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und Infrastruktur

Modelling smart transit app take-up

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Structure

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- Background to the STS project
    - Objectives of the project
    - Evaluation framework
- SD Model description
- Simulation Results
- Outlook

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Background

Project motivation

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- Development and test of a ‘one-stop-shop’ app “Smarter Travel Solution (STS)” for travel in West Yorkshire, UK
- Aim: Shifting travel away from private car by better information provision and easier payment methods
- Questions:
  1. How many people will use the STS app?
  2. (How) will this change their travel behaviour?
  3. (How) will this impact the transport system

- Limited research on travel app diffusion
- Challenges: Large number of operators
- Work in progress!

WienMobil: One-stop-shop app in Vienna

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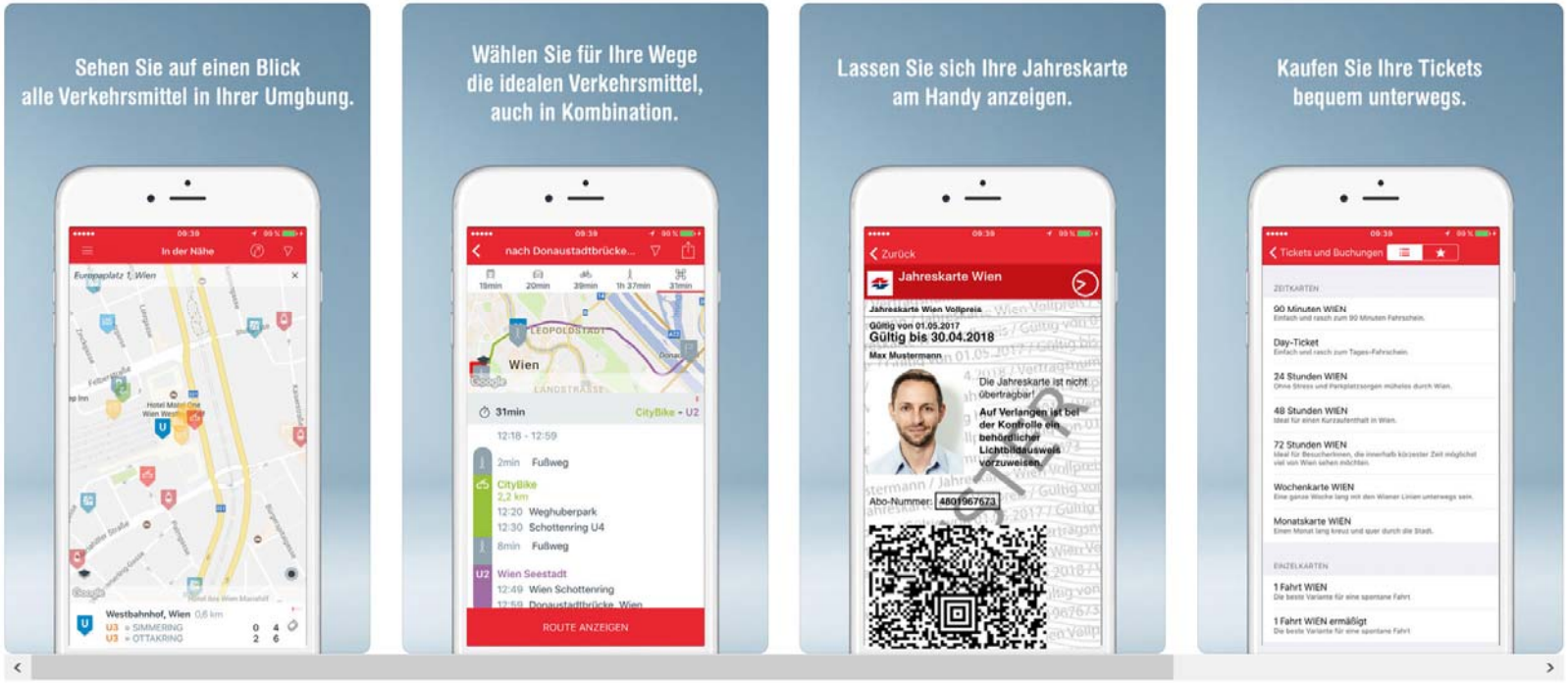
iPhone-Screenshots



