Dayparting in Online Media: The case of Greece

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Abstract— The concept of dayparting has been employed for quite some time in the broadcasting industry. A daypart can be defined as a consecutive block of time on similar days during which the size of the audience is homogeneous as is the characterization of the group using the medium. Until recently Internet media planning has been characterized by overall site reach, demographics and content affinity without particular regard for how audience dynamics change by time of day. The existence of Internet dayparts can have major implications on media organization that continuously update their content offered by internet tools and services. This paper investigates the existence of dayparts in the usage of various publishing channels employed by Greek media web sites. More precisely we investigate the traffic patterns of Greek media web sites, as well as internet usage habits of Greek users. In the case of the internet users the study investigates the existence of dayparts for various devices that are being utilized in order to access the internet as well as internet services that constitute different publishing channels for media organizations. From the data we are able to identify distinct Internet dayparts that exhibit similar usage characteristics.

Keywords— dayparts, Greek media, web site traffic, usage patterns, publishing channels.

I. INTRODUCTION

The concept of dayparting is quite familiar in broadcast media [1]. Daypart can be defined as a consecutive block of time on similar days (weekdays or weekends) during which, the size of the audience is homogeneous as is the characterization of the group using the medium [2]. These subsections have a distinct audience and attitude that fit terrifically with some advertisers and badly with others. In radio and TV, each daypart has a different personality that is reflected in its programming and in its advertising [3].

But although the issue of dayparting has been investigated quite thoroughly in the TV and Radio industries, it has caught little attention as far as Internet is concerned. Until recently, Internet media planning has been characterized by overall site reach, demographics and content affinity without particular regard for how audience dynamics change by time of day. It

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was reasonable to hypothesize that dayparts on the Internet do not exist since people can access the Internet from virtually anywhere at any time. For example web sites' content, social networking posting, blog comments are available 24 hours a day, seven days a week [2]. A portal includes news every hour of the day. The headlines may change with time but the genre of the web site remains constant [3].

Nevertheless this perspective changed when two surveys conducted in 2002 and a third one conducted in 2007 found that dayparts are also applicable to the Internet use and more particularly to online media [2]-[4].

The existence of Internet dayparts can have major implications on news web sites that continuously update their content [5]. In this case the existence of dayparts may play an important role in the success of the web site. The news may exist indefinitely on a news web site but there are not easy to be found if they are not displayed on the web site's first page. When a news web site publishes many articles per day, it is quite common for the users to search extensively in order to retrieve a particular news article that was available on the first page only a few hours ago. Media companies can adapt their news publishing cycle to the access habits of internet users thus accomplishing higher user traffic.

But it is not only the WWW that requires study concerning the existence of dayparts. As technology for the distribution of journalistic information in various forms has become more easily available, the tendency has been for the media organizations to have several publishing channels at their disposal [6], [7]. Additionally media organization are changing their market model and distribute the news in a synchronized manner via different channels and guide their audience from one medium to the next in order to generate brand loyalty. This ability is supported by computer supported collaborative work systems that have been introduced in media organizations [8], [9]. The synchronous use of multiple publishing channels enables a media organization to make contact with its audience in a comprehensive and cross media way. Media use these channels as independent delivery paths. In other words the same information is available via many different channels [10]. Thus the existence of dayparts in all publishing channels that media organizations utilize in order to deliver their products is a issue that needs to be investigated.

One other aspect that must be taken into account is the fact that the nature of the news is topical and that means that if they are not consumed while they are recent (fresh) they lose their

value [11]. For example the updates of an evolving story lose their importance very rapidly. Thus by modifying content and layout of the first page throughout the day, online media can meet users needs by offering different information at different day parts [1]. It has been proposed that the best strategy is to promote news stories in the morning and entertainment stories in the afternoon [11].

This paper investigates the existence of dayparts on the use of the Internet by Greek internet users. The study is focused on the internet access patterns of Greek media. Dayparts are investigated in two ways. More precisely we investigate the traffic patterns of greek media web sites, as well internet usage habits of greek internet users. In the case of the internet users the study investigates the existence of dayparts for various devices that are being utilized in order to access the internet as well as internet services that constitute different publishing channels for media organizations.

The rest of the paper is organized as follows. Section II includes a literature review on previous studies that addressed the issue of Internet dayparting. The various publishing channels employed by media organization are briefly discussed in section III. The following section includes the methodology of the study. Section V presents and discusses the results of two surveys that investigated the existence of dayparts. A daypart model that is applicable in the case of Greece is described in Section VI. Concluding remarks and future extensions of this work can be found in the last section.

