The Social Dimension of Internet Diffusion in Romania: Examining the Connection between Internet Uses and Frequencies

Geomina Ţurlea, Esteve Ollé Sanz, Constantin Ciupagea*

Abstract**: The paper looks at a representative sample of Romanian Internet users, intending to differentiate between factors that are influencing the frequency of use. It describes the statistical setting of occasional users versus the group of regular Internet users that currently represent the main policy focus of the European Commission, synthesizing and analysing some of the findings. The authors then propose a general access equation looking at a large number of usual access factors. A logistic model is tested for similar sets of factors allowing comparison between impacts on the two mentioned groups of internet users. We found that the education level and the location of household may act as proxies for use mode selection and for communication intensity. However, factors not taken into account in these equations seem to be responsible for much more of the difference between the behaviours of the two groups of users, rather than usual access factors. These factors are related to motivations and the last and newest part of the paper is dedicated to the finding of the differentiated impact of utilitarian versus social motivations on the frequency of use. Our analysis, based on a descriptive type of model, reveals the important role that different types of uses play in the transition from occasional to intensive use, and that the main statistically significant differences between intensive and occasional users come from social motivations, out of which the uploading self-created content seems to be the most relevant. Policy makers could focus on the fusion of utilitarian and social motivations as a phenomenal driver of Internet diffusion, using the mix as a catalyser to bridge the important divides in both use and access that still reign in the Romanian information society.

**Keywords**: Internet uses; e-inclusion; access model; Romania; utilitarian and social motivations

**JEL Classification**: O33, O52, L86

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The gradual diffusion of the Internet accesses and uses takes place in the context of irregular social, cultural and economic structures. Research in the field has clearly identified that socio-economic and communication inequalities tend to influence questions of “access” (Norris, 2001) and, as technology diffused along different social strata, into questions of differential “use” (Livingstone and Helsper, 2007; Brandtweiner et al., 2010; Peng, 2010; Sanz and Țurlea, Forthcoming). However, much less attention has been given to the question of what explains Internet use frequency (what explains that one none-frequent Internet user becomes a frequent user), a variable that is charged with policy, social and analytical implications. Romania is gradually entering in a moment where the question of the digital divide demands to be addressed in a more attentive way, and we wish to contribute to this with this paper.

In order to examine frequency, we focus on the interplay between socio-economic and what we call “motivations for use” factors in stimulating Internet appropriation. We use the 2008 Eurostat Community Survey on ICT's use in Households and by Individuals to define two distinct levels of use, namely:

A. Occasional users of Internet (using the Internet once a week or less)

B. Intensive users of Internet (using the Internet daily or almost daily).

In this respect, we concentrate on the group of Internet users that currently represent the main policy focus of the European Commission (2009) and other policy institutions, which is the regular Internet users (defined as those using Internet at least once a week), and we contrast it with the most intensive group of users, which could be interpreted as marking the most advanced face of Internet diffusion, involving the incorporation of the technology into their everyday lives.

For analytical purposes, we equal “motivations for use” with observed uses, considering two main groups of motivations: utilitarian (transactional and informational) and social. Again for analytical purposes, we define as our variable of reference the use of email (basic communication) because it is the first and most wide spread motivation for Internet use, present for both the intensive and the occasional users. Other differentiating factors that would be useful in our analysis, i.e. the frequency of communication, were not included in the survey, but we have defined adequate proxies to account for key elements in our model.

The paper is constructed as follows: we build access equations for both the intensive and occasional groups of users using standard socio-demographic factors. Then we exploit the differential dynamics using various motivations for use applied equally for both groups, calculating odds ratio estimates, i.e. the probability of an event as compared to a reference group. In the concluding section, we discuss the results in terms of the relevant factors making a difference.