Research Objectives

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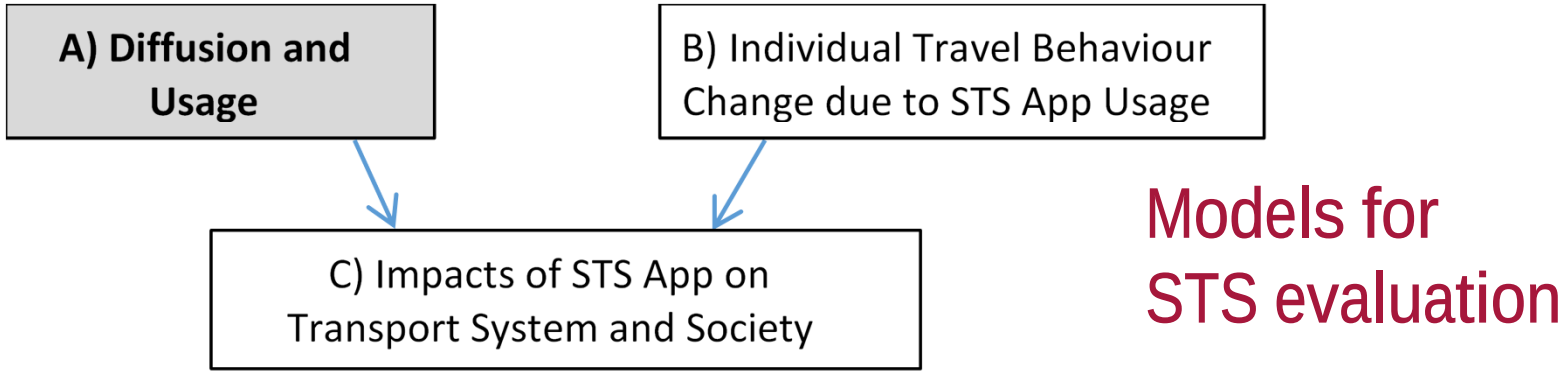
- Assess the potential impacts of this integrated STS app on travellers, society and businesses
- Develop models that allow forecasting
  - *A. how many travellers will use the app*
  - B. how each individual app user will change travel behaviour
  - C. how this aggregate behaviour change will impact the transport system and society.



App Diffusion and Usage Model Aims

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- Identify the factors that influence the diffusion and use of the STS app
- Use simulations to contribute to the development of a business model for running a commercially successful app

Evaluation Framework

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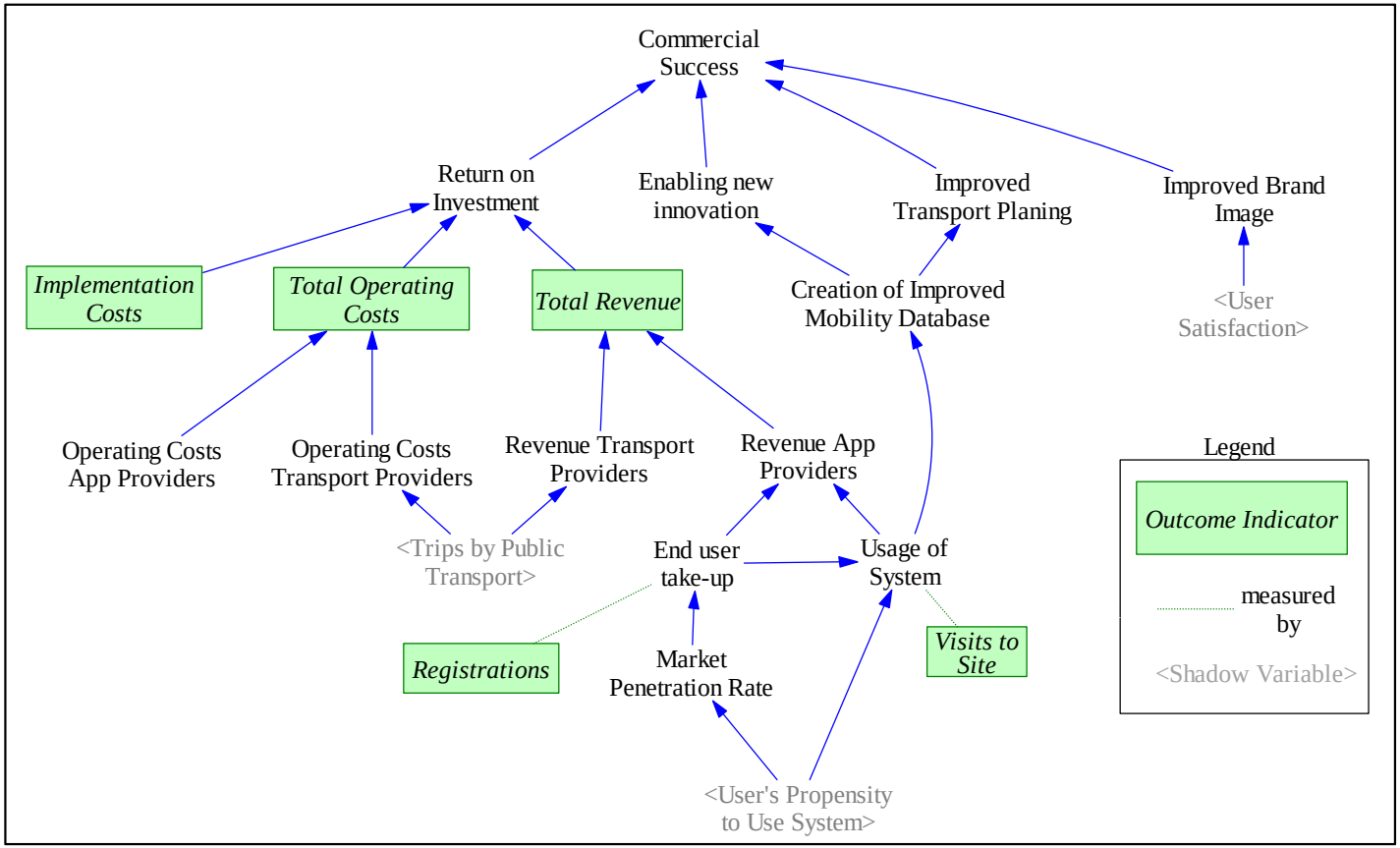
- Definition of criteria & indicators to evaluate the success of the STS app
- Used a logic map (similar to CLD) to visualize interconnections
- Here: commercial success



