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Virtual Experience in the Performing Arts: K-Live Hologram Music Concerts

This article explores the case of K-Live, a performing arts venue in Korea that presents holographic music concerts. The objective is to understand how K-Live uses hologram technology in order to control and direct audiences' virtual experience, to sustain their engagement and satisfaction with the performance, and thereby create a new content category. To understand this emerging phenomenon, the authors conducted extensive fieldwork at the K-Live concert hall where they interviewed audience members, production staff, and stakeholders, such as firm executives, venue managers, content providers, and government officials who function as cultural managers and gatekeepers. The data supporting this research is primarily qualitative; the authors were especially interested in audiences' engagement with and response to virtual representations of liveness. They also consider how industry stakeholders view their audiences and how arts entrepreneurs might take advantage of this new technology to create a range of virtual experiences for audiences in the arts. WoongJo Chang, PhD, is Assistant Professor in the Department of Arts and Cultural Management at Hongik University, Seoul, Korea. His research is focused on small arts organizations, arts entrepreneurship, and cultural policy. Hyung-Deok Shin, PhD, is Professor in Management in the College of Business Administration at Hongik University. His research areas include business strategy, international business, entrepreneurship, and arts management.

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An emerging performance modality is disrupting the conventionally accepted boundaries between live performance and pre-recorded presentation, between audience as watchers and audience as participants, and between the perceived authenticity of live performance and the constructed pleasures of virtual experience. In this article we present findings from our research into the use of holographic virtual experience at the concert venue K-

Live, a project of Korea Telecom (KT). We seek to discern the ways in which K-Live uses hologram technology in the growing experience economy in order to control, direct, and increase audience engagement and satisfaction with the performance and the venue.

K-Live is a performing arts venue in Korea dedicated to presenting music concerts using holographic, virtual reality technologies enhanced with strategically selected live elements. We chose this particular venue because K-Live is positioned on the cutting edge of an emergent technology and a burgeoning sphere of cultural reconfiguration. Since it was launched in Seoul in 2015, K-Live has explored the expanding possibilities for managing audience experience by presenting a number of holographic concerts of locally and internationally well-known K-Pop artists. These presentations are carefully constructed holographic simulations of live concerts that, in conjunction with selected live elements, are effectively developing a hybrid content category that has broad implications for the performing arts.

Virtual reality is generally defined as an experience made possible by specialized apparatuses. Steuer argues for a definition "in terms of human experience rather than technological hardware" that uses the concepts of presence and telepresence.[1] "Presence" is an individual's perception of one's physical surroundings, one's unmediated experience of the real-world environment. "Telepresence" describes an individual's mediated experience of presence in an artificial environment. With this understanding in place, Steuer proposes defining virtual reality as "a real or simulated environment in which a perceiver experiences telepresence."[2] *Virtual experience* denotes the process of engaging with a constructed tele-present virtual reality environment. Thus, holograms, which are created by projecting three-dimensional images with the facilitation and mediation of multiple laser beams or other light sources, are the virtual reality technologies K-Live uses to create and manage its audiences' virtual experience.

Liveness matters to people. Audiences commonly evaluate cultural content according to its degree of liveness, that is, where it lies on the continuum from pre-produced to created live. Liveness, which often confers legitimacy and authenticity, varies with cultural production, as do audience perceptions of the appropriateness and acceptability of relative degrees of liveness. Music concerts are live, whereas movies, television or radio shows are pre-recorded and pre-produced. Contemporary audiences accept these conditions of production and presentation as normative and unremarkable. Yet concerts can be recorded and experienced later, and television and radio shows can be and often are broadcast live. Each of these cultural presentations feature different levels of liveness that are contextually understood and accepted by audiences.

