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Do online access panels need to adapt surveys for mobile devices?

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Abstract

Purpose – Despite the quick spread of the use of mobile devices in survey participation, there is still little knowledge about the potentialities and challenges that arise from this increase. The purpose of this paper is to study how respondents' preferences drive their choice of a certain device when participating in surveys. Furthermore, this paper evaluates the tolerance of participants when specifically asked to use mobile devices and carry out other specific tasks, such as taking photographs.
Design/methodology/approach – Data were collected by surveys in Spain, Portugal and Latin America by Netquest, an online fieldwork company.
Findings – Netquest panellists still mainly preferred to participate in surveys using personal computers. Nevertheless, the use of tablets and smartphones in surveys showed an increasing trend; more panellists would prefer mobile devices, if the questionnaires were adapted to them. Most respondents were not opposed to the idea of participating in tasks such as taking photographs or sharing GPS information.
Research limitations/implications – The research concerns an opt-in online panel that covers a specific area. For probability-based panels and other areas the findings may be different.
Practical implications – The findings show that online access panels need to adapt their surveys to mobile devices to satisfy the increasing demand from respondents. This will also allow new, and potentially very interesting data collection methods.
Originality/value – This study contributes to survey methodology with updated findings focusing on a currently underexplored area. Furthermore, it provides commercial online panels with useful information to determine their future strategies.

Keywords Survey, World Wide Web, Technological innovation, Mobile communications, Methodology, Netquest

Paper type Research paper

1. Introduction

Online surveys have recently become not only a generally recognised and substantial way to involve respondents, but also an increasingly unavoidable standard method for data collection. Moreover, with the recent spread of mobile access to the internet, the use of mobile internet for surveys is seen as a natural evolution that shows how online surveys, self-administration and technology can jointly be used in the future of survey methodology (Couper, 2008). This creates new challenges and opportunities. However, research

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institutes, online panels, government offices, etc., are using more and more frequently web surveys as an efficient and effective way to collect data. Thus, they need more information about these themes in order to take decisions about the use and consequences of mobile devices within these web surveys. In addition, with the fast technology's evolution and the wider population with a mobile device available, on one hand, it will be possible to propose to potential respondents new kind of tasks. On the other hand, the methodology implications and issues (such as the representativeness of respondents or the quality of collected data) need to be studied in depth and frequently updated.

Previous works have highlighted the main advantages of mobile access: it presents all the advantages of self-administered surveys (i.e. reduced survey's costs, if compared to interviewer-based modes), tools such as text messaging can be used to pre-notify the survey, and it makes a location-independent survey completion possible (de Bruijne and Wijnant, 2013; Yeager *et al.*, 2011). Moreover, no significant differences were registered between surveys through mobile devices (i.e. smartphones and tablets) and PCs (meaning both fixed-PCs and laptops from here on) in terms of the evaluation of questionnaire difficulty, and of the interest and enjoyment of the respondent (de Bruijne and Wijnant, 2013).

The advantages of mobile access to surveys, the increasing importance of the use of mobile devices, and their different hardware characteristics (e.g. the size of the screen) suggest that the adaptation of traditional survey tools to the new devices is necessary. Some researchers have studied how to adapt questionnaires to mobile devices (Boreham and Wijnant, 2013) or have investigated whether the answers differ when respondents use mobile devices rather than other data collection modes (Newell *et al.*, 2015). Others have evaluated the quality of data collected through mobile devices (de Bruijne and Wijnant, 2013; Mavletova, 2013; Stapleton, 2013; Wells *et al.*, 2013, 2014). The spread of this interest for mobile use in surveys underlines how an additional amount of resources (in terms of research time and money) needs to be spent to study the adaptation of web survey tools to the new mobile mode. If one wants to involve respondents who use mobile devices, however, the necessity for adaptation becomes one of the main drawbacks of mobile web surveys. Thus, even if the mobile mode (and, more in general, the web surveys mode) can be cost saving in comparison to traditional survey modes, it specifically asks for big development investments for the adaptation of survey tools to the mobile participation. The large number of different devices does not help in reducing these investments.

In addition to this, the involvement of mobile respondents in surveys is linked to other drawbacks (de Bruijne and Wijnant, 2013; Bosnjak *et al.*, 2013; Wells *et al.*, 2013; Buskirk and Andrus 2012; Callegaro 2010; Peytchev and Hill, 2010), in particular:

- low response rates;
- expensive mobile subscription rates if compared to landline costs, although tariffs are gradually decreasing;
- low familiarity of some potential respondents with the recent technologies (the importance of this phenomenon is also reducing);
- the potential influence of the location on the respondent's cognitive processing;
- limitations linked to the characteristics of mobile devices, such as the size of screens (e.g. visibility, scrolling, zooming);
- a lower commitment of respondents in comparison to other traditional modes;

- a longer perceived and objective duration of survey completion; and
- a potential coverage error depending on the involved target population.

Thus, allowing the mobile participation (or involving mobile respondents) can also potentially cause different quality and representativeness issues.

In summary, the involvement of mobile access in web surveys is linked to important advantages, but also to some drawbacks. Thus, on the one hand, the development of mobile web access and the spread of mobile devices can provide researchers with a lot of new and mostly unexplored opportunities. On the other hand, this also generates a lot of new methodology issues and requires additional investments of time and resources to plan and adapt surveys to the new devices.

2. Research objectives

Our research question is as follows:

RQ1. Considering the trade-off between the advantages and problems, is it worth investing to adapt surveys to mobile devices?

This study was developed within the specific framework of online panels; nevertheless, the answer to our research question is relevant to all agencies and institutions that have to deal with a mobile web population in their surveys.

