University of Zurich UZH

IKMZ – Department of Communication and Media Research

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Who Remains Offline and Why? Growing Social Stratification of Internet Use in the Highly Digitized Swiss Society

Kiran Kappeler

Noemi Festic

Michael Latzer

MEDIA CHANGE and innovation a division of ikmz

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In a highly digitized society, internet use yields many advantages in everyday life. The share of non-users is dwindling but at the same time their disadvantages become increasingly severe. For more evidence-based public policies to mitigate the risks of digital exclusion, long-term results from representative surveys are needed. This article investigates how digital divides—social differences in internet adoption—evolved in Switzerland from 2011 to 2019. The results of multiple binary logistic regressions reveal that internet use remains stratified along existing social differences and non-use has become increasingly concentrated in traditionally disadvantaged societal groups. Lower income and lower educational attainment have consistently predicted internet non-use, and the age gap between users and non-users has increased. Gender did not influence internet adoption. The main self-reported reason for non-use was lack of interest. Being indirectly exposed to the internet through proxy use is a key enabling factor for internet use.

Keywords: internet penetration, internet non-use, digitized society, digital divide, social inequality, Switzerland.

1 Introduction

In highly digitized societies, using the internet is often required or expected for a wide variety of everyday activities such as obtaining real-time traffic information, applying for a job, profiting from special discounts or being an informed citizen. Offline alternatives tend to be inferior or altogether non-existent. Non-users of the internet are therefore excluded from various advantages that internet use entails. In a society where using the internet is the norm, not using it is highly problematic.

Accessing possibilities that information and communication technologies (ICTs) provide is essential for living a fulfilled life in today's information society.

Factors that predict internet non-use and the development of their influence are thus worth examining. Not using the internet can either be a deliberate choice (see Syvertsen, 2017) or reside in structural inequalities. The growing importance of the internet for additional areas of everyday life renders potential digital divides—i.e., structural social differences between users and non-users—increasingly severe. With a growing proportion of the population using the internet, those who cannot or do not profit from it are likely to become an increasingly disadvantaged minority.

Regarding the evolution of digital divides, there has been the assumption that with increasing penetration of the internet, early social differences in access to and use of the internet would fade over time (Rogers, 2003). With usage levels assimilating across societal groups, a normalization of social differences between societal groups was expected to set in. However, recent empirical research has shown that, despite high internet penetration, digital divides do not necessarily become negligible. Instead, the likelihood of using the internet can remain stratified among societal groups if it still depends on socioeconomic status and age (van Dijk, 2005, 2013). Hence, existing social inequalities would be reproduced rather than alleviated (DiMaggio et al., 2004; Robinson et al., 2015). Previous studies indicate that socioeconomic patterns of inequality in internet use have persisted, even as internet use has increased at the population level in recent years (e.g., Helsper and

Reisdorf, 2017). However, whether internet adoption reflects normalization or stratification among societal groups remains unclear, since there is insufficient representative empirical research on the recent evolution of digital divides in highly connected countries.

Promoting internet use—especially in traditionally disadvantaged groups with lower adoption rates—has been a goal of public policies in many societies, including Switzerland (BAKOM, 2018). Assessing the success of such policies requires empirical evidence on the evolution of internet non-use against a digital-divide backdrop.

The primary goal of this paper is to discern how digital divides have evolved in Switzerland and whether internet adoption has become normalized or remains stratified across societal groups in this highly connected country. Firstly this paper therefore investigates how sociodemographic background influenced the probability of not using the internet between 2011 and 2019. Secondly, it identifies non-users' self-reported reasons for internet non-use. Moreover, it examines how non-users fulfill their information needs without using the internet themselves. Then it analyzes factors that promote internet use, such as indirect proxy-use of the internet and the intention to use the internet in the future. Finally, it investigates how included in today's information society internet non-users feel.

This article starts by addressing what it means to be an internet non-user in a highly connected society. We then give an overview of the digital-divide framework,

discussing the main assumptions, scenarios on the evolution of digital divides and existing empirical research. After describing the methodological approach, the empirical results of the study are presented and discussed. The article concludes with policy implications derived from the findings.

