

The Impact of New Technologies on the Demand for News Media: The Case of the Czech Republic

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Abstract

The share of everyday readers of print newspapers is declining every year, as is the average number of print newspapers sold. This study aims to examine individual data from the Czech Republic to identify possible reasons for the decline in print newspaper readers in the Czech Republic. Furthermore, the study focuses on socioeconomic factors that affect the demand for the news. Based on the random effect tobit and logit model, the results clearly show that the decrease in print newspaper readers is due to the existence of substitutes in the form of online news. The study shows that new technologies, such as the expansion of Internet access or a higher share of smartphones, play an important role. These results have some implications for the policy and news industry.

Keywords: newspaper, online, news, new technology, the news industry, internet

1. Introduction

Historical experience shows that the introduction and expansion of new media technologies in the last century has often disrupted the user base of older ones (e.g., Lazarsfeld, 1940; Becker & Schoenbach, 1989; Davis & Owen, 1998). This is because the new medium can better meet consumers' needs for choice and control over the content. Because consumers have a limited amount of time and money to spend on media consumption, they devote less of these resources to older media. Whenever a new technology was introduced in the past, questions arose as to whether the new medium would replace or even displace traditional media. Many studies report the effect of displacement with the advent of every new form of technology – including television (Bogart, 1957; Belson, 1961), cable television (Kaplan, 1978), the video recorder (Henke & Donohue, 1989), or computer-mediated communication (James, Wotring & Forest, 1995; Robinson, Barth & Kohut, 1997). Given the historical record, it is logical to expect that the Internet's expansion (fixed and mobile) would be at the expense of traditional media such as newspapers, radio, and television. However, the empirical evidence supporting the substitution hypothesis is ambiguous.

In particular, many people claim publishers who offer digital content cannibalise their print sales (Deleersnyder et al., 2002; Pauwels & Dans, 2001). The argument is quite intuitive. Magazine and newspaper websites can create a seemingly perfect substitute for their printed versions. A reader who wants to learn more about a particular piece of news can find the same information in digital or printed form. In addition, the Internet offers many widespread benefits: thanks to the spread of portable devices with Internet access and online content, consumers can easily access and read online news anywhere and anytime; digital content can be updated almost continuously; websites can contain unlimited content; readers can take advantage of web search capabilities to find the information they seek.

On the other hand, print newspapers and online news can theoretically be complementary. The web version can attract new readers to a print magazine or newspaper. Newspaper websites may provide a preview of the content of the current issue and offer an abstract for one or more articles from the current issue. Thanks to the websites' interactive features, purchasing a subscription is much easier for readers. Online newspapers could pioneer a new, specialised market to complement printed newspapers, as different forms of media serve different needs and markets (Sung & Kwack, 2016).

The empirical relationships between different media have been studied for a long time. However, the empirical findings are inconsistent, with some studies finding that the Internet or online media is a substitute for traditional media, while other studies see no substitutability or rather a complementarity. Some older empirical studies have concluded that the Internet is starting to replace older media forms. Stempel et al. (2000) state that traditional media consumption decreased during the same period that the Internet became more prevalent. Liebowitz and Zentner (2012) found that the

Internet has reduced television viewing. Gentzkow's research (2007) shows that online newspapers and print are clearly substitutes, and publishers can increase their profits by charging for the online version. Lee and Leung (2008) have also shown that television, newspapers, and the radio are being replaced by Internet use. Westlund and Färdigh (2011) show that online news gradually crowds out printed newspapers, but this depends on demographic variables. Ha and Fang (2012) suggest that the Internet has a crowding-out effect on traditional daily news media. Jang and Park (2016) show in data from 2010 to 2012 that newspapers and PCs exhibit substitutability in terms of reading news articles.

