

Transport and Telecommunication, 2014, volume 15, no. 3, 215–226
Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia
DOI 10.2478/ttj-2014-0019

DIGITAL ADVERTISING SYSTEM IN URBAN TRANSPORT SYSTEM OF ŽILINA TOWN

Radovan Madleňák¹, Lucia Madleňáková²

*The Faculty of Operation and Economics of Transport and Communications
University of Žilina
Univerzitná 1, 01026, Žilina, Slovakia*

¹Phone: ++421/41/5133124. E-mail: radovan.madlenak@fpedas.uniza.sk

²Phone: ++421/41/5133125. E-mail: lucia.madlenakova@fpedas.uniza.sk

The Internet and information and communication technologies (ICT) have changed everything: news, commerce, advertising, relating to others, getting information and transport too. It has changed how the people work, how they practice religion, how they date, how they spend the free time and how they travel. One of the technological innovations that are based on usage ICT in advertising space is digital signage. This article presents the results of research dedicated to investigate the relationships between customers-passengers and this new ICT technology in real environment. The results of the research stimulate the discussion about the future advertising practices in Žilina town. Based on the wide analysis of opportunities the digital signage technology in advertising practices, the presented marketing research investigates how passengers accept virtual advertising technology in urban transport system of Žilina town. Authors highlight the advantages of interactivity between digital signage technology and consumers. The conclusions of this article triggers further investigations in the area of the interactions between the digital advertising technology and passengers, and the passengers' perception and acceptance of shopping activities on the basis of advertising in digital signage medias.

Keywords: digital signage, marketing digital media, transport system, calculation, ROI

1. Introduction

Advertisement is all around us. We cannot avoid the contact. Products and services do need advertisement to increase their awareness. Marketers utilize all possible places and methods to catch customers' attention.

There is no guaranteed evidence of the first advertisement. Some specialists consider wall paintings in the caves as some sort of advertisement. We can certainly say that advertisement exists as long as the surplus production. When people started to produce more goods than they were able to consume they needed to barter them for something else. The easiest way how to capture the attention was shout the slogans loud. The Slovak word for advertisement ("reklama") has its origin in Latin. Re-clamo means shout repeatedly (Reklamu.cz, 2014). The voices of the sellers were used as the medium how to deliver the advertising content to the ears of buyers. In the noisy crowd of markets sellers needed specific vocal resonation, vocal registration and remarkable content to distinguish their offer from other sellers.

Advertisement on papyrus was used in Egypt to spread the commercial messages. Similar method was used in Pompeii and ancient Arabia especially to spread political messages. To capture wider audience, they even carved their messages on rocks and walls. In the Middle Ages the population lacked of education and there were only few scholars. Therefore sellers used signs to attract customers. Similar signs are still used nowadays although they are replaced with new types of advertisement (Mogel, 1993).

Advertisement experienced rapid development after the year 1447. It was the year when Johannes Gutenberg invented printing. Therefore sellers could spread their messages faster, easier and more efficient.

The remarkable name connected with advertisement is Théophraste Renaudot, the first French journalist. As a reaction to the poor situation with unemployment in Paris, he created message board for those who offer jobs as well as for those who were seeking for the free positions. To propagate this idea he established the first French newspaper La Gazette in 1631 (the title has its origin in Italian currency unit – gazetta) (Tungate, 2007).

Another French newspaper, La Presse, published first paid advertisement in June 1836. This lowered the price of the newspaper as part of the costs was covered with money made from advertisement. Seeing that this method appeared to be very efficient other newspaper adopted it as well (Burde, 2009).

First public radio broadcasting took place in United States of America in 1906. Even though started radio KDKA in Pittsburgh in 1920 regular broadcasting and British BBC in 1922 (Holakovsky and Rakovsky, 2014).

As the operation of radio requires money owners soon realized that sponsoring is very efficient way how to cover the costs. At the beginning each radio program has its own sponsor. This turned out to be less profitable. For that reason radio owners started to sell short time allocations during the broadcasting as commercial time. Radio started to lose influence after the Second World War with the beginning of television broadcasting. However in the 1970s with introduction of FM broadcasting listening to the radio became fancy among young generation again. New radio stations appeared and covered niche market places offering different styles of music. This brought great opportunity to advertisers to apply target marketing.

Initially radio station BBC started with television broadcasting in previous century. First reporters spoke to the viewers from Alexandra Palace in London on November 2nd 1936. Although the Second World War interrupted television broadcasting for a while after the end of the conflict television influenced population even stronger. The very first television commercial was shown on WNBT station in New York. Bulova Company advertised its watches before the baseball game on July 1st 1941 with the slogan "America runs on Bulova time" [12]. Sponsoring widely used in radio broadcasting was employed in television as well. Movies and programs were interrupted with commercial breaks. Sponsoring of the whole program was used very rarely. Impact of television advertisement rose up with the introduction of cable television. Specialized stations with commercial content were introduced to the viewers. They could order the products via phone directly to their home any time a day. This was new method how to reach the customers.

In the late 1990s the Internet boom overloaded the advertising market. New types of shops started to emerge. Traditional "stone" shops were complemented with their online versions and even pure online shops succeeded on the markets. The so called dot-com bubble reached its climate on March 10th 2000. Stocks of companies that offered their product online increased their value rapidly during this period of time. Some real benefits arose from the Internet for the marketers. Target marketing achieved new dimension.