2 Theoretical considerations

Disadvantages due to internet non-use in a highly digitized society

Discussing internet non-use in highly digitized societies is relevant, as non-users can face societal disadvantages by missing out on advantages that internet use offers. Not using the internet can cause drawbacks in various life domains such as economic chances, education, socializing, culture, health, and institutional and political participation (van Dijk, 2005). A study analyzing panel data in Britain shows that not using the internet affects upward socioeconomic mobility negatively, even when age, gender and health are controlled for (Eynon et al., 2018). Meanwhile, internet users believe they have profited from a variety of advantages through internet use, such as receiving a discount on a product or booking a more affordable trip (van Dijk, 2013). Obtaining a job, discovering a matching political party, finding appropriate social associations, discovering facts about illnesses or finding potential partners are further advantages that internet users have experienced due to their internet use. Those who do not use the internet are excluded from these potential advantages (van Dijk, 2013). A potential relationship between personal well-being

and using the internet has also been identified among older adults, suggesting that

digital and social exclusion can be linked (Seifert et al., 2018).

All these disadvantages of not using the internet are likely to become more

severe in societies where using the internet is normal and expected (Groselj et al.,

2019). For instance, the internet has become the primary mode of filling out one's tax

returns in Switzerland (eTax Nidwalden, 2020). Those who cannot or do not want to

do this online have to request a paper version to be sent to them via mail, which can

be an additional burden for already disadvantaged groups. Similarly, many

companies have switched to sending invoices via e-mail. Paper invoices can usually

be requested, but entail additional costs for customers, thus constituting an

economic disadvantage.

Social inequalities in internet non-use

Identifying the cause of internet non-use is essential to tackle digital exclusion. We

argue that if individuals have all the preconditions required to use the internet—e.g.,

access, financial means, skills—the choice to not use it is legitimate and

unproblematic. Rather than these want-nots, it is the group of have-nots who

warrant further attention from a public policy perspective (van Dijk, 2005). Under

the assumption that internet use is predominantly beneficial, digital-divide research

has addressed differences in internet access and use that reside in existing social inequalities (Selwyn, 2006).

This paper focuses on the first level digital divide. It is understood as the distinction between those who do and those who do not use the internet. Second-level digital divides, i.e., differences in types of internet use and skills (see Büchi et al., 2016), are not discussed here, since these are differences between adopters of the internet. Although digital-divide research views internet use as generally beneficial, internet use can also entail negative effects on individuals, for instance related to overuse (Büchi et al., 2019; Gui and Büchi, 2019). Such consequences of inequalities in internet use are discussed as third-level digital divides. However, this paper does not investigate recent tendencies like 'digital detox', i.e., users opting out of specific services because of concerns of overuse' (Syvertsen, 2017).

Theoretical scenarios for the evolution of digital divides

With the increasing spread of the internet, two scenarios for the evolution of digital divides seem plausible (Norris, 2001; van Dijk, 2013): the normalization of existing differences in internet access and use across societal groups (1) and stratification, where differences persist or increase (2). According to Rogers (2003), the number of adopters of an innovation in a society follows an S-shaped curve with two tipping points. As it spreads, an innovation is understood to trickle down from the privileged groups who mostly constitute the innovators towards all population

levels. Hence, the theory predicts early differences in internet access and use will fade and normalization will set in.

In contrast, van Dijk (2005, 2013) states that differences in internet use are not merely temporal. Rather, the positions of individuals in society and the relations between them are central to explaining them. He argues that during the internet appropriation process social inequalities can be reproduced and hence, rather than normalization of existing differences, stratification would occur.

In a networked society, the structural inequality between the information elite, the participating majority and the excluded potentially grows, because they differ in their opportunities to connect to the network (van Dijk, 2013). In terms of a sociology of stratification, Wessels (2013) argues that class, status and power are key factors in people's chances of being included in a networked society.

Policy measures to alleviate social inequalities in internet non-use

The advantages of using and disadvantages of not using the internet have led to discussions on the need for policy measures to enable everyone to use the internet. This is especially the case in highly connected societies, where using the internet is the norm and not using the internet is therefore highly problematic. Affordable and reliable broadband internet access of a certain quality is considered a universal service in Switzerland (ComCom, 2019). The Swiss federal office for communication grants every citizen the same chances in life and integration into society. This also entails promoting basic competences for the use of new ICTs (BAKOM, 2018). From

a normative perspective, the right to life-long learning highlights the importance of providing internet access and the opportunity to use it – especially for the elderly (Doh et al., 2015). The resources needed for participation should thus be granted to everyone (Wessels, 2013). In order to assess the legitimacy and success of existing public policies aimed at bringing people online, long-term empirical investigations on the evolution of digital divides are required.

3 Existing empirical research and research gaps

A literature review of existing empirical research on internet (non-)use from a digital-divide perspective has revealed two main areas of interest: First, there is a focus on socioeconomic variables predicting internet non-use. A second emphasis is on reasons why this section of the population does not engage in any online activities.