In contrast, Althaus and Tewksbury (2000) found weak evidence of substitution for college students. Examining the answers to their questions about media use, they found a positive relationship between newspaper use and the days of the week spent using the Internet to keep up with current issues and events. There was no relationship between using the Internet to watch the news and hours spent watching the news on television. Thus, based on their study, there appears to be a complementary relationship between the Internet and newspaper use, but there is no relationship between the Internet and television. Nguyen and Western (2006) show that people who rely on the Internet as the primary source of information still use traditional media. Many studies indicate that the frequently cited effects of cannibalisation can be significantly overestimated. Deleersnyder et al. (2002) found on data of 85 Internet channel additions in the United Kingdom and the Netherlands that the Internet had no disruptive effect on print newspaper and advertising revenue. Dutta-Bergman (2004) found complementarity in consumption between traditional and online media. Kaiser (2006) found that the impact of the companion websites of magazines on sales was initially negative, but over time it levelled off. This would indicate that the publisher has learned to work with the web version in favour of the print version.

Some research found that print and online newspapers are not good substitutes. Based on a telephone survey of 211 respondents in the Columbus metropolitan area of Ohio, Dimmick, Chen, and Li (2004) found that about one-third of the respondents used newspapers and television less frequently after using the Internet. Simon and Kadiyali (2007) found a substitution effect between the online and printed versions of 770 US magazines. However, more than 90% of users still buy a print magazine when the same content is available online for free. Likewise, De Waal et al. (2005) concluded that substitution occurs, but only in certain population segments. Their survey of Dutch adults found that reading news online was negatively related to reading print newspapers but that the behaviour of younger individuals influenced this model.

However, Jeffres and Atkin (1996) found no correlation between the Internet and traditional media, as Anderson and Tracy (2001) showed that the Internet did not cause a significant change in traditional media consumption.

Studies of substitutability between the new and old media are mainly based on the time budget theory, the uses and gratifications theory, and the niche theory, which seeks to qualitatively explain the media market environment. Many quantitative studies have sought empirical evidence of media substitution and complementarity.

Based on the time budget theory, users only have 24 hours a day and the time spent on any new activity needs to be appropriated from existing activities. Thus, time spent on the computer must be at the expense of other activities, including the use of traditional mass media. For example, Cai (2005) carried out a field experiment on college students to estimate how abandoning computer use could affect the time spent on other media and examine the amount of time lag in any traditional mass medium. The hypothesis was that if the computer has a shift effect, the time spent with other media should be extended once the use of the computer is removed. The results showed that giving up using the computer did not increase the time allotted to other media. Overall, this study did not support the claim that computer use would take time away from using traditional media.

The uses and gratifications approach assumes that when Internet access has spread in society and is used for the same purposes as the older medium, it becomes a functional alternative to the older medium (Althaus and Tewksbury, 2000). If the new medium meets the users' specific needs better than the older one, they will probably choose online newspapers over print newspapers.

For example, Althaus and Tewksbury (2000) surveyed 520 college students at a university where Internet access was available in their lives. Their findings show that although computer skills and Internet access had expanded, the Internet as a news source was unlikely to significantly affect the use of traditional news media. They have found that entertainment, rather than news content, is more likely to lose users to the web. De Waal and Schoenbach (2010) found a displacement effect between non-paper news channels and print newspapers in a two-wave representative panel survey of adults in the Netherlands.

However, the limitation of the uses and gratifications approach, according to Feaster (2009), is that in previous studies, media use has always been considered independently of other available media options and use trends occurring at the population level. Incorporating the concept of uses and gratifications into the niche theory has partially addressed limitations, as the niche theory assumes that the media compete to provide satisfaction and obtain limited resources. As Feaster (2009) suggested, the niche theory has proven to be a useful contribution to the use and gratifications approach

in that it explains how the media compete and coexist by providing them to the populations that use them. This made it possible to examine the satisfaction and use of the media in the context of intense competition between the media.