One-on-one marketing enable communication with potential customer more effectively. Geographic distances are no longer obstruction for purchase. Customers can order products online and receive them very next day via express delivery service e.g. DHL or UPS. In comparison with traditional "stone" shops, online shops are open twenty four hours per day and seven days per week. Customers can purchase online from the comfort of their homes. Internet offers new distribution channel as well. Products such as software can be delivered online what eliminates intermediaries and lowers the price.

One of the new and perspective marketing techniques is the digital signage. It is a type of out-of-home advertising. Some companies use different names for digital signage to differentiate from others. Therefore we can come across names like narrowcasting, screen media, place-based media, digital merchandising, digital media networks and digital out-of-home or captive audience networks. Disregarding various names it is still just one product of mass marketing (Tungate, 2007). There are many possibilities where to implement digital signage. The list is not completed and places depend on the company, which is installing this type of advertisement. However, there are certain places where we come across digital signage more often.

One of the common applications of digital signage is for public information. Municipalities install interactive touch screens on the places with high visit rate. Inhabitants and tourists can easily find shops, historic monuments, sport centres or even look for free job positions. This type of digital signage considerably complements info centre and increases amount of points of contact with citizens (Madleňák and Mitrev, 2006).

Digital signage is implementing as internal information channel in companies. Employees are informed about corporate news, goals, missions, visions and internal rules via digital screens placed on frequented areas in company buildings. We can come across this type of digital signage in banks for example. Companies are promoting their own products and direct customer's attention to special offers.

Huge stores can implement digital signage to help customers find different types of products instead of traditional cardboard signs. Screens also make waiting in the lines less unpleasant. They are also successfully utilized for enhancing the environment. Now we have continuously shifted to the main application of digital signage – advertisement. Although there are many opportunities for digital signage that have not been utilized yet, advertising campaigns are the most promising and most profitable application of this marketing tool.

“Flasma” is another innovative method of digital signage implementation. The idea arises from the walls overloaded with commercial messages. Customers therefore walk with their eyes stick to the floor. And floor has not been utilized for commercial purposes enough yet. This innovative approach can be successfully used in shopping malls and pedestrian zones.

2. Analysis of the Digital Advertising Systems – Global Entertainment Media

GEM is a shortcut for Global Entertainment Media. It is a software solution, which enables its users to display different type of digital content on the screens. It is most suitable for public locations, e.g. urban mass transportation, train or bus station, airport or even shopping malls. This concept has got its origin in Slovenia. Therefore the first testing took place in Ljubljana, capital of Slovenia. GEM comprise of three main parts: server, network transport, location player and displays.

- Server is running a standard Microsoft Windows Server Operation System. It is a central point for manipulation and communication. It provides the playlists, RSS feeds, real-time content, etc for the screens. SQL database is the foundation for the web-based GEM Interactive server software used for the management of the system.
- Network transport could be wireless or fixed line. It depends on the type of the location. Network transport enables communication between server and location player. It is not necessary to have wireless connection however when the advertisers want to deliver real-time content, this type of network transport is essential (Vaculik, Kolarovszki and Tengler, 2012).
- Location player is the binding point with customers. It displays the content according to the request from the server.
- Displays have to be very tolerant to temperature and humidity, especially in public transport.

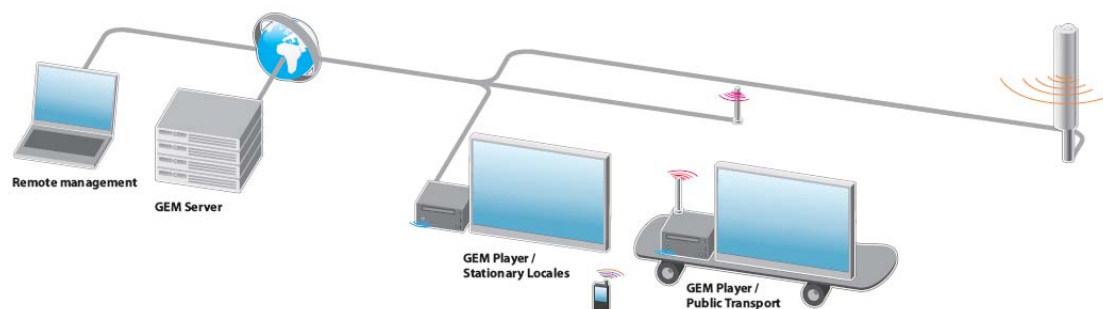


Figure 1. GEM Interactive communication

Generally GEM combines three technologies in one solution. Firstly, there is positioning, usually GPS. If you want to deliver up to date content according to the place, you need to know what your actual position is. Secondly, there is mobile telecommunication. As long as the concept is interactive, there has to be a possibility for back coupling from the users. And, finally, there is digital signage.

2.1. GEM Usage - Public transport

One of the most suitable places where to apply GEM Interactive is urban mass transportation. Anyhow all kinds of public transport are appropriate for digital signage. There are clearly several benefits for passengers. Travelling and especially commuting could be tiresome. In public transport there is no time and no place to start any kind of work. Passengers are therefore looking around for some entertainment. Advertising posters become boring very soon. Changing them every other day is very expensive and therefore impossible. Advertisers are searching for new ways of delivering the content to the customers more effectively. They discovered opportunity in using digital screens on frequented places, e.g. buses, trams or trains. They can capture broad masses of different segments of customers. It is much easier to deliver the right content to the right segment because it is predictable who is travelling on which bus line on which time.