Socioeconomic background as a predictor of internet non-use

Even as the internet first started spreading in Western societies, socioeconomic differences in whether a person used the internet or not were becoming apparent (NTIA, 1995). At the time, individuals with socioeconomically disadvantaged backgrounds were more often non-users (DiMaggio et al., 2004), while more white, male, young, well-educated and affluent people were internet users (Blank et al., 2019; Bonfadelli, 2002; Chia et al., 2006; Dutton and Blank, 2013; Dutton and Reisdorf, 2019; van Dijk, 2013; Zickuhr, 2013). Reisdorf and Groselj's (2017) study, which employs multinomial logistic regression to analyze data from a representative

survey in Britain, finds that higher income and education level as well as lower age

and positive attitudes towards the internet still remain predictors of internet use.

They conclude that "a combination of traditionally disadvantageous socio-economic

patterns and negative attitudes toward the Internet seems to present a hurdle that is

hard to overcome" (Reisdorf and Groselj, 2017: 1172).

Helsper and Reisdorf (2017), who conducted a representative study on the

evolution of digital exclusion in Britain and Sweden, even argued that the social

inequalities grew worse over time and reported the emergence of a digital

underclass: over time, internet non-use has become more common in already

socially vulnerable groups, i.e., among the elderly, the less well-educated and the

isolated. Thus, the socially disadvantaged became more excluded. In their study,

they highlight that lack of access and skills are still important reasons for non-use.

Self-reported reasons for internet non-use

A positive attitude towards the internet and the motivation to use it are necessary

prerequisites for internet adoption and use (van Dijk, 2005). One way to measure

non-users' attitudes is to analyze their self-reported reasons for non-use. A lack of

affordable access, skills or time, as well as lack of interest have been important

reasons that non-users have given for their behavior (Chia et al., 2006; Dutton and

Blank, 2013; Helsper and Reisdorf, 2017; Lenhart et al., 2003; Morris et al., 2007;

Reisdorf et al., 2016; Seifert and Schelling, 2015; Selwyn, 2006; van Dijk, 2005;

Zickuhr, 2013; Zillien, 2008). Lack of interest has become more important over recent

years (Helsper and Reisdorf, 2017).

Research gaps in existing literature

Based on the review of existing empirical research, this paper identifies several

research gaps. Existing research has shown that sociodemographic background

influences internet adoption. However, so far the effects of different

sociodemographic variables on internet (non-)use have not been disentangled and

effect sizes of influencing variables have not explicitly been compared (Helsper and

Reisdorf, 2017).

Additionally, existing literature has shown that negative internet attitudes

negatively influence the likelihood of being an internet user. However, it is not clear

which societal groups have negative attitudes towards the internet. Moreover, the

influence of non-users' social surroundings and the relation between proxy-use and

the intention to use has not been addressed in detail (van Deursen and Helsper,

2015).

Finally, most existing studies rely on cross-sectional data. However, to

understand how digital divides have evolved and will further evolve, longitudinal

studies are needed. The evolution of digital divides has only rarely been studied and

analyses of longitudinal representative data at the population-level in a highly

connected country have so far been scarce (e.g., Helsper and Reisdorf, 2017).

This article contributes to filling these research gaps by investigating who the

internet non-users are in a highly connected society, how digital divides have

evolved recently, why non-users refrain from using the internet, how non-users

fulfill their information needs without using the internet, and what factors might

promote internet use among non-users.

4 Method

Nationally representative survey data

Data was collected from 2011 to 2019 through biannual cross-sectional

representative surveys of the Swiss population aged 14 years and over (N_{2011}=1,104;

N_{2013}=1,114; N_{2015}=1,121; N_{2017}=1,120; N_{2019}=1,120). Each sample is representative by

gender, age, employment status and the three biggest Swiss language regions.

Computer-assisted telephone interviews (CATI) were conducted using a dual-frame

sampling framework to contact landline and mobile phone numbers., The repeated

cross-sectional research design with representative samples for each period allows

remarks about structural societal changes in influencing factors on internet non-use.

The data was collected as part of the World Internet Project, an internationally

comparative and long-term project on internet use.

Measures

     Non-use. Respondents were asked whether they are currently using or have

been using the internet in the past three months. We identified those who answered

the question negatively as non-users of the internet.

     Proxy-use. Non-users were questioned as to whether they have asked

someone to do something for them online in the past year. A positive answer led to

classification as a proxy-user. Proxy-users were subsequently questioned as to

whom they had asked to do something for them online and what they had asked

them to do (e.g., searching for information or buying something online).

     Main reason for non-use. Non-users were asked to indicate their main reason

for not using the internet from the following list of reasons (see Cole et al., 2019): no

computer / no device; too expensive / cannot afford the cost; internet connection

technically not available; afraid of breaking something; do not know how to use /

confused by technology; no interest / not useful; no time / too busy; negative

experiences like spam, virus or credit-card fraud; spent too much time online; concerns about privacy. The non-users also had the option to specify another reason.

