

How does the general population think about smart features?

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Abstract

Smart surveys potentially offer new features to make the utility of surveys more salient and leverage any objections against surveys. The Smart Survey Implementation (SSI) project aims to involve and engage citizens in the policy design and evaluation which potentially contribute to the gain of trust and participation of the citizen. This can only be achieved by diving into the respondent perceptions within realistic and legitimate smart survey settings. Therefore, as part of the SSI project, the cross-national survey on smart survey perceptions was introduced which aims to provide empirically supported understanding of how citizens feel about surveys with smart features, including how well they understand what is being measured and what they consent to. This survey was conducted in three countries (Italy, Slovenia and the Netherlands). The perception survey consists of a paper questionnaire and in addition respondents are asked to conduct an online questionnaire sequentially. The latter includes four smart feature tasks. During the presentation, results of the survey on smart survey perceptions will be presented, in particular the cross-country differences.

Keywords: Smart surveys, Sensor, Privacy, Survey response, Cross-country

1. Introduction

Surveys employing smart features, so-called smart surveys, are promising for topics that are cognitively demanding or burdensome, that are non-central to respondents, and/or for which questions provide weak proxies to the concepts of interest. While promising for various applications, a prerequisite is that respondents are willing and able to perform the corresponding smart tasks. Furthermore, respondent motivations and hesitations are important in ethical and legal decisions around implementation.

Within ESTAT-funded project Smart Survey Implementation (SSI), the smart survey perceptions study has been conducted in Italy (IT), Slovenia (SI) and the Netherlands (NL) to investigate respondent motivations and hesitations. Field work has been performed between September 2023 and February 2024. In the following, we abbreviate the survey to NWM (short for New Ways of Measuring survey). The NWM survey has the following specific goals:

- Get input for tailoring and addressing respondent concerns in smart survey data collection strategies, in particular instruction and introduction materials and interviewer training;

- Get input for addressing the need to offer alternative modes to respondents next to apps;
- Learn how respondents like to keep control over data and what minimal respondent involvement during data collection is needed;
- Inform legal-ethical officers about respondent perceptions, in particular proportionality of the smart tasks and trade-offs in data minimization;
- Learn if and in what way achieving the above goals depends on the topic;
- Learn how achieving all of the above goals depends on the country/NSI;

In this paper, we report results of NWM across the three participating countries.

Table 2.1: Overview of persons that completed NWM-G, partially completed NWM-G, completed NWM-S and broke-off in NWM-S.

IT	NWM-G complete	NWM-G incomplete	NWM-G Nonresponse	Total
NWM-S complete	833 (23%)	2 (0%)	18 (1%)	853 (23%)
NWM-S Break-off	69(2%)	1 (0%)	4 (0%)	74 (2%)
NWM-S nonresponse	1591 (43%)	31 (1%)	1118 (31%)	2740 (75%)
Total	2493 (68%)	34 (1%)	1140 (31%)	3667

NL	NWM-G complete	NWM-G incomplete	NWM-G Nonresponse	Total
NWM-S complete	522 (13%)	5 (0%)	212 (5%)	739 (18%)
NWM-S Break-off	49 (1%)	3 (0%)	84 (2%)	136 (3%)
NWM-S nonresponse	364 (9%)	62 (2%)	2699 (67%)	3125 (78%)
Total	935 (23%)	70 (2%)	2995 (75%)	4000

SI	NWM-G complete	NWM-G incomplete	NWM-G Nonresponse	Total
NWM-S complete	316 (16%)	NA	16 (1%)	332 (17%)
NWM-S Break-off	28 (1%)	NA	8 (0%)	36 (2%)
NWM-S nonresponse	659 (33%)	NA	973 (49%)	1632 (82%)
Total	1003 (50%)	NA	997 (50%)	2000

2. The NWM survey

The NWM survey employed two questionnaires that are sequential but offered to respondents simultaneously. Population samples in NL, IT and SI were invited to fill in a paper survey first and then to proceed to an online survey. The paper survey contained questions on device ownership and usage, and perceptions and requirements towards the use of smart features of these devices in statistical surveys. The online survey combined questions and measurements in short modules on four themes: travel, physical activity, consumption and

energy. We will term the surveys NWM-G(eneral) and NWM-S(mart). Details on the survey can be found in SSI Deliverable 1.1 (Paulussen, Schouten & Van Seville 2023) and the upcoming Deliverable 1.2 (Schouten et al 2024). While the questionnaires are the same in all countries there were differences between the countries in sampling and data collection design. The most influential difference was the recruitment mode for NWM-G which was face-to-face announced via paper invitation letter in IT, only paper invitation letters in NL and a mix of paper invitation letters only and face-to-face announced via paper invitation letter in SI.