Currently, the extent of the need for mobile web surveys, or if this need is felt similarly in different countries, is still not clear; the potentialities of using the mobile web in survey completion needs to be fully explored. Revilla *et al.* (2015) studied access to mobile devices using data collected by Netquest, an online access panel (non-probability based) that covers Spain, Portugal and Latin American countries (www.netquest.com). In these countries, the authors observed that 80.6 per cent of panellists owned at least one mobile device. The number of potential respondents through mobile devices is even greater if one takes into account panellists that do not own a device but have regular access to one. Moreover, Revilla *et al.* (2015) also showed that 78 per cent of the studied panellists owned more than one device (fixed PCs, laptops, tablets or smartphones), whereas only 20.3 per cent owned only one kind of device. This means that most panellists can choose between different devices when they participate in a survey. Thus, the need to adapt surveys to mobile devices is also linked to the preferences of potential respondents. If everybody preferred to answer via a PC, even when they had access to a mobile device, there would be no need to adapt surveys. In an analysis of several countries Fuchs and Busse (2009) confirmed that it was "not clear yet whether the accessibility of potential respondents and the a-synchronous character of mobile web surveys actually translate into high response rates" (p. 31).

In this paper, we further explore this topic, studying the current preferences of web panellists for answering surveys through mobile devices. Using data provided by Netquest, we aim at understanding how much these preferences really translate to an actual choice towards mobile devices. If such a preference exists, there is an actual need to provide panellists with the possibility to answer web surveys by means of mobile devices. Analysing the current situation in a large set of countries, our main purpose is to provide online access panels with a more complete and detailed description that can be useful to define their future strategies about the role of mobile devices in their surveys. However, our findings may be of general interest for survey methodology researchers, since they concern a relatively unexplored research topic that is evolving very quickly and a practice that is spreading increasingly worldwide.

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The next section reviews the literature about the preferences and tolerance of panellists for mobile devices and the characteristics of panellists with different preferences. Section 4 provides new evidence about each of these aspects. Section 5 evaluates the impact of participation through mobile devices on the representativeness of a certain survey. Finally, Section 6 proposes some elements of discussion and the conclusions.

3. The need for mobile in online panels: Literature review

Mobile internet penetration increased from 7 per cent in 2008 to 29 per cent in 2013 and it is forecasted to overtake fixed-broadband penetration in 2017 (Statista, 2014). According to StatCounter GlobalStats (2014), mobile web usage reached 29.8 per cent in October 2014 (+25.5 percentage points in comparison to January 2011). Due to the quick increase of the mobile internet rate on the total traffic, de Bruijne and Wijnant (2014) expect a likewise increase in mobile access to online surveys. The growing importance of this kind of access to surveys pushed researchers to define the "unintended mobile respondent" (Wells *et al.*, 2013; synonymously "unintentional mobile response", see Peterson, 2012). This describes a respondent that attempts to participate in web surveys using mobile devices, when the survey is designed for PCs and has not been adapted for mobile browsers.

One should bear in mind that owning or having access to a mobile device or to the internet does not mean using it. A Nielsen Mobile (2008) study shows that in the USA there were 95 million mobile subscribers (37 per cent of the total population) with access to the mobile internet. However, only 40 million (15.6 per cent) were active users of mobile internet services, with at least one monthly access. An analogous situation is observed in other countries. It is true that the differences between the two rates are becoming narrower, but it is also clear that currently not everyone who has access to internet actually uses it, and not everyone who has mobile devices uses them to surf the web. Furthermore, actively using a mobile device does not automatically imply a willingness to use it for participating in surveys. Thus, we need to establish whether the use of mobile devices to answer surveys is moving in the same direction as the spread of both internet coverage and mobile web access.

3.1 Preferences

Willingness to participate in a web survey using mobile devices is not only a question of being a mobile user but is strongly linked to other aspects. Fuchs and Busse (2009) found that a lack of technological sophistication of potential respondents and the expensive fares established by telephone companies could discourage participation in surveys by mobile devices. Data from the Eurobarometer (2012) show that about 40 per cent of internet users do not use mobile devices to access the web because they are worried about connection costs. Song *et al.* (2015) also found that cost is an influential factor affecting users' intentions to adopt mobile technology in China. Nevertheless, both the phenomena of lacking technological sophistication and high connection costs are recently losing their importance.

Other factors can influence willingness to participate in a survey through mobile devices, including perceived trustworthiness, behavioural attitudes, self-congruity (Bosnjak *et al.*, 2010), enjoyment and perceived usefulness of its role (Verkasalo *et al.*, 2010). In addition, the possibility of participating in surveys from any location is generally considered very important. Nevertheless, de Bruijne and Wijnant (2013) in a

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panel study found that the majority of respondents participate at home, even when they have a mobile device at their disposal.

Moreover, mobile web respondents are considered as mostly progressive forerunners in adopting new technology. Thus, as technology matures, mobile web penetration should rise fast, helping the spread of the unintended mobile web response. Callegaro (2010), analysing customer satisfaction surveys not optimised for mobile participation, observed a participation rate using mobile devices equal to 1.2 per cent in Asia (February 2010), to 1.8 per cent in Europe (October 2010) and to 2.6 per cent in North America (June 2010). Thus, currently the phenomenon of mobile respondents can be still considered to be in its early stage. Nevertheless, we can expect that it will be soon impossible to neglect the growing importance of mobile participation. In more recent years, mobile involvement rates in surveys are increasing (Toepoel and Lugtig, 2014). De Bruijne and Wijnant (2014) confirmed this by studying two online probability-based panels in the Netherlands. In the Longitudinal Internet Studies for the Social Sciences (LISS) the unintended mobile completion of web questionnaires increased from 3.1 per cent in March of 2012 (0.4 per cent through smartphones, 2.6 per cent through tablets) to 10.9 per cent in September of 2013 (1.6 per cent through smartphones, 9.3 per cent through tablets). Results from the CentERpanel showed that the mobile participation rate increased from 3 to 16 per cent between February 2012 and October 2013. Between January 2012 and January 2014, de Bruijne and Wijnant (2014) observed a stable difference of about 7 percentage points between general mobile traffic (an average annual growth rate of 6.3 per cent, according to StatCounter) and mobile web response (an average growth rate of 5.9 per cent, considering LISS panel data): the two phenomena show a similar evolution. They also discovered that the growth of the unintended mobile access rate was mainly due to tablets.

