Cycling motivation and the impact of ITS

Results of the large-scale BITS survey

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Abstract

Within the scope of the multi-stakeholder Bicycles and ITS project, a large-scale questionnaire on cycling and ITS was executed. Over 7000 respondents completed the survey about their cycling behaviour, motivations and barriers to cycle, perceptions on infrastructure and views on ITS in cycling. Using the survey results, the position of ITS in cycling is studied in this paper. With a cluster analysis, different types of cyclists (Happy cyclists, Diehards, Procrastinators and Car fanatics) were distinguished and it was analysed how they perceive ITS in cycling. It can be concluded that ITS still has a large growth potential within the field of cycling. Both diehard cyclists and occasional cyclists would be encouraged to cycle more often using ITS technologies. Experienced cyclists are most interested in ITS improving efficiency. It can be argued that ITS is an important solution in the strive for more people on a bicycle and thus more green transport.

Introduction

Congestion, a growing population, pollution, and health problems threaten the liveability of many urban areas in the world today and therefore a modal shift to more green transport is urgently needed. In the past, cycling proved to be an important part of the solution for these challenges. However, the experience of cycling itself can be much improved in terms of efficiency, safety, comfort etc. The increase of cycling data can contribute to this and allow to better position cycling within the multimodal transport system.

With the Bicycles and Intelligent Transport Systems (BITS) project, ITS solutions will be implemented in cycling (BITS Project, 2021). The project is an initiative of Interreg North Sea Region and involves different European partners. The lead beneficiary is the Province of Overijssel from the Netherlands. The consortium is formed by two regional authorities (provinces Overijssel (NL) and Antwerp (BE)), four local governments (municipalities Zwolle (NL), Bruges (BE), East Riding of Yorkshire (UK), and Aarhus (DK)), two knowledge and research institutions (University of applied sciences VIVES (BE) and University of Oldenburg (DE)), one interest organisation (Cycling Industries Europe), and one enterprise (Baron Mobility, DE).

The BITS project has several aims. Firstly, ITS solutions will be implemented in the participating cities and regions with the goal to increase the take-up of cycling and to reduce CO2 emissions. Secondly, a CyclingDataHub will be created in which cycle data will be collected, shared, analysed and visualised. Thirdly, the collected data of the ITS pilots and of the CyclingDataHub will be used to get insight in cyclists' needs and to improve cycling policies. Finally, the ITS datasets and methodologies will be used to anchor cycling into broader mobility policies, striving for a multimodal future. The ITS applications and the cycling

data will allow others to use these cycling data for future applications and policies. The effectiveness of ITS solutions will be evaluated, challenges identified and results disseminated to other regions.

The project started in January 2019 and will end on December 31, 2022.

BITS survey

Within the scope of the BITS project, a large-scale survey on cycling and ITS was rolled out in the different participating regions and cities. Over 7000 respondents completed our survey and shared their cycling experiences and their interest on ITS in cycling.

The main goal of the survey was to get insight into people's cycling behaviour as well as their perceived motivations and barriers for cycling. Why do people use their bicycle and what prevents them from cycling or from cycling more? Moreover, their interest in ITS technologies in cycling was questioned. It was investigated whether respondents would be encouraged to cycle more using ITS and what type of ITS interests them most.

In this paper, it is studied how ITS can contribute to the domain of cycling. Is ITS capable to make cycling safer, make it more efficient, bring more comfort, etc.? Can the use of ITS result in a growth of cyclists? What is the potential of the integration of cycling ITS into the wider mobility system? Using the large-scale BITS survey, answers to these questions will be given in this paper.

Research design and methodology

The BITS survey was developed during the first year of the BITS project. The content of the survey was discussed with the project partners and feedback was given during the process of developing the survey. In the spring of 2020 the survey was rolled out. It was chosen to roll out the survey in the cities and regions of the six project partners implementing ITS pilots.

To ensure a certain amount of responses, coherent for all six project partners, it was chosen to work together with a market research agency collecting a certain amount of completed surveys. For five of the six participating partners (Zwolle, Bruges, East Riding of Yorkshire, Aarhus and Oldenburg) 300 completed surveys for each partner were delivered. On request of the Province of Antwerp 1000 completed surveys were collected in their region. In total the market research agency collected 2500 completed questionnaires. These completed surveys were collected in April and May 2020.

