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DIGITAL DIVIDE, ISRAEL 2008

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Abstract

The paper presents recent findings about the magnitude and determinants of the digital divide in Israel, focusing on gaps in Internet usage in general, and in the usage of collaborative Internet applications (web2.0) in particular.

1 Introduction

The significance of studying the digital divide increases with the broad penetration of the Internet, and in recent years with the intense usage of collaborative web2.0 technologies. Early studies of the digital divide focused on access gaps. But a thorough understanding of the penetration and impact of the Internet requires more than analysis of pure access, as users with access to the Internet may still avoid using it, or use it inefficiently and ineffectively. A comprehensive analysis of the digital divide should also take into account usage differences, and the variables that predict them in the individual, social and institutional levels (DiMaggio et al., 2004; DiMaggio & Hargittai, 2001). Indeed, recent literature deals with the "hidden layers" of the digital divide and analyzes, for example, gaps between individuals and groups in generating and sharing content through collaborative online platforms (Hargittai & Walejko, 2008), gaps between populations' skills for political information search (Segev & Ahituv, 2010), and gaps in the political usage of the Internet during campaigns (Lev-On, forthcoming).

In Israel, a few studies analyzed the digital divide between Jews and Arabs, and demonstrated considerable gaps between both populations. Notably, Ganayem, Rafaeli & Azaiza (2009) used data from two sources: from the 2004 annual survey of the Israeli central bureau of statistics (CBS), based on face-to-face interviews with a representative sample of the Israeli population in the ages 20 and up (6642 Jews and 974 Arabs); and from the Rikaz database, based on face-to-face interviews with a representative sample of the Arab society in Israel (5663 subjects, ages 10 and up) (The Galilee Society & Rikaz, 2004). CBS data showed that Internet access rates were 47.8% among the Jewish population, compared to only 14.4% among the Arab population. Similarly, Rikaz data showed Internet penetration rates of 17.8% among the Arab population.

Another survey was solicited by the Israeli Ministry of the Treasury in 2005 and based on phone interviews with 1230 people in the ages 12 and up (1004 Jews and 226 Arabs). Findings were similar, with some 38% Internet access from among the 43% who have computers among the Arab population, i.e. 16.3% (Mizrahi et al. 2005, p. 28, 37). The study found that the effect of ethnicity was minor in comparison to education, income and age in predicting the magnitude of the digital divide (ibid., p. 18).

Later studies, also based on phone interviews, seem to show greater penetration and diffusion of the Internet, and to suggest that the digital gap in Israel is diminishing. Avidar (2009) administered a phone-based survey of a representative sample of the Israeli population involving 1410 subjects ages 18 and up. The study found 53% access rates among Arabs, compared to 63.8% among Jews. Moreover, some online activities were prominent among Arabs but not among Jews; for example, 27.6% of Arab Internet users reported using chat rooms, significantly more than 11.7% among Jews. The access gap between Arabs and Jews seemed to decrease with age, i.e. the younger population better bridges the digital divide. In general, ethnicity, income, education, gender and age were all significant predictors of Internet usage (Avidar, 2009, p. 49).

More recent results from industry surveys seem to support these patterns. According to the semi-annual *TIM* report from June 2008, 69% of the adult Jewish population and 56% of the adult Arab population use the Internet (Cohen, 2008). A *Geocartography* survey from November 2008 found that 95% of Arab youth use the Internet (Nechushtai, 2009).

Of special interest are uses of web2.0 technologies, which seem to skyrocket in the past few years in Israel, with the huge popularity of collaborative platforms such as *Facebook* and *YouTube* (TNS, 2008). Furthermore, discussion groups and chat room have been prominent in the Israeli Internet landscape for many years. Studies conducted worldwide demonstrate that discussion groups may be important sources of information, support and sense of belonging (Wellman, 2001). Through such forums, members can establish new social ties and maintain existing ones, keeping in touch with friends and family living close by or further away (Boase et al., 2006; Wellman et al., 2008). The possibility of interacting anonymously, hiding one's physical appearance, controlling the interaction to a great level and easily finding like-minded or similarly-situated others, are especially valuable to members of stigmatized or marginalized groups (Amichai-Hamburger, McKenna & Samuel-Azran, 2008).