Key Variables & Sources

Objective	Outcome Indicator	Measurement
Commercial Success		
End user take-up	# registrations	quantitative, from system /
Usage of system	# number of visits to information services	quantitative, from system
Revenues (App Providers and Transport Operators)	£	quantitative, from system
Integration / implementations costs (public, private)	£	quantitative, from system
Operating costs (App Providers and Transport Operators)	£	quantitative, from system
Innovation potential	Successful creation of an improved database	qualitative,
Positive brand image	User assessment	qualitative, user reported
End user benefits		
End user mobility impacts	travel time savings increase in activity range increase in active modes (health)	quantitative, all estimated, based on self-reported intentions / surveys
End user satisfaction	scheduling effort, reliability of information, use experience	qualitative, from surveys / focus groups
End user costs	cost of car ownership £ cost of travel £	quantitative, all estimated, based on self-reported intentions

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Development of Stock-Flow-Model

Basic App Diffusion and Retention Model

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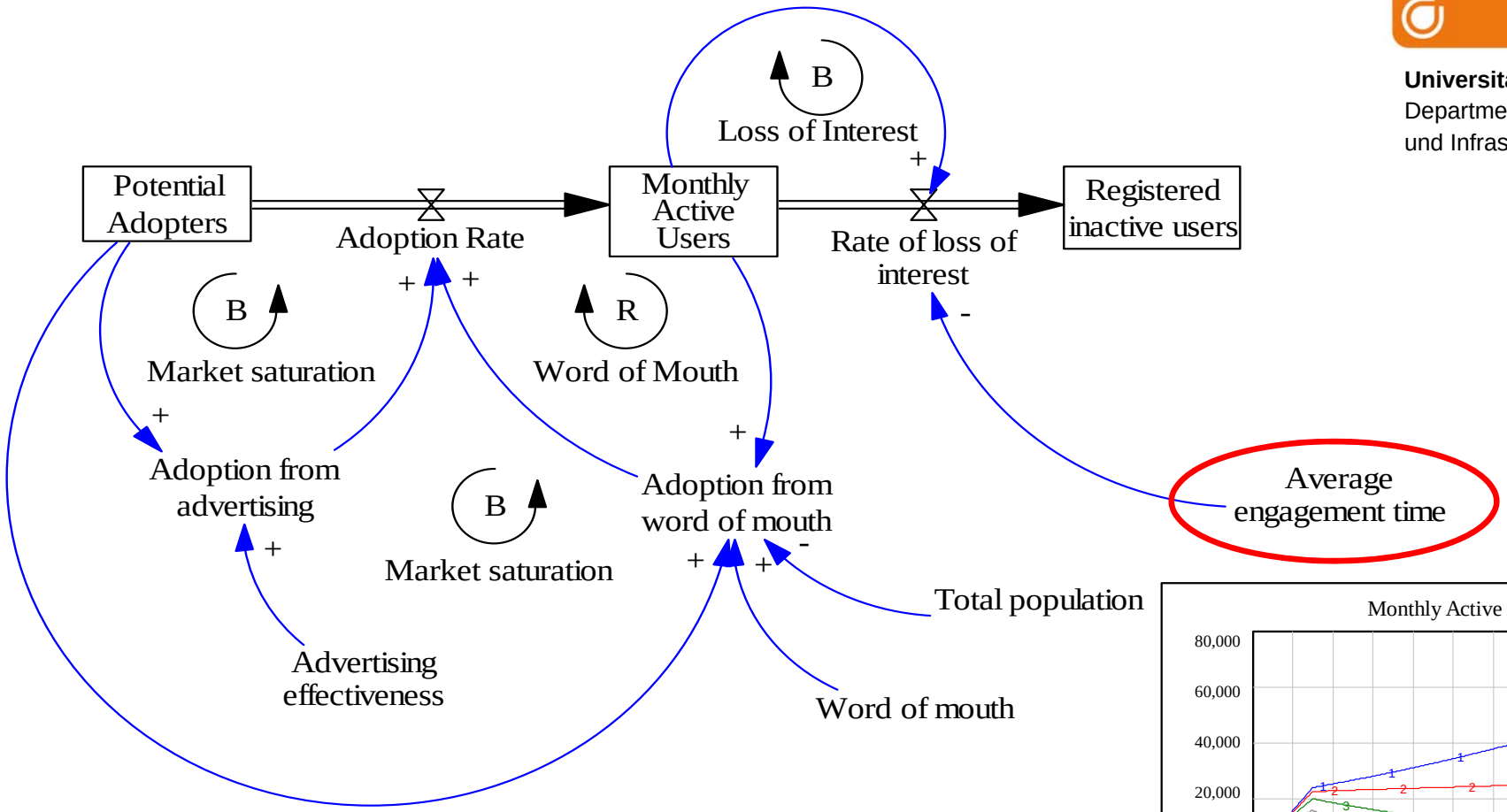
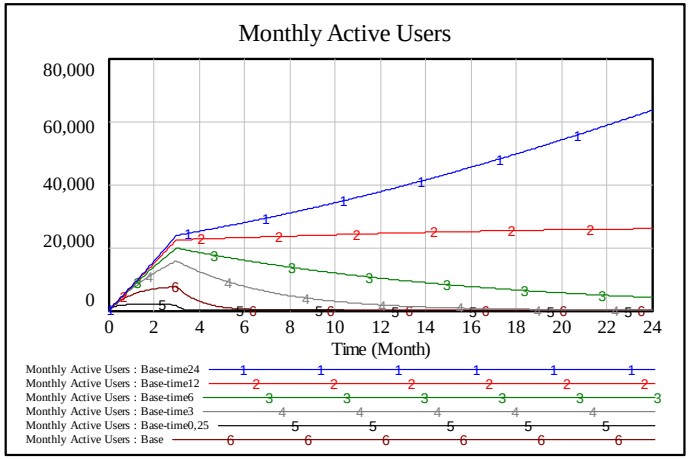