GEM Interactive is based on two different triggers – time trigger and GPS trigger as you can see on Figure 2. GPS triggers initiate advertising content with regard to the location. As the bus enters the geographic cell of opera house for example, its computer gets information about it. As the result the commercial for new opera play appears on the digital screen. Passenger can even book the tickets via SMS.

Very efficient method how to attract customers is offering them bonuses. Shops in big malls can use GEM Interactive to offer discounts in the form of number code as a counter value for SMS. In the geographic cell of shopping mall the commercial for clothing store appears on the screen. It invites passengers to visit the store. If they send SMS with the key word on the given number they receive SMS with number code, which can be used for discount in the store (Hrudkay, 2011). Second type of trigger is based on time. In some areas where no shopping malls, no theatres and no other amusement facilities are is no need for commercials. For that reason news or weather information can be shown. Time triggers initiate the content according to expected time in timetable. However this type of trigger is not that reliable because of traffic jams, for example (Kolarovszki and Dúbravka, 2010).

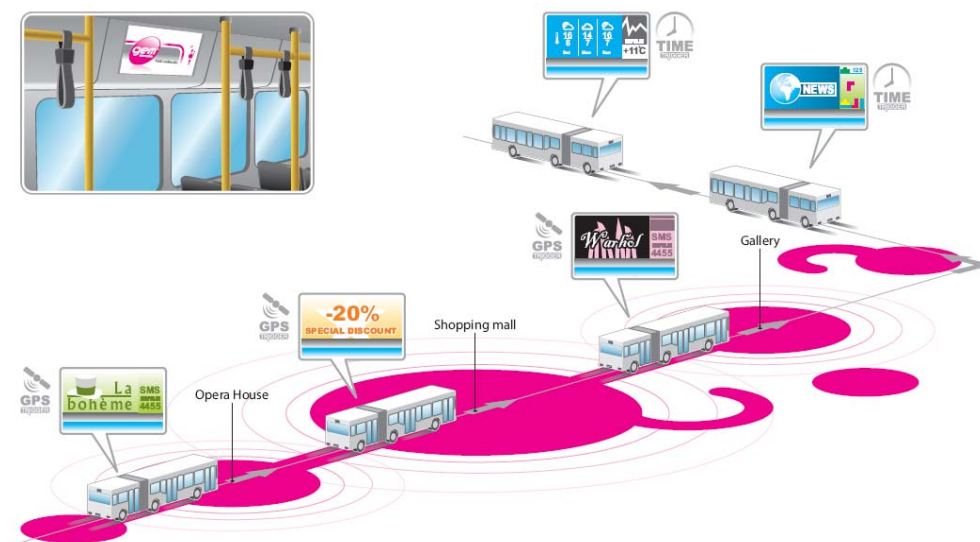


Figure 2. GEM Interactive triggers (Prumaro Interactive, 2012)

2.2. GEM usage - Stationary locations

Every frequented location or even a place where people are waiting in the line is a great opportunity where to capture customers. Digital screens are appearing on newsstands, in stores, in stations, on squares or in the airports. It is not enough to bring the content to the customers. However GEM Interactive brings new ideas. Accordingly to that it is more attractive for advertisers.



Figure 3. Examples of GEM Stationary kiosk in Ljubljana (Prumaro Interactive, 2012)

It is not necessary to bring the advertising content. Using GEM Interactive in stations and terminals can make the waiting less boring. Offering passengers pricing games, news, voting and content influence makes the travelling and commuting more interesting and it can create lifetime relationship. People tend less to switch to private transport when it is possible.

3. Methods and Methodology of Research

Nowadays companies, especially because of the complicated economic situation, consider their investment very carefully. Although marketing research cost money as well it can save much more than money when it is accomplished right (Madleňáková, 2005). Companies that do plan to implement digital media network as their marketing tool need to perform in-depth study. As digital signage is not wide spread in Slovakia and nor in Žilina we need to collect information about the awareness among residents and their interest in this advertising tool.

There are many types of marketing research process methods. They are basically the same and differ only in the number of steps. On Figure 4 we can see one of the possibilities of marketing research process.

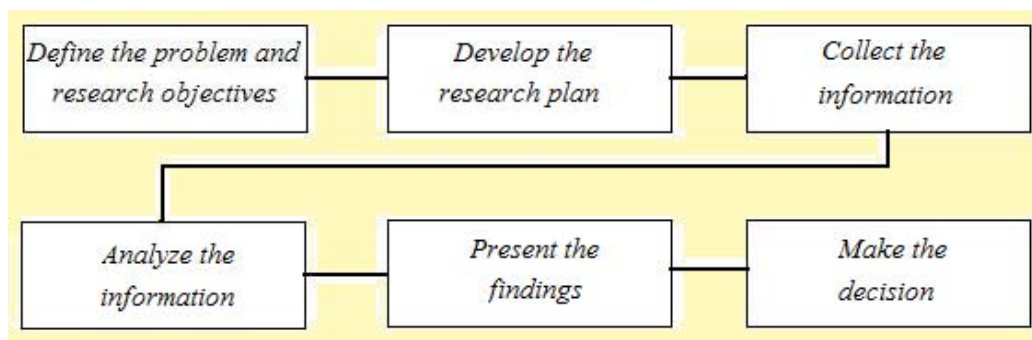


Figure 4. Marketing research process (Kotler and Armstrong, 2006)

This six steps method includes many subparts. We will go through the first five steps and will skip the last one. As this is marketing research focused on awareness of the digital signage it will not contain calculation of the digital network implementation. The last step will be skipped because it is not in our competency to make decision whether implement the system or not.