Table 2.1 presents numbers and rates for the two surveys separately and crossed. The response rates to NWM-G vary greatly, from 23% in NL to 68% in IT. This can be explained largely by the difference in recruitment modes, self-administered in NL, self-administered plus interviewer-assisted in SI and fully interviewer-assisted in IT. Somewhat surprisingly, the response rates to NWM-S do not vary much, from 17% in SI to 23% in IT. We must conclude that the willingness to do the online smart survey was not raised by the prior involvement of interviewers. Break-off in NWM-S varied across countries and was between 8% for IT (74 out of 927) to 16% (136 out of 875) for NL of persons starting the survey.

3. Perceptions on smart surveys

The NWM-G contained three blocks of questions: one block on preferred contact and administration survey modes, one block on smart device ownership and digital skills, and one block on the performance of smart tasks. The third block is the most important and included three sub-blocks: one on hypothetical willingness to perform a set of seven smart tasks, one on feelings about security and privacy protection and one on study information and data control. Here, we include a few of the main findings.

In Table 3.1, we show a summary from self-reported device ownership. The coverage rate of smartphones (and tablets) is high in all countries, as expected. Also, conform expectation, we see that respondents participating also in NWM-S are more 'smart'. The last row contains coverage rates of smart devices¹ not being mobile or tablet. Here, coverage rates are much lower, but, especially, the differences between those that participated smart and those that did not is great. Out of the three countries, NL is most 'smart'. This is largely caused by the relatively high coverage rates of smart meters for electricity/gas/water. For other types of smart devices, differences were smaller.

¹ Smart band, fitness tracker, smart watch, smart speaker, smart meter (gas, electricity, water), smart air quality control.

Table 3.1: Types of devices owned by respondents split also for NWM-G respondents that did the NWM-S survey and those that did not. Standard errors between brackets.

	No NWM-S			NWM-S			All		
	IT	NL	SI	IT	NL	SI	IT	NL	SI
At least one smart device	83.8% (0.9)	82.2% (1.6)	90.2% (1.1)	97.9% (0.5)	97.5% (1.6)	97.5% (0.9)	88.8% (0.6)	90.6% (0.9)	92.5% (0.8)
Phone/tablet	82.1% (1.0)	78.2% (1.7)	89.2% (1.2)	97.7% (0.5)	96.5% (1.6)	97.5% (0.9)	87.7% (0.7)	88.3% (1.0)	91.8% (0.9)
Smart device which is not phone/tablet	33.5% (1.2)	58.1% (1.8)	28.4% (1.7)	57.1% (1.6)	78.9% (1.8)	44.9% (2.8)	57.1% (1.0)	69.6% (1.5)	33.6% (1.5)

In Table 3.2, we display the hypothetical willingness to perform seven different smart tasks. Each of the tasks was motivated from an actual application in statistical surveys: location tracking in travel or time use, pictures of the house and energy meter data air quality systems in housing/living conditions, step counts and physical activity trackers in health, and receipt in household budget/expenditure. Overall, we observe fairly high ‘no’ answers and considerable proportions of ‘maybe’ or ‘do-not-know’. The hypothetical willingness shows differences between countries:

- Overall, NL respondents are the most willing on all tasks; only ‘data donation of energy’ and ‘use an air quality monitor’ reach a majority of respondents who would do it. In IT and SI ‘no’ task reaches a majority, though the two tasks related to living conditions also shows the highest proportion of respondents who are willing to.
- The willingness to share location in IT is much lower than in NL and SI.
- The willingness to do the living conditions related tasks, energy meters and air quality, is much lower in SI.
- The smart tasks rejected most often in all countries are pictures of one’s house and scanning/uploading receipts.

Finally, in Tables 3.3 to 3.5, we show the results for the three key perceptions/opinions included in NWM-G: concern about data being stolen, importance of study information and importance of respondent data control. The main conclusions:

- Respondents that did NWM-S and those that did not differ strongly on how they perceive privacy risks in all countries. However, the contrast is much larger for NL. In IT also those that did NWM-S still show a small majority of ‘quite’ to ‘very’ concerned.
- There is a vast majority that reports it to be ‘quite’ to ‘very’ important to know what is collected and to be able to control, but differences between countries are relatively small.

- Respondents that did NWM-S and that did not differ relatively little in how important they find it to be informed or to be able to control the smart data collection. However, NWM-S respondents tend to find it more important.

Table 3.2: NWM-G question: Would you participate in a ISTAT/CBS/SURS survey which asks you to?

