

## A Study of the Effectiveness of Digital Signage: Importance of Customized Content

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### 디지털 사인지의 효과에 관한 연구: 맞춤식 콘텐츠의 중요성

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**Abstract** This study suggested the alternatives for improving consumers' engagement with digital signage (DS) by analyzing the researches of the effectiveness of DS in marketing and public areas, which is recognized as an essential communication tool for commercial or public matters. According to the results, affective DS ad content of DS resulted in positive shoppers' buying behaviors and perceiving buying environment; DS was also effective for public affairs, which how proper channel and message for the target public resulted in solving community problems. However, it was rare to measure precisely the level of consumers' engagement with DS content and what DS content aroused higher engagement in both areas. Thus, DS content should be more customized based on multiple converged contents for consumers' engagement and the research efforts of DS should be focused on the development of not only its device technology, but also creative content.

**Key Words** : Digital Signage, Effectiveness of Digital Signage, Customized Digital Signage Content, Personalized Digital Signage, Engagement of Digital Signage

**요약** 본 논문에서는 상업적 및 공적 업무를 위해 필수적인 커뮤니케이션 도구로 인식되고 있는 디지털사인지의 효과에 관한 연구들을 분석하여 소비자의 인게이지먼트를 향상시킬 수 있는 대안을 제안하였다. 분석 결과에 의하면, 디지털사인지의 감성적 광고가 인지적 광고보다 쇼핑객들의 행동을 긍정적 구매 행동으로 이끌었으며 구매 환경을 이해하는데도 긍정적인 영향을 미치는 것으로 나타났다. 공적 차원에서는 타겟 공중에게 얼마나 적합한 채널과 메시지인가에 따라 커뮤니티의 문제를 해결하는데 있어서 긍정적인 것으로 나타났다. 그러나, 양 차원에서 해당 디지털사인지의 콘텐츠에 대한 소비자들의 인게이지먼트는 어느 정도인지 그리고 어떠한 디지털사인지의 콘텐츠가 소비자의 높은 인게이지먼트를 가져오는지 등을 측정하는 경우는 거의 없었다. 따라서, 디지털사인지가 소비자의 인게이지먼트를 높이기 위해서는 복합적이면서도 융합적인 콘텐츠를 기반으로 소비자 맞춤형으로 실행되어야 할 것이며 앞으로는 디지털사인지 기기와 관련된 기술뿐만 아니라 창의적 콘텐츠 개발과 관련된 연구에도 초점을 두어야 할 것이다.

**주제어** : 디지털사인지, 디지털사인지의 효과, 맞춤형 디지털사인지 콘텐츠, 개인화된 디지털사인지, 디지털사  
인지의 인게이지먼트

## 1. Introduction

Digital signage (DS) in its beginning stage was applied generally for the purpose of marketing or advertising, but recently it is used as communication media in various areas such as public affairs, art, banking, health caring, education, etc.[1–3]. Its functions and roles in the society is being continually expanded due to the development of ICT (information and communications technologies) such as display, content management, content delivery network (CDN) and converged communication technology. Furthermore, it is being evolved into so called ‘smart signage’ (SS), which is connected to smartphone for each individual to use for his/her own needs. This may result from convergence of various ICT including proximity sensor, RFID, touch sensor, face recognition system, Bluetooth, NFC etc. and it is appreciated as a converged multiple media.

Although the value of DS in the various areas is widely recognized, there has not been sufficient effort to heighten its effectiveness. Most researches of the improvements of DS have focused on mainly hardware technology, but it seems to be lack of researches about achieving consumers’ high engagement with DS. Thus, this study investigated the effectiveness of DS by analyzing the researches in marketing and public areas and suggested the alternatives for the development of the efficiencies and effectiveness of DS in the future.

## 2. Literature Review and Analysis

### 2.1 Situation Analysis

The value of DS is annually increasing as shown in Fig. 1[4], which its global market size estimation of 2016 was USD 19.61 billion and will be USD 32.84 billion by 2023. This market growth arises from the continually increasing demand for the marketing promotion of products to pull consumers’ attention more effectively and

create purchasing climate. DS has advantages for offering the information that consumers really need in right location focusing on the target consumers, and the improvement of the DS technology like digitized display is anticipated to catalyze the market growth[5].

