public & private investors	Financial cost values Accountability values

5.1. Perspectives for the text-analysis

Property value

This perspective emphasises the enhancement of property values around railway stations, primarily reflecting the interests of real estate developers and, to a lesser extent, also the homeowners and municipalities as landowners. It frames the station area as a strategic zone for urban investment, where development can lead to increased property value. The underlying value here is financial, with success often measured through land use density and proximity to services.

Connecting passengers

The core focus for this perspective is on improving the accessibility of the railway station within the wider urban mobility network. This involves local public transport companies, which play their role in strengthening connections with buses, trams, and metros. Additionally, walking and bicycle infrastructure are prioritised, ensuring passengers can reach the station easily and efficiently. The attention is on multimodal transport integrating the first and last mile with the train service, where high-quality transfer points, cycling facilities, and well-integrated local transit services play a crucial role. This perspective is important for municipalities as it helps reduce congestion in urban areas and promotes their sustainability and accessibility values.

Urban context

From this perspective, the aim for municipalities is to find the right balance between transport functions and the needs of the surrounding urban context. Rather than applying a one-size-fits-all model, this perspective recognises that each station area must respond to its unique spatial, social, and cultural setting. The goal is to integrate the railway station into the urban surroundings in a way that enhances public life, supports local development, and respects the existing character of the area. Rooted in public values, this approach seeks to harmonise the railway station with urban quality and local identity.

Railway transport

This perspective is championed by infrastructure managers and rail undertakings. It focuses on everything related to the technical aspect of running trains through the railway station, including operational efficiency of the railway network, ensuring capacity, punctuality, and safety. The core values are safety, capacity, and punctuality, which can be conflicting at times with different priorities from the two main stakeholders. The key performance indicators are often tied to train movements and infrastructure reliability.

Passenger flow

This perspective concerns the efficient and safe movement of people through the station. Railway station managers focus on the seamless movement of passengers within the station. They aim to ensure safety and efficient circulation, especially during high-traffic periods. This perspective is rooted in safety values, with attention to service capacity, crowd control, and signage.

Retail logistics

Railway station owners/managers also prioritise the station's function as a commercial environment from this perspective. They aim to facilitate retail operations by providing space and facilities for shops and services, enhancing the station's role as a retail destination, and increasing commercial revenue. Furthermore, the focus is on logistical support for shops and other station amenities. This perspective emphasises financial values, with a focus on tenant

mix, layout, and consumer access.

Architecture and design

From the perspective of architecture and design, the railway station is not merely a transit node, but a public space that shapes user experience. The aim is to serve as a welcoming and accessible environment, with attention to both functionality and atmosphere. This includes the provision of sufficient space for passenger flows, as well as areas where people can dwell, wait comfortably, or simply spend time. Stations should be places where users feel safe, at ease, and encouraged to linger, rather than being treated only as points of movement. This perspective combines aesthetic and safety values, using design as a tool to enhance both usability and spatial quality.

Political approval

The political approval perspective is shaped by politicians in the municipalities and the responsibility to their citizens, viewing the station as a public asset that should reflect community needs and political commitments. It upholds legitimacy values, ensuring the station project aligns with voter expectations and contributes to public well-being.

Process management

This perspective focuses on the task of project managers, guiding the station (re)development process. A key challenge is managing the high level of activity and potential disruption that such projects bring, often affecting local residents, businesses, and other organisations in the vicinity. The goal is to coordinate stakeholders effectively, ensure all agreed-upon project components are realised, and maintain momentum throughout long planning and construction phases. This perspective emphasises legitimacy values, relying on trust-building to keep the process on track and socially supported.

Project accomplishments

This perspective is tied to the substantial investments required for railway station (re)development. Funding typically comes from a combination of public and private investors, each stakeholder with specific demands regarding project outcomes. These demands are commonly assessed through measurable features and concrete project milestones, such as technical performance, financial return, and timely delivery. Fundamentally, this perspective reflects accountability values, with an emphasis on clear deliverables and performance tracking.

5.2. Excluded perspective

The topic of passenger experience has been excluded from the final list of perspectives. This has to do with the too broad a scope of this perspective and the lack of a specific stakeholder that could possibly represent the range of aspects that come with it. The topic of passenger experience is, however, still included in other perspectives. As became clear in the interviews, station architecture is closely tied with many aspects of passenger experience, especially in terms of attractiveness and perceived comfort and safety. Passenger flow also has similarities in the focus on safety and crowd control.

6

Perspectives in the documents

This chapter reports on the outcome of the manual text analysis conducted in Atlas.ti and MAXQDA. The analysis resulted in eleven dictionaries—one more than in the previous chapter—since the perspective of *sustainability* was additionally identified. The reasoning behind the construction of these dictionaries, as well as a description of the type of terms included, is explained in this chapter. This provides the foundation for interpreting the outcomes of the subsequent automated text analysis. The complete dictionaries for each perspective are provided in Appendix C. The chapter begins with general remarks on the manual analysis, followed by an explanation of each perspective.

6.1. General remarks

Most documents in the corpus focus less on the railway station itself and more on the broader project context, including the surrounding urban area and the linkages between urban centres. Consequently, some of the perspectives defined in the previous chapter are less explicitly tied to the railway station. Nevertheless, these perspectives remain recognisable in the policy discourse. To reflect this, the perspectives were adapted slightly so that they would better correspond to the language and emphasis of the policy documents. This adaptation was done while maintaining consistency with the stakeholders and values connected to the perspective.

Not all perspectives are equally easy to capture through a dictionary-based approach. Some are associated with practical terms that appear frequently and often in combination, whereas others rely on more specific vocabulary that only signals the perspective in particular contexts. As a result, the number of words identified per perspective varies considerably. Direct comparison of frequencies across perspectives within one country should therefore be approached with caution.

The perspectives were developed primarily by manually coding a test set of English documents, complemented by an additional review of a set of Dutch documents, which enriched the dictionaries further. These documents were deliberately chosen for their likelihood of addressing all perspectives, which may have influenced the dictionary composition. For the German language, the dictionaries were created by translating the Dutch and English versions, after which the translations were checked in context and supplemented with alternative terms where necessary. The perspectives described in this chapter are therefore based primarily on Dutch and English material, rather than on German or Swiss documents.

6.2. Adjustments to the perspectives

As mentioned in the previous section, there is a difference between the way the perspectives are described in chapter 5 and how they appear in the documents. This section, therefore, elaborates on each perspective and explains how it was converted into a dictionary for the automated text-analysis. To provide clarity, every perspective is described in terms of how it is identified in the documents, making explicit both its representation and its possible limitations.

Property value

This perspective highlights the financial value of railway station development, framing the area as a strategic zone where urban investment can lead to increased property values.

To identify passages in the documents that align with this perspective, the dictionary primarily draws on references to relevant stakeholders, such as investors, developers, and other private-sector actors. In addition, terms related to mixed-use development were included, reflecting the emphasis in the literature on the relationship between mixed-use projects and property values.

This perspective proved relatively difficult to capture in the policy documents, as explicit references to property value are uncommon and often only implied indirectly through stakeholder involvement or development strategies. As a result, this perspective is less about just property value and more about investment opportunities in general.

Connecting passengers

This perspective highlights the value of accessibility in railway station development, with a focus on integrating the station into the wider urban mobility network.

In the documents, this perspective is not only addressed in terms of bringing passengers to the railway station, but more broadly in terms of connecting people throughout the urban area. In line with the view of the main stakeholders—municipalities and local public transport companies—the emphasis lies on active modes of transport and on the integration of different forms of public transport. Attention is also given to overall connectivity and transfer possibilities, ensuring that the railway station functions as a well-integrated node within the wider mobility system.

A drawback for this perspective is that words such as *pedestrian*, *cycling*, and *public transport* are often mentioned together as one category of modes, but they also appear in more practical contexts, for example, in references such as “next to the cycling path.” In such cases, the term is used as a place indicator rather than a direct reference to accessibility, which makes precise interpretation more difficult.

Urban context

This perspective is rooted in public values, embedding the railway station within its surrounding urban context, ensuring that development responds to the local spatial, social, and cultural conditions.

In the documents, this perspective is closely connected to the perspective *architecture and design*, which requires a clear separation between the two. Whereas *architecture and design* is about shaping a suitable urban environment, the *urban context* perspective is about acknowledging and respecting what is already there. Accordingly, the dictionary for this perspective relies on general indicator words such as *character*, *distinctive*, and *community*, which capture the uniqueness of a place and the consideration of local factors.

A limitation of this perspective is that the reliance on general indicator words helps to circumvent the need for highly context-specific terms, but at the same time risks missing the more unique and distinctive features that make each place different. Such nuances are difficult to capture consistently in a dictionary-based approach.

Railway transport

This perspective highlights the operational value of running trains through the railway station, with a focus on safety, capacity, and punctuality.

In the documents, the perspective covers everything related to railways and trains. The word *station* is not included in the dictionary, since in many cases it refers to a place or to the wider urban development project rather than to railway operations themselves. The dictionary, therefore, concentrates on general and basic railway terminology.

A limitation of this perspective is that it proved difficult to capture railway station-specific performance indicators. Terms such as *capacity* and *safety* can refer both to train operations and to other, unrelated aspects of railway station development. This overlap complicates their use as clear markers for this perspective.

Passenger flow

This perspective highlights the value of safety by managing passenger flows in and around the railway station.

In the documents, this perspective was not strongly represented in the initial set. This may be because the focus of many documents is less on the railway station itself and more on the wider urban development area. The dictionary, therefore, includes only a small set of general terms, mainly variations of *passenger flow*.

The low frequency of this perspective in the corpus means that the resulting counts are likely to be sparse and may not yield significant differences between documents or across countries.

Retail logistics

This perspective highlights the commercial value of the railway station, focusing on its role as a retail destination and on enabling shop and service operations.

In the documents, references to retail are often about the wider urban area rather than the interior of the railway station building. The dictionary, therefore, includes general terms such as *retail*, *shops*, *restaurants*, and *hospitality*.

A limitation of this perspective, as it is represented in the documents, is that these general retail terms frequently appear in broader urban-development contexts. The dictionary pays less attention to logistical aspects of railway station retail operations, such as deliveries, waste handling, and storage.

Architecture and design

This perspective highlights the design value of the railway station as a public space, aiming for a welcoming and accessible environment that balances functionality and atmosphere.

In the documents, this perspective is discussed largely through the design of the urban area and city landscape. The dictionary, therefore, relies on general indicator terms such as *layout*, *urban design*, and *design quality*, as well as vocabulary associated with the public realm and open space (e.g., *public realm*, *open space*, *parks*, *green spaces*). Where relevant, these terms capture sections that address how design shapes user experience in and around the

railway station.

A shortcoming is that these terms primarily refer to outdoor spaces; suitable, consistent terminology for indoor spaces in the context of architecture and design proved difficult to identify. As a result, interior aspects of railway station design may be underrepresented, and some matches may reflect general urban-design discourse rather than station-specific design.

Political approval

This perspective highlights the legitimacy value of the railway station as a public asset, shaped by municipal politicians' responsibility to citizens and aligned with community needs and political commitments.

In the documents, a significant emphasis is placed on job creation and access to employment across the wider urban area. This appears as a highly prioritised goal in many (re)development projects and, although not part of the initial formulation, is clearly consistent with the political approval perspective because it benefits the population directly. Accordingly, the dictionary includes employment-related terms alongside words in the following public-welfare domains: housing, education, health, and facilities. General socio-economic indicators like income and family were also included as signals of this perspective.

Process management

This perspective focuses on guiding the railway station development process, with an emphasis on planning and expectation management.

In the documents, this perspective is signalled by references to collaboration, timelines and phasing, the approach, construction activities, and completion/delivery. To reduce over-inclusion, very general project terms (e.g., *plan*) were excluded. A small number of general project terms (e.g., *vision*) were included in the dictionary, because they mostly occurred in the context of process management. Because of this, this perspective was particularly difficult to balance among the three languages.

A limitation is that this vocabulary can still overlap with broader project discourse, so some matches may not be specific to the railway station process.

Project accomplishments

This perspective highlights the accountability value in railway station development, emphasising clear deliverables, measurable outcomes, and performance tracking in the context of substantial public–private investment.

In the documents, the dictionary aimed to capture explicit deliverables and milestones. Few such references were found. Mentions of the number of jobs and housing occur relatively often, but these are better suited under the *Political Approval* perspective and are therefore excluded here. Instead, this dictionary focuses on references to economic development and productivity growth as outcomes aligned with public and private investors' interests.

A limitation is that explicit, railway station-specific deliverables are rarely stated. As a result, counts for this perspective are sparse and may not yield strong differentiation between documents.

Sustainability

This perspective highlights the sustainability value in railway station development and aligns with municipal priorities for public well-being.

Although it was not part of the initial ten perspectives, it is mentioned frequently in the documents and can hardly be ignored. The dictionary, therefore, focuses on general terms around *sustainability*, *climate change*, and *emissions*.

Results text-analysis

This chapter presents the results from the automated text analysis performed with the dictionaries in MAXQDA. The analysis is structured in three steps. First, the numerical outcomes are examined to provide an overview of the absolute quantitative differences between perspectives and countries in section 7.1. Second, the relative distribution of perspectives is analysed and possible explanations are discussed in section 7.2. Finally, the overall range of perspectives is considered and connected back to the underlying values in section 7.3.

7.1. Number of coded sections

This section reports the absolute counts from the text analysis in order to highlight the major differences between the document sets across the four languages. These figures provide essential context for the subsequent sections, as they reveal inequalities in both the data and the results. By making these differences explicit, the interpretation of the analysis can proceed in a more transparent way.

The first major difference concerns the number of documents per country. The British set is considerably larger than the others, while the Swiss set is the smallest. This imbalance reflects the availability of data. Despite this, the German and British corpora contain an almost identical number of words, indicating that German documents are generally longer. This is largely due to the type of documents in the German set, which include several extensive planning reports without images, consisting of many pages that meticulously describe each step of the process.

Table 7.1: Relative amount of coded words in the complete document set

Country	Documents	Words	Coded words	Coded words per mille
Germany	26	1 106 283	13 649	12.338
The Netherlands	29	543 278	19 681	36.226
Switzerland	14	300 146	6 981	23.259
The United Kingdom	51	1 107 903	42 623	38.472

Another difference, shown in Table 7.1, is the relative density of coded words, expressed as coded words per thousand. The Dutch and British sets show similar values, whereas the Swiss and German sets are clearly lower. This partly reflects the fact that the dictionaries were

initially developed on the basis of Dutch and British test documents. As Table D.1 illustrates, the test documents used to translate the perspectives do correspond closely to the total sets of each country, with only one set scoring notably higher.

However, the relatively low scores of the German documents cannot be explained by dictionary design alone. A more important factor appears to be the type and style of the German reports. By contrast, the Swiss documents score higher despite the dictionaries not being designed for German, which suggests that document type and writing style have a greater influence on code density than language alignment alone. The perspective *Process management* is most frequently coded in German documents, but the density of coding within relevant sections is low. These passages often deal with regulation procedures, construction applications, or impact enquiries. Although central to the process dimension of railway station development, such material is not well captured by the dictionary, which focuses on more general terms.

Table 7.2: Coded words by country and perspective (counts)

	Rail	Connect	Flow	Architect	Urban	Retail	Property	Project	Sustain	Politic	Process
Germany	3603	1494	21	1349	608	214	164	37	392	1475	4292
The Netherlands	1718	4048	18	3478	1314	414	685	93	1100	3345	3468
Switzerland	535	3406	68	828	255	48	36	1	158	132	1918
The UK	2766	5759	18	5621	6823	2165	1316	308	2374	8370	7103

An overview of the absolute frequencies per perspective is given in Table 7.2. Here it becomes clear that *Passenger flow* and *Project accomplishments* occur least frequently. Besides reflecting their relatively lower prominence in the documents, this can also be attributed to the specificity of their dictionary entries, which reduces the number of matches. In contrast, the third lowest perspective, *Retail logistics*, is based on general terms and therefore its limited presence seems more reflective of the content of the documents.

