

COOPERATION ON MULTI-MODE DATA COLLECTION (MMDC)
MIXED MODE DESIGNS FOR SOCIAL SURVEYS - MIMOD

GRANT AGREEMENT FOR AN ACTION WITH MULTIPLE BENEFICIARIES
AGREEMENT NUMBER – 07112.2017.010-2017.786

Mixed-mode experiences of European NSIs
WP4- Deliverable 1

Date: June 22, 2018

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WP4: Mixed-mode designs

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Summary

This deliverable presents some key results from the MIMOD survey on mixed-mode experiences and practices among European Statistical System (ESS) National Statistical Institutions (NSIs). The observed heterogeneity in mode use and data collection procedures is assumed to be the product of different historic and current preconditions. The NSIs own perceived recommendations and best practices as gathered through the survey are then analysed and discussed. Case studies from MIMOD partners Statistics Norway, Istat and Statistics Netherlands illuminate further aspects of the survey results. Statistics Norway's contribution shows how technical and economic developments have shaped mixed-mode designs up until now, and presents examples of questionnaire development and fitting CAWI into data collection designs. Istat's case study contains a description of how their current mixed-mode combinations have developed. Lastly, the case study describing CBS's approach contains a description of their Omnimode design, which involves creating a new, mode-agnostic questionnaire rather than adapting a pre-existing one optimized for one particular mode. The paper concludes with the tentative recommendation of an omnimode approach, but notes that this would ideally imply that Eurostat's model questionnaires and technical specifications and guidelines be re-developed to avoid conflicts of recommendations.

1. Mixed-mode experiences of European NSIs

This document constitutes deliverable 1 of Work Package 4 of the MIMOD project. As stated in the grant agreement, it is intended to give an overview of mixed-mode combinations and experiences, with recommendations for key ESS surveys. The deliverable takes the results from parts of the MIMOD survey as a starting point and is supplemented by case studies from MIMOD partners. These case studies also contain information on survey communication practices, which will be followed up in WP4's deliverable 2. An overview of NSI's actual use of data collection modes, including a historic understanding of how their use has evolved and concrete experiences, is necessary not only for collecting good advice, but also in order to understand the audience to which we will be offering questionnaire design recommendations.

Regarding these concrete recommendations for the ESS surveys, further analytical work on Eurostat model questionnaires, technical and variable descriptions needs to be done, as well as user testing, which is planned for deliverable 3. For this reason, only tentative recommendations will be offered in the present deliverable.

1.1. Mixed-mode combinations in use

The MIMOD survey confirms that CAWI and mixed-mode data collection is increasing in the National statistical institutions belonging to the European statistical system, compared to the results from the 2013 DCSS query (Blanke and Luiten, 2014). For the key surveys of LFS, EU-SILC, EHIS, AES and ICT¹, only one of the 31 participating countries currently uses neither mixed-mode nor CAWI for data collection. An additional seven are using mixed-mode for data collection, but without CAWI mode. Table 1 contains an overview of all modes used by all participating countries.

¹ Labour Force Survey, European Standards of Income and Living Conditions, European Health Interview Survey, Adult Education Survey and Information and Communication Technology surveys respectively

Table 1. Modes used for key ESS surveys

	LFS1	LFS2+	SILC1	SILC2+	EHIS	AES	ICT
Greece	CAPI/PAPI	PAPI	PAPI/CAWI	PAPI/CAWI	PAPI	PAPI	PAPI
Austria	CAPI	CATI/CAPI	CAPI	CATI/CAPI	CAPI/CAWI	CAPI/CAWI	CATI
Slovenia	CAPI	CATI/CAPI	CAPI	CATI/CAPI	CAPI/CAWI	CATI/CAPI/CAWI	CAPI/CAWI
Luxembourg	CATI/CAWI	CATI/CAWI	CAPI	CAPI	PAPI/CAWI	CAWI	CATI
Portugal	CAPI	CATI/CAPI	CAPI	CAPI	CAPI/CAWI	CAPI	CATI/CAPI/CAWI
Sweden	CATI	CATI	CATI	CATI	CATI/PAPI/CAWI	CATI	CATI/CAWI
Belgium	CAPI	CATI/CAWI	CAPI	CAPI	CAPI	PAPI/CAWI	PAPI/CAWI
Lithuania	CATI/CAPI/CAWI	CATI/CAPI	CATI/CAPI/CAWI	CATI/CAPI/CAWI	CAPI/CAWI	CAPI/CAWI	CATI/CAPI/CAWI
Croatia	CAPI	CATI/CAPI	CAPI	CAPI	CAPI	CAPI	CATI/CAPI/CAWI
Hungary	CAPI	CATI/CAPI	CAPI/CAWI	CAPI/CAWI	CAPI	CAPI/CAWI	CAPI
Malta	PAPI	CATI	CATI/CAPI	CATI/CAPI	CAPI	CAPI	PAPI
The Netherlands	CATI/CAPI/CAWI	CATI	CATI/CAWI	CATI/CAWI	CAPI/CAWI	CATI/CAWI	CATI/CAWI
Spain	CAPI	-	CAPI	CAPI	CAPI	CATI/CAPI/CAWI	CATI/CAPI/CAWI
Germany	CATI/CAPI/PAPI	CATI/CAPI/PAPI	PAPI	PAPI	PAPI/CAWI	CAPI	PAPI
France	CAPI	CATI	CAPI	CAPI	CAPI	CAPI	CATI/PAPI/CAWI
Ireland	CAPI	CATI/CAPI	CAPI	CAPI	PAPI	CAPI	CAPI
Norway	CATI	CATI	CATI	CATI	CATI	CATI/CAWI	CATI
Switzerland	CATI	CATI	CATI/CAPI	CATI/CAPI	-	CATI	CATI/CAWI
Cyprus	CAPI	CATI	CAPI	CATI/CAPI	CAPI	CAPI	CAPI
Czech Republic	CAPI/PAPI	CATI/CAPI/PAPI	CAPI/CAPI	CAPI/PAPI	CAPI/PAPI	CAPI/PAPI	CAPI/PAPI
Estonia	CAPI	CATI/CAPI	CAPI	CATI/CAPI/CAWI	CAPI/CAWI	CATI/CAPI	CATI/CAWI
Finland	CATI/CAPI	CATI	CATI	CATI	-	CAPI/CAWI	CATI/CAWI
Latvia	CATI/CAPI	CATI/CAPI/CAWI	CATI/CAPI	CATI/CAPI/CAWI	CATI/CAPI/CAWI	CATI/CAPI/CAWI	CATI/CAPI/CAWI
United Kingdom	CAPI	CATI/CAPI	CAPI	CAPI	CATI	CATI	CATI/CAPI
Bulgaria	PAPI	PAPI	PAPI	CAPI/PAPI	PAPI	PAPI	PAPI
Romania	PAPI	PAPI	PAPI	PAPI	PAPI	PAPI	PAPI
Italy	CAPI	CATI/CAPI	CATI/CAPI	CATI/CAPI	PAPI	CATI	PAPI/CAWI
Iceland	CATI	CATI	CATI	CATI	CATI/CAWI	-	CATI
Poland	CAPI/PAPI	CATI/CAPI/PAPI	CAPI/PAPI	PAPI	PAPI	CAPI/PAPI	CAPI/CAWI
Denmark	CATI/CAWI	CATI/CAWI	CATI/CAWI	CATI/CAWI	-	-	-
Slovak Republic	CAPI/PAPI	CATI/CAPI/PAPI	PAPI	PAPI	PAPI	PAPI	PAPI
Mode ranking	CAPI: 22 CATI: 11 PAPI: 8 CAWI: 4	CATI: 27 CAPI: 15 PAPI: 6 CAWI: 4	CAPI: 20 CATI: 11 PAPI: 7 CAWI: 5	CAPI: 20 CATI: 15 PAPI: 7 CAWI: 7	CAPI: 15 CAWI: 11 PAPI: 11 CATI: 5	CAPI: 17 CAWI: 11 CATI: 10 PAPI: 7	CATI: 16 CAWI: 15 CAPI: 12 PAPI: 10

