

# Assessment of the ICT Market Development through Study of Web Hosting Services in a Country with Transition Economy

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The paper presents the results of a study with objective to provide an outlook of the on-going development of the e-services in a country with transition economy. The e-service studied is the emerging industry of web hosting. The area studied was adoption of the services by SME sector in Slovenia. Results of this type of study may be used as a good indicator of the telecommunication market service development and as guidance for the new entrants on the web hosting market.

**Key words:** telecommunication market, web-hosting, SMEs, e-services

## 1 Introduction

From the functional side of view, web-hosting services are covering provision of storage and the servers' internet connectivity on which the customers' web based applications are deployed (EDS, 2003). These offerings might be extended to the offering of space and connectivity for customers hosting their own servers and systems for their web-sites and the provisioning of application services at the hosting provider's data-centres. Hosting service providers are also offering managed services for the maintenance, administration and monitoring of customers servers and their sites and applications (Schaaf 2001). The market of web hosting service providers (also referred to as web hosts) is rapidly changing and the identification of the organisation of the market by segment, positioning and business model is required by many bodies working on the regulation of the market. Market assessment is usually provided by benchmarking of data about the presence and the quality of the service (Posey and Munroe, 2001). The quantity and quality of services currently provided on the market or planned to be provided gives clear foreword vision regarding the prospective of other emerging e-services (Turban, 2002). Some assessment results can be used also as an indicator that points to the level of transition of a society based on traditional economy from the twentieth century to knowledge-based society (Ovum, 2003) that emerged in the developed part of the world.

In case of evaluation and study of web hosting services adoption by a Small- to Medium-sized Enterprises (SMEs) the outcomes can be used as an information for a large part of the economic subjects regarding the intention to enter the e-commerce business (ISC, 2003). Qualitative and quantitative assessments of the e-service markets are important especially for markets in countries with transition economies as this complements the usual environmental data about the level of telecommunication infrastructure development (Internet World Stats, 2003).

This paper discusses the data collected in a study of the web hosting services in Slovenia. National project team was set up within a larger European based project to do the study in Slovenia and to try to answer to several issues arising around the situation of the e-business appearance and development in the countries with emerging markets. The paper is organized in four chapters dealing with research methodology, designed instrument, the collected data and the study findings. It ends with general views presented in the conclusions.

## 2 Research methodology

### 2.1 Country environmental data

Slovenia is rather small but relatively well developed country with a GBP per capita coming close to the EU average. The same applies to the rate of Internet usage

that is little bit higher than the average in the EU 15 old member states. The advancement in this area is expected to be even higher after the EU membership that was on place on May 1st 2004. That was one of the reasons why Slovenia was selected for the study among the others new entrants in EU. Despite the classification of Slovenia as small country with two MIO populations, the telecommunication market according to several studies with 515 MIO EUR is considered of middle size among the new EU member states.

Internet in Slovenia is a very well developed area in terms of high Internet penetration, (49% the highest among the NMS), household Internet access penetration (47 %), number of ISPs and number of hosts per inhabitant (20 hosts per 1 000 inhabitants) (Vehovar et. al., 2004, SIBIS+ project, 2003). Dial-up Internet access costs for residential users are high due to high ISP charges, but ADSL technology is relatively cheap and affordable. The bundling between ISDN subscribership with ADSL provided by the incumbent operator was recently dissolved by the National regulation Authority and flourishing of x-DSL based access services is expected in near future. Second possible access technology is offered by the cable operators. The share between the ADSL and cable access is 63% and 37%. There is only one provider of WLAN access and there are several centres with Wi-Fi technology.

The existing surveys (Vehovar et. al, 2004) also have shown that Slovenia has 3, 96 Million web pages, the increase rate is 13% per year, the time spent on the web pages is also still growing, and the last six months has grown from 37 to 53%. The most of the web documents is in textual form (around 2 Million), followed by images (1, 41 Million). The number of audio data is rather low e.g. around 20 000 items. The TLD (Top Level Domain) used is mainly the national one .SI; from the generic TLD dominates.NET. The language used is mainly the national language - Slovenian, followed by English and after that other European languages. The Slovenian customers are mainly interested in Internet services, shopping, sex, travel, learning, education, automobiles and music.