Studies of online discussion groups in Israel also demonstrate their significance for users in a variety of contexts, for example for gay adolescents interested in coming out of the closet (Marciano, 2009), for evacuees from Gush Katif for maintaining social ties and obtaining relevant information (Lev-On, 2010), and for empowering ultra-Orthodox women who browse closed designated forums (Lev-On & Neriya-Ben

Shahar, 2009). The current study looks at the magnitude of discussion group usage, and its variation between different segments of the Israeli population.

2 Research questions and hypotheses

- What is the scope of the *Internet usage divide* in Israel, and which variables predict it? The studies of Mizrahi et al. (2005), Avidar (2009) and Ganayem, Rafaeli & Azaiza (2009) found that Internet connectively is correlated with ethnicity, age, education, income, and (to a lesser degree) gender and geographic district. The current study takes another look at these correlations, using more recent data.
- What is the scope of the *Web2.0 usage divide* in Israel 2008 (the divide between users and non-users of web2.0 technologies such as discussion forums, among the population of Internet users), and which variables predict it? This is the first study in Israel to look in this question. It is hypothesized that the variables that predict the *Internet usage divide* predict the *Web2.0 usage divide* as well, but not in the same magnitude; it is likely that among the "elite" of those already connected to the Internet, self-selection and learning effects may be responsible for relatively high usage of web2.0 technologies, and hence a reduced *Web2.0 usage divide* .in comparison with the *Internet usage divide* will be observed.

3 Methodology

The study uses data from the social survey (2008) conducted by the Israeli central Bureau of statistics (CBS). The survey is conducted annually with a new representative sample of the Israeli population every year; in 2008 the survey focused on social mobility and included a battery of questions about Internet usage. The survey was conducted through face-to-face interviews, between January and December 2008. Interviews lasted an hour and were carried out in Hebrew, Arabic and Russian. The sample included 6207 Jews and 1120 Arabs, ages 20 and up.

Dependent variables:

- **Internet Usage**: 0- no, 1- yes (the wording of the relevant question: "during the last three months, have you made use of the Internet, including e-mail?")
- **Web2.0 Usage**: 0- no, 1- yes (the wording of the relevant question: "did you use the computer for discussion groups and communications; e.g., chat rooms, forums, Messenger, Skype… in the last three months?").

Independent variables:

- Ethnicity: 0- Jewish, 1- Arabic.
- Gender: 0- female, 1- male.
- Age: divided by categories of 5-year intervals, between ages 20 and 75+ (20-24, 25-29 and so on).
- Education: years of schooling, divided by categories: 1-4, 5-8, 9-10, 11-12, 13-15, 16+.
- Income: Total net monthly household income: under 2500 NIS, 2501-4000, 4001-5000, 5001-6500, 6501-8000, 8001-10000, 10001-13000, 13001-17000, 17001-24000, 24001+.
- Religiosity: very religious, religious, not so religious, not religious at all.
- Residence: 0- periphery, 1- center, where the Jerusalem, Tel-Aviv and Center districts (according to the classification of the ministry of interior affairs) were coded as "center", and the Haifa, North, South, and Judea and Samaria districts were coded as "periphery".

4 Results

First, general findings about Internet usage among the study population are presented. Table 1 demonstrates that usage rates are slightly higher among men than women, among residents of the center compared to residents of the periphery, and among Jews (of all groups) than Arabs. Internet usage increases with education and income, and decreases with religiosity and age. Note the dominant gap between Jews (64%) and Arabs (30%).