In total, eight different combinations of modes are used for these surveys, five of which include CAWI mode (table 2):

Table 2. Different mixed-mode combinations in use. Not indicative of sequence or priority.

1. CAPI/PAPI
2. PAPI/CAWI
3. CATI/CAPI
4. CAPI/CAWI
5. CATI/CAWI
6. CATI/CAPI/CAWI
7. CATI/PAPI/CAWI
8. CATI/CAPI/PAPI

No clear pattern emerges on a European level from the overview of modes used by the different countries for the surveys: computer-assisted modes are mixed with paper and pencil, and visual modes are combined with aural modes. CAWI use is most prominent in the newer EHIS, AES and ICT surveys (between 11 and 15 countries), in contrast with the more traditional LFS and EU-SILC (between 4 and 7 countries). Notably, CAWI is not the most widely used mode for any of the surveys.

In the LFS, CAPI is by far the most widely used mode in the first wave, with CATI taking the same role from the 2nd wave onward. For the EU-SILC, CAPI is the most used mode in all waves, with slightly increased use of CATI and CAWI from the 2nd wave onward.

There is also no clear pattern regarding the use of concurrent, sequential, and a combination of concurrent and sequential mixed-mode data collection. They are all used by at least one participating survey for each

survey, but the variation between surveys is great. Table 3 shows the situation for mixed-mode designs using CAWI.

Table 3. Mixed-mode combinations for surveys using CAWI as one of the modes.

Country	A9[LFS1]	A9[LFS2]	A9[EUSILC1]	A9[EUSILC2]	A9[EHIS]	A9[AES]	A9[ICT]
Greece			Concurrent	Concurrent			
Austria					Combination	Sequential	
Slovenia					Combination	Sequential	Sequential
Luxembourg	Concurrent	Concurrent			Concurrent		
Portugal					Sequential		Concurrent
Sweden					Concurrent		Sequential
Belgium		Concurrent				Concurrent	Concurrent
Lithuania	Combination		Combination	Combination	Combination	Combination	Combination
Croatia							Combination
Hungary			Concurrent	Concurrent		Concurrent	
The Netherlands	Combination		Concurrent	Sequential	Concurrent	Sequential	Concurrent
Spain						Combination	Combination
Germany					Sequential		
France							Combination
Norway						Combination	
Switzerland							Concurrent
Estonia				Combination	Concurrent		Concurrent
Finland						Combination	Sequential
Latvia		Combination		Combination	Combination	Combination	Combination
Italy							Sequential
Iceland					Sequential		
Poland							Sequential
Denmark	Combination	Combination	Combination	Combination			

Eight of the countries doing fully or partially sequential mixed-mode have used different mode combinations for different subgroups of the population. The survey shows that this has been done by using demographic and contact information to tailor for different demographic groups. In some cases, embedded experiments have been conducted to assess the effect of different mode combinations for the same demographic group.

The "combination" of concurrent and sequential modes can occur when starting the survey in one mode only for all participants, and bring in a second mode for follow-up while still allowing responses in the first mode. Several NSIs report practising this strategy.

1.2. Questionnaire differences in mixed-mode surveys

There are many reasons for the observed heterogeneity, including but not limited to available resources in general, access to registers, survey history, technological history, demographics, and whether a specific survey is embedded in another national survey.

Regardless of the great diversity in mode combinations, it is of our interest to investigate whether this has had consequences for how the questions and questionnaires are designed. In the MIMOD questionnaire, the countries that used CAWI as part of their mixed-mode design were asked how different the versions of their questionnaires are. Table 4 shows the responses to whether there were differences on five dimensions on a questionnaire level, and three on a question level.

Table 4. Survey question 33 on differences between modes, regardless of survey

Questionnaire differences	Yes	No
Questionnaire structure	4	19
Number of questions	4	19
Error and consistency checks	13	10
Don't know options	10	13
Permission of item nonresponse	8	15
Question differences		
Question wording	7	16
Number/wording of answer categories	2	21
Placement/wording of instructions	11	12

A total of 16 of 23 NSIs with mixed-mode involving CAWI reported having differences on at least one of the dimensions. 12 of the 16 NSIs reported having differences on more than one dimension.

There are noticeable differences between countries and surveys, and in the degree of change. Since there are very few observations for several of the surveys, it is more meaningful to construct an aggregated difference indicator for the key surveys. (Table 5)

Table 5. Aggregated differences from key ESS surveys, survey question 34 and 35

Degree of questionnaire differences	Large	Some	Small	Sum
Questionnaire structure	0	1	8	9
Number of questions	1	0	4	5
Error and consistency checks	2	4	23	29
Don't know options	5	4	5	14
Permission of item nonresponse	7	1	3	11
Amount of differing questions	Many	Some	Sum	
Question wording	0	14	14	
Answer category wording	0	3	3	
Number of answer categories	0	4	4	
Placement of instructions	2	16	18	
Wording of instructions	2	16	18	

On a questionnaire level, the most common difference is on the dimension of error and consistency checks, but these are for the most part considered small. Differences in Don't know options and Permission of item nonresponse are also quite common, though considered to be larger. Differences in questionnaire structure are reported for nine surveys, though considered small for eight. On a question level, the differences are mostly in question wording, and the placement and wording of instructions.

Luxembourg and The Netherlands stand out by reporting no differences whatsoever between CAWI and other modes. Lithuania, Belgium and Portugal all report very few or no changes. Latvia, on the other hand, reports changes on many different parameters for all their surveys, but not large. Only Estonia, Spain, Hungary and Italy report large changes on any parameter, and most of these are Don't know and Nonresponse.

The questions on differences are subjective and can have been interpreted differently. In the case of the Netherlands, however, their reporting of no changes is due to their omnimode question design philosophy:

e.g. that everything that is visible on the screen in CAWI shall be read out loud in CATI, and that all Don't know options are explicit in all modes.