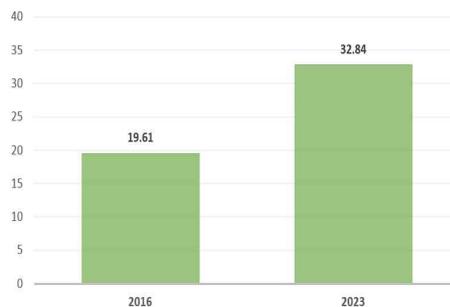


Fig. 1. The Estimates of the Global Digital Signage market size in 2016 and 2023(in Billion U.S. Dollars)

Table 1. Classification of Digital Signage Market

Part	Item	
By Product	Sign Boards/ Billboards/ Menu Boards/ Kiosks/ Others	
By Offering	Hardware	<b>Displays</b> Displays, by Type: LCD Display, OLED Display, Direct-View Fine-Pixel LED Display, Direct-View Large-Pixel LED Display, E-Paper Display Displays, by Resolution: 8K, 4K, WQHD/2K, FHD, HD, Others Displays, by Brightness: 0-500 nits, 501-1000 nits, 1001-2000 nits, 2001-3000 nits, More than 3000 nits <b>Media Players</b> <b>Projectors</b> <b>Mounts &amp; Other Accessories</b>
	Software	Edge Server Software, Content Management System, Others
	Services	Installation Services Maintenance & Support Services Consulting & Other Services
By Application	Commercial	Retail, Corporate, Healthcare, Hospitality, Government
	Infrastructural	Transportation, Entertainment
	Institutional	Banking, Education
	Industrial	
By Geography	Regional Characteristics	

Although the statistics imply that its market size is being expanded, they don’t mean its qualitative progress, which means how much users (consumers or audience) are satisfied with

DS content. DS market is classified into four big parts as shown in Table 1, which is modified from Markets and Markets[6], as products, offerings, application and geography. Considering this wide variety of the market and the qualitative development of the market in the future, it seems to be danger to conclude cursorily from the quantitative data. More important things should be thought for improving qualitatively the market to satisfy consumers' needs and wants.

## 2.2 Analysis of the Various Effectiveness of DS

### 2.2.1 Effectiveness of DS Contents in Marketing

DS was implemented in its early stage with a simple function of viewing by one-way communication and companies were hesitant to apply DS to their marketing promotion strategies. In recent, DS is recognized as an essential and effective communication medium to seize market opportunities for attracting consumers' attention. Its efficiency is concentrated on a user oriented way, which means it should be interactive and informative for consumers to solve problems, moreover enjoy it as an entertainment tool with high level of engagement[2,7–10]. As DS becomes an essential and effective communication tool for commercial or public organizations, there have been researched a lot practically and academically to prove the effectiveness of DS.

In practice, for instance, it was reported in 2010 that 52% of Americans had seen a DS display in the past week and 70% viewed a display within the past month. They didn't only notice DS, but also spent more time on searching information or enjoying the DS contents[11]. There are some explanations of the effectiveness that firstly, DS contents supported by motion pictures and animations are more dynamic than any other communication or display media that are hard to escape; secondly, DS displays increase more sales volume compared to other types of signs at the point of purchase. A dynamic DS display is available all the time to

help buyers by providing product features and serving benefits. The buyers who want more information can search directly into the contents and make a decision to buy based on enough information; thirdly, DS is profitable. Once the investment of DS device has been made, recurring costs are very little because it is not disposal costs; finally, DS motivates employees to work with sharing sense of belonging and make them be more kindly to consumers. These explanations are supported by the following results of marketing researches.

DS functions as a multichannel in marketing strategy, with unlimited marketing contents and promotions, providing a seamless flow of experience. Over 25% of organizations deemed campaign management by multichannel effective for achieving their goals[12]. This result is supported by the fact that 63% of people agreed that DS captures their attention, which its percentage was very higher than other media like Internet, TV and billboard advertising[13]. Thus, industries accept DS as a useful marketing tool and they struggle to build a digital strategy in the critically competitive market situation. According to a report, not less than 30% or often more executives from 15 industries were expecting mild or huge digital disruption in the next one year[14]. And nearly 30% of consumers approved that digital menus in restaurants influenced their purchase of products[15]. The digital menu displays are usually eye-catching and dynamic so as to draw consumers' attention.