Next to the cooperation with a market research agency, partners were given the option to share an online link of the survey among their inhabitants via SurveyMonkey, to increase the amount of completed surveys.

Four partners (Zwolle, Bruges, Antwerp and Oldenburg) chose to use the online link to have more respondents. In total 4583 people completed the online survey, which brings the total of completed BITS surveys to 7083. In Table 1, the exact amount of respondents per region and per type of data collection can be found. The SurveyMonkey data was collected in May and June 2020.

Table 1 – Total amount of respondents BITS survey

Project partner	Market research agency	SurveyMonkey	Total
Province of Antwerp (BE)	1000	2459	3459
City of Bruges (BE)	300	646	946
City of Oldenburg (DE)	300	1203	1503
City of Zwolle (NL)	300	275	575
City of Aarhus (DK)	300	0	300
East Riding of Yorkshire Council (UK)	300	0	300
Total	2500	4583	7083

The survey consists of different parts: (1) socio-demographic information such as year of birth, gender, and living environment; (2) modes of transport used at the moment; (3) current bicycle use and willingness to cycle in the future; (4) motivations for cycling (health, pleasure, environment etc.); (5) barriers to cycle and elements preventing and promoting cycling; (6) perception on cycling infrastructure in their local area; (7) interest for ITS in cycling. Finally, to each regional survey, some specific questions were added. The project partners were given the option to add questions to their interest to the survey that was rolled out in their city or region.

The data were analysed first with descriptive analyses and ANOVAs. Afterwards, a cluster analysis (K-means, Euclidean distance, Ward's method) was executed based on motivations for cycling resulting in four types of cyclists. These motivations for cycling were selected and constructed after an intensive literature study on the topic of cycling and after discussions with experts in the field of cycling.

The data sample used for all analyses except the cluster analysis is a set of 5331 respondents. In this data set the respondents of the SurveyMonkey questionnaire for the province of Antwerp not living in the province itself were left out in order to avoid a skew towards respondents from this subdivision of the survey. The cluster analysis was based on a valid sample of 3881 respondents.

Results

In what follows, the results of the analyses on the BITS survey data will be discussed. First, socio demographic information of the respondents and motivations for cycling will be described. Afterwards, the results of the cluster analysis based on cycling motivations will be described. In a third part, a closer look will be given to the ITS and the interest of different groups of respondents.

Socio-demographic information

Gender was well-balanced over sexes: 51% of the respondents are female. More young people completed the survey: 24% are below 30 years old, 28% are between 31 and 40 years old, 22% are between 41 and 50 years old, 16% are between 51 and 60 years old and 11% are 61+. More than 55% of the respondents live in the centre of a municipality, 40% live in the suburbs of a municipality and 5% indicated that they live on the countryside. When taking a look at the family situation, 36% of the respondents live with partner and another 30% live with partner and children, 5.5% live with children but without partner, 19% live alone and the last 10% live with friends, with their parents or in other living situations. In our sample, 13% obtained primary or lower secondary education as highest qualification, 39% completed upper secondary education, 26% obtained a bachelor's degree or similar and 22% obtained a master's degree, postgraduate degree or higher as highest qualification. Finally, we also questioned their current professional situation. More than half of the sample works full-time (55%) and another 15% work part-time, 10% are students, 5% are temporarily not working, 4% run a household full-time, 7% are retired and 4% are unemployed.

Motivations for cycling

Respondents were given 25 motivations to cycle or not cycle and were asked to which extent they agreed with the statements. The results can be found in Table 2. More than four out of five think cycling is relaxing (81%) and even more respondents indicate that they like cycling (88%). Respondents are also convinced of the health advantages of cycling: 88% indicate that cycling is good for their health and for 68% it reduces stress. Next to the health benefits, respondents are well aware of the environmental benefits of cycling. More than 95% of the respondents is convinced that cycling is good for our environment and 89% indicate that cycling instead of using motorized transport helps against climate change. More than two third of the respondents say that cycling allows them to discover new places. Finally, more than 75% indicate that cycling is a cheap mode of transport.

