Reaching Specific Audiences by Television Advertising Scheduling – the Case of the Czech Republic

Michal Novák, University of Economics, Prague, Faculty of Management, Jarošovská 1117/II., 377 01, Jindřichův Hradec, Czech Republic, novak@michalnovak.eu
Tomáš Kincl, University of Economics, Prague, Faculty of Management, Jarošovská 1117/II., 377 01, Jindřichův Hradec, Czech Republic, kincl@fm.vse.cz

Abstract

Television is a mass media which aims to reach large audiences. Since targeting through selection of the most suitable TV channel was not confirmed in our previous study we tried to discover another targeting mechanism used by companies. The research question whether there are different prime times for companies from different industries has been analyzed. It could be expected that various audiences watch TV at different times of the day/week. However, this assumption has not been confirmed. Only minor groups of commercials are usually aired in specific day/week times. This is caused by the fact that such commercials are aired only a few times a week (or even a year). The main (industry) groups of commercials have not shown any significant difference in the times that the commercials are broadcasted. The media market is on the edge of manageability and the pressure on low CPP and bundling the advertising space causes unreasonable ineffectiveness when targeting suitable audiences. There should be a debate initiated to adjust the media market processes to comply with corporate communication strategies and to support companies' business objectives once again.

Keywords: television, targeting, differentiation, audience selection

Introduction

Television is generally recognized as the most powerful advertising media delivering information and entertainment to immense audiences (Kotler and Keller, 2009). However new technologies led to the fragmentation of existing media and audiences (Soberman, 2005). With the emergence of new media consumers change their habits, switch to new alternatives and use more and more multiple information channels (Danaher and Rossiter, 1993). On the other hand, they might feel overwhelmed, mistreated and disrespected, as they have a multiplicity of choices but a diminishing amount of trust and confidence (Zoratti and Gallagher, 2012). Therefore, marketers also need to change their behavior in media planning to become more relevant and to precisely target fragmented audiences (Iyer, Soberman and Villas-Boas, 2005). This problem is similar in all traditional media such as print, outdoor and radio and new media (Yao and Mela, 2011).

The media environment has become more complex with increased fragmentation and audience autonomy (Napoli, 2011). The mass audience which was once concentrated on three or four viewing options, has become more widely distributed (Webster, 2005). Media proliferation, driven largely by new technologies, fragmented the market into thousands of media vehicles. Still, more than 50% of media budget is spent on television advertising (Mediaresearch, 2012). Even though a fragmented market brings more choices, greater opportunities and media channel selection to media consumers, it also presents a huge challenge to marketers. Communication is more effective when the marketing message is delivered via channels and with attributes preferred by targeted audiences so the message needs to be adjusted accordingly (Danaher and Rossiter, 1993).

Audience targeting is a process where marketers attempt to place their advertising message in a channel where it is most likely to be received by its target market members (Nelson-Field and Riebe, 2011). The objective is to avoid the inefficiency of sending a marketing message to untargeted audience (Kotler and Keller, 2009). Precise audience targeting is the most effective way to seek cost efficiency (Foley and Engelberts and Wicken, 2005). Imprecise targeting also leads to an excessive

amount of commercials on TV where consumers can be confused or overloaded (Becker and Murphy, 2006).

Advertising time on TV channels is usually sold in GRP (gross-rating-point) packages. GRP measures the size of an audience reached by a specific media vehicle. It equals the product of the percentage of the target audience reached by a commercial multiplied by the frequency people see the advertisement in a given campaign. A GRP of 100 means a commercial reached the equivalent of a 100% target audience. This could mean that all members of targeted population had viewed the commercial, but also that 25% of the population had viewed four commercials (Farrelly et al., 2005). However, companies willing to address customers with their marketing message are often forced to buy whole packages of advertising space on one or more TV channels owned by one media group (Mediafax, 2011).

The costs of advertising media are based on quantitative and qualitative factors (i.e. cost per person reached, overall reach potential). However, the total expenditure on producing and purchasing a commercial is not the most important media-selection factor (Van den Putte, 2009). Marketers prefer to consider the possibility of targeting a specific audience and audience reach (the number of people who will view a commercial) (Nowak and Cameron and Krugman, 1993). Thus media owners need to precisely state the audience profiles of their TV channels and propose they are able to deliver greater impact and efficiency among certain market segments (Nelson-Field and Riebe, 2011). Furthermore it is usually much cheaper to place a commercial on highly differentiated TV channels (with a smaller but well defined audience) than on undifferentiated and mass-oriented TV stations. Therefore, marketers should diversify between different media profiles and reflect their audiences in the media selection (Abratt and Cowan, 1999).

According to findings in our preliminary research (Novák and Kincl, 2013), there are just small differences in the distribution of commercials among the TV channels. Only three main groups of channels based on TV commercial differentiation were identified. The first group consisted of the four channels of Czech national broadcasting company (ČT1, ČT2, ČT4 and ČT24). Even though these channels are different in their (promoted) audience profiles (ČT24 is a news channel, ČT2 represents the "alternative stream" and ČT4 is a sports channel), the distribution of the commercials aired were very similar to each other (and different to any other channel in the research sample). However this is mainly due to the legal restrictions on commercials on these national (and publicly financed) channels. The second identified group of channels included the children's channels, Minimax and Disney. Children are a very specific audience and this is reflected in the distribution of the commercials aired. Thus this could support the hypothesis that thematic channels have a different distribution of commercials to address their specific audience. However, the analysis did not distinguish between the remaining channels any further. The last group (including all remaining channels) consisted of channels with very diverse characteristics and audience profiles.

Since most TV channels have a very similar distribution of advertisements across industries, an additional research question can be formulated. The assumption of the differences in the distribution of commercials between TV channels among industries is rather unsupported; however, there might be a difference between industries in terms of the distribution of commercials broadcast in time (days and hours of the week). The following research question has been formulated:

Q1: Is there a difference in Czech TV advertisement distribution in time?

Research Design and Methodology

More than a half of all media expenditure on the Czech media market is spent on TV advertising (Admosphere, 2013). Complete data for TV commercials from 2011 was obtained by comprehensive media monitoring of the whole advertising market in the Czech Republic. Monitoring was carried out in accordance with the product categorization based on the segmentation of NACE EU/CZ economic activities and modified to better fit the media market (Mediaresearch, 2013). The

data set includes 1,858,100 commercials aired in 2011. Data of commercials is categorized by the industry in a hierarchical tree. There are 23 sections on the main level according to the main industries (see Table 1). The industry tree consists of another five levels, where the final and most detailed categorization includes more than 1,500 different sections.

Tab. 1: Modified Industry Groups on the First Level of the Hierarchy Tree

A	AGRICULTURE, FORESTRY AND FISHING	M	FINANCE AND INSURANCE BUSINESS
B	MINING AND EXTRACTION	N	REAL ESTATE ACTIVITIES
C	FOODS, DRINKS	O	PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES
D	TEXTILE, CLOTHES, LEATHER, SHOES	P	ADMINISTRATIVE AND SUPPORT ACTIVITIES
E	OTHER PROCESSING INDUSTRIES	Q	PUBLIC ADMINISTRATION AND DEFENSE; COMPULSORY SOCIAL INSURANCE
F	ELECTRICITY, GAS, HEATING AND AIR CONDITIONING	R	EDUCATION
G	WATER SUPPLIES; ACTIVITIES RELATED TO WASTE WATER, WASTE AND SANITATION	S	HEALTH AND SOCIAL CARE
H	BUILDING INDUSTRY	T	CULTURAL, ENTERTAINMENT AND RECREATIONAL ACTIVITIES
I	REPAIRS AND MAINTENANCE OF MOTOR-POWERED VEHICLES AND MACHINES	U	OTHER ACTIVITIES
J	TRANSPORT AND STORAGE	V	ACTIVITIES OF EXTRATERRITORIAL ORGANIZATIONS AND AUTHORITIES
K	ACCOMMODATION, ALIMENTATION AND HOSPITALITY	Z	CROSS-SECTION CATEGORIES
L	INFORMATION AND COMMUNICATION ACTIVITIES		

Source: (11)

The data contains commercials from 22 Czech TV channels. The channels are represented by four different advertising sales agencies. The TV channels are shown in Table 2.