For the purpose of this probability analysis all the variables have been transformed into binary variables, indicating whether the individual observation belongs or not to one of the categorical values. For the access equation, our reference (base) group consists of men aged between 35 to 44, inactive, with no or only basic education, revenues in the first or second quartile, and living in large family nucleus (4 to 8 persons) with children under 16 years, having no access to broadband at home and no access to Internet from multiple locations. In the Romanian dataset, this group represent less than 1/1000 part of the sample due to the reason that they seldom use the Internet.

When discussing the aspect of motivation for use, we restrict to the subsample of the
active Internet users (defined as people who used the Internet in the last three months) that declare their revenue. We are interested in explaining the different model of use between the intensive and the occasional users within this sample.

Our research design assumes that socio-demographic factors influence the conditions of access, while the frequency of use will be more tightly corroborated with the motivations behind this used, which we equate to actual uses. We attempt to offer empirical support to this approach and investigate how much of the difference between being an occasional or an intensive user of Internet is related to the structure of alternative uses. We find, as we will explain below, that increase in frequency seems to be driven more by social uses than by utilitarian ones.

**INTENSIVE VS. OCCASIONAL USERS – DATA STATISTICS**

Romania is lagging behind other EU member states in Internet uptake, despite the huge progress registered in the last years. EC (2009) places Romania on the last position among the EU countries with respect to a number of dimensions of Internet uptake and expresses concerns about the country’s slow progress. Less than a quarter of Romanians were regular users on Internet (persons that use the Internet at least once a week) in 2008, as compared with more than half in the case of an average European. The intensive users (those using Internet every day or almost every day) reached 12.6% of the total population and 58% of the regular users, as compared with the average for EU, 43% of total population and as much as 77% of regular users.

We define the occasional users as those using the Internet in the three months prior to the survey, but with a frequency of once per week or less. 15.5% of the population is an occasional user of Internet. Comparative data for EU is not available. The concept of Internet users employed in this paper refers to persons active on the Internet in the last three months before the survey, which means slightly over 28% of the population surveyed.

From this point further, the analysis will only use the data for the subsample corresponding to the households that declared the income. This will induce a certain selection bias in our subsample, which reduces slightly the level of representativeness. The selected sample consists of 7882 observation out of which 1343 are active internet users. From the latter, 55.4% are intensive internet users.

What differentiates the intensive users from the occasional users within our selected sample?

In Fig. 1, we show the frequency of use distribution by age groups in the legend, while the height of columns represents the share of the age group in total number of Internet users and can be read on the vertical axis. There is a clear pattern of decreasing usage of Internet with ageing, and also a predominance of Internet use in the case of individuals aged between 25 and 54, with a peak for those between 35 and 44 years of age. This is a normal pattern, with young Romanians being more and more frequent Internet users (new technology) and with active people using more than others the Internet (age groups 25 to 54); it also explains why we have chosen as a reference group those aged between 35 and 44.

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1 Data for all EU member states is taken from EC(2009)
2 Other 5.5% of the population used Internet before the framed interval, but they are not included in this analysis.
The comment made above is further supported by the evidence from Fig. 2, where we see that the vast majority of Internet users is composed by active - most of which employed - persons, while the highest share of intensive users is to be found among students (once again, the youngsters).

No surprise, again, to be seen in the distribution of Internet use by the education level groups described by Fig.3. Although being far less numerous than the rest of groups, the highly educated individuals represent more than 40% of the total Internet users in Romania, while the share

**Fig. 1:** Distribution of Internet users by age groups and frequency of use (100%-total active Internet users)

<table>
<thead>
<tr>
<th>Age group</th>
<th>Share of intensive Internet users</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-24</td>
<td>63.5%</td>
</tr>
<tr>
<td>25-34</td>
<td>64.9%</td>
</tr>
<tr>
<td>35-44</td>
<td>52.0%</td>
</tr>
<tr>
<td>45-54</td>
<td>53.6%</td>
</tr>
<tr>
<td>55-64</td>
<td>49.7%</td>
</tr>
<tr>
<td>65-74</td>
<td>70.0%</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations based on the Romanian Survey on ICT use in Households and by Individuals