Table 2 – Motivations to cycle

	Strongly disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Strongly agree
I think cycling is dangerous and/or scary	39%	27%	16%	14%	4%
I think cycling is relaxing	2%	5%	12%	40%	41%
Cycling is good for the environment	1%	1%	3%	16%	79%
Cycling helps me arrive at my destination faster compared to other modes of transportation	6%	14%	26%	32%	22%
Cycling is too expensive	56%	26%	12%	3%	3%
I like cycling to be alone	10%	10%	33%	29%	18%
Cycling allows me to discover new places	1%	6%	21%	41%	31%
Cycling is a fast and efficient way to reach my work place	21%	7%	20%	17%	35%
Cycling is not possible for me practically	61%	13%	12%	7%	7%
As a cyclist, you are too much dependent of the weather and other environmental factors	14%	20%	26%	29%	11%
Cycling helps me to reduce stress	5%	6%	21%	41%	27%
I think cycling is safe	6%	19%	31%	33%	11%
Cycling reduces CO2 emissions	1%	1%	6%	15%	77%
Cycling helps me sleep better	4%	3%	37%	36%	20%
I think cycling is a cheap mode of transport	2%	5%	17%	36%	40%
I like cycling with others	2%	10%	31%	37%	20%
Cycling is good for my health	5%	1%	6%	29%	59%
I like cycling	1%	3%	8%	32%	56%
Cycling instead of using motorized transport helps against climate change	1%	1%	9%	22%	67%
I think cycling is complicated (organisation etc)	34%	25%	21%	14%	6%
I think cycling is unhealthy (air pollution etc)	51%	28%	14%	4%	3%
I think cycling is a waste of time	63%	22%	12%	2%	1%
I think cycling is exhausting	53%	22%	17%	6%	2%
Cycling keeps me fit	3%	1%	13%	42%	41%
I think cycling is boring	57%	24%	14%	3%	2%

Types of cyclists

Using the answers on the 25 motivations to cycle, clusters of types of cyclists were constructed. Firstly, the 25 motivation items (such as I like cycling, cycling is safe, cycling is good for my health etc.) were grouped

into seven subdimensions (fun, safety, health, environment, practical, financial and social reasons). In the cluster analysis, respondents scoring the same on a combination of the subdimensions were grouped together. This resulted in four groups of respondents. The respondents within one group were more similar to each other concerning the cycle motivations compared to the respondents in other groups.

In a second step, we tried to find out what characterized the four clusters and what made each cluster different from the other clusters. How do the clusters score on cycle use, willingness to cycle, barriers to cycle etc. and what differentiates the clusters? This analysis resulted in the following four types of cyclists: Happy cyclists (n = 1428), Diehards (n = 1085), Procrastinators (n = 1035), and Car fanatics (n = 323). Below, the cycling behavior of the different clusters will be described. Afterwards, we will describe the opinions of the different types of cyclists on cycling infrastructure and ITS in cycling.

Types of cyclists and their cycling behaviour

The Happy cyclists are people who regularly use their bike; 79% is a frequent cycler, which means they cycle at least once a week. In the total sample, 75% is frequent cycler. Three out of four uses their bike more than once a week for shopping, while six out of ten uses the bike more than once a week for commuting. More than half of the Happy cyclists would like to cycle more as a leisure activity.

Although Happy cyclists are regularly using their bicycle, Diehards are cycling even more. 95% of them are frequent cyclers and thus cycling more than once a week. They use their bike very often for shopping, commuting and for sport. And these people score very high on all cycling motivations.

The third cluster are the Procrastinators. These people use their bike often; more than one out of two is a frequent cycler. However, more than other clusters, these people have high aspirations to cycle more in the future. 40% want to cycle (a lot) more for commuting, 54% want to cycle (a lot) more for shopping and travel to family and friends and 62% would like to cycle (a lot) more as a leisure activity in itself. In the total sample, 29% would like to cycle (a lot) more for commuting, 41% would like to cycle (a lot) more for shopping and travel to family and friends, and 54% would like to cycle (a lot) more as a leisure activity in itself.

Finally, we have the Car fanatics. Among these people only a small number is frequent cycler and they use their car very often. Three out of four car fanatics use their car daily or several times a week, compared to 46% of the total sample. These people also show low aspirations to cycle more in the future, except for sport. They also score least positive on the cycling motivations.