The holographic concerts presented at K-Live remix the live and the pre-recorded in ways that trouble conventional categories in the performing arts and raise a number of questions. How do audiences come to accept the not really real presentation of a holographic concert as virtually real, and more importantly, as a satisfying and pleasurable experience? How do stakeholders—technological

platform providers, content providers, and government agencies—understand audiences' desires and experiences and construct newly refigured sites and modes of social and cultural engagement through holographic simulations of live concerts? What are the roles, investments, and strategies of those involved in the production of the virtual concert experience? How do each of the industry stakeholders conceive of their intended audience? Does virtual reality technology give industry stakeholders tools that differ in kind, degree, and power from conventional approaches to producing entertainment? How do audience members conceive of their virtual concert experiences? And, while we recognize that this is a question for a future article, we wonder what impact this virtual experience of the performing arts has on the wider society in public value, economics, and cultural capital?

We contend that the answers to these questions have important and wide-ranging implications for customer relationship management, the development of sustainable arts organizations, the future of arts and cultural management, and popular art as a public good. In practical terms, virtual reality technology offers arts and cultural managers unprecedented tools for effecting greater audience engagement in the arts.

A selective literature review on the experience economy and a discussion of our methodology is followed by an exposition of our case study through a detailed description of a K-Live concert. In describing the K-Live concert, we discuss the technological developments that have made hologram concert productions viable modes of audience engagement. We then map the concerns and roles of the primary stakeholders—the technological platform providers, the content providers, and the government agencies—and focus on the audience engagement with technology in holographic performances. We conclude with a look forward to the game-changing potential, as well as pitfalls, of the intersection of the experience economy, technological developments, and the shift in audiences' desires for liveness toward increasing acceptance of virtual simulation.

The Experience Economy

To gain competitive advantage, companies have traditionally used strategies such as price competition and product differentiation to attract customers. [3] Increasingly enabled by newly available technological tools, companies have adopted an emerging strategy that takes account of and fosters consumers' experience and engagement with the product or service. Researchers are studying the nature of experience and its implications for customer relationship management in order to explore the "interface of consumer experience and happiness."[4] Entertainment industry stakeholders strategically construct, in both the literal and social sense, platforms for the active involvement of the public in elements of the process such as design ideation, product development, and production. The development of an interactive relationship between the consumer and the brand is a key goal.[5]

Art is an intrinsically intangible product; conventionally, audiences purchase a (usually passive) experience, such as viewing a play, a museum

exhibition, or musical concert. However, digital, online, and virtual presentation and 3D technologies, especially holograms, have provided arts entrepreneurs and industry stakeholders with powerful tools to expand audience experience into an interactive, co-creative engagement with the performance and, in the long term, the brand, which results in greater consumer satisfaction and loyalty. [6] Consequently, as arts organizations seek to transform receptive audiences into creative partners, the key to customer *relationship* management is to understand "experience."[7]

In their book on today's emerging experience economy, Pine and Gilmore contend that cash-rich/time-poor consumers increasingly want to experience perfect moments in their limited leisure time. [8] They argue that successful products must provide memorable and meaningful experiences and highlight the need to further enrich the consumer experience. There is a "sweet spot … a distinctive place" where the realms of aesthetics, escapism, education, and entertainment intersect in the consumer's experience. [9] Consequently, consumers' experiences must be constructed to be both entertaining and educational in nature.

Technological advances have introduced a number of production and presentation tools that enable providers to offer customers high-quality, pleasurable interactive experiences.[10] Piyathasanan *et al* examined the way that virtual experience influences customer's value perceptions and loyalty and found the important factors include flow or compelling experiences like actors' sense of involvement or enjoyment, their needs, motivations, and personal/social interactions, or a sense of presence such as "telepresence, copresence, social presence, and physical presence."[11] As Soukup argues, 3D visual technology has become central to virtual experience.[12] Li, Daugherty, and Biocca note that 3D visual technology enables consumers to have multisensory interactions with products in electronic commercial environments online. [13] According to them, "interactive advertising in the form of 3D product visualizations simulates a new type of indirect experience—virtual experience."[14] Virtual experiences thus are indirect and consist of visual, textual, and audio cues guiding consumers when they interact with a virtual product.[15]

