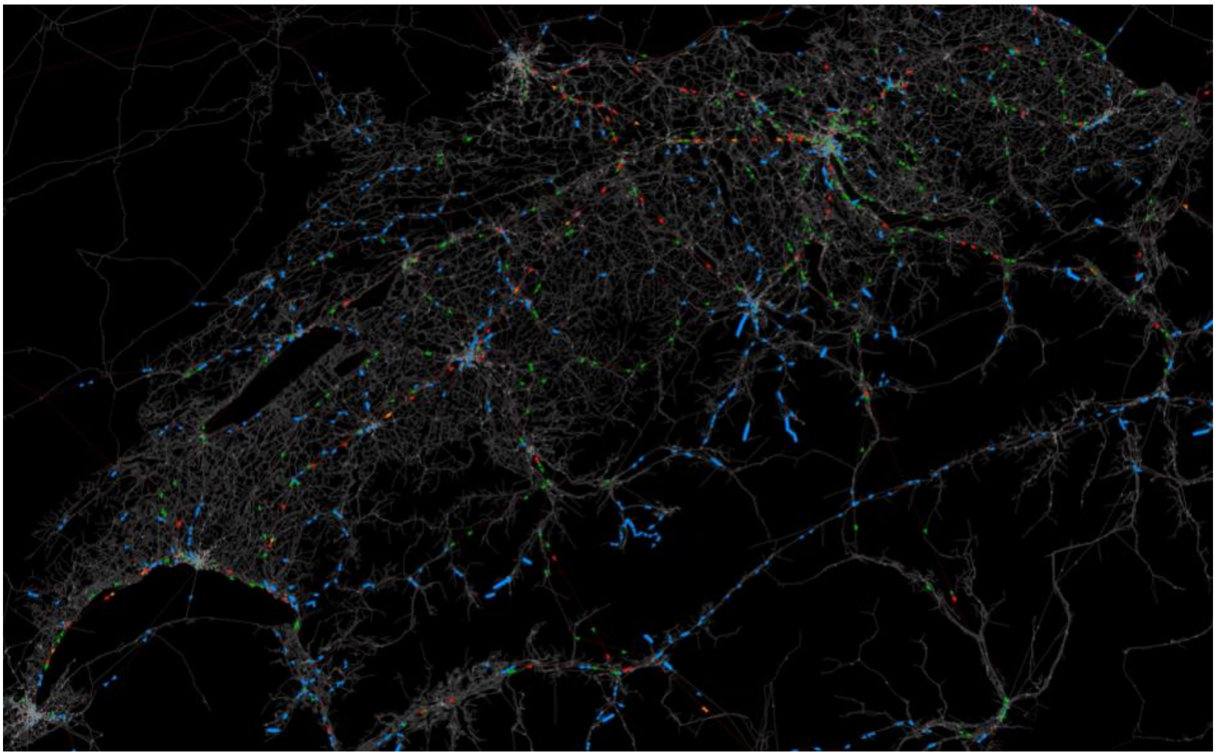

Quantifying Future Mobility: Scenario-Based Analysis with Agent-Based Modeling

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Abstract

By 2050, Switzerland's mobility landscape will face increasing travel demand, requiring more efficient and flexible transportation solutions. Switzerland's integral clock-face timetable has long been the backbone of public transport. This study examines new concepts for future mobility, including the replacement of the integral clock-face timetable with a metro-like system featuring more frequent, faster, and more flexible services. Using an advanced agent-based modeling framework, we quantify the impact of such transformations by capturing individual mobility behavior and system-wide effects. Multiple scenarios are investigated, examining how changes in the train schedule, stop pattern, first/last-mile connectivity and regulatory measures influence modal shift, travel times, and overall public transport system performance. The findings indicate that the new railway concept and the regulatory measures each, on their own, raise the modal share of public transport. When combined, they yield the largest increase in public transport usage. A detailed investigation of the new railway concept reveals that most simulated passengers benefit from the new schedule. However, trade-offs remain, and some travelers experience longer travel times. Our findings highlight the importance of agent-based simulations and scenario analysis in navigating the complexities of future transport planning.

Keywords

Agent-based modeling; Scenarios; Railway system; Public transport; Long-term planning

1 Introduction and literature review

By 2050, Switzerland's mobility landscape will face increasing passenger and freight demands, requiring more efficient and flexible transportation solutions. The integral clock-face timetable has long been the backbone of Switzerland's public transport system. This coordinated schedule concept ensures synchronized arrivals and departures at key nodes, minimizing transfer times. However, the railway system faces growing challenges due to factors such as population growth, changing mobility behavior, and capacity constraints on major corridors and nodes. Because the integral timetable often requires trains to converge simultaneously at major nodes, station infrastructure must handle large volumes of passengers and rail traffic within short time windows, potentially leading to congestion and limited capacity at these critical locations. One way to address these capacity constraints is to expand the infrastructure. However, this can be very expensive or practically unfeasible due to limited space and urgency. As an alternative, innovative timetable concepts can increase effective capacity and offer a more sustainable approach to maintaining the reliability and attractiveness of Switzerland's railway system in a rapidly evolving mobility landscape.