The niche theory was proposed by Dimmick and Rothenbuhler (1986) to explain media competition. The theory suggests that the new media in the mass media industry creates competitive relationships with traditional media for limited resources such as advertising resources or consumer time. As a measure of competition for certain limited resources, the theory proposes the concept of niche overlap. If two media types have similar functions, they will have a significant overlap of the niche and can form a substitution relationship.

Each of the theories of media substitution mentioned above served as the basis for literature examining the relationships between media. Theories have also been synthesised in various ways. For example, Dimmick, Chen, and Li (2004) evaluated the competition between the Internet and traditional media in the light of the niche theory and the usage and satisfaction theory. They found that the Internet clearly impacts the crowding out of traditional daily news media. Lee and Leung (2008) and Ha and Fang (2012) also used these two theories to assess the impact of the Internet crowding-out on traditional media.

This inconsistent findings in previous research could also be explained by Jang and Park (2016) as owing to the different types of data used, including cross-sectional data, panel pseudo-data, panel data, and diary data at the individual level with different methods and periods used in each study. No or poor substitutability between print and online newspapers in early studies can also be explained by the expansion of Internet access, especially broadband expansion at the turn of the millennium and the later expansion of smartphones and mobile internet access.

One other reason for these mixed results may be that the extent of the overlap between digital and printed forms and the type of content vary from newspaper to newspaper and from one magazine to another (Simon & Kadiyali, 2007).

However, the decline in the use of printed newspapers does not necessarily have to be due to substitution by the Internet. Consumers may reduce their consumption of print newspapers due to a decline in their usefulness or the demand for the newspaper itself. This hypothesis states that the declining demand for newspapers for various reasons, such as an increased political apathy and distrust of newspaper articles, reduces subscriptions to print newspapers. Many developed countries have seen a decline in the time spent on news consumption across all age levels, especially among the younger generations (Spyridou & Veglis, 2008; Sung & Kim, 2020).

Studies from Greece and South Korea suggest that news consumption may decline with the spread of political indifference and growing scepticism about politics and the media, especially among young people (Papathanassopoulos, 2001; Spyridou & Veglis, 2008; Sung & Kim, 2020). The unreliability of politicians, journalists, and the media may have caused an indifference to politics and a decline in newspaper consumption.

2. The Current Situation and Trends in the Czech Republic in the Newspaper Industry

Before the analysis itself, this part presents an overview of the Czech newspaper industry and a brief analysis of the behaviour of the media and consumers in the Czech Republic.

In the Czech Republic, a gradual worldwide decline in print newspapers and newspaper subscriptions can be observed, as shown in the graph below. The average daily total circulation decreased from more than 2 million copies in 2008 to 660 thousand in 2020. With this, the total average paid circulation and the average subscribed circulation decreased, but not at the same rate as the total circulation. In 2008, the share of subscriptions on the total average circulation of leading Czech dailies was 21%; in 2020, this share was 27%. On the other hand, digital circulation has been growing (sold for at least 51% of the price of the printed version), but the circulation in 2020 was only 41,000. This may be because most newspapers publishing a printed version of their newspaper also have a web version, and users may perceive it as a substitute for a paid printed version. The total number of households with Internet access is constantly increasing in the Czech Republic. In 2003, only 15% of households had access to the Internet; in 2020, it was already 88% of households (Eurostat, 2020). According to NetMonitor (2020), out of 8.6 million users in the Czech Republic older than 10 years with an Internet connection, 6.5 million users visit news websites (Novinky.cz, Seznamzpravy.cz, iDnes.cz, Aktuálně.cz, etc.). This seems to be a significant reason for the decline in sales of both print news in dailies and the low share of paid online news in the Czech Republic.