Virtual experience as a new content category

Given the cultural credibility that liveness carries, content providers have used various techniques to increase the level of liveness in each content category. For example, a movie might feature greater liveness with three-dimensional optical illusion effects or even seat movements to add a fourth dimension. *Bohemian Rhapsody* is a 2018 movie that moviegoers watch in sing-along theatres. These theatres feature upgraded sound systems and enhanced acoustics, which transform them into aurally rewarding places for people to sing together. At screenings of *Bohemian Rhapsody*, the level of liveness is enhanced by the sound system and an acoustic design that fosters audience participation. In the case of productions that are already live, such as music concerts or stage musicals, liveness can be enhanced by various technical effects such as a rotating stage, laser lighting, and surround sound. These technological enhancements to cultural

presentations have contributed to blurring the lines between live performance and pre-recorded presentations, effectively reshaping audiences' openness to and perception of what is culturally appropriate and desirable.

Recently, emerging virtual reality technologies are further disrupting the traditional distinction between pre-produced and live music concerts. Hologram technologies offer digital simulations of concerts that, while not really real, are nevertheless virtually real and able to deliver much of the affective and experiential power of a live concert. Even within this new category productions can have various levels of liveness, as K-Live concerts do when they engage audience participation and feature live performers. This strategy overcomes the limitation of pre-produced concerts and allows audiences to get some (strictly orchestrated) real-time reactions from the music performers on the stage. These live elements, though only enhancements to the core, virtual presentation, serve to anchor the virtual to the real. Further, while not yet realized at the K-Live concerts described in this article, it is technically possible to live-stream concert contents holographically to provide some real-time reaction to the audience from the music performers. Thus, liveness, as a signifier of realness and value, provides a bridge from the quotidian to the imagined created by virtual technologies and is deployed in various ways by content providers, including K-Live.

While popular entertainment providers have long combined elements of the virtual with the real in their productions, and K-Live concerts are a hybrid of holographic and live elements, we argue that KT's holographic presentations constitute a significant development in the performing arts. For one thing, at K-Live the core performance is holographic and is only augmented by a few live elements. This reverses the arrangement of music concerts, in which holographic and other special effects augment the core performance, which is live. Furthermore, in our fieldwork, the expected discourse about authenticity was lacking, which suggests that audience members have agreed to suspend disbelief, and that the emerging representational technologies of holograms are being naturalized by audiences. In other words, audiences not only agree to suspend their disbelief; they allow themselves to interactively experience the virtual representation at a holographic K-Live concert as real and natural, rather than artificial and constructed. In addition, in holographic virtual reality productions, live cultural workers are displaced by digital representations, which challenges aesthetic norms and expectations of music concerts. While it is beyond the scope of this article to deeply analyze the social implications of these departures, audiences' performative engagement with emerging virtual reality technologies and willingness to accept virtual experience as natural, and even normative, represents a profound shift in cultural consumption patterns.

Methodology

To understand this emerging phenomenon, we conducted extensive fieldwork at the first K-Live concert hall. Grounding our work in a review of previous scholarship, we gathered information through document analysis and ethnographic methods, such as participant observation, on the spot interviews at concerts, and in-depth interviews with significant stakeholders. We reviewed KT

company documents such as their initial project proposals and organization mission statements and reports, and used KT's extensive customer surveys, in addition to all the concert programs and published reviews on K-Live concerts. We interviewed KT managers and directors, venue managers and staff, content providers, and government officials, all of whom function as arts and cultural managers and gatekeepers. We also conducted short, on-the-spot interviews with 127 audience members and staff who were engaged in the production and consumption of K-Live hologram concerts.[16] Many were interviewed with the help of translators since our respondents spoke four different languages (Korean, English, Chinese, and Japanese). We also conducted in-depth interviews with other stakeholders, including staff members of Idea Interactive, Inc. and SD Frontier, the companies that operate the K-Live concert venues on behalf of KT, and K-Art, the gift shop attached to the concert venue. We paid particular attention to how managers implemented customer experience management and how they evaluated its effectiveness.

