

DIGITAL MULTIMEDIA TECHNOLOGY TO SUPPORT SERBIAN SME's

Zlatibor Ljubinković, M.Sc
Joint-Stock Company "Serbian Railways" Belgrade, Serbia
zlatibor.ljubinkovic@gmail.com

Abstract - Digital multimedia technology is an emerging new communication technology. It is expected to play an important role in communication today and to provide timely information, with reducing costs in relation to traditional media. The main target of this paper is the implementation, and evaluation of a digital multimedia technologies based on a computers to display contents on digital displays located at one or more locations, also each display has an attached processor and local storage containing both the information which will be displayed and the local playlist of what should be displayed. Additionally, the design allows content to be customized to specific local viewers, i.e., the displayed information can be adapted to the user or users currently in front of the display. The granularity of the schedule is much shorter in digital multimedia technology – leading to a more visually dynamic experience for viewers. The paper also investigates how the installation of proven digital multimedia technology into many places could provide a valuable and relatively low-cost marketing platform for any large or small enterprise/organisation to communicate and promote their respective products and services. Finally, such a system could be an important ICT support of Serbian SME's development.

I. INTRODUCTION

Digital multimedia is the most compelling platform to effectively reach employees, students, customers, and partners. This digital media is used to convey important information and messages such as news, training material, and information about upcoming or current events. Digital media is effective because it brings familiarity and closeness to modern communications. In today's dynamic world digital media has an important role; especially for organizations who wish to spread their business throughout the world. For educational organizations digital media plays an important role in informing target audience about the events, such as: seminars, lectures, meetings, registration deadlines, schedule changes, exams, and sports activities. Digital multimedia represents an emerging new communication technology; in particular digital signage is rapidly gaining popularity today.

The main challenge today for many organizations is the successful deployment and integration of a digital network system. In large organizations, such as business, educational, and research organizations, lots of events are taking place each day. Thus there is a constant need to inform people about what activities are taking place, where

they are taking place, and how to get from where the sign is to this place. Informing the potential audience in these organizations through conventional media has many disadvantages. Some of these drawbacks and disadvantages are the great financial costs of printing, broadcasting, distributing, etc.

An important aspect in the digital multimedia industry is educating the end-user firstly about what digital multimedia technological systems are and secondly about its benefits, why are they need it and what is it bring to them. If one still believes out-of-home advertising is for large organisations or advertising agencies only, a reality-check is needed. By becoming more affordable digital multimedia technologies allow SMEs to take advantage of engaging with their customers cost-effectively and even make a profit out of this.

II. BASICS OF MEDIA AND NEW DIGITAL MULTIMEDIA TECHNOLOGIES

Media is essentially the routes by which messages are passed on, for a limited period of time, from a sender to a recipient. A broad view of it is to consider businesses or people as units of energy or material known in communication terms as intermediaries. They convey information to each other and so forge links between them. In marketing terms, information is the primary objects of market exchange, and media plays a crucial role in any communication process.

Media is divided into the following categories:

- **Print media** - daily newspapers and periodicals, post, etc.
- **Electronic media** - radio, television, computers, radio stations for advertising, etc.;
- **Media posted in public places** - posters, boards, billboards, illuminated signage, etc.;
- **Media in a space** - shop windows, exhibitions , fairs, theaters and similar media;
- **Media on the move** - public transportation vehicles, as well as all other means of transport;
- **Multimedia** - uses multiple different types of media integrated into a whole.

The term digital multimedia technologies implies any combination of two or more media in digital form, which are so integrated that they can be presented through a unified interface, using a computer program, which broadcasts the content from one central place to multiple remote locations, according „Digital Signage” networks, see Figure 1, as in [1].