In recent research, several authors reconsider the strict symmetry of Switzerland's Integrated Timetable and propose frameworks that accommodate demand variability while safeguarding service regularity. Caimi et al. (2011) introduce the Periodic Service Intention, a hierarchical description that allows partial periodicity without abandoning clock-face consistency. Robenek et al. (2016a) advance this line with the Passenger-Centric Train Timetabling Problem (PCTTP), showing that non-cyclic or mixed schedules can boost passenger welfare under real-world capacity constraints. Their subsequent Hybrid Cyclicity concept blends 75 % cyclic with 25 % flexible trains to match peak-hour demand yet remain easily memorable (Robeneck et al., 2016b). Pushing further, Leutwiler (2022) demonstrates through large-scale Swiss case studies the feasibility to generate fully non-periodic timetables, questioning the continued need for 30/60-minute symmetry.

Looking into the development of Switzerland's railway system since the mid-1990s, a timetable-led, multi-stage strategy was pursued. The Rail 2000 program (Bahn 2000, CHF 5.9 bn, 1995–2004) introduced the nationwide clock-face timetable and the 52 km Mattstetten–Rothrist cut-off, bringing Bern–Zürich below one hour (BAV, 2024). The NEAT mega-project

(CHF 18 bn) bored the Lötschberg (2007), Gotthard (2016) and Ceneri (2020) base tunnels, creating a low-gradient north–south axis that now carries heavy freight trains and trims Zürich–Lugano to roughly two hours (BAV, 2024). To integrate with Europe's high-speed grid, the High-Speed Connection Act (HGV-Anschluss, CHF 1.3 bn, 2005–2015) co-financed domestic and cross-border upgrades that cut links to Paris and Munich by up to 30 minutes (BAV, 2024 The follow-up ZEB program (Future Development of Rail Infrastructure, CHF 4.8 bn) addresses the capacity and timetable stability, notably through projects like the four-track Olten–Aarau section and the Eppenberg Tunnel (BAV, 2024). The expansion step 2025 (AS25, CHF 6.8 bn) removes key bottlenecks so that half-hourly Intercity cycles can run on corridors such as Bern–Lucerne and Zürich–Chur (Bundesrat, 2012; BAV, 2024). The CHF 12.9 billion expansion step 2035 (AS35) provides the necessary infrastructure that enables the supply concept 2035 (Angebotskonzept 2035, short: AK35), which includes the Lötschberg twin tube, the Brütten and Zimmerberg II bypass tunnels, and to enable a 15-minute headway on the busiest Intercity axes by the mid-2030s (Bundesrat, 2018; BAV, 2024). The *Perspektive Bahn* initiative sets a longer-term vision for enhancing rail transport as a cornerstone of Swiss mobility (BAV, 2023).

Currently, the AK35 is revised (BAV, 2024). One frequent criticism concerns the predominantly incremental infrastructure expansion approach, which many view as insufficient for addressing capacity bottlenecks or ensuring greater resilience against disruptions. Additional critiques have emerged regarding the strategic development frameworks, particularly concerning the substantial investment volumes required. The realization that additional billions of Swiss Francs will be needed for the AK35 has raised concerns about financial feasibility. Furthermore, lengthy implementation timelines pose challenges, as construction is constrained by the heavily utilized network, potentially delaying capacity enhancements. Moreover, there is a perceived lack of focus on optimizing transportation modes for specific purposes, limiting the railway's ability to fully leverage its strengths in serving diverse mobility needs. Addressing these critiques requires innovative solutions that enhance capacity and efficiency while strategically integrating various modes.

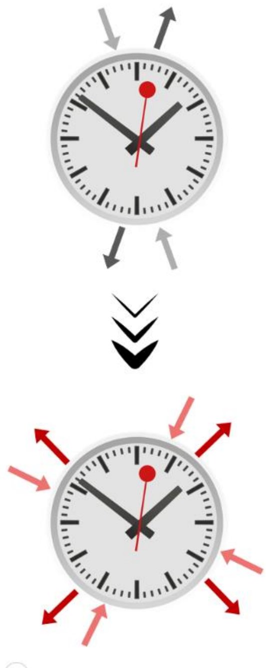
This study examines various concepts for future mobility, including the replacement of the integral clock-face timetable by a metro-like system featuring more frequent, faster, and more flexible services. Using an advanced agent-based modeling framework, we quantify the impact of such transformations by capturing individual mobility behavior and system-wide effects.