By means of CentERpanel data (year: 2012) de Bruijne and Wijnant (2014) also studied the preferences of respondents regarding the devices they used to visit websites and complete surveys. Only 11 per cent of respondents preferred tablets for both activities, and only 1 and 2 per cent of respondents showed a preference for smartphones to visit websites and complete surveys, respectively. Nevertheless, there are further issues connected with the preferences of respondents for various types of mobile participation that need to be clarified.

First, in several studies a group of respondents already showed its preference for mobile devices, even when unintended. Furthermore, the impact of unintended mobile response is even more relevant, because the switch to mobile devices is not led by the researchers, but rather by the respondents. More research is needed in order to define the characteristics of this group and to check if it is becoming larger simultaneously with the spread and the growing importance of mobile devices. In this regard, Mavletova (2013) observed a lower response rate for the mobile web compared to the computer web. This could be considered a partial confirmation of the results of de Bruijne and Wijnant (2014) shown above. However, in the same paper Mavletova also suggested that the relationship between general mobile internet usage and mobile survey completion should be studied carefully. It is possible that the two aspects are linked to two different groups and types of users.

Moreover, some panellists have already affirmed that they would prefer to use mobile devices for survey participation, if the survey could be adapted accordingly. For example, Baker-Prewitt (2013) showed that the percentage of smartphone respondents that preferred to participate in surveys through this device is significantly higher if the surveys were adapted. How many of this group of potential respondents would be lost

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if we do not provide them with a "mobile option" and/or with a mobile-adapted survey? Will the adaptation of surveys to mobile device help increase the response rates, at least of specific groups of respondents? Section 4 tries to answer some of these partially still unexplored questions.

3.2 Tolerance

When respondents participate in a web survey, their involvement is driven not only by their preferences but also by their tolerance for a certain device. By "tolerance" we mean that, even if the device is not the respondents' first choice, they would agree to use it, if the researchers explicitly asked them to participate to the survey through this device. In this regard, de Bruijne and Wijnant (2013) found that even when they are specifically requested to use a PC, around 12 per cent of respondents used tablets and, although asked to use mobile devices, 9.9 per cent used a PC. At least part of the unintended mobile respondents may not have fully realised that the switch to a different device can affect the contents and the quality of their answers. They probably felt they were respecting the panel engagement rules as long as they answered the questionnaire. Therefore, the authors suggested carefully monitoring the device actually used by respondents, for example, by detecting it automatically. In addition to this, they recommended that respondents' answers about the device used for completion should not be completely relied upon, because they noticed that respondents estimated their mobile device usage as being higher, when reporting they had used a mobile device. These preliminary results suggest that some respondents can be intolerant of some devices, refusing to use some types when they are requested to do so, even if these devices are available.

Baker-Prewitt (2013) pointed out that the evaluation of the survey participation's quality experience can be different if the respondents chose to participate through a mobile device, rather than if they were asked to do so. Furthermore, mobile devices have features that allow the researchers to obtain information in other ways than the classic survey methods: for instance, tracking the GPS position, collecting information at specific moments or in specific spaces (e.g. when respondents leave a store; see Soltani, 2014), asking respondents to take and send photographs (e.g. of the place where they are, of their fridge, or of the receipts of the supermarket), or obtaining behavioural information. Giannotti and Rinzivillo (2014), used mobility data from mobile phones and GPS tracking to study the patterns of collective movement behaviour, identifying specific subgroups of travellers. Pilot research by Scagnelli and Bristol (2014) studied the participation by and the tolerance for mobile devices over time to gather longitudinal data on consumer behaviour.

The new features of mobile devices can provide researchers with attractive tools and possibilities that can be easily implemented. However; are respondents tolerant of these new tasks? Currently, there is still little knowledge about the link between these new possibilities and the willingness of respondents to engage in them. For example, privacy aspects are often mentioned as a barrier to these kinds of involvement (Federal Trade Commission, 2014).

3.3 Impact on representativeness

A further issue linked to the mobile web participation is the representativeness of respondents. Studies about the adoption readiness of mobile devices have shown that there are significant differences between adopters and non adopters (Thakur and Srivastava, 2014). When focusing on the particular task of completing surveys,

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the switch from PC to mobile is more likely by people who have the same characteristics as the early technology adopters: young, well-educated and with high incomes (Yu, 2006). The population with a mobile device available also showed more sophisticated technological competencies (Nicolai, 2009), and mostly comprised younger people, male, with a higher degree of education, residing in larger municipalities, and less often married or widowed (Fuchs and Busse, 2009). This could potentially affect the representativeness of a survey that excludes (or that is based exclusively on) this group.

More recently, Peterson (2012) noticed that females and people younger than 35 years old were more likely to access surveys on smartphones. De Bruijne and Wijnant (2014) found that some variables predict the preference to complete surveys through a certain device. A preference for tablets was mostly linked to age, gender, working status, level of education and housing composition, whereas the preference for smartphones was associated with age and education. Moreover, at a general level, those using smartphones frequently were more likely to participate in surveys. These results suggest that the characteristics of mobile respondents can be quite different than those of the group that is more likely to participate in surveys through PCs. de Bruijne and Wijnant (2014) found a higher share of females in mobile respondents than in PC users. Moreover, differences were observed between smartphone users (mainly young) and tablet users (mostly working adults, between 25 and 54 years old). Nevertheless, the group of mobile respondents still requires further study, taking also into account the fast evolution of its characteristics over time. Do mobile respondents still significantly differ from the others? Who is lost if we do not allow respondents to answer through mobile devices?

These questions are very important from a practical point of view, since they are strictly linked to the representativeness issue. If allowing mobile participation (and accepting the connected investments), or if giving priority to a certain device does not preserve representativeness, then this strategy should not be suggested to online panel companies.