Within the clusters a mix of personal characteristics is found. No clustering on personal characteristics was made, so often similarities between clusters were found. However, also some interesting differences

between the clusters appeared. The Procrastinators and Car fanatics are on average younger (respectively age 36.9 and 38.1) compared to Happy cyclists and Diehards (respectively age 40.7 and 43.3). Car fanatics live more often in the centre of a city compared to the other clusters (68% compared to 53 to 59%). Happy cyclists and Diehards are on average higher educated compared to Procrastinators and especially Car fanatics. In proportion, more people running a household full-time and unemployed people can be found among the Car fanatics and more retired people can be found among the Diehards. In Table 3, an overview can be found of the proportion of each type of cyclists within the demographic characteristics. All described associations between the types of cyclists and a demographic variable are significant at $p < .05$.

Table 3 – Proportion types of cyclists within demographic characteristics

	Happy cyclists	Diehards	Procrastinators	Car fanatics	Total
Gender					
Male	37%	30%	26%	7%	50%
Female	37%	27%	26%	10%	50%
Age (mean)	40.7	43.3	36.9	38.1	40.2
Living environment					
City centre	36%	29%	25%	10%	57%
Suburbs	39%	28%	27%	6%	37%
Countryside	32%	21%	37%	10%	5%
Family situation					
I live alone	30%	27%	31%	12%	18%
I live without partner, with children	35%	18%	37%	10%	5%
I live with my partner	40%	26%	25%	9%	34%
I live with my partner and children	41%	30%	23%	6%	32%
I share a house with friends	26%	50%	21%	3%	4%
I live with my parents	35%	17%	43%	5%	5%
Other	14%	29%	22%	35%	1%
Education					
Primary education	30%	10%	52%	8%	2%
Lower secondary educ. (age 12-15)	39%	13%	35%	13%	10%
Upper secondary educ. (age 15-18)	34%	21%	32%	13%	37%
Bachelor's degree or similar	40%	31%	22%	7%	27%
Master's degree or higher	36%	43%	19%	2%	24%

Professional situation					
I am a pupil or student	29%	29%	37%	5%	11%
I work full-time	38%	28%	25%	9%	56%
I work part-time	43%	32%	23%	2%	16%
I am temporarily not working	34%	19%	39%	8%	6%
I run a household full-time	20%	17%	30%	33%	3%
I am in retirement	33%	42%	22%	3%	4%
I am unemployed	35%	12%	25%	28%	3%
Total	27%	37%	28%	8%	100%

Types of cyclists and their view on cycling infrastructure and ITS in cycling

After defining the types of cyclists, their perception on cycling infrastructure and ITS will be investigated. All associations described below are significant at $p < .001$. Although all types of cyclists show a high willingness to cycle more in the future as a more sustainable way to travel, Happy cyclists (65%) and Diehards (73%) more often partly or fully agree compared to Procrastinators (60%) and Car fanatics (54%). In total, 43.5% (somewhat) agree to be willing to make more use of multimodal transport in the future. Procrastinators score the lowest (34%) while Diehards score the highest (50%) on this thesis. Only about 30% of the respondents is (somewhat) satisfied with the investments and initiatives of their government concerning bicycle policy in the region. The dissatisfaction can mainly be found among Diehards (58%) and Happy cyclists (45%). Procrastinators (39%) are to a lesser extent dissatisfied and only a small group of Car fanatics (21%) is dissatisfied.

When taking a look at cycling infrastructure specifically, interesting differences between types of cyclists can be found. A complete overview can be found in Table 4 below. Compared to Procrastinators and Car fanatics, mainly Happy cyclists and Diehards are unsatisfied with cycling infrastructure. Often one out of three to one out of two or more indicated they are (rather or really) unsatisfied. In general cyclists are mainly unsatisfied with the condition, the safety, and the width of bicycle paths and the safety of bicycle crossings. Comparable with what was indicated before, many people are unsatisfied with investments of the government to make cycling more attractive.

Table 4 – Proportion of respondents unsatisfied with cycle infrastructure in their area

	Happy cyclists	Diehards	Procrastinators	Car fanatics	Total
Sufficient bicycle paths	36%	34%	34%	27%	34%
Condition bicycle paths	59%	52%	46%	29%	51%
Safe bicycle paths	49%	42%	34%	37%	43%
Safe (bicycle) crossings	51%	49%	37%	25%	44%
Sufficiently wide bicycle paths	54%	56%	40%	34%	49%
Cycle friendly roads	45%	47%	38%	27%	42%
Illuminated bicycle paths	36%	29%	29%	28%	32%
Availability bicycle highways	39%	50%	30%	27%	39%
Sufficient bicycle parking	37%	41%	33%	29%	36%
Availability bicycle sharing systems	20%	18%	25%	21%	21%
Safe or secured bicycle parking	40%	42%	30%	19%	36%
Government investments	46%	55%	33%	28%	43%