Tab. 2: Czech TV Channels by Czech Media Groups

Media Group	Represented TV Channels
Media Master	ČT1, ČT2, ČT24, ČT4, TV Barrandov
Nova Group	Nova, Nova Cinema
FTV Prima	Prima family, Prima COOL, Prima love
At Media	AXN, CS Film, Disney Channel, Film+, MGM, Minimax, National Geographic Channel, Óčko, Spektrum, Sport 1, TV Paprika, Universal Channel

Source: own

Three channels (Z1, TV Deko and Public) were excluded from the analysis since they were discontinued or transformed into a different channel in 2011. The data was transformed into the contingency table where the rows represent each TV channel and the columns represent the number of commercials from a given industry on a selected TV channel. Since the number of commercials aired on TV channels differs by orders of magnitude, the table was recalculated to relative shares (the sum of each row is 100 % representing all commercials aired on a given channel; see Table 3).

Tab. 3: Contingency Table with TV Channels and Shares of Commercials Aired in each Industry (in %)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	Z
ČT1			9.1	0.9	20.4	0.9	0.2	0.1	0.3	0.5		39.5	7.8		2.0	1.5	0.3			3.5	0.1		12.8
ČT2		0.1	3.3	0.8	27.9	2.6	0.2			0.4		42.6	8.7		2.0	1.1	0.1			4.5	0.2		5.4
ČT24		0.1	2.0		20.8	2.0		0.7	0.1	0.8		47.5	10.1	0.4	3.1	3.5	0.6			7.7	0.4		0.3
ČT4		0.2	19.0	0.2	20.9	1.1	0.4	1.0	0.2	0.5	0.4	25.5	11.1		0.8	1.3	0.2			13.4	1.1		2.6
TV Barrandov		0.1	22.1	1.4	44.6	1.1	0.4	0.5	0.2	0.1	0.9	10.5	7.5	0.1	0.7	0.3	0.1			1.6	0.3		7.6
Nova			24.7	0.9	50.0	0.5			0.1		0.7	6.4	8.2		0.5	0.3				1.2	0.1		6.4
Nova Cinema			24.4	1.2	51.7	0.9			0.1		0.7	4.8	7.5		0.3	0.1				1.1	0.1		7.0
Prima COOL			27.0	0.9	43.6	0.4	0.2		0.1		1.2	11.1	6.2		0.2	0.3				1.6	0.2		7.0
Prima family			30.0	0.7	41.2	0.4	0.1		0.1		0.8	9.3	7.1		0.2	0.3			0.1	1.3	1.0		7.3
Prima love			17.4	1.8	42.3	0.7	0.2	0.1	0.1		1.1	16.0	7.4		0.4	0.3			0.2	2.2	0.3		9.5
AXN		0.1	12.4	0.4	61.1	0.3	0.3		0.2		2.2	7.8	10.7		0.3	0.4		0.1		1.3	0.4		1.8
CS Film		0.1	12.8	0.2	56.6	0.4	0.4		0.1		1.7	9.9	13.2		0.2	0.6		0.1		1.8	0.6		1.3
Disney Ch.		0.1	26.9	1.1	50.8	0.5					2.2	11.4	0.8			0.3		0.1		3.8			2.0
Film+		0.1	10.8	1.1	56.3	0.4	0.4		0.2		0.8	14.6	10.8		0.1	0.4		0.2		1.8	0.4		1.6
MGM		0.1	11.3		65.1	0.6	0.4	0.1	0.2		0.7	5.5	11.4	0.1	0.5	0.3		0.1		1.6	0.7		1.3
Minimax		0.3	21.6	1.5	49.8	0.6					2.3	13.2	1.0			0.2		0.5		6.6	0.3		2.2
Nat. Geo. Ch.		0.3	8.8	0.4	56.1	0.1	0.6		0.4		1.2	10.8	15.7		0.1	0.8				0.8	1.1		2.8
Óčko		0.1	16.6	0.8	47.9	0.3	0.4	0.1	0.1		1.9	11.9	8.6		0.9	0.5		0.3	0.1	5.9	0.2		3.5
Spektrum			13.3	0.2	58.3	0.4	0.3		0.3		2.3	9.2	10.5		0.4	0.3		0.1		2.0	0.4		2.1
Sport 1		0.2	12.9	0.5	51.2	0.3	0.4		0.1	0.1	2.1	12.9	13.9		0.3	0.4		0.1		2.2	0.6		1.9
TV Paprika			20.8	1.5	51.5	0.6	0.4	0.1	0.6		0.8	8.9	9.5	0.1	0.2	0.3		0.1		2.1	1.0		1.7
Universal Ch.		0.1	11.4	0.5	61.2	0.4	0.4		0.2		2.3	7.8	11.5		0.2	0.4		0.1		1.2	0.4		1.7

Source: own

Table 3 indicates there are industries represented by only a few commercials. On the other hand, the groups C, E, L and M together represent almost 90% of all commercials aired. Therefore the analysis mainly focuses on these four categories and their sub-classes.

Each TV channel is described by a series of numbers representing the relative share of the commercials aired on a given channel. However, a methodology-related question arises about the selection of the correct method for comparison. Comparing the data as statistical distributions is questionable since the frequency data cannot be considered as continuous (Kolmogorov–Smirnov test for the equality of continuous distributions cannot be used) and contains a lot of values close to zero (the chi-square tests are also questionable). But the data could be perceived as vectors representing each TV channel. To quantify the similarity (or dissimilarity) of channel vectors, the cosine similarity measurement was computed. Cosine similarity measures the similarity between two vectors by finding the cosine value of the angle between them. For a pair of vectors **a** and **b**, the cosine similarity is given by:

$$\text{similarity}(\mathbf{a},\mathbf{b}) = \frac{\mathbf{a}\cdot\mathbf{b}}{\|\mathbf{a}\|\mathbf{b}|}. \quad (1)$$

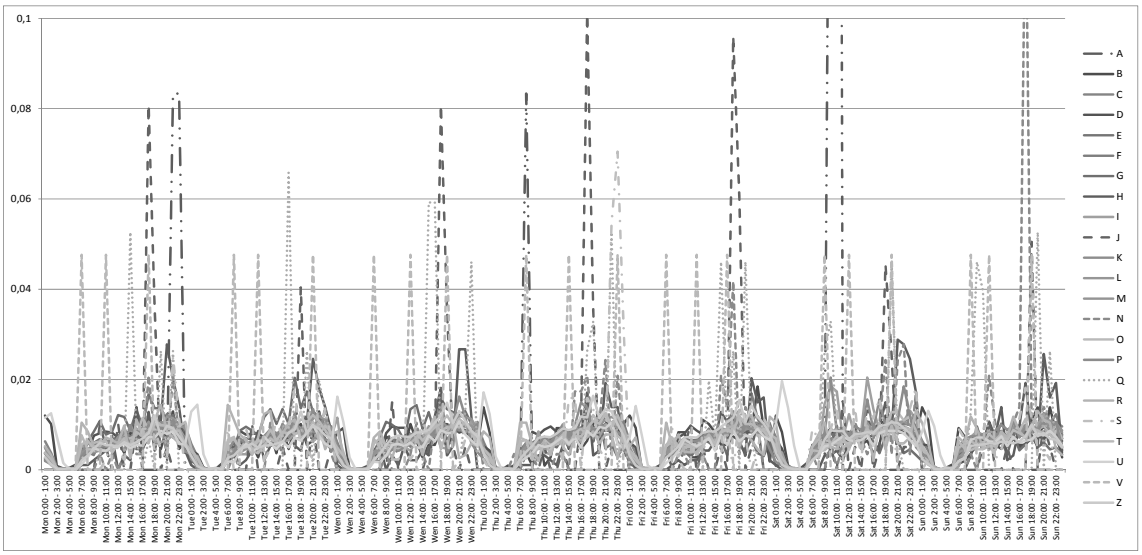
The cosine of the angle between two vectors determines whether two vectors are roughly pointing in the same direction. Thus the cosine of the angle is a measure of similarity between vectors. Computed similarity ranges from −1 meaning exactly the opposite, to 1 meaning exactly the same, with 0 usually indicating independence, and in-between values indicating intermediate similarity or dissimilarity. The cosine angle between 0 and 1 means the vectors are related in some way (Garcia, 2006). Cosine similarity has been widely used in a high-dimensional data analysis such (Yang, 1994). The analysis was conducted using Rapidminer software which is an open-source tool for data-mining (Mierswa et al, 2006).