In summary, the main goal of this paper is to better understand the phenomenon of mobile web participation in surveys; trying to compensate for the current general "lack of information about the frequency of mobile Internet usage" (de Bruijne and Wijnant, 2014); and, mostly, to explore the propensity of respondents to participate in a survey through a mobile device.

4. Findings of this study

4.1 Method and data

The new findings were obtained using data from Netquest, an online fieldwork company that started its first online panel in 2006, in Spain. Currently, it is also present in Portugal and Latin America, with more than 450,000 active panellists and 4 million completed surveys every year. Netquest panellists are recruited from different databases of many website users who agree to receive e-mails. For each completed survey, panellists receive points that can be exchanged for gifts. Most of the surveys sent by Netquest were thought to be completed on PCs. However, in the last few years the company started to receive requests for surveys adapted to mobile devices. In our research, we used Netquest data in order to study the preferences and tolerance of panellists, both for using mobile devices to participate in surveys and other specific tasks. These are first research steps in order to suggest which strategy panel companies like Netquest should adopt over the following years. Our findings may also be of more general interest, from the methodology point of view, for everybody dealing with surveys that potentially or actually involve mobile participation. The data come

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from two main sources: surveys on representative samples of Netquest panellists (about 1,000 panellists were interviewed in each of the seven countries), and automatic tracking of the devices used by Netquest panellists to answer to all surveys from January 2013 to June 2014.

4.2 Preference for different devices

First, we studied the devices that random samples of the Netquest panellists claimed to prefer. Second, we tracked the types of devices used by panellists to participate in surveys as an indicator of current preferences.

4.2.1 Claimed preferences. To determine which devices panellists preferred to use, in July 2013 we surveyed a representative sample of around 1,000 panellists in each country. The following three questions were asked to panellists: what devices do they usually use in answering the surveys proposed by Netquest? ("usually"); what devices are they using to answer the current survey? ("now"); what device would they use, if Netquest would propose only surveys adapted to mobile devices? ("future"). The main results are shown in Table I (that includes the complete samples) and 2 (focused on respondents that owned all three devices).

	Device				
	S	*T*	PC	Others	Vary
Usually					
Average	5.5	2.8	85.5	0.9	5.3
Argentina	4.4	1.9	88.6	0.9	4.2
Brazil	5.4	1.8	86.0	2.1	4.8
Chile	9.3	2.7	77.6	0.6	9.8
Colombia	4.3	1.7	87.2	0.7	6.1
Spain	6.0	4.0	85.6	0.4	4.0
Mexico	5.7	3.2	85.9	1.0	4.3
Portugal	3.2	4.4	87.6	0.9	3.9
Now					
Average	6.5	3.4	89.2	0.9	na
Argentina	4.9	2.3	91.5	1.3	
Brazil	4.9	1.4	91.8	2.0	
Chile	14.2	3.9	81.2	0.7	
Colombia	3.3	2.8	93.5	0.4	
Spain	7.9	3.7	88.3	0.1	
Mexico	5.5	3.8	89.4	1.4	
Portugal	4.7	5.7	88.9	0.7	
Future					
Average	31.0	11.7	38.8	na	18.5
Argentina	25.2	6.5	47.5		20.8
Brazil	33.8	8.8	40.4		17.0
Chile	39.4	9.5	28.8		22.3
Colombia	34.5	13.7	34.6		17.3
Spain	24.3	12.3	44.2		19.3
Mexico	40.6	16.6	28.0		14.8
Portugal	19.4	14.8	47.9		17.9

Table I. Complete samples: percentages of respondents declaring they usually use (usually), are using (now) or would use the different devices if the surveys were adapted (future)

Notes: $n \approx 1{,}000$ in each country. *S*, smartphones; *T*, tablets; PC, fixed PCs and laptops; vary, they would vary from one device to another; average, non-weighted average of different countries

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Table I shows that, on average, 85.5 per cent of the respondents usually answered surveys using a PC, 5.3 per cent varied among devices, 5.5 per cent answered through a smartphone, and 2.8 per cent used a tablet. Similar proportions were found when looking at the question about the current survey (category "now"). When considering what the respondents would do if the surveys were to be adapted to mobile devices, in Argentina, Brazil, Spain and Portugal, there was still a higher proportion of respondents that would answer from a PC (40.4 to 47.9 per cent). On the contrary, in Colombia there was a similar proportion that would answer by smartphone (34.5 per cent) and by PC (34.6 per cent), whereas in Mexico and Chile more would answer through smartphones (around 40 per cent). In Mexico and Chile, 14.8 and 22.3 per cent, respectively said they will vary among devices. These data reveal a real need to adapt surveys to mobile devices, even if this need varies considerably according to country.

Table II focuses on the respondents that owned all three devices. Since they could choose between different devices, we can obtain a more precise idea about the devices that the respondents really preferred when all the choices were at their disposal.

	Device				
	S	*T*	PC	Others	Vary
Usually					
Average	6.6	5.3	80.5	0.8	6.9
Argentina	5.9	5.1	82.8	0.4	5.9
Brazil	6.0	3.3	84.7	1.3	4.8
Chile	8.4	5.9	71.9	0.8	13.0
Colombia	5.8	3.2	81.0	1.1	9.0
Spain	6.9	5.8	81.8	0.4	5.1
Mexico	6.9	4.8	83.1	0.7	4.6
Portugal	5.9	9.1	78.2	0.7	6.1
Now					
Average	7.1	6.5	85.8	0.6	na
Argentina	5.9	6.3	86.3	1.6	
Brazil	4.5	2.3	92.2	1.0	
Chile	15.3	7.9	76.0	0.8	
Colombia	4.0	5.0	90.8	0.3	
Spain	8.4	5.6	85.9	0.0	
Mexico	4.8	6.7	88.3	0.2	
Portugal	7.1	11.5	80.9	0.5	
Future					
Average	36.7	20.4	23.1	na	19.8
Argentina	32.9	16.1	27.8		23.1
Brazil	37.4	14.8	28.4		19.4
Chile	43.9	17.4	16.8		21.9
Colombia	43.5	23.0	17.2		16.4
Spain	25.7	21.0	30.0		23.3
Mexico	46.6	24.1	15.8		13.5
Portugal	26.7	26.7	25.7		20.8