2 Proposed railway concept

In response to the growing challenges faced by Switzerland's railway system, a new mobility concept is developed which allows for more flexible and efficient services. The new railway concept has been developed as part of a strategic project within Swiss Federal Railways (SBB) by an interdisciplinary, cross-divisional team and is intended solely as a conceptual framework, without any political implications or binding commitments. It serves primarily to stimulate dialogue, offering a new basis for discussion rather than representing a finalized policy proposal. The new mobility concept outlines the following key aspects.

The new concept **dissolves the clock-face integrated timetable** and envisions frequent train departures, targeting 15-minute intervals to enhance reliability and accessibility. This frequent service model reduces waiting times and improves connections, aiming to streamline operations and facilitate smooth transitions between nodes, thereby minimizing congestion at major stations. Moreover, it enables the strategic partial dissolution of traditional timetable nodes while ensuring that passengers can easily transition between different lines and modes of transport. This allows for a more even distribution of passenger flows and infrastructure utilization, alleviating pressure on major hubs and enhancing overall network capacity. In addition to temporal smoothing, demand is also spatially distributed across multiple stations within the same city or region helping to relieve overstressed stations.

Figure 1: Dissolved clock-face timetable



A further aspect of the new concept is the **harmonization of train speeds** across different services, cargo and passengers, long distance and regional connections. The harmonization of train speeds can be achieved both by using more powerful rolling stock or by adjusting the stop policy, which can increase the effective speed on certain track sections. There are various operational concepts for stop policies along a corridor, displayed in Fig. 3:

Figure 2: Harmonized speeds

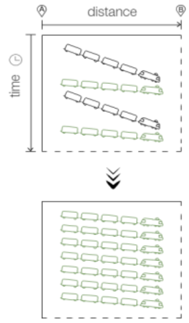
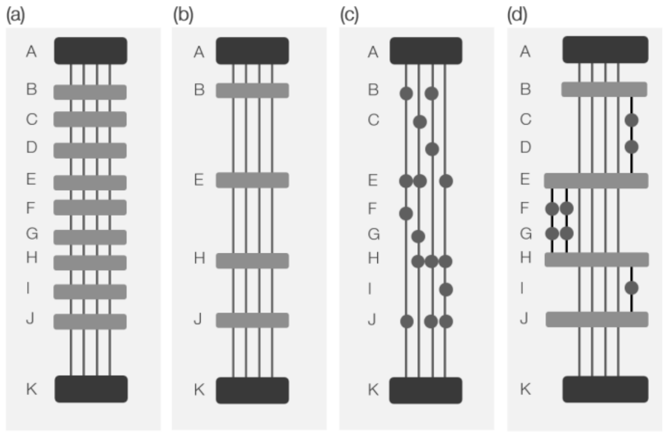


Figure 3: Railway operation concepts along a corridor



a) Serving all stops: This approach involves trains stopping at every station along the route, resulting in longer travel times. It's suitable for areas where accessibility to all stations is a priority, but may lead to inefficiencies (long travel times, low effective speed).

b) Station bundling: This strategy entails closing smaller stations and providing their service through alternative transport modes like buses or on-demand mobility services. It focuses resources on major hubs, enhancing efficiency and reducing operational costs.

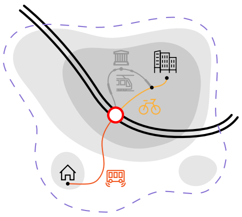
c) Skip-Stopping: An operational strategy where trains skip certain stations to shorten travel times and increase capacity. This method is commonly used in high-frequency systems. Various models exist, such as the AB-pattern, where trains alternate between serving different stations.

d) Mini shuttles: As in (b), but with few additional train services connecting smaller stations to major hubs.

Overall, the operation schemes (b), (c) and (d) provide the potential for improved efficiency compared to (a). However, the optimal operation scheme depends on the political objectives as well as the spatial and temporal travel patterns.

The new concept also emphasizes an **optimized feeder system**, i.e., the optimal combination of various transportation modes–walking, cycling, buses, trams, on-demand shuttles, trains, and cars–acknowledging their unique strengths and limitations. By tailoring transportation solutions to specific spatial and demand contexts, the system ensures efficient and effective service delivery. A key principle is that a significant share of Switzerland's population should be able to reach a train station within 15 minutes using public transport, with trains departing at least every 15 minutes (see paragraph "Accessibility and service quality" in Sec. 4.2).

Figure 4: Optimized feeder system



As further design elements, **innovative infrastructure approaches** are central to the new railway concept, incorporating conflict-free and standardized track layouts to minimize bottlenecks and enhance network resilience. **Standardized rolling stock** supports operational flexibility, facilitating quick responses to changing service demands and simplifying maintenance. These elements contribute to an agile and efficient railway system, capable of adapting to short-term passenger needs and long-term strategic goals.

While the new mobility concept aims to accommodate increased passenger volumes without extensive new infrastructure, offering a cost-effective solution to capacity constraints, its success hinges on effective implementation and stakeholder collaboration. The anticipated benefits include improved network efficiency and resilience, ensuring a reliable service even under high demand conditions.