K-Live Holographic Music Concerts

The K-Live holographic concert combines the features of a typical live concert with elaborate special effects, many of which are not possible in a live concert (see Figure 1). Holographic music concerts are made up of dynamic media façades of holographic images, the visual effects of brilliant lighting, lasers, fog, and other special effects, with powerful 14.2 channel surround sound (14 full-range channels plus 2 low frequency effects channel). These effects create "the cheerful energy of K-Pop … and a fantastic sense of space," as advertised in K-Live's printed program. A typical holographic concert of famous K-Pop stars lasts for about an hour. These virtual concerts are provided and facilitated by Korea Telecom (KT), an IT conglomerate in Korea, in collaboration with Korean entertainment companies YG and JYP, and the Korean Ministry of Science, ICT and Future Planning (Ministry of SIFP).

Figure 1. Holographic K-Pop singer Psy performing in a K-Live concert at Dongdaemun K-Live in 2016 (Source: Korea Telecom).

In 2015, a venue was established to present holographic performances of K-Pop stars in a shopping mall located in the Dongdaemun area of Seoul, a popular tourist destination. The launch of this undertaking was the result of a collaboration between KT and YG that aimed to engage audiences in virtual concerts of K-Pop musicians using holograms and various sensory technological gimmicks. It was initially funded by a grant from the Korean Ministry of SIFP. The two-story hologram theatre has 300 seats, with a standing zone that can hold about 100 more people, in a total area of approximately 1,650 square metres. Since the 2015 opening of the Dongdaemun K-Live venue, KT has opened several more holographic concert halls nationally and internationally. Over 350,800 visitors had attended these concerts by the time it closed in June 2017, clearly exceeding its target audience. In order to secure the operation of a domestic point-of-reference site, in July 2017 K-Live opened Songdo in Incheon, the third largest city in Korea, and offered a much greater variety of content. The Songdo venue is a space in which KT's other immersive media technology projects can be experienced. Since launching the K-Live theatre in Dongdaemun, KT has opened two more domestic concert halls and one in Sentosa, Singapore. The company is working on opening other performance halls in Thailand and China, as well, and is planning to open a total of twenty hologram performance theatres, both in and outside of Korea, by 2020.

KT's Immersive Media Task Force Team develops various media business technologies, such as next-generation holographic and virtual reality tools. According to the Virtual Culture team manager at KT,[17] K-live based its business model on using these technologies in various outlets from children's play and educational spaces to Virtual Reality Theme Parks. KT is launching differentiated services by applying realistic media technology to these various areas. According to the Vice President of KT,[18] the KT Immersive Media Task Force's goal for the K-Live project was to provide a real-life concert experience at a more affordable

price and in a more intimate setting. When the hologram concerts were first launched, the performances included artists associated with YG, such as Psy and Big Bang. In 2016 KT, in cooperation with JYP, brought virtual performances by JYP artists, including the Wonder Girls and 2PM, to their venue. Currently the venue continues to offer performances by YG and JYP artists. KT is exploring possibilities for collaboration with other entertainment companies.

For audiences, K-Live concerts are often a convenient alternative to the traditional concert experience. Even though the visuals presented in the hologram theatre are not "real," per se, these simulated performances offer fans several benefits. It is clear that K-Live venues present attendees with a more intimate and physically comfortable experience than standing among thousands of strangers in a typical concert hall. One fan from the Ukraine who attended a concert with her daughter told us: "It was not hot in the hall like yesterday in the outside concert, so my daughter and I could enjoy the great music by Big Bang while staying cool."[19] A fan can decide to attend one of these concerts on the spur of the moment, say, in the middle of shopping at the mall, rather than having to plan and purchase tickets ahead. "I came here three times with my friends, each time with different friends," said a Chinese K-pop fan.[20] Groups are also able to book a special concert/session to enjoy with their friends.