Possibilities of digital multimedia technologies:

1. **Multi-zone** – divide the screen into multiple zones,
2. **Multi-layer** – layered presentation,
3. **Multi-source** – content that is displayed may come from a large number of external sources,
4. **Multi-channel** - the management of multiple displays over a single computers,
5. **Multi-display** - connecting multiple displays or projectors into a single image. as in [2]

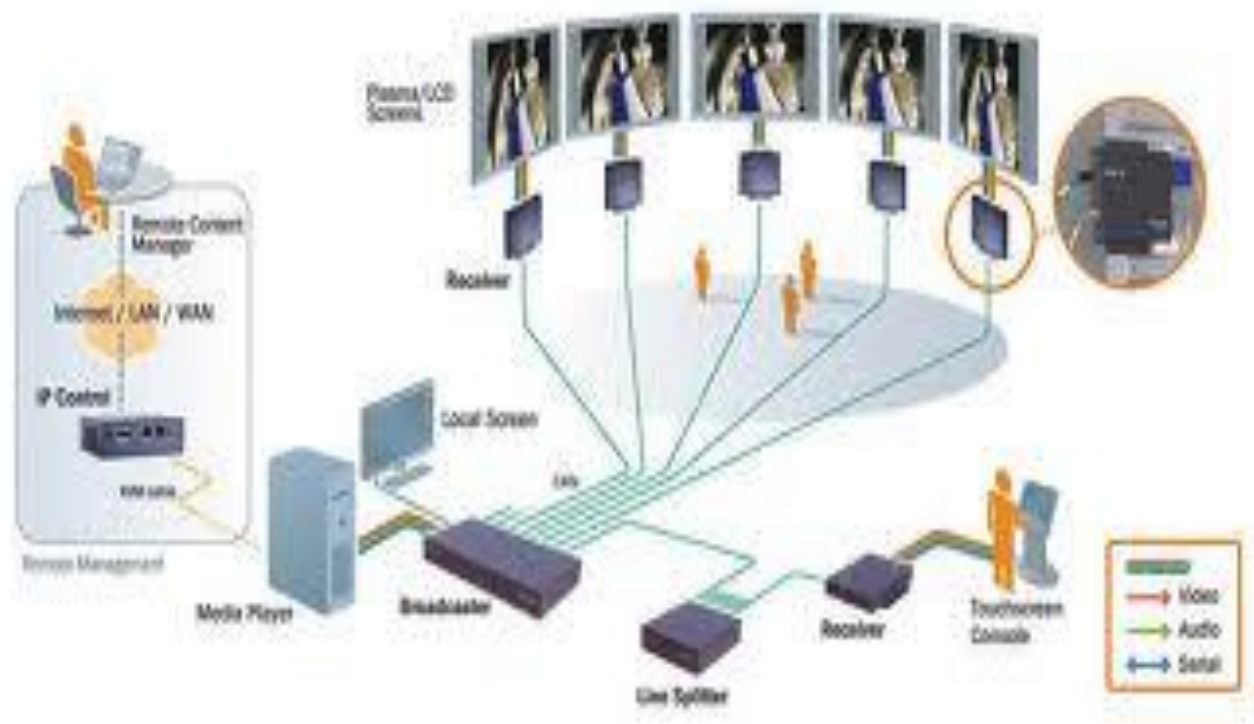


Figure 1. Basic components of „Digital Signage” networks

Computers and the Internet are an integral part of multimedia technology. Specialised software means that information can now be transmitted as text, images, graphics, movies, video clips, music and sound effects, which can be further processed and manipulated. Interactivity is one of the most important features of digital multimedia technology, and it represents a change from one-way communication through traditional media, towards diffuse communication where every person and device become both emitters and receivers (Bluetooth, touch-screen displays etc).

These systems are already used by different industries, including: commercial, sports, entertainment, hospitality, corporate business, transportation, education, healthcare, public sector and banking, as in [3]. Digital multimedia

technology is used for many different purposes and there is no definitive list.

Below are some of the most common applications:

- Public information – news, weather and local information, such as fire exits and traveler information,
- Internal information – corporate messages, health and safety, news, etc.,
- Advertising – either in related to the location the digital multimedia technological system is in or just using the audience reach of the screens for general advertising,

- Brand building – in-store digital multimedia technological system to promote the brand and build a brand identity,
- Influencing customer behavior – directing customers to different areas, increasing the dwell time on the store premises,
- Enhancing customer experience – applications include the reduction of perceived wait time in restaurant waiting areas, bank queues, etc., as well as recipe demonstrations in food stores,
- Enhancing the environment – with interactive screens or with dynamic way finding.