Results

The distribution of commercials in time is shown on Figure 1. It represents the commercials aired (from different industries) across the days and hours in the week. The patterns on Figure 1 supports

the hypothesis that commercials from different industries might be broadcasted in dissimilar time schedules throughout the week.

Fig. 1: Distribution of Commercials Broadcast in Time



Source: own

The data were then transformed into the contingency table where the rows represent each hour of the week and the columns represent a share of commercials from a given industry. The sum of each row equals 100 %, representing all commercials aired in a given hour of the week. First, the vectors (the rows in the contingency table) were based on the first level of industry categories to show the global overview of the data set. The analysis was repeated with vectors representing the second (see Table 4) and third levels of the industry hierarchy.

Tab. 4: Second Level Industry Groups

	SECTION C - FOODS, DRINKS	E13	Rubber and plastic products
C1	Drinks	E14	Machines and devices
C2	Food products	E15	Tobacco products and related equipment
	SECTION E - OTHER PROCESSING INDUSTRY	E16	Elementary metals, metallurgic treatment of metals; foundry industry
E1	Electrical devices		**SECTION L - INFORMATION AND COMMUNICATION ACTIVITIES**
E2	Pharmaceutical products	L1	Activities in the area of information technologies
E3	Chemical materials and products	L2	Films and video-records, audio-records and music publishing activities
E4	Lignite coke and refined oil products	L3	Information activities, Internet
E5	Metallic constructions and metalworking products, except machines and mechanisms	L4	Telecommunication activities
E6	Motor-powered vehicles (except motorcycles), caravans and trailers	L5	Television, radio programs and broadcasting
E7	Furniture	L6	Publishing activities
E8	Non metallic mineral products		**SECTION M - FINANCE AND INSURANCE BUSINESS**
E9	Other forms of transport and vehicles	M1	Financial agencies, except insurance and retirement financing
E10	Other products	M2	Other financial activities
E11	Paper and paper products	M3	Insurance, security and retirement financing, except compulsory social insurance
E12	Computers, electronic and optical instruments and devices		

Source: (11)

The output table was 168×168 cells large and there was a clear pattern (as shown in Table 5) repeated for every day of the week. Since such a large table is difficult to display, we decided to merge data from 168 values (hours of the week) with 24 values (the hours of all the days merged). The output is in Table 5.

Tab. 5: Cosine Similarity of Industry Distributions among the Hours of the Day

	<0:00 - 1:00)	<1:00 - 2:00)	<2:00 - 3:00)	<3:00 - 4:00)	<4:00 - 5:00)	<5:00 - 6:00)	<6:00 - 7:00)	<7:00 - 8:00)	<8:00 - 9:00)	<9:00 - 10:00)	<10:00 - 11:00)	<11:00 - 12:00)	<12:00 - 13:00)	<13:00 - 14:00)	<14:00 - 15:00)	<15:00 - 16:00)	<16:00 - 17:00)	<17:00 - 18:00)	<18:00 - 19:00)	<19:00 - 20:00)	<20:00 - 21:00)	<21:00 - 22:00)	<22:00 - 23:00)	<23:00 - 0:00)
<0:00 - 1:00)		0.99	0.94	0.76	0.48	0.59	0.84	0.83	0.86	0.87	0.87	0.86	0.86	0.87	0.87	0.87	0.88	0.89	0.90	0.91	0.92	0.94	0.96	0.97
<1:00 - 2:00)	0.99		0.95	0.78	0.51	0.60	0.80	0.79	0.82	0.83	0.83	0.82	0.82	0.82	0.83	0.82	0.84	0.84	0.86	0.88	0.88	0.90	0.93	0.95
<2:00 - 3:00)	0.94	0.95		0.89	0.71	0.76	0.78	0.77	0.80	0.80	0.80	0.80	0.79	0.79	0.80	0.79	0.80	0.81	0.83	0.84	0.84	0.85	0.88	0.89
<3:00 - 4:00)	0.76	0.78	0.89		0.88	0.76	0.58	0.57	0.59	0.58	0.57	0.56	0.55	0.56	0.56	0.56	0.57	0.59	0.61	0.63	0.64	0.65	0.68	0.70
<4:00 - 5:00)	0.48	0.51	0.71	0.88		0.74	0.34	0.34	0.36	0.35	0.34	0.33	0.32	0.32	0.33	0.32	0.34	0.35	0.37	0.38	0.38	0.39	0.42	0.43
<5:00 - 6:00)	0.59	0.60	0.76	0.76	0.74		0.63	0.63	0.63	0.63	0.61	0.61	0.60	0.59	0.60	0.59	0.60	0.60	0.61	0.62	0.60	0.60	0.60	0.60
<6:00 - 7:00)	0.84	0.80	0.78	0.58	0.34	0.63		0.99	0.99	0.98	0.98	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.94	0.93	0.92	0.91
<7:00 - 8:00)	0.83	0.79	0.77	0.57	0.34	0.63	0.99		0.98	0.97	0.97	0.96	0.96	0.96	0.97	0.96	0.96	0.96	0.97	0.96	0.93	0.92	0.90	0.89
<8:00 - 9:00)	0.86	0.82	0.80	0.59	0.36	0.63	0.99	0.98		1.00	1.00	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.97	0.96	0.94	0.93
<9:00 - 10:00)	0.87	0.83	0.80	0.58	0.35	0.63	0.98	0.97	1.00		1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99	0.99	0.99	0.97	0.97	0.95	0.94
<10:00 - 11:00)	0.87	0.83	0.80	0.57	0.34	0.61	0.98	0.97	1.00	1.00		1.00	1.00	1.00	1.00	0.99	1.00	0.99	0.99	0.99	0.97	0.96	0.95	0.94
<11:00 - 12:00)	0.86	0.82	0.80	0.56	0.33	0.61	0.97	0.96	0.99	1.00	1.00		1.00	1.00	1.00	0.99	0.99	0.99	0.98	0.98	0.97	0.96	0.94	0.93
<12:00 - 13:00)	0.86	0.82	0.79	0.55	0.32	0.60	0.97	0.96	0.99	1.00	1.00	1.00		1.00	1.00	1.00	1.00	0.99	0.99	0.99	0.97	0.97	0.95	0.94
<13:00 - 14:00)	0.87	0.82	0.79	0.56	0.32	0.59	0.97	0.96	0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00	0.99	0.99	0.99	0.98	0.97	0.95	0.94
<14:00 - 15:00)	0.87	0.83	0.80	0.56	0.33	0.60	0.97	0.97	0.99	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	0.99	0.99	0.97	0.97	0.95	0.94
<15:00 - 16:00)	0.87	0.82	0.79	0.56	0.32	0.59	0.97	0.96	0.99	0.99	0.99	0.99	1.00	1.00	1.00		1.00	1.00	0.99	0.99	0.98	0.98	0.96	0.95
<16:00 - 17:00)	0.88	0.84	0.80	0.57	0.34	0.60	0.97	0.96	0.99	0.99	1.00	0.99	1.00	1.00	1.00	1.00		1.00	0.99	0.99	0.98	0.98	0.96	0.95
<17:00 - 18:00)	0.89	0.84	0.81	0.59	0.35	0.60	0.97	0.96	0.99	0.99	0.99	0.99	0.99	0.99	0.99	1.00	1.00		1.00	0.99	0.99	0.99	0.97	0.96
<18:00 - 19:00)	0.90	0.86	0.83	0.61	0.37	0.61	0.97	0.97	0.99	0.99	0.99	0.98	0.99	0.99	0.99	0.99	0.99	1.00		1.00	0.99	0.98	0.97	0.96
<19:00 - 20:00)	0.91	0.88	0.84	0.63	0.38	0.62	0.97	0.96	0.99	0.99	0.99	0.98	0.99	0.99	0.99	0.99	0.99	0.99	1.00		1.00	0.99	0.98	0.98
<20:00 - 21:00)	0.92	0.88	0.84	0.64	0.38	0.60	0.94	0.93	0.97	0.97	0.97	0.97	0.97	0.98	0.97	0.98	0.98	0.99	0.99	1.00		1.00	0.99	0.98
<21:00 - 22:00)	0.94	0.90	0.85	0.65	0.39	0.60	0.93	0.92	0.96	0.97	0.96	0.96	0.97	0.97	0.97	0.98	0.98	0.99	0.98	0.99	1.00		1.00	0.99
<22:00 - 23:00)	0.96	0.93	0.88	0.68	0.42	0.60	0.92	0.90	0.94	0.95	0.95	0.94	0.95	0.95	0.95	0.96	0.96	0.97	0.97	0.98	0.99	1.00		1.00
<23:00 - 0:00)	0.97	0.95	0.89	0.70	0.43	0.60	0.91	0.89	0.93	0.94	0.94	0.93	0.94	0.94	0.94	0.95	0.95	0.96	0.96	0.98	0.98	0.99	1.00	