Concert producers deploy the holographic technology to afford fans the virtual experience of interacting with the artists they idolize. The smaller venue puts the audience in closer proximity to the performers, which allows for a more intimate, though virtual, experience. Although the audience in the virtual setting is not able to talk to the artists (who are not actually present), there are still some of the interactive elements of a live concert. "Are you guys ready?" and "Can I hear you scream?" are common in both live and virtual concerts. As a KT official commented: "The performance is not [intended] to demonstrate the technological prowess of our company, but to bring in technology to enliven the show."[21] An additional benefit is that fans can take a "virtual" photograph of themselves with their idol in a photo booth; create composite photos with their idol; and also purchase K-Pop goods, including accessories, albums, clothes, and stationery from more than 50 K-Pop groups and artists at the venue's large K-Art specialty gift shop. The price of admission is clearly a huge benefit for fans as tickets cost less than 35 USD (about 37,000 KRW). In contrast, a live K-Pop concert costs anywhere from 100 to 1,000 USD. Since one hologram stage can carry several performances produced by competing entertainment companies, K-Live's concerts offer fans very good value.

The realness of the performances seemed to matter less with audience members than we expected. Few attendees were concerned that the concerts were not "real" and therefore inauthentic. Audience members seemed to suspend disbelief and allow themselves to be carried into an immersive experience of the concert in a way that felt natural and virtually, if not actually, real. "The music was so great. The hologram technology did not bother me at all, which was good because it means that it seamlessly worked for me to enjoy the great music. I would definitely come back here again," commented a musician from the United States.[22] The age of the attendees may factor into perceptions of naturalness

versus artificiality. One staff member of the operating team from Idea Interactive, Inc. remarked: "Older members of the audience [often] express their surprise over the hologram technology. For young concert attendees, curiosity over the technology does not last more than 10 minutes. They tend to focus more on the content itself."[23] Yet it appears that even older concert-goers, while self-consciously aware that the holographic presentations are not real in the same way as a live performance might be, are nevertheless able to naturalize the experience enough to unselfconsciously enjoy it as natural rather than artificial. One fan, a female in her 40s from Japan, reported that:

> The singers look so real. They look so handsome. I could not really tell the difference if I didn't know it was not real. The singers' interactive gestures were just [the] same as if I was in the real concert, although they were all planned. But, after all, aren't they all planned in the real concerts, if there's not accidents? I'm just happy that I have just seen T.O.P. again. He was just so handsome.[24]

The producers of K-Live concerts consciously seek to construct and manage the audiences' experience. KT's Virtual Culture team manager said: "We really try to understand what our customers experience so we can give them the best experience. [...] We hope they will prefer our virtual reality concerts. [... So] we try to make them as real as possible and we pay close attention to what our customers want."[25] To understand how they accomplish the construction of this consumer experience using emerging technologies, we mapped the stakeholders involved in the production of K-Live concerts.

Mapping the Stakeholders

The combined, collaborative effort of multiple stakeholders is necessary to create the unique customer experience of K-Live's holographic concerts. These stakeholders include: (1) the telecommunications company, Korea Telecom (KT), which is the technological platform provider; (2) the entertainment companies (YG and JYP), which are the content providers; and (3) the government (the Ministry of Science, Information Communication Technology, and Future Planning); which collectively provide all the required elements of a virtual experience music concert (Figure 2).
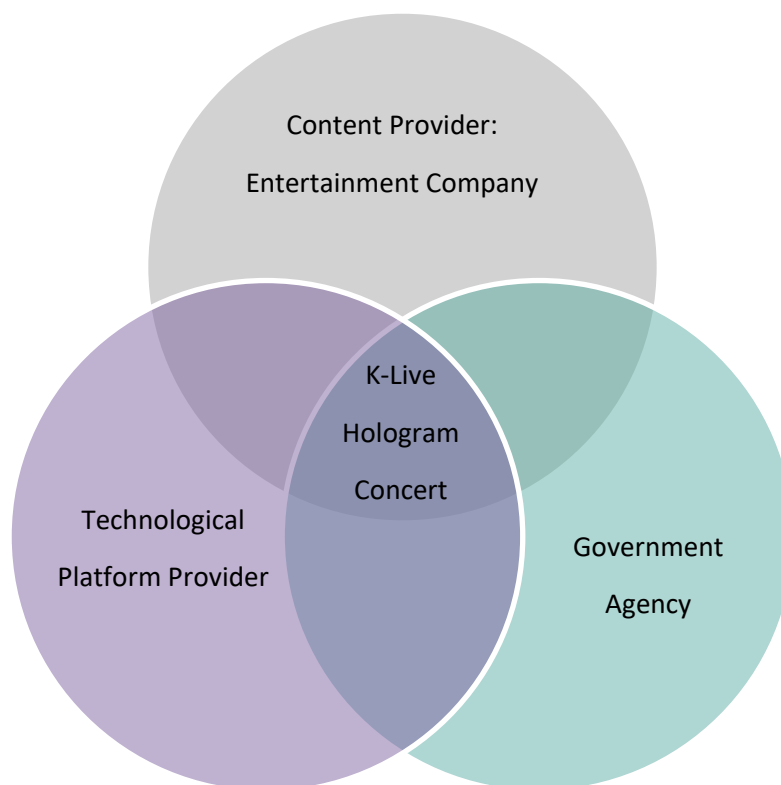
Figure 2. Stakeholders of K-Live

