

# Research on the Image Projection of Platform Screen X

Xinyi Shan\*, Jean-Hun Chung\*\*

Dept. of Multimedia, Graduate School of Digital Image and Contents, Dongguk University, Doctor's course,\*  
Dept. of Multimedia, Graduate School of Digital Image and Contents, Dongguk University, Professor\*\*

## 스크린 X 영상 투영 방식의 특징 연구

선심이\*, 정진현\*\*

동국대학교 영상대학원 멀티미디어학과 박사과정\*, 동국대학교 영상대학원 멀티미디어학과 교수\*\*

**Abstract** Screen X is one of the Premium Large-Format platforms. Screen X projects images and video along the side wall of the theatre that go in synch with the front main screen. It's a different way of immersing the audience. This technique demands film-makers taking the two new "screens" into account when making movies. Screen X is the most obvious feature of viewing content with a range of 270 degrees. Viewers can view the experience of viewing experiences beyond the frame of screen screens by allowing viewers to experience the experience beyond the frame of screen screens, which means screen X can immerse the audiences without 3D glasses. Based on the results of this study, studies of content specifications and how they fit in the screen X are studied, and goals for maximizing the visual effects of the visual effects are studied. Looking forward to future research paper researchers and industry professionals who will benefit from future research papers.

**Key Words** : Screen X, Digital media contents, Platform, Panorama, 270 degrees screens, CGY cinema

요 약 스크린 X가 프리미엄 대형 영화(Premium Large-Format, 이하PLF)의 플랫폼 중 하나이다. 스크린 X은 관람관 안에 중앙 스크린과 좌우 양쪽 스크린을 연결해서 세 면 스크린을 구성한 기술이다. 이 새로운 나온 PLF 플랫폼은 관람자에게 파노라마 비주얼을 제공할 수 있다. 다만 영상 콘텐츠를 촬영했을 때 스크린 2 개 더 있기 때문에 콘텐츠 화면을 더 추가적인 제작해야 된다. 스크린 X는 제일 명확히 특징이 270도 범위로 콘텐츠를 시청할 수 있는 것이다. 시청자가 일반 영화 스크린 화면의 프레임 워크를 넘어선 경험을 갖도록 하여 시청자가 시청 경험에 대한 특정 장면을 가장 직접적으로 볼 수 있다. 그래서 스크린 X는 3D 안경을 착용하지 않아도 시청자에게 몰입 효과를 줄 수 있는 의미가 있다. 이 특징 연구 결과에 따라 스크린 X에 맞는 콘텐츠 사양 및 제작 방식을 연구하며, 시각효과를 극대화한 콘텐츠에 대한 연구를 목표로 한다. 그리고 향후 스크린 X 영상 콘텐츠 관련 연구자와 산업계 종사자들에게 향후 도움이 될 수 있는 연구 논문으로 사료 될 것을 기대한다.

주제어 : 스크린 X, 디지털 영상 콘텐츠, 플랫폼, 전경, 270도 스크린, CJ CGY 그룹

Received 17 October 2017, Revised 27 November 2017  
Accepted 20 December 2017, Published 28 December 2017  
Corresponding Author: Jean-Hun Chung  
(Dongguk Univ. Dept. of Graduate School of Digital Image and Contents. Professor)  
Email: evengates@gmail.com

ISSN: 1738-1916

© The Society of Digital Policy & Management. All rights reserved. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0>), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## 1. Introduction

### 1.1 Objectives and Background of the Research

Digital technology has been developing rapidly in 21<sup>st</sup> century. With the improvement of living standards, cinema becomes an indispensable entertaining place in our daily lives. With the development of digital media content, its platform is also changing rapidly, for example, from silence to sound and even stereo, and from black and white to color and even three-dimensional. Such as from the general screen to the wide screen and then dome or ring screen, the shape, size, proportion, and acoustics of digital media contents platform are always changing. Among digital media contents platform, screen X has become a state-of-art screen technology[8].

### 1.2 Range of the Research

The scope of this research is screen X. Based on the books and previous research papers about these platforms, concept of each platform and the features of each platform will be discussed in this paper.

## 2. Theoretical Background

### 2.1 Concept of Screen X

The first time of the world screen X showed was in October, 2013 at Busan International Film Festival (BIFF). Developed by the CJ CGV Group and the Korean Institute of Science and Technology (KAIST). It was the first projection system on multiple planes in the world[1]. Screen X is a cinema technology which promises to offer audiences an immersive cinematic experience without wearing any glasses. As we know traditional movie theater had only one front viewable screen[2]. But screen X implements a three-sided screens using not only the front screen but also the two sidewalls. For simple summary, screen X basically

projects images and video along the sidewall of the theatre that go in sync with the front main screen[10]. So, that the audience can be immersed in 270 degrees of content, which means that, screen X is a different way of immersing the audience[4].