1.3. Opinions on surveys that are not fit for CAWI

WP4 is to give recommendations on mixed-mode data collection including CAWI. A prerequisite for offering such recommendations is that the survey is determined to be fit for CAWI, by the MIMOD project group but also by the NSIs. Because there can be differences in national survey adaptations, practices and experiences, the MIMOD survey included questions about NSI opinions on the fitness of surveys for CAWI, and their reasons for not considering a survey fit.

Table 6. NSI opinions on the suitability of key surveys for CAWI, survey question 30

Survey	Suitable for CAWI	Not suitable
LFS1	11	20
LFS2	26	5
EU-SILC1	12	19
EU-SILC2	22	9
EHIS	21	10
AES	24	7
ICT	28	3

Table 6 shows that LFS wave 1 and EU-SILC wave 1 are the only surveys considered not fit for CAWI by a majority of the participating NSIs. The ICT survey and LFS wave 2 are on the other end of the spectrum. For surveys they considered not suitable, the NSI respondents were asked to specify the reasons for this in an open question.

1.3.1. The Labour Force Survey

In the case of LFS wave 1, twelve NSIs gave *complicated questions or need for interviewer clarification* as reasons for the survey not being suitable. Eight countries emphasized the *length* of the survey, and six mentioned *recruitment or response rate* concerns. All these topics are all more or less related to the fact that the LFS in most countries is a household survey, and many NSIs need a specific protocol for identifying and registering the respondents connected to the household before interviewing can commence.

It is noteworthy that only five NSIs are of the opinion that LFS wave 2 and later is not suitable for CAWI. This seems to imply a consensus that the problems of complex questions and recruitment can be handled during LFS wave 1.

1.3.2. The EU-SILC

When it comes to the EU-SILC wave 1, the *length* of the survey is the factor mentioned by most NSI, twelve in total. Seven countries mention *complicated questions or need for clarification*. Interestingly, one NSI mentions *privacy* as a factor, expressing concern that respondents are not willing to share personal information online. This goes against literature recommendations that self-completion modes are well suited for sensitive questions because the absence of an interviewer enables respondents to answer more candidly. The issue of web privacy and respondents' trust in questionnaires from NSIs trust may be related on historical and cultural differences, as well as incidents like security breaches.

1.3.3. Other surveys and factors

Some of the factors mentioned for other surveys can be categorized as *mode related bias* and *"pure" mode effects*. For the AES, one NSI mentions that using CAWI would likely increase education bias already present in the net sample. As education level is correlated with the AES variables of interest, this is of special concern. In the case study for Norway (Chapter 2.1.), such effects are confirmed. Relatedly, for the ICT

survey, one NSI remarks that the offline population is of special interest, and that CAWI for that reason cannot be the only mode used.

Another factor mentioned for the AES is the survey's long *batteries of questions* that make the survey ill suited, particularly for mobile web with a high risk of breakoffs.

For the EHIS survey, one NSI mentions that interviewers need eye contact to determine whether a respondent has certain health problems. This can be connected both to clarification, privacy and mode effect concerns.

1.4. Advantages and disadvantages experienced – good and bad practices

In the MIMOD survey, two open questions were asked on NSI's concrete mixed-mode experiences: Question 28 about their opinions on advantages and disadvantages, and question 29 on good practices for inspiration, and bad practices to avoid.

Regarding the advantages of mixed-mode data collection, aspect connected to cost *reduction* were mentioned by 14 of the 28 NSIs who responded to the question. *Improved coverage* was mentioned by 6, and *increased response rate* by 4. The ability to adapt to respondents' preferences and convenience was mentioned by five. Interestingly, one NSI mentioned that going mixed-mode enabled the *simplification of questions and questionnaires* as a positive aspect.

When it comes to the disadvantages of mixed-mode data collection, the most common one mentioned was *organizational complexity and investments* required, by 7 countries. This was followed by *mode effects* and *measurement error*, which was mentioned by 6.

Mentioned by 4, *questionnaire development costs* follow on third place. Mirroring aspects mentioned by some as positive, two other NSIs highlighted *poorer coverage* and *reduced response rates*. One final interesting aspect was *poorer interviewer motivation*, due to the "easiest" respondents now doing surveys online, leaving interviewers to follow up the more difficult cases.

When it comes to the question on good practices, the responses were more singular and more difficult to meaningfully aggregate. Instead, we group the advice under six main topics.

1. General advice

- When introducing mixed-mode at your NSI, start with a simple survey
- Gradually introduce web sample to go mixed-mode
- Pretest
- Pilot
- Measure effects

2. Login and completion assistance

- Make login as easy as possible
- Establish a helpdesk
- The helpdesk must be manned at the times respondents are active

3. Questionnaire development

- Adapt questionnaires strongly
- Ensure smartphone compliance
- Use a respondent-centric web design approach
- Modularize questionnaires
- Add open questions to surveys asking for suggestions for improvement

4. Communication strategies

- Find the right communication strategy for each survey
- Use ONE web address for all surveys, use login info for routing respondent to the correct one
- Add a brochure with web completion instructions to your cover letter
- Use recurrent reminders
- Shorten e-mail notifications
- Use lotteries for boosting CAWI response

5. Data collection organization

- Find the right mixed-mode strategy for each survey
- Use an online first approach
- Do CAWI breakoff reclaim directly in CATI
- Customize breakoff strategies
- In CAPI/CATI designs, use the same interviewer for the same respondent
- Keep CAWI option open after introducing other modes

6. Technical aspects

- Monitor servers constantly
- Enable restart at breakoff points

Regarding bad practices, only five were mentioned:

- Don't send too many reminders
- Don't send reminders indiscriminately
- Don't introduce questionnaire differences that can lead to bias and time series breaks
- Don't underestimate case management and IT infrastructure costs
- Don't make questionnaires too long

1.5. Tentative conclusions

Although the results from the survey show a quite heterogeneous state of ESS mixed-mode and CAWI data collection, some tentative conclusions can be drawn. Firstly, modes *will* be mixed, and they will be mixed for a variety of reasons. Sometimes, modes that are discouraged either by Eurostat or by literature for specific types of questions will be used.

Secondly, national questionnaire differences between modes appear to be moderate. This could be due to unimode strategies, but may also be related to lack of resources, or by constraints from Eurostat specifications and recommendations. Some of the countries that have done major changes recommend strong questionnaire adaption, a respondent-centric web design approach and modularizing of questionnaires. These are among the topics that will be discussed in connection with the national case studies.

2. National case studies

2.1. Statistics Norway case study

When Statistics Norway's Division for interviews was established in 1966, the predominant mode of data collection was personal interviews using a paper questionnaire. Poor telephone coverage was an important factor in this, but as this situation improved more and more data collection was being done as paper-assisted telephone interviews. As large parts of Norway are sparsely populated, and often difficult to reach either by public or private transport, it made sense both in an economic and a timeliness related sense to do the interviews by phone.

For the Labour Force Survey, by far the most important one, a self-completion paper questionnaire was even developed in the 1970s. This made the LFS possibly the first of Statistics Norway's surveys to combine interviewer-administered and a self-administered mode in a mixed mode design. The paper option was reserved for respondents living too far away from any of Statistics Norway's interviewers, and according to oral sources was not very widely used.