The first stakeholder, Korea Telecom, is a Korean telecommunications conglomerate that initiated and organized this collaborative project. It provides the necessary hologram technologies that make the virtual experience of K-Live concerts possible. KT works with the Korean technology startup D'strict to implement the hologram technologies. KT's underlying goal, through the hologram performances, is to make its corporate brand a household name. To help achieve this goal, it concurrently conducts research and development (R&D) and tests 5G technology, [26] through the KT Institute of Convergence Technology. Recently, KT patented its hologram technology through this institute. One assistant manager at KT explained that:

> we have expanded our venue nationally and internationally … we try not to lose money but we don't try to make huge money out of this because K-Live is our R&D outlet. We are constantly making our best efforts to construct the ecology of the immersive media to provide new virtual experience to our customers so that we can prepare for the 5G network world.[27]

KT secured a government grant to fund its project, and then recruited artists to perform in a virtual experience holographic concert, including artists under contract with YG and JYP. KT asked them to undertake a project involving a complicated production process of audio and video recordings. According to KT's Vice President, the company uses its hologram concerts to conduct market research for new business opportunities, to enhance KT's customer relationship management, and to pursue its agenda of making its corporate brand a household name.[28] KT plans to use the hologram performance hall as a venue through which

to diversify Korean pop culture and promote the spread of *hallyu*, or Korean Wave, overseas. KT's Vice President acknowledged that "our eventual purpose for this mega and longitudinal experimental project is to become a leader of [the] 5G network world, where AI and IoT [Internet of Things] will be common technology for everyone."[29]

The second group of stakeholders in the K-Live concerts are the content providers, the entertainment companies YG and JYP. YG, in particular, holds a stake in this new innovative technology as it contributed to the establishment of NIK, the hologram content investment company. NIK is currently negotiating contracts with various other entertainment companies for additional hologram content to be displayed through K-Live. The hologram concert defies the theory of "cost disease," a concept coined by Baumol and Bowen, which states that every performance comes at a cost because performers have to input the same resources every time.[30] However, with the hologram concert, the artists make a great effort at the beginning, after which they no longer need to show up in person to perform at future concerts, though they can continue to collect revenue via a license fee.

Content providers of other entertainment forms have also used K-Live's technology. In collaboration with other content providers, KT added children's musicals to its repertoire. For instance, in July 2016, it unveiled a holographic musical based on the "Maple Story," a popular comic book of the video game of the same name. Earlier in 2015, KT presented a drawing show, "Let's Go," in which the performers draw a picture using motion sensing, sound visualization, and telepresence technologies. Content providers use these technologies to immerse audiences directly into the performance by reducing the distance between stage and audience, which results in fans being increasingly loyal to their brand.

The third stakeholders in K-Live concerts are government agencies, including the Ministry of SIFP which funded this experimental performance project with seed grants. The seed grants were valuable and necessary since events in which the arts and technology converge usually require a large upfront investment. Most arts organizations are unable to afford this level of investment and for-profit entities are often not interested in pursuing big-ticket, untried projects. The government's funding and its endorsement is invaluable for the success of experimental projects such as K-Live. In turn, that success brings enhanced national branding—"K-" for "Korean"—that the government views as a benefit. Successful K-Live performances also are opportunities for the Ministry of SIFP to showcase its effective governance.