II. LITERATURE REVIEW

Broadcast media have been employing dayparts for quite some time. Dayparts for TV and radio represent a subsection of the day during which a program or a group of similar or related programs are broadcasted. Each daypart has a discrete audience [3]. Dayparting is entirely based on the viewer's local time [12].

Back in 2002 two studies confirmed that temporal influences affect Internet users in USA [1]. Specifically MORI (a research company) conducted a research for the Newspaper Association of America (NAA), which studied the temporal opportunities for online newspapers [3]. The results of the study confirmed the existence of dayparts in the Internet use of online newspapers. In other words users' priorities appeared to change across a 24-hour period. Another study conducted by OPA (Online Publishers Associations) provided additional evidence to support the existence of five distinct dayparts on the Internet, which differ in usage levels, demographics and type of content accessed [2]. Five years later Burst Media conducted a survey that focused on the Internet habits of women, age 25 year and older [13]. The survey identified different usage patterns in different time periods. One year later a study was published that focused on media consumption [11]. The data of the study included 4 years of biannual daypart media consumption surveys. The study compared new media usage with other incumbent media (newspapers, magazines, radio and television) [14]. Bari (a research company), conducted daypart surveys in Greece by assuming 4

	OPA (2003)*	MORI (2003)**	Newell et al. (2008)**	Burst Media (2007)**	Bari (2009-10)**	Avraam (2012)**
0:00-1:00	Late night	18:00-8:00	Overnight	Early morning	1st	Night
1:00-2:00						
2:00-3:00						
3:00-4:00						
4:00-5:00						
5:00-6:00						
6:00-7:00	Early Morning		Morning drive			Morning
7:00-8:00						
8:00-9:00	Daytime	8:00-11:00		Morning - noon	2nd	
9:00-10:00						
10:00-11:00						
11:00-12:00		11:00-13:00	Mid-day			
12:00-13:00				Afternoon - noon		During the day
13:00-14:00		13:00-18:00	Aftrnoon (13:00-16:30)		3rd	
14:00-15:00				Late afternoon		
16:00-17:00						
17:00-18:00	Evening	18:00-8:00	Aftrnoon drive (16:30-17:30)			
18:00-19:00						Afternoon - evening
19:00-20:00			Primetime (17:30-23:00)	Evening	4th	
20:00-21:00						
21:00-22:00						
22:00-23:00						
23:00-24:00	Late night		Overnight			

*these dayparts apply only to weekdays. OPA proposed a distinct daypart for the weekend.
**there is no distinction between weekdays and weekends

Fig. 1 Definition of dayparts in various surveys

equal dayparts in a day (6 hours each) [14]. Finally Avraam proposed a dayparting model for online media consumption in Greece that employed four dayparts during the weekdays [15].

As mentioned earlier dayparts were employed in broadcast media. Thus all the attempts to propose Internet dayparts were based or were influenced by this previous experience. We must note that dayparts were mainly a tool for the advertising industry, which now acknowledges Internet and WWW in particular as a new ground to expand to.

Each of the surveys, mentioned in the literature review, proposed different Internet dayparts. OPA defined 4 dayparts during weekdays and one daypart for the weekend. On the other hand MORI did no distinguish between weekdays and weekend and proposed 4 dayparts. Newll et al, proposed 6 dayparts, each one with small duration [14]. Burst Media [13] included 5 dayparts and Bari [14] just divided the day in four equal dayparts. Lastly Avraam employed 4 dayparts with no distinction between weekday and weekend [15].

The exact dayparts of each survey are presented in Fig 1. All dayparting models employ 4 to 6 dayparts. In the case of models that include four dayparts the duration of the dayparts are quite close (with the exception of OPA that includes one daypart with very small duration). On the other hand models of MORI and Newell et al. propose more dayparts during the working day (7:00- 17:00) while Burst media (which employed 5 dayparts) includes 4 medium size dayparts and one small daypart in the afternoon.

It is worth noting that the issue of dayparting in the internet has caught very little attention from scientists. Nevertheless many related article have been published recently on this issue from various professional in the area of advertizing, search engines, mobiles etc [16]-[20].