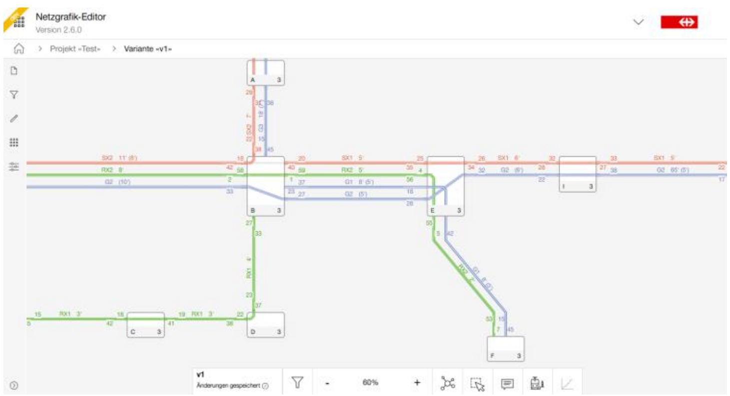
3 Methodology

The investigation of the new railway concept makes use of SBB's existing transport model SIMBA MOBi (see, e.g., Scherr et al., 2020) for the forecast year 2050 in which the railway supply is based on the AK35 and the local public transport is primary based on today's services with additional services to adapt buses and trams to the improved railway supply . The applied transport model makes use of the agent-based simulation framework MATSim (Multi-Agent Transport Simulation, www.matsim.org, Horni et al., 2016). In MATSim, each person is represented as an individual agent which has a daily activity schedule and trip chain. These agents travel across the multimodal network, using private cars or public transport “containers” (i.e., trains, busses, trams) for the relevant parts of their journeys. The framework captures realistic interactions among travelers, such as traffic congestion, and can iteratively adjust agents’ choices to improve individual travel decisions. By modeling every individual traveler, MATSim provides a highly detailed perspective on overall system performance and user experiences.

The existing transport model with the original AK35-based railway supply is adjusted by using the following workflow:

1. An initial version of a new railway timetable for entire Switzerland is designed by experts using an open-source tool which allows to design network graphics in the railway context (https://github.com/SchweizerischeBundesbahnen/netzgrafik-editor-frontend). The resulting railway timetable is illustrated as a comprehensive network plan. For each version of the timetable, the required infrastructure can be derived, e.g., the number of tracks along each corridor, required passing loops, number of tracks in each station. The required infrastructure is then compared to the available infrastructure, and if these do not match, either the timetable or the infrastructure must be adapted. The applied tool supports this design process; however, the tool does not provide an automated generation of feasible timetables.

Figure 5: Illustrative visualization of a network plan using the network graphic editor



2. The network graphic, representing a sample hour, is expanded into a complete daily timetable and exported in the MATSim transit schedule format. For that, a converter was developed (available as open-source software, see https://github.com/SchweizerischeBundesbahnen/netzgrafik-editor-converter).
3. The existing agent-based transport model for the year 2050 is modified as follows: The AK35 based railway supply is removed and replaced by the new railway schedule from the previous conversion step, while local public transport supply (bus, tram) remains unchanged.
4. Depending on the specific scenario case, further elements of the transport model are altered, see the description of simulation experiments in Sec 4.1.
5. The simulation then calculates demand responses, including a spatially and temporally detailed analysis of train occupancy and station accessibility.
6. Based on the simulation results, the experts refine the service concept and update the network graphic, creating an iterative cycle of design and evaluation.