Initially, artists and musicians were regarded by the platform and content providers as assets of the entertainment companies rather than independent stakeholders themselves. However, this is beginning to change as the major stakeholders seek to involve artists, individually and in groups, in the process of content creation using these cutting-edge technologies. Although KT originally worked only with the national government, they are now also working with local governments. For example, KT and the Gwangju Information and Culture Industry Promotion Agency (GITCT) collaborate to fund individual artists to act as content providers. The intention is to incubate those artists as holographic arts experts.[31]

Virtual Reality Technology as Audience Experience Enhancer

K-Live concerts provide an unparalleled aesthetic ecology by combining recorded hologram performances using virtual reality technologies; on-site real performances by non-artist staff; and facilitated audience engagement. This unique conjunction of elements means that the holographic concert venue provides an effective experiential platform where producers and audiences co-create the content and experience of a virtual reality concert. An assistant manager at KT explained how they are trying to shape the audience experience: "With 5G technology, we have tested a lot of ways to make the performers look like they're really there. The software and gear that were developed via the 5G tech is just amazing. It certainly has a lot of power. It's not that we want to mess with people's heads, but really we just try to make the cultural experience more fun for the audience. Because that's fun for us too."[32]

The screen on which the performances are viewed is set two metres into the stage in order to create shadows and add depth to the hologram projections. Mimicking the traditional concert stage, the hologram stage has screens on both sides on which a zoomed-in view of the (holographic) performance is projected with colored and flashing strobe lights. Other special effects, such as bubbles and foam rain can simulate a live concert and enliven the atmosphere. In addition, speakers surround the audience, blasting the music as one would expect at a K-Pop concert. With these special effects, the K-Pop stars and their holographic performances are in 3D and appear quite real. The optical illusion is achieved by filming the artists multiple times in front of a blue screen, and then connecting each image and processing them with computer graphics applications.

In some concerts, there is a live dance sequence in which real dancers move in tandem with holographic dancers and various projected objects. When real dancers dance among the graphics, it is difficult to discern what is real and what is not. The K-Pop stars are holographic, while the backup dancers may be real. As in a live concert, the stars on the stage banter with each other between the songs; they also address the audience members, asking them to sing along or to clap to the beat of the music, saying, "Are you with me?" or counting, "One! Two! Three! Four!" At some point, a (live) staff member wearing an iconic teddy bear suit comes into the standing room audience area and mingles and dances with audience members. The teddy bear, named Klunk, was designed by GD, a popular K-Pop star. However, since Klunk's dance routine is not synchronized with the music and is ruining the concert, other staff members try to kick him out of the concert. While Klunk is running away from them, he lands on the stage, as was planned from the beginning. Once on the stage, Klunk morphs into a hologram of himself and soon removes the teddy bear suit to reveal (a hologram of) K-Pop star GD singing and dancing. This playful illusion offers audience members the pleasurable virtual experience of having danced with their idol. As a K-Live operating team leader observed:

> We can certainly tell that audiences' overall satisfaction sky-rocketed when the real-life Klunk comes out and dances. It certainly provides [a] seamless link between real-life and virtual experiences.[33]

Brown and Novak-Leonard identify five points on what they term the Audience Involvement Spectrum. [34] The first two, spectating and enhanced engagement, are receptive, while the remaining three, crowdsourcing, co-creation, and audience as artist are increasingly participatory. In crowdsourcing, in the middle of the spectrum, audience members participate in a scripted improvisation that plays a relatively pre-determined role in the production of the concert. As we observed in the K-Live concert, the virtual experience made possible by hologram technology transformed the audience from receptive spectators to participants actively engaged somewhere between crowdsourcing and co-creation, in that audience members co-create the experience among themselves as well as with the virtual artists and staff. One of the Operating Team staff from Idea Interactive, Inc., who sometimes acts in the Klunk costume, commented:

> Yes, I can tell that I make [a] huge difference in audience engagement when I wear this Klunk bear costume and play with them. There's certainly interaction between musicians and audience but the interaction among the audience is very important or more important.[35]