3.1. Defining the problem and researching objectives

To define the problem properly can help researchers to find the way how to solve it. Although it appears that this step is very easy, most of the failures of researches arise from bad definition of the problem. Sometimes managers set the problem too broadly and therefore get information they do not need. On the other hand problem defines too narrowly does not bring enough information to solve it (Kotler and Armstrong, 2006). As digital signage is not widely used in Slovakia and is only at the beginning of its era we will consider on *three problems*:

- Do customers use urban mass transportation lines in Žilina, which can be effectively involved in digital media network?
- Do customers know about digital signage and how do they perceive it in comparison with printed posters?
- Would passengers use the opportunities that are offered by digital signage?

We will consider on implementation of digital media network in urban mass transportation in Žilina, as GEM System is designed for public location and urban mass transportation. The testing period in Ljubljana was good success and brought a good start point for system expansion.

3.2. Developing the research plan

Researchers can utilize two types of information, primary data and secondary data. Secondary data represent information that was collected for other purposes. This type of data is available for free or for a fee. Researchers use this information usually at the beginning of the project. They try to find secondary data that will help to solve the problem at the lowest cost. However this type of data is often obsolete, incomplete and not too suitable as they were collected for other purpose. Researchers are therefore compelled to collect primary data. Primary data represent information that is collected for special reason for the first time. There exist several types how to gather primary data e.g. observation, focus groups, experiments and more (Čorejová and Imrišková, 2008).

In our research we will collect primary data. This sphere of marketing and advertising has not been investigated enough yet. Digital signage in urban mass transportation is sort of innovation in Slovakia. For the purposes of the research we will consider on two customer's segments. Segments will be divided on the basis of demographic – specifically on the age. Millennials is the so-called demographic group, which members were born between 1979 and 1994 (Strauss and Frost, 2008). This group is very promising for marketers. More than 90% members of this group use Internet and therefore we will conduct online survey. 80% members have mobile phones. These findings help us to solve two problems we have established in the first step of our research process. As Millennials is big group we will divide it in two subgroups. First subgroup Segment A – will include 18 to 24 years old people. Second group Segment B – will include 25 to 33 years old people. The questionnaire includes eleven questions. We can aggregate questions in four parts. Three parts help us to solve the problems we have determined; and the fourth part separates respondents into two subgroups according to their age.

3.3. Situation analysis

The first part of the questionnaire is oriented on the public transportation analysis. We need to know whether Millennials use urban mass transportation in Žilina and if so how often they travel. There is one question oriented on the lines, which serve areas with shopping malls as we can see on Figure 5.



Figure 5. Map of the urban mass transportation in Žilina (Valašková and Križanová, 2008)

In Žilina there are five existing shopping malls that can utilize digital media network in urban mass transportation and few shopping malls is under construction. Already existing shopping malls are OC Atrium Dubeň, ZOC MAX Žilina, TESCO Hypermarket, Aupark Žilina and OC Mirage. Aupark Žilina has a place for hundred and thirty shops. TESCO hypermarket does not include variety of different shops but it is a part of successful business chain. Line number 99 is serving the area of these shopping malls (Aupark and TESCO) for free and it is called TESCO bus. Other lines are called MAX BUS and MIRAGE BUS that serves the area of ZOC MAX and OC MIRAGE. To enable its services to more customers, owners of ZOC MAX and OC MIRAGE, supports these lines.

OC Atrium Dubeň offers seventy-four shops and services for its customers. ZOC Max offers even more – over eighty shops and services and five cinemas. This represents huge concentration of potential digital media network advertisers on one place. OC Mirage is new shopping mall situated in the centre of Žilina town. It offers ninety shops and four cinemas for its customers.

There are also future plans for other shopping malls in Žilina. One of them called multipurpose project Štadión will be completed in next five years. Not only can shopping malls exploit the opportunities of digital signage in public transport. Cultural and sports centres can display advertising for their events as well. However shopping malls represent areas with great density of shops and services in more or less small place. Therefore bus lines, which serve shopping malls areas, create great opportunity for digital media network.

3.4. Awareness of digital signage

The second part of questionnaire is dedicated to awareness of digital signage. Although people come across this type of marketing tool they often do not realize it is digital media network. Digital signage is mostly compared with printed posters as we have already mentioned in introduction section. As printed posters have been here for a long time so far it is necessary to understand whether people are ready to accept new type of advertising media. Another aspect that is investigated by these questions is interest in present advertisement in urban mass transportation. If we want to implement new type of advertising tool we need to be sure that the previous one draws enough attention. Afterwards digital signage with its target marketing and interactive content will create even greater effect.

If investors in digital signage make decision about the project they need to know whether it will have sufficient response. GEM System offers two opportunities for viewers how to interact with it. SMS field which enables displaying content created by customers e.g. greetings and interactive field which navigates viewers how to communicate with GEM System. Both services are provided by SMS communication.