IT	Yes	Maybe	No	DK
Share location	13,0%	21,8%	60,1%	5,1%
Share pictures of your house	10,3%	11,6%	74,2%	3,9%
Share data on energy use	35,6%	21,5%	37,5%	5,4%
Use an air quality monitor	43,3%	18,3%	32,6%	5,8%
Give the step counts on your mobile devices	30,5%	18,1%	46,6%	4,8%
Wear an activity tracker provided by ISTAT	17,9%	19,5%	57,1%	5,5%
Take pictures of receipts or upload digital receipts	9,3%	17,2%	67,6%	5,9%

NL	Yes	Maybe	No	DK
Share location	24,9%	24,9%	37,8%	4,1%
Share pictures of your house	11,8%	17,9%	58,9%	3,1%
Share data on energy use	40,9%	24,8%	28,0%	3,8%
Use an air quality monitor	47,4%	19,8%	24,7%	5,3%
Give the step counts on your mobile devices	39,0%	22,8%	32,4%	3,1%
Wear an activity tracker provided by CBS	20,2%	20,0%	48,3%	3,0%
Take pictures of receipts or upload digital receipts	13,8%	19,3%	56,0%	2,5%

SI	Yes	Maybe	No	DK
Share location	20,9%	22,5%	50,9%	5,6%
Share pictures of your house	7,4%	13,3%	76,0%	3,4%
Share data on energy use	17,5%	22,5%	54,1%	5,8%
Use an air quality monitor	32,7%	22,4%	40,5%	4,4%
Give the step counts on your mobile devices	29,7%	21,8%	45,0%	3,5%
Wear an activity tracker provided by SURS	19,2%	18,5%	57,7%	4,5%
Take pictures of receipts or upload digital receipts	9,3%	14,4%	70,7%	5,7%

Table 3.3: Summary of NMW-G Question: In general, how concerned are you about your data being stolen and misused by others? split also for NWM-G respondents that did the NWM-S survey and those that did not.

	No NWM-S			NWM-S			All		
	IT	NL	SI	IT	NL	SI	IT	NL	SI
Not	12.3%	24.5%	21.4%	15.7%	30.6%	25.6%	13.5%	28.0%	22.7%
Somewhat	25.9%	33.9%	31.1%	33.3%	47.9%	36.7%	28.6%	42.0%	32.9%
Quite	28.7%	25.5%	30.4%	29.0%	17.1%	25.9%	28.8%	20.6%	29.0%
Very	33.1%	16.1%	17.0%	22.0%	4.6%	11.7%	29.1%	9.3%	15.4%

Table 3.4: Summary of NWM-G question: When you are invited to participate in a study that collects data through smart devices, how important would it be for you to be informed about what data will be collected? split also for NWM-G respondents that did the NWM-S survey and those that did not.

	No NWM-S			NWM-S			All		
	IT	NL	SI	IT	NL	SI	IT	NL	SI
Not	7.8%	7.2%	6.4%	5.0%	0.8%	2.2%	6.0%	3.4%	5.1%
Somewhat	7.8%	8.4%	7.4%	8.4%	9.1%	9.8%	8.0%	8.8%	8.2%
Quite	22.2%	28.9%	37.0%	23.8%	35.5%	35.8%	22.7%	32.8%	36.6%
Very	44.7%	55.4%	39.9%	58.5%	54.5%	50.6%	49.7%	54.9%	43.3%
DK	17.5%		9.3%	4.4%		1.6%	12.8%		6.9%

Table 3.5: Summary of NWM-G question: How important would it be for you to be able to control what data will be collected? split also for NWM-G respondents that did the NWM-S survey and those that did not.

	No NWM-S			NWM-S			All		
	IT	NL	SI	IT	NL	SI	IT	NL	SI
Not	8.1%	7.6%	7.7%	6.0%	3.8%	3.2%	7.3%	5.4%	6.3%
Somewhat	8.0%	7.9%	7.3%	10.1%	11.0%	9.8%	8.7%	9.7%	8.1%
Quite	22.0%	32.7%	37.7%	26.3%	44.8%	45.9%	23.5%	39.7%	40.3%
Very	41.1%	42.9%	36.1%	51.2%	39.3%	39.6%	44.7%	40.8%	37.2%
DK	20.8%	8.9%	11.2%	6.5%	1.1%	1.6%	15.6%	4.4%	8.2%

4. Hypothetical versus actual willingness

As a final result, we show the contrasts between hypothetical and actual willingness. In the NWM-S survey, respondents were asked four smart tasks which matched to four of the hypothetical tasks in NWM-G: to share their location, to share their step count, if available, to scan or upload a receipt, if available, and to take a picture of their energy meters, if at home and if present in their dwelling.