### 2.2 Development of Screen X

The first film shown on Screen X technology is the appropriately titled The X[6]. It is a half-hour spy thriller directed by JeeWoon Kim who premiered at the recent Busan International Film Festival. By 2016, Screen X has been in operation in more than 80 countries including South Korea, China, the United States, and Thailand and etc.. To be more specific, CGV has 23 theatres in Seoul operating with Screen X technology, and another 40 screens to be set up. Paul Kim, the lead producer of Screen X, claimed that “we plan to open 50 by the end of this year, 100 by the end of next year, and depending on how the film goes, in this format we may open more.’ Therefore, it can be predicted that Screen X’s market will grow rapidly in the next one or two years.

## 3. Methods

Based on the basic concept of screen X, we can raise the following questions. And through these discussions, we call on more profound studies relating screen X.

### 3.1 Questions of the Research

- 1) What are the characteristics of screen X?
- 2) What are the difference between side screen and center screen?
- 3) How many forms of screen X? and what are the differences?
- 4) How to optimize the screen X effect?

### 3.2 Methods of the Research

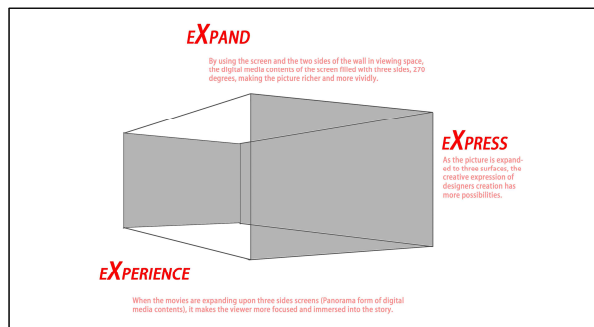
This paper presents the concepts and characteristics

of screen X while compares and analyzes the difference between side screen and center screen of each form of screen X. Finally, we looked ahead the development direction of screen X through the above results.

#### 4. Results and Discussion

##### 4.1 Characteristics of Screen X

In general, there are three major features of screen X: Expand, Express and Experience[11]. As shown in [Fig. 1], firstly, screen X expands beyond the front screen with spectacular special effects and additional immersion experience[9]. Secondly, contents expressed by screen X could reach beyond limits with innovatively creative methods. At last, for the audiences, the long-last entertainments and maximum immersion of screen X is a brand new experiences[3].



[Fig. 1] Three areas of screen X

##### 4.2 Comparison Between Different Screens

According to these features of Screen X above, we can analyze that its center screen and side screen are not the same. As it is shown in <Table 1>, we can see that screen X's center screen is a white or silver screen set up horizontally on the viewing platform, and the value of Front Side Ratio (FSR) is 1. Purely on the center screen, the viewing position is not a big request, which means it is very similar with the IMAX. While, the screen X's side screen is composed of vertical and horizontal vertical plane perpendicular to the horizontal plane, and the value of FSR is 1.8. And generally it

does not need to set a screen specifically, instead of, the projection will be showed directly on the left and right sides white walls. And because the cinema seats is inclined ladder (slope) slowly upward, the side screens will also slope based on them. To be more specific, the left and right sides may have screens of different tilts varying from before and after, respectively. These different slopes results in a great impact on the viewing effect of side screen if the viewers sit at different viewing position. Above all, in screen X, the center screen is the main screen while the side screens are used as auxiliary screens.

<Table 1> Comparison between center screen and side screen in screen X

	Center	Side Screen
Number of Screen	1	left 1, right 1
FSR	1	1.8
Screen	white/ silver screen	white walls
Impact or demand of viewing position	not much demand for viewing position	great impact of the viewing effect with different viewing position
Screen angle	horizontal plane	90-degrees curved surface whit the centre plane
Slope(Y/N)	N	Y
	MAIN SCREEN	AUXILIARY SCREEN

##### 4.3 Different forms of screen X

Screen X gets rid of the current concept of watching digital media contents through only one screen. It makes the left and right walls of theaters also become screens, resulting in kinds of 270 degrees screen which is like a 'C' character[2]. Therefore, the screen X can either extend the image that is presented on one face to both the left and the right sides (Panorama), or at the same time to present a different picture on a different screen (Split-Screen).

Taking the *Nespresso 'Milano' Commercial Screen X Version* released in October 2015 as an example, the two different methods of screen X can be showed sufficiently. This commercial can be viewed by scanning the QR Code in [Fig. 2].