In 1996, computer-assisted interviewing was introduced at Statistics Norway. Among other things, this meant that the LFS self-completion paper questionnaire was dropped, and mixed mode combinations reduced to CAPI/CATI.

When choosing CATI and/or CAPI for a survey, the rationale for choosing CAPI as the (main) mode was often respondent burden. It was assumed that interviews exceeding 45 minutes would be too tiresome to complete on the phone, resulting in breakoff or poor data quality. As a rule of thumb, surveys of this length should have CAPI as the main mode, with CATI as a last resort for follow up. When the survey involved show cards, the threshold was even higher. (For the very short Norwegian LFS, CAPI was discontinued in the early 2000s, making it CATI single-mode.) It is difficult to categorize these CAPI/CATI designs as either concurrent or consecutive. This to some degree depended on the preferences and behaviour of the interviewers, as some were quick to offer CATI and others preferred to make the journey for a personal interview, using CATI for nonresponse follow-up only.

Budgetary cutbacks, difficulties recruiting interviewers and changing respondent preferences also contributed to the watering out of the CAPI/CATI mixed mode protocol. The development came to a head when the first Adult Education Survey (AES) was launched in 2007. Originally intended as a CAPI main mode survey per Eurostat's recommendations, with CATI as a follow-up mode, the design had to be changed in the 11th hour. The main reason for this was that the interview was very short for respondents who had not participated in any education or training during the past year – averaging ten minutes. A structured screening interview was introduced, with the intention of offering CATI for non-participants and CAPI for participants in education or training. The aim of the structured screening was to both reduce interviewer variance, and to avoid mode effects between respondents. Many education/training-participating respondents nevertheless preferred to respond via telephone rather than making an appointment for a visit. 44% of these responded by CAPI.

Since that time, CAPI has continued its decline at Statistics Norway. When the 2nd round of the AES was conducted in 2012, CATI was the main mode with CAPI offered only when the respondent requested it. In 2016, the 3rd edition of the AES had a sequential mixed mode design, with a split sample experiment using CATI/CAWI and CAWI/CATI sequences. (2.1.1.2 below) Today, CAPI is not used for any of the European Statistical System surveys by Statistics Norway.

2.1.1. Modern times: web as a component in mixed mode surveys

The first time CAWI was used in combination with interviewer-administered modes at Statistics Norway was the Continuous Vocational Training Survey (CVTS) in 2006. In this business survey, interviewers were

sent to the largest and most complex businesses to aid in the questionnaire completion process, whilst smaller businesses were encouraged to respond in CAWI.

In recent years, four surveys have been conducted using a mixed mode design involving CATI and CAWI:

- 1) The Housing Panel Survey. Non-ESS Monthly, continuous.
- 2) The Adult Education Survey. ESS, quadrennial
- 3) The Parliamentary Election Survey. Non-ESS, quadrennial
- 4) The Government and Citizenship survey. Non-ESS, standalone.

2.1.1.1. The Housing Panel Survey

The housing panel is a sequential mixed mode that monitors the development of prices in the Norwegian rental market. The questions are all factual, and most are yes/no.

The data collection follows the same pattern every month, first offering the respondents CAWI for one week, before CATI mode is introduced in the second week of data collection. Even after the CATI-mode is introduced, the web mode remains available during the whole data collection.

The housing panel include a selection of 2500 rental apartment addresses. In the 2016-2017 timeline, the response declined from 1790 interviews in November (2016, wave 1?) to 1301 in October (2017, wave 12?). This illustrates that some months are more problematic than others, e.g. in May and August many students are moving in and out, creating difficulties in having correct tenant contact information. Of course, as in all panels there will also be some general abrasion from wave to wave. In table 7, the response rates for the housing panel in 2016- 2017 are presented according to mode.

Table 7. Response rates in the housing panel 2016-2017

Waves	1	2	3	4	5	6	7	8	9	10	11	12
Total resp	71.6	68.5	63.7	61.7	57.7	54.4	56.7	50.8	49.0	47.5	51.5	53.1
CAWI	53.0	54.2	50.3	47.7	45.3	42.4	43.7	42.3	38.6	37.5	40.8	40.8
CATI	18.6	14.3	13.4	14.1	12.4	12.1	12.9	8.5	10.4	10.0	10.7	12.3
N	2500	2496	2493	2491	2490	2488	2481	2477	2473	2463	2458	2452

The housing panel has several advantages when it comes to fitness criteria for mixed mode. The questionnaire is short and can be completed on both pc and an optimized version for smartphone. By doing 75-79% of the interviews during the web week by self-administration, interviewer costs are reduced. The mixed-mode design also allows us to do the data collection in a shorter time frame, as self-administration does not have the same capacity challenges as telephone interviews.

Since the 2016-2017 round of the housing panel, Statistics Norway has designed a new information campaign with emphasis on keeping the respondents in the panel from month to month. The communication campaign seems to be a success, as the response rates for the corresponding months are higher for the 7 first waves in the 2017-2018 version of the housing panel. The response rate is rising independent of mode, as seen in table 8.

Table 8. Response rates in the housing panel 2017-2018

Month	1	2	3	4	5	6	7
Total resp	79.8	70.1	67.0	66.5	63.2	63.3	60.4
CAWI	60.6	54.5	50.6	49.8	50.1	47.5	45.4
CATI	19.2	15.6	16.4	16.6	13.1	15.8	15.0
N	2500	2488	2483	2482	2479	2474	2472

The communication campaign for the housing panel is designed to maximize the effect of the mixed-mode design. Since CAWI is self-administered, and can be completed when it suits the respondent, the information campaign is focused on the first part of the data collection. All invitations and reminders include direct links with unique login information taking the respondents to the questionnaire. Making it as easy as possible for the respondent to participate, the links also contain an html mark to measure which reminders are most efficient. At the time the respondent completes the survey, they are registered as interviewed and the communication stops automatically.

At Friday the week before the web-mode starts, all respondents receive a SMS invitation to that month's questionnaire. The communication in the initial reminder is targeted. Respondents who completed last month's questionnaire get a straight forward invitation. Last month's refusals and non-respondents receive a SMS invitation telling them that we can see their non-response, politely asking them to re-join the reporting to the panel. The invitations are sent at 09:50 a.m.

On Monday, all respondents receive both a SMS and an email reminder about the survey. The email reminder contains information about the survey in both Norwegian, English and Polish, also with direct links to the survey in the corresponding language. Because of SMS length restrictions, it only contains information in Norwegian and English. By combining different information channels using both email and SMS let us reach more respondents. Digital forms of communication are also cheap in comparison to the traditional paper letters. Tuesday, a second wave of email and SMS are sent to the respondents. All respondents also receive a SMS on Wednesday. In addition, approximately half of the respondents also receive an email reminder. The other half receive the third email reminder on Thursday.