Intended future internet use. Non-users were also asked about their agreement with the statement that they would like to use the internet in the future on a scale from 1 = do not agree at all to 5 = strongly agree.

Feeling of inclusion in today's information society. At the end of the survey, after having answered several questions about the media, the internet and various communication technologies, respondents had learned what today's new information society entails. Hence, all respondents were asked about their agreement with the statement that they feel integrated in this new information society (1 = do not agree at all, 5 = strongly agree).

Sociodemographic variables. Several sociodemographic variables such as gender (1 = male, 2 = female) and age were recorded. Age was recoded into the following categories: 1 = 14–19 years, 2 = 20–29 years, 3 = 30–49 years, 4 = 50–69 years, 5 = 70+ years. Education was measured by the highest level of educational attainment and recoded as follows: primary education, i.e., completion of compulsory school into 1 = lower, education on secondary level such as vocational school or higher school certificate into 2 = intermediate and tertiary education, i.e., university degree or higher into 3 = higher. Household income was measured in different categories in the years 2011 to 2013 and 2015 to 2019 and thus had to be recoded for approximate comparison (2011 and 2013: up to 7,000 Swiss francs = low, 7,001–12,000 Swiss francs

= medium, more than 12,000 Swiss francs = high; 2015, 2017 and 2019: up to 6,000 Swiss francs = low, 6,001–15,000 Swiss francs = medium, more than 15,000 Swiss francs = high).

Non-users' offline sources of information. Non-users were asked whether they informed themselves through other media such as television, radio, newspapers or magazines and books. Those who answered this question positively were asked which of these offline media they gained their information from. Then they were asked which of these four sources of information they find most important.

Data Analysis

This article applies multiple binary logistic regression analyses to determine and compare the influence of sociodemographic characteristics on the probability of being an internet non-user between 2011 and 2019 in Switzerland. Binary logistic regression is an apt method of analysis since the dependent variable (i.e., internet non-use) was dichotomous. In addition, we computed different descriptive statistics

to complement the findings with self-reported reasons for non-use and intention to use the internet as well as offline activities and inclusion in the information society.

5 Results

Influencing factors on internet non-use: descriptive statistics

In 2019, the majority of the Swiss population (92%) used the internet. The adoption of the internet has steadily increased over the period of investigation. Table 1 shows the proportion of non-users in the Swiss population in the years 2011 to 2019.

Table 1.

Proportion of Non-Users of the Internet in the Population of Switzerland 2011-2019

	Year				
	2011	2013	2015	2017	2019
Gender					
Male	21%	13%	8%	6%	6%
Female	25%	17%	17%	13%	9%
Age (in years)					
14–19	27%	2%	1%	0%	0%
20–29	12%	4%	0%	2%	0%
30–49	11%	5%	4%	3%	0%
50–69	23%	17%	17%	13%	7%
70+	63%	53%	48%	34%	40%
Education					
Lower	49%	30%	22%	21%	17%
Intermediate	25%	16%	15%	11%	9%
Higher	8%	6%	4%	2%	2%
Income					
Low	73%	52%	54%	44%	39%
Medium	16%	11%	9%	11%	5%
High	5%	6%	2%	0%	8%
Total	23%	15%	13%	10%	8%

Note. N_{2011}=1,104; N_{2013}=1,114; N_{2015}=1,121; N_{2017}=1,120; N_{2019}=1,120.

In 2019, 40% of those aged 70 and over were internet non-users while there were no non-users in the Swiss population aged 49 and under. Among people with a higher educational attainment (2%), fewer were non-users than among those with intermediate (9%) or lower (17%) levels of education. The percentage of non-users was also lower among those on high (8%) or medium incomes (5%) than among those on low incomes (39%). Altogether, the highest proportions of non-users were found among the older, the less well-educated and those with lower household income.

Regarding the evolution of digital divides, the descriptive data shows that internet penetration has increased since 2011. Hence non-users have become fewer. At the same time, there was a tendency towards a concentration of non-users in more vulnerable societal groups (i.e., the older, the less well-educated, the less affluent) over time.

Influencing factors on internet non-use: regression results

In order to test these discernible trends, binary logistic regressions on the probability of being a non-user were calculated for each of the five years under examination. Table 2 shows the results of the binary logistic regression on the probability of not using the internet 2019.

