

Evaluation report

Title pilot: CO2 Fit Challenge

Name partner: Baron Mobility Service

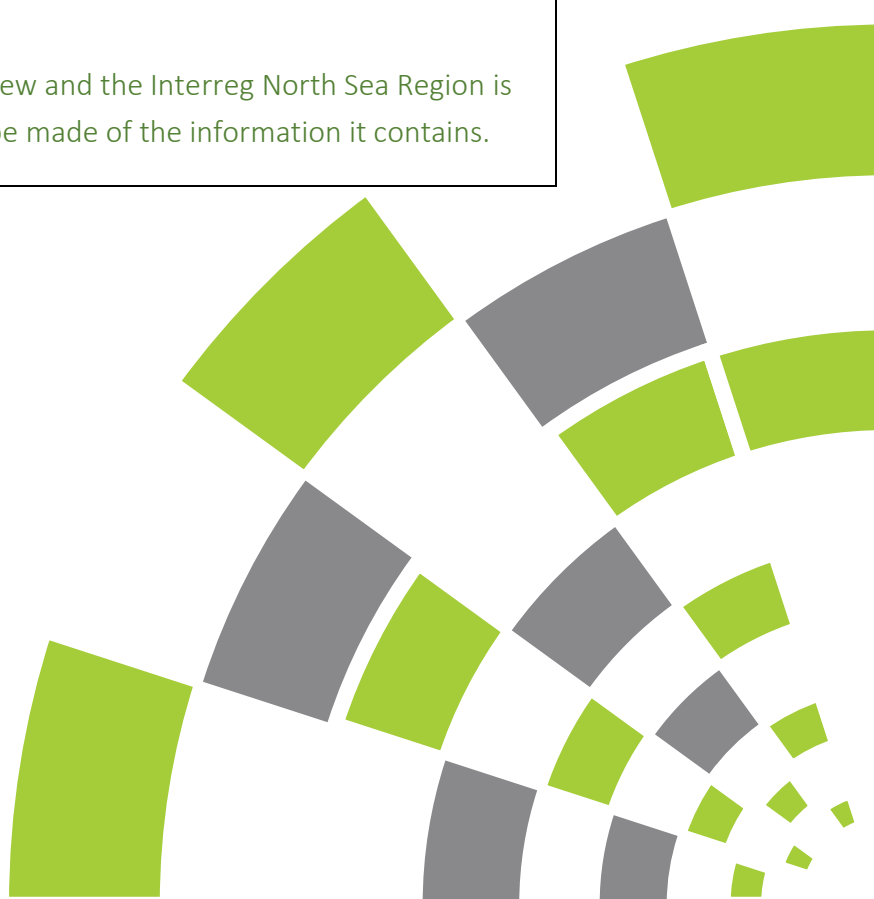
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Short description

Baron mobility service GmbH (with its brand mein-dienstrad.de) organized a CO2 Fit Challenge by which Baron wanted to investigate the impact of a gamification-based app on cycling behavior. The app Changers Fit has more extensive tracking and gamification options than apps used in earlier pilots and allows, for example, automatic tracking and linking with various smartwatches such as Garmin, Fitbit and Misfit. The app is oriented at motivating users by the elements of competition, rewarding, info on CO2 savings and emissions as well as statistics on the cycling and mobility behavior and bringing people together (in a community).




Type of ITS

App with gamification and functionalities that enable group competition, contains an indicator of CO2 emission reduction (while cycling instead of motorized mobility) and allows for some elements of community building.

Timeline

March 2022	April 2022	May 2022	June 2022	...	September 2022	October 2022
Tender						
	Analysis of offers					
	Cooperation talks					
			Installation and preparation of the pilot			
		Promotion and user acquisition				
				Pilot launch		
				Implementation phase		
					Evaluation	

Legend

	Baron mobility service GmbH
	App-Provider
	Both partners

Hypothesis

In the CO2 Fit Challenge, Baron wanted to test the research question to which extent an app with gamification functions contributes to an increase in bicycle use and achieves the BITS goal of a 10% increase in bicycle use. This pilot with a different gamification app of Baron Mobility Services also wanted to investigate which app-functions play a crucial role for motivating to cycle. It is hypothesized that competition, CO2 emission reduction and community-building are important motivators.

Data sources

- Survey data at the start and the end of the pilot in both participating companies
- Data collected by the app on CO2 emission reduction, different modes of mobility use by participants,...