Table 7.3: Relative amount of coded words in the masterplan document set

Country	Documents	Words	Coded words	Coded words per mille
Germany	9	113 064	2 441	21.590
The Netherlands	8	150 825	5 673	37.613
Switzerland	3	30 062	1 076	35.793
The United Kingdom	7	120 600	5 009	41.534

To address some of these differences, a subset of documents was created for cross-country comparison. This subset consists of the station area development plans (listed in Appendix B), hereafter referred to as masterplans. These documents are the most comparable across the four corpora, since they typically cover all perspectives, unlike technical reports that focus narrowly on *Railway transport* or *Process management*. Moreover, the very idea of perspectives and the construction of the dictionaries was grounded in such masterplans, making them particularly suitable for comparison. The scores in Table 7.3 confirm this: the number of coded words per thousand is closer across countries, although Germany remains a clear outlier for the reasons outlined above. Both the complete sets and the masterplan subset are therefore used in the subsequent analysis, as each offers complementary insights.

7.2. Relative perspective appearance

This section examines the relative share of perspectives in the document sets of each country. The statistic used is the percentage of coded words per perspective relative to the total number of coded words per country. This provides an indication of which perspectives receive the most attention in each national context. Pie charts for each country are presented in section D.2. The following subsections highlight the most notable outliers for each country, followed by some general comparative remarks.

Table 7.4: Coded words by country and perspective (% of coded words)

	Rail	Connect	Flow	Architect	Urban	Retail	Property	Project	Sustain	Politic	Process
Germany	26.4	11.0	0.2	9.9	4.5	1.6	1.2	0.3	2.9	10.8	31.5
The Netherlands	8.7	20.6	0.1	17.7	6.7	2.1	3.5	0.5	5.6	17.0	17.6
Switzerland	7.7	48.8	1.0	6.1	3.7	0.7	0.5	0.0	2.3	1.9	27.5
The UK	6.5	13.5	0.0	13.2	16.0	5.1	3.1	0.7	5.6	19.6	16.7

For Germany, the perspectives *Railway transport* and *Process management* together account for almost 60% of the total coded words. The prominence of *Railway transport* is particularly striking compared to the other countries. The distribution of perspectives also varies strongly between the four German cities, as the documents for each city are centred on a single major project with a distinct focus. As shown in Figure D.1, the Stuttgart project dominates the results for *Railway transport*, reflecting its emphasis on a comprehensive reconfiguration of railway tracks through the city and region. Across all cities, *Process management* occupies a large share, making it the most consistent outlier in the German document set.

The Dutch corpus stands out for its relatively high shares of *Connecting passengers*, *Architecture and design*, and *Political approval*. This is partly explained by the inclusion of several city-wide development strategies, which naturally devote more attention to socio-economic development than station-specific plans. The prominence of *Connecting passengers* and *Architecture and design* reflects the emphasis on urban design quality in the Netherlands, a field in which the country is internationally recognised. A noteworthy detail is the frequent appearance of the word *groen* (green), which in Dutch is also used to describe green spaces. This single term accounts for almost 20% of the coded sections under *Architecture and design*. In addition, the Dutch set shows the highest proportion of the perspective *Property value*, suggesting a strong focus on attracting investment and managing real estate.

In Switzerland, the perspective *Connecting passengers* dominates with nearly 50% of the total coded words, making it the most extreme outlier in any of the four countries. This is partly due to the relatively small corpus and the inclusion of several transportation planning documents focused specifically on transportation planning around the railway station. Another distinctive feature of the Swiss set is the infrequent appearance to near absence of several perspectives. *Property value*, *Urban context*, *Retail logistics*, *Political approval*, and *Project accomplishments* make up almost half of the perspectives that all receive relatively little attention. Most notably, the latter only appears once across the entire set, while *Political approval* is mentioned ten times less often than in other countries. This suggests a strong orientation towards the technical *how* of implementation, with comparatively little emphasis on the *why* of the development benefits.

The British corpus shows the highest proportion of *Political approval*, accounting for almost 20% of coded words. As in the Netherlands, this can be attributed to the inclusion of extensive city-wide development strategies. Another relatively prominent perspective is *Urban context*,

where the words *historic*, *heritage*, and *community* appear particularly frequent. Compared to the other countries, the perspectives *Project accomplishments*, *Property value*, and *Retail logistics* also occur more often, suggesting that financial and commercial considerations play a substantial role in the British documents.

The perspective *Railway transport* appears particularly sensitive to document type. In technical reports, it is often the dominant theme, with other perspectives, besides *Process management* or *Connecting passengers*, largely absent. By contrast, in urban design documents, it is mentioned only sparingly. This indicates that the relative share of *Railway transport* reflects corpus composition as much as national priorities. The German case of Stuttgart illustrates this clearly. The comparison with the masterplan subset in Table 7.5 supports this point, as the German share for *Railway transport* is more in line with the other countries in that subset.

Table 7.5: Coded words by country and perspective (% of coded words, masterplan set)

	Rail	Connect	Flow	Architect	Urban	Retail	Property	Project	Sustain	Politic	Process
Germany	7.8	13.2	0.0	24.8	7.7	2.9	1.5	0.3	1.8	14.2	25.9
The Netherlands	8.1	25.2	0.1	18.2	10.0	3.9	4.5	0.3	2.7	11.4	15.7
Switzerland	4.1	48.3	0.0	9.2	3.6	1.1	0.9	0.0	2.2	2.2	28.3
The UK	6.3	25.9	0.0	18.5	18.4	8.7	2.9	0.8	3.0	7.6	8.0

Overall, the British corpus displays the most balanced distribution of perspectives, closely followed by the Dutch set. These two countries also show the greatest similarity in terms of document types, topics, and even the aesthetic presentation of the documents. The German documents, by contrast, differ most strongly in structure, content, and style. The Swiss corpus falls somewhere in between: less comprehensive in terms of perspectives than the Netherlands and Britain, more visually appealing than the German set, but sharing with Germany a strong emphasis on practical and procedural aspects. A full overview of all percentage scores is provided in Figure 7.1.



Figure 7.1: Relative occurrence of perspectives in complete document set

7.3. Value priorities derived from the results

This section takes a closer look at the priority of the perspectives in each country. To facilitate cross-country comparison, the perspectives are scaled relative to the maximum percentage score within each perspective. In addition, the perspectives are interpreted not in isolation but as part of a spectrum of preferences, allowing an assessment of which values are prioritised across national contexts.

Figure 7.2 shows the scaled scores for all perspectives and countries. This provides an overview of which perspectives are relatively prioritised in each country. The perspectives are ordered clockwise on the spider graph to approximate conceptual profiles with the line plots. At the top is *Railway transport*, representing the primary function of a railway station. Moving clockwise, the focus first remains on transport and movement, then shifts to the design and integration of the urban area. Next comes a cluster of financially oriented perspectives, ranging upwards in scale. From these financial concerns, the order transitions back to public values, represented by *Sustainability* and *Political approval*, before concluding with *Process management*, which connects to most perspectives and is essential for delivering railway station development projects.

Figure 7.3 presents the results for the masterplan subset. The perspective *Passenger flow* is

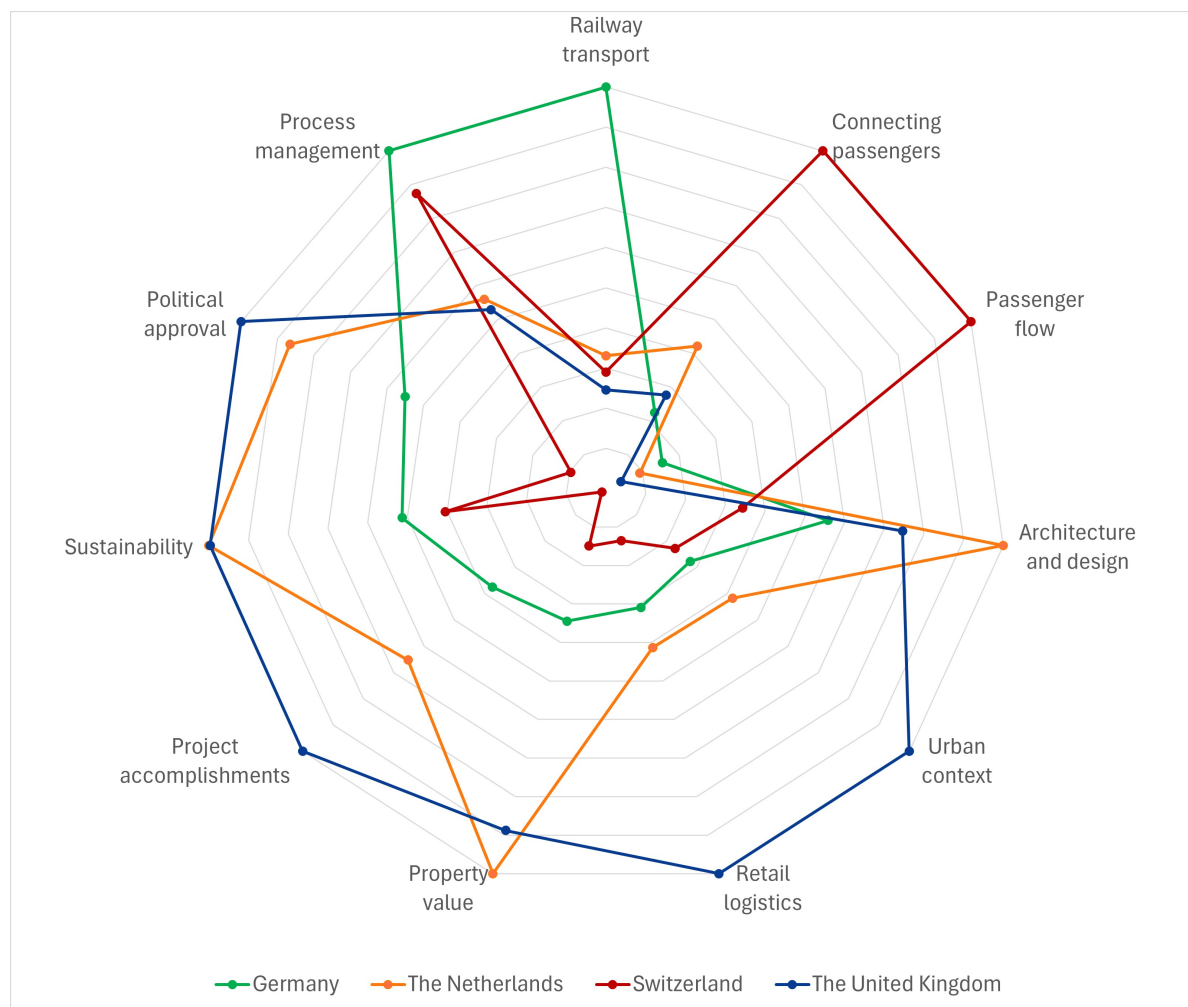


Figure 7.2: Normalised relative occurrence of perspectives in complete document set

excluded here, as it is mentioned too infrequently to produce meaningful results. Compared to the complete corpus, the differences between countries appear less pronounced, yet the main contrasts remain visible. The added value of this subset is to demonstrate that the priorities identified in the full corpus are not solely a result of corpus composition. For example, the extreme *Railway transport* score in the German set is moderated in the masterplan-only comparison. Using both datasets, therefore, allows the analysis to benefit from the breadth of the full corpus while avoiding exaggerated claims.

The German results reveal a strong orientation towards process legitimacy values. The highest priority is given to ensuring that every procedural step, ranging from applications and site studies to construction and nuisance control, is addressed in exhaustive detail. This procedural orientation is centred around a strong focus on the technical dimension of railway transport and, to a lesser extent, on the design of public spaces. At the same time, public values are reinforced by the consistent search for political approval and strict adherence to regulatory correctness.

The Dutch results highlight a strong orientation towards the layout of the urban landscape, with particular attention to the design and the connectivity of urban areas. This makes aesthetic and accessibility values a clear priority. This design orientation is accompanied by a strong incentive to attract investment and businesses, reflecting the importance of financial values

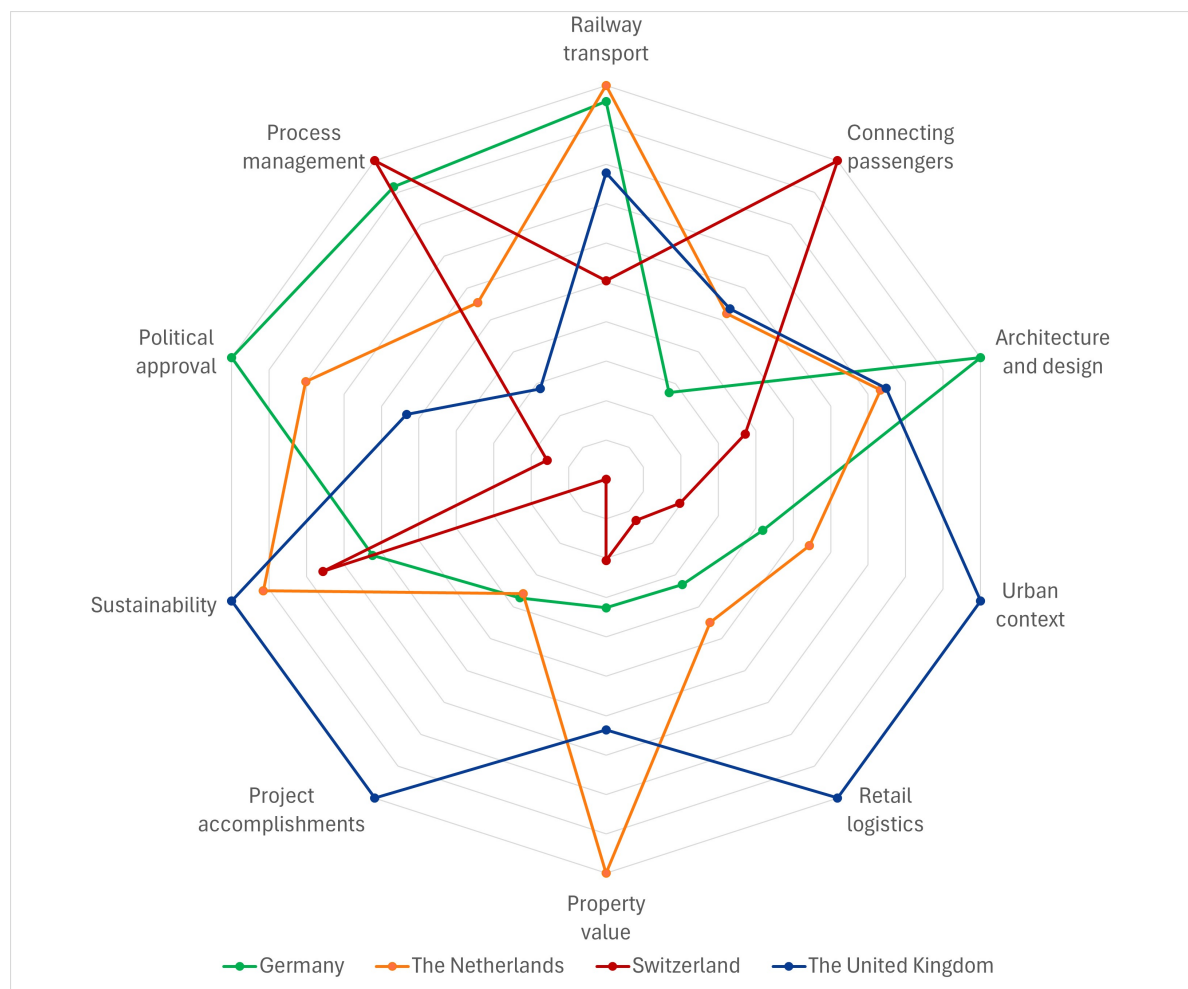
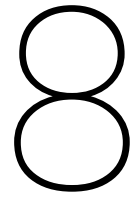


Figure 7.3: Normalised relative occurrence of perspectives in masterplan document set

and a perceived need to demonstrate the Netherlands' relevance in terms of business opportunities. Economic growth and productivity are also prioritised, further underlining the weight of financial considerations alongside the concern for urban design quality.