After two full panel rounds, a fourth email reminder was introduced on Tuesday in week two as an option for the respondents to answer in web-mode after the interviewers had started calling. As we saw that some respondents were pushed to web when interviewers started calling them. The entire communication campaign includes four SMS and four emails to the respondents, but the content of the first invitation SMS varies according to whether the respondent participated or not in the previous round.

The experiences from the housing panel is that mixed-mode under the given circumstances (questionnaire length, number of respondents, digital communication available) has several advantages compared to single-mode designs both when it comes to cost reduction, timeliness and panel abrasion.

2.1.1.2. The Adult Education Survey

The Adult Education Survey 2016 was originally intended as an interviewer administered survey. However, due to a high workload and a lack of interviewers, it was determined that the survey had to be run as a mixed-mode survey using CAWI to save not money, but rather *interviewer work hours*.

In practice, the CATI and CAWI versions of the questionnaires were identical, with the obvious exception that the CAWI version uses visual and CATI aural only communication channels. It is fair to say that due to time constraints because of the late decision to go mixed-mode, too little time was spent developing the CAWI version, and no pretesting was done.

The AES was devised as sequential with two main subsamples, with CATI->CAWI and CAWI->CATI as the respective sequences. Experiments in information campaign sequences, with invitations and reminders, were also embedded. The intention was to study differences in response rates, net sample representativeness and possible measurement differences. However, because of technical difficulties, the experiment protocol had to be abandoned. In practice, the AES became a concurrent survey, where it was possible for a respondent to answer either in CAWI or in CATI.

The net sample after data collection was 2712, consisting of 47 % CATI and 53 % CAWI responses. Because the experiment protocols were compromised, it is difficult to draw many conclusions. Still, there are some

noticeable net sample differences between CATI respondents and CAWI respondents. Firstly, the education level of CAWI respondents was significantly higher than CATI respondents. (Table 9)

Table 9. ISCED education levels of Norwegian AES respondents

ISCED level	CATI	CAWI
0-2	12.3	9.3
3-4	51.1	43.3
5-6	36.5	47.2
Sum	100.0	100.0
N	1276	1430

When we look at the respondents' motivation for participating in learning activities, there are also some interesting observations to be made. The results in table 10 indicate that CAWI respondents were more likely to participate in an activity for personal fulfilment than CATI respondents. Both selection effects (mode related bias) and interviewer effects could conceivably have contributed to this.

Table 10. Norwegian AES respondents' reasons for participating in a randomly selected learning activity. Controlled for employment status.

Reason for participation	CATI %	CAWI %	Difference
To do my job better	62.1	57.9	-4.2
To improve my career prospects	12.5	11.6	-0.9
To be less likely to lose my job	3.0	3.4	0.4
To increase my possibilities of getting a job, or changing a job/profession	4.1	5.1	1.0
To start my own business	1.7	2.2	0.5
Because of organizational and/or technological changes at work	8.3	8.5	0.2
Required by the employer or by law	37.6	31.3	-6.3*
To get knowledge/skills useful in my everyday life	15.8	20.9	5.1*
To increase my knowledge/skills on a subject that interests me	24.5	33.9	9.4*
To obtain a certificate	9.6	11.6	2.1
To meet new people/for fun	6.4	6.1	-0.3
For health reasons	2.4	2.8	0.5
To do voluntary work better	2.8	3.4	0.7

2.1.1.3. The Parliamentary Election Survey 2017

The Parliamentary Election Survey took place after the Norwegian Parliamentary Election, from September to December 2017. It is a panel survey, where a portion of the sample had also responded to the Parliamentary Election Survey four years prior. Several experiments with the mode sequences, timing of mode switches and communication strategies were embedded in 2017. These experiments were more successful than the AES experiments of the previous year, though the analyses of the experiments have not been completed and published yet.

To be able to combine modes in a good way, we started with a thorough review of the questionnaire, in collaboration with the survey sponsors. Based on the review, we decided to modularize the original survey into two questionnaires based on question topics, with two different samples. One module was done as a CAWI only survey with attitude questions, with a completion time of about 20 minutes. The proper election

survey was prepared as CATI/CAWI mixed-mode with a completion time of about 40 minutes. Instead of a 60-minute survey, we now had something we could go mixed-mode with.

When adapting the questionnaire to CAWI, we employed a mobile first approach. That made us obliged to keep the formulations and questions simple. Asking for just one thing at a time became a necessity, making the respondent's task burden easier. A lot of unnecessary words were deleted, and our sponsors understood why: The small mobile screen was a good pedagogical tool and provided us with arguments to achieve better quality in the language and questions. We tried to keep the CAWI, CATI and CAPI questions as similar as possible. The difference was in the wording of instructions. CATI needed a lot more instructions than CAWI, because the respondents do not get any visible help at all. The grouping of response categories was changed for some questions, to ease the memory workload for CATI respondents. As there was no need to have different versions of the same question, the new category grouping was also used in CAWI mode.

CAWI -> CATI SEQUENCE VERSUS - CATI-> CAWI

About half the groups containing both people from the new sample (which will be part of the next Parliamentary Election Survey in 4 years) and people from the old sample (who participated in the previous Parliamentary Election Survey) were offered to take part in the survey on the web first (CAWI), if they did not answer, they were offered CATI.

The other half of the groups, also containing a mix between old and new sample, were offered a CATI interview first. If they did not answer, they were invited to take part in the survey on the web. The people that refused to be interviewed on the phone, were offered CAWI if they demanded it, but they were not actively offered CAWI. Many of these CATI non-respondents did not answer on the web either.

The timing of switching from CATI to CAWI or vice versa varied in different experimental groups. The group that in the end achieved the highest response rate was first offered to answer in CAWI and were transferred to CATI after two weeks. This is somewhat surprising, as the CATI->CAWI sequence normally yields the highest response rates. This could be due to differences in the information campaigns and will be investigated further.

CAPI AS THE THIRD MODE OFFERED

In the Parliamentary Election Survey only people from the subgroups with lowest response rate were visited by CAPI interviewers. In this survey, it applied to elderly women, and, to a certain extent, women in their early twenties. We did not start the CAPI interviewing before we had tried both CATI and CAWI.

PAPERLESS COMMUNICATION?

Although Statistics Norway has a policy of strictly paperless communication, we did send paper letter invitations to some young people, for example people who could vote for the second time in their life. People in this subgroup were not very eager to respond to our E-mails and SMS-invitations to the CAWI questionnaire. It is perhaps counter-intuitive that young people respond better to means of communication presumed to be outdated. One reason could be that such young people are flooded with information via digital channels, and that a paper letter sticks out. This also reflects that policies of digitalization should be less rigidly applied as long as the end justifies the means.