Notes: Argentina ($n = 255$); Brazil ($n = 398$); Chile ($n = 392$); Colombia ($n = 379$); Spain ($n = 533$); Mexico ($n = 461$); Portugal ($n = 408$). *S*, smartphones; *T*, tablets; PC, fixed PCs and laptops; vary, they would vary from one device to another; average, non-weighted average of different countries

Table II. Panellists with three devices: percentages of respondents declaring they usually use (usually), are using (now) or would use the different devices if the surveys were adapted (future)

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For this specific group, the percentage of respondents that used or would use mobile devices was almost double in all countries, in particular regarding tablets. The proportion of respondents that used or would use a PC decreased. The PC option for the "future" category was the main choice only in one out of the seven countries (Spain). However, depending on the country, 15.8-30.0 per cent of the respondents would prefer to answer via a PC, even if the surveys were to be adapted for mobile devices, with all three available. Thus, there was a considerable part of the population that had a preference for PCs (23.1 per cent, on average).

To investigate if the preference for answering via mobile devices, mainly smartphones, is linked to the possibility of participating in surveys from any location. Table III shows the place of participation of the respondents who answered the current survey via a tablet or a smartphone.

The results do not support the hypothesis that mobile devices encourage the participation from any place. On the contrary, a large majority of respondents answered from home (74.6 per cent for smartphones and 83.8 per cent for tablets). The prevalence of this location was observed in all countries, with a maximum level registered in Chile (86.6 per cent) for smartphones, and in Argentina (95.6 per cent) for tablets. About 12-13 per cent answered via mobile devices from a workplace or from schools/universities. Few respondents (7.4 per cent, overall) answered by mobile devices from other places. Thus, home was still the most favoured place for participating in surveys. This supports the findings of de Bruijne and Wijnant (2013), suggesting that the possibility of completing the survey at any place is not the main factor that motivates the respondents to participate using mobile devices. It should be noted, however, that 25.4 per cent of smartphone respondents and 16.2 per cent of tablet respondents participated from places other than home. Therefore, the prevalence of the home option does not discount the need to adapt surveys for mobile devices.

4.2.2 Tracking observed preferences. We automatically tracked the kind of devices used by all respondents in each month and country, from January 2013 to June 2014. This approach has two main advantages. First, it allows looking at the evolution of the actual preferences through time. Second, automatic tracking of devices provides accurate data regarding the type of device used and the percentage of respondents using them (see Mavletova and Couper, 2013). Figure 1 shows these percentages for smartphones and tablets separately, by quarter.

Table III.
Place of participation for respondents participating through tablets or smartphones

	Smartphone					Tablet				
	Home	W/S	T/P/S	Other	*n*	Home	W/S	T/P/S	Other	*n*
Argentina	85.7	6.1	6.1	2.0	*49*	95.6	0	0	4.3	*23*
Brazil	69.4	26.5	2.0	2.0	*49*	92.9	7.1	0	0	*14*
Chile	86.6	5.6	4.9	2.8	*142*	89.7	7.7	2.6	0	*39*
Colombia	75.8	21.2	0	3.0	*33*	75.0	17.9	3.6	3.6	*28*
Spain	67.1	8.9	8.9	15.2	*79*	67.6	24.3	0	8.1	*37*
Mexico	78.2	16.4	0	5.4	*55*	81.6	15.8	0	2.6	*38*
Portugal	59.6	12.8	6.4	21.3	*47*	84.2	7.0	0	8.8	*57*
Average	74.6	13.9	4.0	7.4	*65*	83.8	11.4	0.9	3.9	*34*

Notes: W/S, workplace or school/university; T/P/S, transports/public transports or Streets; average, non-weighted average of different countries values

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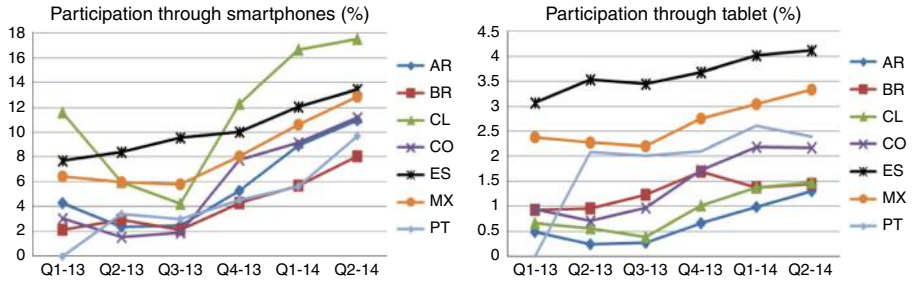
In the second quarter of 2014 (Q2-2014), Colombia, Spain and Mexico had the highest percentages of smartphones respondents (> 12 per cent), whereas in Brazil the figure was about 8 per cent. Spain and Mexico also showed the highest percentages of tablet respondents (> 3 per cent, in Q2-2014); again, the lowest levels were observed in Brazil, Colombia and Argentina (< 1.5 per cent). Overall, smartphones were used much more frequently than tablets (7.1 per cent vs 1.8 per cent). These findings differ from those of de Bruijne and Wijnant (2014) in the Netherlands, possibly because there were fewer tablets owners in the countries that we were studying. Finally, the two graphs in Figure 1 show a clear trend over time: in the second quarter of 2014, the proportions of unintended respondents through smartphones increased noticeably in comparison to the first quarter of 2013, achieving a minimum of 8.05 per cent in Brazil (+5.9 percentage points (pps)), and a maximum of 17.5 per cent in Colombia (+5.9 pps). Tablet use varied between a minimum of 1.3 per cent in Argentina (+0.8 pps in comparison to Q1-2013), and a maximum of 4.1 per cent in Spain (+1.0 pps).