Table 2

Binary Logistic Regression: Probability of Not Using the Internet 2019

	B	SE	Exp(B)	CI Exp(B)	
				Lower	Upper
Gender	-.287, *ns*	.318	.750	.402	1.400
Age	2.015***	.238	7.497	4.701	11.957
Education	-1.108***	.264	.330	.197	.554
Income	-.347**	.127	.707	.551	.907
Constant	-6.895***	1.196	.001		
Nagelkerke's R^2	.487				
% correct	94%				

Note. N_{2019}=1,120. *B*=regression coefficient; *SE*=standard error; *Exp(B)*=odds ratio; *CI Exp(B)*=confidence interval of the odds ratio. *p<.05; **p<.01; *** p<.001; *ns*: non-significant (p>.05).

In 2019, the model that analyzes the influence of socioeconomic background on internet non-use was significant as a whole (χ^2=214.419, p<.001) with a strong effect size (R^2=.487, f=.974) (Cohen, 1992). It assigned the correct category to 94% of the cases. In 2019, age affected the likelihood of being a non-user significantly positively (*B*=2.015, p<.001, *Exp(B)*=7.497). The older a person was, the more likely they were to be non-users. Education (*B*=-1.108, p<.001, *Exp(B)*=.330) and income (*B*=-.347, p<.01, *Exp(B)*=.707) influenced the probability of being a non-user significantly negatively. Thus, the higher a person's level of educational attainment and the greater their household income, the lower was the likelihood of them being non-

users. Gender did not significantly influence the probability of being a non-user (*B*=-.287, *p*>.05, *Exp(B)*=.750) in 2019.
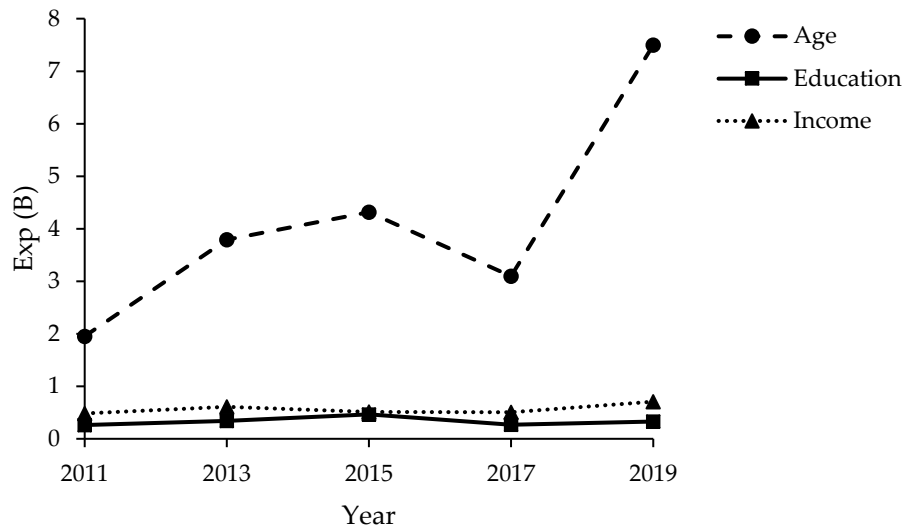

Figure 1. Binary logistic regression: probability of not using the internet 2011–2019.

N_{2011}=1,104; N_{2013}=1,114; N_{2015}=1,121; N_{2017}=1,120; N_{2019}=1,120. *Exp(B)*=odds ratio. Only significant effects at the level of *p*<.01 are shown.

Figure 1 illustrates the evolution of digital divides in Switzerland from 2011 to 2019. The results indicate that education, income and age influenced the likelihood of not using the internet significantly during the whole period under examination (see appendix for detailed tables on binary logistic regressions of the years 2011–2017). Lower education and income as well as higher age significantly predicted internet non-use from 2011. Through the years, the effects of education (e.g., $Exp(B)_{2011}$=.262, $Exp(B)_{2019}$=.330) and income (e.g., $Exp(B)_{2011}$=.483, $Exp(B)_{2019}$=.707) remained relatively stable. The effect of age has grown over the years (e.g., $Exp(B)_{2011}$=1.953; $Exp(B)_{2019}$=7.497). Compared with education and income, age had a

consistently greater and growing effect on the probability of not using the internet. Over the whole period examined, gender did not relate to the likelihood of being a non-user.

The results thus show that even at this high level of internet penetration—in 2019, 92% of the Swiss used the internet—a person's sociodemographic background influenced their likelihood of internet non-use. Societal groups that have traditionally been disadvantaged were at a greater risk of digital exclusion.

Self-reported reasons for non-use

Pursuing an in-depth approach, this article not only examines how sociodemographic factors affect internet non-use, but also how non-users' motivation does. Table 3 shows the main reasons non-users reported for not using the internet and how their importance changed over time.