3.5. Collecting the information

Survey was conducted online and was available at: <http://fped.uniza.sk/>. It was created on April 3rd 2012. To reach relevant results, we needed to collect two hundreds responses all together, one hundred for each age segment. Another specification was that respondents have to live in Žilina so they are familiar with situation in urban mass transportation.

In order to be able to accurately project the results of a survey question from the sample to the entire population of the target market, the correct sample size must be used. The correct sample size can be calculated using this formula:

$$n = \frac{z_{1-\alpha/2}^2 \times \sigma^2}{H^2} = 195 \quad (1)$$

in which:

n = Sample Size;

Z = Level of Significance (Expressed as a Z-Score);

σ = Population Standard Deviation (σ^2 = Population Variance);

H = Acceptable Amount of Sampling Error.

The respondents of the questionnaire were the representative sample of population from Žilina (we set confidence interval estimate at 95% (a probability of a sample error of 0.05 has an associated Z-score of 1.96) and acceptable margin of error at $\pm 7\%$). The minimum numbers of respondents was set at 195.

We used many types of communication tools to reach people. Facebook as social network offers lot of possibilities for marketers. We could send the link directly to people who live, work or study in Žilina. Not only to those who are in our private network but also to anyone else who has created online profile on Facebook and filled the information about the hometown or joined the group that is connected with Žilina. Good example is group Žilina Slovakia that connects people living in this city. We could utilize the so-called wall to place the link publicly or choose members of this group to send them private message. As we needed just certain age segment we chose the second option – private message to people.

We had to control proportion of each age segment to have enough responses for both. At the end of this step of marketing research process we were ready to analyse the information.

4. The Results of Survey

4.1. Analyzing the information

When we collected enough responses we could move to the fourth step of marketing research process – analyse the information. At the beginning we needed to create the code list for the questionnaire. We set numerical codes to every question. To easily work with the responses we did the same with the answers. After that every word answer was transformed into numerical answer. When code list was done we started to process the responses. Last question was about the age of participants. This helped us to divide the Millennials group into two subgroups. Segment A included responders in the age

15 to 21 years. This subgroup got numerical code 1 in last question. Numerical code 2 was given to segment B that included the older subgroup, responders in the age 22 to 30 years.

Outcome of the fourth step of marketing research process was research matrix. It gave us greater opportunity to work with the responses much faster and use simple mathematic calculations to get the results. We used spreadsheet program to analyze the responses and create outputs. When the responses are in the form of research matrix we can use different angles of vision on the problems and find the best possible solution.

4.2. Presenting the findings

As we have already mentioned in previous chapter, we aggregated questions into four parts. Last part has already helped us to separate respondents into segment A and segment B so we can compare them. Average age of segment A was nineteen years and eight months. Average age of segment B was twenty-three years and four months. Other three parts are composed to find the answers on these problems:

- Do customers use urban mass transportation lines in Žilina, which can be effectively involved in digital media network?
- Do customers know about digital signage and how do they perceive it in comparison with printed posters?
- Would passengers use the opportunities which are offered by digital signage?

As investment into digital media network requires lot of money and effort we wanted to be sure that urban mass transportation is suitable for that. Advertisers are looking for places with big amount of passing people who spend some time there. 85% of respondents use urban mass transportation in Žilina on a regular basis. 3,5% of respondents use it sporadically and only 11,5% of respondents do not use urban mass transportation at all. On Figure 6. we can see the frequency of travelling. We can state that in town Žilina exists potential for usage of digital signage advertising in urban transport.

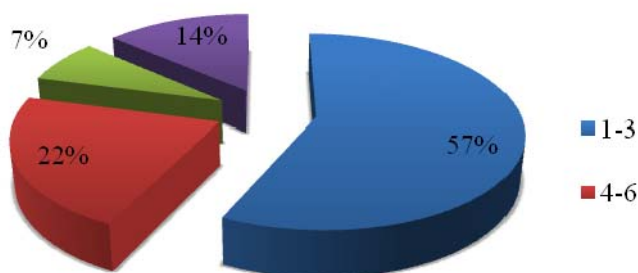


Figure 6. Frequency of travelling

The most utilized bus line is number fourteen which serves the area of ZOC MAX and TESCO hypermarket. Second one is line number four which serves the same area. The bus lines number three and five are on the third place that operates in the area of OC Aupark. On the fourth place is the bus line number six, which operates in the area of OC Atrium Dubeň. As we can see the most utilized lines serve areas with existing shopping malls. Implementing the digital signage in these lines at the beginning of the project would have impact on many passengers and potential customers of shopping malls. It might be interesting to investigate whether the amount of passengers of lines, which will serve, are of Štadión project would increase when the shopping mall will be finished.

Digital signage is implemented in many different spheres of use. However people often do not realize it actually is digital signage. Average age gap between segment A and segment B was three years and eight months. This age gap represents considerable difference in awareness of digital signage between the segments. 59% of all respondents did not come across digital signage or were not sure about that. However, it was 64% in the segment A. On the other hand in the segment B it was 10% less that means 54% respondents of segment B did not have experience with digital signage. This might be caused by greater opportunities of the older segment to travel abroad, for example, because of exchange studies or internships. This segment contributes of employed members more than segment A. As we have already mentioned digital signage is utilized in companies to inform their employees about actual events in the company or on the market.