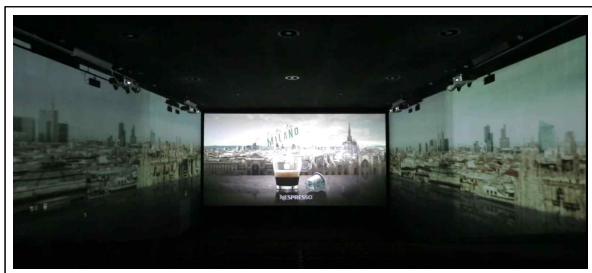


[Fig. 2] The QR Code of Nespresso 'Milano'

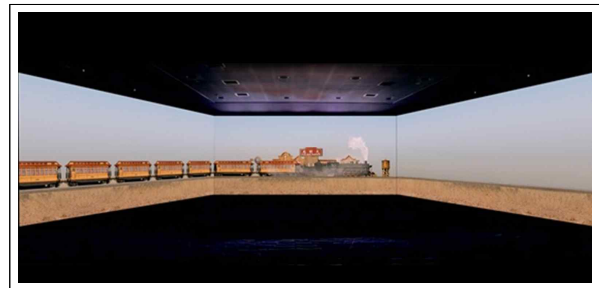
At the same time, we also exemplified *For A Few Bullets* to distinguish the two different methods of screen X again. *For A Few Bullets* (screen X version), which was shot by Chinese director Anzi Pan in 2014, is a 115-minute comedy movie. The film was released in China in July 2016 in the format of IMAX and screen X and the latter format attracted many audiences with a brand-new shock[7].

#### 4.3.1 The panorama visual form of screen X

As shown in [Fig. 3], this is the image at the end of *Nespresso 'Milano' Commercial Screen X Version* (at 32 seconds). Screen X can show a bird's eye view of the entire city, through a continuous frame on three screens, which brings the viewer's amazing three-dimensional visual impact on space[15]. But the important thing is that it does not affect the visual status of the coffee on the main screen, which still attracts viewers' eye sight and attention absolutely. We can call it panorama visual form.



[Fig. 3] An image cut in *Nespresso 'Milano'* ----- Panorama form



[Fig. 4] An image cut in movie *For A Few Bullets* ----- Panorama form

This panorama visual form is often used in screen X videos. As shown in the [Fig. 4], is an image of a moment in *For A Few Bullets* (screen X version) screen X movie. At this moment, through the screen X's three screens, to show audience a continuous image of the train moving medium shot[14]. The train pass through from the left to right of the screen. Compared with the general movie, the image of originally presented on a screen will be extended on three screens. The scene of "train moving across vast plain" could be experienced more by audience. This panorama visual form rang also bring the viewer with more immersive feelings.

#### 4.3.2 The Split-Screen form of screen X

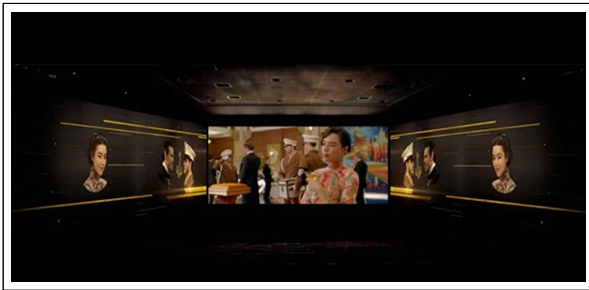
As shown in [Fig. 5], that is the image in the *Nespresso 'Milano' Commercial Screen X Version* (at 26 seconds). The projection on left and right are different from the main screen. Through the left and right screens, part details of the coffee machine on main screen can be enlarged in different the angle of sight. Therefore, some contents of the story can be explained specifically, and at the same time, through the left and right screen the viewers can be attract into in-depth feelings about the main screen's content[13].

The picture shown in [Fig. 6] is another screen of the movie *For A Few Bullets* (screen X version). This is a very obvious the Split-Screen formed into the screen X. We can see the content of the film before and after the convergence of the lens screen is shown on

the center of the main screen. While at this time, the left and right sides of the screen show the main characters[14], indirect expression of the characters thinking, and interpersonal relationships. It is summarized as ‘The Split-Screen form’ that presenting different content in the form of the picture at the same time for the viewers.



[Fig. 5] An image cut in *Nespresso 'Milano'* ----- Split-Screen form



[Fig. 6] An image cut in *For A Few Bullets* ----- Split-Screen form

#### 4.4 Maximize screen X performance to show the scene

Through the above research, can see screen X can bring the viewer with more immersice feelings, and at the same moment, it can bring the viewer some different images, also more information. Simultaneously, screen X also inevitably has some shortcomings[5].

The originally one-screened view now extends to three consecutive screens. However, problems come with advantages, especially in moving scenes, as rough moving trails could be noticeable[12], which requires stricter criteria in movie and special effect makings.

We found that screen X has more advantages in brighter scenes, while in darker scenes, additional screens have no differences with normal walls.