Table 3.

Importance of the Main Reason for Internet Non-Use 2011-2019

	Year				
Rank	2011	2013	2015	2017	2019
1	interest (41%)	interest (33%)	interest (50%)	interest (38%)	interest (38%)
2	access (10%)	other (14%)	access (14%)	knowledge (17%)	other (17%)
3	knowledge (9%)	knowledge (12%)	other (11%)	cost (10%)	age (16%)
4	cost (9%)	access (10%)	knowledge (8%)	time (8%)	knowledge (12%)
5	other (9%)	age (9%)	age (7%)	other (8%)	cost (6%)
6	time (7%)	time (7%)	time (6%)	age (7%)	time (6%)
7	age (5%)	cost (2%)	privacy (2%)	privacy (6%)	access (2%)
8	privacy (<1%)	privacy (1%)	bad experiences (2%)	access (4%)	bad experiences (2%)
9	bad experiences (<1%)	bad experiences (<1%)	cost (<1%)	bad experiences (4%)	privacy (1%)

Note. N₂₀₁₁=253; N₂₀₁₃=165; N₂₀₁₅=140; N₂₀₁₇=107; N₂₀₁₉=85.

In 2019 the reason most non-users regarded as most important was lack of interest or not finding the internet useful (38%). Feeling too old to use the internet (16%) as well as lack of knowledge and being confused by the technology (12%) were other important reasons reported by non-users. The high cost (6%) or not having access (2%) were of primary importance for only a relatively small group of non-users. Lack of interest was the most important reason for non-use across all

periods examined. This indicates that lack of interest and perceived usefulness remain a relevant barrier to internet use that should be tackled by policies.

Fulfilling information needs offline

The internet has become a primary source for information, which not using the internet can imply missing out on. The 2019 survey therefore asked non-users what they did to fulfill their potential information needs instead of using the internet. Almost all non-users (96%) said they seek information through offline media. Most of them use multiple offline sources and gather information by reading newspapers or magazines (86%), watching television (75%) or listening to the radio (66%). A considerable proportion obtain information from books (29%). Newspapers and magazines are regarded as the most important information source by 55% of non-users.

Benefiting from the internet indirectly through proxy-use

Even though most non-users use offline media for information purposes, some non-users still seek to benefit from the internet indirectly. One way for non-users to profit from the internet without using it themselves is through proxy-use. The number of proxy users has risen slightly in recent years (2011: 36%, 2013: 48%, 2015: 40%, 2017: 51%, 2019: 40%), although the development is not consistent. In 2019, most of the proxy-users were over 65 years (87%) and belonged to the group with low household incomes (83%), a majority were female (61%) and had a lower (35%) or intermediate (58%) levels of educational attainment. In 2019, the most common

fields for proxy-use were e-commerce (41%) and finding information online (39%).

Entertainment (25%) and socializing (19%) were less prominent purposes of proxy-use. Proxy-users mainly asked their (grand-) children (51%) or partner (23%) to help them. Asking a friend (14%) or someone else (20%) was less common.

Intended future internet use

To anticipate future developments, non-users were also asked whether or not they would like to use the internet in the future. Non-users' intention to use the internet has fallen in recent years. While in 2011 three in ten non-users (28%) said that they would like to use the internet, this proportion fell to 10% in 2019. From 2015 onwards, the intention to use the internet differed between strict non-users and proxy-users. In these years, being a proxy-user significantly correlated with an increased willingness to use the internet (2011: r=.053, p>.05, 2013: r=.156, p>.05, 2015: r=.284, p<.001, 2017: r=.260, p<.01, 2019: r=.277, p<.05). Recently, indirect contact with the internet through proxy-use could thus have become a trigger for an increased willingness to start using the internet.

Inclusion in the information society

All respondents were asked how included in today's information society they feel. Being a non-user correlated significantly negatively (p<.001 for all years) with the feeling of inclusion in all the years examined (2011: r=-.445; 2013: r=-.376; 2015: r=–

.328; 2017: *r*=-.282; 2019: *r*=-.280). The share of people who feel integrated into today's information society is thus greater among users than among non-users.

6 Discussion

With 92% of the Swiss population being internet users in 2019, the shrinking but increasingly disadvantaged group of 600,000 non-users warrants attention. This article has therefore addressed the evolution of first-level digital divides, applying a longitudinal perspective.