The major explanation of the high figures that reflects the telecommunication infrastructure development in Slovenia is related to the traditionally high interests of the citizens for any advanced technologies, early existence of the PSDN serviced based on X.25 protocol in early eighties, relatively early introduction of Internet services in early nineties by the academic sector (first IP connection to the Internet in 1991), good economical situation and an average GNP (higher than EU MS-15 average) and the highest among the new members states in EU.

On the other side, general indicators used for assessment the level of Internet economy adoption studied through e-services development show slightly different picture. Several studies (e.g.COM 2004) have shown that the percentage of population interested in e-services is higher in Slovenia than in the EU MS (member states) in

general for almost 50%. This is particularly true for the interest for on-line consumer rights, on-line consulting of medical doctors, on-line travel plans and telework. However, they are not fully deployed and offered. Digital Divide Index (Digex, 2003), (SIBIS+ project, 2003) calculated according these measured indicators, where value 100 means no gap, is 45% for Slovenia, and is slightly lower than in member states of EU (53%), meaning that the 45% of population in Slovenia is likely to use PC, Internet and have access at home. The gender gap for the usage of these services is even smaller than in MS, while for the educational divide<sup>1</sup> the gap is dramatic: 7.5% Slovenia vs. 27% in MS. The age gap (people aged 50 years or older) is also critical (35%) as it is behind MS (53%) and NMS (37%). Here, we should mention that the use of e-Learning is also among the lowest in EU-25 countries, with only 7% Slovenian of labour force using it (SIBIS+ project, 2003).

It seems that Slovenia is the country with the highest gap between, interest existence and actual usage of these services. However, this depends on circumstances governed by several factors regarding particular service. The library search in Slovenia (offered by the governmental funded system [URL:www.izum.si/COBISS](http://www.izum.si/COBISS)) available in almost all libraries in Slovenia), for example it is among the highest in Europe both regarding interest and actual usage: 76% of Internet users would prefer to use Internet to search for books in libraries (MS 73%), and 38% have actually tried to use this service. The percentage of such users is rather lower in MS countries - 22% (Internet World stats, 2003). Again, the Slovenian users prefer to interact with governmental services over the Internet compared to the traditional one (+SIBIS project, 2004). This is true as well for custom declaration, electronic banking and on-line purchasing without direct on-line payment system.

## 2.2 The instrument

The findings regarding the environmental data that statistically shows very good results for the country influenced the selection of the research instrument in our study. The Usage Attitude and Investigation instrument (UAI) (Iacovou et al., 1995) was selected for the study rather than usual methods applied for assessment of the emerging markets regarding development of the Internet economy. When conducting a complete Usage Attitude Investigation (UAI), it is best to study only one, narrowly defined, service type. It is also useful to have information in case of studied SME sector, where the SMEs get the service and how SMEs use the service. As part of the instrument design process, it is important also to be known who among the employees will be interviewed. A UAI survey can include either the general population of SMEs in a given area or the users of the particular service in question.

<sup>1</sup> Education is here understood as a formally institutionalised process of knowledge transfer and knowledge development, as opposed to informal learning arrangements taking place through various communities of practice arrangements, on-the-job training and peer learning.

Market penetration data is particularly relevant for those interested in market development because it provides a baseline against which to monitor progress. However, most of the questions in the UAI study relate to the use of the service, and much of the useful information is gathered from users. If only a few SMEs in the general population of SMEs are users of the service, the number of SME users interviewed in a study may be too small to be statistically significant. Alternatively, the survey should be larger to ensure that enough users are interviewed. On other side to interview a sufficient number of users without making the sample size too large, it is good the respondents to be limited to the users of the service. The UAI as an instrument uses survey methodology. Because survey methods are described in detail elsewhere, the description of how the UAI study was conducted focuses on the design of the survey questionnaire and the analysis of the survey results.

The questionnaire is usually administered through oral interviews because it is important for the interviewer to judge the respondents' understanding of the services and clarify questions as necessary. Oral interviews also make the UAI a particularly effective tool in a country where functional illiteracy is rather high among the adult population and that is a case with Slovenia.