III. CHANNELS

The majority of the media organizations today employ various channels in order to distribute their products (news). These channels are being used in a cross media scheme. The majority of them are based on the internet and some of them on mobile phone network [21]. Precisely these channels are WWW, Webcasting, Smartphone/Tablet apps, e-mail, SMS, PDF, RSS, Social Networks and Twitter [22]. The internet users employ these channels and in some cases they do not distinguish them as separate publishing channels. For example while visiting a news article on the WWW the user can also watch a video (Webcasting channel), download and read a PDF file (PDF channel) etc. Next we briefly discuss these channels.

The main advantage of WWW is the transportation of information over great distances, and the possibility of continuous updating [23]. Newspapers publish the majority of their articles along with the photos and in some cases they enrich the articles with additional sources that cannot be included in the printed edition.

Smartphone is a high-end mobile phone that combines the functions of a personal digital assistant (PDA) and a mobile phone. Although they include browsers that enable users to access regular web sites, they incorporate small screens and thus web surfing is not an easy task. Smartphones are devices that users have in their reach almost all the time [18]. More than half of smartphone users admit that they look at their phone as soon as they wake up [17]. That is why many media companies are offering special designed applications (called apps) that are able to display news articles that include limited graphics (with basic navigation functions) but all the necessary text and pictures for each article [24].

One other device category is the Tablet. Tablet is a portable PC that includes touch screen and wireless connection to the Internet. These devices offer relatively large high resolution displays and an extensive storage capacity (in comparison with smartphones) that allow publishers to provide readers with visually rich content in a fixed format that can retain each publication's established brand identity [25]. Although there are some cases of special designed applications that take advantages of the Tablets' characteristics, in most cases Tablet users employ the same apps that are designed for smartphones.

E-mail is employed by media organizations in order to alert their readers about breaking news, relay them the headlines of the main stories (with links to the entire articles included in an online version of the newspaper), or send them the entire edition in a PDF file [26]. RSS is a method of describing news or other Web content that is available for feeding from an online content provider to internet users. Today many media organizations are employing RSS in order to alert their readers about the news headlines [27]. A RSS feed usually employs text and often small pictures. Blog: A blog is a web site where entries are written in chronological order and displayed in reverse chronological order. An important feature of the blog is the ability for visitors to leave comments. That is the reason why media organizations have included blogs as a supplement to their web editions, thus giving their journalists the opportunity to comment onto current events and to their readers the ability to interact with them [27].

Social Networks are web-based services that allow individuals to construct a public of semi-public profile within a bounded system, articulate a list of other users with whom they share a connection, and view and traverse their list of connections and those made by others within the system [28]. Many media companies have established a present in the most popular social networks in order to publish their news articles and attract other members of the social network to their web site. They have also integrated social media links in their web articles in order for the users to link to them through their social network profiles [24].

Twitter is a social networking and micro-blogging service that enables its users to send and read other users' updates known as tweets. Tweets are text-based posts of up to 140 characters in length. Updates are displayed on the user's profile page and delivered to other users who have signed up to receive them. Users can send and receive updates via the Twitter web site, SMS, RSS (receive only), or through

applications. Many media organizations are using twitter in order to alert their readers about breaking news [22]. It is worth noting that although one may argue that Twitter belongs to the Social Network category, its distinct characteristics allow us to categorize it as a separate channel.

IV. METHODOLOGY

In order to investigate the existence of dayparts in the Greek media web sites we employ two approaches. The first includes the study of the traffic of Greek media web sites and the second the internet usage habits of Greek internet users.

A. Web traffics

The research tool, employed for the needs of the study, was web analytics. Web analytics are considered to be an integrated part of the evolution of the Web [24]. The first software packages for log files analysis and reporting were introduced in 1995 [30]. Since they provide information regarding the performance and popularity of web sites, web analytics can be considered as the equivalent of traditional media metrics. Through web analytics researchers are able reveal significant trends and usage patterns in fields like content consumption, user behavior and online habits. Their major strength is the fact that they actually log all visits and not only a fraction of the population of users [29], [31].

For the purpose of this study Google Analytics was employed, since it is the most widely-used on-site web analytics service, although we must note that new tools have appeared that offer additional traffic information. It is a service offered by Google that generates detailed statistics about a web site's traffic and traffic sources. The basic service package is offered with no cost, but Google also offers a paid premium package that includes additional data traffic [32].

The sample of our study included two media web sites (www.tvxs.gr, and www.eklogika.gr) with moderate to high Internet traffic. The data that were studied covered a one year period, specifically April 2012 to March 2013. The findings of our study are presented in detail in the following sections.