Source: own

In the early morning, there is a block of very industry-specific commercials. As the day continues, the commercials also change (although the follow-up hours are always similar). The evening hours are then similar to the morning time. Still, most values of the cosine similarity are quite high which means there are only minor differences between the distributions of commercials among industries throughout the day. The most variable time of the day is the early morning (3–6 a.m.). The morning and afternoon are surprisingly similar with almost no difference in the distribution of commercials. The commercials then differ again in the late afternoon and evening. To determine which industries drive the changes in the distribution of commercials during the day, we conducted the subsequent analysis.

The contingency table has been transposed with the week divided into days and hours completing a vector 168 numbers (hours) long. Letters (now the rows in the contingency table) represent industry groups (see Table 1). Cosine similarity of advertisement distribution throughout the week was measured according to these main industry groups. The results are shown in Table 6.

Tab. 6: Cosine Similarity of Industry Groups Time Distribution

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	Z
A		0.13	0.14	0.15	0.14	0.12	0.15	0.08	0.27	0.01	0.16	0.12	0.13	0.04	0.14	0.19	0.10	0.10	0.16	0.12	0.11	0.03	0.15
B	0.13		0.92	0.89	0.90	0.88	0.81	0.71	0.87	0.39	0.88	0.90	0.90	0.48	0.87	0.85	0.43	0.86	0.60	0.90	0.88	0.30	0.87
C	0.14	0.92		0.96	0.98	0.98	0.88	0.81	0.95	0.42	0.98	0.99	0.99	0.55	0.97	0.94	0.47	0.90	0.70	0.98	0.88	0.34	0.96
D	0.15	0.89	0.96		0.97	0.95	0.90	0.75	0.92	0.45	0.96	0.95	0.96	0.50	0.94	0.93	0.44	0.88	0.65	0.96	0.86	0.34	0.96
E	0.14	0.90	0.98	0.97		0.97	0.92	0.78	0.94	0.44	0.99	0.97	0.99	0.55	0.97	0.95	0.47	0.92	0.68	0.98	0.84	0.37	0.96
F	0.12	0.88	0.98	0.95	0.97		0.88	0.84	0.93	0.42	0.97	0.98	0.99	0.57	0.96	0.94	0.45	0.88	0.68	0.97	0.83	0.33	0.96
G	0.15	0.81	0.88	0.90	0.92	0.88		0.71	0.83	0.48	0.91	0.90	0.92	0.48	0.88	0.87	0.43	0.84	0.57	0.91	0.76	0.34	0.88
H	0.08	0.71	0.81	0.75	0.78	0.84	0.71		0.77	0.40	0.80	0.85	0.82	0.62	0.82	0.83	0.38	0.66	0.58	0.80	0.67	0.26	0.80
I	0.27	0.87	0.95	0.92	0.94	0.93	0.83	0.77		0.41	0.95	0.94	0.94	0.52	0.92	0.93	0.48	0.86	0.68	0.93	0.82	0.34	0.92
J	0.01	0.39	0.42	0.45	0.44	0.42	0.48	0.40	0.41		0.44	0.46	0.44	0.36	0.43	0.45	0.22	0.36	0.31	0.46	0.37	0.24	0.51
K	0.16	0.88	0.98	0.96	0.99	0.97	0.91	0.80	0.95	0.44		0.97	0.99	0.57	0.97	0.95	0.49	0.91	0.68	0.98	0.82	0.36	0.96
L	0.12	0.90	0.99	0.95	0.97	0.98	0.90	0.85	0.94	0.46	0.97		0.99	0.58	0.97	0.95	0.49	0.89	0.70	0.98	0.85	0.32	0.96
M	0.13	0.90	0.99	0.96	0.99	0.99	0.92	0.82	0.94	0.44	0.99	0.99		0.57	0.97	0.95	0.48	0.90	0.70	0.98	0.84	0.34	0.96
N	0.04	0.48	0.55	0.50	0.55	0.57	0.48	0.62	0.52	0.36	0.57	0.58	0.57		0.58	0.57	0.27	0.46	0.45	0.54	0.45	0.15	0.55
O	0.14	0.87	0.97	0.94	0.97	0.96	0.88	0.82	0.92	0.43	0.97	0.97	0.97	0.58		0.93	0.47	0.90	0.70	0.98	0.82	0.36	0.96
P	0.19	0.85	0.94	0.93	0.95	0.94	0.87	0.83	0.93	0.45	0.95	0.95	0.95	0.57	0.93		0.46	0.85	0.64	0.94	0.81	0.32	0.94
Q	0.10	0.43	0.47	0.44	0.47	0.45	0.43	0.38	0.48	0.22	0.49	0.49	0.48	0.27	0.47	0.46		0.46	0.40	0.47	0.40	0.11	0.48
R	0.10	0.86	0.90	0.88	0.92	0.88	0.84	0.66	0.86	0.36	0.91	0.89	0.90	0.46	0.90	0.85	0.46		0.60	0.92	0.81	0.39	0.85
S	0.16	0.60	0.70	0.65	0.68	0.68	0.57	0.58	0.68	0.31	0.68	0.70	0.70	0.45	0.70	0.64	0.40	0.60		0.67	0.54	0.31	0.68
T	0.12	0.90	0.98	0.96	0.98	0.97	0.91	0.80	0.93	0.46	0.98	0.98	0.98	0.54	0.98	0.94	0.47	0.92	0.67		0.85	0.38	0.97
U	0.11	0.88	0.88	0.86	0.84	0.83	0.76	0.67	0.82	0.37	0.82	0.85	0.84	0.45	0.82	0.81	0.40	0.81	0.54	0.85		0.27	0.82
V	0.03	0.30	0.34	0.34	0.37	0.33	0.34	0.26	0.34	0.24	0.36	0.32	0.34	0.15	0.36	0.32	0.11	0.39	0.31	0.38	0.27		0.35
Z	0.15	0.87	0.96	0.96	0.96	0.96	0.88	0.80	0.92	0.51	0.96	0.96	0.96	0.55	0.96	0.94	0.48	0.85	0.68	0.97	0.82	0.35	

Source: own

Substantial differences in advertisement broadcasting schemes are present in industries A, J, N, Q, S and V (those industries are also highlighted by a different line style in Figure 1). However these industries represent only 0.07% of all commercials aired so therefore no conclusion can be made about the advertising market as a whole. The largest advertisement industries (C, E, L and M which represent almost 90% of all ads aired) are almost identically distributed in the times of the week (lowest cosine similarity is 0.97).