More specifically, a research showed that DS in retail atmospherics resulted in positively shoppers' behaviors such as spending and perceiving retail environment although they tended to attend more to affective communication contents[16]. Similarly, another research focused on DS ads for investigating how brand experience was constructed by DS in retail atmospherics. The results demonstrated that sensory affective ads of DS were more effective

than cognitive contents because the sensory cues in DS aroused consumers' affective experience, more being associated with their attitudes to the ads and advertisers and finally constructing intellectual brand experience[17]. More recently, it was reported that affective DS content create more positive emotions of grocery shoppers that improve impulsive purchasing and enhance revisit intentions[18]. These results imply that affective DS ad content can increase consumers' approach and bring more sales volume.

### 2.2.2 Effective Uses of DS in Public Area

The effectiveness of DS was also reported in public area. According to a research, DS was a great social marketing tool to build a community[19]. A social marketing for increasing participation in radon program of health department was successful because the message was intervened by DS technology[20]. DS was effective for solving community problems confronted by a city or non-profit organization in a troubled community. In the case, its effectiveness was decided by how the information of DS was designed and implemented[21]. For example, kiosks, one type of DS with audiovisual technology, enabled several different school districts to have common meetings for community. The technology was effective and inexpensive[22]. Prior to this research, there was a similar research that multiple DS was useful for expanding network integration in campus. It informed various issues, displayed accomplishments of the campus, and provided services of meetings. Conclusively, more proper DS is for target public, it can give more vibrant boost to the public[23].

### 2.3 Reconsideration of DS Effectiveness

According to the analysis, DS was effective in both commercial and social marketing, but it was rare to measure precisely the level of consumers' engagement with DS content and what DS

content aroused higher engagement.

As shown in Fig. 2[24], DS systems are generally consisted of a few different elements including one or a few (or more) displays and media players, and managing and delivering system of content. The latter is often provided by DS networks. Most DS solutions are based on IP (Internet Protocol), which may combined with wired or wireless, that is Wi-Fi, networks. For a successful flow of connections which means the attainment of senders' final goals, first of all qualitative services should be provided to consumers (or users) based on security system. Qualitative services may include marketing stimuli which attract consumers' attention; and DS contents which make them engage with and finally have problem-solving. In this process, it would be very necessary to get the DS contents connected to their smart phones for more effectiveness. Even the attractive marketing stimuli, if it can't arouse consumers' interest in the contents, they would not be engaged with the message.

Thus, as an alternative, it is suggested that customized contents connected to individual consumer's smart phone. The contents should be very creative considering maximizing synergy effect with other media executions. This will bring achievements of the installation intention after all, influencing target consumers or audience. In this regard, it is necessary to reconsider the importance of qualitative content, which is more personalized, for improving consumers' engagement.

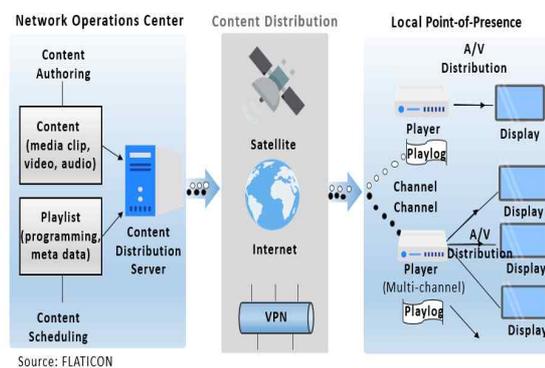


Fig. 2. An Example of Digital Signage Service System

### 3. Discussion

#### 3.1 Implications

Although there may be various factors which cause the success or failure of DS system, it would be concluded by consumers after all. If they turn away their heads from a DS because its content is worn-out or doesn't serve fully their needs, then no matter how high-tech the DS system is, the installation purpose cannot be achieved. Thus, it is more important to fill the screen with proper content to move consumers' attitude with customizing their needs and wants. If DS is connected with smart phone, providing coupons, special offers, events and so on, it becomes more personal and customized to individual consumer resulting in high engagement with DS.