However, Figure 1 does not show if the respondents answering through a mobile device were the same for consecutive surveys. In order to check this aspect, we tracked the devices used by a sample of about 1,000 respondents in each country. In January 2014, the samples were drawn randomly from the lists of panellists. The participation of these groups was then followed across time, observing how many surveys they answered, how many were completed through a mobile device, and what proportion of the completed surveys were answered through a mobile device. Table IV shows the percentages of respondents that completed a certain number of surveys (by row) without taking the device into account (first part of the table), and then by type of device (central part of the table). We also computed the ratios of surveys that the respondents completed through mobile devices against the total number of completed surveys: the last four rows of the table show the percentages of respondents for which these ratios were lower than 0.05 or higher than 0.80.

The total number of surveys completed by the panellists varied considerably between and within countries (median: from 13 in Chile, to 38 in Mexico). Within a country, some panellists completed only one survey (e.g. 6.5 per cent, in Chile), whereas others did more than 50 (e.g. 4.3 per cent in Chile).

A large majority of panellists did not complete any surveys through smartphones (minimum: 55.6 per cent in Spain; maximum: 80.1 per cent in Argentina). These proportions were even larger for tablets (minimum: 88.5 per cent in Spain; maximum:



Notes: AR, Argentina; BR, Brazil; CL, Chile; CO, Colombia; ES, Spain; MX, Mexico; PT, Portugal

Figure 1. Unintended respondents that already answered through mobile devices

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No. of Surveys x	Country Argentina $n=969$	Brazil $n=984$	Chile $n=972$	Colombia $n=976$	Spain $n=982$	Mexico $n=980$	Portugal $n=954$
Tot. no. of surveys							
1	4.3	2.8	6.5	6.6	0.7	1.1	0.7
2-5	15.8	7.9	19.7	19.6	3.2	5.9	5.9
6-10	14.5	10.0	16.3	16.3	6.6	6.3	6.6
11-25	28.1	28.0	32.2	28.8	22.0	21.3	37.8
26-50	28.3	32.2	21.0	22.2	46.8	31.2	47.8
>50	9.0	19.0	4.3	6.2	20.7	34.1	1.1
Median	19	26	13	13.5	36	38	25
Max	92	104	70	73	90	128	59
S: no. of surveys							
0	80.1	74.8	64.8	73.7	55.6	66.7	79.7
1	8.1	10.5	10.4	11.2	12.4	11.9	7.0
2-5	7.8	9.8	16.8	9.5	16.0	11.6	9.7
6-10	2.2	3.2	5.4	3.9	7.3	5.3	2.2
11-25	1.7	1.3	2.6	1.6	6.2	3.4	1.3
26-50	0	0.3	0	0.1	2.2	0.9	0.1
>50	0	0.1	0	0	0.2	0.1	0
Max	23	66	22	27	58	51	26
T: no. of surveys							
0	97.5	94.6	96.1	93.2	88.5	89.4	93.0
1	0.8	2.1	1.5	2.4	3.5	4.1	2.7
2-5	1.3	1.9	1.4	2.4	3.0	3.7	2.1
6-10	0.3	0.6	0.5	0.6	2.7	0.9	1.0
11-25	0	0.3	0.4	0.9	1.8	1.0	1.0
26-50	0	0.4	0	0.5	0.4	0.9	0.1
>50	0	0	0	0	0	0	0
Max	9	41	23	47	37	41	28
Ratios S/Tot.							
Ratio <0.05	85.8	83.1	68.5	80.3	67.7	79.3	84.8
Ratio >0.80	1.2	1.5	5.2	1.6	3.9	1.6	0.6
Ratios T/Tot.							
Ratio <0.05	98.3	96.7	96.9	94.6	91.7	94.2	95.5
Ratio >0.80	0.1	0.2	0.1	0.6	0.6	0.7	0.2

Table IV.
Percentages and ratios of panellists that completed x number of surveys: total (Tot. no.), by smartphones (S) and by tablets (T)

97.5 per cent in Argentina). However, in all countries there was a small group of panellists that participated in more than 10 surveys through smartphones (maximum: 8.6 per cent in Spain) or tablets (maximum: 2.2 per cent in Spain). Only a few panellists answered more than 50 surveys through smartphones.

Considering the last part of Table IV, the percentages of panellists for which the ratios were lower than 0.05 vary for smartphones from 68.5 per cent in Chile to 85.8 per cent in Argentina, and for tablets from 91.7 per cent in Spain to 98.3 per cent in Argentina. Thus, there were quite large proportions of panellists who were not using mobile devices at all, or to a very small extent especially where tablets were concerned. Nevertheless, there was also a small group showing a very large proportion of mobile (mostly smartphone) participation (more than 80 per cent), with a maximum of 5.2 per cent observed in Chile.

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To summarise, although small and varying by country, there was a group of panellists with a clear preference for mobile devices who used them to participate in a lot of surveys. This group probably would be larger if surveys were adapted. Moreover, although we can assume that it was easier to participate in surveys through a tablet rather than through a smartphone, a larger percentage of respondents used smartphones. This is observed both in general and for the subgroup of those using mobile devices frequently. This observation might be linked to the coverage: Netquest panellists more often have a smartphone than a tablet at their disposal (Revilla *et al.*, 2015).

4.3 Going further: tolerance for the mobile web and for new tasks

Mobile devices offer many potentially interesting ways of collecting data. However, little is known about the tolerance of panellists for answering surveys through mobile devices and for additional tasks that demand different efforts to those of answering a questionnaire. Figure 2 shows the percentages of respondents (owning or with access to the corresponding mobile device) that stated they would agree to participate if they were asked explicitly by Netquest to use a mobile device, as well as the percentages of respondents who would, or would not accept to do additional tasks: "install an application on the mobile device", "take photos and send them", and "share GPS position".