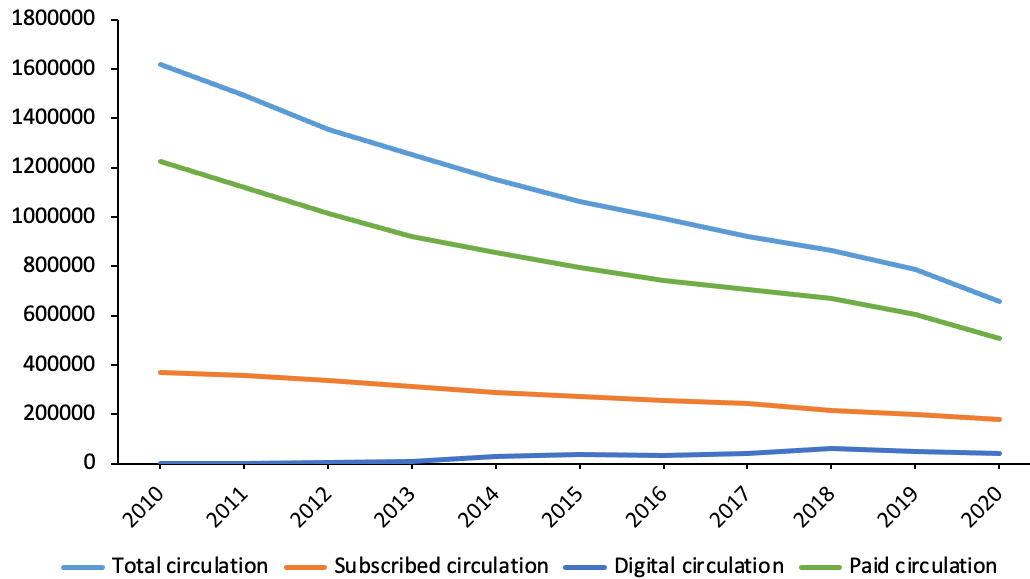


Figure 1. Trends in the Czech newspaper media

Source: ABC ČR

The overall decline in traditional media such as television, radio, and newspapers may be due to new technologies, where an individual can access the news at a lower cost. This can be caused by the prevalence of smartphones in society and the rising number of households with access to the Internet or the number of individuals with access to the Internet on mobile phones. In such situations, they can get to the news faster – they can avoid going to the newsagents or waiting for a news programme on TV. However, there may also be a decline in the number of households with a TV, as shown below. In the Czech Republic, the ownership of television sets and desktop computers has declined slightly. However, desktop computers are usually replaced by laptops and tablets. There has also been a significant increase in the share of individuals who own a smartphone. In 2011, only 16% of the population owned a smartphone; in 2019, it was already 77%. Likewise, access to the Internet is becoming more common, both for fixed and mobile Internet connections, with 65% of the population having access to fixed Internet and 8% through a mobile phone in 2011, and 81% to fixed Internet and 64 % to mobile Internet in 2019.

Table 1. Household telecommunication devices and Internet access

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Television	98%	98%	97%	97%	97%	97%	96%	95%	95%
PC	53%	52%	51%	47%	45%	42%	38%	36%	34%
Laptop	44%	51%	55%	56%	60%	62%	63%	64%	65%
Tablet	2%	9%	18%	22%	28%	29%	33%	33%	31%
Smartphone	16%	27%	30%	47%	56%	65%	71%	74%	77%
Fixed Internet	65%	69%	70%	74%	76%	77%	79%	81%	81%
Mobile Internet	8%	13%	21%	29%	37%	41%	50%	58%	64%

Source: ATO, Czech statistical office, own calculation

One can also notice changes in the use of different types of media. Table 2 shows the proportion of individuals who use the news media each day by type of media. The daily consumption of television news is declining, as is the case with radio and newspapers, where the decrease is most prominent. The growth of daily consumption traces the growth of new technologies, especially in online news. Although news consumption is declining for PCs, it is growing for mobile phones and others, which mainly include tablets, laptops, etc.