Figure 7 shows awareness of the digital signage and places where respondents came across it. As we can see people have already noticed multimedia screens in shops. Many of them, especially in segment B, know digital signage from foreign countries. Many respondents commute to Žilina and have noticed the screen in train station, which displays short informative presentations about railways.

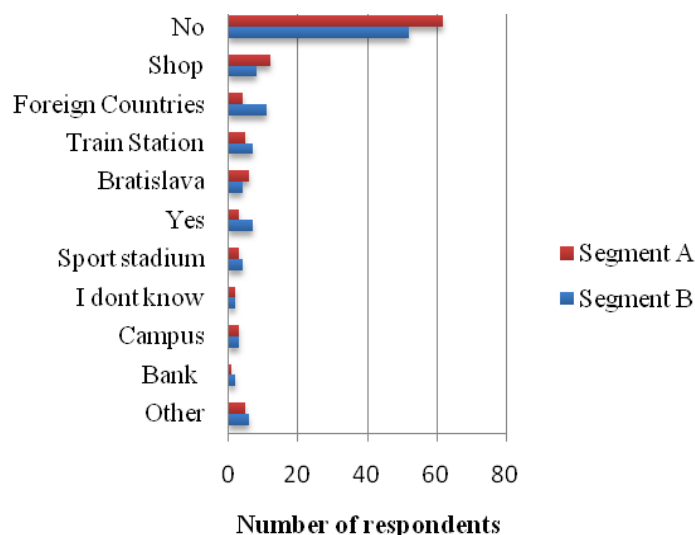


Figure 7. Contact with the digital signage. Segment A and B

Printed posters still have strong position on the advertising market. However the power of moving pictures is stronger. Both segments, as we can see on Figure 8, are attracted with digital signage more than with printed posters.

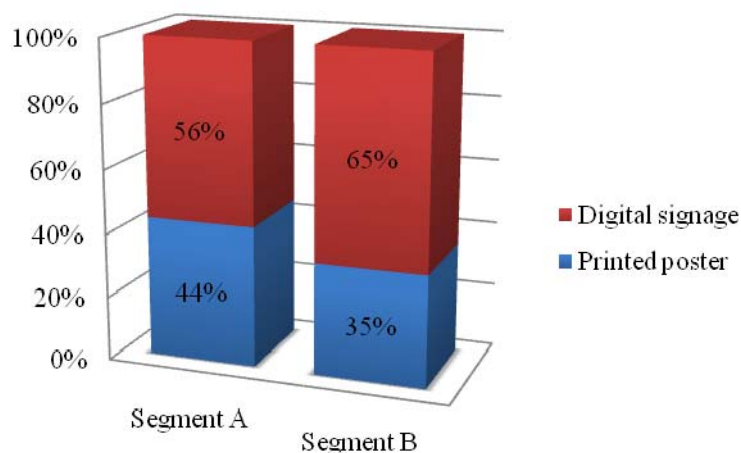


Figure 8. Digital signage versus printed poster

Another question was dedicated to interest in printed posters in buses. This helped us to ensure that advertisement in urban mass transportation has impact on viewers and still captures their attention. 25% of respondents notice printed posters regularly and 71% notice just sometimes. Only remaining 8% do not pay attention to printed posters in buses at all. When advertisers would be able to bring more attractive commercial content to the buses they could gather even more viewers and therefore customers. Digital signage offers this in one solution and urban mass transportation provides viewers, which have to stay at the same place for a longer time.

It is necessary to make sure whether passengers even want to have digital media network in buses and whether they would utilize the services that are offered by digital signage. It is common that younger generation is more open for new technologies and new appliances (Madleňák and Švadlenka, 2009). They connect with their friends online and share their opinions and feeling publicly.

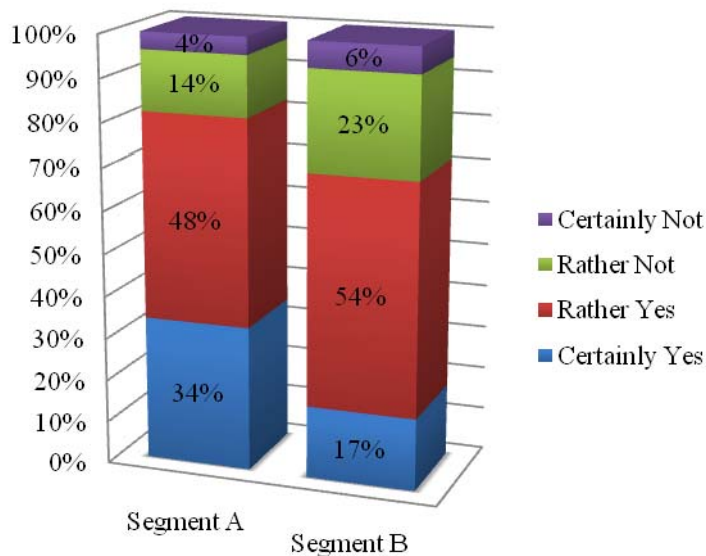


Figure 9. Interest in digital signage

As Figure 9 shows more than three quarters of all respondents would appreciate digital signage in public transport in Žilina. The difference between segment A and segment B is 11%. This confirms *the theory that younger generation is waiting for new trends and is ready to implement them in their daily life*. More than three quarters of all respondents also give investors good point to think about the digital media project more deeply.