based on Nel, 2016

between 1 week and 24 months:



Extensions

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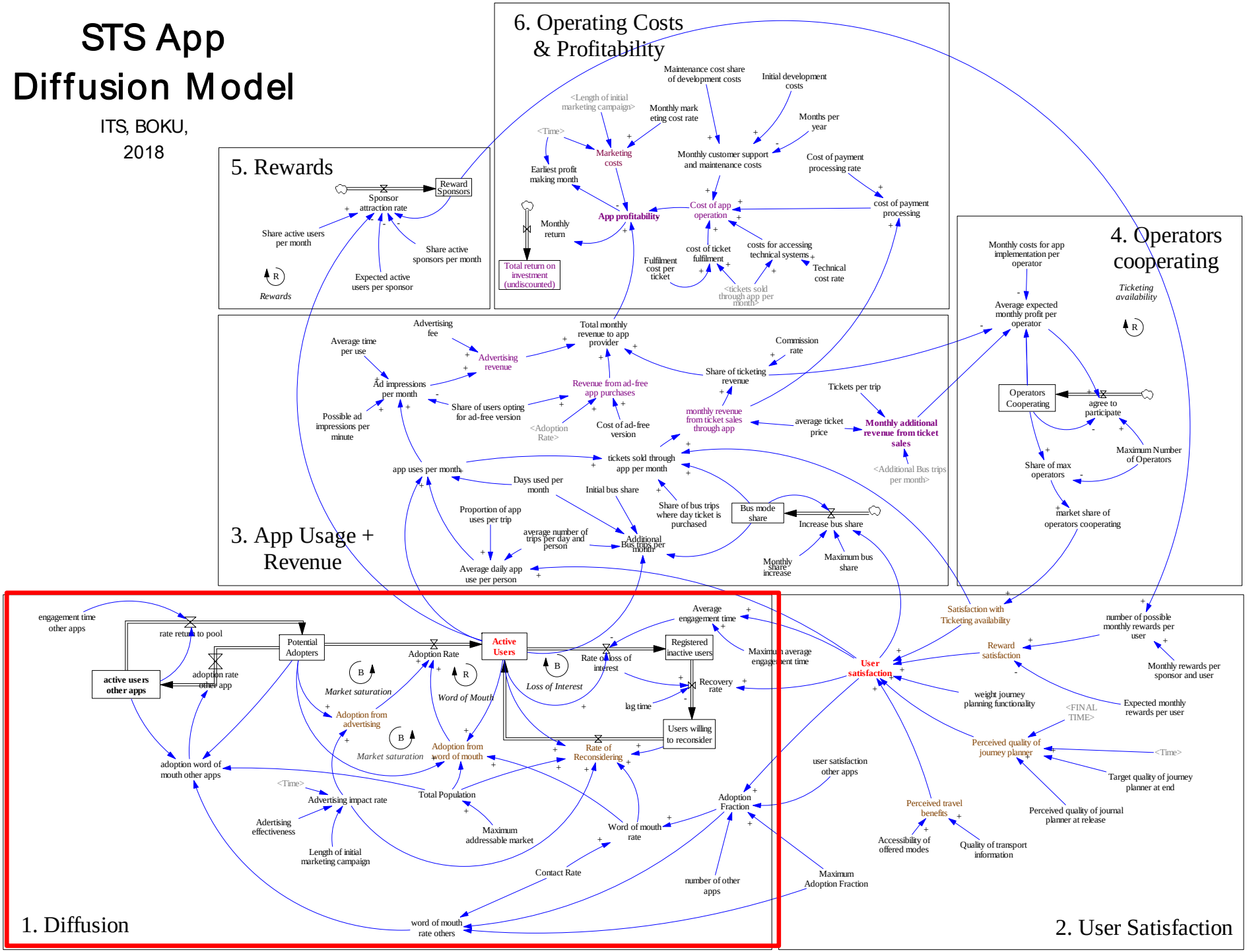
1. Balancing loops: Diffusion model
   Bass model plus re-activation and Competition
2. User satisisfaction model
   Driving engagement time
3. App usage and revenue calculation
   Based on number of trips, revenue from in-app advertising and ad-free version
4. Reinforcing loop: Ticketing availability + operators cooperating
   More operators -> more functionality -> more users/usage + revenue
   -> more operators
5. Reinforcing loop: Rewards
   More users/usage -> more reward sponsors -> more rewards -> more users
6. App operating costs and profitability calculation