Several ITS were proposed to the respondents and they were asked whether they would be encouraged to cycle (more often) by these technologies. The results of the analysis for each type of cyclists can be found in Table 5. Overall, respondents are (rather) enthusiastic about the ITS technologies in cycling. The technologies that would encourage respondents most often to cycle (more) are an app that prevents bicycle theft or that can help locate the bicycle after theft (73.3% would be encouraged to cycle more[1]), a sensor at traffic lights that detects the approach of the cyclist and prompts the traffic lights faster into a green light (68.3%) and an app showing the fastest route to the destination (62.7%). The least popular technologies are an app helping the cyclist to find a cycle buddy (18.7% would be encouraged), an app with gamification aspect, giving rewards when cycling and stimulating competition with others (36.2%) and an app showing how many emissions were saved by riding a bicycle instead of a car (37.5%).

Some remarkable differences between the types of cyclists can be seen as well. In general, procrastinators would be most encouraged to cycle more with the ITS, while Diehards and Car fanatics are least encouraged. Mainly people who cycle already often are interested in apps for fastest and scenic routes (Happy cyclists, Diehards and Procrastinators). Diehards are less interested in apps with nudging elements (app giving rewards), but they are a lot more interested in technologies increasing efficiency (sensor at traffic lights and app showing fastest route).

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[1] Proportions based on full sample (n=5331), not on valid sample for cluster analysis (n=3881)

Table 5 – Proportion of respondents that would be encouraged by ITS to cycle (more often)

	Happy cyclists	Diehards	Procrastinators	Car fanatics	Total
App giving the safest route	48%	41%	42%	30%	43%
Informative LED lights on bicycle paths	53%	41%	56%	47%	50%
App giving health info while cycling	42%	33%	47%	29%	40%
Nudging app giving rewards	37%	33%	43%	35%	38%
App giving the most scenic route	67%	67%	55%	33%	61%
App showing your saved emissions	37%	40%	42%	30%	39%
Traffic light sensors prompting green light	74%	81%	68%	46%	72%
App giving the fastest route	66%	64%	66%	48%	64%
App or signs giving the real cycle time	65%	54%	61%	45%	59%
Theft prevention app or bike locator after theft	77%	76%	76%	56%	74%
Sensor showing free parking space	49%	52%	50%	29%	48%
App for finding cycle buddy	17%	13%	21%	24%	18%

When respondents were asked what type of apps they currently use, mainly apps giving information on cycling conditions (e.g. weather info) and cycling routes were used. In general, Diehards make most use of one or more apps when cycling (74%), followed by Happy cyclists (64%), Procrastinators (51%) and finally Car fanatics (40%). Across all type of cyclists, 70% of the respondents agreed that apps can give them a lot of useful information. However, main reasons to refuse the use of apps in cycling are privacy and distraction while cycling. Of the Diehards, 43% is worried about their privacy when using cycle apps. About the same number of Happy cyclists (39%) and Procrastinators (36%) follow this opinion. 30 to 40% of the Procrastinators, Happy cyclists and Diehards indicated that apps can distract them while cycling. Only a small percentage (6.5%) indicated that not knowing how an app works is a reason not to use apps for cycling.

Interest for ITS in cycling

In this final part, we will take a closer look to the groups of respondents interested in ITS in cycling. Before, we discussed the interest in ITS of the types of cyclists, now we'll look at socio-demographic characteristics. Except on the living environment variable, all associations with socio-demographic characteristics are significant at $p < .001$. Concerning the living environment, some associations appear not to be significant

(LED lights, app giving health info and app giving fastest route), and some are significant at p < .05 (real cycle time and theft prevention).

When looking at age, young people seem more interested in efficiency improving ITS. They would be more encouraged to cycle compared to other age groups by the sensor at traffic lights, the real cycle time app or road signs, the app giving rewards when cycling and the app showing the fastest route. Especially the group of respondents between 10 and 20 years old shows a lot more interest in all ITS, however this is a rather small group of respondents, hence no firm conclusion can be drawn. Older people show more interest in the LED lights giving information. They are on the other hand not at all interested in the nudging app. The app showing the most scenic route is rather popular among all age groups (average of 59.4%), however this app is among older people even more popular: more than 60% of people above age 51 would be encouraged to cycle (more) and more than 69% of people above age 61.