Analysis

Report of the pilot

Technology

The CO2 Fit app allows for different tracking options, from manual tracking, Google Fit, Apple Health to wearables like Garmin, Fitbit or Misfit. Automatic tracking is also possible and recommended to use during the challenge. This setting records all routes, whether on foot, by bike, by car, by public transport or even by plane and detects the used mode of transportation. Based on this data, a CO2 profile is created, displaying the saved and the emitted CO2 emissions. The CO2 Fit app also provides the function of a community, where the users can share their cycling experiences. Furthermore, the app provides health and lifestyle activities, in which the users can participate, set reminders, get tips, watch videos and earn points.

Methodology

The CO2 Fit Challenge, also called “MeinDienstradeln Challenge” in German had its start in the beginning of September. Two companies with headquarters in cities in the German states Schleswig-Holstein, Sachsen, Hamburg, Brandenburg and Berlin launched the CO2 Fit Challenge within their companies and with their employees on the 1st and on the 5th of September.

One company is a big company with headquarters in all of the mentioned states above. It is a former very active participant of the Business Bike Challenge and already familiar with these kind of cycling challenges. In the Business Bike challenge 50 employees of this company participated actively in the challenge, who cycled a total of around 16.500 km by bike. In the CO2 Fit Challenge, a total of 120 employees from this company participated, divided over 7 teams. Together they cycled a total of 32.105 km in one month.

The other company is a smaller company, located in a small town close to Hamburg. It is their first time in participating in a bicycle challenge. 9 employees participated, who cycled 2.290km in 1,5 months.

At the start, in September 2022, a first survey was held as a baseline measure, in order to be able to track subsequent changes and compare results. A final survey was conducted at the end of the pilot, in October 2022. The surveys allowed for a pre- and posttest to assess to what degree there was an uptake in cycling during the challenge and a decrease in motorised forms of mobility. The app delivered data on the number of km's cycled, and the total CO2 reduction as a result of the challenge.

Results

Based on the questionnaire for both companies together there was a decrease in car-use (both private or company car) of 8,6%-points for commuting and an uptake in cycling of 5,9%-points. For mobility during

the working hours there was a slight uptake in car-use of 1,6% and an increase in cycling of 6,7%. For mobility outside the working context there was a strong drop in car use of 33,0% and a strong uptake in cycling of 22,7%.

These data indicate in general a modest (commuting) to strong (outside working hours) uptake in cycling that is associated with the pilot. If every participant had been using a car in total 20.294 kg CO2 would have been created.

Experience of users

35,1% 'would recommend' the app to others, 36,6% 'would perhaps recommend' the app and 22,1% would not recommend the app to others, the remaining 6,5% choose the 'another' answering option. From the respondents of the larger company 34,6% of the participants indicated that they were cycling more since participating and 11,5% noted they cycle longer distances, 52,3% saw no change in cycling behavior.

Comparing the number of kms cycled on a weekly basis we assumed that the group who indicated to have cycled between 0 and 20 km – the survey predefined 7 categories – had on average cycled 10 kms, the group between 20 and 40 on average 30kms and so on... The group between 100 and 200 was estimated to have cycled 150km and the group that indicate 'above 200 km' was estimated to have cycled on average 250 kms. A global average indicated that before the pilot participants cycled 33,0 km while at the end of the pilot the average number of kms increased to 62,3 kms.

These additional numbers further support the finding that the user experience of the app is generally positive and that it has a positive impact on the uptake of cycling in a substantial group of users. Further research should focus on long term effects of the app-use.

Respondents to the survey had the opportunity to offer more qualitative reviews of the app. Most suggestions indicate the presence of certain bugs, connectivity issues and concerns about data & battery consumption of the app.

Impact

The app indicates that 7.908 kg of CO2 or 40% of that number has been avoided because participants were walking, cycling or car-pooling/taking public transport.

Obviously even before the pilot people were cycling, walking, car-pooling or taking public transport, so the number has to be corrected by the estimate change in car-use as a result of the pilot, based on the reports of the pre- and posttest surveys.

The estimated effects of the pilot based on the comparison of both gives us some indications, unfortunately, however, we have no information on the amount of km's that corresponds with the drop in 'car use for commuting' of 8,5%, an 'increase in car use during working hours' of 1,6% and a decrease in car use (outside the work context of 33,0% outside work for each category separately. The real decrease of CO2 emissions as a result of the pilot depends on the amount of kms for each of these categories.