STS App Diffusion Model

ITS, BOKU, 2018



Diffusion model with re-activation and competition

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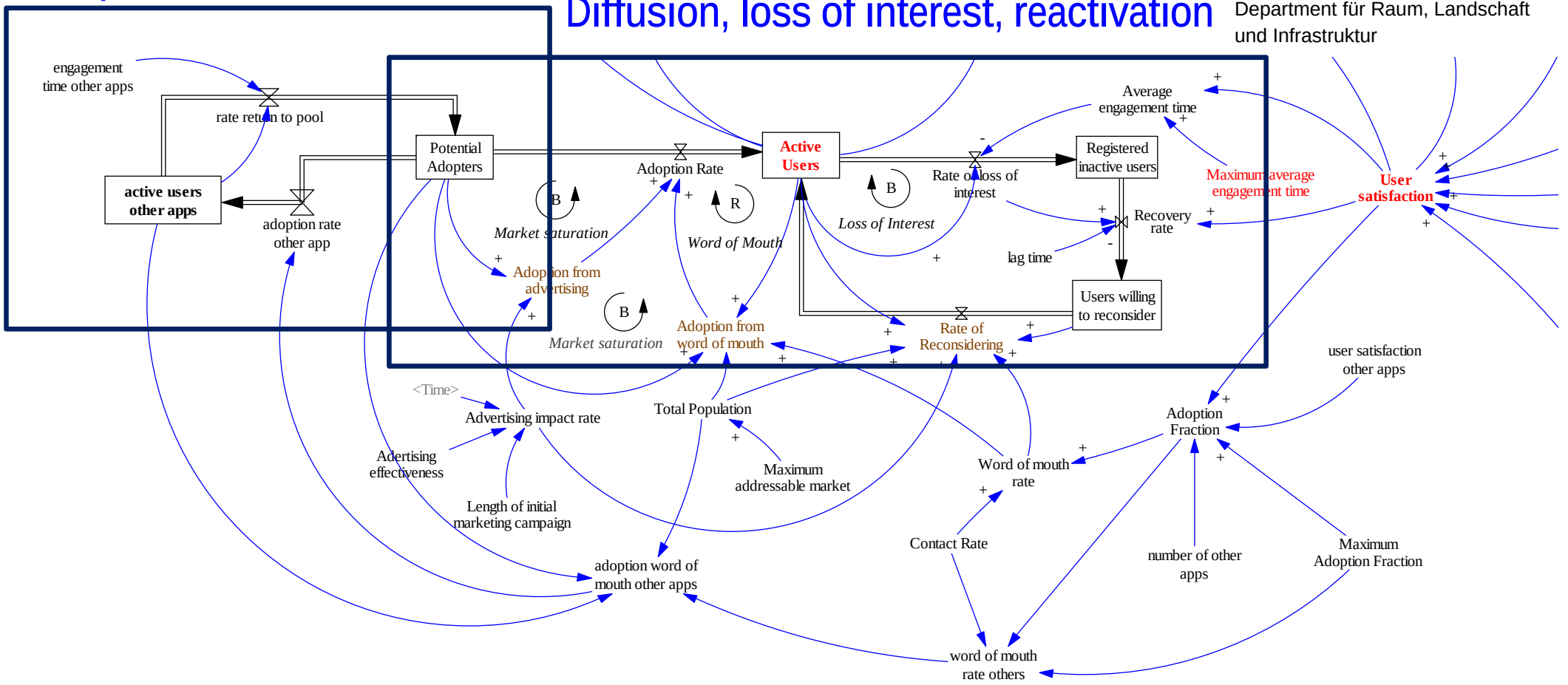