Many want-nots among non-users, but digital divides remain relevant

In 2019, the proportion of non-users who wish to use the internet was low (10%), which suggests that most of those who want to use the internet are doing so already. Also, since 2011, the main reason for not using the internet has been not being interested in it. However, these findings should not lead to the premature conclusion that most non-users are want-nots rather than have-nots in van Dijk's (2005) terminology. Individuals may say that they are not interested in using the internet to (unconsciously) avoid admitting that a lack of financial resources or skills is the underlying reason for their internet non-use. Especially in information societies where internet use is omnipresent, people may feel socially pressured to use the internet (Groselj et al., 2019). Lack of interest has been viewed as a socially legitimate reason for not using the internet, while not having the capacity to do so might not be (Syvertsen, 2017). Indeed, even though the proportion of internet users in the population has grown, this study shows that digital exclusion that resides in

sociodemographic factors prevails: higher age, lower educational attainment and lower incomes increased the likelihood of being a non-user in Switzerland 2011 to 2019.

The evolution of digital divides

We have described two possible scenarios for the evolution of digital divides: normalization and stratification of social differences influencing internet use (Norris, 2001; van Dijk, 2013). The results reveal that gender differences have normalized in Switzerland. While in the late 1990s the likelihood of using the internet differed between women and men (Bonfadelli, 2002), it no longer does so today. Regarding education, income and age, however, we observed stratification. Educational attainment and income have influenced the probability of not using the internet negatively since 2011. This is thus likely to continue to be the case in the future. The effect of age, which has been the strongest predictor of internet non-use in all years, has grown in the period examined and will thus likely continue to do so in the future. With internet adoption starting at earlier ages, the age gap between users and non-users is likely to increase further.

The need for policy measures to facilitate internet use

In sum, these results show that even in a highly connected country like Switzerland, where the internet is regarded a universal service and access is granted to every citizen (ComCom, 2019), certain groups are excluded from internet use. As not using the internet is still associated with sociodemographic background,

traditionally disadvantaged societal groups are at greater risk of digital exclusion

and the reinforcement of existing social inequalities is likely. Helsper and Reisdorf

(2017) found similar results in Britain and Sweden.

The growing risks of digital exclusion call for appropriate policy actions to

address this problem. Focusing on the barriers that sociodemographic inequalities

create in order to alleviate digital ones is one suggestion (see Reisdorf and Groselj,

2017). Existing policies to promote internet use include for instance general access to

computers through libraries in the US in the early 2000s (van Dijk, 2005) or, on a

financial level, tax refunds for ICTs in Sweden (Helsper and Reisdorf, 2017).

Investing in media literacy is another valuable path. Besides resource-based

approaches, increasing the intention to use the internet in the remaining offline

population is another starting point for policies aimed at bridging the gap between

offliners and onliners.

Promoting the intention to use the internet in the future is promising
Earlier research suggests that people are unlikely to adapt internet use if they do not

deem it valuable (van Dijk, 2005). Policies should therefore also aim at increasing the

perceived usefulness of the internet among non-users by highlighting the

opportunities the internet offers to them specifically. These policy measures should

especially be tailored to reaching older adults as the biggest proportion of non-users

was found among them and the effect of age as the strongest predictor of non-use has even grown in recent years.

A promoting factor for internet adoption is proxy-use: this study has shown that proxy-use correlates with a greater willingness to use the internet. So-called warm experts (Bakardjieva, 2005) or peer experts (Doh et al., 2015) may also encourage recognition of the usefulness of the internet and thus increase the wish to use the internet. In 2019 Swedish authorities ran an online campaign on social media channels aimed at young internet users, i.e. the main group of people through which proxy-use is offered. The campaign provides advice on how to help older relatives go online and engage in internet use (PTS, 2019). The present study indicates that proxy-use and help by one's family or peers may be a promising avenue for increasing internet use in excluded groups. The evaluation of such campaigns will bring valuable insights for the design of future policy measures. Such policies are needed to facilitate a more equal digital society.

Limitations and future research avenues

The present study is based on data from representative surveys on the population level between 2011 and 2019. The repeated sampling from the Swiss population permits a longitudinal perspective on structural developments in society.

Nevertheless, using panel data may be beneficial for future research, as this makes it possible to follow individuals in their path to internet adoption or non-adoption.

Data collection by CATI entails the risk that too few non-users were found to match their actual proportion in the Swiss population. It is for example difficult to reach marginal groups through telephone interviews. However, the percentage of non-users may be comparatively high in such marginal groups. Other studies have employed different methods of sampling, like interviews in person (e.g., Blank et al., 2019), which can address this problem. Besides the factors identified influencing the adoption of the internet, further relevant aspects are also conceivable. In order to identify these, more in-depth interviews with non-users would be desirable. Finally, this study illustrates non-users' situation in one highly connected country. In the future, comparative studies with other countries would shed light on possible similarities and differences between societies.