**Fig. 2:** Distribution of Internet users by employment status and frequency of use (100%-total active Internet users)

<table>
<thead>
<tr>
<th>Employment status</th>
<th>Share of intensive Internet users</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPLOYED</td>
<td>55.8%</td>
</tr>
<tr>
<td>STUDENTS</td>
<td>68.6%</td>
</tr>
<tr>
<td>INACTIVE</td>
<td>43.9%</td>
</tr>
<tr>
<td>UNEMPLOYED</td>
<td>38.9%</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations based on the Romanian Survey on ICT use in Households and by Individuals
There is a consistent difference between male and female Internet users in terms of number, while the shares of intensive users are similar: the ratio of women active Internet users to total female population (12.42%) appears much lower than the one for men (18.5%). However, the results shown in Figure 4 are reported for the restricted sample of income-declaring households, and undervalue the number of users for both genders, but even more so for women. When taking into account the entire population (18092 observations in the entire sample), the corresponding rates for women and men do not differ that much: 26.5% for women vs. 29.6% for men. A certain selection bias is assumed by this study while restricting to the subsample of households declaring the income, as explained at the beginning of this subsection.

The same pattern of normality is to be observed when we refer to the divide between urban and rural population, described by Figure 4, which shows much higher incidence of Internet use and intensiveness in urban areas. However, the urban-rural gaps for the Romanian population are much larger than in most of the EU countries, a phenomenon that should be clearly signalled to the Romanian authorities, as there is an urgent need to address properly the issue, as it could be a vicious cycling factor in impeding quicker e-inclusion in Romania. The ratio between urban and rural Internet users in Romania is almost 6 to 1, while the corresponding ratio for intensive users reaches more than 14 to 1!
The revenues are classified using the groups proposed in the Romanian survey. They are specific to the surveyed population and do not necessarily correspond to the actual distribution of Romanian population on revenues (considering a division by quintiles or deciles and an aggregate average income, in line with the total population of Romania).

Fig. 4: Distribution of Internet users by type of residence, gender and frequency of use (100%-total active Internet users)

Source: Authors’ calculations based on the Romanian Survey on ICT use in Households and by Individuals

Fig. 5: Distribution of Internet users by family revenue and composition and frequency of use (100%-total active Internet users)

Source: Authors’ calculations based on the Romanian Survey on ICT use in Households and by Individuals
In the understanding of this survey, adult is considered any person of 16 years of age and over. Consequently child will be any person younger than 16. One can expectedly observe that households with higher incomes, with less members (even more so in case of single people) are more using the Internet, and much more often.

In Figure 6, the intrinsic technology access factors are taken into account for graphing the distribution of Internet users. The outcome is normal in the case of the number of points to connect available for an individual, as we observe a consistently higher than double share of intensive users for those users who benefit of more than one point of access.

The survey overviews several potential location of Internet use, including home, education place, employment place and a range of public access points. To avoid excessive correlations between the variables later during the econometric estimation, if these locations would have been considered as such, we elaborated and used an index that takes value one if the subject accesses the Internet from more than one such location. As it will be reinforced again later, this variable is very connected with the intensive use of the Internet.

Surprisingly, though, the availability of broadband at home seems to have no association with the intensive use of Internet. To control for possible selection bias effect, we checked as well the ratio for the entire population. Indeed, a selection bias seems to exist. When the entire population is considered, the share of intensive users of Internet that have broadband at home is higher than the share of occasional users by 13pp. However, one should also consider that the social profile of households in Romania (income, location, education, professional status, having relatives abroad) could be more important than the technological factors in driving pro-active use of Internet.

Fig. 6: Distribution of Internet users by connection related variables and frequency of use (100%-total active Internet users)

Source: Authors’ calculations based on the Romanian Survey on ICT use in Households and by Individuals
INTENSIVE VS. OCCASIONAL USERS – ACCESS EQUATIONS

The probability of being an Internet user can be econometrically modelled through binary outcome models. These type of models focus on the determinants of the probability p of an individual to be an Internet user versus the probability 1-p than the individual is not an Internet user.