#### 3.2 Suggestions

Although customization of DS content has been rarely researched, its technology of customized content which can draw consumer engagement becomes more important. There are many ways to develop customized content, and this is not from focusing on only DS itself, but relating with other media because a customized content of DS can work under connecting with personal smart phone and old media such television, radio, newspaper or magazine. If DS and proximity beacons are used together, consumers can be more personalized and interactive through the content.

Personalizing or customizing content involves tailoring contents specifically to individual consumer's needs and wants. For achieving its goal successfully, some data of consumers are needed. It would be difficult to create customized contents at first because of collecting their data, but after the customized contents would be actualized, then they could keep target consumers holding onto the marketer and easier to collect

the data by voluntary interactive communication. Successful customized content may help truly target consumers because they can get individual benefits including solutions to their problems from the content. This binds the marketer to his or her target consumers and the right consumers would become loyal to the marketer.

With regard to creating customized content, it is suggested that the first step is to get target consumers' data by various ways such as surveys, participant observations, tracking web sites and so on. The next is segmentation of content on the basis of target. Each content should be appealed to the right target consumers. Their types may be young ladies, professional women, sports maniac and so on, and regardless of the types customized content should be directed towards an individual person. Lastly, it is absolutely imperative to measure the results and the data of the results should be used for next promotion. For doing this whole process rightly, it should be considered that personal information is not be infringed[25,26].

### 4. Conclusion

The past researches showed that DS was effective in both commercial and social marketing, but it was rare to measure precisely the level of consumers' engagement with DS content and what DS content aroused higher engagement. Some part of the researches verify that although there may be various factors which cause the success or failure of DS system, it would be concluded by consumers after all, and the more customized DS content is, the higher its target consumers' engagement with it is. Customizing content involves tailoring contents specifically to individual consumer's needs and wants on the basis of their data

A lack of researches on developing customized content in DS area is highly regrettable. Although it was reported that more affective content was

more effective for engaging with it, the results were drawn from the limited atmosphere and they didn't show how specifically affective it was. There are many types of affective appeals in commercial or public message such as humor, emotional (e.g. love, friendship, kindness, cheerfulness etc.), fear and so on. Each type of appeal should meet the right target consumers. Furthermore, if the DS content can be worked under connecting with the target consumers's personal media, it may be easier to make them be loyal to the brands. The researches in the future, should be paid attention more to this points to actualize more qualitative improvement of DS area.