Table 1. Internet usage: General findings

		Internet Users %
Gender	Females	56%
	Males	62%
Age	20-29	78%
	30-39	73%
	40-49	62%
	50-59	55%
	60+	26%
Sector	Ashkenazi	73%
	Mizrachi	57%
	Immigrants from the Former Soviet Union	53%
	Israeli third generation	82%
	Total Jews	64%
	Arabs	30%
Religiosity	Orthodox	24%
	Religious	47%
	Traditional	61%
	Secular	75%
Education	Secondary school	48%
	Matriculation	78%
	Non-academic post-secondary	64%
	BA	88%
	MA	79%
	PhD	88%
Household income	Less than 4000 NIS	27%
	4001-6500 NIS	37%
	6501-10000 NIS	60%
	10001-17000 NIS	83%
	More than 17000 NIS	93%
Residence	Periphery	54%
	Center	63%

Figure 1 shows the prevalent uses of the Internet (the numbers on top of the bars represent percentages among the entire survey population; numbers in the white boxes represent percentages among Internet users only). The most common online pursuits are information search, e-mail and downloads. Participation in discussion groups is less frequent, but still more prevalent than paying bills and shopping online. Note the prominent gaps between Jewish and Arab users across all activities; only when it comes to downloads, Arab users are more active than Jewish users.

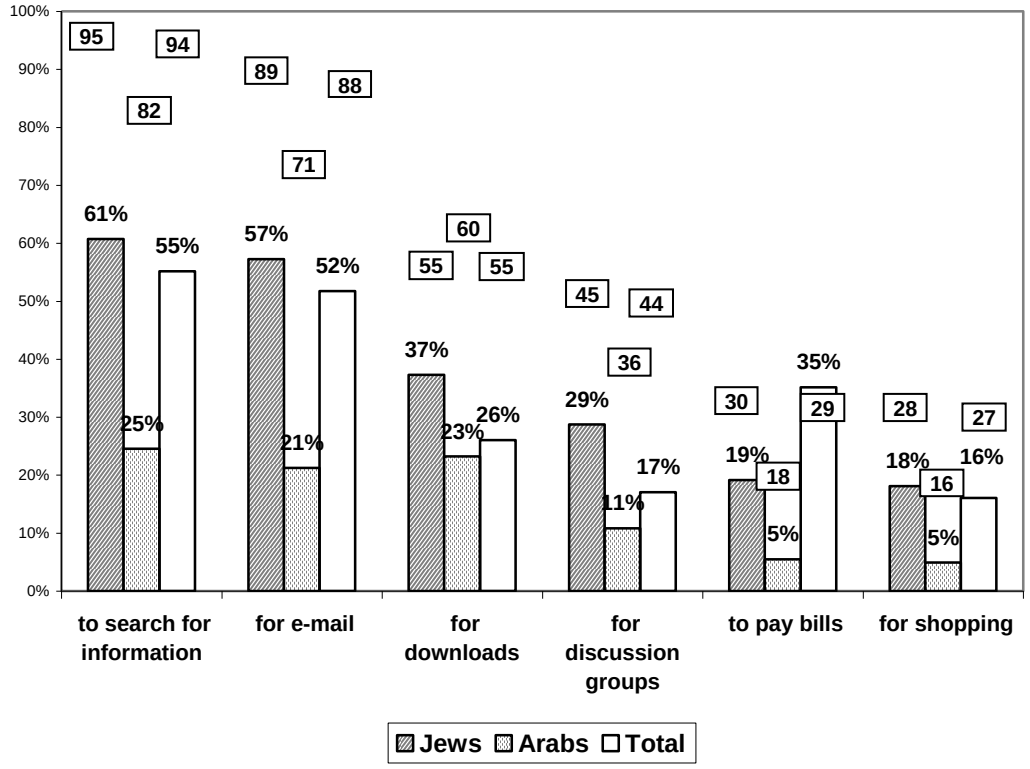

Figure 1. Internet usage among Jews and Arabs

Predicting Internet usage

A logistic regression analysis was used to determine which variables predict Internet usage. The first block of the regression introduces ethnicity (Jewish/Arab) to the regression model. The other independent variables were introduced in the second block: age, gender, religiosity, education (years of schooling), income and residential area (center/periphery). The third block of the regression model includes the interaction effect between ethnicity and education. The fourth block of the regression model refers also to the interaction between ethnicity and religiosity. The results are presented in Table 2.