4 Simulation experiments and results

4.1 Simulation experiments

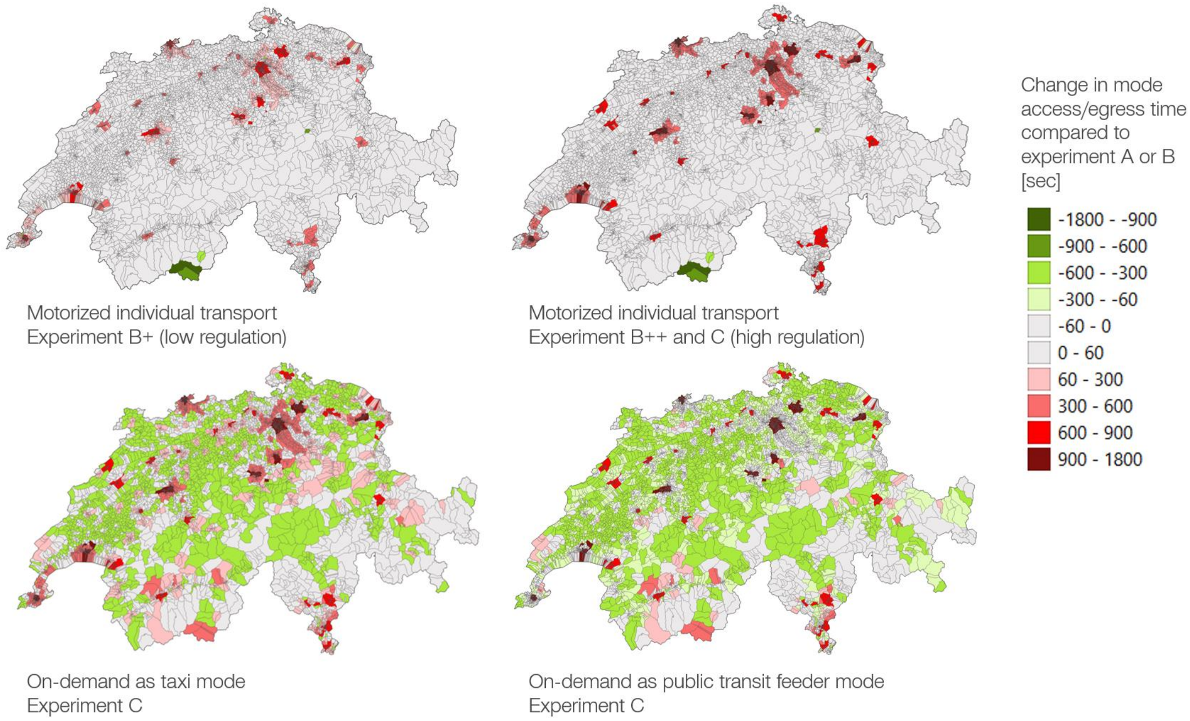
The following simulation experiments are carried out to allow for a detailed analysis of the new railway concept in different scenarios.

Table 1: Simulation experiments

Exp.	Description
A	Base case: AK35 railway supply and population forecast for the year 2050
A+	New train schedule, incl. short-term demand reactions: mode, time and route choice
B	as in A+, incl. long-term demand reactions: destination choice and mobility tools
B+	as in B, incl. low regulation of motorized individual transport (see Fig. 6)
B++	as in B+, but with high regulation of motorized individual transport (see Fig. 6)
C	as in B++, incl. regulation of autonomous on-demand mobility (see Fig. 6)

The regulation scenarios are implemented by changing the access and egress time for the motorized individual transport (in experiments B+, B++, and C) and the on-demand mode (in experiment C). The access and egress time is an additional zone-based penalty which comes on top of the actual travel time. The following Fig. 4 describes the change in access/egress time of experiment B+, B++ and C compared to the original model state (experiment A or B respectively).

Figure 6: Regulation scenarios in experiment B+, B++ and C

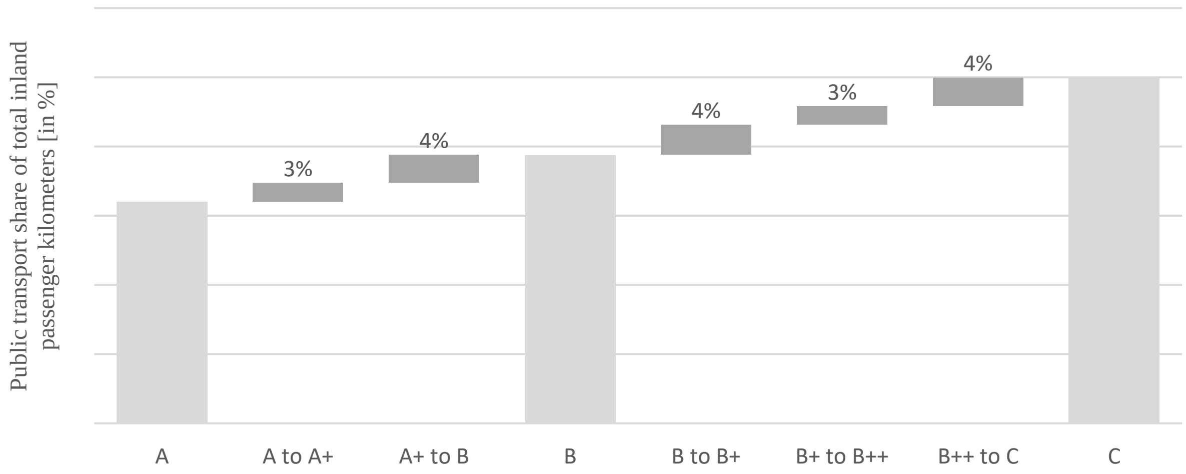


4.2 Results

Aggregated travel demand

The simulation results reveal a significant shift towards public transport. Fig. 5 shows the contribution of each scenario modification step on the public transport share of total passenger kilometers. The pure schedule effect without transport users' changes in destination choice and mobility tools (experiment A+) yields an increase in public transport share of 3 percent points. Accounting for destination choice and the adjustment of mobility tools (public transport subscriptions, car ownership) in experiment B results in an additional increase of 4 percent points. In simulation experiment B+, B++ and C regulatory elements are incorporated which yields an additional modal split effect of 11 percent points. Overall, Fig. 7 reveals the importance of accompanying regulatory policies. The pull effect of the new railway concept increases the public transport share by 7 percent points (experiment B vs. A). Additional regulatory policies yield a modal split effect of 11 percent points (experiment C vs. B).