B. Internet usage habits

Data was collected within a one month period (May 2013) using online questionnaires of predetermined options. The questionnaires included 18 questions. Except the questions that collected demographic data, a five-level Likert scale was employed in order to measure the possibility of using certain internet tools and services in specified time periods. The questionnaires were completed in the laboratory and additional information was provided in oral form upon request. The sample of the study included graduate and post graduate students of the Department of Journalism & Mass Media Communication. 94 questioners were completed. These students are considered to be above average internet users since in their field of study the use of internet is considered to be a necessity. The data was analyzed with the help of SPSS 20.0.
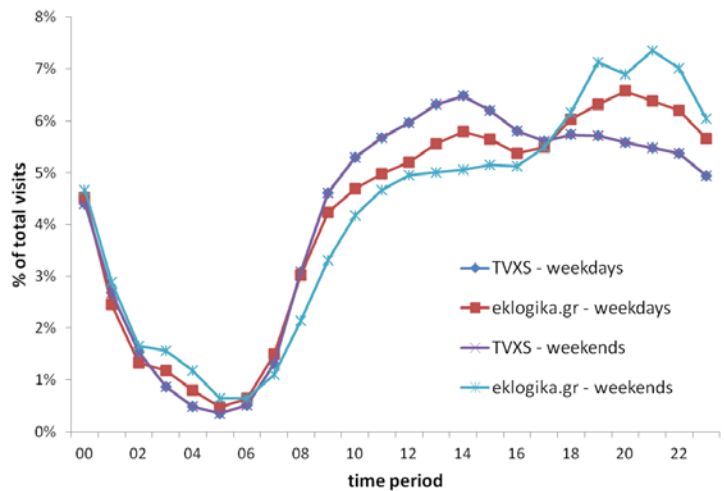

Fig. 2 Percentages of visits (in weekdays and weekends) in relations with the total number of visits in a day, for each hour of the day.

V. RESULTS

A. Survey based on Web traffics

Initially we tried to determine if the usage pattern of Greek media web sites varies between weekdays (Monday – Friday) and weekends (Saturday and Sunday). In order to present the visit patterns of the two media web sites we plotted a diagram that includes the percentages of the visits in relations with the total number of visits in a day, for each hour of the day. This metric allowed us to compare the traffic patterns of the two media web sites although they differ considerably as far as the amount of traffic they attract. The results indicate that although there seems to be a drop in the number of visits during weekends (10-20%), the traffic pattern remains unchanged (see Fig. 2). Precisely in the case of TVXS the plots for weekends and weekdays are exactly identical, and in the case of eklogika.gr the plots differ partially. The previous findings oblige us not to treat weekends as a different daypart.
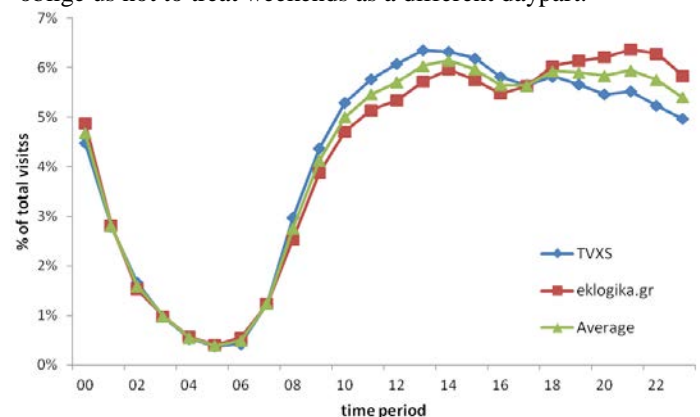

Fig. 3 Average number of pages accessed per visit for each hour of the day.

Next in Fig. 3 we have included the same plots without the distinction between weekdays and weekends and also the average usage pattern. The pattern indicates significant variations of the number of visits during the 24 hour period. Specifically the percentages range from 0,5% early in the

morning to above 6% during noon and evening.