In general we see that women score more positive on the ITS compared to men. Women would certainly be more encouraged compared to men for the app showing the safest route (46.3% vs 39.9%), for the app showing the most scenic route (63% vs 55.8%), for the app showing how many emissions were saved by riding a bicycle instead of a car (44.2% vs 30.6%), for the app showing the fastest route (67.5% vs 57.5%), for the app or signs showing the real cycle time (64.3% vs 53.7%) and for the app preventing bicycle theft (76.1% vs 70.5%).

Whether someone was living in the city centre, in the suburbs of a city or municipality or on the countryside did not really make a difference in their interest in the ITS.

On the contrary, differences between family situations of the respondents were found. Some ITS were remarkably more popular among parents living with their children. This was the case for the app giving the safest cycle route, for the app giving the fastest cycle route and for the app for theft prevention. The sensor at traffic lights is a popular ITS among respondents living with their partner, with their partner and children and with friends. People living alone show less interest in efficiency ITS such as the sensor at traffic lights, the app fastest route and the real cycle time.

Also between educational background, interesting differences were found. Higher educated respondents (bachelor's or master's degree) would be more encouraged by the app giving the most scenic route, the sensor at traffic lights turning faster to green and the sensor showing free parking space. Lower educated respondents (lower or upper secondary education) show more interest in the informative LED lights.

Finally, some differences based on the current professional situation of respondents can be found. Students show more interest in the app giving rewards, while retired people are a lot less interested (52.5%

vs 18.4%). Retired people show more interest compared to the other groups in the app giving the safest route and in the app for theft prevention. People running a household full-time and unemployed people show remarkably less interest in the sensor at traffic lights. The app showing the most scenic route is among all respondents rather popular (on average 59.6%), although retired people show even more interest (72.6%) and unemployed are a lot less interested (34.9%).

Conclusions

Within the scope of the Interreg North Sea Region Bicycles and ITS project (BITS project), a large-scale survey on cycling and ITS was executed. Over 7000 respondents completed the questionnaire. We can conclude that many people enjoy cycling; they cycle because it is good for their health and for the environment. Many people also show a strong willingness to cycle more in the future. It was found that respondents were less satisfied with cycle infrastructure and the investments of the government concerning cycling. Moreover, the more people cycled, the less satisfied they are. An important part of the survey questioned people's interest in ITS in cycling. It was studied whether ITS within the field of cycling has a possibility to make cycling safer and more efficient and could be a means attracting more cyclists. Overall a large interest in ITS was found. Different types of people, both concerning socio-demographic characteristics and cycling habits, show different interest in varying types of ITS. We can conclude that a large growth potential for ITS in cycling can be determined. ITS in cycling shows many opportunities to make cycling safer, more attractive, more efficient which will lead to more people on the bicycle and will be a large step forward in the strive to more liveable urban areas and a modal shift to green transport.

Limitations

Although our results are valuable, some limitations should be noted. The data was collected via two different ways. On the one hand, results were collected by a market research agency. On the other hand, partners in the different cities and regions could share an online link to the survey among their inhabitants as much as they wanted. This resulted in differences between the two groups of respondents. It was found that the respondents who completed the survey via SurveyMonkey were more often 'bike lovers'. These people had a higher frequent use of their bicycle and showed a higher motivation to cycle. Likely cycle fanatics take more often the time to complete a bicycle survey compared to car enthusiasts. And also, the survey was often distributed via social media channels from the government or bicycle lobby organisations. Moreover, we saw a lot more people that completed the survey from the Province of Antwerp compared to the other regions and cities. This was a consequence on the one hand because they asked the market

research agency to have more respondents and on the other hand, they recruited more respondents by actively using the SurveyMonkey link.

Although it was not our intention to strive for a representative sample, it is important to take these remarks into account when interpreting the survey results. Even though we didn't have a representative sample, the high number of respondents allows us still to make several conclusions.

This survey has learned us how cyclists in some cities or regions in a few countries perceive cycling. It would be interesting in the future to collect similar data in other cities or regions to compare the results. Moreover, in this study people showed interest in several ITS technologies. Further research is needed in order to study the effects of the actual use of ITS in cycling and whether people are cycling more due to the ITS technologies.

References

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