We noticed first that the distributions of the answers for tablets and smartphones were similar for the tasks "Install application", "Take photos" and "Answer surveys", whereas larger differences were noticed for "share GPS position" (mostly in specific countries). Overall, in most cases, the type of mobile device did not seem to play a role in determining the willingness of panellists to be involved in specific tasks. However, there were a few exceptions. In Chile and Argentina, the tolerance for smartphones appeared to be larger. This may be linked to the fact that smartphones are considered as more personal, whereas tablets are more often shared by several members of a household. For "Sharing GPS position", in general there was a greater willingness to share data in smartphone users than for users of tablets.

A small proportion of respondents answered "no" to the different questions, although there were clear differences across countries. In all countries, the question about sharing GPS information led to the highest refusal rates (from 18.4 per cent in Mexico, to 35.3 per cent in Argentina). This was expected, since this activity implies more privacy concerns; even so, 65-82 per cent of respondents did not refuse. Thus, we could expect a relatively high participation of the panellists in some of these new techniques of data collection.

5. Differences across groups

This section investigates whether characteristics of panellists differing in their relationships with mobile devices vary across groups. We analysed the following variables: gender (dummy: 1 = men), age (numeric), education (lower to higher level; categories varying by country) and number of household's members (numeric).

Table V provides the coefficients for a logit of the respondents who used exclusively PCs to answer surveys, comparing them with those who at least sometimes used other devices. The second part of the table shows the coefficients of a logit for the respondents that had a smartphone at their disposal, but would not agree to use it to complete a survey.

Concerning panellists who used only a PC to complete the survey, in all countries except Brazil there was a significant effect of having only a PC; if panellists had only a

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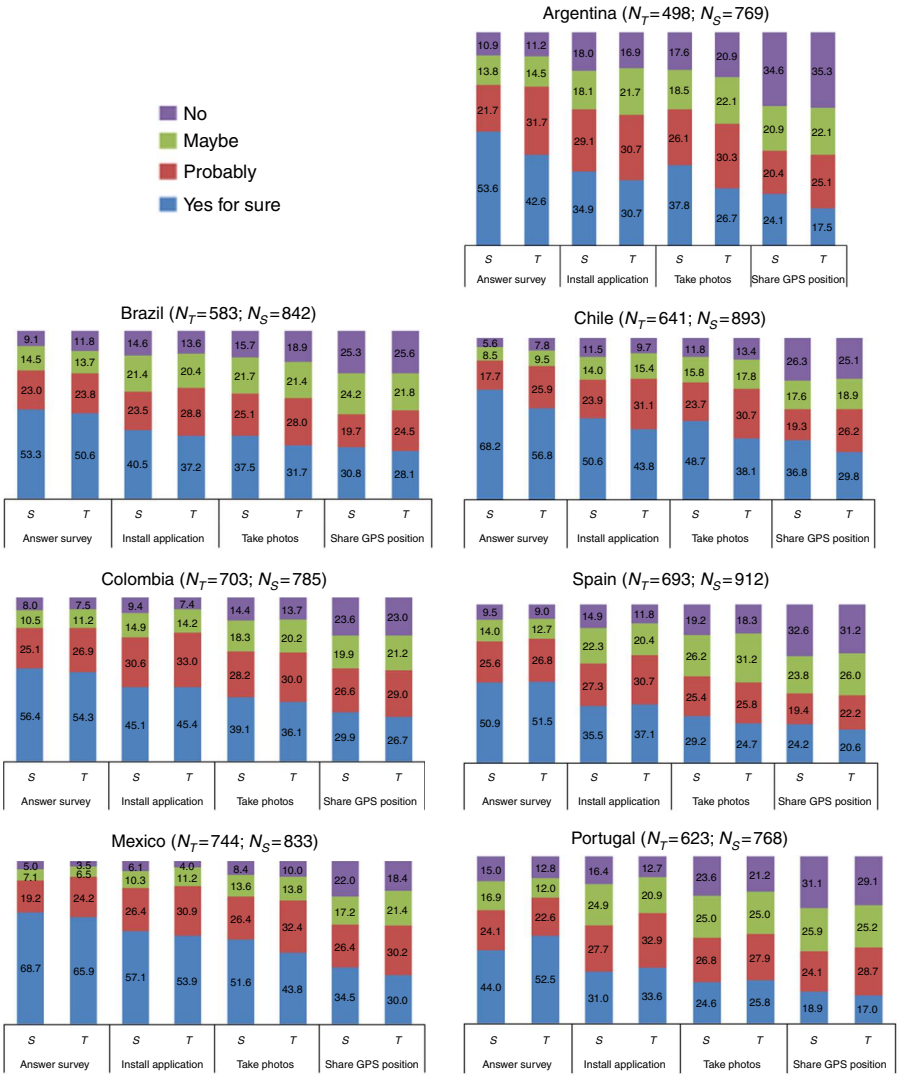

Figure 2.
Percentages of respondents that would accept specific tasks

Notes: *S*, smartphones; *T*, tablets

PC, they would mostly use it to answer. Education did not play a relevant role (whereas in previous research it was a discriminant variable); and age had a significant effect only in four countries out of seven. Gender had an effect only in Spain and Portugal, where men showed a higher probability of using only PCs.

Finally, the panellists who had a smartphone but would not agree to use it to complete surveys were older (there was a significant effect of age in all countries; $p < 0.05$). In Argentina, Brazil and Colombia, panellists with a smartphone were also less educated ($p < 0.10$). In general, the variables of gender and number of persons in a household did not play a relevant role, but they were significant in Portugal ($p < 0.05$) and Brazil ($p < 0.10$).