In order to obtain more information concerning the changing visiting patterns, next we studied the variation of the number of pages users visit in relation with time. Higher number of page accessed per visit indicates a more serious approach in reading the news. In Fig 4 we have included the average number of pages accessed per visit for each hour of the day. The results indicate a moderate variation of the average number of pages, ranging from 2,5 to 3,5. TVXS exhibited significantly higher average number of pages accessed per visit in comparison with eklogika.gr. This can be explained by the higher traffic that TVXS exhibits in relation with eklogika.gr. It is obvious that the two sites demonstrate similar behavior although we must note that in the case of eklogika.gr the variations appear to be slightly smaller in comparison with the ones exhibited by TVXS. Overall users tend to access more pages per visit late at night and during the day the variations are quite small.
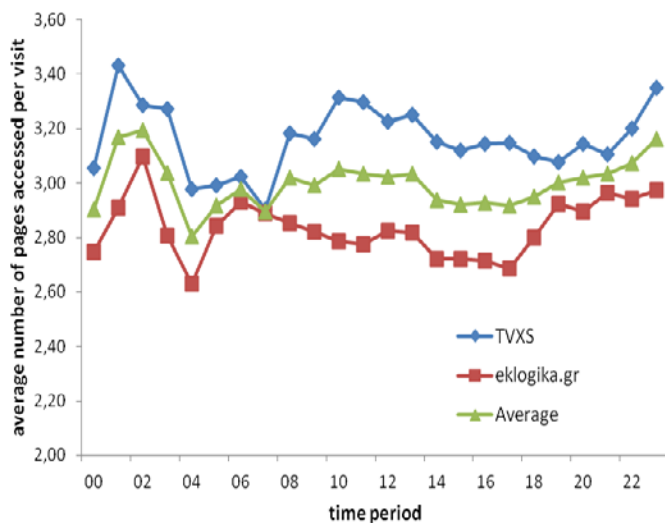

Fig. 4 Average number of pages accessed per visit for each hour of the day.

B. User survey

Moving next to the users' traffic usage survey, 31,9% of the sample were male and 68,1% female. The majority of the participants (61,7%) belonged to the 18-24 age group and 30,9% to the 25-34 age group. Initially, survey participants were asked to determine how often they access the internet. Almost all of them (99%) reported that they are online every day. Only one participant answered that he access the internet 2-3 times per week. This finding justifies our initial assumption that the sample can be considered to be consisted of above average internet users.

Next we tried to determine which devices (namely desktop or laptop PC, smartphone and Tablet) the survey participants use in order to access the internet. Precisely the users were asked to determine how probable (in a 1-5 scale, 1 the least probable and 5 the most probable) is to use the previous mentioned devices during various time periods in a day. Thus

we were able plot the usage pattern of those devices during a 24 hour period. Fig. 5 includes the usage patterns for PC, smartphone and Tablet.

From the plots it is obvious that PC is the device that the participants are more likely to use during a day. It is worth noting that for almost 12 hours the probability of PC use is above 4. The smartphone exhibits an average probability (2.5) for use, especially in the second half of the day. Tablet seems to be employed by only a few participants, but their usage patterns seem to remain almost constant during the 24 hour period. Of course they are some minor fluctuations that follow the usage pattern of the PC use. It is worth noting that PC and smartphone usage patterns exhibit their lower points at different time periods (PC in the 6:00-8:00 time period and smartphone in the 8:00-10:00 time period. But during the afternoon all three devices exhibit a slight decline in use during the 16:00-18:00 time period. Finally smartphone exhibits its pick use during the 00:00 to 6:00 time period. The latter can be explained by the fact that during this time period many young people are usually away from their homes and thus relay to smartphones for internet connectivity.

PC and smartphone usage patterns show significant variations during the day (varying from 1.5 percent up to 4.3) that are similar to the variations that were observed in the media web sites traffic.

The collected data on the use of the three different devices in order to access the internet, allow us to investigate the existence of correlations between various parameters of the study. Precisely we have found that the use of PC and smartphone in order to access the internet is not correlated with any of the demographic parameter collected (gender, age, education level, etc.). But in the case of the tablet the statistical analysis indicates a strong correlation with the use of smartphone ($p=0.296$, $t<0.001$), age ($p=0.332$, $t<0.001$), education ($p=0.308$, $t<0.003$), occupation ($p=-0.454$, $t<0.000$), and income ($p=0.305$, $t<0.003$). The above findings can be explained by the fact that tablets are expensive and as new technology they are initially adopted by young educated people with high income [33], [34]. Data from other countries (USA and UK) where mobile devices are more widespread indicate that their use peaks between 18:00 and 22:00 (approximately after work until bedtime) [17]. Our results indicate this true only for the case of smartphones.