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Simulation results

Simulation Results without competition

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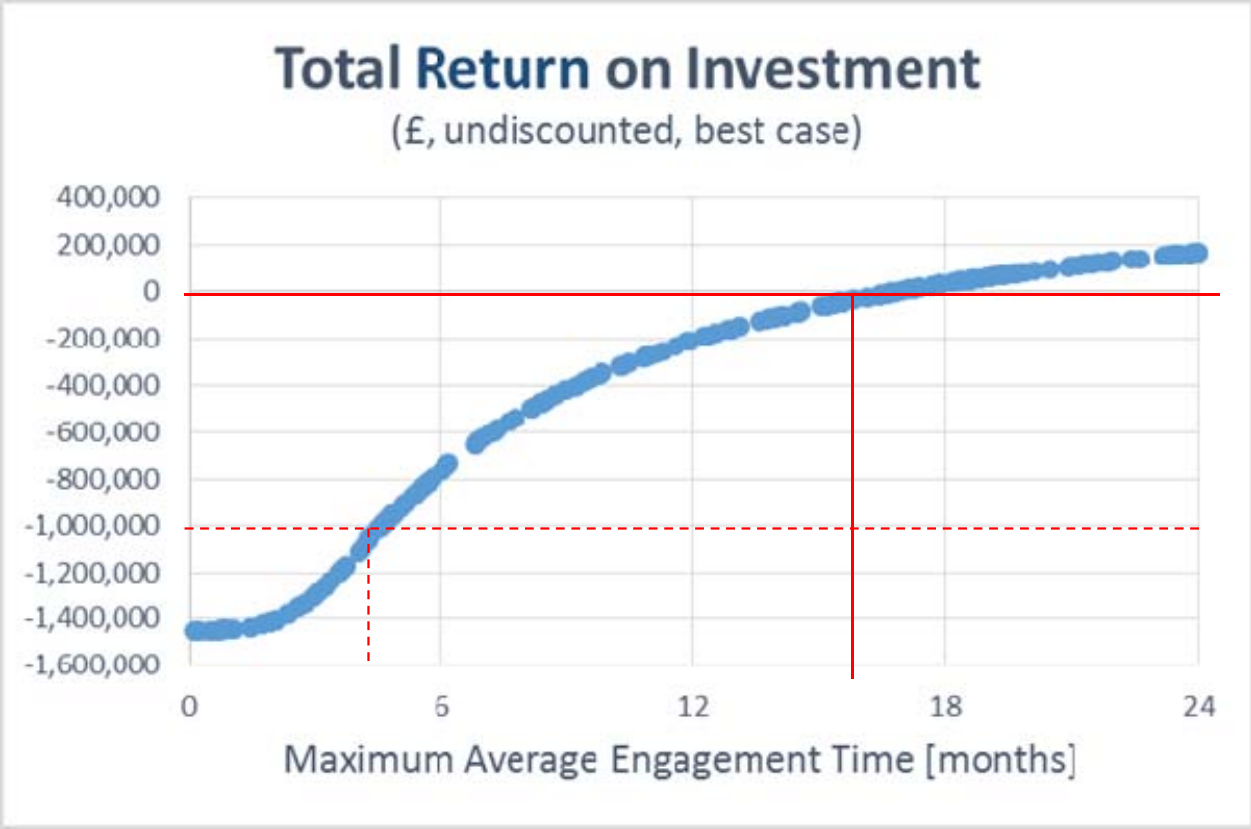
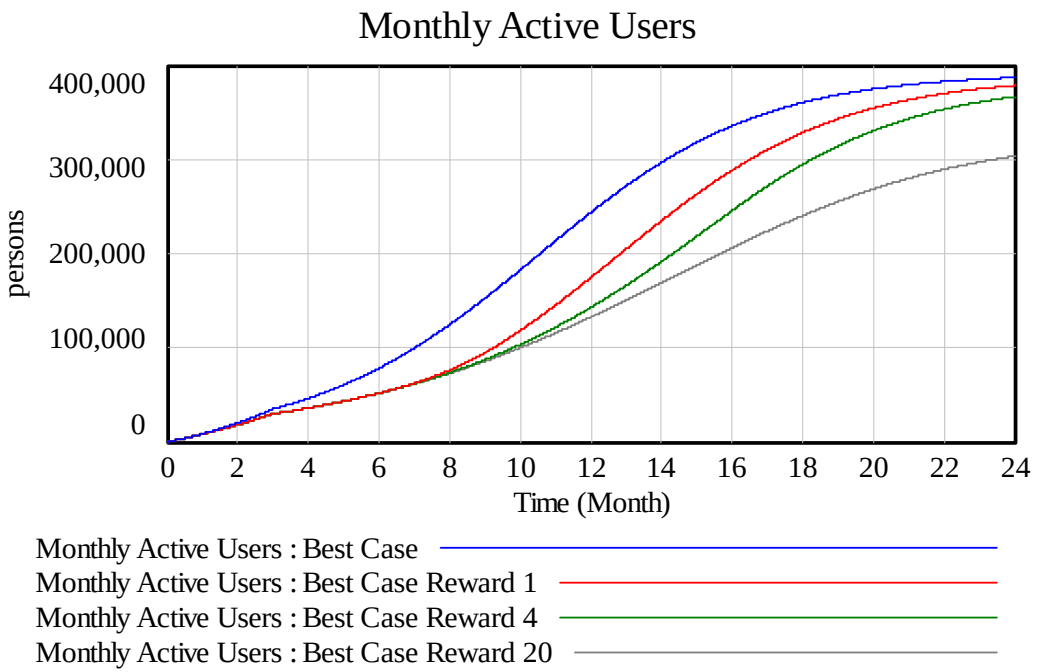
- Average engagement time and ROI