In addition to predictions by classical innovation theories, the diffusion of technologies like the internet can also be affected by coincidence. The Covid-19 pandemic and related societal lockdowns have fundamentally transformed all life domains and increased the dependence on digital tools for working (from home), satisfying consumer needs or interacting with others to an unprecedented level. The disadvantages of not using the internet have presumably become even more far-reaching. As a result, an increase in the wish or need to use the internet among non-users and acceleration of the diffusion of the internet is likely. Future research

should address whether this leads to the formation of even smaller, yet more

disadvantaged groups of non-users in societies and how this development can be

mitigated.

Conclusion: the relevance of bridging the gap

To conclude, internet use increasingly entails advantages that can hardly be

achieved otherwise. This study shows that internet use has become increasingly

socially stratified and that internet non-users feel less integrated into today's

information society than internet users do. Especially for people who are at greater

risk of being socially excluded, i.e., the elderly, the less well-educated and the less

affluent, internet use would provide opportunities for greater inclusion. Because of

the positive effects that internet use can entail, it should be promoted especially

among the vulnerable groups that have been identified.

Research on second- and third-level digital divides (e.g., Büchi et al., 2016,

2018) has shown that inequalities are not only relevant for the dichotomous

distinction between internet users and non-users, but also for differences in types of

internet use, internet usage skills and consequences among different social groups.

While bringing non-users online is therefore a vital first step in alleviating existing

inequalities and avoiding their reinforcement, policy interventions cannot stop there.

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Appendix

Binary Logistic Regressions Years 2011-2017

Table A1

Binary Logistic Regression: Probability of Not Using the Internet 2011

	B	SE	Exp(*B*)	CI Exp(*B*)	
				Lower	Upper
Gender	-.240, *ns*	.197	.787	.535	1.157
Age	.669***	.096	1.953	1.619	2.355
Education	-1.338***	.208	.262	.175	.394
Income	-.728***	.106	.483	.393	.594
Constant	1.149, *ns*	.624	3.154		
Nagelkerke's R^2	.352				
% correct	84%				

Note. N_{2011}=1,104. *B*=regression coefficient; *SE*=standard error; *Exp(B)*=odds ratio; *CI*

Exp(B)=confidence interval of the odds ratio. *p<.05; **p<.01; *** p<.001; *ns*: non-

significant (p>.05).

Table A2

Binary Logistic Regression: Probability of Not Using the Internet 2013

	B	SE	Exp(*B*)	CI Exp(*B*)	
				Lower	Upper
Gender	.249, *ns*	.235	1.282	.809	2.033
Age	1.333***	.145	3.792	2.852	5.042
Education	-1.077***	.211	.341	.225	.515
Income	-.498***	.132	.608	.470	.787
Constant	-3.835***	.848	.022		
Nagelkerke's R^2	.411				
% correct	89%				

Note. N_{2013}=1,114. *B*=regression coefficient; *SE*=standard error; *Exp(B)*=odds ratio; *CI*

Exp(B)=confidence interval of the odds ratio. *$p<.05$; **$p<.01$; *** $p<.001$; *ns*: non-

significant ($p>.05$).

Table A3

Binary Logistic Regression: Probability of Not Using the Internet 2015

	B	SE	Exp(B)	CI Exp(B)	
				Lower	Upper
Gender	.387, *ns*	.263	1.472	.879	2.467
Age	1.462***	.169	4.317	3.100	6.010
Education	-.765***	.203	.465	.312	.693
Income	-.674***	.126	.510	.398	.652
Constant	-4.994***	.927	.007		
Nagelkerke's R^2	.457				
% correct	91%				

Note. N_{2015}=1,121. *B*=regression coefficient; *SE*=standard error; *Exp(B)*=odds ratio; *CI*

Exp(B)=confidence interval of the odds ratio. **p<.05; **p<.01; *** p<.001; ns:* non-

significant (*p*>.05).

Table A4

Binary Logistic Regression: Probability of Not Using the Internet 2017

	B	SE	Exp(B)	CI Exp(B)	
				Lower	Upper
Gender	.381, *ns*	.280	1.463	.845	2.533
Age	1.131***	.147	3.099	2.322	4.136
Education	-1.320***	.251	.267	.163	.437
Income	-.680***	.120	.507	.401	.641
Constant	-2.723***	.830	.066		
Nagelkerke's R^2	.431				
% correct	93%				

Note. N_{2017}=1,120. *B*=regression coefficient; *SE*=standard error; *Exp(B)*=odds ratio; *CI*

Exp(B)=confidence interval of the odds ratio. *$p<.05$; **$p<.01$; *** $p<.001$; *ns*: non-

significant ($p>.05$).