If we turn our attention to the various channels that can be employed by media organizations in order to disseminate their news content, we observe similar usage behaviors with variations that relate mainly with the probability of use during the various time periods (see Fig. 6). The channels that exhibit the higher usage patterns are: social networking, e-mail, WWW, and blogs. The app channel appears to have moderate use and Twitter and RRS channels demonstrate the lowest usage patterns. All channels exhibit their lowest use during the 6:00-8:00 time period. Some channels (e-mail and WWW) show significant fluctuations in the probability of use during afternoon and evening, in comparison with other channels
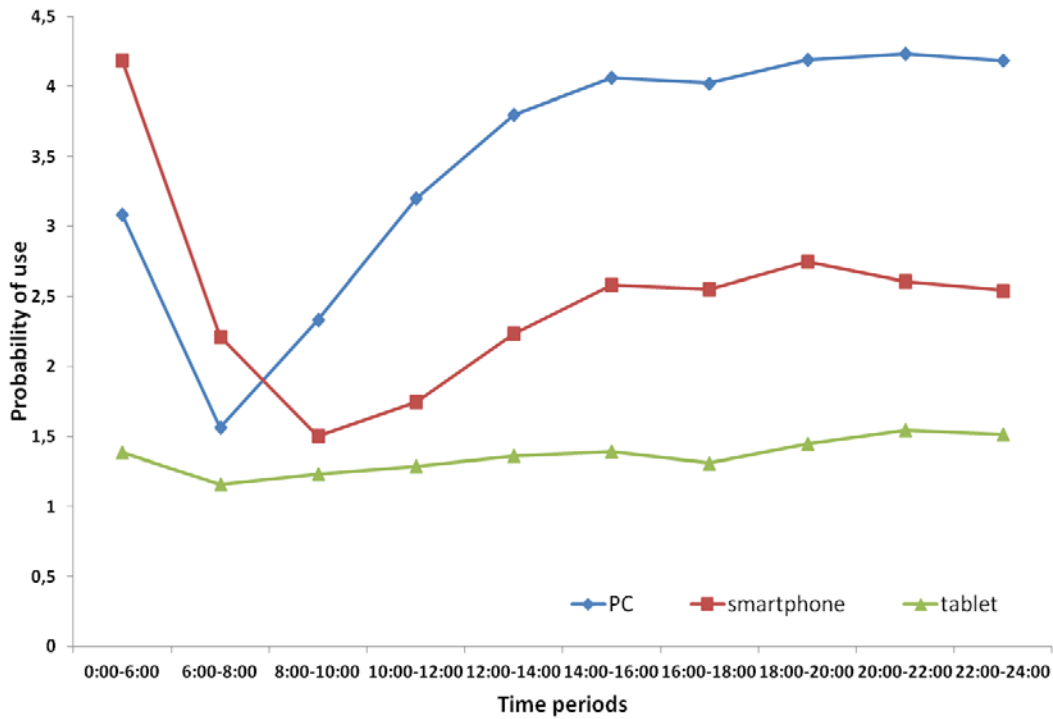
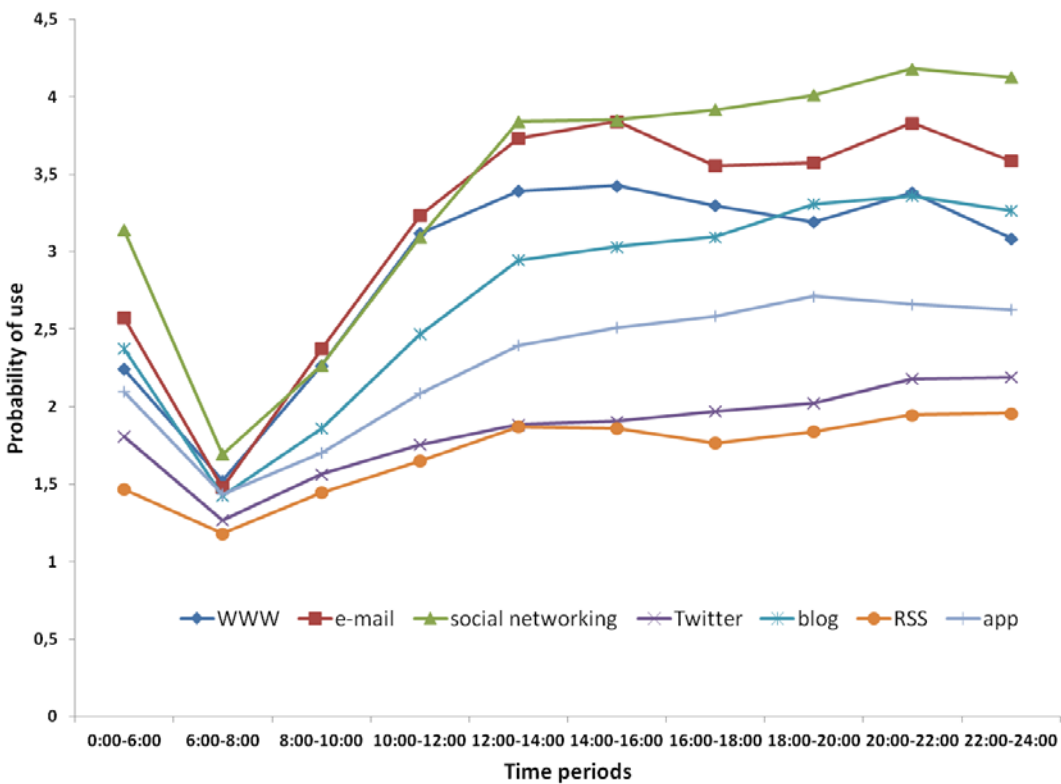Fig. 5 Usage patterns for three different devices for a 24 hour cycle.