The Swiss results are strongly outcome-oriented, primarily focusing on achieving improvements. The main priority lies in connectivity, both around the railway station and throughout the wider urban area, with accessibility emerging as a closely related value. Contrarily, financial values are scarcely elaborated, and political reasoning is mentioned far less than in the other countries, indicating a limited emphasis on legitimacy values. Once the necessity of railway station redevelopment is established, its utility is not questioned; instead, the focus is placed firmly on ensuring the realisation of the intended improvements.

The British results reveal a strong orientation towards financial values. Attention is given to the broader economic situation, including investment opportunities and, at a smaller scale, retail. Retail development is closely tied to the ambition of creating attractive urban areas, often framed in relation to historical and heritage aspects of the urban landscape. Although this emphasis could be associated with aesthetic values, the framing consistently points to an underlying financial value: enhancing urban attractiveness in order to support investment and competitiveness on a broader scale.



Discussion

This chapter discusses the implications of the differences in value priorities established in section 7.3, followed by some recommendations targeted at authors of railway station development documents. Section 8.3 describes the limitations of the applied research approach; finally, the recommendations for future research are provided in section 8.4.

8.1. Implications

Do differences in value priorities translate into different outcomes in railway station design? A brief visual inspection of stations across the included countries (via Google Maps) suggests that this is not the case: the physical layouts exhibit the same core components. For example, the near absence of the *Retail logistics* perspective in Swiss documents does not imply an absence of shops in Swiss stations, nor does its higher frequency in British documents imply substantially more retail there. Across all countries, stations adjoin bus or tram facilities and are clearly integrated with their urban surroundings. If value priorities directly affect the physical layout, one would expect visible divergence in appearance; such divergence is not evident at the level of components observable on a map.

This simplified assessment indicates that the observed differences in priorities do not materially affect the primary considerations of railway station form. This does not preclude differences in quality or service. It is entirely plausible, for instance, that local public transport in Switzerland is more tightly integrated with rail services than elsewhere, a meaningful difference that may stem from value priorities without manifesting as distinct station layouts.

Perspectives less apparent from inspection of a map, such as *Process management*, *Property value*, and *Political approval*, could, in principle, yield differing impacts where they are emphasised. Yet large effects driven solely by priority differences appear unlikely. Germany scores highest on *Process management*, but this does not imply faster delivery, greater efficiency, or lower construction costs. The trajectory of Stuttgart's main station illustrates the point: initially planned for opening in 2019, the railway station is now scheduled for late 2026, with costs roughly quadrupling (zdfheute, 2025). By the same token, property values around stations are unlikely to be affected only in the Netherlands and the United Kingdom, simply because project documents contain that topic. Swiss projects do not cease to create public value merely because *Political approval* is less frequently invoked.

Taken together, the differences in priorities seem to have limited large-scale influence on built outcomes. They do, however, call for explanation. Rather than reading them as direct de-

terminants of design, it is possible to interpret them as instruments for securing approval, addressing the values of those whose support is needed to realise projects, and as responses to cultural expectations and the prevailing policy vocabulary of the time.

Sustainability exemplifies this last phenomenon. Experts characterise it as implicit in routine practice rather than a subject for active discussion, yet documents refer to it frequently, signalling importance. This discrepancy suggests a legitimacy function: sustainability language may serve as boilerplate to demonstrate alignment with contemporary norms, raising questions about audience and purpose rather than evidencing competing priorities in railway station development outcomes.

This persuasion-oriented reading also clarifies cross-country patterns. In Switzerland, high per-capita rail investment reduces pressure to obtain additional funding, which helps explain the lower occurrence of financially oriented perspectives (Statista, 2024). By contrast, the United Kingdom's comparatively privatised sector requires robust business cases to mobilise commercial actors, elevating financially framed perspectives. A consistent indicator across all four countries is the relative absence of *Passenger flow* in development documents despite its prominence in academic literature: flow and safety requirements are typically codified in regulations and technical specifications, and thus seldom serve a persuasive function in project narratives.

Cultural patterns further shape value emphases. Dutch documents appear to have a heightened attentiveness to attracting investors indicated by a recurrent use of "*investeringsklimaat*" (investment climate), a term almost exclusively mentioned in Dutch documents. This reflects a broader societal feeling of having to put effort into retaining visibility internationally as a small nation. Likewise, Germany's strong emphasis on *Process management* coheres with cultural expectations of procedural and regulatory adherence.

Overall, the occurrence of perspectives appears largely driven by legitimacy needs, addressing influential stakeholders and reflecting culturally expected forms of reporting, rather than by direct causation of physical design differences. In this sense, observed value differences primarily structure what is needed to justify these projects, rather than the fundamental configuration of railway stations.

8.2. Recommendations

To address the implications outlined above, this section advances two recommendations directed at authors of documents produced for railway station development projects. The aim is to improve future documentation so that the diverse set of stakeholders can access relevant information more efficiently and in a form aligned with their needs and values.

First, documents would benefit from explicit audience signposting. An opening passage should state (i) what the document contains and (ii) which stakeholder groups are likely to find each component useful. Currently, extensive reports often combine multiple perspectives that speak to different stakeholders, with limited guidance on where each audience should look. A real estate investor, an urban designer, and a citizen do not require the same information; separating content by audience, either through distinct documents or clearly demarcated sections, would enable each group to locate what matters to them without exhaustive searching. Clarifying the intended reader also supports authors by sharpening the narrative and focus.

Second, introductions should include a concise statement of purpose. This statement should specify the function of the document, the scope of information included, and the rationale for its relevance to the intended reader. As with the first recommendation, such framing facili-

tates targeted retrieval for stakeholders and aids authors in maintaining focus on value-adding content while omitting material that does not serve the document's purpose. Together, these recommendations are intended to yield reports that can be read linearly, without scanning for relevance, while efficiently informing heterogeneous audiences.

8.3. Limitations

Constructing dictionaries for automated text-analysis is inherently challenging and will almost inevitably entail imperfections. The aim in this study was to apply systematic criteria for including or excluding terms. As a result, most entries generally capture the intended perspective, though some inevitably do not. Such misalignments, added because the terms usually fit the perspective, can nonetheless reduce clarity in the outputs. It is difficult to quantify how often this occurs, and the rate likely varies by language, even for direct translations. Moreover, because the dictionaries were developed from a finite sample of English and Dutch documents, relevant expressions may be missing. At the same time, expanding the lists indefinitely risks over-fitting to the sample. A practical stopping rule was therefore necessary to avoid terms that are overly specific to that vocabulary.

To enable cross-country comparison, the dictionaries were balanced across languages by using mostly the same or closely equivalent terms. This choice reflects the assumption that fully exhaustive, perspective-covering dictionaries are not feasible within the scope of this research. Balancing was therefore used as a mitigation strategy to preserve comparability. Ideally, future work would broaden coverage as far as practicable and include a more thorough analysis of the German and Swiss corpora to identify whether perspectives are expressed differently in those contexts.

Additional iterative cycles, both in dictionary refinement and in corpus selection, would likely have improved performance. In particular, they might have increased the proportion of coded sections in the German set, which showed the lowest relative density. Reiterating after observing these differences could have helped identify sources of low density, incorporate topics specific to the German documents, and then examine the presence of those topics in the other countries. This, in turn, may have clarified priorities that are prominent in Germany but less visible elsewhere.

Finally, the document sets were assembled primarily on the basis of availability and are therefore not perfectly balanced. Selection itself is consequential, as inclusion and exclusion shape the results. Ideally, a larger and more harmonised corpus, containing comparable document types in each language, would have reduced this source of bias. Such a corpus would also have enabled more systematic like-for-like comparisons in the analysis and a clearer assessment of cross-country differences across documents from different institutions.

Nevertheless, differences in what documents are publicly available are themselves informative about national priorities. Although the corpus cannot claim to represent all documentation produced for railway station developments, the visual and stylistic contrasts are striking. The German set is dominated by procedural reports with extensive sub-sections, and there is comparatively little material from architecture or design firms. By contrast, the Dutch and British sets include more visually communicative documents, with imagery and designed layouts. These document styles suggest different intended audiences and functions, procedural traceability in Germany versus public-facing communication in the Netherlands and the UK.

8.4. Future research

The perspectives set out in chapter 5 offer a practical framework for future research on railway stations and urban development. They make explicit the roles, priorities, and associated values of institutional stakeholders, thereby supporting the interpretation of project outcomes in Western European contexts. One avenue is to integrate these perspectives into the node–place model of Luca Bertolini (1996). To build on Caset et al. (2018), who extend the model by distinguishing categories on both the node and place axes, a further refinement would be required: several perspectives do not map cleanly onto either axis. Incorporating an additional dimension of development over time would enable perspectives such as *Process management*, *Project accomplishments*, and *Political approval* to be represented, as these cannot be meaningfully assessed at a single moment.

This complementary extension could improve the evaluation of how differences in value priorities shape station project outcomes. Because the success of large, complex projects cannot be captured by a single objective metric, a targeted, multi-criteria assessment is necessary. The perspectives developed here provide an analytical lens to test whether stakeholders who are more influential during the process ultimately secure outcomes that align with their priorities. The node–place model additionally provides balance by structuring the relationship between transport function and urban activity.

As noted in section 8.1, temporal context also matters at the level of individual projects and may help explain observed value priorities. The projects examined here post-2000 span periods marked by shifting views on urban design and societal organisation. Some development projects, particularly larger stations, act as symbolic “projects of their time.” For example, Rotterdam Centraal was designated a national “key project” intended to provide a broader positive impulse to the city (Trouw, 2000). The planned high-speed (HS2) station in Birmingham is of comparable scale. Both cases express national value priorities while also serving a prestige function at a global scale. With roughly two decades between them, further analysis could examine how such flagship projects influence the balance of value priorities and the extent to which prevailing policy fashions shape their composition.

Because term frequencies vary substantially across perspectives, direct comparison between perspectives is of limited interpretive value. One way to address this would be to introduce a weighted scoring scheme in which indicators receive differential weights to compensate for frequency differences. In this study, however, such weighting was not pursued: given the remaining uncertainty around dictionary construction, assigning weights without a validated basis would have introduced additional arbitrariness.

The results nonetheless indicate clear cross-country differences in value priorities. To catch the origins of these differences, future research could draw on the Williamson framework (Williamson, 1998), which distinguishes four institutional layers. Positioning the observed patterns within this structure may help to determine whether they primarily reflect cultural, institutional, or governance-level drivers, and would allow more grounded interpretation of the contrasts observed here.

9

Conclusion

This conclusion distils the study's main contributions: the perspective framework, the multilingual text-analysis approach, and the different priorities in values across the four Western European countries. It also reflects on methodological limits to guide a careful interpretation of the results.

The perspectives developed in this thesis offer a comprehensive framework for understanding the multiple values at stake in railway station development. Grounded in the literature and refined through expert interviews, they cover a wide spectrum ranging from governance and legitimacy to accessibility, design, and financial considerations. This breadth reflects the reality that stations are simultaneously transport hubs, urban places, political projects, and economic assets. Every perspective was clearly specified to represent a core value, and certain broad concepts were excluded for analytical clarity. Nonetheless, the diversity of perspectives ensures that the analysis can reveal how different national contexts emphasise different priorities of values in railway station development.

The text-analysis in this thesis combined a systematic document collection with the construction of multilingual dictionaries to capture perspectives derived from the literature and expert interviews. This method enabled the identification of these perspectives in a diverse corpus of planning and policy documents from four countries. An iterative process of manual coding, validation through context checks, and cross-language balancing ensured that the dictionaries represented perspectives as consistently as possible, despite linguistic and contextual differences. This methodological framework offers transparency, reproducibility, and the ability to handle large document sets that would otherwise be too time-consuming to analyse manually.

At the same time, several limitations must be acknowledged. Dictionary-based methods inevitably simplify language and may miss nuances, particularly when words carry multiple meanings or appear in unfamiliar contexts. Some terms included captured their perspective imperfectly, while others that might have been relevant were absent, especially in German and Swiss documents that were not included in the manual test corpus. The reliance on available documents also introduced imbalances: the corpora differed in size, type, and style, reflecting what was accessible rather than a fully representative sample. These factors limit the precision of cross-country comparisons and mean that the results should be interpreted as indicative patterns rather than exact measures.

Despite the noted limitations, the analysis yields clear cross-country differences in the frequency of the perspective occurrences. The distinct value priorities derived from those scores are as follows: Germany is strongly oriented towards process legitimacy, with an emphasis on detailed procedural planning and regulatory correctness, supported by technical considerations of railway transport. The Netherlands prioritises the design and connectivity of the urban landscape, combining aesthetic and accessibility values with a notable concern for investment and economic growth. Switzerland shows a predominantly outcome-oriented profile, where connectivity and accessibility are prioritised, while financial and political values are given little attention. The United Kingdom, by contrast, places financial values at the centre, focusing on investment, retail, and the creation of attractive urban areas to draw visitors and strengthen economic competitiveness. Together, these findings underline how different national contexts emphasise different priorities of values in railway station development.

Despite the observed differences in value priorities, these do not translate into major divergences in railway station layouts across the included countries. While the quality and emphasis of certain services and features may vary, the core components of railway stations remain broadly consistent. The variation in priorities appears to reflect the need to secure support from particular stakeholders and to align with cultural and period-specific expectations, rather than to redesign the physical configuration.

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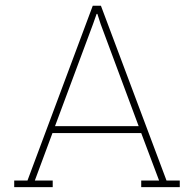
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Interview protocol

Explanatory introduction

For my research I am trying to find out if there are differences in the relative importance of values in the process of railway station projects between four European countries – The Netherlands, Germany, Switzerland and The United Kingdom.

I will be conducting a text-analysis on policy documents from multiple railway station projects, to research how projects in different countries score on several perspectives.

In order to conduct this analysis I first need a clear set of perspectives that could potentially be identified. So far I have completed a literature review which gave me a good foundation, however to get a more comprehensive view of all perspectives and to verify the literature I am conducting additional interviews with people with experience in the field of railway station development such as yourself.

In this interview when talking about railway station development it is implied that we also include the urban surroundings in the station area, as these projects often tend to be (re)developed at the same time.

Stakeholders / Perspectives

- What are the main stakeholders and different perspectives that play an important role in railway station (re)development projects?
- Should the following stakeholders also be included, or is their role in your view insignificant?
- Name the stakeholders from this list of stakeholders found in the literature that are not mentioned yet:
 - Real-estate developers
 - Municipality
 - Policy makers
 - Homeowners
 - City planners
 - Railway undertaking

- Infrastructure manager
- Railway station managers
- Local public transit companies

Processes / Functions

Railway stations have different roles that they need to fulfil in order to function properly as a transport hub, a place that people visit and as part of the city.