### 3 Web-hosting services evaluation study

#### 3.1 The questionnaire

The survey requested preparation of the questionnaire with many relevant questions (Novak, and Hoffman, 1998). The questions were grouped in six groups of topics. The first group of questions dealt with the size of the company, its position in the market, the type of the business regarding products and services deployed or marked. The second group of questions was addressing the ICT used within the company itself or associated branches. Information about the computer technology and information system used and information about number of PCs, working stations, industrial robots, network components etc. were requested from the inquired SMEs as well. Another question in this group was addressing the type of department(s) that is using the ICT. The following departments were mentioned: marketing/advertisement, sales, CRM/ Customer support, Billing, R&D, Production, Purchasing, Maintenance, General Management, Administration/Finance, HR Management/Payments and Training. Importance of the ICT in particular department was also asked to be specified. The third group of questions was addressing Internet and web facilities. The SMEs were asked to answer to questions dealing with the access to the Internet, type of access, bandwidth, and cost. The next group of questions was dealing with the approach regarding the selected ISP provider(s) by the SME. The inquired were asked to assess the performance of their service provider through evaluation of different service features. In that

context data were collected regarding the cost of the service, user support, the service content and other characteristics of the service. The importance and the relevance of being on the Internet for the SMEs business itself was asked as well.

The fifth group of question was addressing the content and the importance of having a web site. SMEs were asked about their satisfaction with the maintenance of the site, number of visitors they have, influence of the web site to their business enlargement etc. The final group of questions were demanding the inquired SMEs to give an assessment regarding the web hosting service satisfaction. The SME was asked to specify the exact purpose of the web site, which type of services are provided within the site e.g.: e-mail, contact forms, information, software download, on-line shopping, e-learning etc. The SMEs were allowed to classify the purpose of the site as advertising/marketing, sales, communication, CRM/Help Desk, Training or other. In this group of questions there were also important questions for the web hosting service adoption assessment such as: frequency of the site updating, who was developer of the site and who takes care of the further development, advantages in having site within the company contrary to the other solution having site outside in the web hosting provider company, what are the SME plans regarding provision of web site for SMEs that have declared that they still do not have their own web pages on the Internet.

#### 3.2 The study

The total number of questionnaires completed by the respondents was 42. The selection of the SMEs was targeted in way to enable good representation of the population of the business sector studied. The number of employees that frame the classification as an SME in Slovenia (1 to 50 employees) ranged from 47 up to few employees. Among the respondent we had a SME that had only one employee. Three SMEs indicated that have employees working outside the country as tele-workers. The business sector addressed was covering almost all important sectors of the business activity. Distribution of different business sector among the respondents was the following: manufacturing 5%, transport 5%, commerce 21%, education and counselling 16%, finance and banking 11%, ICT 26%, health, insurance 5%. The income per employee was in the range 0.05 MIO EUR to 0.55 MIO EUR that is considered to be in the upper half if the average of Slovenian SMEs sector.

Most of the SMEs have rather good coverage with ICT equipment; however, the SMEs in the IT sector were out of the average that is self explanatory. The number of PCs per employee there goes from five up to one PC per employee. The other numbers are the following: 23,1% have mainframes or mini computers, all of them have PCs and working stations, 69,2% are using Local Area Networks technology, 92% of them have modems and 23,1% are owner of Computer – aided Design Tools. Most of the

SMEs (69%) are planning to invest further in ICT and 92% of them are connected to the Internet. Another question in this group was asking about the type of department(s) that is (are) using the ICT. The following departments were mentioned: marketing/advertisement, sales, CRM/Customer support, Billing, R&D, Production, Purchasing, Maintenance, General Management, Administration/Finance, HR Management/Payments and Training. Importance of the ICT in particular department was also asked to be specified. The answers were satisfactory and reflected the good ICT infrastructure in the sector and in the country as well. The importance of the ICT was remarkable for most of the involved SMEs in the study. The importance was ranked as »high« by 90% of SMEs. The access to Internet is almost permanent as 80% of the inquired SMEs have permanent access to the Internet. The telecommunication network used differs very much. It is encouraging to see that the almost the half of SMEs inquired use either T1 or DSL/cable connectivity guaranteeing good bandwidth from 512 K up to 1.5 Mb/s and more than a half SMEs with lower bandwidth access facility to the Internet plan upgrading to higher in the near future.