For a deeper insight, the data from the main industries C, E, L, and M were repeatedly analyzed. An analysis was conducted again through the second level industry groups (Table 4) and the results are shown in Table 7. The main differences in distribution in the time of the week are in categories E9, E11, E14, E15 and E16. However, these five highly differentiated categories represent less than 4% of all commercials aired (within groups C, E, L, M).

Tab. 7: Cosine Similarity of Industry Groups (C, E, L, M, second level of industry tree) Time Distribution

	C1	C2	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16	L1	L2	L3	L4	L5	L6	M1	M2	M3
C1		0.88	0.90	0.88	0.88	0.80	0.88	0.94	0.80	0.81	0.37	0.62	0.39	0.89	0.92	0.37	0.13	0.15	0.64	0.76	0.93	0.93	0.93	0.90	0.92	0.86	0.90
C2	0.88		0.98	0.99	0.99	0.89	0.98	0.98	0.94	0.87	0.39	0.84	0.34	0.98	0.94	0.47	0.22	0.13	0.67	0.92	0.98	0.94	0.94	0.96	0.99	0.80	0.98
E1	0.90	0.98		0.99	0.98	0.87	0.98	0.98	0.94	0.85	0.37	0.81	0.35	0.99	0.95	0.47	0.29	0.15	0.67	0.90	0.98	0.94	0.94	0.95	0.98	0.80	0.98
E2	0.88	0.99	0.99		1.00	0.88	0.99	0.98	0.95	0.86	0.39	0.82	0.35	0.99	0.94	0.48	0.23	0.15	0.69	0.92	0.98	0.94	0.94	0.96	0.99	0.79	0.99
E3	0.88	0.99	0.98	1.00		0.87	0.99	0.98	0.95	0.86	0.40	0.82	0.33	0.99	0.95	0.47	0.23	0.14	0.69	0.92	0.98	0.94	0.94	0.95	0.99	0.79	0.99
E4	0.80	0.89	0.87	0.88	0.87		0.88	0.90	0.84	0.92	0.40	0.73	0.34	0.87	0.87	0.40	0.16	0.10	0.60	0.82	0.87	0.88	0.87	0.85	0.89	0.77	0.88
E5	0.88	0.98	0.98	0.99	0.99	0.88		0.98	0.94	0.87	0.38	0.80	0.33	0.98	0.94	0.46	0.22	0.14	0.66	0.92	0.97	0.95	0.94	0.95	0.99	0.81	0.98
E6	0.94	0.98	0.98	0.98	0.98	0.90	0.98		0.93	0.89	0.38	0.77	0.40	0.97	0.96	0.44	0.19	0.17	0.66	0.88	0.99	0.97	0.97	0.97	0.99	0.84	0.99
E7	0.80	0.94	0.94	0.95	0.95	0.84	0.94	0.93		0.81	0.34	0.79	0.32	0.94	0.89	0.52	0.23	0.12	0.65	0.87	0.93	0.87	0.87	0.91	0.93	0.74	0.94
E8	0.81	0.87	0.85	0.86	0.86	0.92	0.87	0.89	0.81		0.40	0.66	0.41	0.85	0.84	0.39	0.17	0.16	0.57	0.79	0.85	0.87	0.86	0.83	0.87	0.77	0.85
E9	0.37	0.39	0.37	0.39	0.40	0.40	0.38	0.38	0.34	0.40		0.29	0.02	0.39	0.35	0.13	0.11	0.00	0.33	0.42	0.38	0.38	0.34	0.33	0.39	0.33	0.36
E10	0.62	0.84	0.81	0.82	0.82	0.73	0.80	0.77	0.79	0.66	0.29		0.12	0.82	0.73	0.40	0.24	0.05	0.63	0.83	0.81	0.67	0.69	0.75	0.78	0.54	0.81
E11	0.39	0.34	0.35	0.35	0.33	0.34	0.33	0.40	0.32	0.41	0.02	0.12		0.34	0.37	0.15	0.00	0.35	0.14	0.21	0.36	0.45	0.44	0.44	0.38	0.41	0.37
E12	0.89	0.98	0.99	0.99	0.99	0.87	0.98	0.97	0.94	0.85	0.39	0.82	0.34		0.95	0.48	0.29	0.14	0.69	0.91	0.98	0.93	0.93	0.94	0.98	0.78	0.97
E13	0.92	0.94	0.95	0.94	0.95	0.87	0.94	0.96	0.89	0.84	0.35	0.73	0.37	0.95		0.43	0.20	0.14	0.64	0.85	0.96	0.93	0.92	0.92	0.96	0.83	0.94
E14	0.37	0.47	0.47	0.48	0.47	0.40	0.46	0.44	0.52	0.39	0.13	0.40	0.15	0.48	0.43		0.19	0.00	0.39	0.48	0.46	0.41	0.39	0.49	0.45	0.34	0.46
E15	0.13	0.22	0.29	0.23	0.23	0.16	0.22	0.19	0.23	0.17	0.11	0.24	0.00	0.29	0.20	0.19		0.00	0.20	0.29	0.19	0.13	0.14	0.16	0.19	0.06	0.21
E16	0.15	0.13	0.15	0.15	0.14	0.10	0.14	0.17	0.12	0.16	0.00	0.05	0.35	0.14	0.14	0.00	0.00		0.04	0.09	0.16	0.19	0.19	0.19	0.16	0.16	0.17
L1	0.64	0.67	0.67	0.69	0.69	0.60	0.66	0.66	0.65	0.57	0.33	0.63	0.14	0.69	0.64	0.39	0.20	0.04		0.70	0.71	0.59	0.61	0.62	0.65	0.52	0.66
L2	0.76	0.92	0.90	0.92	0.92	0.82	0.92	0.88	0.87	0.79	0.42	0.83	0.21	0.91	0.85	0.48	0.29	0.09	0.70		0.89	0.85	0.83	0.85	0.90	0.68	0.89
L3	0.93	0.98	0.98	0.98	0.98	0.87	0.97	0.99	0.93	0.85	0.38	0.81	0.36	0.98	0.96	0.46	0.19	0.16	0.71	0.89		0.94	0.95	0.96	0.98	0.81	0.98
L4	0.93	0.94	0.94	0.94	0.94	0.88	0.95	0.97	0.87	0.87	0.38	0.67	0.45	0.93	0.93	0.41	0.13	0.19	0.59	0.85	0.94		0.97	0.95	0.98	0.86	0.95
L5	0.93	0.94	0.94	0.94	0.94	0.87	0.94	0.97	0.87	0.86	0.34	0.69	0.44	0.93	0.92	0.39	0.14	0.19	0.61	0.83	0.95	0.97		0.95	0.97	0.84	0.95
L6	0.90	0.96	0.95	0.96	0.95	0.85	0.95	0.97	0.91	0.83	0.33	0.75	0.44	0.94	0.92	0.49	0.16	0.19	0.62	0.85	0.96	0.95	0.95		0.97	0.82	0.96
M1	0.92	0.99	0.98	0.99	0.99	0.89	0.99	0.99	0.93	0.87	0.39	0.78	0.38	0.98	0.96	0.45	0.19	0.16	0.65	0.90	0.98	0.98	0.97	0.97		0.84	0.99
M2	0.86	0.80	0.80	0.79	0.79	0.77	0.81	0.84	0.74	0.77	0.33	0.54	0.41	0.78	0.83	0.34	0.06	0.16	0.52	0.68	0.81	0.86	0.84	0.82	0.84		0.81
M3	0.90	0.98	0.98	0.99	0.99	0.88	0.98	0.99	0.94	0.85	0.36	0.81	0.37	0.97	0.94	0.46	0.21	0.17	0.66	0.89	0.98	0.95	0.95	0.96	0.99	0.81	

Source: own

On the other hand, sub-industries E10, L5, C1, E1, E3, E2 and E6, which represent over 50% of all ads aired (within groups C, E, L and M), are very similar. This result further supports the previous findings that targeting TV commercials based on particular viewing segments is not used.

The third level of industries hierarchy has been also analyzed. As there are 79 categories at the third level, Table 8 displays only the groups representing more than 0.1% of commercials aired (within groups C, E, L, M).