From the several possibilities of estimating the binary outcome models, the literature tends to converge towards using logistic regressions rather than for example, probit regressions for the case of the Internet users, because the underlying functional form for the probabilities is considered marginally most appropriate for the case at hand.

We have chosen logistic models to estimate the probability of being an intensive user of the Internet and of the probability of being an occasional user of the Internet. We use the same sample of individuals living in households declaring the income and the same set of regressors when running the two distinct equations. We will further compare the odd ratios to assess the qualitative differences in access determination for the two groups of intensive versus occasional users.

As we mentioned already, for both equations, the reference group consists of men aged 35 to 44 years, inactive, with no or poor education, income declared to belong to the first or second quartile, living in larger family nucleus (4 to 8 persons) with children under 16 years, and having no access to broadband at home and no access to Internet from multiple locations.

The logistic estimation results in odds ratios, which are ratios between the probabilities associated to the sample group used for the estimation as compared to the reference group. Consequently, they have to be interpreted as such, both in what concerns the levels and their significance. Since we use the same set of regressors and the same reference group for two alternative models, in our case it is meaningful to make comparisons between the models by using the results of these estimations.

The odd ratios resulting from modelling the probability of being an intensive vs. an occasional user of Internet are reported below in Table 1, together with the associated tests of goodness of fit and prediction.

Table 1: Access equations - Odd ratios

<table>
<thead>
<tr>
<th></th>
<th>INTENSIVE USER</th>
<th>OCCASIONAL USER</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE1624</td>
<td>2.144007</td>
<td>*</td>
</tr>
<tr>
<td>AGE2534</td>
<td>1.509074</td>
<td>**</td>
</tr>
<tr>
<td>AGE4554</td>
<td>0.565686</td>
<td>***</td>
</tr>
<tr>
<td>AGE5564</td>
<td>0.471429</td>
<td>***</td>
</tr>
<tr>
<td>AGE6574</td>
<td>0.136663</td>
<td>***</td>
</tr>
<tr>
<td>EMPLOYED</td>
<td>3.054217</td>
<td>***</td>
</tr>
<tr>
<td>STUDENT</td>
<td>7.826619</td>
<td>***</td>
</tr>
<tr>
<td>UNEMPL</td>
<td>4.933768</td>
<td>***</td>
</tr>
<tr>
<td>ED_ISCED34</td>
<td>4.111429</td>
<td>***</td>
</tr>
</tbody>
</table>

* Indicates significance at the 0.1 level,
** Indicates significance at the 0.05 level,
*** Indicates significance at the 0.01 level.
In explaining the significance of the odds ratios, a ratio higher than one would mean a higher probability for the group that is tested as compared to the reference one in using the Internet.

When considering the distribution by age, the values below 1 are well explained by the decreasing appetite for using the Internet which has been observed within the overall statistics already presented in previous chapter. The only exception seems to refer to the group of age between 25 and 34, for which probability could be less than the one for the reference age group. However, the statistical significance of the test in that case is low and an explanation may reside in the higher incidence of occasional users in the age group between 35 and 44 due to presence of relatives abroad in those households.

Also, the probability seems considerably and significantly higher for all groups of activity other than the inactive population, regardless their frequency in using the Internet, which again can be considered as a normal result. The same comment applies to the levels of education, with a particular consistency in the case of highly educated people. It is possibly one of the most important factors in determining people to use the Internet. Moreover, there is a significant difference between the odds ratio

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3 The sample is restricted to income declaring households
4 The ROC curve is a graph that depicts the sensitivity of the test versus one minus the specificity of a test and calculates the area below the functional curve. Sensitivity is the fraction of the observed positive outcomes that are correctly classified; specificity is the fraction of observed negative outcomes cases that are correctly classified. Values between 0.7 and 0.8 represent an acceptable predictive ability and values > 0.8 represent excellent predictive quality.
for intensive users as compared to occasional users, which makes the education factor even more relevant for differentiating among users.