- What are the functions that need to be considered or play a role in an operating railway station and their development project?
- Should the following processes also be included or is their role in your view insignificant?
- Name the functions from this list that are not mentioned yet:
 - People living around the railway station
 - Attracting passengers to the railway station
 - Developing the built environment around the railway station
 - Managing the trains and rail infrastructure in the railway station
 - Getting people through the railway station
 - Assuring people feel safe and comfortable in the railway station

Values

- What values are represented by the different stakeholders and functions that we just discussed?
- Should the following values also be included or is their role in your view insignificant?
- Name the values from this list that are not mentioned yet:
 - Financial value
 - Sustainability value
 - Public value
 - Safety value
 - Aesthetic value
 - Accessibility value
 - Legitimacy value

B

Documents included in the text-analysis

B.1. German documents

Table B.1: German document list

Location	Document name	Author(s)	Document type	Year	# words
Berlin	Masterplan Berlin Heidestraße	Local government	Station area development plan	2009	5 384
Berlin	Europacity Nachhaltiges Quartier am Hauptbahnhof	Local government	Station area development plan	2006	2 421
Berlin	Europacity Urbanes Quartier am Hauptbahnhof	Local government	Station area development plan	2006	1 539
Hamburg	Begründung zum Bebauungsplan Altona-Nord 26	Local government	Station area justification plan	2014	39 485
Hamburg	Letter of Intent (LOI) Projekt Bahnhof Hamburg-Altona	Local government Rail infrastructure manager	Station area letter of intent	2016	1 894
Hamburg	Planfeststellungsbeschluss: Verlegung Bahnhof Hamburg - Altona	National railway agency Rail infrastructure manager	Station railway planning brief	2017	41 823
Hamburg	Anlage B zum Masterplan Mitte Altona Auszug Bürgerforderungen	Local government	Station area civilian claims	2011	14 367
Hamburg	Stellungnahme zum „Masterplan Mitte Altona“	Local government	Station area council proposal	2012	1 410
Hamburg	Masterplan Mitte Altona Fundamente für ein neues Stück Stadt	Local government	Station area development plan	2012	4 788
Hamburg	Quartierszentren in der Integrierten Stadtteilentwicklung Leit-faden für die Praxis	Local government	City wide development strategy	2013	8 493
Hamburg	Rahmenprogramm Integrierte Stadtteilentwicklung Globalrichtlinie	Local government	City wide development guideline	2022	6 571

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Location	Document name	Author(s)	Document type	Year	# words
Hamburg	Rahmenprogramm Integrierte Stadtteilentwicklung Leitfaden für die Praxis	Local government	City wide development guideline	2022	36 589
Hamburg	Mitte Altona Masterplan Anlage A	Local government	Station area development plan appendix	2012	8 743
Hamburg	Vorbereitende Untersuchungen und Rahmenplan Diebsteich	Architecture firms Urban planning firms	Station area development plan	2021	72 893
Hamburg	Vielfalt im Quartier Städtebaulich-freiraumplanerischer Rahmenplan Diebsteich	Local government	Station area development plan	2020	6 281
Stuttgart	Verkehrsbedeutung der Anbindung der Gäubahn an den Flughafen Stuttgart und den neuen Fernbahnhof	Transport consultancy firms	Railway study	2021	7 568
Stuttgart	Umgestaltung des Bahnknotens Stuttgart	Rail infrastructure manager	Station railway study	2017	506 090
Stuttgart	Ein Bahnhofs- und Mobilitätsprojekt für das 21. Jahrhundert	Architecture firms	Station area development plan	2010	1 299
Stuttgart	Planfeststellungsunterlagen Umgestaltung des Bahnknotens Stuttgart	Rail infrastructure manager	Station railway planning approval	2005	34 822
Stuttgart	Planfeststellungsbeschluss: Umbau des Bahnknotens Stuttgart	National railway agency Rail infrastructure manager	Station railway planning brief	2005	118 851
Stuttgart	Rahmenplan Stuttgart 21	Local government	Station area development plan	1997	15 514
München	Stadtbildverträglichkeitsuntersuchung zum Projekt 'Hohhaus am Starnberger Flügelbahnhof' in der Münchner Innenstadt	Railway station manager	Station area landscape compatibility study	2018	17 865
München	Planfeststellungsbeschluss: Bauliche Änderung des Bahnhofs München Hbf	National railway agency Rail infrastructure manager	Station railway planning brief	2022	40 678
München	Planfeststellungsbeschluss: Integrierte Gesamtlösung Hauptbahnhof München	National railway agency Rail infrastructure manager	Station railway planning brief	2022	83 665
München	Der neue Münchner Hauptbahnhof Das Tor zur Stadt	Rail infrastructure manager	Station area development plan	2018	2 945
München	Zukunftsschau München 2040+	Local government	City wide development strategy	2016	24 305

B.2. Dutch documents

Table B.2: Dutch document list

Location	Document name	Author(s)	Document type	Year	# words
Delft	Nieuw Delft Integraal Ontwikkelingsplan 2025	Local government	Station area development plan		24 685
Delft	Beeldkwaliteit Spoorzone Delft	Local government	Station area landscape compatibility study	2008	10 352
Delft	Planstudie Spoorzone Delft	Local government	Station area development study	2004	14 139
Delft	Zicht op Delft	Urban planning firm	Urban development plan	2012	4 772
Eindhoven	Eindhoven Internationale Knoop XL Toepassing 'leidraad omgang Knoop XL'	Local government Regional government	Station area planning guidelines	2022	17 172
Eindhoven	Plan van Aanpak Internationale Knoop XL	Local government	Station area action plan	2019	12 371
Eindhoven	Uitvoering gebiedsontwikkeling Fellenoord (Hoe)	Local government	Station area council proposal	2022	9 153
Eindhoven	Ontwikkelperspectief Multimodale Knoop Eindhoven XL	Architecture firms Urban planning firms	Station area development plan	2021	31 458
Eindhoven	Bijlage Eindhoven Internationale Knoop XL Toepassing 'leidraad omgang Knoop XL'	Local government Regional government	Station area planning guidelines	2022	10 692
Eindhoven	Integraal MIRT-Onderzoek Verstedelijking en Bereikbaarheid Brainportregio	Consultancy firm	Regional development study	2020	11 019
Eindhoven	Toekomstvisie Fellenoord	Architecture firm Local government	Station area development plan	2022	3 000
Eindhoven	MIRT-verkenning Brainportregio – Spoorknoop Eindhoven	Rail infrastructure manager Engineering firm	Station railway study	2024	6 040
Eindhoven	Integrale studie Emplacement Eindhoven – Westzijde: Eerste ontwerprapportage	Engineering consultancy firm	Station railway study	2021	14 993
Eindhoven	Raadsvoorstel Uitwerking publiek belang gebiedsontwikkeling Fellenoord	Local government	Station area council proposal	2022	4 354
Eindhoven	MIRT-Verkenning OV-Knoop Brainportregio Eindhoven	Local government National government	Station area development study	2022	5 745
Rotterdam	Weena Glocal City District Het gebiedsconcept voor de toekomst van het Stationskwartier	Development firm	Station area development plan	2007	19 614
Rotterdam	Centraal District Rotterdam	Architecture firm Local government	Station area development plan	2007	17 524
Rotterdam	Stedenbouwkundig plan Stationskwartier	Local government	Station area development plan	2005	8 556

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Location	Document name	Author(s)	Document type	Year	# words
Rotterdam	Gebiedsontwikkeling Rotterdam Central District	Local government	Station area risk justification plan	2011	13 700
Rotterdam	Structuurvisie Rotterdam Central District	Local government	Station area development plan	2011	25 737
Rotterdam	PlanMER Rotterdam Central District	Local government	Station area environmental impact	2009	67 866
Utrecht	Masterplan Stationsgebied Utrecht	Local government	Station area development plan	2003	20 251
Utrecht	Structuurplan Stationsgebied Utrecht	Local government	Station area environmental impact report	2006	2 500
Utrecht	Integraal Ruimtelijk Perspectief	Local governments	Metropolitan area development strategy	2021	45 372
Utrecht	Samen OV Versnellen in Utrecht	Local government Regional government	City public transport strategy	2021	19 912
Utrecht	Utrecht Nabij Ontwikkelperspectief verstedelijking en bereikbaarheid Metropoolregio Utrecht 2040, met een doorkijk naar 2050	Local government Regional government	Metropolitan area development strategy	2020	34 889
Utrecht	Schaalsprong OV en Verstedelijking Metropoolregio Utrecht	Local government Regional government	Metropolitan area public transport and urban development plan	2021	18 633
Utrecht	Voorstel aan de gemeenteraad Eerste stappen Schaalsprong OV	Local government	Metropolitan area public transport council proposal	2021	6 897
Utrecht	Utrecht dichtbij: de tien-minutenstad Ruimtelijke Strategie Utrecht 2040	Local government	City wide development strategy	2021	61 882

B.3. Swiss documents

Table B.3: Swiss document list

Location	Document name	Author(s)	Document type	Year	# words
Bern	Technischer Bericht Publikumsanlagen Ausbau Publikumsanlagen Bahnhof Bern	Rail infrastructure manager	Station area technical planning brief	2015	24 226
Bern	Zukunft Bahnhof Bern Das Gesamtkonzept im Überblick	Local governments Rail infrastructure manager	Station railway study	2011	19 068
Bern	Die städtischen Bau- und Verkehrsmassnahmen Zukunft Bahnhof Bern (ZBB)	Local government	Station area traffic plan		705
Bern	ZBB Stadt Bern Verkehrsmassnahmen Überbauungsordnung Er-läuterungsbericht	Local government	Station area traffic plan	2020	8 750
Bern	Zukunft Bahnhof Bern (ZBB) Verkehrsmassnahmen, Person-enpassage und Neugestaltung Hirschengraben mit Option Velo-station Mitwirkungsbericht	Local government	Station area traffic plan	2020	99 638
Bern	Hirschengraben, Bern Gartendenkmalpflegerisches Gutachten	Urban planning firm	Park and land-scape plan	2022	10 245
Bern	ZBB Stadt Bern Verkehrsmassnahmen Überbauungsordnung Technis-cher Bericht	Local government	Station area traffic plan	2018	16 939
Bern	ZBB Stadt Bern Verkehrsmassnahmen Überbauungsordnung Konzept-bericht	Local government	Station area traffic plan	2020	14 432
Bern	ZBB Stadt Bern Verkehrsmassnahmen Umweltverträglichkeitsbericht Hauptuntersuchung	Local government	Station area envi-ronmental impact report	2023	63 030
Zürich	Strategie für die Gestaltung von Zürichs öffentlichem Raum	Local government	Urban develop-ment strategy	2006	4 729
Zürich	Entwicklungskonzept Arbeitsge-biet Bahnhof Altstetten	Local government	Station area de-velopment plan	2001	2 552
Zürich	Zürich Altstetten. Arealentwicklung VZA Master-plan	Financial firm	Station area real estate develop-ment strategy	2020	8 322
Zürich	Programm Testplanung Phase Präqualifikation	Local government	Station area de-velopment plan	2020	15 670
Zürich	Aufbruch in den Stadtraum Hauptbahnhof 2050 Weissbuch	Local government	Station area de-velopment plan	2025	11 840

B.4. British documents

Table B.4: British document list

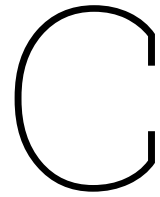
Location	Document name	Author(s)	Document type	Year	# words
Birmingham	City Centre Canal Corridor	Local government	Urban develop- ment plan	2001	10 835
Birmingham	Birmingham Curzon HS2: Mas- terplan for growth	Local government	Station area de- velopment plan	2015	19 806
Birmingham	Birmingham Design Guide Principles Document	Local government	Urban develop- ment plan	2022	20 619
Birmingham	Birmingham Design Guide The Birmingham ID City Manual	Local government	Urban develop- ment plan	2022	2 616
Birmingham	The Big City Plan 1	Local government	Station area de- velopment plan	2011	11 494
Birmingham	The Big City Plan 2	Local government	Station area de- velopment plan	2011	25 063
Birmingham	Birmingham development plan	Local government	Urban develop- ment plan	2017	58 142
Birmingham	Curzon Investment plan	Local government	Station area investment plan	2016	10 404
Birmingham	Birmingham Design Guide Efficient and Future Ready City Manual	Local government	Urban develop- ment plan	2022	2 557
Birmingham	Birmingham Design Guide Supplementary Planning Docu- ments	Local government	Urban Supple- mentary Planning Document	2022	51 107
Birmingham	Planning Guidelines for Development Involving Public Houses	Local government	Urban planning guidelines		704
Birmingham	Birmingham Design Guide Streets and Spaces City Manual	Local government	Urban develop- ment plan	2022	10 240
Birmingham	Green Living Spaces Plan	Local government	Urban develop- ment plan	2013	9 448
Birmingham	Birmingham Design Guide Healthy Living and Working Places City Manual	Local government	Urban develop- ment plan	2022	21 113
Birmingham	Houses in Multiple Occupation and Large Scale Shared Accom- modation Supplementary Planning Docu- ments	Local government	Urban Supple- mentary Planning Document	2022	20 289
Birmingham	Core strategy 2026	Local government	City wide develop- ment strategy	2010	86 605
Birmingham	Birmingham Design Guide Landscape and Green Infras- tructure City Manual	Local government	Urban develop- ment plan	2022	12 085
Birmingham	Urban centres framework	Local government	Urban develop- ment plan	2020	16 109
Birmingham	Planning for Birmingham's grow- ing population	Local government	City wide sce- nario assesment	2012	10 587
Birmingham	The Birmingham plan Core strategy Issues and op- tions	Local government	City wide sce- nario assesment	2008	12 848

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Location	Document name	Author(s)	Document type	Year	# words
London	King's Cross: shaping the future	Local government	Urban development plan	2011	27 771
London	Paddington Station and Environs, London W2: Planning Brief	Local government	Station area planning brief	2009	31 145
London	Paddington Places Engagement Summary	Local government Architecture firms	Urban engagement summary	2022	8 583
London	Cally Plan	Local government	Urban Supplementary Planning Document	2014	11 491
London	Regenerating King's Cross Neighbourhood Framework Document	Local government	Station area Supplementary Planning Document	2005	14 506
London	London's Railway Land – Strategic Visions for the King's Cross Opportunity Area	Local government	Station area strategic vision	2007	4 922
London	Plot T6, King's Cross Central	Local government	Station area planning application	2010	5 737
London	Principles for a Human City	Development firm	Station area development plan	2001	8 335
London	Development proposals Paddington	Development firm	Station area development plan	2023	1 817
London	Paddington Public Realm Strategy	Local government Architecture firms	Station area development plan	2023	35 575
London	Old Oak Common Station design vision	Infrastructure development firms Engineering consultancy firms	Station area development plan	2021	1 909
Manchester	Manchester Piccadilly Station Options Assessment	National infrastructure commission	Station area scenario assesment	2016	16 594
Manchester	Report for Resolution Manchester Piccadilly Strategic Regeneration Framework	Local government	Station area report for resolution	2018	7 084
Manchester	Network Rail Manchester Piccadilly and Oxford Road Capacity Scheme	Local government	Station railway report for resolution	2015	4 002
Manchester	Greater Manchester Rail Update	Local transport companies	Railway network development plan	2024	52 504
Manchester	HS2 Manchester Piccadilly Strategic Regeneration Framework	Architecture firm	Station area development plan	2013	12 962
Manchester	Piccadilly high speed stations – technical note	Local government Local transport company	Station railway proposal	2023	4 449
Manchester	Consultation on the Network Rail Manchester Piccadilly and Oxford Road Capacity Scheme	Local government	Station railway report for resolution	2013	3 699
Manchester	HS2 Environmental Statement Community Area reports Manchester Piccadilly Station	National department for transport Consultancy firm	Station area environmental impact report	2022	126 774

Continued on next page

Location	Document name	Author(s)	Document type	Year	# words
Manchester-Liverpool	A new Liverpool-Manchester Railway	Local governments Regional governments	Regional transport strategy	2024	11 680
Oxford / Oxfordshire	Oxford Transport Strategy	Local government Regional government	Regional transport strategy		19 059
Oxford / Oxfordshire	Oxfordshire Rail Corridor Study	Rail infrastructure manager Local governments	Regional railway strategy	2021	3 193
Oxford	Oxford Station Enhancements Project Business Update	Rail infrastructure manager Valuation office agency	Station area project update	2025	2 760
Reading	Reading Station Park Design Code	Architecture firm	Station area development plan	2020	3 639
Reading	Reading Station Park Redevelopment Outline Planning Application Booklet	Engineering firm	Station area planning application	2020	8 586
Reading	Reading City Centre Framework	Local government Consultancy firm	Urban development plan	2008	11 421
Reading	Reading Borough Local Plan	Local government	City wide development strategy	2019	111 369
Reading	Local Transport Plan: Strategy 2011-2026	Local government	City transport strategy	2011	35 190
Reading	Reading Borough Local Plan Partial Update	Local government	City wide development strategy	2023	47 640
Reading	Reading West Railway Station Upgrade Full Business Case	Consultancy firm	Station area development business case	2019	40 136
Reading	Reading Station Area Framework	Local government	Station area development plan	2010	20 700



Dictionaries for the text-analysis

This appendix contains all entries for the dictionaries used for each perspective. The German and Swiss dictionaries are identical, with the exception of the perspective *Connecting passengers*. Words marked with an asterisk (*) are only counted in the text-analysis when they appear as an exact match. All other words are included whenever the string is part of a longer word. For this reason, some words are intentionally truncated (e.g., *collaborati*) to capture multiple related forms. This also explains why, in some cases, lists of acceptable terms are provided in one language but not in another. An example is the Dutch word *spoor*, which can appear in many unrelated words and therefore requires a curated list of proper occurrences.