Tab. 8: Cosine Similarity of Industry Groups (C, E, L, M, third level or industry tree) Time Distribution

	C11	C21	C22	C23	C24	C25	C26	C29	E22	E24	E31	E42	E43	E44	E45	E51	E62	E72	E81	E94	E111	E114	E115	E116	E133	E135	E137	E143	L21	L22	L31	L41	L51	L52	L62	L63	M11	M12	M31	M32
C11		0.41	0.80	0.52	0.71	0.74	0.67	0.77	0.63	0.57	0.77	0.76	0.82	0.73	0.62	0.51	0.74	0.88	0.53	0.67	0.32	0.62	0.59	0.50	0.68	0.86	0.35	0.83	0.55	0.58	0.84	0.77	0.69	0.66	0.75	0.85	0.64	0.78	0.66	0.80
C21	0.41		0.45	0.35	0.44	0.43	0.43	0.43	0.42	0.48	0.48	0.45	0.47	0.48	0.41	0.49	0.48	0.47	0.74	0.45	0.25	0.42	0.50	0.38	0.43	0.38	0.33	0.42	0.40	0.54	0.48	0.42	0.41	0.42	0.57	0.40	0.44	0.45	0.40	0.54
C22	0.80	0.45		0.64	0.87	0.92	0.88	0.90	0.85	0.44	0.89	0.92	0.88	0.89	0.88	0.36	0.87	0.89	0.40	0.78	0.42	0.85	0.39	0.35	0.88	0.88	0.21	0.85	0.60	0.32	0.68	0.90	0.62	0.39	0.61	0.80	0.85	0.91	0.74	0.65
C23	0.52	0.35	0.64		0.78	0.75	0.74	0.75	0.68	0.32	0.76	0.76	0.69	0.72	0.72	0.27	0.72	0.70	0.32	0.59	0.41	0.74	0.25	0.25	0.75	0.67	0.14	0.62	0.47	0.20	0.52	0.70	0.43	0.26	0.49	0.64	0.68	0.75	0.69	0.50
C24	0.71	0.44	0.87	0.78		0.98	0.96	0.96	0.92	0.45	0.96	0.97	0.91	0.94	0.91	0.34	0.93	0.91	0.38	0.72	0.69	0.94	0.38	0.32	0.94	0.85	0.23	0.80	0.58	0.30	0.67	0.89	0.59	0.36	0.63	0.83	0.90	0.95	0.88	0.66
C25	0.74	0.43	0.92	0.75	0.98		0.97	0.97	0.94	0.42	0.97	0.98	0.92	0.95	0.94	0.31	0.94	0.93	0.36	0.73	0.60	0.95	0.35	0.29	0.96	0.89	0.19	0.83	0.60	0.27	0.66	0.93	0.61	0.35	0.60	0.83	0.92	0.97	0.86	0.65
C26	0.67	0.43	0.88	0.74	0.96	0.97		0.94	0.94	0.43	0.95	0.96	0.87	0.93	0.94	0.31	0.94	0.91	0.34	0.71	0.63	0.94	0.33	0.23	0.96	0.83	0.21	0.79	0.58	0.26	0.62	0.92	0.63	0.32	0.58	0.80	0.93	0.96	0.87	0.62
C29	0.77	0.43	0.90	0.75	0.96	0.97	0.94		0.91	0.46	0.97	0.98	0.91	0.94	0.89	0.33	0.94	0.93	0.39	0.71	0.60	0.92	0.42	0.32	0.94	0.90	0.25	0.84	0.62	0.34	0.69	0.89	0.59	0.39	0.64	0.85	0.91	0.96	0.89	0.67
E22	0.63	0.42	0.85	0.68	0.92	0.94	0.94	0.91		0.39	0.93	0.94	0.84	0.91	0.91	0.28	0.92	0.87	0.33	0.68	0.58	0.93	0.29	0.20	0.94	0.82	0.19	0.77	0.55	0.22	0.59	0.88	0.58	0.28	0.53	0.75	0.90	0.94	0.84	0.59
E24	0.57	0.48	0.44	0.32	0.45	0.42	0.43	0.46	0.39		0.55	0.48	0.52	0.56	0.37	0.67	0.54	0.58	0.65	0.46	0.28	0.40	0.89	0.51	0.42	0.42	0.87	0.51	0.69	0.80	0.71	0.40	0.55	0.67	0.83	0.59	0.37	0.47	0.43	0.63
E31	0.77	0.48	0.89	0.76	0.96	0.97	0.95	0.97	0.93	0.55		0.99	0.92	0.96	0.90	0.40	0.96	0.95	0.44	0.73	0.60	0.94	0.48	0.39	0.95	0.90	0.34	0.85	0.67	0.39	0.74	0.90	0.63	0.45	0.70	0.88	0.91	0.97	0.91	0.72
E42	0.76	0.45	0.92	0.76	0.97	0.98	0.96	0.98	0.94	0.48	0.99		0.93	0.96	0.92	0.34	0.96	0.94	0.39	0.72	0.58	0.96	0.41	0.33	0.97	0.92	0.27	0.85	0.65	0.33	0.70	0.92	0.61	0.39	0.64	0.86	0.92	0.98	0.90	0.68
E43	0.82	0.47	0.88	0.69	0.91	0.92	0.87	0.91	0.84	0.52	0.92	0.93		0.91	0.85	0.43	0.88	0.91	0.44	0.72	0.47	0.86	0.49	0.46	0.88	0.87	0.29	0.84	0.63	0.42	0.71	0.88	0.63	0.47	0.70	0.83	0.82	0.92	0.79	0.70
E44	0.73	0.48	0.89	0.72	0.94	0.95	0.93	0.94	0.91	0.56	0.96	0.96	0.91		0.91	0.37	0.94	0.91	0.40	0.72	0.56	0.92	0.49	0.41	0.93	0.87	0.40	0.82	0.68	0.37	0.68	0.90	0.60	0.40	0.65	0.84	0.87	0.95	0.83	0.66
E45	0.62	0.41	0.88	0.72	0.91	0.94	0.94	0.89	0.91	0.37	0.90	0.92	0.85	0.91		0.28	0.90	0.86	0.32	0.71	0.47	0.93	0.29	0.21	0.94	0.80	0.16	0.77	0.59	0.21	0.57	0.91	0.60	0.29	0.53	0.72	0.85	0.93	0.73	0.58
E51	0.51	0.49	0.36	0.27	0.34	0.31	0.31	0.33	0.28	0.67	0.40	0.34	0.43	0.37	0.28		0.44	0.49	0.80	0.47	0.23	0.28	0.62	0.40	0.33	0.30	0.51	0.44	0.58	0.79	0.74	0.30	0.48	0.82	0.77	0.46	0.29	0.38	0.29	0.72
E62	0.74	0.48	0.87	0.72	0.93	0.94	0.94	0.94	0.92	0.54	0.96	0.96	0.88	0.94	0.90	0.44		0.93	0.48	0.71	0.56	0.92	0.48	0.28	0.94	0.84	0.33	0.80	0.71	0.45	0.73	0.89	0.64	0.49	0.70	0.86	0.89	0.96	0.85	0.73
E72	0.88	0.47	0.89	0.70	0.91	0.93	0.91	0.93	0.87	0.58	0.95	0.94	0.91	0.91	0.86	0.49	0.93		0.50	0.75	0.51	0.88	0.50	0.39	0.91	0.90	0.33	0.87	0.64	0.47	0.84	0.92	0.74	0.57	0.74	0.88	0.86	0.96	0.83	0.82
E81	0.53	0.74	0.40	0.32	0.38	0.36	0.34	0.39	0.33	0.65	0.44	0.39	0.44	0.40	0.32	0.80	0.48	0.50		0.47	0.24	0.35	0.65	0.49	0.37	0.34	0.41	0.39	0.54	0.83	0.68	0.33	0.55	0.76	0.78	0.50	0.34	0.41	0.35	0.74
E94	0.67	0.45	0.78	0.59	0.72	0.73	0.71	0.71	0.68	0.46	0.73	0.72	0.72	0.72	0.71	0.47	0.71	0.75	0.47		0.38	0.67	0.40	0.31	0.69	0.68	0.24	0.78	0.50	0.38	0.69	0.72	0.56	0.42	0.62	0.66	0.69	0.74	0.58	0.59