Gender doesn’t seem to qualify for driving factors in differentiating between Internet users, as the statistical results are neither significant nor very different from one group to the other.

The basic access models presented above have less than expected explanatory power, although other authors like Vicente et al (2006) and Rice and Katz (2003) reported pseudo-R2 similar of even lower than ours. However, the Person test for goodness of fit signals misspecification in both models, while the Hosmer-Lemeshow test will fail only the model for the occasional users. It does appear as surprisingly indeed that the standard specification explains more and better the variation in the case of the intensive users than in the case of the occasional users.

Our explanation is as follow. On the one hand, the limited subsamples available and the selection biases affect the robustness of the econometric exercise. On the other hand, it is not unreasonable to assume that the standard access factors would play a crucial, however limited role in driving the Internet behaviour.

In this respect, it can be assumed that some variable may act as proxies for other factors not included in the equation and that those factors are linked to motivations and usage of the Internet. Our hypothesis is that factors like education are proxies for motivations that may seem less utilitarian but more specific to the intensive Internet users (such as reputation or networking). Nevertheless, no variable in the standard model will reasonably approximate utilitarian motivations (eg. e-banking or access to the labour market), which could be essential for both categories of users. This view is the cornerstone of our paper and it will be analysed in detail in the second part of the analysis.

**INTENSIVE VS. OCCASIONAL USERS – HOW SIMILAR ARE THEIR ACCESS EQUATIONS?**

Further down we are testing whether the two models actually have equal explanatory power. This is to say, we are indirectly trying to confirm (or infirm) the hypothesis announced above, namely that the most of the access and socio-economic factors, while driving the quality of being an Internet user, will not clearly determine if the user is intensive or occasional. For this purpose we use the Wald test, with the null hypothesis of no difference between the tested coefficients. When applied for the overall set of coefficients, the test rejects at 99% the hypothesis that the models would have similar explanatory power.

However, when tested one by one, three variables are responsible for the difference in the two models, namely the completed tertiary education, the location type of region (urban vs. rural) and the availability of multiple points for connection to the Internet. As well, the constant in the model, which is capturing some of the unexplained differences, resulted significantly different between the models.

Taking into account the results and the comments made above, we come to the conclusion that the education level may act as a proxy of certain model of use and that the location of household can be a proxy for more intense communication models.

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5 The logistic model calculates a constant but the constant will cancel out when reporting the odd ratios because of their values relative to a reference group.
Broadband presence would have been a candidate, but in our subsample seems equally distributed between intensive and occasional users. Following the same line of reasoning, the multiple location point is probably only a direct (technology-constrained) access factor that is different between the types of use.

The difference resulted in the two cases of estimations of the constant term means that factors not taken into account in these equations are responsible for the difference between their statistical outputs. As mentioned before we believe that these factors are related to motivations and particularly to uses as their proxies.

### Table 2: Wald tests for differences in coefficients between the access model for intensive Internet users and for occasional Internet users