The main features of „Digital Signage” network:

- **Adaptability** – it can cover broadly what people care about and adapt to most of the existing implementation with little change,
- **Manageability** – it can be used as the key information in managing,
- **Extensibility** – it allows future expansion for various digital multimedia applications,
- **Scalability** – its existence does not provide a hardship when the network scales large,
- **Easy to implement** – the effort to generate such log and any value-added services (e.g. reporting, analytics) are reasonable., as in [4]

III. ASSUMPTIONS OF EFFECTS ON USE OF ALTERNATIVE MEDIA FOR MARKETING COMMUNICATIONS AND BUSINESS IN GENERAL

The communication effects of traditional media have been declining in recent years. There are currently several methods for the measurement of range, frequency and impact of media. In the United States results using CPM methods (Cost per thousand impressions) show that there is smaller investment required in advertising through digital multimedia technologies in public places than in other media, as in [5], as seen in Table 1 below. Other measurements show that digital multimedia technologies increase awareness of the brand by 48%, increase the consumption of customers by 30%, increase sales by 32% and increase in the number of visitors into retail areas by 33%, as in [6].

TABLE 1. The results of some analysis carried out in the U.S. According to the Cost per thousand impressions (CPM) method

TYPE OF MEDIA	PRICE PER ONE VIEWER
Digital multimedia systems (outdoor)	In the range from \$1.5 to \$5
Television network	≈ \$25

Digital Multimedia technology offers companies a fast, cost-effective way to roll out user-centric Unified Communications with extensive mobility support. By putting users at the centre of communications, the new technology enables them to keep in touch wherever they are, using their preferred available device and network.

The Digital Multimedia technologies is a business communications solution that provides user-centric Unified Communications which does fully adhere to the Protocol standards: no proprietary signaling is used to secure interoperability with other network components. It gives business users a single point of contact for any form of communications, Presence, preference management and real-time monitoring are available for all users on all devices, as shown in Figure 1.

Battlefield for advertisers has been extended! Traditionally, brand managers contest TV channels in living rooms. Nowadays, more and more of them are trying to reach their target audiences with timely information right at points of purchase, where customers can enter into the immediate action to buy.

They also try to convey corporate image and up-to-date information of new products and promotional activities to target customers in train stations, airports, bus stops, hospitals, banks, and other places where people have to wait, also in public transport vehicles. Moreover, those commercials in the out-of-home media network cannot be skipped or changed by viewers.

Digital multimedia technology can thus play a very important role because it can help SMEs both create business opportunities and combat pressures from competition. Appropriate Digital multimedia technology can help SMEs cut costs by improving their internal processes, improving their product through faster communication with their customers, and better promoting and distributing their products through constantly presence. In fact, Digital multimedia technology has the potential to improve the core business of SMEs in every step of the business process.

Given the focus of SME performance and productivity, to this paper, there is a research which did not quite give answer on the relative costs and benefits of Digital multimedia technology. A key issue is that whereas many of the costs of adoption are tangible and quantifiable, the benefits may be often either speculative, intangible or difficult to quantify. However, many research has shown that companies who have accepted Digital multimedia technology believe that it contributes to improved performance in four main ways:

- The development of new products and services;
- The generation of new customers;
- Reductions in costs; and
- Improved productivity.

IV. STRATEGY MEDIA SUPPORT TO SME SECTOR

SMEs are often the main driver for a country's economic growth. However, as the number of SMEs increases, competition increases, which then results in a decrease in prices, customer base, or both. This in turn will erode existing profits, creating less incentive for people to start SMEs. This dynamic is captured by balancing feedback loops where the greater the number of SMEs, the greater the competition, resulting in a slower rate of growth for SMEs. To counter the increasing competition, firms can lower prices, increase promotion of their product, improve their product, add new distribution channels, and/or improve their internal processes. The challenge is to counter competition when the firm still has the financial resources to do so. Otherwise, once the pressure of competition sufficiently decreases the SME's profits, it will no longer have resources to counter the competition and will have to exit the market.