Table 2. Shares of individuals using the news media daily

	2010	2011	2012	2013	2014	2015	2016	2017	2019	2020
TV	79%	75%	75%	67%	63%	66%	62%	58%	64%	64%
Radio	59%	51%	53%	47%	49%	49%	45%	43%	49%	43%
Newspaper	26%	24%	21%	17%	20%	20%	19%	17%	15%	11%
PC	78%	72%	78%	73%	69%	69%	67%	56%	60%	61%
Mobile	9%	16%	16%	22%	25%	29%	30%	37%	43%	54%
Others	5%	4%	5%	14%	15%	14%	18%	15%	18%	17%

Source: Nielsen Admosphere, own calculation

Note: No data for year 2018

With new technologies, there are also changes in the consumption of news. The following chart shows the development of the average daily news consumption in minutes for individual media. A slight decrease in the total time spent on the news can be noticed. This decrease is mainly due to the decrease in the time spent on online news and the time spent on newspapers. However, the graph shows the tendency of newsreaders in the Czech Republic to spend more time on online news than printed ones or the television and radio. This decline in the average daily consumption of print news, together with the willingness to use more online, has a major impact on print newspaper publishers, reducing their average daily paid circulation and the number of subscribers.

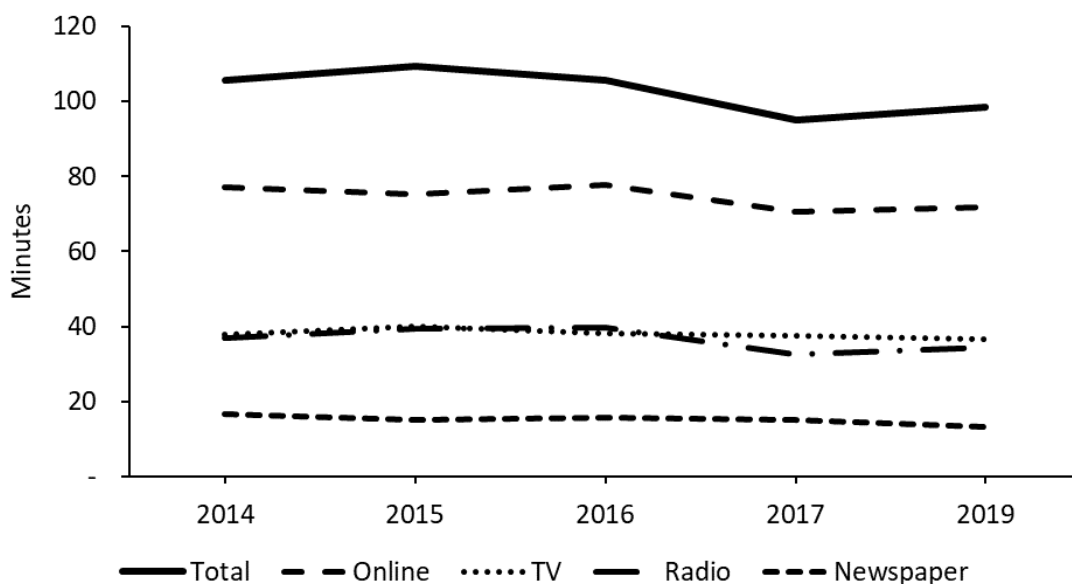


Figure 2. Average daily usage of the news media (in minutes)

Source: Nielsen Admosphere, own calculation

Note: No data for 2018

3. Data

Data for this study comes from the News server surveys administered by Nielsen Admosphere in the Czech Republic. Every year, the company conducts a survey focusing on monitoring the news usage and behaviour, both online and offline, with a different sample every year. The analysed period for this study is dictated by the availability of data and repeating the same questions in each survey wave in the years 2014, 2015, 2016, 2017, and 2019. Table 3 presents the descriptive statistics of the variables used in the models and their definitions for completeness. The total number of observations is 5,183.