<table>
<thead>
<tr>
<th>Overall models</th>
<th>chi2(17) = 297.54 Prob &gt; chi2 = 0.0000</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE GROUPS</td>
<td>chi2(5) = 10.11 Prob &gt; chi2 = 0.0721</td>
</tr>
<tr>
<td>OCCUPATIONAL STATUS - Employed</td>
<td>chi2(1) = 0.18 Prob &gt; chi2 = 0.6702</td>
</tr>
<tr>
<td>OCCUPATIONAL STATUS - Student</td>
<td>chi2(1) = 0.48 Prob &gt; chi2 = 0.4884</td>
</tr>
<tr>
<td>OCCUPATIONAL STATUS - Unemployed</td>
<td>chi2(1) = 0.07 Prob &gt; chi2 = 0.7866</td>
</tr>
<tr>
<td>EDUCATION - high school education</td>
<td>chi2(1) = 0.16 Prob &gt; chi2 = 0.6879</td>
</tr>
<tr>
<td>EDUCATION - university and over</td>
<td>chi2(1) = 17.27 Prob &gt; chi2 = 0.0000</td>
</tr>
<tr>
<td>GENDER</td>
<td>chi2(1) = 0.39 Prob &gt; chi2 = 0.5333</td>
</tr>
<tr>
<td>URBAN RESIDENCE</td>
<td>chi2(1) = 4.74 Prob &gt; chi2 = 0.0295</td>
</tr>
<tr>
<td>BROADBAND AT HOME</td>
<td>chi2(1) = 0.77 Prob &gt; chi2 = 0.3797</td>
</tr>
<tr>
<td>MULTIPLE ACCESS POINTS</td>
<td>chi2(1) = 81.42 Prob &gt; chi2 = 0.0000</td>
</tr>
<tr>
<td>SIZE OF HOUSEHOLD (3 or less members)</td>
<td>chi2(1) = 1.12 Prob &gt; chi2 = 0.2899</td>
</tr>
<tr>
<td>INCOME OF THE HOUSEHOLD (above average)</td>
<td>chi2(1) = 1.78 Prob &gt; chi2 = 0.1826</td>
</tr>
<tr>
<td>PRESENCE OF CHILDREN IN THE HOUSEHOLD</td>
<td>chi2(1) = 1.88 Prob &gt; chi2 = 0.1706</td>
</tr>
<tr>
<td>Constant</td>
<td>chi2(1) = 10.96 Prob &gt; chi2 = 0.0009</td>
</tr>
</tbody>
</table>
MODELING INTENSITIES: 
UTILITARIAN VS. SOCIAL MOTIVATIONS

In our empirical exploration, we equal “declared uses” with “motivations”. As we have seen, they are good candidates for driving factors in the analysis of Internet diffusion. The population in the samples was restricted to the Internet users as we are trying to see what makes the difference between the occasional and intensive users. The model we propose is not a causal model, but a descriptive one, based on correlations.

We look at a number of uses that broadly reflect what we can call utilitarian vs. social motivations for going online. Utilitarian motivations reflect, in principle, purely instrumental uses of the web. They are tasks that involve potential efficiency gains, logically leading to the substitution of previous offline activities. Social motivations have a cultural component, that is, they involve some sort of interaction with broadly defined communities. The underlying motivations are more complex, involving structures of feeling beyond purely rationalistic modes of activity.

Starting with this distinction, we extracted from our data 12 specific uses, grouped into a second level of aggregated motivations:

Utilitarian:
A. E-services (4 uses): This category includes active Internet users that have used the Internet for at least one of the following activities:
1. Use of Internet for e-commerce and e-banking;
2. Use of Internet for interacting with the public administration: online interactions with the public administration if he/she have downloaded information and forms from the public administration sites or have transmitted requested files online to the public administration, at anytime during the previous year;
3. Use of Internet for obtaining information or accessing the labour-market: search or apply for a job through Internet;

B. Browsing (use of Internet for information search – 3 uses): An active Internet user is considered to have Internet uses prone to this category is he/she reports performing one of the following:
4. Browsing for information on goods and services;
5. Browsing for news and news services;
6. Browsing for retrieving health information;
7. Use of Internet for educational purposes: search of information regarding educational programs, attending a course online and search online information as training support;

Social:
C. Social sharing (3 users): To be included in this category and individual should have reported performing one of the following activities:
1. Uploading self-created content to share (text, pictures, video...)
2. Downloading shared applications: listening to Web radios and/or watching Web television; downloading/listening to/watching music and/or films; peer-to-peer file sharing for exchanging movies, music, video files; podcast service to automatically receive audio or video files of interest, gaming;
3. Downloading software;