GEM System offers *two opportunities* for passengers how to interact with it. The first is *entertainment SMS*. Interest in this service is almost the same in both segments. 53% members of segment A and 52% members of segment B would use this service. However, the difference is in the certainty. More members of segment A are sure they would use entertainment SMS if available than members of segment B. Figure 10 shows us the opinions of respondents about entertainment SMS.

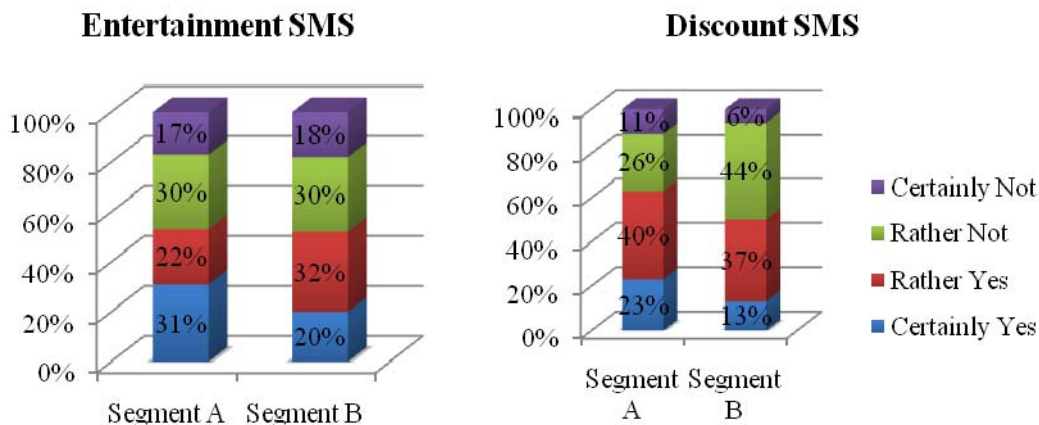


Figure 10. Entertainment SMS versus Discount SMS

The second opportunity for passengers offered by GEM System is *discount SMS*. This service is offered in cooperation with advertisers. 63% respondents from segment A are ready to use the opportunity to obtain discount as a counter value for sending SMS according to instruction on digital signage. 50% respondents from segment B are ready to do the same. Offering discount and small presents would lure more customers to the shopping malls. Figure 10 shows us the amount of respondents, which are or are not ready to utilize the opportunity of discount SMS.

4.3. Economic Evaluation – Calculation of ROI

The most similar advertising method to digital signage is printed poster. To understand advantages of digital signage in comparison with printed poster we have to take a look on ROI (return on investment) of both advertising tools more deeply.

In a short time period it might appear that printed posters have more favourable ROI. However we cannot consider building of digital media networks as short-term project. As digital signage is mostly applied in food, retail, transport and entertainment sectors for sales promotion we will compare the ROI for them.

As it is suggested for bigger networks, minimum number of locations is 500. Commercial for mentioned sectors change more frequent intervals. However digital signage has not been implemented broadly in Slovakia therefore we will choose weekly content update interval. Investment in digital signage is long-term business, especially in urban mass transportation, as we will consider on implementation of this technology in vehicles of urban mass transportation Žilina. Five years operation lifecycle is therefore the most suitable. Calculation is made for 32" full-colour screens. As the prices of screens are decreasing companies can even reduce the initial installation cost. The calculation is made in euro. The cost of digital signage project is calculated on 100000 €. Average cost per digital sign is 2000 € and monthly maintenance fee per digital sign is 35 €.

On the other hand average cost of printing per poster is 25 € and average distribution cost per location is 36€. For the conditions we have chosen we get 2150000 € cost savings for digital signage in comparison with printed posters. ROI represents 263%.

We can see a lot of the reasons of printed posters' inefficiency. The poster holder is not working properly and the poster is therefore dropping out. Such a problem cannot happen on digital screen. Commuting to work is everyday occasion and printed posters in mass transportation do not have strong enough impact. Changing posters every day on 500 locations during 5 years period would cost 54750000 €. When we compare it with 2150000 €, which are needed for digital media network at the same size, we can definitely understand the advantage of investment into new technologies.

5. Conclusions

This research is dedicated to the advertisement and new methods of delivering commercial content to the customers. We mentioned many possibilities that can be utilized to capture people "on the go". This gave us good overview of the present and future situation on the commercial market. We introduced very effective digital signage system called GEM Interactive. We consider on the implementation of this media in urban mass transportation in Žilina. We conducted survey among "Millennials" in order to gather the necessary information. It is group set by the age of its members. It contributes only by people who were born between the year 1979 and 1994. It is a segment of people who are very open to new technologies. According to the responses we were able to help to find the answers to the problems we had set at the beginning of the marketing research process.

However the results presented in this paper are only introduction to the whole concept. Before the investment into digital media network in urban mass transportation further investigation is needed. We considered only on passengers. Whether there even is interest into digital signage. Now as we know that people are ready to accept this type of advertisement and would like to use its opportunities it is desirable to focus on advertisers, shopping malls and provider of public transport in Žilina. This might be topic of another research. Financial calculations are needed as well. Although we pointed out that ROI of digital signage is much bigger than ROI of printed posters it is necessary to support the project with other calculations according to the conditions in Slovakia and Žilina.