Table 3. Descriptive statistics

Variable	Definition	Mean	Standard error
Daily_reader	= 1 if individual reads print newspapers daily; = 0 otherwise	0.181	0.385
Minutes_paper	= average daily minutes spent on newspapers	6.334	14.900
Minutes_online	= average daily minutes spent on online news media	39.319	46.171
Minutes_total	= average daily minutes spent on news media	101.960	97.564
Minutes_ratio	= share of <i>Minutes_online</i> on <i>Minutes_total</i>	0.407	0.286
Sex	= 1 for men; 0 = women	0.510	0.500
Age	= age of individual	40.626	16.017
Edu_graduation	= 1 if the individual has a high school diploma; 0 = otherwise	0.393	0.488
Edu_university	= 1 if the individual has a university education; 0 = otherwise	0.237	0.425
Municipality	= 1 if the individual resides in a municipality with more than 100,000 inhabitants; 0 = otherwise	0.239	0.427
Mobile_internet	= 1 if the individual has mobile Internet; 0 = otherwise	0.751	0.432
Fixed_internet	= 1 if the individual's household has fixed Internet; 0 = otherwise	0.960	0.196

Source: Nielsen Admosphere, own calculation

4. Model

This model was inspired by an early study (Sung & Kim, 2020). The empirical analysis proceeded as follows. The main question of this study is what is causing the decrease in the number of daily readers and thus the decrease in subscribers of print newspaper subscribers. Therefore, the analysis began by estimating the determinants of the decreasing numbers of daily readers in model 1. Then the analysis focused on the socioeconomic factors that affect the demand for news media in model 2.

The following model was specified to identify the causes of decreasing the decline in the number of daily newspaper readers.

$$Daily_readers_{it} = \beta_0 + \beta_1 * Minutes_Paper_{it} + \beta * X_{it} + w_t + \varepsilon_{it} \quad (1)$$

Where *Daily_readers_{it}* is a binary variable (individual I does not read print newspapers daily = 0; individual I reads print newspapers daily = 1). The variable *Minutes_Paper_{it}* refers to the average daily print newspaper time spent reading a newspaper article. The vector *X* includes the set of control variables. The year fixed effects *w_t* were included to capture the yearly fixed effects and the term *ε_{it}* is a random error term. The random effect logit model was used to estimate the cases of a decrease in the number of daily newspaper readers, and it was estimated using the maximum likelihood estimation method. Random effects were selected to fit the randomly selected sample of the Nielsen Admosphere surveys.

5. Empirical Results

Table 4 reports the results for estimating the determinants of the decreasing numbers of daily newspaper readers. Column 1 shows the model with the key variable *Minutes_paper*, which measures the consumption of newspaper articles. Column 2 includes the variable *Minutes_online*, which refers to the time spent on online newspaper articles. Column 3 includes *Minutes_ratio*, which refers to the proportion of time spent on online sources and the total time spent on the news media, and finally, the last column 4 includes the variable *Minutes_total*. This variable refers to the total daily average time spent on the news (offline and online).

Table 4. Models for daily newspaper readers

	(1)	(2)	(3)	(4)
cons	-3.866 *** (0.438)	-2.652 *** (0.286)	-1.798 *** (0.291)	-2.641 *** (0.292)
Minutes_paper	0.248 *** (0.008)	- -	- -	- -
Minutes_online	- -	0.005 *** (0.001)	- -	- -
Minutes_ratio	- -	- -	-1.452 *** (0.149)	- -
Minutes_total	- -	- -	- -	0.006 *** (0.001)
Sex	-0.161 (0,118)	0.071 (0,075)	0.242 *** (0,050)	0.051 (0.051)
Age	0.018 (0.020)	0.026 ** (0.026)	0.016 (0.013)	0.011 (0.013)
Age ²	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)
Edu_graduation	-0.125 (0.134)	0.104 (0.086)	0.257 *** (0.087)	0.126 (0.088)
Edu_university	-0.502 *** (0.163)	-0.032 *** (0.100)	0.135 (0.101)	-0.027 (0.103)
Municipality	0.226 * (0.135)	0.303 *** (0.084)	0.382 *** (0.084)	0.310 *** (0.086)
2015	-0.157 (0.185)	-0.058 (0.113)	-0.018 (0.113)	-0.070 (0.116)
2016	0.025 (0.187)	-0.104 (0.113)	-0.026 (0.113)	-0.096 (0.116)
2017	0.225 (0.185)	-0.215 * (0.115)	-0.169 (0.115)	-0.188 (0.118)
2019	0.341 * (0.187)	-0.453 *** (0.286)	-0.408 *** (0.121)	-0.408 *** (0.124)