2.1.1.4. The Government and Citizenship survey 2018

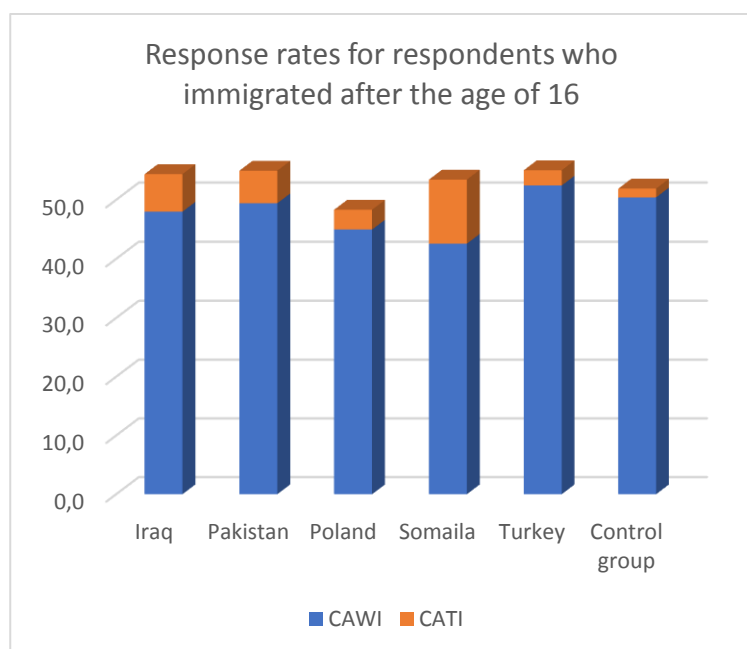
In the Government and Citizenship Survey (GOVCIT), the population consists mostly of people between the age of 20 and 36 with an immigrant background. Compared to other age groups, achieving high response rate is a challenge.

In the GOVCIT survey, we started with two weeks CAWI, sending invitation and reminders with e-mail and SMS. To the people we did not have the electronical contact information, we sent a paper letter by mail.

After two weeks we started CATI-interviewing, concentrating the interviewing on the groups with the lowest response rates.

We had a fixed goal in each subgroup, containing people with immigrant background from the same country. Although the questionnaire was translated into Somali, the CAWI response rate in the Somali group was very low. But thanks to young, dedicated CATI interviewers with Somali backgrounds, the response rate improved. We used interviewers with different language skills. Compared to the groups with background from other countries, respondents with a Somali background have the highest proportion of CATI interviews. (Figure 1)

Figure 1. Response rates in the Government and Citizenship survey 2018



Unlike in the Parliamentary Election Survey, we did not switch mode completely. In each CATI information e-mail or SMS (invitations and reminders), there was also a direct link to the CAWI questionnaire, making it a cross between concurrent and sequential mixed-mode design. Each CATI e-mail or SMS resulted in more people answering in CAWI, and for maximizing response we recommend this approach.

Like in the Parliamentary Election Survey, in the GOVCIT survey the most time-consuming and resource-demanding modes were used to reach respondents in the groups that had the highest nonresponse rates, with the goal of fighting bias.

2.1.2. Conclusions and planned future work

The case of Statistics Norway shows the way one European NSI has followed to today's situation regarding modes and mode combinations. Historically, experiences have been mostly with interviewer administered surveys. CAPI has now lost its previous importance in ESS surveys mainly for economic reasons, and single-mode CATI or CAWI surveys are the most common. Still, we believe that mixed-mode is the future for many surveys. In an ideal world, a combination of CAWI and CAPI would perhaps be preferable, because visual aids can be used also in CAPI: show cards for questions with many response options, and partial self-completion for sensitive items.

Statistics Norway's recent experiences with mixed-mode data collection show that short panel surveys with frequent waves and questions that do not have a high risk of mode effects are the easiest to adapt and develop for mixed-mode data collection. With frequent iterations, it is possible to devise communication strategies that can maintain or even improve response rates. The experiences with the Parliamentary

Election Survey demonstrates the advantages of having a quality first, rather than an economy first perspective when adapting surveys to mixed-mode data collection. It is also a successful example of modularization of a large questionnaire into smaller ones better suited for CAWI.

With people's accessibility and technology use constantly changing, it is also important to continuously try out new methods and channels for recruitment, follow-up and questionnaire distribution, including "old" new methods.

Insights gained from shorter panel surveys can and should be tested in larger and more complex surveys. Negative experiences from the AES have demonstrated that it is extremely important to have a functioning IT infrastructure before embedding advanced experiments with questionnaire design or communication campaigns.

Before any of the larger ESS surveys are offered as mixed-mode with CAWI, Statistics Norway needs to do more in terms of questionnaire development and pretesting. Currently, we are preparing for a mixed-mode pilot for the Labour Force Survey (LFS). Several of the key questions have been pretested previously. In the first wave, we will be following a strategy of CATI as the first mode for recruitment and CAWI for follow up. From the second wave on, we will try to tailor the mode sequence and communication not only on the response propensity of different demographic groups, but also on how fit the questionnaire is expected to be for CAWI and CATI respectively dependent on labour market status – one of the survey's main target variables.

2.2. Istat – Italian National Statistics Institute case study

The first experiences of use of computer assisted data collection techniques for socio-demographic surveys date back to the late 90s. Several reasons inspired this strategy: saving the time necessary to type paper questionnaires, improving data quality thanks to the checking rules included in electronic questionnaires and, as far as CATI is concerned, the possibility of reaching people all over the country without the need of physical travels of interviewers.

Abandoning PAPI to adopt CAPI and CATI techniques influenced many data collection aspects: sample designs were reconsidered, interviewer selection criteria and training methods were rethought in order to take into account the new techniques, and questionnaires were redesigned to make questions colloquial, to customize them according to already known respondent characteristics and to manage routing and checking rules.

The first experimental project of migration from PAPI to CAPI was made in 1996 for the 'European Panel Survey on Households'. The aim was to verify its feasibility from an organizational point of view, and to identify the possible changes needed in the questionnaire design. As a matter of fact, the electronic questionnaire used with CAPI was identical to the paper one in terms of question wording, response items, instructions, etc., and interviewers were asked to report the questions that caused problems when submitted with CAPI. It emerged that questions characterised by very long wording and/or a high number of response items were the most problematic, probably because, while with paper questionnaires, respondents tend to take a look at it together with the interviewer, with the electronic questionnaire they simply tend to listen to the interviewer, so they often ask for repetition. The experiment was conducted on a subsample of 113 households and the response rate was the same of the traditional PAPI survey (89 households completed the interview).

Concerning CATI, one of the first tests was realized in 1996 on the 'Citizen's safety pilot survey' with the main purpose of verifying whether CATI was a suitable technique for the survey topics. The main result was that this technique was really suitable because telephonic interview guarantees anonymity and favors confidentiality more than what is the case with face to face interviewing. In addition, the centralization of interviewers made it easier to monitor them and to organize the debriefing. Some changes in the

questionnaire were made after the pilot survey, concerning mainly the streamlining of screening questions on criminal facts, the transformation of some open questions into closed ones and the modification of the structure of some sections. Following these results, the 1997-1998 survey was made with the CATI technique, obtaining a response rate of 68.4% and a refuse rate of 19.7%, while nonresponses to single questions were almost not existing.

After these first experiences, CAPI and CATI techniques have been used for many socio-demographic surveys, widely replacing PAPI and obtaining even higher response rates. Only recently, with the increasing use of Web among individuals and the reduction of coverage of landline phones, CAWI has been added to the other data collection techniques.