Table 2. Variables predicting general Internet usage

Model 4			**Model 3**			**Model 2**			**Model 1**			
Sig	**Exp**	**B**	**Sig**	**Exp**	**B**	**Sig**	**Exp**	**B**	**Sig**	**Exp**	**B**	
**	.13	-2.02	**	.16	-1.86	**	.15	-1.89	**	1.97	0.68	**Constant**
*	3.09	1.13	**	.63	-.46	**	.57	-.56	**	.27	-1.30	Ethnicity
**	1.22	.20	**	1.24	.21	**	1.23	.21				Region
**	1.94	.66	**	1.86	.62	**	1.87	.62				Religiosity
**	.69	-.38	**	.69	-.37	**	.69	-.37				Age
**	2.14	.76	**	2.12	.75	**	2.32	.84				Education
**	1.42	.35	**	1.42	.35	**	1.42	.35				Income
*	1.21	.19	*	1.18	.16	*	1.17	.15				Gender
**	1.54	.43	**	1.64	.50							Interaction- ethnicity and education
**	.55	-.60										Interaction- ethnicity and religiosity
		0.44			0.44			0.44			0.05	Cox & Snell R Square
		0.59			0.59			0.59			0.07	Nagelkerke R Square

* Sig < .05; ** Sig < .01

The first block of the model in Table 2 demonstrates that the probability that Arabs use the Internet is lower than the probability that Jews use it by some 70% (according to exp=0.27 of the ethnicity variable). Controlling for the independent variables (in the second block of the regression) reduces the ethnic gap; accordingly, Arabs are 43% less likely than Jews to use the Internet, when other conditions are held equal (according to exp=0.57 of the ethnicity variable).

Results from the second and third blocks of the regression demonstrate that Internet usage increases with education (years of formal schooling) and income, and decreases with age and religiosity. Region and gender have modest impacts as well. Men are approximately 20% more likely to use the Internet than women, other things being equal (according to exp=1.17 of the gender variable). Residents of the center are 23% more likely to use the Internet than residents of the periphery (according to exp=1.23 of the region variable).

In the third block of the model, the interaction between education and ethnicity was introduced. The positive sign of the interaction coefficient indicates that each year of education contributes more to the probability that Arabs use the Internet, than to the probability that Jews do so (other things being equal).

In the fourth block of the model, the interaction between religiosity and ethnicity was also introduced. Interestingly, when controlling for the unique influence of religiosity and education in both ethnic groups, it turns out that Arabs are *more likely* to use the Internet than Jews. The negative sign of the interaction between ethnicity and religiosity indicates that the influence of religion is more dominant among Jews than among Arabs. The coefficients of the remaining variables did not differ significantly.

Predicting discussion group usage

Figure 2 demonstrates that 29% of Jews (from the entire sample) participate in discussion groups, compared to 11% of Arabs. When comparing the use of online forums among Internet users, the divide somewhat decreases: 45% of Jewish Internet users participate in discussion groups, compared to 36% of Arabs.

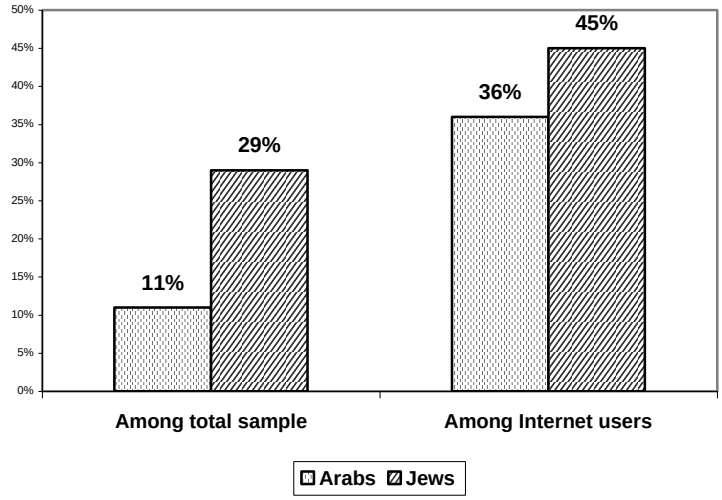

Figure 2. Discussion group usage among Jews and Arabs

To predict discussion group usage, a logistic regression analysis was conducted in similar lines to the regression presented above (in Table 2), *only among Internet users* (not the entire sample). Note that this time the analysis refers only to Internet users, not to the entire sample. Table 3 presented the findings.