Source: Nielsen Admosphere, own calculation

Notes: Standard errors are in parentheses. *p < 0.10, **p < 0.05, ***p < 0.01.

Variables relating to consumption behaviour are the most important for this study. All these variables are statistically significant ($p < 0.05$). The coefficient of *Minutes_paper* is positive. People who spend more time on newspapers are more likely to read print newspapers daily. The same variable *Minutes_total* has a positive sign.

On the other hand, *Minutes_ratio* has a negative value. That means increasing time spent on online newspaper articles has a negative impact on print newspapers, or rather on whether a person is a daily print newspaper reader. Of the control variables, *Edu_university* and *Municipality* are statistically significant. It seems that people with a higher education prefer online newspapers to offline ones. People in cities are more likely to be daily readers of print newspapers. The year dummy variables have a negative effect, and their absolute values increase over time. This means that the probability of being a daily reader has continued to decrease in time. Unfortunately, only the 2019 dummy variables are statistically significant.

Furthermore, I analysed the socioeconomic and demographic factors that could impact demand for print newspapers

and the substitution between print newspapers and online media. In this analysis, there are 4 dependent variables representing news media behaviour, and these are *Minutes_paper*, *Minutes_online*, *Minutes_ratio* and *Minutes_total*. A random-effects tobit censored model using the maximum likelihood estimation method is used to estimate these relationships. The OLS (ordinary least squares) model is not suitable because some individuals do not read newspapers at all. Therefore, the full specification is as follows:

$$Newspaper_behaviour_{it} = \beta_0 + \beta * X_{it} + w_t + \varepsilon_{it} \tag{2}$$

Where *Newspaper_behaviour* measures newspaper behaviour, meaning minutes spent on news media. The vector *X* includes the set of control variables. Telecommunication technology – *Mobile_internet* and *Fixed_internet* – was included to control variables. Year fixed effects *w_t* were included to capture the yearly fixed effects and the term ε_{it} is a random error term.

Table 5. Results of models for news usage

	(1)	(2)	(3)	(4)
dependent variable	<i>Minutes paper</i>	<i>Minutes online</i>	<i>Minutes ratio</i>	<i>Minutes total</i>
cons	30.356 *** (4.087)	-68.006 *** (6.591)	0.063 * (0.628)	-65.202 *** (11.861)
Sex	1.851 ** (0.877)	12.781 *** (1.352)	0.063 *** (0.008)	14.968 *** (2.675)
Age	0.232 * (0.148)	0.572 ** (0.228)	-0.010 *** (0.001)	3.031 *** (0.450)
Age ²	0.001 (0.001)	-0.004 * (0.003)	0.001 *** (0.001)	-0.018 *** (0.005)
Edu_graduation	2.620 ** (1.027)	7.566 *** (1.576)	0.078 *** (0.010)	2.773 (3.114)
Edu_university	3.421 *** (1.176)	7.411 *** (1.824)	0.083 *** (0.011)	3.114 (3.362)
Municipality	2.574 ** (1.027)	5.121 *** (1.593)	0.035 *** (0.010)	4.672 (6.161)
Mobile_Internet	5.367 *** (1.109)	23.120 *** (1.711)	0.093 *** (0.010)	30.949 *** (3.348)
Fixed_Internet	7.137 *** (2.498)	61.499 *** (4.414)	0.440 *** (0.025)	48.416 *** (7.028)
2015	-0.268 * (1.352)	2.618 (2.141)	0.023 * (0.013)	4.585 (4.237)
2016	-2.348 *** (1.361)	2.259 (2.139)	0.043 *** (0.013)	-1.122 (4.232)
2017	-6.145 *** (1.380)	-0.646 (2.129)	0.015 (0.013)	-7.848 * (4.211)
2019	-9.577 *** (1.423)	-2.808 (2.174)	0.026 * (0.038)	-14.160 *** (11.861)