Findings on survey verify the interest in digital signage among people living in Žilina. Interest in GEM System's products for passengers is over 50% in both cases. This means that conditions of Žilina town are suitable for implementing digital signage advertising system in urban transport. Most utilized bus lines serve the areas of shopping malls that even strengthen the impact of digital media network. The significant challenge is in knowledge of digital signage forms. A lot of respondents from both segments do not know the digital signage advertising system, so there is a key success factor of this project. If the passengers will know then they will trust these forms of advertising in urban transport system. The great opportunity for passengers is a possibility to interact with this advertising system. There are two forms of interaction entertainment and discount SMS. The results of the research shows that passengers want to use these forms of sales support. They prefer the discount SMS more than entertainment SMS. But there is a significant finding that passengers from older segment do not accept discount SMS rather younger segment. It looks that older population of Žilina town has a more experiences with discounts and they are a little bit conservative with discounts. Again there is more space to convince

citizens of Žilina town about the credibility of the digital signage advertising system. All these findings ensure us that implementation of digital signage in urban mass transportation would be a success among passengers.

This article also suggests future development of transport advertising system in Žilina town. Development of urban transport advertising system should bring the new forms of interaction between passengers and urban transport system. Therefore, the authors aim to trigger further investigations in the areas of interaction between passengers and transport advertising technology in two ways, (1) the relations between the advertising technology and passengers (I-It relation); and (2) passengers' perception and acceptance of shopping activities on the basis of advertising in different forms of digital signage medias. This agenda aims to contribute for future development on urban transport advertising technology in correlation with shopping practices and to suggest a viable research direction for further investigation on this topic.

Acknowledgements

- KEGA-053ŽU-4/2013 – Improving and interconnection key subjects of the study program: “E-commerce and Management”.
- IMTS 26110230083 – The quality of education and human resources development as pillars of the knowledge society at the Faculty PEDAS of University of Žilina.
- VEGA 1/0421/12 – Modelling of diffusion of knowledge in corporate value chains.

References

1. Bulova Company. (2013) *Overview of our corporation*. [Online]. [s.a.]. Available from – <http://www.bulova.com/about/about.aspx>
2. Burde, D. (2009) *The Overview of Advertising*. [Online]. Available from – <http://ssrn.com/abstract=1274582>
3. Čorejová, T., Imrišková, E. (2008) Convergence at the postal market. *Eksploatacja i Niezawodność = Maintenance and Reliability*, 3 (39), pp. 74–76.
4. Holakovský, Rakovský (2014) *History of radio broadcasting*. [Online]. Available from – http://www.radia.sk/citaren/632_historia-rozhlasu.html
5. Hrudkay, K. (2011) National system of traffic information and benefits for SMEs. In *Transport and Logistics SMEs: Cooperation and Competition, B2B LOCO Workshop & Brokerage Event*, Opatija, Croatia, 28th of April, 2011 [Online]. Available from – <http://www.b2bloco.eu/events/opatija/presentations/workshop/Hrudkay.pdf>
6. Kolarovszki, P., Dúbravka, V. (2010) The presentation of production line and warehouse management based on RFID technology through 3D modelling and animation. *Transport and Telecommunication*, 11(3), pp. 26–36.
7. Kotler, P., Armstrong, G. (2006) *Marketing Management*. Upper Saddle River, NJ, USA: Prentice-Hall, Inc. ISBN 0131457578
8. Madleňák, R., Mitrev, L. (2006) Acceptance of Internet advertising. *InfoWare, Computer Magazine from the World of Information Technology*, 8, pp. 28–30. ISSN 1335-4787
9. Madleňák, R., Švadlenka, L. (2009) Acceptance of Internet advertising to users in the Czech Republic. *Economics and Management, Scientific Journal of Economics*, 12(1), pp. 98–107. ISSN 1212-3609
10. Madleňáková, L. (2005) On the problem of evaluation of customer satisfaction. In *Proceedings of the Conference 'POSTPOINT 2005'* (pp. 148–153). Žilina: University of Žilina. ISBN 80-8070-454-6
11. Mogel, L. (1993) *Making it in advertising: an insider's guide to career opportunities*. New York, USA: Macmillan Publishing Company.
12. Prumaro Interactive. (2012) *GEM Interactive concept*. [Online]. Available from – http://www.gem.si/en/active_locations/
13. Reklamu.cz. (2014) *History of advertisement* [online]. Available from – <http://www.reklamu.cz/historie.html>
14. Strauss, J., Frost, R. (2008) *E-marketing*, fifth edition. Upper Saddle River, NJ, USA: Prentice-Hall, Inc. ISBN 0136154409
15. Tungate, M. (2007) *Adland: a global history of advertising*. Great Britain: Kogan Page Publishers. ISBN 0749448377
16. Vaculík, J., Kolarovszki, P., Tengler, J. (2012) Results of automatic identification of transport units in postal environment. *Transport and Telecommunication*, 13(1), pp. 75–87.
17. Valášková, M., Križanová, A. (2008) The passenger satisfaction survey in the regional integrated public transport system. *Promet – Traffic & Transportation: scientific journal on traffic and transportation research*, 20 (6), pp. 401–404.