Through the above content, we can see that screen X in the performance of the bright scenes of the speed sense of a greater advantage. In addition, screen X can be through the addition of the two sides of the screen to expand the story, through more expand the information, so that the viewer can be out of the movie described the story. Compared to the long movie (Screen X Movies), screen X is more suitable for use as a short advertising format. Screen X Advertisement can maximize the interest of screen X, through a few minutes in the film to the viewer all-round introduction of the product.

## 5. Conclusion

Through the above understanding of the concept of screen X, and the analysis of specific examples on its characteristics, we can make a conclusion that screen X is a new concept that breaks the way of traditional viewing. It can make viewers have 270 degrees viewing platforms, by the C-type three sideds screen which is formed by the main screen and two auxiliary screens. So that the viewing field becomes broader, and visual effect of three-dimensional space becomes stronger. But in the other respect, it is also because of the three-dimensional visual effects, different viewing position will lead to different effect, and long-term viewing will possibly lead to a certain sense of dizzy. So, this platform can be used effectively in the future to make short advertising video, so as to achieve better publicity.

## REFERENCES

- [1] Xinyi Shan, Jean-Hun Chung, “Comparison of the Characteristics of Three Premium Large-Format

Platforms IMAX, Screen X and 360 Degrees Circular Screen”, Journal of Digital Convergence, Vol.15, No.8, pp.375-381, 2017.

[2] Xinyi Shan, “Analysis and Research on the Characteristics of Commercial Screen X Version Nespresso ‘Palermo’”, Journal of Convergence Contents, Vol.2, No.1, pp.26-27, 2017.

[3] Patrick Frater, “CinemaCon: Korean Immersive Format ScreenX Targets Hollywood and China”, Asia Bureau Chief, Apr. 6, 2016, <http://variety.com/2016/film/asia/screenx-targets-hollywood-and-china-at-cinemacon-1201747914/>, Apr. 22, 2017.

[4] Kaleem Aftab, “Introducing Screen X, Cinema in 270 Degrees”, Filmmaking, Oct. 17, 2013, <http://filmmakermagazine.com/76652-introducing-screen-x-cinema-in-270-degrees/#.WQqNWWelUk>, Apr. 22, 2017.

[5] Lee J, Lee S, Kim Y, Noh J, “ScreenX: Public Immersive Theatres with Uniform Movie Viewing Experiences”, IEEE transactions on visualization and computer graphics, Vol. 23, No.2, pp. 1124-1138, 2017.

[6] <http://www.rov8.com/index.php/Ta/index/2155.html>

[7] [http://blog.sina.com.cn/s/blog\\_bfbd08170102wz52.html](http://blog.sina.com.cn/s/blog_bfbd08170102wz52.html)

[8] <http://ln.qq.com/a/20151218/066055.htm>

[9] <https://buluo.qq.com/p/detail.html?bid=276999&pid=6944339-1450862256>

[10] <https://baike.baidu.com/item/screenx/20125387?fr=aladdin>

[11] <http://screenx.co.kr/en/>

[12] Yu-Seop Lee, Jean-Hun Chung, “Study on the Scanimation Expression Using Color Scheme”, Journal of Digital Convergence, Vol.14, No.12, pp.451-456, 2016.

[13] Lee, MyounJae, “Production of Media Art using OpenC”, Journal of the Korea Convergence Society, Vol.7, No.4, pp.173-180, 2016.

[14] Lee, Jun-Hyuk, “Electronic Attendance - Absence Recording System using BLE Advertising Function

of Smartphone”, Journal of the Korea Convergence Society, Vol.8, No.1, pp.7-11, 2017.

[15] Sun-Wha Chio, “<Orlando> - Unity and Harmony of Male and Female”, Journal of Convergence for Information Technology, Vol.7, No.3, pp.127-137, 2017.

선 심 이(Xinyi, Shan)



- 2014년 2월 : 평택대학교 영상디자인학과 (BFA)
- 2016년 2월 : 동국대학교 영상대학원 멀티미디어학과 (MFA)
- 2016년 3월 ~ 현재 : 동국대학교 영상대학원 멀티미디어학과 박사과정
- 관심분야 : 3D Computer Graphic, Contents Design, VR, Lighting, Visual Effects, Game Effects 등
- E-Mail : yarina.0122@gmail.com

전 진 현(Jean Hun, Chung)



- 1992년 2월 : 홍익대학교 미술대학 시각디자인학과(BFA)
- 1999년 11월 : 미국 Academy of Art University Computer Arts (MFA)
- 2001년 3월 ~ 현재 : 동국대학교 영상대학원 멀티미디어학과 교수
- 관심분야 : VR, Contents Design, 입체영상, 3D Computer Graphic, Computer Animation, Visual Effects 등
- E-Mail : evengates@gmail.com