Source: Nielsen Admosphere, own calculation

Notes: Standard errors are in parentheses. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 5 shows the results of this model. The dependent variable in model 1 is *Minutes_paper*, *Minutes_online* in model 2, *Minutes_rate* in model 3, and *Minutes_total* in model 4. The results for all models show that men spend more time on

news media. Likewise, more educated people are more likely to read newspapers, especially online. Older people spend more time on news media as well, but the effect is more prominent for *Minutes_total*. This means that older people spend more time on TV news than on print newspapers and online news. The municipality again has a positive effect on all dependent variables. The coefficients for *Mobile_Internet* and *Fixed_Internet* are statistically significant and positively signed for all models. This shows that if individuals had Internet access on their cellphones or Internet access in their households, they tended to spend more time on news media. The effect is higher, of course, for *Minutes_online* but *Minutes_total* as well. This may indicate that people use cellphones to watch the news online – using them not only to read online newspaper articles but also the TV news and news on the social networks– Twitter etc. The growing influence of new telecommunication technologies on the news media behaviour of users can be expected to grow further in the future, with the further expansion of smartphones in society and higher use of mobile Internet with a continuing decline in mobile data prices in the Czech Republic.

Years dummy variables show decreasing absolute values for models 1, 2 and 4. In the last 3 years, the coefficients have been negative. It means the total time spent on news media – both offline and online- is decreasing in the Czech Republic. However, these variables are significant, especially for newspapers.

6. Discussion and Conclusion

This study addressed the main reasons for the decline in print newspaper readers in the Czech Republic from 2014 to 2019. Furthermore, the study focuses on the socioeconomic factors that affect the demand for the news. This study presents several new findings in the area of news consumption. The results clearly show that the decrease in print newspaper readers is due to the substitution between print newspapers and online news. This confirmed the main hypothesis of this study, namely that new technologies such as the expansion of Internet access or a higher share of smartphones in society have a negative impact on traditional news media such as print newspapers. These results prove that individuals replace time spent in print newspapers with online news. This conclusion was also confirmed in previous research (e.g., Gentzkow, 2007; Westlund and Färdigh, 2011, or Jang and Park, 2016). However, other studies have found that online news and print newspapers can be complementary (Dutta-Bergman, 2004), and yet other studies do not even find a significant change in traditional media consumption (Anderson and Tracy, 2001). These differences are mainly caused by the methods and data used. However, recent studies confirm that online news replaces traditional news media, such as print newspapers, television, and radio.

Furthermore, results show that younger and less educated people tend to spend less time on the news – both print and online. Likewise, people in larger cities spend more time on news media. These results confirmed the findings of previous research on this topic (e.g., Thurman, 2018; Sung & Kim, 2020). This means that both the Asian news industry and the European one face a similar challenge: More people will use free online platforms to get news, and the time spent doing so will decrease, which will mean lower demand for news. This trend can be expected to prevail in the future due to a decrease in news consumption by younger people, which could have significant social, cultural, and political consequences, as Thurman (2018) suggests. These results also have possible implications for public policy and the news industries. Society also needs to be well informed. The news industry is a crucial source of new information for society. Free and independent journalism is one of the main pillars of democracy, and government policies should support this idea. As such, the news industry should attempt to restore trust through objective news reporting.

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