	Argentina	Brazil	Chile	Colombia	Spain	Mexico	Portugal
Use only PC							
Men	0.28	0.19	0.12	0.11	0.37**	0.18	0.36*
Age	0.08	0.18**	0.14*	0.30**	0.30**	0.03	0.05
Educ.	0.15	0.06	0.11	−0.19	0.12	0.04	−0.10
No. hh	−0.16**	−0.03	0.06	0.05	−0.04	−0.02	−0.12*
PC Only	1.39**	0.42	2.27**	1.34**	1.76**	2.13**	1.72**
C	1.46	1.06*	−0.02	1.65**	0.21	1.17*	2.38
Pseudo R^2	0.0458	0.0137	0.0377	0.0439	0.0351	0.0317	0.0422
	$n = 1{,}000$	$n = 1{,}011$	$n = 1{,}000$	$n = 1{,}001$	$n = 1{,}002$	$n = 1{,}005$	$n = 1{,}000$
Tolerance S: No							
Men	−0.12	−0.28	0.09	0.38	−0.22	−0.52	−0.45**
Age	0.32**	0.44**	0.43**	0.31**	0.58**	0.61**	0.28**
Educ.	−0.24*	−0.24*	0.08	−0.23*	−0.17	0.03	−0.14
No. hh	−0.02	−0.17*	−0.08	0.09	−0.06	0.08	−0.03
C	−1.90**	−1.65**	−4.08**	−2.70**	−2.86**	−4.92**	−1.59**
Pseudo R^2	0.0269	0.0458	0.0379	0.0241	0.0661	0.0681	0.0216
	$n = 769$	$n = 842$	$n = 893$	$n = 785$	$n = 912$	$n = 833$	$n = 768$

Notes: *S*, smartphones; Educ., education; No. hh, number of members in the household; *C*, constant. *$p < 0.10$; **$p < 0.05$

Table V. Logits of respondents answering surveys by PCs only (first part), and respondents with access to a smartphone who will not agree to use it in a survey (second part)

6. Conclusions

Revilla *et al.* (2015) pointed out that most Netquest panellists had access to several devices and, therefore, could choose to participate in surveys using one or another. In order to suggest if there is only a potential rather than a real need to adapt surveys to mobile devices, it is necessary to consider respondents' preferences. Some respondents have already shown their preferences by using mobile devices even when this was unintended. However, the group of unintended mobile respondents was still relatively small in the countries considered in this analysis. Concerning Netquest panellists, participating through PCs was still the favourite option whether we asked the respondents directly and tracked the device used. Nevertheless, a generally increasing trend was observed for tablets' and mostly smartphones' usage in participating in surveys. A large proportion of panellists declared they would prefer to use mobile devices if the surveys were to be adapted. The PC remained the preferred option, but the choice of this device had noticeably decreased. This further confirms the need to adapt surveys for mobile devices.

Some respondents preferred to vary devices. This suggests that preferences may depend on the specific survey (length, topic, whether the survey is adapted to mobile devices, and so on) and on the context in which they are answering (moment, place, etc.). Studying the most usual places for the survey participation, our results confirm previous findings: the most common place was home, this also applied to respondents using mobile devices. Most panellists seemed to have a preference for a specific device rather than changing from one to the other. Many more panellists preferred smartphones rather than tablets, both currently and in the hypothetical situation where the surveys were to be adapted to mobile devices.

We also found that most respondents were, at least, not opposed to the idea of participating in tasks such as taking photographs or installing an application on their mobile devices. Sharing GPS information was the task that led to more refusals; but

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even so, the majority of panellists showed a willingness to accept it. This suggests that there is space for new ways and methodologies by which to collect data. We should underline, however, that, although the general trends hold for all the results described so far, there are clear differences by country.

Finally, the need to adapt surveys to mobile devices depends on the characteristics of the panellists: who we will lose if the adaptations are not made? If the group that would only participate using mobile devices, and would stop if forced to use a PC, is similar to the group of respondents that would continue participating, then the effect on representativeness would be negligible. Contrary to what was expected and to what was found by others, our analyses indicate no significant effect of education on using only PCs to answer surveys. This finding may be a consequence of the rapid changes in the spread of mobile devices among older people and the overall increased ability to deal with new technologies. In some countries, however, the variables "age" and "gender" were significant. If we consider aversions to using smartphone for survey participation, age is usually significant and, in some countries, also the level of education. These observations support the idea that there is really a need to adapt surveys for mobile participation, because this allows access to groups of potential respondents with different profiles, and more complete coverage of the target population.

All these findings have practical implications, suggesting that access panel agencies cannot continue to avoid considering mobile survey participation. They should take into account the growing presence of unintended mobile respondents and implement a mobile-adapted version of surveys. This implies that the formats of some items, for instance large grids of questions or sliders that can be more complicated to answer through smartphones should probably be avoided. Panel agencies also should monitor continuously the devices panellists use to complete surveys. This may demand more effort from panel agencies in terms of money and time investments. However, if this phenomenon continues spreading so quickly, not proposing mobile-adapted web surveys will lead to a loss of respondents with specific characteristics, thus, reducing both participation and representativeness. Moreover, many panellists seem to be receptive towards new ways of providing information; panel agencies such as Netquest should take advantage of these new opportunities and improve the quality of the data collected through traditional survey tools.

Further study is needed of many different aspects linked to mobile web survey participation, including the adaptation of surveys to mobile technologies. What are the additional costs of adapting a survey to the mobile web in comparison to the costs of a classic web survey? What facilities do we lose in the adaptation process (e.g. formats of items that cannot be adapted to mobile devices)? Is it possible to control the device used by respondents (i.e. require them to participate in the survey by means of a specific device)? What is the impact of this choice on representativeness? What are the features that really make a difference among devices (size of the screen, portability, etc.)? How do differences in these features affect the comparability of the results? What level of effort could we obtain for participation through mobile devices rather than through PCs? What are the consequences of the survey context to the quality of the answers? In some situations users may prefer to answer by mobile rather than by PC; for example, because of the availability of the device itself (or of the wi-fi connection), their personal preferences, the contents of the questions, or what is less time-consuming, the availability of time in specific moments of the day, and so on. Moreover, can preferences for PCs or mobile devices be considered stable over time? Or will it be easier in the future to involve respondents through mobile devices rather than by PCs?

How, and how often, do respondents switch from one device to another (and from mobile to PCs, or vice versa)? What are the factors that influence them to do so? These are just examples of the many questions that can stimulate further research. This paper does not deal with a further relevant topic, the quality of collected data: the comparison between web and mobile web participation should also be deeply studied considering this criterion.

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