Table C.1: Dictionary entries for the perspective: Property value

English	Dutch	German
mixed-use development	gemengde ontwikkeling	gemischte Nutzung
mixed use development		Mischnutzung
mixed-use	functiemenging	Funktionsmischung
mixed use		
commercial development		
density development		
residential development		
property development		
high density		hohe Dichte
high-density		dichte Bebauung
higher density		
business case	businesscase	Geschäftsmodell
	business case	
investor	investeerder	Investor
commercial investment	private investering	Private Geldgeber
investment case		
business investment		
attracting investment	vestigingsklimaat	
investment opportunities	vestigingsmilieu	Investitionsmöglichkeiten
development opportunities		Entwicklungsmöglichkeiten
investment market	marktpartij	Kapitalmarkt
private sector	private sector	Privatwirtschaft
	private partner	Privaten Bauherr
	particuliere sector	Kooperationspartner
	private partij	private Wirtschaft
developer	ontwikkelaar	Projektentwickler
real estate	vastgoed	Immobilien
		Grundeigentum
	grondexploitaite	Grundstücksausnutzung
	grondwaarde	Grundstückswert
	grondprijs	Grundstückspreis

Table C.2: Dictionary entries for the perspective: Connecting passengers

English	Dutch	German	Swiss
pedestrian	voetganger	Fußgänger	Fussgänger
walk	wandel	fußläufig	Fussläufig
	lopen*		
	loopbaarheid	Fußverkehr	Fussverkehr
on foot	te voet	Fuß*	Fuss*
	looproute	Fußweg	Fussweg
	looprichting	Gehweg	Gehweg
	loopafstand		
	loopruimte		
bike*	fiets	Fahrrad	Fahrrad
bikes*		Fahrräder	Fahrräder
bicycle		Rad*	Rad*
cyclist		Radfahr	Radfahr
cycle*		Radweg	Radweg
cycling			Velo
bus*	bus*	Bus*	Bus*
buses	bussen	Busse	Busse
bus-based	busverkeer	Busverkehr	Busverkehr
	busstation	Busbahnhof	Busbahnhof
	busdienst	Buslinie	Buslinie
	busbaan	Omnibus	Omnibus
	busplein	Linienbus	Linienbus
	busreiziger		
tram*	tram	Straßenbahn	Straßenbahn
trams*		Tram	Tram
light rail	lightrail	Stadtbahn	Stadtbahn
metro*	metro*	U-Bahn	U-Bahn
	metronet		
	metrostation		
public transport	openbaarvervoer	öffentliche Verkehr	öffentliche Verkehr
mass transit	openbaar vervoer	öffentlicher Verkehr	öffentlicher Verkehr
		öffentlichen Verkehr	öffentlichen Verkehr
		öffentliches Verkehr	öffentliches Verkehr
	OV*	ÖPNV	ÖV
	OV-*	Nahverkehr	Nahverkehr
transfer	overstap	Umstieg	Umstieg
connections	verbinding*	Anschlüsse	Anschlüsse
	verbindingen*		
connectivity	connectiviteit	Erreichbarkeit	Erreichbarkeit

Table C.3: Dictionary entries for the perspective: Urban context

English	Dutch	German
character	karakter	Charakter
historic	historisch	historisch
heritage	erfgoed	geschichtlich
vibrant	levendig	lebendig
	bruisend	lebhaft
quiet	rustig	ruhige
culture	cultuur	Kultur*
	culture	kulturelle
activity	bedrijvigheid	Aktivitäten*
community	gemeenschap	Kommune
communities		
distinctive	kenmerkend	markant
		eigenart
		lokaler bedeutung
local area		
local people	lokale bevolking	
environment*	omgeving*	Umgebung*
environments		
feel*	sfeer	Atmosphäre
		Flair

Table C.4: Dictionary entries for the perspective: Railway transport

English	Dutch	German
rail*	spoor*	Schiene
railway	spoorweg	Gleis
	spoorlijn	Bahnstrecke
	spoortunnel	Bahntunnel
	spoorviaduct	Bahnviadukt
	keerspoor	Eisenbahn
	keerspooren	Fernbahn
	perronspoor	Bahnanlage
	perronsporen	
	bufferspoor	
	bufferspooren	
	wachtspoor	
	wachtsporen	
track	tracé	Streckenführung
	emplacement	Betriebsanlage
train*	trein	Zug*
trains*	treinstation	Züge*
		Zugver
station capacity	stationcapaciteit	Bahnhofskapazität
timetable	dienstregeling	Fahrplan
quality of service	service kwaliteit	
high speed network	hogesnelheid	Hochgeschwindigkeit

Table C.5: Dictionary entries for the perspective: Passenger flow

English	Dutch	German
flow of people	mensenstromen	Personenströme
flows of people	stroom van mensen	Fahrgastströme
	stromen mensen	Einströme von personen
passenger flow	reizigersstromen	Passantenströme
flow of passengers	stroom van reizigers	
	stromen reizigers	
pedestrian flow	voetgangersstromen	
flow of pedestrians	stroom van voetgangers	
	stromen voetgangers	

Table C.6: Dictionary entries for the perspective: Retail logistics

English	Dutch	German
retail	retail	Einzelhandel
shop*	winkel	Ladengeschäft
shops*	detailhandel	Läden
shopping*		Shoppingcenter
bars*	bar*	
café	café	Café
restaurant	restaurant	
hotel	hotel	Hotel
hospitality	horeca	Gastronomie

Table C.7: Dictionary entries for the perspective: Architecture and Design

English	Dutch	German
sense of place	gevoel van plaats	
public space	publieke ruimte	Gemeinbedarfsfläche
public realm	leefomgeving	öffentlicher Raum
open space	openbare ruimte	Lebensräume öffentlicher Platz Freiraum Freiräumen Freifläche
green space	groen*	Grünfläche Grünraum Grünanlage
meeting place	ontmoetingsplek	Treffpunkt
parks	stadspark	Volkspark Parkanlagen
	park*	Park*
environment*	omgeving*	Umgebung*
environments*	verblijfs	Aufenthaltsräume
architectur	architect	Architekt
urban design	stedenbouwkund	Städtebau* städtebaulicher Struktur städtebaulichen Struktur städtebauliche Struktur städtebauliches Konzept städtebaulichen Konzept städtebauliche Entwurf städtebauliche Neuordnung
landscape	landschap	landschaftgerecht landschaftlich landschaftplan Stadtlandschaft
design quality	vorm te geven	Gestaltungsqualität
quality design	vormgegeven	Aufenthaltsqualität
quality space	ruimtelijke kwaliteit	Raumqualität
quality place	plaatsgebonden	Ortsbild
appearance	uitstraling	Erscheinungsbild
station design		Bahnhofsgestaltung
layout	inrichting	Raumgestaltung
placeshaping	plaatsvorming	Platzgestaltung Oberflächengestaltung

Table C.8: Dictionary entries for the perspective: Political approval

English	Dutch	German
job	banen*	Job
employment	werkgelegenheid	Beschäftigung
labour	arbeid	Arbeitsplatz Arbeitsstätte Arbeitsplätze
homes	huizen	Häuser*
housing	huisvesting	Wohnraum
accommodation	woning	Wohnung
apartment	appartement	Wohnhäuser
household	huishouden	Haushalt* Haushalte*
residents	bewoner	Bewohner
	inwoner	Anwohner
family	gezin	Familien
liveable	leefbaar	lebbbar
well-being	welzijn	
quality of life	levenskwaliteit	Lebensqualität
quality of living		lebenswert
prosperity	welvaart	Wohlstand
income	inkomen	Einkommen
poverty	armoede	Armut
equality		Gleichheit
school	school	Schule
	scholen	
education	onderwijs	Bildungs
	educatie	Berufsbildung
health	gezondheid	Gesundheit
facilities	voorzieningen*	Einrichtungen*
amenities	faciliteit	
	publieke functie	

Table C.9: Dictionary entries for the perspective: Process management

English	Dutch	German
collaborati	samenwerken samenwerking	Zusammenarbeit Kooperation Kooperativ
partner	partners	Partner
phase	fase	Phase
period	periode	Zeitraum
duration		Dauer*
	stadium	Stufe*
approach	aanpak werkwijze	Ansatz Vorgehensweise
vision*	visie	Leitbild
monitor	controle	Kontrolle
planning	planning	Planung* Folgeplanung Gesamtplanung Bauleitplanung
implementation	implementatie	Umsetzung
process	proces	Prozess
progress*	voortgang	Fortschritt
progresses*	voortgang	
commence	vordering uitvoering	Durchführung Ausführung
	procedure	Verfahren
completion	oplevering	Fertigstellung
scheduled to	afronding	Abschluss*
agenda	agenda stappenplan sturing regie	Steuerung
construction work	werkzaamheden	Bauarbeiten
construction manage		Bauleitung
during construction	tijdens de bouw	Bauzeit
construction method	bouwmethode	Bauätigkeit
construction plan	bouwplan	Bauplan

Table C.10: Dictionary entries for the perspective: Project accomplishments

English	Dutch	German
economic growth	economische groei	Wirtschaftswachstum
economic development	economische ontwikkel	wachsende Wirtschaft
economic benefit	economisch belang	ökonomische Entwicklung
economic impact	economische potentie	wirtschaftliche entwicklung
economic prosperity	economische kracht	wirtschaftliche Auswirkung
economic output	economische motor	
economic competitive	economische draagkracht	
economic succes	economische vooruit	wirtschaftlich erfolgreich
economic value	sterke economi	wirtschaftliche Stärke
economic activity	nieuwe economi	wirtschaftlich stark
economic opportunit	bloeiende economi	starken wirtschaft
economic performance	toegenomen economi	
productivity	productiviteit	Produktivität*
growth potential	groeipotentieel	Entwicklungspotenzial
business growth		

Table C.11: Dictionary entries for the perspective: Sustainability

English	Dutch	German
sustainab	duurzaam	nachhaltig
	duurzame	zukunftsfähig
carbon	Co2	CO2
climate change	klimaatverandering	Klimawandel
	klimaatdoel	Klimaschutz
	klimaadaptatie	Klimaanpassung
clean energy	schone energie	
pollution	uitstoot	Ausstoß
emission		Emission
renewable	hernieuwba	erneuerbar
		regenerativ

D

Additional result data

D.1. Test-sets

Table D.1: Relative amount of coded words in the test document set

Country	Document set	Number of words	Total coded words	Coded words per mille
The Netherlands	Complete	543 278	19 681	36.226
The Netherlands	MAXQDA-test	45 612	1 821	39.924
The United Kingdom	Complete	1 107 903	42 623	38.472
The United Kingdom	MAXQDA-test	87 255	4 318	49.487
The United Kingdom	Atlas.ti-test	54 319	2 019	37.169