Fig. 6 Usage patterns for various publishing channels for a 24 hour cycle.

(social networking, blogs, RSS, app and twitter) that their usage patterns remain relatively constant during the same time period.

It is worth noticing the overall dominance of the social networking channel, which can be justified by the fact that the majority of the participants of the survey are between 18 to 14 years old. According to data provided by the Observatory for digital Greece, almost 70% of young Greeks used social
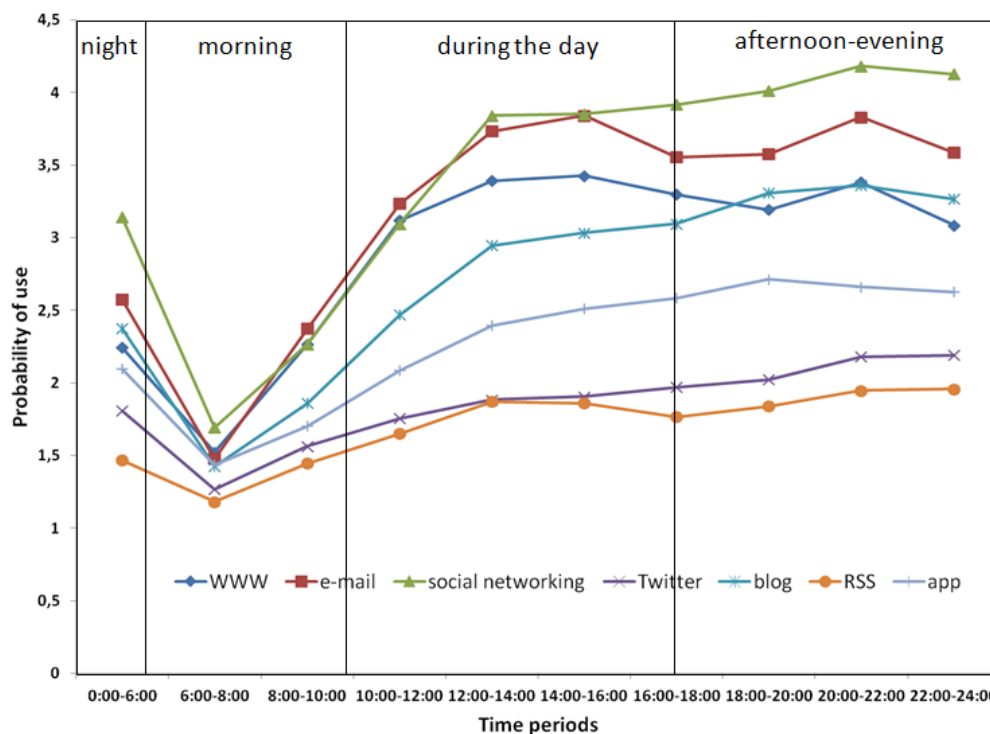
Fig. 7 Average number of pages accessed per visit for each hour of the day.

networking in 2010 [35]. On the other hand the low use of twitter can be contributed to the fact that this service is not yet very popular in Greece, especially among young people that constitute the majority of our sample [33]. Also the low usage of RSS can be justified by the fact that RSS is considered to be an "old" service that has been substituted with other social networking notification services especially among young people.