Simulation Results without competition



Reward satisfaction scenario	Active Users	Return on Investment
Best Case (100% satisfaction)	386,942	168,752
1 monthly reward expected	378,527	-84,855
1 weekly reward expected	366,640	-248,491
1 daily reward expected	303,485	-577,494

Simulation Results without competition

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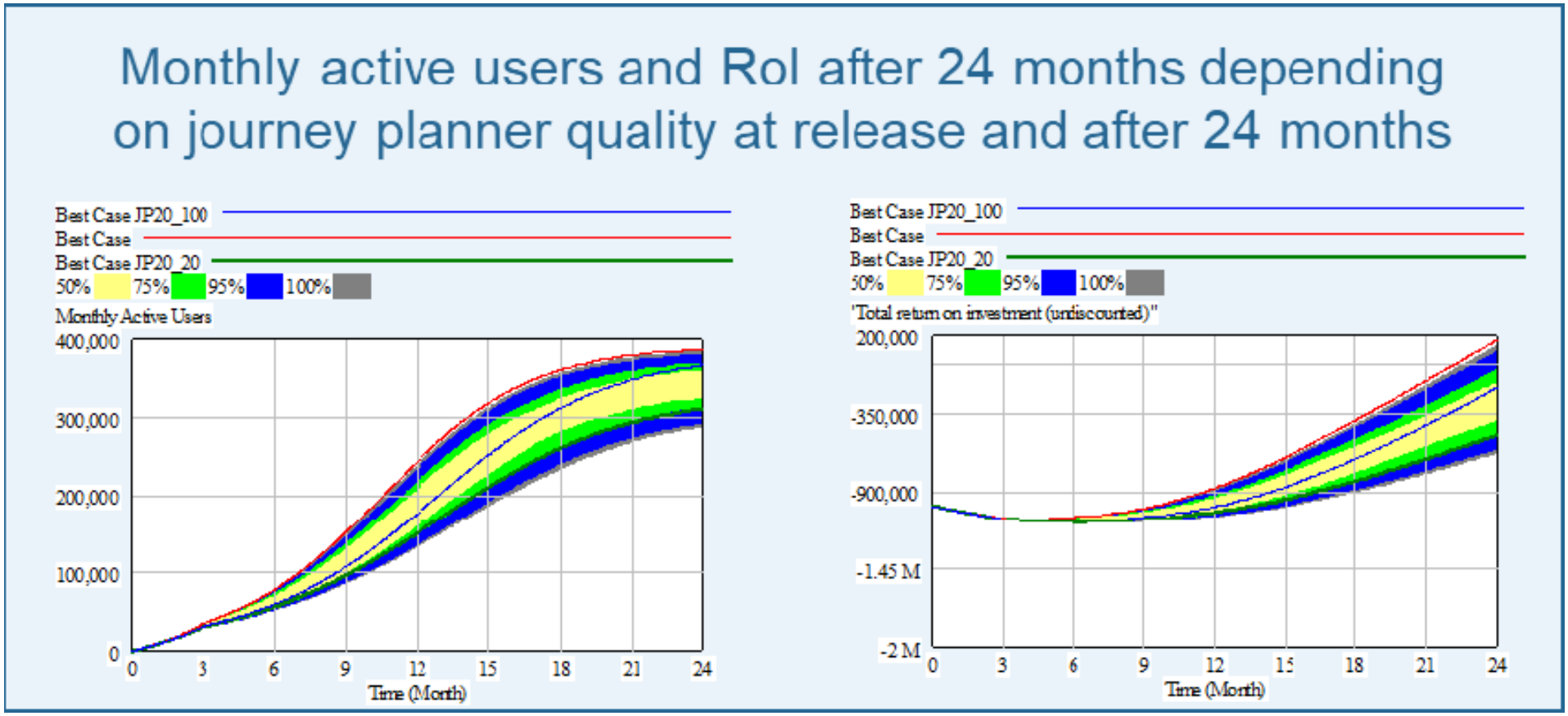
- Quality of Journey Planner (0 – 100%)