## REFERENCES

- [1] R. Bendici. (2017). Paid Attention: Higher ed Institutions Increasingly Find Revenue Through Digital Signage Platforms. *University Business*, 20(11), 31-33.
- [2] L. S. Larsson. (2015). The Montana Radon Study: Social Marketing via Digital Signage Technology for Reaching Families in the Waiting Room. *American Journal of Public Health*. 105(4), 779-785. DOI:10.2105/AJPH.2014.302060.
- [3] R. Koolen. (2010). Technology Targets Recruitment. *Applied Clinical Trials*, 19(3), 72-72.
- [4] Statista. (2018). *Statista*. Value of the Digital Signage Market Worldwide in 2016 and 2023 (in billion U.S. dollars). <https://www.statista.com/statistics/699718/digital-signage-market/>
- [5] Grand View Research. (2017). *Grand View Research*. Digital Signage Market Analysis by Application. <https://www.grandviewresearch.com/industry-analysis/digital-signage-market>
- [6] Markets and Markets. (2018). *Markets and Markets*. Digital signage market worth 32.84 billion USD by 2023. <https://www.marketsandmarkets.com/PressReleases/digital-signage.asp>
- [7] K. Lacey. (2013). The Business of: Digital Signage. *District Administration*, 49(7), 34-37.
- [8] K. Lacey. (2014). Finding the Way. *University Business*, 17(6), 42-45.
- [9] H. K. Seok. (2017). The Effect of Digital Signage and Smart Media Convergence on Memory and Attitude According to the Level of Engagement and Interactivity. *Journal of the Korea Convergence Society*, 8(6), 1-7.
- [10] M. W. Choi. (2018). A Study on the Meaning and Future of Sales Promotion in New Marketing Communication Environment. *Journal of the Korea Convergence Society*, 9(12), 145-150.
- [11] Navori. (2018). *Navori*. Why is Digital Signage Effective? <https://www.navori.com/digital-signage-effective/>
- [12] V. Kees. (2018). *Econsultancy*. The Multichannel Challenge for Retailers. [from:https://econsultancy.com/the-multichannel-challenge-for-retailers/](https://econsultancy.com/the-multichannel-challenge-for-retailers/)
- [13] Seesaw Networks. (2018). *Seesaw Networks*. Engaging People with Digital Out-Of-Home Media: Digital Out-Of-Home Media Awareness & Attitude Study, United States 2007. <http://www.richmediatechnologies.com/uploads/articles/pdf/Outdoor%20Effectiveness.pdf>
- [14] R. Grossman. (2018). *Harvard Business Review*. The Industries That Are Being Disrupted the Most by Digital. <https://hbr.org/2016/03/the-industries-that-are-being-disrupted-the-most-by-digital>
- [15] Digital Signage Articles. (2014). *Digital Signage Articles*. Top Benefits and ROI of Digital Menu Boards 2014. <http://www.digitalsignagearticles.com/2014/06/top-benefits-and-roi-of-digital-menu-boards-2014/>
- [16] C. Dennis, R. Michon, J. J. Brakus, A. Newman & E. Alamanos. (2012). New Insights into the Impact of Digital Signage As A Retail Atmospheric Tool. *Journal of Consumer Behaviour*, 11(6), 454-466. DOI:10.1002/cb.1394.
- [17] C. Dennis, B. Josko & E. Alamanos. (2013). The Wallpaper Matters: Digital Signage As Customer-Experience Provider at the Harrods (London, UK) Department Store. *Journal of Marketing Management*, 29(3-4), 338-355. DOI:10.1080/0267257X.2013.766628.
- [18] M. Garaus, S. Manzinger & U. Wagner. (2016). Happy Grocery Shopper: The Creation of Positive Emotions Through Affective Digital Signage Content. *AMA Winter Educators' Conference Proceedings*, 27, K-23-K-23.
- [19] M. Strand. (2009). Using Digital Signage to Build Community. *Long-Term Living: For the Continuing Care Professional*. 58(8), 40-46.
- [20] L. S. Larsson. (2015). The Montana Radon Study: Social Marketing via Digital Signage Technology for Reaching Families in the Waiting Room. *American Journal of Public Health*. 105(4), 779-785. DOI:10.2105/AJPH.2014.302060.
- [21] J. Song, C. S. Sankar, P. Kahai & D. Mixson. (2016). Use of Digital Signage in A Distressed Community: An Example of Community Informatics. *Information Systems Management*, 33(1), 17-29. DOI:10.1080/10580530.2015.1117849.
- [22] S. Noonoo. (2017). Digital Signage that Brings Schools Together. *T H E Journal*, 44(3), 22-24.

- [23] J. Penny. (2012). Communicate Campus-Wide with Digital Signage. *Buildings*, 106(5), 46-51.
- [24] ITU-T Technology Watch Report. (2011). *ITU. Digital Signage: the Right Information in All the Right Places.* [https://www.itu.int/dms\\_pub/itu-t/oth/23/01/T2301000150002PDFE.pdf](https://www.itu.int/dms_pub/itu-t/oth/23/01/T2301000150002PDFE.pdf)
- [25] H. K. Kong, H. J. Jun & S. K. Yoon. (2018). A Study on the Privacy Policy of Behavioral Advertising. *Journal of the Korea Convergence Society*, 9(3), 231-240.
- [26] Y. S. Jeong. (2014). Tracking Analysis of User Privacy Damage using Smartphone. *Journal of Convergence for Information Technology*, 4(4), 13-18.

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