If we assume that these categories account on average for the same number of km's, the average of these changes would translate in a decrease of 13.3% in km's driven by car what would result in a similar relative drop in CO2 emissions as a result of the project.

With respect to the uptake in cycling for each of these categories, a respectively 5,9%-points, 6,7%-points and 23,7%-points could be expected. If we follow the same logic as above there would be an average increase in bicycle uptake of 12,1%.

Based on these number the pilot achieved its objectives and the overall BITS objectives. It is important to notice that these numbers are theoretical and based on a set of untested assumptions (e.g. importantly the numbers of km for each category, the logic behind the CO2 emission reduction by avoiding a car ride the app uses). In addition, we could not compare the characteristics of the respondents of the pre- and posttest sample (that may or may not tell us something about some forms of bias). However, we can conclude that the numbers show that the app and its gamification aspects can motivate people to cycle more and as such has the potential to contribute to reduced CO2 emissions.

Potential based on bits survey

The Oldenburg pilot involved the employees of 2 companies. Based on the BITS survey we can try to assess the appeal the app has with the broader population of Oldenburg.

38,2% of the Oldenburg inhabitants who participated in the BITS survey (N=1503) indicated that they would be inclined ('probably or definitely yes) (to use, if given the chance, an app that gives one rewards (points or vouchers) and stimulates competition with other cyclists'. 31% to use 'an app showing how many emissions one saved by riding a bicycle instead of a car'. 17,6% to use 'an app that brings one together with other people looking for cycle buddies'.

It is clear that a substantial part of the population would welcome an app that include functionalities that are at the heart of the Oldenburg pilot. Given its potential to change mobility related behavior, targeting the broader population with the app could have a substantial impact.

Experiences project managers

The project managers indicate that the data collected support the conclusion that the app works: the employees of the participating companies cycled more because of the challenge and the gamification app. The bicycle use compared to car use for commuting and in leisure time activities substantially increased.

Some observations from the pilot:

- Draw attention to the possibility of bike leasing in the participating company - Customer loyalty
- The pilot allowed to compare different gamification apps and different app functions
- Some app problems were present in the beginning and also during the pilot: app did not work on some smartphones, routes were not recorded correctly, kilometers got lost... The pilot increased the awareness about the importance that apps in order to be effective must be very easy and mutual to control in its functionalities: reliability is crucial and tracking should start automatically and without any difficulties.
- It was difficult to find participating companies for the challenge due to the timing after the summer holidays, the limited time frame was a handicap for this pilot.

Based on their experience, lessons-learned are formulated:

- Short challenge periods
- There needs to be an incentive, for the challenge and especially for the participation in the evaluation
- Data protection of mobility data is always a crucial topic in this kind of implementations and has to be discussed and coordinated with different parties
- Team-competitions and internal challenges between certain groups – e.g. between employees or departments are a big motivation factor for participating in these kind of challenges
- Implementation needs to be planned many months before the start
- It is important that the company's staff members responsible for the challenge, carry and push the challenge internally
- Reliable and well-functioning app right from the start, otherwise the motivation effects do not take place or demotivation will happen
- Display of statistics and route map in the app is a big motivation factor
- Data for evaluation should be included in the app
- For company challenges: It would be interesting to differentiate between leisure routes and work routes to and back from the workplace and to reward these routes differently and to differentiate in the statistics about the commuting behavior

Conclusions

The CO2 Fit app pilot was clearly aligned with the overall BITS goals and successfully reached its goals. The app has the potential, at least in the short term, to change mobility related behavior, increases the uptake of cycling and decreases the use of cars primarily with respect to commuting and mobility outside of the work context. Follow-up evaluation efforts should focus on its long-term impact on behavior and its effects in other target groups within the population.

Regarding the question of the effect of app-functions on the cycling behavior, Baron compared the different apps Ciclogreen and the Changers Fit app. Furthermore, Baron considered the app experiences, the realization from the evaluation recommendation workshop and also asked for feedback from the DRK employees, which functions/characteristics an app should have for motivating to cycle on a long term. Through these sources, Baron could conclude that reliability, precise recording and easy operation of a tracking app are very important factors for the motivation effect of a gamification and tracking app. This also includes the possibility for automatic recording for a good user experience. An easy registration and installation process, as well as team rankings and detailed statistics in the app also play a crucial role for the motivation to cycle.