E111	0.32	0.25	0.42	0.41	0.69	0.60	0.63	0.60	0.58	0.28	0.60	0.58	0.47	0.56	0.47	0.23	0.56	0.51	0.24	0.38		0.58	0.25	0.13	0.52	0.46	0.17	0.40	0.36	0.19	0.40	0.42	0.25	0.20	0.38	0.53	0.61	0.54	0.71	0.39
E114	0.62	0.42	0.85	0.74	0.94	0.95	0.94	0.92	0.93	0.40	0.94	0.96	0.86	0.92	0.93	0.28	0.92	0.88	0.35	0.67	0.58		0.31	0.23	0.96	0.83	0.18	0.76	0.60	0.23	0.61	0.86	0.54	0.30	0.56	0.77	0.89	0.94	0.85	0.61
E115	0.59	0.50	0.39	0.25	0.38	0.35	0.33	0.42	0.29	0.89	0.48	0.41	0.49	0.49	0.29	0.62	0.48	0.50	0.65	0.40	0.25	0.31		0.62	0.33	0.37	0.84	0.45	0.71	0.86	0.65	0.31	0.49	0.71	0.81	0.59	0.28	0.38	0.36	0.63
E116	0.50	0.38	0.35	0.25	0.32	0.29	0.23	0.32	0.20	0.51	0.39	0.33	0.46	0.41	0.21	0.40	0.28	0.39	0.49	0.31	0.13	0.23	0.62		0.24	0.35	0.46	0.36	0.44	0.53	0.49	0.23	0.27	0.52	0.54	0.43	0.20	0.28	0.29	0.52
E133	0.68	0.43	0.88	0.75	0.94	0.96	0.96	0.94	0.94	0.42	0.95	0.97	0.88	0.93	0.94	0.33	0.94	0.91	0.37	0.69	0.52	0.96	0.33	0.24		0.86	0.20	0.81	0.61	0.26	0.64	0.91	0.60	0.33	0.58	0.80	0.92	0.97	0.85	0.64
E135	0.86	0.38	0.88	0.67	0.85	0.89	0.83	0.90	0.82	0.42	0.90	0.92	0.87	0.87	0.80	0.30	0.84	0.90	0.34	0.68	0.46	0.83	0.37	0.35	0.86		0.20	0.90	0.56	0.28	0.70	0.85	0.57	0.37	0.56	0.85	0.79	0.90	0.82	0.63
E137	0.35	0.33	0.21	0.14	0.23	0.19	0.21	0.25	0.19	0.87	0.34	0.27	0.29	0.40	0.16	0.51	0.33	0.33	0.41	0.24	0.17	0.18	0.84	0.46	0.20	0.20		0.30	0.58	0.66	0.49	0.18	0.29	0.51	0.59	0.38	0.15	0.24	0.25	0.42
E143	0.83	0.42	0.85	0.62	0.80	0.83	0.79	0.84	0.77	0.51	0.85	0.85	0.84	0.82	0.77	0.44	0.80	0.87	0.39	0.78	0.40	0.76	0.45	0.36	0.81	0.90	0.30		0.59	0.37	0.74	0.82	0.58	0.43	0.64	0.78	0.75	0.86	0.72	0.65
L21	0.55	0.40	0.60	0.47	0.58	0.60	0.58	0.62	0.55	0.69	0.67	0.65	0.63	0.68	0.59	0.58	0.71	0.64	0.54	0.50	0.36	0.60	0.71	0.44	0.61	0.56	0.58	0.59		0.66	0.65	0.51	0.44	0.63	0.72	0.66	0.52	0.61	0.53	0.65
L22	0.58	0.54	0.32	0.20	0.30	0.27	0.26	0.34	0.22	0.80	0.39	0.33	0.42	0.37	0.21	0.79	0.45	0.47	0.83	0.38	0.19	0.23	0.86	0.53	0.26	0.28	0.66	0.37	0.66		0.70	0.25	0.51	0.89	0.86	0.54	0.25	0.34	0.29	0.75
L31	0.84	0.48	0.68	0.52	0.67	0.66	0.62	0.69	0.59	0.71	0.74	0.70	0.71	0.68	0.57	0.74	0.73	0.84	0.68	0.69	0.40	0.61	0.65	0.49	0.64	0.70	0.49	0.74	0.65	0.70		0.63	0.64	0.82	0.83	0.76	0.60	0.70	0.63	0.91
L41	0.77	0.42	0.90	0.70	0.89	0.93	0.92	0.89	0.88	0.40	0.90	0.92	0.88	0.90	0.91	0.30	0.89	0.92	0.33	0.72	0.42	0.86	0.31	0.23	0.91	0.85	0.18	0.82	0.51	0.25	0.63		0.71	0.34	0.57	0.78	0.86	0.96	0.75	0.62
L51	0.69	0.41	0.62	0.43	0.59	0.61	0.63	0.59	0.58	0.55	0.63	0.61	0.63	0.60	0.60	0.48	0.64	0.74	0.55	0.56	0.25	0.54	0.49	0.27	0.60	0.57	0.29	0.58	0.44	0.51	0.64	0.71		0.56	0.67	0.62	0.59	0.68	0.51	0.67
L52	0.66	0.42	0.39	0.26	0.36	0.35	0.32	0.39	0.28	0.67	0.45	0.39	0.47	0.40	0.29	0.82	0.49	0.57	0.76	0.42	0.20	0.30	0.71	0.52	0.33	0.37	0.51	0.43	0.63	0.89	0.82	0.34	0.56		0.83	0.58	0.31	0.41	0.33	0.89
L62	0.75	0.57	0.61	0.49	0.63	0.60	0.58	0.64	0.53	0.83	0.70	0.64	0.70	0.65	0.53	0.77	0.70	0.74	0.78	0.62	0.38	0.56	0.81	0.54	0.58	0.56	0.59	0.64	0.72	0.86	0.83	0.57	0.67	0.83		0.76	0.55	0.64	0.58	0.85
L63	0.85	0.40	0.80	0.64	0.83	0.83	0.80	0.85	0.75	0.59	0.88	0.86	0.83	0.84	0.72	0.46	0.86	0.88	0.50	0.66	0.53	0.77	0.59	0.43	0.80	0.85	0.38	0.78	0.66	0.54	0.76	0.78	0.62	0.58	0.76		0.76	0.85	0.81	0.76
M11	0.64	0.44	0.85	0.68	0.90	0.92	0.93	0.91	0.90	0.37	0.91	0.92	0.82	0.87	0.85	0.29	0.89	0.86	0.34	0.69	0.61	0.89	0.28	0.20	0.92	0.79	0.15	0.75	0.52	0.25	0.60	0.86	0.59	0.31	0.55	0.76		0.92	0.87	0.60
M12	0.78	0.45	0.91	0.75	0.95	0.97	0.96	0.96	0.94	0.47	0.97	0.98	0.92	0.95	0.93	0.38	0.96	0.96	0.41	0.74	0.54	0.94	0.38	0.28	0.97	0.90	0.24	0.86	0.61	0.34	0.70	0.96	0.68	0.41	0.64	0.85	0.92		0.86	0.70
M31	0.66	0.40	0.74	0.69	0.88	0.86	0.87	0.89	0.84	0.43	0.91	0.90	0.79	0.83	0.73	0.29	0.85	0.83	0.35	0.58	0.71	0.85	0.36	0.29	0.85	0.82	0.25	0.72	0.53	0.29	0.63	0.75	0.51	0.33	0.58	0.81	0.87	0.86		0.61
M32	0.80	0.54	0.65	0.50	0.66	0.65	0.62	0.67	0.59	0.63	0.72	0.68	0.70	0.66	0.58	0.72	0.73	0.82	0.74	0.59	0.39	0.61	0.63	0.52	0.64	0.63	0.42	0.65	0.65	0.75	0.91	0.62	0.67	0.89	0.85	0.76	0.60	0.70	0.61	

Source: own

The results confirm the previous conclusion. The 20 most differentiated groups only represent 0.33% of all commercials aired (within groups C, E, L, M). On the other hand, the 10 largest groups (C11, C24, C26, C27, E31, E42, E72, L31, L41 and M12) representing almost 80% of all commercials aired (within groups C, E, L, M) are similar to each other with the lowest similarity of 0.63.