In particular, only for one social survey (Survey on the vocational integration of research doctors) CAWI technique has been used as a single technique, thanks to the peculiar characteristic of the target population, while in all the other cases CAWI was part of a mixed-mode strategy. In particular:

- the mixed-mode strategy in 2011 Population Census was PAPI, CAWI
- the mixed-mode strategy in 'University-to-work transition survey and perspectives' and in 'Upper secondary school graduates survey' was CAWI, CATI
- the mixed-mode strategy in two surveys, part of the system of Multipurpose surveys ('Aspects of daily life survey' and 'Citizens and Free time survey') was CAWI, PAPI.

In the following, the two case studies concerning Population Census and Aspects of daily life survey are briefly described.

2.2.1. 2011 Population Census

The Population Census, up to now carried out each 10th year, is aimed at providing a picture of the population of the country from a demographic, social and economic point of view. By the comparison to previous censuses, it also allows to outline the population evolution.

Resident and temporarily present population is surveyed. Statistical units are households and institutional households. Censuses on houses and buildings have been added to the traditional population census, in 1951 and 2001 respectively.

The main estimates produced by the census regard:

- structural characteristics of population
- number of resident persons in each municipality, which constitute the resident population
- number and characteristics of houses and buildings.

Data collected in census are also the source used to update the population registries of each municipality.

The 2011 census has been a milestone for household surveys as Web technique has been adopted for the first time. A PAPI/CAWI concurrent mixed mode design has been implemented: respondents could fill in an electronic Web questionnaire or a paper one, which should be given back to postal offices or to the collection centres set up in the municipalities.

The results were very satisfactory, as 33.4% questionnaires were filled in through CAWI technique, 31.7% paper questionnaire were returned to municipal collection centres, 22.6% to postal offices and for only 12.3% it was necessary to go to the address of respondents to solicit the compilation and collect the questionnaires.

This innovative strategy led to a reduction of the workload for the local statistical offices and of the burden on respondents. The main critical aspects regarded paper questionnaires, due to their handling, stocking and delivering to respondents.

Thanks to the good results, the feasibility of CAWI technique for social demographic surveys has been confirmed, which implied an acceleration of the adoption of this technique for these kinds of surveys.

In the recent years, many innovations have been thought for future censuses, which led to the so called '*permanent census*' strategy, which was tested in 2015.

For this purpose, two pilot surveys have been organized:

- the C-Sample survey, which was an area survey with a *short form questionnaire* aimed at testing the entity of the coverage error of population registers, with the purpose of defining the legal population
- the D-sample survey, which was a sample survey (sampled municipalities should rotate year by year), which had to collect data not present in administrative sources, to produce the estimates to be provided in the hyper-cubes defined in the European Regulation on Censuses.

These pilot surveys were made to test different aspects: methodologies, data collection techniques and also the organization to be set up in the next permanent census. As far as data collection techniques are concerned, C-Sample data were collected through CAPI technique, while a mixed-mode strategy was tested for D-Sample. In particular, this strategy included CAWI, CATI and CAPI with the aim of being completely ***paperless***, even though the possibility of using paper questionnaires (PAPI) was kept as a residual solution, in case of technical problems or needs to solve peculiar not coverage cases.

Considering the modes sequences, data collection has been organized in two phases. The first one was based on CAWI and CATI-inbound (respondents could call the free toll number to be interviewed by telephone). In the second phase, CAPI was added for nonrespondents, leaving, in the same time, the possibility of using the other techniques. As already mentioned, in some cases interviewers went to nonrespondents' addresses and used a paper questionnaire when technical inconveniences did not allow filling in the electronic one.

The electronic questionnaires managed the routing rules automatically. Many consistency rules were included, the most important in *hard mode* (the errors should be corrected to complete the compilation), the other ones in *soft mode* (error messages were shown, but the responses could be confirmed). It was possible to interrupt the compilation, save the responses already given and continue at a later time.

The IT tools used for the electronic questionnaire and the case management system have been designed and developed in-house, according to a re-use approach, as requested by DigitPa (National Authority for the Digitalization of the Public Administration).

The percentages of completed questionnaire per technique were the following:

- CAWI → 49.2%
- CATI → 28.8%
- CAPI → 17.8%
- PAPI → 4.2%

Following this experience, the next census will be organized completely *paperless*.

2.2.2. Aspects of daily life survey

Aspects of Daily Life survey (ADL) is a large annual sample survey that covers the resident population in private households. It is a part of an integrated system of social surveys, The Multipurpose Surveys on Households, and collects fundamental information on individuals' and households' daily life.

The survey provides information about citizens' habits and different social aspects. Topics like education, work, family and social life, spare time, political and social participation, health, life style are investigated

from different points of view: behaviours, motivations and attitudes. ADL also contributes to the estimation of indicators on the people quality of life such as the degree of satisfaction, the economic conditions, the area in which they live, the efficiency of public utility services, etc.

The data collection strategy was based on Paper and Pencil, with two different questionnaires: a pink one, administrated by the interviewer, and a green one, which was self-administrated. The pink questionnaire collected information regarding the household as a whole and, for each household member, topics like education, work, job commuting, sports, etc. The green questionnaire treats a series of different topics concerning personal life style of each component of the household.

The sample design consists of around 25,000 households and 800 municipalities. All selected households' members are interviewed.

According to a strategy aimed at reducing the use of paper in surveys, a first test of use of CAWI technique was set up in 2014 on this survey. CAWI was used as single technique on an independent sample, with the purpose of verifying the performance of this technique.

Following the analysis of data collected in the 2013 survey, which showed that 58.7% of households had internet at home and a further 4.2% who did not have it at home, but could use it at work or somewhere else, it was decided to use a sample design very similar to the classic one, based on resident households. The sample was very big for a pilot survey (12,000 household) in order to have a sufficient number of responses for the data analysis.

The impact of CAWI technique on the questionnaires design regarded more their structure than their characteristics in terms of questions wording, sequence, etc. As a matter of fact, the paper questionnaires were reproduced for CAWI as a structure composed by as many independent questionnaires as there were household members, with a supplement for the section concerning the household as a whole, which was filled in by the so-called 'reference person' to whom the invitation letter with the log-in information was sent. This architecture allowed each household member to fill in his/her questionnaire and to submit it, so that the other household members could not see or modify it, which implied a concrete advantage in terms of privacy. The other main differences between paper and electronic questionnaires regarded the automatic management of the skipping rules, the fact that non-response to single questions were not admitted (with the exception of sensitive questions) and the introduction of a small number of checking rules.

Respondents were the 13.2% of sampled households, very far from the results obtained in census, but absolutely not comparable for different reasons: first of all, being a pilot survey, participation was not compulsory like in census, secondly, the census was preceded by a big information campaign through all the media.