D. Communication (2 uses): This category includes individuals that used Internet for one of the following activities:
4. Use of advanced communication services: Internet calls and video
calls, posting messages on chat rooms, newsgroups, forums, real time messaging, read and write on blogs (including creating and maintaining own blog);

5. Use of e-mail;

In our model, we keep certain socio-economic variables (high level educated individuals and urban vs. rural residence for the household) among the explanatory factors. On the one hand, they seemed to make a statistical difference between the access models for intensive vs. occasional users. On the other hand, we consider that education and residence could fundamentally contribute to define particular communities in Romania. For this reason, they could bring into our analysis a good way of controlling the social vs. utilitarian types of Internet motivation as we have broadly defined them. We also introduce the variable “multiple access points” to control for the only access variable that seemed to make a difference between the two models. All the variables, except the use of Internet for interacting with the public administration refer to usage the three months previous to the survey.

In Figure 7, one can see that some of the applications and in particular those related to communication, but also with the administration, are used with prevalence. Intensive users, however, seem to behave differently only in a few selected types of uses when compared with the occasional ones, mainly in the file sharing, but also in e-commerce and e-banking. What becomes immediately clear, however, is that neither type of Internet users stick with one application only – there are a variety of motivations for Internet uses which are likely to be not-randomly distributed. We can then pursue our exploration of the relationship between increased frequency of use and the variety of motivations.

Indeed, as it is shown in Fig. 8, the intensive users record on average a higher variety of usage by 2 (of our taxonomy of 12 uses). Also, the distribution of the occasional users is more skewed towards the lower values. It does appear indeed that the status of an intensive Internet user is determined both by the nature and by the variety of uses. The analysis below tries to give a further visualisation to this hypothesis, before resorting to the second econometric analysis of this paper. To simplify the image, we look only at the aggregated groups of uses in Graph 1: they are represented graphically against the number of usages and the type of user.

The smallest difference in the distribution of uses in relationship with the number of different uses and the frequency of use appears in the most utilitarian class: e-services (e-commerce and e-banking have a very low share and their specificity dilutes with the aggregation) and browsing. Surprisingly, as much as 25% of the occasional Internet-users don’t use email and 50% of them don’t use advance communication techniques. The highest difference between the occasional and intensive users is to be observed in social sharing. It is also the case that both the distribution of the users and the one of non-users are more skewed towards the lower values in the case of occasional users. But how do these uses and the different intensities related to each other? To further explore this relationship we need to further elaborate an econometric model that puts all these variables in the same relational context.
Fig. 7 Shares of intensive Internet users in total Internet users by types of uses

![Graph showing the share of intensive internet users by type of use.](image1)

Source: Authors’ calculations based on the Romanian Survey on ICT use in Households and by Individuals

Fig. 8 Number of types of Internet use for intensive and occasional users

![Graph showing the number of Internet uses by type for intensive and occasional users.](image2)

Source: Authors’ calculations based on the Romanian Survey on ICT use in Households and by Individuals
Graph 1
The econometric model

We have modelled all the previously mentioned variables, adding to the reference group, in this case, those Internet users that declare using it mainly for email services, which is a basic and frequent use. The “learning curve” of the Internet user certainly plays an important role in the relationships explored below. Unfortunately, the survey did not provide information about the period of time the user had been active on the Internet, but we believe that the variable “education”, being a crucial determinant of access in Romania, would capture at least partially this effect.

Our analysis not only reveals the important role that different uses play in the transition from occasional to intensive use, but also that the main statistically significant differences between intensive and occasional users are social motivations, with an especial relevance of the uploading self-created content (the most significant variable in the model) and downloading activities. This supports the hypothesis of the Internet being mainly a social space, where a certain culture of sharing and communication takes precedence over the transactional motivations that define occasional users. This conclusion is also supported by the fact that what we have grouped under other variables also perform a very important role in our equation.

Table 3: Modelling Intensities through Social and Utilitarian Motivations.