Figure 7: Increase in public transport share of total passenger kilometers (avg. working day)

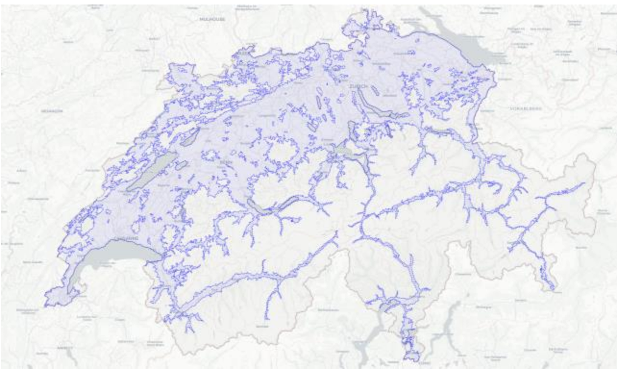


Accessibility and service quality

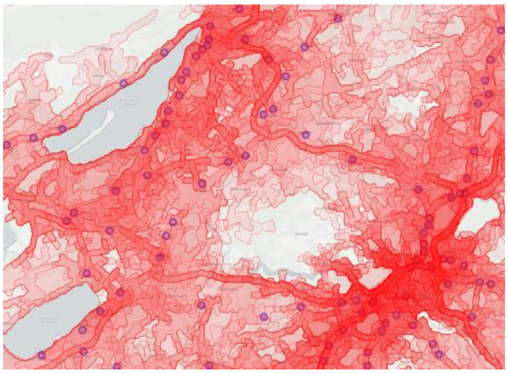
It is often assumed that maximizing the number of railway stations will maximize accessibility. This may be correct for the first and last mile since access/egress times to/from the station are reduced. However, a high density of stops along a corridor also means that train cycle times increase. This may lead to conflicts in the timetable. Furthermore, some passengers may experience longer in-vehicle travel times which reduces overall accessibility. This paragraph addresses these trade-offs.

Switzerland’s railway system is characterized by a high density of stations. The following Fig. 8a shows the 15-minute railway station catchment area in the base case (AK35 case, experiment A). The catchment area is approximated based on today’s 10-minute car travel times using the HERE Isoline Routing API (https://www.here.com) plus a 5-minute setup time (parking, walking from/to the car, waiting for an on-demand service, etc.). The catchment area is the intersection of multiple overlaying isochrones, see Fig. 8b. An overlay with today’s spatial structure data (BFS, 2020a, 2020b) reveals that 96% of Switzerland’s population and 98% of all workplaces are located within the 15-minute catchment area.

Figure 8: 15-minute railway station catchment area in the AK35 base case (Experiment A)



(a) Isochrone intersection area (blue area)



(b) Overlaying isochrones in the Bern area

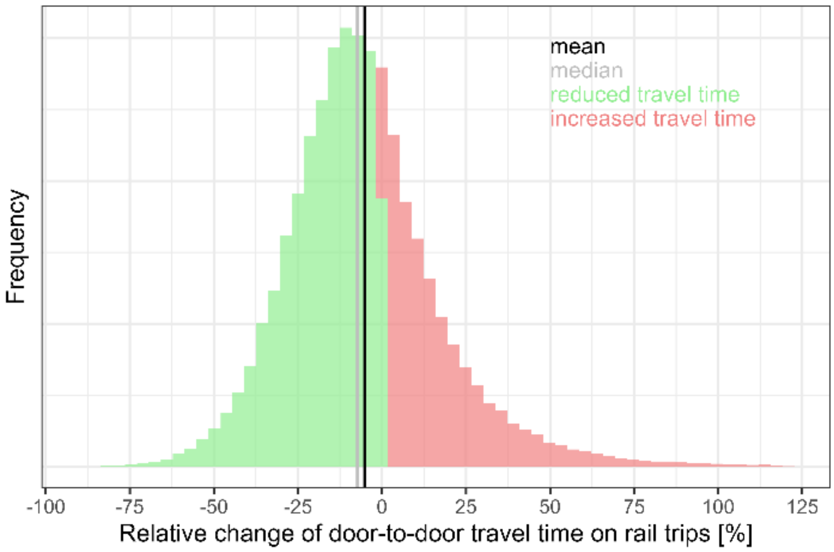
Background map: © OpenStreetMap contributors, © CARTO

In one of the design variants which is explored in simulation experiment A+ and the following experiments, station bundling (see Fig. 3b) is the predominant operational scheme, with 20% fewer stations served by rail, the accessibility analysis reveals a rather small effect: 95% of the population and 97% of the workplaces are located within the 15-minute catchment area. The analysis also reveals that in experiment A+ and the following experiments, 93% of the population and 96% of all workplaces are located inside the 15-minute catchment area of high service railway stations, which account to 36% of all railway stations in experiment A.