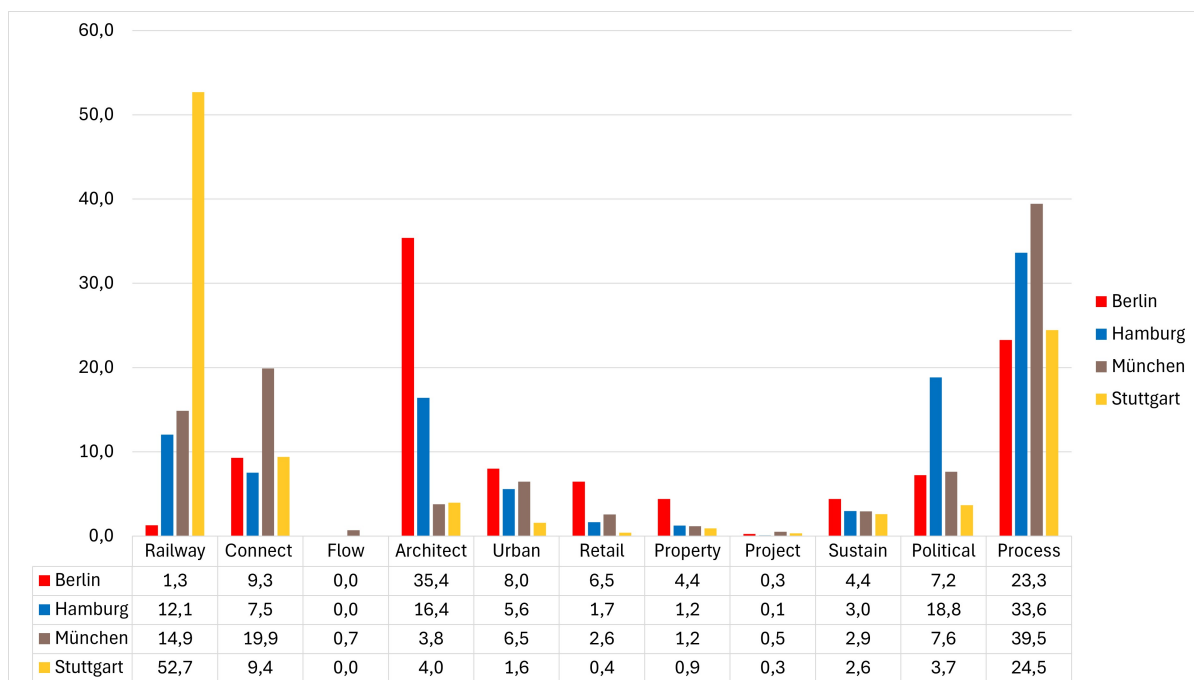


Figure D.1: Relative occurrence of perspectives in different German projects

D.2. Perspective pie charts

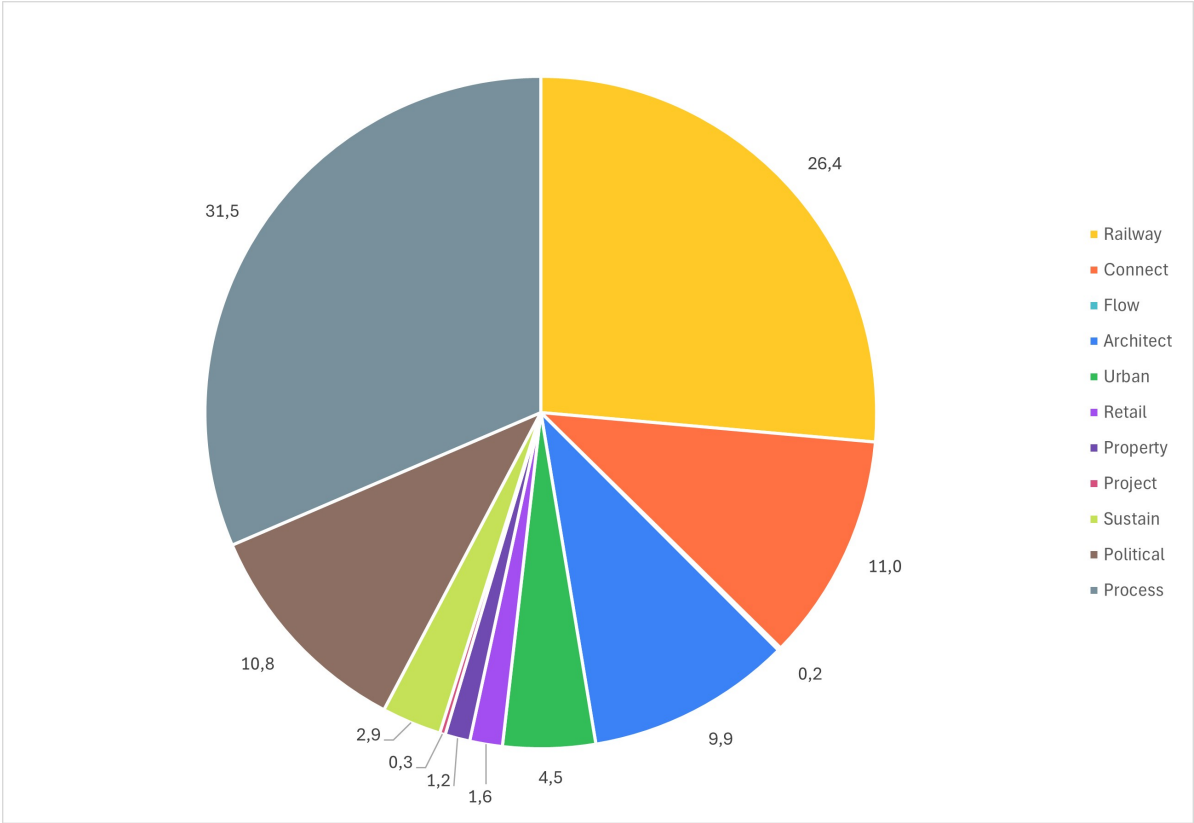


Figure D.2: Relative occurrence of perspectives in complete German document set

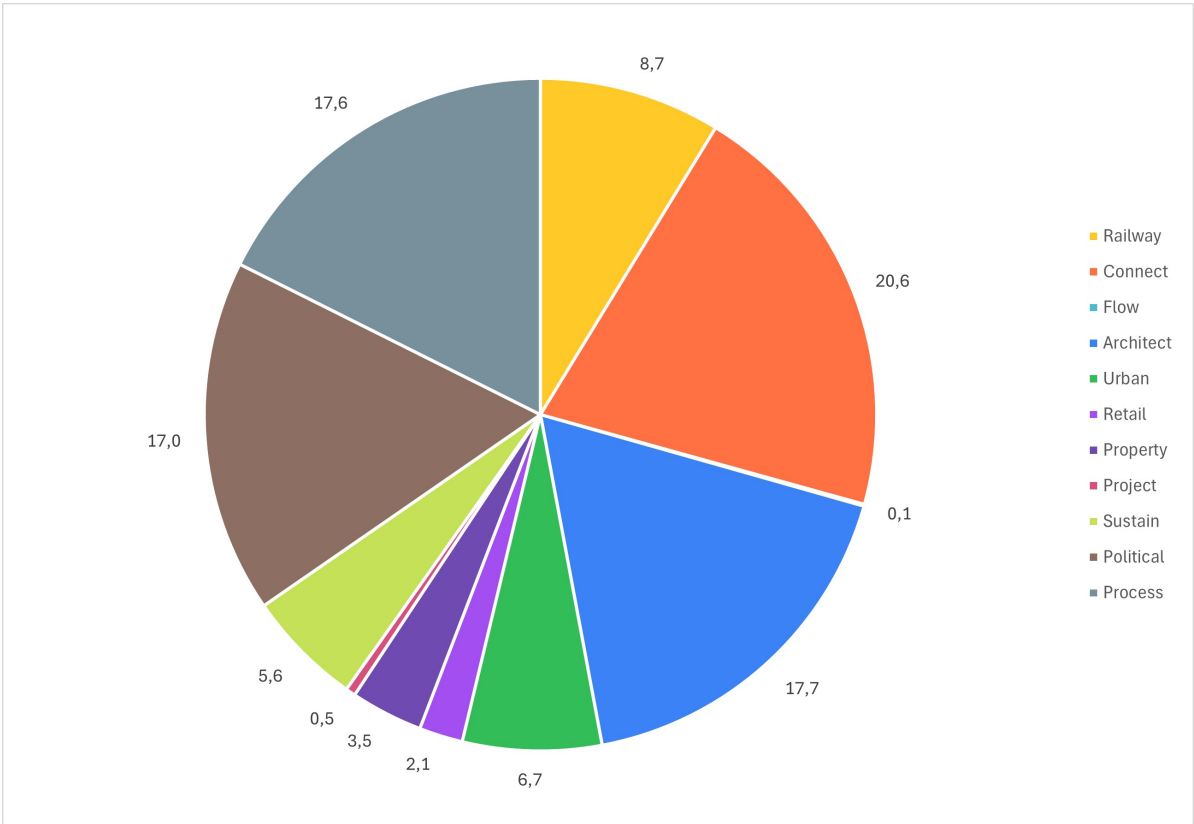


Figure D.3: Relative occurrence of perspectives in complete Dutch document set

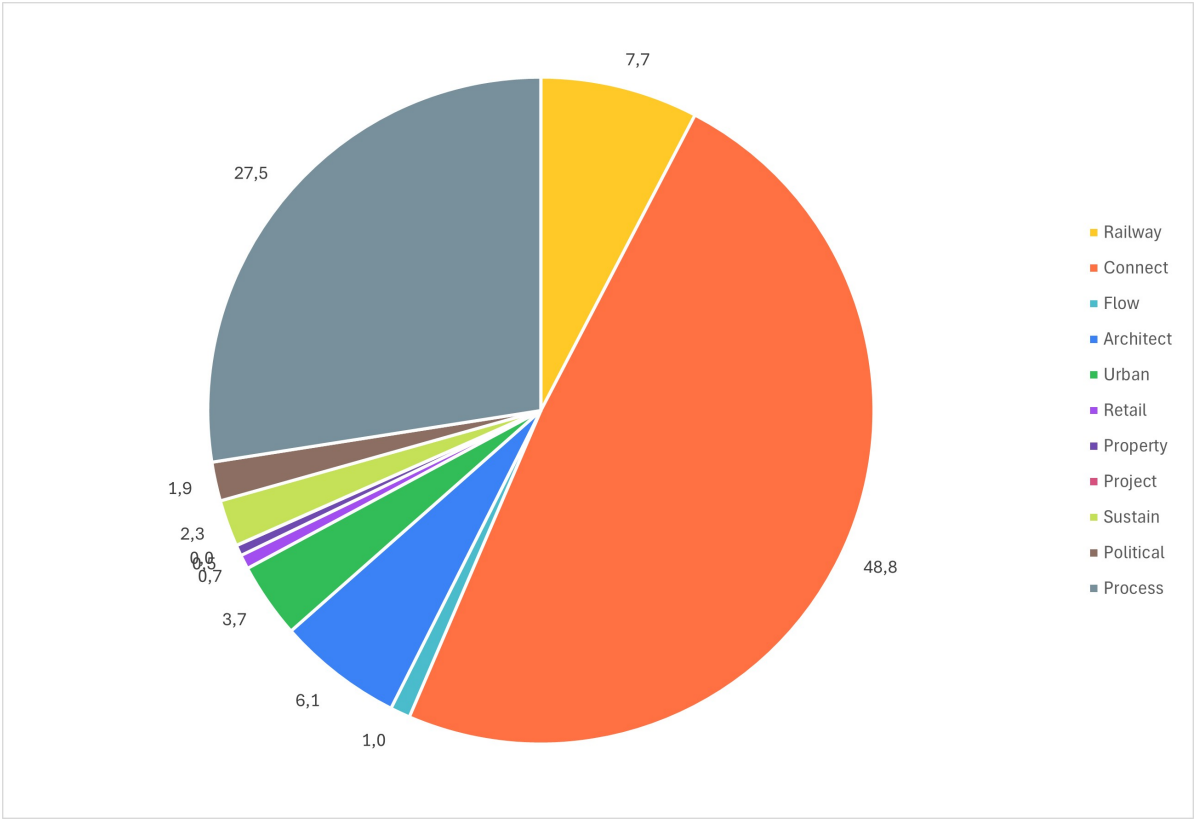


Figure D.4: Relative occurrence of perspectives in complete Swiss document set

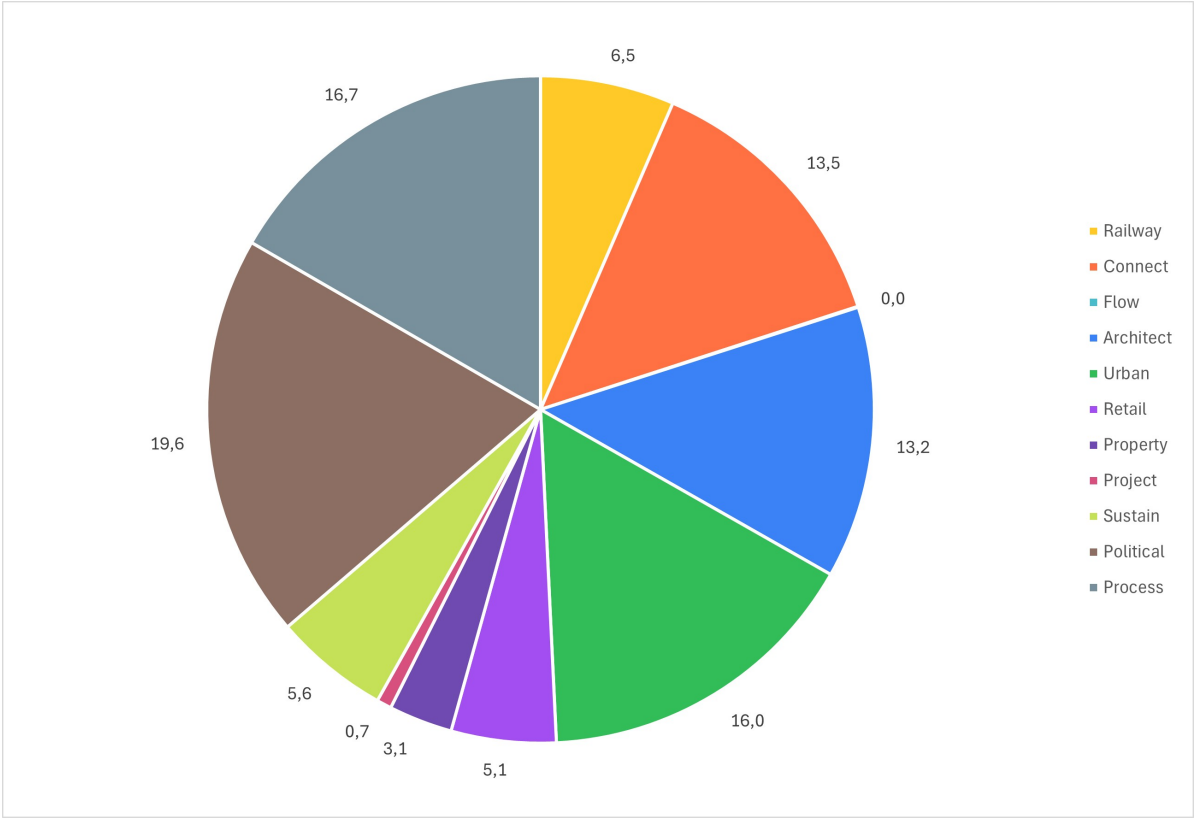


Figure D.5: Relative occurrence of perspectives in complete British document set

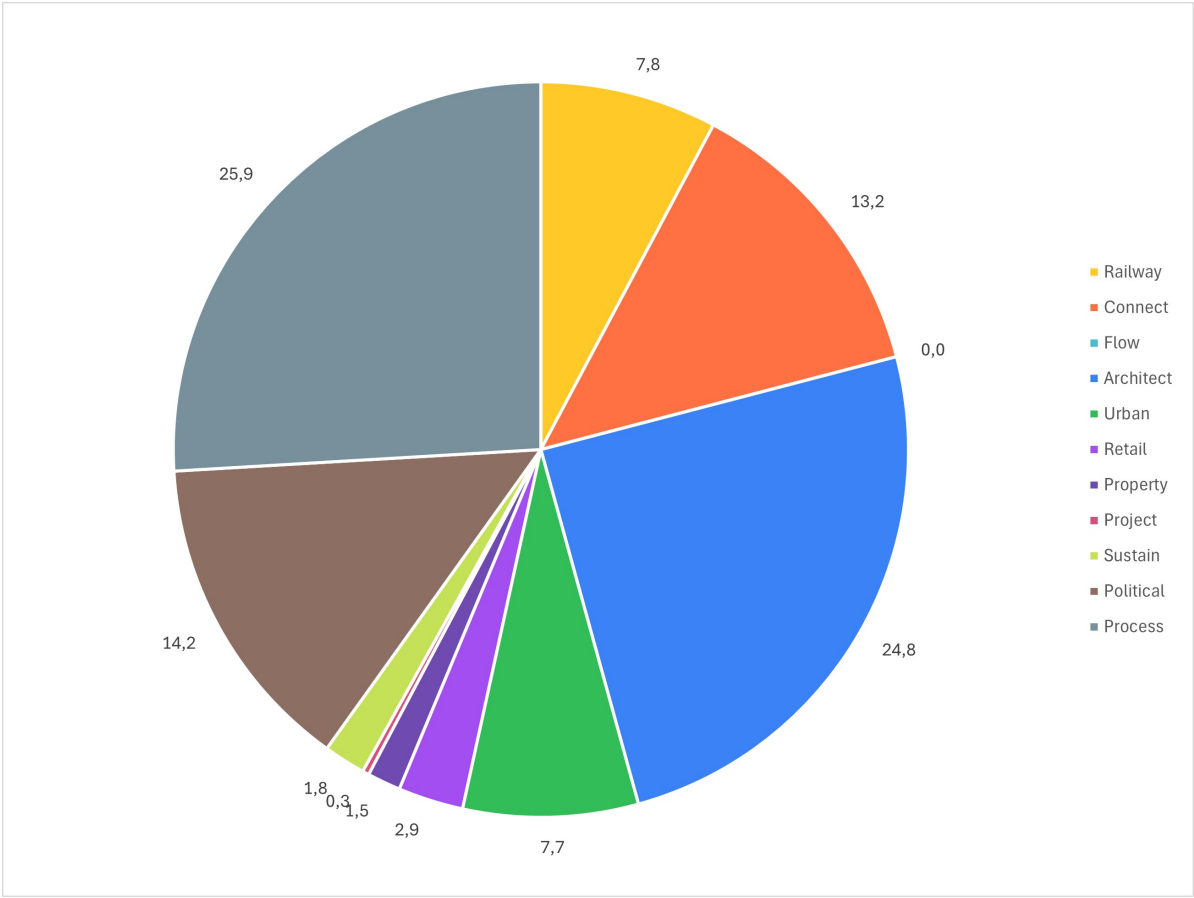


Figure D.6: Relative occurrence of perspectives in German masterplan set

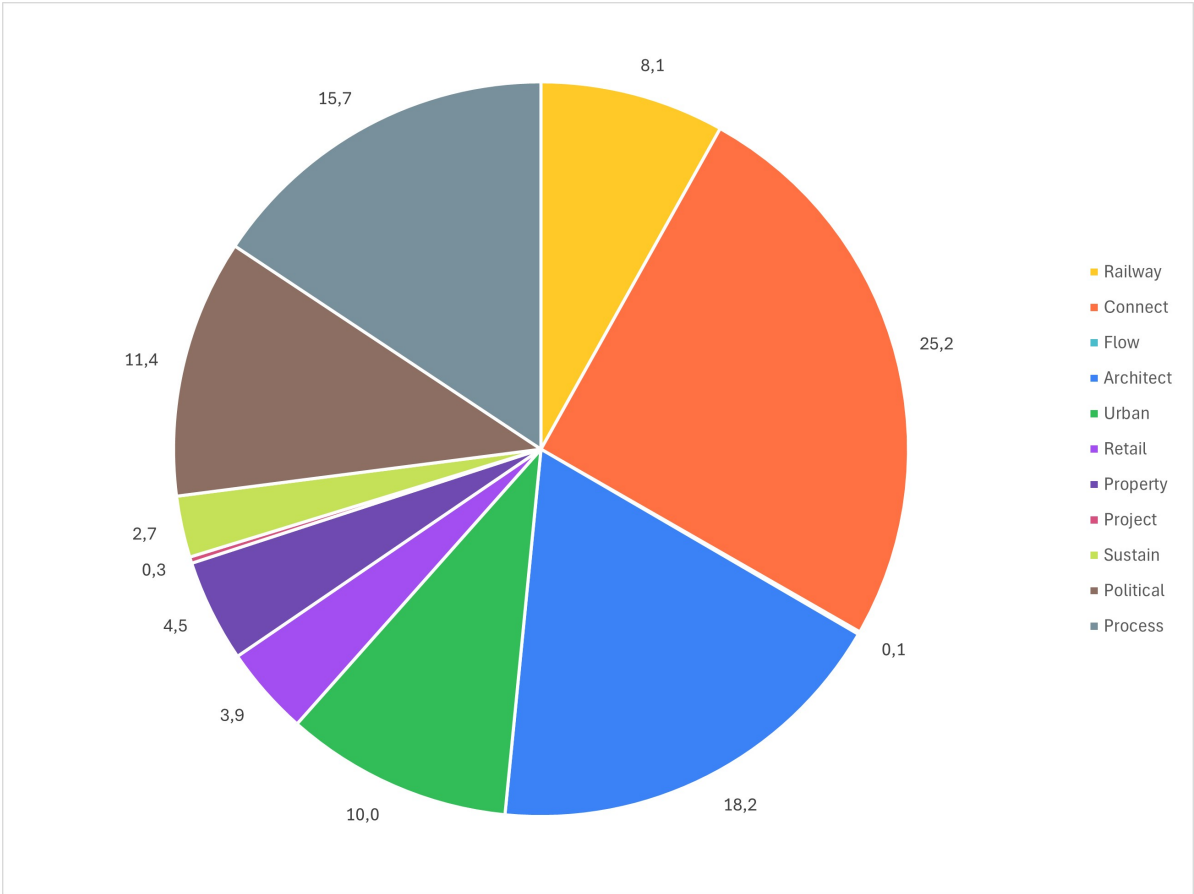


Figure D.7: Relative occurrence of perspectives in Dutch masterplan set

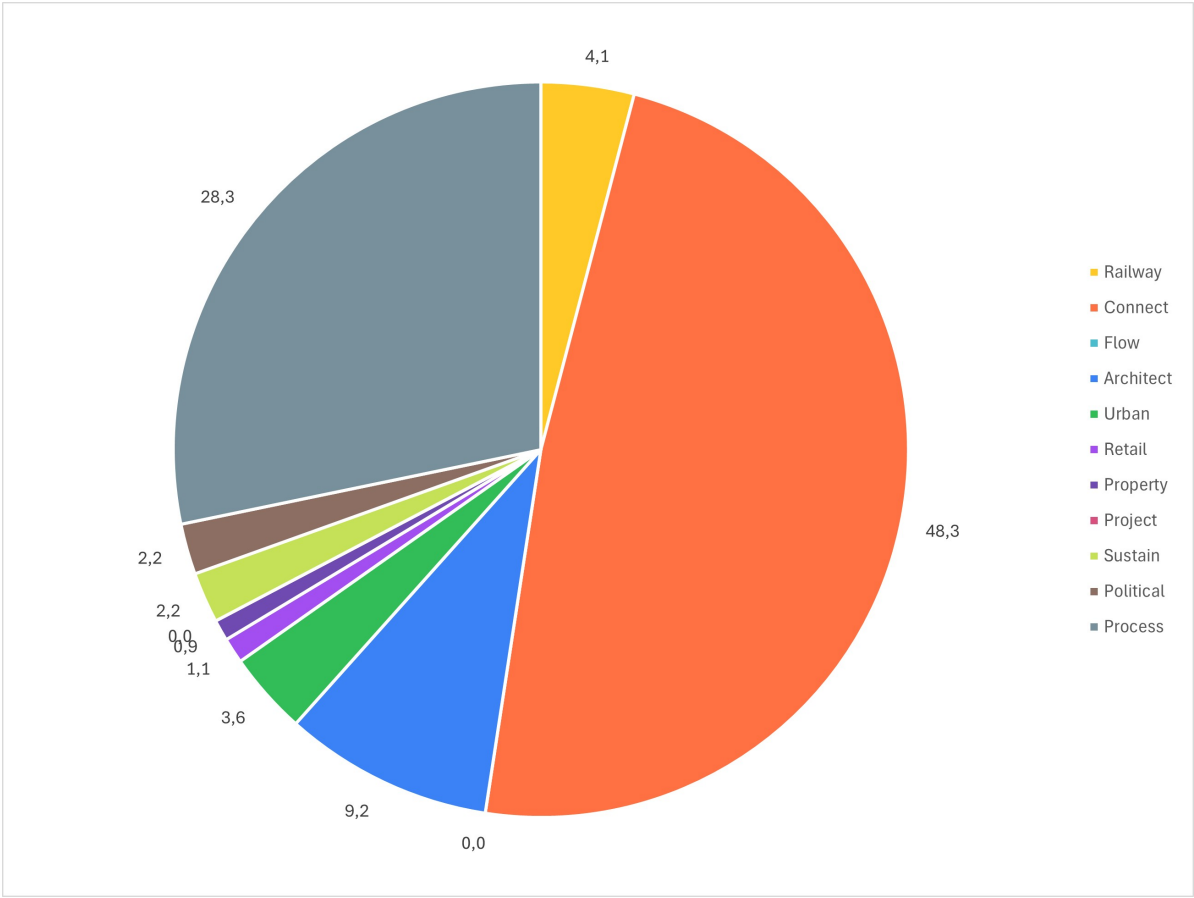


Figure D.8: Relative occurrence of perspectives in Swiss masterplan set

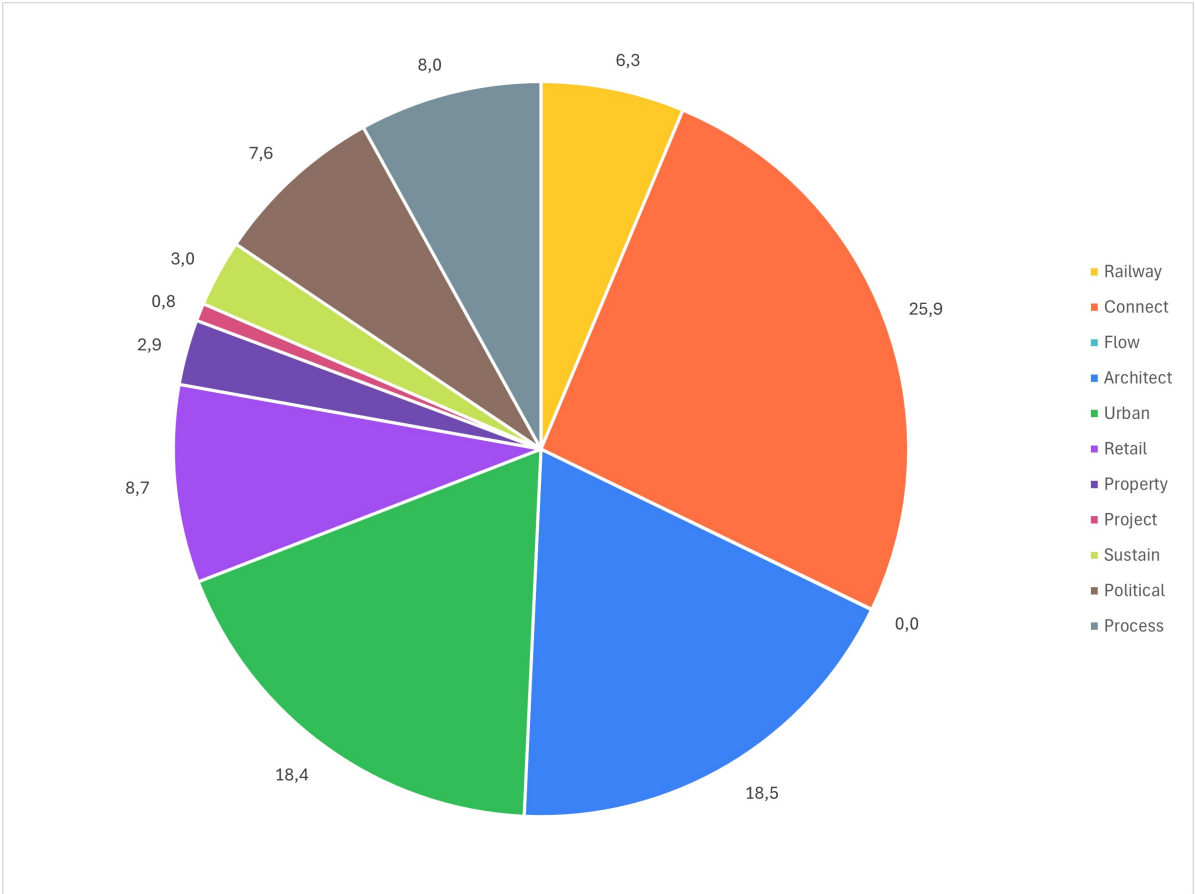


Figure D.9: Relative occurrence of perspectives in British masterplan set

What values are prioritised in the development of a railway station and its urban surroundings?

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Abstract

Railway stations are no longer mere transport nodes; they function as complex urban places where mobility, design, land use, commercial activity, and political legitimacy converge. Building on a perspectives framework synthesised from the literature, this paper quantifies cross-country differences in the *value priorities* embedded in official planning and project documents for station areas in Germany, the Netherlands, Switzerland, and the United Kingdom. We construct multilingual, perspective-specific dictionaries (EN/NL/DE) and apply dictionary-based coding to large corpora of available documents. Robustness checks include outlier cleaning and a comparability subset of station *masterplans*. Results indicate distinctive national profiles: for example, stronger emphases on process/legitimacy and rail-technical concerns in Germany; design, connectivity, and growth in the Netherlands; accessibility/connection priorities in Switzerland; and a focus on financial values in the UK. We discuss institutional interpretations and limitations of dictionary methods, and we outline implications for planning practice and future analytic refinements.

Keywords: railway stations, urban development, value priorities, dictionary based text-analysis

1. Introduction

In the nineteenth century, rail reshaped European cities: early stations were often sited at the urban edge to mitigate disruption, then evolved into architecturally ambitious landmarks and anchors of urban growth (UIC, 2013; Bogart et al., 2022). Today, stations are increasingly conceived as civic assets that transform mobility and the public realm, with stakeholders emphasising accessibility, design quality, and urban value creation (Lunardon et al., 2023; Baron et al., 2025).

Two longstanding frameworks motivate our study. First, the node–place approach positions stations simultaneously as network nodes and urban places (Bertolini, 1996). Second, transit-oriented development (TOD) research underscores compact, walkable, mixed-use station areas that link land use with transit performance (Vale, 2015; Lee et al., 2015; Niu et al., 2019). Yet we still know little about how *value priorities*—the relative emphasis on transport, design, urban integration, commerce, political legitimacy, process, sustainability, etc.—vary across countries as expressed in official documents.

We offer a comparative, document-based measurement of value priorities across four Western European countries using a transparent, multilingual dictionary pipeline aligned to a perspectives framework grounded in prior literature.

2. Literature

Railway stations are widely treated as both network nodes and urban places, a duality formalised in the node–place tradition and frequently operationalised in TOD studies; across this literature, compact, mixed-use, and walkable station areas are associated with stronger functional performance and

urban quality (Bertolini, 2008; Appleyard et al., 2019; Caset et al., 2018). Within this broad field, six strands recur. First, work on property and land value—usually hedonic—shows that rail proximity capitalises into residential and commercial values, though effects are context-dependent and can be offset by disamenities such as noise or crime; classic and recent studies document significant price gradients around stations and leverage these findings to motivate joint development and zoning decisions (Bowes and Ihlanfeldt, 2001; Debrezion et al., 2007; Hess and Almeida, 2007; Duncan, 2011). Second, trip generation research links ridership to built-environment attributes and station-level accessibility: densities and land-use mix in the catchment matter; so do first/last-mile conditions—especially walking up to roughly 1.2 