As far as the characteristics of CAWI respondents are concerned with respect to PAPI respondents, there is a higher percentage of households living in the north of Italy, which is consistent with the socio-demographic profile of this zone of the country. Another difference is that these households are more concentrated in bigger municipalities and that there is a higher number of them with 3-4 members, which could be due to the fact that households with only 2 members are more frequently composed by elder persons who do not usually have access to internet. Finally, respondents to this pilot survey have on average a higher education degree. With regard to responses concerning life style, the main differences are those related to the frequency of use of PC and to the IT competences, as percentages of CAWI respondents are significantly higher.

In synthesis, this pilot survey has been very useful to test all the process of a CAWI survey and to verify its feasibility. This made it possible to define the strategy to be set up for the forthcoming survey, for which a

mixed-mode solution CAWI-PAPI has been adopted. The approach is sequential with one single sample: households are contacted to respond with CAWI and, after a pre-defined period, nonrespondents are contacted again to fill in a paper questionnaire.

2.3. CBS case study – a short summary

During the last decade, Statistics Netherlands (CBS) has published a number of papers on their mixed-mode designs for household surveys. In a paper from the Q2010 conference, Cuppen, van der Laan and van Nunspeet (2010) describe their Household Survey Redesign Project. Having been started in 2010, cost efficiency and timeliness were among the driving factors of this project. Among the first measures taken was combining CAPI and CATI modes in the POLS panel survey, using CAPI in the first wave and CATI in later waves. Soon, also CAWI came into the picture as an option, and as a necessity as budgets were progressively reduced. The redesign strategy contained five different means:

1. The use of registers and administrative data.
 - a. As surrogate for survey data.
 - b. As auxiliary information for sampling, data collection, processing and analysis.
2. The use of cheaper modes – web and paper.
3. Combinations of survey modules and themes.
4. Re-use of respondents, e.g. follow-up surveys or after screening questions.
5. Use of new estimation techniques.

Regarding the use of CAWI as a cheaper mode, CBS has done a lot of work on questionnaire design strategies and mode effects when CAWI is involved. Meertens and Cremers presented papers on aspects of this at the QDET2 conference in 2016 on this.

2.3.1. The Omnimode design system

Cremers (2016) describes the background and basics of CBS's so-called omnimode design. Previously, two different questionnaire designs were made for mixed-mode: one for CATI/CAPI, and one for CAWI. This made the design process costlier, with a number of unnecessary iterations, but also contributed to measurement differences. The paper also effectively sums up some of the factors that can lead to questionnaire differences when a single-mode survey is converted to mixed mode:

1. Not being able to start afresh, but having to deal with a pre-existing questionnaire. This can make the original mode the “leading” mode.
2. Fear of time series breaks makes fundamental changes difficult.
3. Specific client demands – if your client is king and will not listen to well-founded arguments.
4. Technical restrictions. This is linked to the inherent mode differences – visual vs. aural, but also to device limitations of smartphones versus tablets and PCs.
5. Consequences for the rest of the organisation. In terms of survey management systems, interviewer friendliness, data merging, cleaning and editing processes etc.
6. Time and money restrictions.

The omnimode design system visually presents the different mode versions on the screen, with colour codes and shapes to indicate differences in content or implementation. Some of the main changes due to the omnimode system were the following:

1. Answer categories are exactly the same in CATI/CAPI and CAWI
2. Item nonresponse attributes are the same in each mode. In general, Refusal is always allowed in both modes, whereas Don't know is not.
3. Instruction texts are treated equally. Instructions that are visible on the CAWI screen is read out in CATI.
4. No use of pop-up checks or controls in CATI/CAPI mode. Instead, questions are used for consistency.
5. Mode-specific imputations and questionnaire routing. When the exact same design is not possible in all modes.

2.3.2. Omnimode: guidelines for implementation and adaptation

In her paper, Meertens (2016) presents CBS's guidelines for the implementation of omnimode design. The starting point is that a straightforward unimode approach in most cases is most likely to achieve measurement equivalence, there are some significant exceptions. She emphasizes

- the amount of wording,
- use of Don't know options,
- display of instructions
- error checks, and
- use of grids

Meertens distinguishes between *external factors* and *internal factors* causing measurement differences in mixed mode designs. External factors have to do with respondent and/or interviewer behaviour, whereas internal factors have to do with (visual aspects of) questionnaire design. Meertens then goes on to present examples. An example of internal factors is the separation of interrelated questions on different screens in a web survey leading to measurement differences. The disbanding of the context elicits a different interpretation and response process, resulting in measurement differences.

As one example of external factors due to social desirability and interviewer effects, Meertens uses questions intended for measuring BMI. Open questions on height and weight are asked to determine this. Here, the interviewer effect in a CAPI interview was the opposite of what is normally expected: the respondents answered more truthfully because of the interviewer presence. Eventual desires to appear to have a lower or higher BMI than the actual must have been outweighed by the desire to not be caught lying.

Lastly, the paper presents CBS's guidelines for omnimode design:

1. Keep the stimulus – question and answer categories – the same across modes
2. Redesign using unimode principles if possible. The questions should not be “locked” to one mode as the primary one.
3. Use a screen-by-screen design to keep the respondent focussed on one question at a time ...
4. ... unless they are filter and follow-up questions
5. Repeat question texts on next page/screen to give the complete stimulus again
6. Always include all answer options in questions to be read out loud, including No opinion, Refused or Don't know.
7. Avoid grids if possible, and ask series of questions in all modes instead
8. Minimize instructions and explanations, and present them similarly across modes, preferably in the form of questions

3. Final tentative recommendations and conclusions

The three NSI case studies demonstrate the way these organisations have arrived at their present-day use of modes and mode combinations. A lot of work is being done in questionnaire design, but also in data collection designs, trying to find the best way to do each survey and how to fit CAWI into the mix. The heterogeneity of the situation and the apparent constant change to be expected is an argument in favour of generalizing the advice on questionnaire design as much as possible. This implies that although the WP will offer recommendations on CAWI question and questionnaire design, priority should not necessarily be given to CAWI as a dominant mode.

The NSI most in line with such an approach is Statistics Netherlands, with their omnimode strategy of rebuilding questionnaires for mixed-mode from scratch. In the short term, this is likely to be costly and time-consuming, but in terms of quality it appears to be superior. The UK's ONS, which is not part of the MIMOD consortium, has had a similar approach with their LFS transformation project (Nolan 2018). Although their approach is *web first* rather than omnimode, the need for starting afresh and doing cognitive and usability pretesting iterations appear highly sensible. Nolan stresses the need for cutting down, rationalizing and making questions more relevant: recommendations which are also found in the MIMOD survey.

Against these tentative conclusions stands the fact that Eurostat's model questionnaires and technical guidelines often recommend or require one type of mode. This means that WP4's recommendations for CAWI question design will probably contradict Eurostat requirements. Although there may be good reasons for that one mode is better suited than another for a particular question or survey, the MIMOD survey shows that modes will be mixed in many different ways and are likely to continue to be in the foreseeable future. A tentative recommendation from MIMOD WP4 would then be to *redesign the model questionnaires and technical guidelines themselves* to make proper recommendations for mixed-mode data collections.

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