In Table 4.1, we match the actual willingness to the hypothetical willingness for respondents that did both NWM-G and NWM-S. We must remark that we did not notify respondents in advance of the smart tasks. As a consequence, they were not able to perform the required tasks when they were using a device without location tracking, did not have a (e-)receipt available, or were not at home. Also only respondents with an activity tracker could provide step counts. We conclude the following:

- There is, as expected, a positive relation between hypothetical and actual willingness. With a few exceptions, it holds that those who consented hypothetically have a much higher rate of really sharing. However, the strength of this relation varies between countries and per smart task. For NL it is true in all tasks, but only for sharing location is the pattern clear for all countries.

- More specifically:
 - The low hypothetical willingness to share location in IT is confirmed; also the actual willingness is much lower than in NL and SI.
 - Also the actual sharing of a step count is much lower in IT. In NL and SI, the majority provides a step count.
 - The actual sharing of receipts when one or more are available is low in IT and SI. Only in NL, the majority provides a receipt.
 - Given the low coverage rate of smart meters in IT and SI, it is no surprise that actual sharing is low and the proportions that were not able is high.

Table 4.1: Hypothetical willingness in NWM-G against real willingness in NWM-S

NWM-G hypothetical	NWM-S observed willingness									
	Shares			Is not able to			Not share			
	IT	NL	SI	IT	NL	SI	IT	NL	SI	
Share location										
Yes	63%	62%	49%	23%	30%	23%	14%	9%	28%	
Maybe	39%	56%	43%	36%	19%	21%	26%	24%	36%	
No	17%	28%	20%	63%	22%	12%	20%	51%	68%	
Don't know	32%	47%	9%	46%	18%	27%	23%	35%	64%	
Share step count										
Yes	47%	66%	84%	42%	33%	14%	11%	1%	2%	
Maybe	42%	58%	85%	55%	40%	15%	3%	2%	0%	
No	20%	24%	80%	68%	75%	4%	13%	1%	16%	
Don't know	21%	29%	100%	67%	71%	0%	12%	0%	0%	
Share receipt										
Yes	18%	48%	22%	65%	47%	66%	17%	5%	12%	
Maybe	18%	32%	20%	71%	56%	67%	11%	12%	13%	
No	7%	16%	13%	56%	48%	43%	37%	36%	44%	
Don't know	9%	24%	24%	57%	59%	53%	34%	18%	24%	
Share meter reading										
Yes	15%	63%		28%	8%		57%	29%		
Maybe	5%	42%		27%	10%		68%	48%		
No	5%	8%		16%	12%		80%	80%		
Don't know	2%	22%		25%	17%		73%	61%		

5. Discussion

In this first paper, we report on a cross-country study on respondent motivations and hesitations to perform smart tasks in general population surveys. The study consisted of a general paper survey (NWM-G) and an online 'smart' survey (NWM-S). Response rates to the

general survey NWM-G varied greatly across the three participating countries. This likely led to some confounding of selection and answers given by respondents. The drop-out between NWM-G and NWM-S was quite sizeable, especially in Italy and Slovenia. We conclude that respondents to a non-smart paper questionnaire really are different from those participating in a smart survey. We must remark that the NWM is a survey on surveys and respondent behaviour may have been affected by the hypothetical nature of the survey. Surprisingly, the response rates to the smart survey varied but little across the three countries; there was less than 10% difference in rates.

The interest in going smart, both hypothetically and actually, varied between the countries, despite relatively similar NWM-S rates. Willingness is highest in NL. The relation between hypothetical and actual performing of smart tasks was also clearest in NL. Smart tasks also revealed specific differences: Willingness to be tracked was relatively low in IT, whereas willingness to provide information on living conditions was low in SI.

The interest in NWM lies especially in the NWM-G response that dropped-out for the NWM-S. A small part of these NWM-G respondents did start the NWM-S but broke off. From the basic analyses, we conclude that there are at least two reasons. The first reason is that NWM-G only respondents are less digital and seem to feel less comfortable with using smart devices. The second apparent reason is a much higher concern about data security risks. The two reasons are related. Importantly, in particular for legal and ethical decisions, we do not see a big difference in how NWM-G respondents like to be informed or how they like to control smart data. For now, we conclude that tactics at encouraging smart survey non-respondents should be especially oriented at making respondents feel more comfortable with smart devices and at improving the (perceived) sense of data security risk.

Acknowledgment

The field tests that form the basis for this project were funded by Eurostat. However, various researchers and data collection staff have also contributed beyond the formal funding. We thank all that were involved in study preparations, data collection, data processing and analyses. A special thanks goes to Ilaria Lunardelli who contributed to this paper as EMOS master student at Statistics Netherlands and Utrecht University.

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