km, bicycle–rail integration, feeder bus services, and, in some contexts, park-and-ride—underscoring how design and access policies shape demand (Rietveld, 2000; Loo et al., 2010; Sung et al., 2014). Third, land-use integration work—sitting at the intersection of node–place and TOD—develops station typologies and evaluation frameworks, often adding explicit walkability and street-network structure (e.g., betweenness/closeness) to capture how well stations are embedded in their urban fabric; these studies argue for context-sensitive planning tools (including TJD and inclusionary policies) to align public and private goals (Higgins and Kanaroglou, 2016; Niu et al., 2019; Lyu et al., 2016). A fourth body of work focuses on railway operations in and around stations—platforming and scheduling at complex nodes, routing and shunting, headway and conflict constraints, and resilience to knock-on delays and blockages—where optimisation and predictive-control approaches aim to reconcile capacity with robust, passenger-friendly timetables (Carey and

Carville, 2003; Zwaneveld et al., 2001; Caimi et al., 2012). Fifth, studies on passenger flow address crowding, queuing, boarding/alighting dynamics and evacuation behaviour, showing how layouts, stairs and gates, wayfinding, and operational controls (including demand-responsive flow restrictions) affect throughput and safety (Jiang et al., 2009; Asano et al., 2010; Tang et al., 2017). Finally, a growing line of research foregrounds passenger experience, connecting information clarity, perceived safety, environmental quality (thermal/air/ventilation), and the management of everyday encumbrances to satisfaction and the attractiveness of rail services; recent empirical work links targeted design and operational measures to measurable improvements in user evaluations (Bissell, 2009; Eboli et al., 2018; Nam et al., 2020). Taken together, these strands chart a coherent agenda: value creation around stations is mediated by accessibility and urban integration; operational constraints at complex nodes feed back into passenger flow and experience; and planning instruments that balance node efficiency with place quality are central to delivering high-performing, equitable station districts

3. Methodology

Text-as-data spans simple bag-of-words counts to more advanced machine-learning approaches. Common families include (i) concept identification (typically dictionary-based or Named Entity Recognition), (ii) classification (supervised models using manually coded training data), and (iii) discovery (unsupervised topic models or scaling methods) (Gilardi and Wuest, 2020). Method choice hinges on task fit and on practicalities of corpus building and text preparation (standardisation, translation, stop-word handling). Given the goal here—detecting predefined perspectives across multilingual planning documents—a dictionary-based concept-identification pipeline was selected for transparency, portability, and feasibility, while acknowledging the existence of more complex alternatives such as NER and supervised classifiers (Gilardi and Wuest, 2020).

To complement the literature and counter citation-driven blind spots, semi-structured expert interviews were conducted. Their purpose was to validate the literature-derived topics and surface additional perspectives grounded in current practice. The interviews followed a prepared protocol (topics, ordering, prompts) and were used explicitly to define and refine the set of perspectives that later underpinned the dictionaries for the text-analysis.

Documents were gathered iteratively from stakeholders and public sources, building a multilingual corpus of policy, plan, and project materials. To ensure traceability and enable subgroup analyses, all items were entered into a database capturing location, title, author, document type (subject and format), year, and word count. Clear exclusion criteria removed materials with narrow or misaligned scopes (e.g., strictly environmental reports, route-placement studies, city-wide policies unrelated to station areas), which would otherwise distort counts by over-triggering specific terms.

Dictionary development combined manual coding and context validation in two tools. First, a small English test set (UK) was coded in ATLAS.ti, deliberately at the passage level, to collect rich evidence per perspective and harvest candidate terms. Then, in MAXQDA, a keyword-in-context review verified whether candidates consistently appeared with the intended meaning; only terms with stable context were retained. To balance languages, Dutch documents were analysed to add genuinely Dutch terms and to realign the English list accordingly. The German dictionaries were initially translated from EN/NL and then pruned/expanded in MAXQDA using the same context checks. Because German and Dutch compounding differ from English, more entries were sometimes required to cover the same concept; comparability was pursued at the level of meaning, not raw word counts.