<table>
<thead>
<tr>
<th></th>
<th>Odds ratios</th>
<th>Marginal effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Utilitarian Motivations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1- E-commerce and e-banking</td>
<td>1.241230</td>
<td>0.0514119</td>
</tr>
<tr>
<td>2- E-administration</td>
<td>1.377357</td>
<td>** 0.0770963</td>
</tr>
<tr>
<td>3- Labour market applications</td>
<td>1.039994</td>
<td></td>
</tr>
<tr>
<td>4- Browsing for information goods and services</td>
<td>1.157566</td>
<td>0.0356063</td>
</tr>
<tr>
<td>5- Browsing for news and news services</td>
<td>1.042982</td>
<td>0.0101911</td>
</tr>
<tr>
<td>6- Browsing for health applications</td>
<td>1.023311</td>
<td>0.0055760</td>
</tr>
<tr>
<td>7- Use of education applications</td>
<td>1.414914</td>
<td>** 0.0851485</td>
</tr>
<tr>
<td><strong>Social Motivations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1- Upload self-created content</td>
<td>3.23095</td>
<td>*** 0.2509660</td>
</tr>
<tr>
<td>2- Download shared applications</td>
<td>1.866509</td>
<td>*** 0.1489697</td>
</tr>
<tr>
<td>3- Download software</td>
<td>2.712241</td>
<td>*** 0.2201156</td>
</tr>
<tr>
<td>4- Use of advanced communications services</td>
<td>1.473086</td>
<td>*** 0.0942137</td>
</tr>
<tr>
<td><strong>Other Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tertiary education</td>
<td>2.127630</td>
<td>*** 0.1795863</td>
</tr>
<tr>
<td>Urban environment</td>
<td>1.916019</td>
<td>*** 0.1606240</td>
</tr>
<tr>
<td>More than one access point to the Internet</td>
<td>2.659270</td>
<td>*** 0.2274172</td>
</tr>
<tr>
<td>Pseudo R2</td>
<td></td>
<td>0.2134</td>
</tr>
</tbody>
</table>
**THE SOCIAL DIMENSION OF INTERNET DIFFUSION IN ROMANIA: EXAMINING THE CONNECTION BETWEEN INTERNET USES AND FREQUENCIES**

| Goodness of fit (Pearson chi2) | number of observations = 1343  
|                              | number of covariate patterns = 724  
|                              | Pearson chi2(709) = 704.30  
|                              | Prob > chi2 = 0.5428  
| Number of observations in the sample | 1343  
| Average probability | 55.5%  
| Predicted probability | 58.9%  
| Sensitivity | 90%  
| Specificity | 58%  
| Correctly classified observations | 74%  
| Area under the ROC curve | 0.80  

**CONCLUDING INTERPRETATION**

That the highest level of Internet diffusion, i.e. intensity of use, is driven by social uses more than utilitarian ones does not mean that the Internet is not a better instrument for market and public sector transactions, or could not become one. But there seems to be a certain contradiction between the ways in which Romanian public organizations and economic firms project themselves into the web and the social realities and motivations that seem to be driving Internet uses. Transactional uses are not yet very much present in the online world of Romania. But given the fundamental role that banking, commerce and public institutions play in society, one could target the fusion of utilitarian and social motivations and use such a mix as a phenomenal driver of Internet diffusion.

Policies managing this mix correctly could become an engine to bridge the important divides in both use and access that still reign in the Romanian information society. To do so, both private and public bureaucracies will have to gain understanding of the complex cultural and communication sensitivities that motivate Romanian citizens to share their creations, which, according to our model, is the key driver of intensity of use. This is not always related to a “citizen-centric” bureaucracy or “24-hour-open” commerce. What would seem to be operating is a sharing economy, where perhaps the utility function does not always perform as smoothly as we all tend to assume.
References

THE SOCIAL DIMENSION OF INTERNET DIFFUSION IN ROMANIA: EXAMINING THE CONNECTION BETWEEN INTERNET USES AND FREQUENCIES

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