From the perspective of public transport passengers, metrics such as door-to-door travel time, waiting times, and the frequency of transfers are particularly relevant. To quantify the impact of the new railway concept on these metrics, all public transport trips in simulation experiments A and A+ are compared. This comparison allows for insights into the pure timetable effect without considering potential new destination or mobility tool choices (public transport subscription, car ownership, etc.). Since this analysis builds on actual public transport demand, high-demand relations are higher weighted, and the results also include effects on the first and last mile.

On average, the new schedule concept reduces the in-vehicle travel time and waiting time in public transport, while the number of transfers remains the same. The average reduction in door-to-door travel time for all rail trips amounts to 7.9%. A detailed winner-loser-analysis reveals that, despite the overall improvement of the service level, there is a significant share of individuals who experience longer travel times (see Fig. 9). These effects are evaluated at a spatially disaggregated level and will be considered for the iterative development of further planning variants.

Figure 9: Histogram of relative change in door-to-door travel time on train trips from Experiment A to A+ (pure timetable effect). The black and grey line indicate the mean and median value of the distribution showing that on average the door-to-door travel time is reduced.



Individual travel behavior

In addition to aggregated analyses the microscopic traffic model allows for detailed analyses of individual agents, enabling the assessment of the individual advantages and disadvantages of the new rail concept. The following presents two examples that illustrate how the concept affects individuals on their daily journeys.

In the first example, we consider a 50-year-old commuter (person ID 784426, trip ID 1) traveling from A1 to A2 for work purposes (see Tab. 2). In the base case (simulation experiment A), the travel chain of this agent passes through A3, where a transfer and waiting are required. However, the new timetable (simulation experiment A+) introduces a direct connection from A1 to A2. As a result, this agent experiences a shorter door-to-door travel time. On the one hand, because the new direct connection eliminates transfer time at A3, and on the other hand, because the waiting time at the starting station is reduced due to a higher frequency of service. Additionally, the agent gains comfort from the direct connection.

Table 2: Travel times in A and A+ of agent with person ID 784426 and trip ID 1.

Experiment A (Base Case)			Experiment A+ (new Schedule)		
7.37 – 7.40 am	3’	Home → station A1 (walk)	7.10 – 7.13 am	3’	Home → station A1 (walk)
7.40 – 7.47 am	7’	waiting	7.13 – 7.15	2’	waiting
7.47 – 8.20 am	33’	station A1 → station A3 (train)	7.15 – 7.55 am	40’	station A1 → station A2 (train)
8.20 – 8.29 am	9’	transfer and waiting			
8.29 – 8.33 am	4’	station A3 → station A2 (train)			
8.33 – 8.40 am	7’	station A2 → work place (walk)	7.55 – 8.02 am	7’	station A2 → work place (walk)
63 minutes, 1 transfer			**52 minutes, 0 transfers**		

The second example shows that station bundling results in both positively and negatively affected travellers. In experiment A+, less frequented stations along the corridor between B1 and B2, such as the station B3, are no longer served by rail. In the following, we examine two agents who are affected by this change.

The first agent (person ID 10753638, trip ID 4, see Tab. 3) is a 25-year-old student traveling home to city B2 from a university in city B1. On this trip, the agent gains six minutes of travel time, partly because the train saves four minutes by serving less stations between B1 and B2, and partly because the higher frequency of service means less waiting time along the way.

The second agent (person ID 12398090, trip ID 2, see Tab. 4) lives in the municipality B3 which, in experiment A+, is affected by station closure. The 18-year-old apprentice is on the way home from working in city B1. In the base case, the agent uses the train between B1 and B3. With the new timetable, this agent now needs to take the train to B2and then travel by bus to B3. This means, on one hand, a longer travel time and, on the other hand, one additional transfer.

Table 3: Travel times in A and A+ of agent with person ID 10753638 and trip ID 4.

Experiment A (Base Case)			Experiment A+ (new Schedule)		
7.26 – 7.30 pm	4’	University → station B1 (walk)	7.00 – 7.04 pm	4’	University → station B1 (walk)
7.30 – 7.34 pm	4’	waiting	7.04 – 7.06 pm	2’	waiting
7.34 – 7.56 pm	22’	station B1 → station B2 (train)	7.06 – 7.24 pm	18’	station B1 → station B2 (train)
7.56 – 7.58 pm	2’	station B2 → home (walk)	7.24 – 7.26 pm	2’	station B2 → home (walk)
32 minutes, 0 transfers			**26 minutes, 0 transfers**		

Table 4: Travel times in A and A+ of agent with person ID 12398090 trip ID 2.