Recent government statistics report that SMEs represent a key factor of economic development in Serbia and make up 98.8 % of total registered enterprises. They also make up 65.5 % of the total number of employees in Serbia, as in [7]. As such, SMEs are important agents of economic growth. They raise the living standards and create conditions for a better trade balance. During the last decade, much has been said and done about supporting the development of the SME sector. Almost all previous Serbian governments have issued and implemented a Strategy for SME's development and growth statistics show that the country has achieved considerable benefits from this. Among other elements of the development strategy, one of the most important is the promotion of activities to support SMEs' development through a continuous media campaign, as well as to promote SMEs themselves and their products and services. Most SMEs do not have the ability to allocate funds for media campaigns using traditional media because prices for advertising services are generally cost-prohibitive. SMEs in general, and in particular start-up and immature enterprises have so many demands on their working capital that there is insufficient means to invest in expensive marketing campaigns. In such a situation, by introducing digital multimedia technologies for marketing communications, can create more SME media centers providing practical and even subsidised support for SMEs to promote their goods and services which is entirely consistent with the stated aims of the Serbian Government development strategy.

Digital products and information services are an increasingly significant part of economic activity and they offer important opportunities to small firms. Government and the private sector have key roles in facilitating content availability across all platforms and encouraging local development of new content, including content from public sources.

Potential partners for this initiative include:

- Relevant ministries and other state bodies governing development in the Republic of Serbia;

- Local governments, who in most cases would be able to use the resource to advertise local developments, tourism, cultural and historical content, agriculture and products;
- A wide range of manufacturing and non manufacturing organizations, which could include: travel, sports, commercial, marketing, logistics and others, as well as all transport providers who could benefit from a multi-modal communication platform being available on the Serbian transportation system., as in [8]

Small firms may lack objective information regarding the benefits and costs of adoption of Digital multimedia technologies. The private sector (e.g. business associations) and government have a role, and can provide information about services available and when necessary improve coordination of government information on the benefits of adoption and use of Digital multimedia technologies, for example case studies and good-practice.

It is commonplace for governments to have policies to encourage the growth of SMEs as they can help to directly alleviate poverty by increasing income levels and creating jobs. However, as the global economy becomes increasingly reliant on information and communications technology to receive, process, and send out information, the small businesses in Serbia, which form a significant portion of their developing economies, have yet to gain the benefit of these benefits evenly. This is because obtaining such opportunities rests largely upon the ability of SMEs to engage in the regional and global economic business networks which, in turn, demand provision of a prerequisite level of access to and use of ICT. Unless these prerequisites are in place, these SMEs are set to lose out on opportunities to integrate into the global supply chain, bid for outsourcing businesses, and increase their internal productivity and efficiency. SMEs can benefit either as producers of ICT or as users of ICT for purposes such as increased productivity, faster communications and reaching new clients.

While ICT can benefit SMEs in multiple ways, SMEs in Serbia have been slow to adopt ICT as they face major constraints such as poor communications infrastructure, limited ICT knowledge, inability to integrate ICT into business processes, high costs of ICT equipment, incomplete government regulations for e-commerce, and a poor understanding of the dynamics of the knowledge economy. To remove these constraints, government need to do more than merely improving ICT national policy and promoting SMEs in the ICT sector. Instead, government should embed ICT components (in this paper, components digital multimedia technology) into overall SME policy in a comprehensive manner. However, this does not mean that SME policy should be the same for all industries. SMEs in different sectors use ICT differently and will adopt them at a different pace. Additionally, SMEs need help in translating the benefits of ICT to their core business.

The willingness of SMEs to integrate multi-modal communication business practices depends on how much it can directly improve their core business and how much the potential benefits outweigh the definite costs. This can have wider impact on national economies since SMEs are the engines of economic growth.

V. CONCLUSION

Serbian government and economy have not explicitly focused on Digital multimedia technology adoption by SMEs. They have either focused on growing the ICT sector or supporting the growth of SMEs, but they have not focused on integrating the more media in digital form, which are today used all around the world.

The author of paper recognised that there is a substantial opportunity for Serbian economy to create a very sophisticated marketing communications platform to deliver emotionally intelligent content to highly segmented and predictable target audiences. From this, Serbian SMEs will be able to realise considerable benefits together with the potential for a very healthy financial return on investment (ROI) on a long-term and ongoing basis.

The author believe that a more important output of this paper is the recognition that the implementation of such a platform could also play a significant role in helping to grow the emerging Serbian economy by using at least some of the financial surpluses from this initiative to provide SMEs with a subsidised means to promote their products and services to their selected target audiences.

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