Simulation with competition

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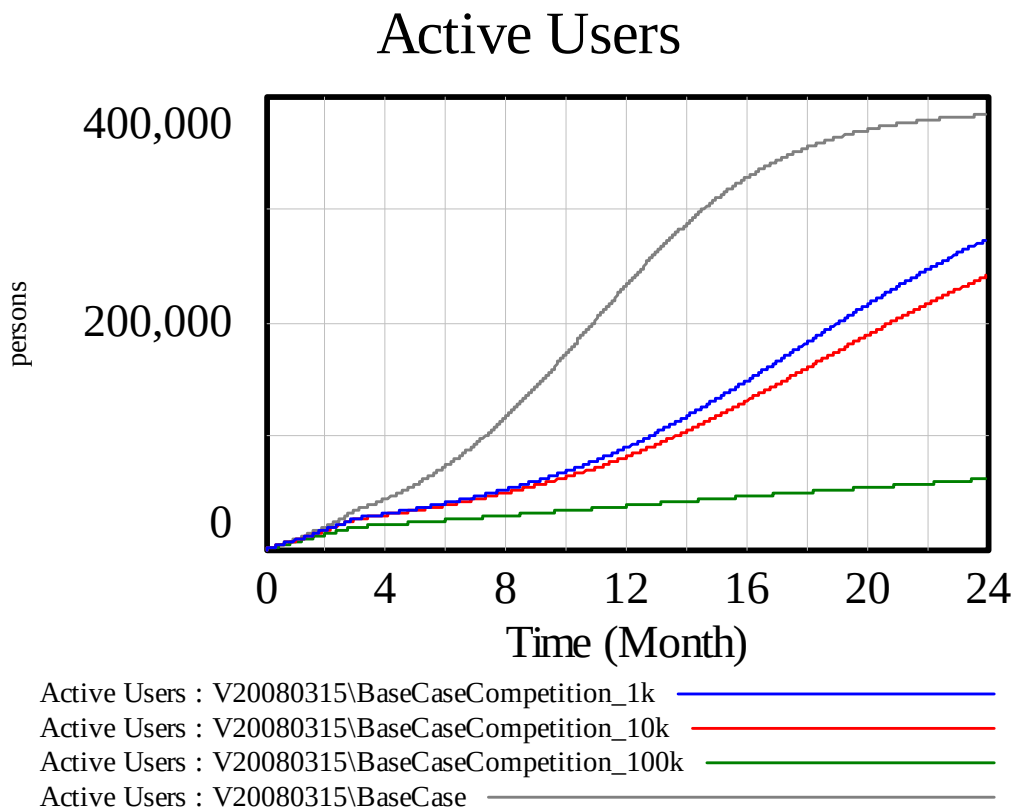
- Introduction of a competitor app leads to massive drop in users, even if only few use it at the start



Conclusions

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- Quality of the journey planning and reward functionality of the app are key factors for user satisfaction & average engagement time
- Attractivity for new operators to join very dependent on their objectives for the app (additional revenue), important to start with largest
- Low satisfaction levels delay and decrease app uptake considerably (reinforcing loops)
- Presence of competitor app significantly reduces app adoption

Outlook

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- More detailed research on factors influencing user satisfaction and how these affect engagement time
  - reward schemes, modes included, personalization, ...
- User surveys planned once app is released
- Data on revenues and costs need verification, sharing of ticketing revenues between operators crucial
- Extension of model to differentiate between user types
- ‘hypothetical’ SD model helped to understand structures and key factors driving commercial success of the app (reinforcing loops!)
- Data, data, data!!!