The questions regarding the web site of the inquired were addressing the content and importance of having a web site, and then there were questions about maintenance of the site, number of visitors, influence to their busi-

ness enlargement etc. The study has shown that 85% of the SMEs had their own web page, the maintenance of the page was outsourced in 47% of the SMEs, 38% of the SMEs were maintaining there web pages internally within the company, the rest did not answer. The web hosting on "shared" server was present in 31% of the respondents and 38% had their own host server. The web site was developed outside of the company in 47% of the respondents and 37% did the development themselves. 47,2% use the web presence for marketing, 27,5% for sales, 15,1% for communication and data interchange, 8% are using it as well for user support and after sale activities and 7,7% are using web site for some other purposes. 92% have answered that the content of their web site is in line with the business of their company. The relationship between active and non active web pages was fifty-fifty. The average satisfaction with the web pages was evaluated with the same indicators as was the case with the Internet connection (performance, cost, support and content). The numbers here were somehow lower with the lowest score given to the content of the page.

The way used for web page marketing was different between the respondents. Majority (41%) were using Internet and the available Slovenia Internet directories, press was used in 11%, and radio and TV in 7% of the res-

Table 1. Assessment of the indicators regarding their importance for the SME

Indicator	Average mark
Pricing	8,43
Data security	8,43
Flexibility and Scalability	7,43
Network connectivity	<b>8,0</b>
Performance	<b>8,14</b>
System availability	<b>7,71</b>
Customer care/Help Desk	<b>7,71</b>
24x7 Support	6,86
Possibility of adding new/additional functionalities	<b>7, 71</b>
One-stop-shopping bundle offerings [Internet Access and Hosting]	<b>7, 74</b>
Service Quality [SLAs]	7,57
State of the art Hardware	7,29
Usage of new software	6,69
Monitoring	7,43
Transparency of Offerings	7,00
Economic stability	7,14
Size of provider	6,57
Expertise and reputation	7,43
Geographical Location	5,71
Systems Integration Services	6,86
Information and Consultancy services	6,86



pondents and rest were using their business partners or related company's web pages.

The most relevant part of the study was addressing web-hosting issues such as selection of the web service provider and the SME vision regarding web hosting usage and satisfaction. SMEs were asked to specify the exact purpose of the web site, which type of services are provi-

ded e.g.: e-mail, contact forms, information, software download, on-line shopping, e-learning, post sale activities etc. The purpose of the web site could be classified by the respondent as advertising/marketing, sales, communication, CRM/Help Desk, Training or other. In this group of questions, there were also inquiry about how often the site is updated and who takes care of the further develop-

Table No 2. Comparison of the service features offered by the web hosting providers

Type of service	Provider No.1	Provider No.2	Provider No.3
Space	X	X	X
Subdomain registration	X	X	X
POP3 e-mail box	X	X	X
PGP mail support		X	X
E-mail forwarding		X	X
E-mail access over WWW		X	
On-line chat		X	
Archiving tool		X	
FTP server	X	X	X
MySQL DB	X	X	X
128 bit SSL secure server	X		X
e-mail pseudonymous	X	X	X
Auto responder	X		X
Internal mailing list	X		X
Undelivered mail tool	X	X	X
spam filter	X		X
Virus protection	X	X	X
PHP4	X	X	X
Perl5	X	X	X
CGI	X	X	X
SSI	X	X	X
JavaScript		X	X
VB script		X	X
C		X	
WAP	X	X	X
Shockwave ext.			X
FrontPage support	X		X
Monitoring table	X	X	X
WEB statistics	X	X	X
Saved CGI scripts	X		X
Directory protection with password	X	X	X
error log file	X	X	X
daily backup	X		X
UPS	X		X
Server video monitoring			X
Service availability	X		X
Help desk		X	X
Entry in Slovenian directories		X	X
DNS	X	X	X
WEB page installation	X		
Monthly rate <sup>2</sup>	10–50 EUR	20–80 EUR	10–30 EUR

<sup>2</sup> depending on the selection

ment. Respondent were asked to report about difficulties encountered in the cases when the site was located in the company itself. Similar question was asked in cases when the site was located in the web-hosting provider. Furthermore, the SMEs were asked what their plans are: to develop a site by internal forces or to use the web hosting services. Each SME was asked to rank a group of criteria from 1 to 10 regarding the importance and influence that particular indicator may have in the selection of the web hosting service provider. The criteria and the collected scores about particular indicator are summarised in Table No 1. Indicators with highest score are bold-faced.