VI. DISCUSSION

Based on the results presented in the previous section we attempt to determine the dayparts in the media channel use in Greece. It is worth noting that although media channels' usage patterns appear to be identical in the early hours of the day, they have significant variation in the afternoon evening hours (see Fig. 6). We propose 4 dayparts, namely, *night* (00:00-6:00), *morning* (6:00-10:00), *during the day* (10:00-17:00), and *afternoon - evening* (17:00-24:00). The proposed daypart model is presented in Fig. 7.

The first daypart, *night*, ranges from 0:00 to 6:00. During this period the visits in Greek media web sites drop sharply. 4:00-5:00 is the time period when the number of visits exhibits its lowest value (see Fig. 2). Also during the *night* daypart the average number of pages accessed per visit varies considerably. More precisely the average number of pages increases rapidly and then decreases in the same manner. It is worth noting that from 2:00 to 3:00 the users tend to access more pages per visit, than every other time period (see Fig. 4). That means that media web sites accept less traffic but by

users that want to access more pages. During this period the use of all channels is quite high initially but drops sharply during the next time period 6:00-8:00, where all channels exhibit their lowest use of the day.

The second daypart, *morning* (6:00 to 10:00) is characterized by a sharp growth in the number of visits in Greek media web sites. The average number of pages accessed per visit slightly increases, but with notable fluctuations. Channel usage is also characterized by a drop and growth in probability of use.

During the day is the biggest daypart, which spans from 10:00 to 17:00. Throughout this daypart the number of visits picks at 14:00. The average number of pages accessed per visit remains constant from 10:00 to 13:00 and from 14:00 to 17:00. In this daypart, channel use continues to grow and saturates around 14:00. Around 17:00 the majority of the channels exhibit a slight decline.

This constitutes the beginning of the *afternoon- evening* daypart which ranges from 17:00 to 24:00. During this time period channel use fluctuates but generally remains high. The number of visits seems to remain almost constant and the average number of pages accessed per visit increases significantly and reaches its highest value at 0:00.

It is worth noting that the proposed daypart model is quite similar with the dayparts proposed by Avraam [15]. This can be explained by the fact that both daypart models are applicable for Greek users. This daypart model is consistent with the average working day in Greece. Precisely the majority of Greeks work from 8:00 to 16:00. Also surveys have indicated that most of Greeks access the Internet at home,

where they are located during the afternoon and the evening [30]. But in the recent years an increasing number of Greeks access the Internet via portable devices (mainly Smartphones, tablets, etc.). Nevertheless there seems to be a change after 17:00 that may be due to many reasons (different location, different device employed to access the Internet, etc.). The fact that the proposed dayparting model is compatible with traffic data form web sites, as well as with user usage behavior guarantees its validity. Nevertheless we must point out the small number of media websites that were included in our study. This is due to the fact that Greek media website administrators are very reluctant to disclose their traffic data.

VII.   CONCLUSIONS AND FUTURE EXTENSION OF THIS WORK

This paper has studied the issue of dayparting in the use of various publishing channels employed by Greek media organizations. The study has identified the existence of dayparts by studying media website traffic data as well as the usage habits of internet users with the help of online questionnaires. Based on the findings we have proposed a dayparting model that includes four dayparts, namely *night* (00:00-6:00), *morning* (6:00-10:00), *during the day* (10:00-17:00), and *afternoon - evening* (17:00-24:00). This model is able to describe the behavior of Greek media consumers.

During the study of the findings we have pointed out some interesting variations between the various publishing channels (smartphone and tablet). The continue increase in the use of handheld devices may indicate a change in the news consuming habits of the Greek internet users.

 The results of the study can be proven valuable to Greek media organizations, since they can help them in their news update planning in the various publishing channel they utilize in order to discriminate their news. Users tend to use different devices for different things and at different times [17]. Media companies must target accordingly. With dayparting models they can have the ability to disseminate the right message, through the right channel, at the right people, at the right time. Not surprising Google Adwords includes a dayparting feature that allows publishers customize their campaigns according to users' habits [19].

Special attention should be given to mobile devices dayparting. It is wrong to assume that users use their smartphones only when they are away from their homes [17]. Also their usage habits tend to change according to various parameters (day of the week, season, etc.). For example teens are more likely to stay awake at early hours in Saturdays and Sundays as well as during holidays.

The study produced also some interesting results that need to be investigated more thoroughly. For example the smartphone use differs on the time period when it exhibits its lowest value, and the tablet use is quite low in order to extract valid results. The survey concerning internet usage habits of Greek users which has been presented in this paper was intended to act as a pilot study for the main survey that will be conducted in the end of 2013 in a wider scale, in order to collect more tangible results.

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