Conclusion and discussion

Television is a mass media which aims to reach large audiences. Since targeting through selection of the most suitable TV channel (being viewed by the targeted audience the most) has not been confirmed in our study we tried to discover another targeting mechanism used by companies. The research question whether there are different prime times for companies from different industries has been analyzed. It could be expected that various audiences watch TV at different times of the day/week (Kotler and Keller, 2009). Children usually watch TV on weekend mornings whereas young men stay up late at night to watch TV. Therefore, companies could use different day/week times to attract different audiences. However, this assumption has not been confirmed. Only minor groups of commercials are usually aired in specific day/week times. This is caused by the fact that such commercials are aired only a few times a week (or even a year). The main (industry) groups of commercials have not shown any significant difference in the times that the commercials are broadcasted. Such a result is somewhat surprising although it has been confirmed with previous studies from other countries (Nelson-Field and Riebe, 2011).

There may be several explanations of the results. The first reason could be that companies do not take into account different audience profiles when deciding to place a commercial. However, companies are well aware that precise audience targeting is the most effective way to (cost) efficiency (Foley and Engelberts and Wicken, 2005) and therefore to the overall competitiveness of the company. The true reason could be that there is simply too much advertising on TV and it is not possible to administer the broadcasting of so many commercials on an individual level. The number of TV channels has more than doubled in recent years (due to the digitalization of TV). Even if the amount of time dedicated for commercials is limited by law (no more than 0.5% of broadcasting time for Czech national TV company; no more than 12 minutes per hour for commercial TV companies) there are almost two million commercials aired per year (2011, Czech Republic). Therefore media companies look to sell whole packages of advertising space. This reduces the administrative load and enables to include less attractive channels or broadcasting times in the bundle. This causes a tradeoff between GRP maximization (high levels of population reach) and precise targeting and CPP minimization (Cost per Point – the cost of reaching one rating point of the targeted audience). The marketers demand a specific time on a specific TV channel to reach the targeted audience, however the account managers push hard to get the lowest CPP possible. To get lower CPP, the companies must accept less attractive times or channels with an unsuitable audience and thus their targeting is less effective. This is further influenced by the constantly accelerating pace of processes and contracts between companies and media agencies (e.g. former 3–5 year advertising tenders are now a maximum of 1–2 years).

The proliferation and fragmentation of the media has led the advertising market into a plight. Many new TV channels have emerged and more companies are willing to target their audiences through TV channels. The media market is on the edge of manageability. The pressure on low CPP and bundling the advertising space causes unreasonable ineffectiveness when targeting suitable audiences. There should be a debate initiated to adjust the media market processes to comply with corporate communication strategies and to support companies' business objectives once again.

Acknowledgment: The paper was supported by grant project of IGS VŠE v Praze F6/1/2014.

References

ABRATT, R. and COWAN, D., 1999. Client-agency perspectives of information needs for media planning. *Journal of Advertising Research* 39. pp. 37-52.

ADMOSPHERE, 2013. *Admosphere.* http://www.admosphere.cz/download/Media_News/20130118_Mediatypy%20v%20letech%202011%20a%202012%20pohledem%20Admosphere.pdf. (last accessed: July 8, 2013)

BECKER, GARY S. and MURPHY, KEVIN M., 1993. A Simple Theory of Advertising as a Good or Bad. *The Quarterly Journal of Economics, 108 (4)*, pp. 941-964.

DANAHER, PETER J. and ROSSITER, JOHN R., 2006. A comparison of the effectiveness of marketing communication channels: Perspectives from both receivers and senders. *Occasional Papers University of Auckland.*

FARRELLY, MATTHEW C., et al., et al., 2005. Evidence of a Dose—Response Relationship Between "truth" Antismoking Ads and Youth Smoking Prevalence. *American Journal of Public Health.* March 2005, pp. 425-431.

FOLEY, T., ENGELBERTS, P. and WICKEN, G., 2005. Compose: the art of channel planning. *Admap 467.*, pp. 34-37.

GARCIA, E., 2005. An Information Retrieval Tutorial on Cosine Similarity Measures, Dot Products and Term Weight Calculations. *Information Retrieval Intelligence.* 26. 10., 2006. http://www.miislita.com/information-retrieval-tutorial/cosine-similarity-tutorial.html.

IYER, GANESH, SOBERMAN, DAVID and VILLAS-BOAS, J. MIGUEL., 2005. The Targeting of Advertising. *Marketing Science, Vol. 24, No. 3.* 2005, pp. 461-476.

KOTLER, PHILIP and KELLER, KEVIN LANE., 2009. *Marketing management.* Upper Saddle River, N.J. : Pearson Prentice Hall.

MEDIAFAX, 2011. TV Nova začne nabízet reklamu v balíčcích za všechny kanály skupiny. *Mediafax.cz.* http://www.mediafax.cz/ekonomika/3306872-TV-Nova-zacne-nabizet-reklamu-v-baliccich-za-vsechny-kanaly-skupiny.

MEDIARESEARCH, 2013. Produktová segmentace. *Mediaresearch.* (Online) http://www.mediaresearch.cz/file/174/produktova-segmentace-2.xls. (last accessed: July 9, 2013)

MEDIARESEARCH, 2012. PR Admosphere: The value of advertising space in the first quarter of year decreased by 2 %. *Mediaresearch.* http://www.mediaresearch.eu/news/pr-admosphere-the-value-of-advertising-space-in-the-first-quarter-of-year-decreased-by-2.

MIERSWA, I., et al., et al., 2006. Yale: Rapid Prototyping for Complex Data Mining Tasks. *Proceedings of the 12th ACM SIGKDD international conference on Knowledge discovery and data mining*, pp. 935-940.

NAPOLI, P. M., 2011. *Audience evolution: New technologies and the transformation of media audiences.* New York : Columbia University Press.

NELSON-FIELD, K. and RIEBE, E., 2011. The impact of media fragmentation on audience targeting: An empirical generalisation approach. *Journal of Marketing Communications, Vol. 17, No. 1.*, pp. 51-67.

NOVÁK, M. and KINCL, T., 2013. Television Commercials on Czech Market: Audience Targeting or Undifferentiated Approach? In: Vision 2020: Innovation, Development Sustainability, and Economic Growth. Wien, 27.06.2013 – 28.06.2013. USA : International Business Information Management Association, pp. 1-9.

NOWAK, G. J., CAMERON, G. T. AND KRUGMAN, D. M., 1993. How local advertisers choose and use advertising media. *Journal of Advertising Research 33.* pp. 39-49.

SOBERMAN, D., 2005. The complexity of media planning today. *Brand Management 12.* pp. 420-429.

VAN DEN PUTTE, B., 2008. "What matters most in advertising campaigns? The relative effect of media expenditure and message content strategy.". *International Journal of Advertising.* 4, Vol. 28, pp. 669-690.

WEBSTER, JAMES G., 2005. Beneath the veneer of fragmentation: Television audience polarization in a multichannel world. *Journal of Communication 55.2*, pp. 366-382.

YANG, Y., 1994. Expert network: effective and efficient learning from human decisions in text categorization and retrieval. *SIGIR 94.* pp. 13-22.

YAO, SONG and MELA, CARL F., 2011. A Dynamic Model of Sponsored Search Advertising. *Marketing Science 30.,* pp. 447-468.

ZORATTI, SANDRA and GALLAGHER, LEE., 2012. *Precision Marketing: Maximizing Revenue Through Relevance.* London : Kogan Page.