## 4 Study findings

There are not many web hosting providers in Slovenia however they were all evaluated according to the most known and available criteria (Clemente, 1998). The criteria cover all relevant data for web hosting from data base server, back-up, DNS provision, CGI script and Java support, video control for security reason of the server and directories in the national language (Slovenian). We are providing here comparison of three web hosting providers present at the Slovenian market (Polan et al., 2003). These three have been selected because they differ in the range of services offered and can be considered as representatives of the whole group of ISPs that show similar offers. The data are provided on Table 2. The grey fields indicate same features offered by the all three web hosting providers.

Assessment of a service market requires knowledge about the awareness of the service called »awareness ratio«. Next requested information is the »reach ratio« - an indicator that gives estimation of the consumers that have tried and used the service and finally »the retention ratio«, that gives information about the consumers that have tried the service and who continue to use it regularly<sup>3</sup>. In the case of Slovenian study of the web hosting market within the SMEs sector it appeared from the respondent's answers that the »awareness ratio« was 100%, reach ratio 87% and the retention ratio 42%. This is rather low retention ratio.

The service features provided determine the interest and the benefits that and SMEs get from the service. Service features often determine if SMEs will use the service and, given a choice, from whom it will be purchased. Our market survey provides two types of information that enable to analyze the service features. The first information gives insight on the importance of the various service features for the SMEs. The second is the satisfaction rating of the SMEs with the features offered and consequently with the provider. There is a good overlap between the features evaluated by the SMEs and the features of the service offered by the market. This is evident from the data in Table No 1 and Table No 2.

The dominating criteria for selection of web hosting provider follows from the scores given to the service features as presented in Table 1. The security of operation and data protection, the performances of the provider, connectivity and availability of the system, support to the users and help desk received the highest scores. Regarding the satisfaction rating the SMEs answered that they would go to the web hosting provider instead of in-house solution in case the provider(s) offer more reliability and more quality in the service as well. Security and performance have the highest marks in Table 1.

The SMEs studied were not a homogenous group but they represented good sample of the overall Slovenian SME population. Personal and business information on survey respondents enabled the eliciting the type of SMEs that use the service. Our study showed that besides the group of SMEs from IT sector, SMEs that use web-hosting service belong to the following business sectors: leisure, education and trading. The remainder SMEs were in production or manufacturing sector. This led to conclusion that service oriented SMEs are more interested in offering their services over the Internet by use of qualified service provider.

The SMEs answers and the retention factor showed that SMEs in general were not satisfied with the service provision and with the quality of their web pages. The web pages serve for advertisement, as the other service features are not very well represented and deployed. This is especially true for e-shopping, e-payment and e-learning type of services. Good half of the SMEs are developing and maintaining their pages in-house. 17% of the SMEs did not have any presence on the Internet despite the fact that they have a connection. The satisfaction with the content and the design of the web pages was low especially in context of the SME business applications. Web hosting service providers do not provide sufficiently good and appealing offers for companies with demanding business and markets. The retention ratio was too low when compared to the reach ratio and awareness ratio. Most of the SMEs (43%) answered that they would go to the web-hosting provider(s) in case they offer more reliability and more quality of the service. The performances of the service got the highest mark of importance from the service features by the respondents. The indicators that govern the selection of a web host provider are ranked according to their importance in the context of the business run by the SME. The cost of the service was not ranked high compared to other indicators regarding performance, availability, connectivity, user support and security.

Slovenia is quite well ranked regarding the electronic communication market in most of the international studies (EIU 2005), however study about competitiveness of the economical subjects and the environmental conditions for investment have ranked Slovenia at 63 place among 100 studied countries. This is in line with our findings regarding the level of development of the web ho-

<sup>3</sup> This technique is from (Roberto, 1996).

sting market. Retention ratio of web hosting service was low, the SMEs have claimed that they would change the web hosting company and that the price of the services was not dominating factor compared to the quality of the offered service.

## 5 Conclusion

Network information infrastructures together with value added services where web hosting can be allocated have an enabling function. Telecommunication infrastructure is usually designed to support a wide range of activities intended to open up a new field of economic achievements. Data collection about the state of the development of these activities and study of the collected information provides good assessment of the market capability its and development. The results could be conceivably utilized for strategy and development planning for the country economy. The findings of the web hosting study performed in Slovenia and its outcomes can be considered as valuable input to the IST policy makers in EU and at large. It clearly shows that much more effort are needed in these emerging markets in order the Internet economy and e-business to flourish with full power.

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