The automated pass applied the perspective-specific dictionaries to the corpus and computed, for each country, the share of coded words per perspective. Quality control included an outlier screen: code-frequency overviews were inspected for documents whose counts were disproportionately driven by artefacts (e.g., repeated occurrences in titles/captions or names). Such spurious segments were manually removed prior to aggregation. Final results were compiled and visualised for analysis.

The comparison spans Germany, the Netherlands, Switzerland, and the United Kingdom. Selection reflected (i) data availability and access through ongoing networks, and (ii) analytical relevance: the four countries share comparable macro conditions and rich rail histories yet differ in sector organisation and user attitudes—yielding a useful contrast set for examining how values are prioritised in station-area documents.

4. Perspectives

Here, we introduce the perspectives framework that structures the analysis of station-area development across countries. The framework consolidates topics surfaced by the literature and then validates and extends them with expert interviews to mitigate literature bias and to align concepts with practice. Each perspective is mapped to one or two primary stakeholders and an associated core value—a design that makes the dimensions analytically distinguishable and operational for text-analysis Table 1. Notably, the interviews emphasised public-space quality, retail operational logistics, and multi-level legitimacy; in addition, Sustainability—initially treated as implicit—was included as a separate perspective due to its frequent appearance in the documents.

To recognise perspectives consistently in policy and planning texts, we built multilingual dictionaries (EN/NL/DE) and validated terms with keyword-in-context checks. The aim was meaning alignment across languages rather than literal symmetry, accounting for Dutch/German compounding and pruning or expanding entries where contextual use required it. This procedure improves precision for perspectives that rely on generic lexicon (e.g., “capacity,” “safety”) and helps separate adjacent concepts such as Architecture and design versus Urban context.

Table 1: Perspectives included in the text-analysis

Perspective	Main stakeholder(s)	Values
Property value	Real estate developers	Financial gain values
Connecting passengers	Municipality Local public transport	Sustainability values, Accessibility value
Urban context	Municipality	Public values
Railway transport	Infrastructure manager, Railway undertaking	Safety values, Punctuality values, Capacity values
Passenger flow	Station manager	Safety values
Retail logistics	Station manager	Financial gain values
Architecture and design	Architects & Designers	Aesthetic values, Safety values, Cultural values
Political approval	Municipality	Legitimacy values
Process management	Project manager	Legitimacy values
Project accomplishments	Public & private investors	Financial cost values Accountability values

The **Property value** perspective frames the station area as a locus for urban investment and value uplift, primarily reflecting the interests of real-estate developers (with municipalities and homeowners as secondary landholders). Its core value is financial return, often linked to densification and development opportunities. In documents, it was recognised indirectly through references to investors, developers, private-sector partners, business cases and mixed-use/commercial development; explicit invocations of “property value” were uncommon, making this perspective more about investment logic than valuation per se—hence its harder detectability in narrative planning texts (dictionary emphasis on private actors and investment terminology).

Connecting passengers captures the accessibility-first view that integrates the station into the wider urban mobility network. Municipalities and local public-transport operators are the principal stakeholders; values centre on accessibility and sustainable mobility. Recognition in texts came from multi-modal access terms—walking, cycling, bicycle-rail facilities, feeder bus/tram/metro, interchange/transfer—although some tokens (e.g., “next to the cycling path”) served merely as locational descriptors, requiring keyword-in-context validation to avoid false positives.

The **Urban context** perspective emphasises embedding the station within its specific spatial, social and cultural setting; municipalities are again central stakeholders, and the associated values are “public” in the sense of place quality and local fit. In documents, it was recognised via general indicators—e.g., references to character, distinctiveness and community—while being carefully distinguished from design-led architecture. This reliance on broad cues reduced over-specificity but risks under-capturing unique local attributes.

Railway transport reflects the operational concerns of infrastructure managers and railway undertakings—safety, capacity and punctuality as primary values. Recognition relied on generic rail terminology (trains, track, operations), deliberately excluding “station” where it referred to the development area rather than operations. Ambiguities around terms like “capacity” and “safety” (which may also pertain to passenger spaces) imposed a known limitation on clean separation from adjacent perspectives.

Passenger flow focuses on safe, efficient movement within and around the station, with station managers as focal stakeholders and safety as the leading value. In texts, it appeared through references to circulation, crowding, queuing, wayfinding and platform management. However, because many detailed flow and safety requirements live in technical specifications rather than narrative plans, this perspective surfaced sparsely in the corpus and required specific terms in the dictionaries to avoid bleed-over into general design content.

The **Retail logistics** perspective treats the station as a commercial environment whose back-of-house processes (waste, storage, loading) enable front-of-house amenities; station owners/managers are the primary stakeholders, and the values are financial/operational. It was recognised via retail/tenant terminology and operational logistics language. It’s relatively low salience in many policy texts likely reflects the tendency to foreground public-realm narratives while relegating logistics to management plans.

Architecture and design centres on the station’s form, public-realm quality and landmark role; architects and designers lead, with aesthetic (and, secondarily, safety/cultural) values. Recognition came from design and place-making lexicon tied to spatial quality. To avoid conflation with Urban context,

Table 2: Relative amount of coded words in the complete document set

Country	Documents	Words	Coded words	Coded words per mille
Germany	26	1 106 283	13 649	12.338
The Netherlands	29	543 278	19 681	36.226
Switzerland	14	300 146	6 981	23.259
The United Kingdom	51	1 107 903	42 623	38.472

cues were tied to shaping/creating environments rather than referencing inherited identity.

Political approval captures the search for legitimacy in democratic arenas, with municipalities as the main stakeholder; core values are credibility, accountability and formal approval. In texts, the perspective surfaced through references to approvals, decision-making bodies, public engagement and the fulfilment of political commitments. Interviews further stressed multi-level legitimacy (political, processual, fiscal), which informed dictionary choices.

Process management reflects the project-management lens on procedures, regulation, coordination, time and disturbance control; project managers are central, with legitimacy (procedural correctness) as the dominant value. Recognition relied on process terms (applications, permits, studies, phasing, and construction nuisance). In practice, relevant sections were often long regulatory passages where dictionary coverage necessarily remained general, lowering code density despite frequent mentions.

Project accomplishments foregrounds delivery and outcomes as an accountability frame for public and private investors; values centre on cost control and demonstrable results. References to milestones, deliverables, budgets and business cases enabled recognition, though high-level documents sometimes referenced these only summarily.

Finally, **Sustainability** aggregates environmental and climate-related commitments commonly treated as background consensus in rail contexts (hence less contested in stakeholder negotiation). Recognition in documents came from emissions, energy and climate lexicon; interviews suggested these themes are often assumed rather than debated, a pattern borne out by moderate coded presence relative to accessibility and design.

5. Results

The text-analysis provides a systematic overview of how different perspectives are represented in planning and policy documents concerning major railway station projects in the Netherlands, Germany, Switzerland, and the United Kingdom. The full set of coded material reveals both broad commonalities across the four countries and distinct national profiles in the relative weight of perspectives. Table 2 summarises the overall coding results, Table 3 shows the total distribution of perspectives across the corpus, while Figure 1 visualises the relative share per country. Together, these outputs form the empirical basis for interpreting differences in value priorities across contexts.

Across the entire dataset, three perspectives emerge as particularly prominent: the railway transport function, process management, and political approval. These perspectives are strongly represented in almost every document set, underscoring their universal relevance for station development. The rail function perspective reflects concerns with operational capacity, connectivity, and integration with the broader transport network. Process management captures the complex sequencing of planning and construction activities, while political approval represents the legitimacy and political support required to move projects forward.

While these three perspectives dominate in terms of coded frequency, other perspectives — such as urban development, sustainability, and passenger experience — are present to varying degrees across countries. Their more uneven distribution suggests that while some values are embedded in all station projects as “baseline requirements,” others depend more heavily on national institutional traditions or specific project contexts.

A more fine-grained comparison highlights significant national contrasts. Figure 1 shows that German documents are disproportionately oriented towards process-related issues. References to collaboration, project phases, and institutional procedures occur much more frequently in the German case than in the other countries. This aligns with the federal governance structure and the tradition of detailed procedural planning in Germany, where large-scale projects are subject to extensive consultation, negotiation, and staged approval processes.

The Netherlands, in contrast, shows a more balanced profile. While process and political approval perspectives remain visible, Dutch documents allocate considerably more attention to urban development and sustainability. This reflects the long-standing Dutch tradition of integrated spatial planning and the emphasis on creating multimodal hubs that are not only transport-efficient but also embedded within high-quality urban environments. Sustainability concerns also feature prominently, consistent with Dutch national policies on climate adaptation and sustainable mobility.

Switzerland exhibits similarities to the Netherlands in that urban and sustainability perspectives are strongly represented, but it differs in its relatively modest attention to commercial functions such as retail. Swiss station projects tend to emphasise integration with the surrounding built environment and high-quality public space, with strong attention to accessibility and passenger experience. The more limited presence of retail reflects a context where commercialisation of station environ-

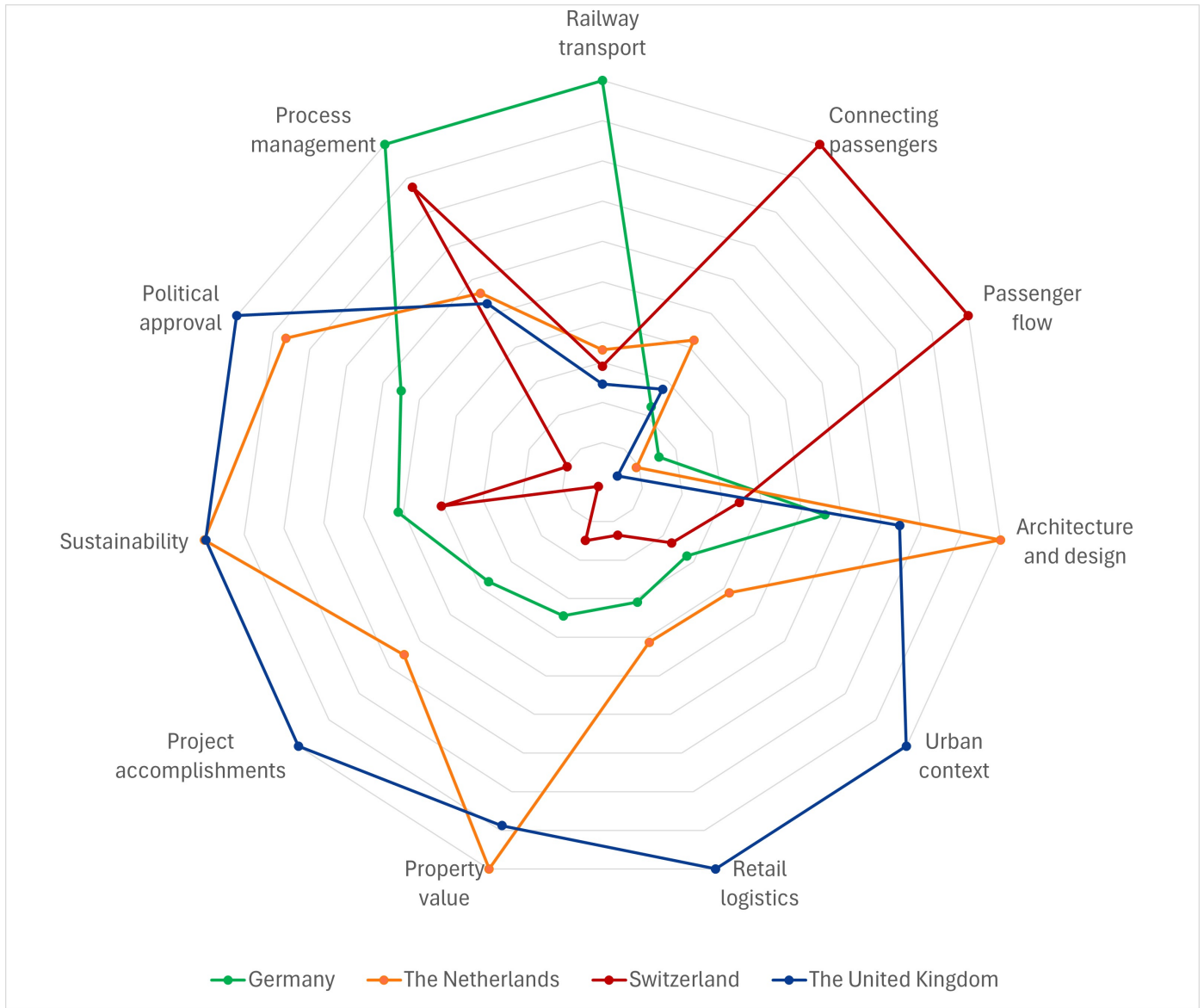


Figure 1: Normalised relative occurrence of perspectives in complete document set

Table 3: Coded words by country and perspective (% of coded words)

	Rail	Connect	Flow	Architect	Urban	Retail	Property	Project	Sustain	Politic	Process
Germany	26.4	11.0	0.2	9.9	4.5	1.6	1.2	0.3	2.9	10.8	31.5
The Netherlands	8.7	20.6	0.1	17.7	6.7	2.1	3.5	0.5	5.6	17.0	17.6
Switzerland	7.7	48.8	1.0	6.1	3.7	0.7	0.5	0.0	2.3	1.9	27.5
The UK	6.5	13.5	0.0	13.2	16.0	5.1	3.1	0.7	5.6	19.6	16.7

ments plays a smaller role in planning policy.

The United Kingdom presents yet another distinctive profile. Here, retail and commercial perspectives receive considerable emphasis, alongside transport efficiency. Station development documents frequently highlight the role of retail in funding station modernisation and in generating added value for passengers and investors alike. Compared to the continental European cases, the UK documents display less emphasis on sustainability and public value, and more attention to financial viability and market-oriented redevelopment strategies. This confirms observations in the literature about the more liberalised governance context of British railway infrastructure.

The cross-country differences in perspective dominance can be directly linked to the prioritisation of different value sets. For instance, in Germany, the prominence of process and political approval perspectives translates into a strong emphasis on legitimacy and procedural fairness as guiding values. In the Netherlands and Switzerland, by contrast, urban development and sustainability perspectives underline the importance of public value, accessibility, and environmental responsibility. In the UK, financial and commercial values are foregrounded, as station redevelopment is often justified in terms of its capacity to attract investment and generate revenue.

This analysis demonstrates that while all four countries treat stations as complex, multi-functional nodes, the relative priority of values diverges according to institutional traditions. Efficiency, safety, and accessibility are universal, but sustainability, commercial viability, and procedural legitimacy vary in their salience. These divergences suggest that value priorities in station development are not only functional requirements but also reflections of broader governance cultures.

6. Conclusion

We provide a transparent, extensible measurement of value priorities in station-area development across four countries using multilingual, perspective-based dictionaries. The analysis reveals distinctive national profiles that persist in a masterplan subset, indicating institutional fingerprints in how objectives are framed. The approach offers a scalable diagnostic for early-stage planning and comparative research; methodologically, it invites hybrid pipelines that combine curated dictionaries with newer semantic models.

7. Discussion

Differences in document style and emphasis likely reflect institutional arrangements and intended audiences: Germany's

procedural traceability versus the Netherlands' and UK's more visually communicative, public-facing materials; Switzerland's accessibility-forward planning rhetoric. These contrasts cohere with comparative rail-sector analyses and governance literatures (Van de Velde, 2015). A deeper institutional reading could position findings within Williamson's four-layer framework to probe whether divergences arise from culture, formal rules, governance structures, or day-to-day contracting (Williamson, 1998).

For practitioners, comparative value profiles clarify which objectives are likely to be salient in consensus-building and which may require explicit advocacy (e.g., balancing rail operations with urban place quality in process-heavy contexts; safeguarding accessibility in design-led settings). The portable dictionary approach enables quick scoping of document sets at the start of complex station projects.

Dictionary methods simplify language and cannot fully capture semantics or irony; translation and compounding (DE/NL) require extra care. We mitigated risks through keyword-in-context validation, removal of spurious outliers, and a masterplan comparability check, but residual bias remains. Future work should test weighting schemes, distributional semantics or contextual embeddings, and expand corpora to additional countries and document types

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