Experiment A (Base Case)			Experiment A+ (new Schedule)		
5.35 – 5.37 pm	2’	Workplace → station B1 (walk)	5.47 – 5.49 pm	2’	Workplace → station B1 (walk)
5.37 – 5.42 pm	5’	waiting	5.49 – 5.51 pm	2’	waiting
5.42 – 6.03 pm	21’	station B1 → station B3 (train)	5.51 – 6.09 pm	18’	station B1 → station B2 (train)
			6.09 - 6.15 pm	6’	transfer (walk) and waiting
			6.15 - 6.24 pm	9’	bus stop B2 → bus stop B3 (bus)
6.03 – 6.08 pm	5’	station B3 → home (walk)	6.24 – 6.28 pm	4’	bus stop B3 → home (walk)
33 minutes, 0 transfers			**41 minutes, 1 transfer**		

This last example shows that adaptions to the schedule always bring both losers and winners. However, with four times as many travelers on the relation from B1 to B2 compared to the relation from B1 to B3, more people benefit from an improvement. Results at this disaggregated level are used in the iterative process to increase the proportion of travel time winners.

Vehicle and station load analysis

The vehicle load factor is relevant from different perspectives. A high load factor translates into an efficient utilization of the transport system. On the other hand, a high load factor reduces passenger comfort which may shift transport users from public transport to alternative modes. In this study, in each iterative planning step of the new mobility concept, the vehicle load is evaluated for the peak hour, and the network graphic was accordingly revised. Furthermore, based on the vehicle load factor, the required number of train units is estimated, which forms the starting point for rolling stock cost calculations.

Besides vehicle load factors, station occupancy is also of high interest. A high volume of boarding, alighting, and transferring passengers can indicate an efficient use of station capacity, provided that critical, particularly safety-related pedestrian-flow thresholds are not exceeded. Our results indicate a substantial increase in the overall number of station users, in particular in experiment B+, B++ and C. Two mechanisms, however, counterbalance this growth: (1) dissolving the clock-face integrated timetable spreads demand more evenly across the hour, and (2) the proposed line layout deliberately relieves highly loaded stations by decentralizing transfer hubs and distributing them over several stations.

5 Conclusion and outlook

In this study, multiple scenarios are investigated, examining how changes in the train schedule, stop pattern, first/last-mile connectivity and regulatory measures influence modal shift, travel times, and overall public transport system performance (e.g., vehicle and station load). The findings indicate that the new railway concept and the regulatory measures each, on their own, raise the modal share of public transport. A combination of both interventions makes use of both the pull and push demand effect which yields the largest increase in public transport usage. Our capacity load analysis shows that the projected increase in demand can be accommodated by the public transport system. Higher service frequencies not only make travel more convenient by offering passengers greater departure/arrival flexibility; the additional train runs also inject the public transport system with the extra capacity to meet that growth. A detailed investigation of the new railway concept reveals that most simulated passengers benefit from the new schedule. However, trade-offs remain, and some travelers experience longer travel times. Within our iterative design-evaluation framework, these insights can be fed straight back into revising the rail supply, enabling continuous refinement and closer alignment with passengers' needs.

Overall, our findings highlight the importance of dynamic simulations in navigating the complexities of future transport planning. This approach enables policymakers to quantify synergies and trade-offs across competing strategies. By leveraging agent-based simulation and multimodal scenario analysis, we provide a robust decision-support tool for designing resilient transport systems.

In addition to the content-related results, the model-based workflow brought the following methodological takeaways to light:

Plan under uncertainty with scenarios. When the future is unclear, exploring multiple scenarios and presenting results incrementally helps decision makers grasp robustness and sensitivity.

Design in variants. Testing multiple corridor options—such as station bundling, skip-stopping patterns or mini-shuttles—opens a more productive dialogue and uncovers solutions that a single blueprint would hide.

Leverage detailed simulation. High-resolution modelling compels a holistic examination of every aspect of the service concept, supports deep dives into results, and makes it easier to create compelling visualizations.

Use modelling to enforce data consistency. Integrating heterogeneous data sources exposes mismatches (e.g., differing station names) and even flaws in the service concept itself; visual outputs are diagnostic tools, not just cosmetics.

Frame numbers for top-management audiences. Absolute figures can mislead executives who carry different baseline metrics in mind (e.g., weekday modal split vs. annual average). Clearly state the reference metric and timeframe whenever communicating up the hierarchy.

Separate model development and application. Having one team build the model and another apply it replicates a "four-eyes" review: users test corner cases the developers did not anticipate, surfacing inconsistencies and strengthening the model's robustness.

The strategic planning efforts at SBB are ongoing, and the presented framework will continue to support the next project phases and conceptual ideas. Upcoming regional deep dive studies will focus on the first and last mile interface. Preliminary results indicate that investments in improved autonomous feeder services can stimulate enough additional system-wide fare revenue—largely from induced rail trips—to bring the associated operating costs to break-even.

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