Table 3. Variables predicting discussion group usage

Model 4			Model 3			Model 2			Model 1			
Sig	**Exp**	**B**	**Sig**	**Exp**	**B**	**Sig**	**Exp**	**B**	**Sig**	**Exp**	**B**	
**	0.17	-1.75	**	0.17	-1.76	**	0.17	-1.74	**	0.77	-0.27	**Constant**
	.72	-.33		.86	-.16		.80	-.23	**	0.67	-.39	Ethnicity
	1.05	.05		1.05	.05		1.06	.06				Region
**	1.37	.32	**	1.38	.32	**	1.38	.32				Religiosity
**	.87	-.15	**	.87	-.15	**	.87	-.14				Age
**	1.20	.18	**	1.20	.18	**	1.16	.15				Education
**	.93	-.07	**	.93	-.07	**	.93	-.07				Income
	1.02	.02		1.03	.03		1.03	.03				Gender
*	.76	-.27	*	.76	-.27							Interaction- ethnicity and education
	1.07	.06										Interaction- ethnicity and religiosity
		0.06			0.06			0.06			0.01	Cox & Snell R Square
		0.08			0.08			0.08			0.01	Nagelkerke R Square

* Sig < .05; ** Sig < .01

The first block of the regression model demonstrates that the probability of Arab users to participate in forums is 33% lower than that of Jews, other things being equal (according to exp=0.67 of the ethnicity variable). But the second block demonstrates that controlling for the socio-demographic variables makes the ethnic gap in Web2.0 usage insignificant, i.e. when Internet users from both ethnic groups have similar socio-demographic characteristics, the gap in web2.0 participation diminishes.

Results from the second and third blocks of the regression demonstrate that the probability of users to participate in forums increases with education (years of formal schooling), and decreases with religiosity, age *and income* (although the income effect is weak). Gender and region (center/periphery) are not significant predictors of participation in forums.

The third and fourth blocks of the model demonstrate a significant effect of the interaction between education and ethnicity. The negative sign of the interaction coefficient indicates that each year of education contributes less to the probability that Arabs to participate in forums, than to the probability that Jews do so (other things being equal). Note also that this time the interaction effect between religiosity and ethnicity was insignificant.

5 Discussion and Conclusions

The study demonstrates that the digital divide in Israel of 2008 is alive and well; significant usage gaps were found in terms of all independent variables: ethnicity, age, income, education, religiosity, geographic region, and gender. The logistic regression demonstrates that all these variables predict Internet usage, in varying magnitude, and – in most cases -- in the same directions indicated by earlier studies.

Note that the ethnic usage gaps found in the current study (64% vs. 30%), are starker than the gaps found in recent studies carried out roughly in the same timeframe (Avidar, 2009; Cohen, 2008); some of the differences may be attributed to the different methods of collecting the data (face-to-face interviews which were used to collect CBS data used in this study, vs. data from phone surveys used elsewhere); i.e. people may be more reluctant to admit the absence of Internet usage in phone interviews than in face-to-face interviews.

Results also demonstrate that the independent variables are in general much better predictors of Internet usage, than of discussion group usage (this is also evident by the substantially higher R square values in Table 2 compared to Table 3). Ethnicity, religiosity, age and education are better predictors of Internet usage than of discussion group usage; gender and geographic region are predictors of Internet usage, but not of discussion group usage; income has a positive impact on Internet usage, but a weak negative impact on Web2.0 usage.[1] This may be a result of self-selection and learning effect of Internet adopters compared to the general population; this hypothesis, however, requires further support. Also, interestingly, religion seems to have an important role in explaining usage gaps between Jews and Arabs. This conclusion, however, requires further support and specification.

As socio-economic and socio-demographic variables are of limited explanatory value for discussion group usage, future studies should involve other variables such as skills and attitudes regarding Internet and web2.0 usage. Avidar (2009), for example, found that negative attitudes towards technology mediate much of the variation in Internet usage rates between Jews and Arabs. The results presented here also suggest that such individual-level variables may be good predictors of Internet users' involvement in collaborative arenas online.

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[1] Note also that the unique contribution of education to Arabs (beyond its impact on the entire sample) exists only in reference to Internet usage, but not in reference to discussion group usage

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