One way in which K-Live audiences are engaged in co-creation of the concert experience is through a form of crowdsourcing made possible by technology. Before the audience enters the theatre, they are asked to take selfies and submit them to the staff. The images are immediately processed by the backstage engineer and incorporated into the video images projected onto the screen. Thus, the concert begins with a computer graphic motion picture of audience members dancing with the K-Pop stars. As the veil rises on the stage, the singing and dancing artists appear to be very real. At some point, the hologram of the K-Pop star selects a fan, usually female, and asks her to answer the telephone box on the side stage, while a live shot of the fan doing this is projected onto the screen along with shots of the K-Pop star as they are performing together. In the end, the fan who was selected to answer the phone is presented with a virtual rose by the virtual star. Achieving this depends on the hard work and skills of engineers and staff members who operate the high-resolution media devices to seamlessly create a technologically enhanced reality. This masterful performance seems to have made a huge impression on the audiences. Many people reported in the on-the-spot interviews that they enjoyed the interaction tremendously and how much the technology invisibly contributed to their feelings of engagement. As one Korean teenager said,

> my friends photographed me while I was on the stage virtually with GD. At first, I was very embarrassed when I was called up. But now I am so thrilled to see that I was on the stage with GD. I have it in my phone. This is a pleasurable fantasy. This is why we go to concerts, right?[36]

Whereas Sullivan describes the live performing arts as amenities that traditionally require ongoing investment to produce and provide,[37] holographic concerts redefine the relationship between production and provision. They help to maintain K-Pop fandom and create a participatory culture without requiring much further investment of time or resources, after the initial investment in

development. A young Chinese woman who attended the hologram concert remarked how it was the highlight of her visit to Korea. As she stated, "I really enjoyed the hologram concert, and it did not cost me an arm and a leg to attend it. I was just shopping in the mall, and then came here. It was really cool to see my favorite K-Pop singer GD without having to travel far from my hotel."[38] A mother and daughter visiting from Kazakhstan said they really enjoyed the interactive feature of the concert. The mother expressed her concern for her young daughter's safety and said that the hologram concert felt like a safer environment than a real concert venue would have been. A Korean woman with her husband and two girls said, "My two daughters have always wanted to attend a Big Bang concert but it's difficult to let those kids go to the real concert halls due to the safety. However, a venue like this is very safe and family friendly."[39] A French visitor said she is a huge fan of Big Bang's T.O.P. and she was surprised to see her face floating on the screen with T.O.P. She enjoyed the virtual experience of feeling as though she was dancing and singing with her idol.[40]

Discussion and Implications for Management

In this article, we have presented findings from our study of the ways in which an emerging performance modality—holographic music concerts—is being deployed by technology and entertainment companies, with support from the government, to construct a new, participatory, virtual experience for consumers of the performing arts. Through extensive document analysis and a year of fieldwork at K-Live, a hologram concert venue operated by KT in Korea, we sought to understand how the stakeholders were able to construct and manage their customers' virtual experiences and how audiences responded. We were able to trace how these stakeholders—the technological platform provider (KT), the content providers (YG and JYP), and a government agency (the Korean Ministry of SIFP)—work together to offer audiences carefully constructed and enhanced virtual experiences through holographic simulations of live concerts. K-Live is an R&D project for KT, which is less concerned with making money from it than with developing modalities and techniques to generate sustainable audience engagement with, immersion in, and ongoing satisfaction with their virtual experience product: the holographic concert. In pursuit of these goals, stakeholders have taken new and innovative approaches to the experience economy, as their customers have, with notable seamlessness, embraced the virtually real experience that K-Live constructs for them.

For concert attendees, holographic concerts offer some significant benefits over the experience of attending traditional live concerts. While holographic concerts lack some important qualities inherent in live concerts—the presence of live musicians, for instance, and the gritty, sweaty experience of catharsis—the intensive integration of technological presentation with audience participation in this emerging representational form delivers most of the amenities of a live concert without the inconveniences. Concert goers appreciate the convenient access, lower cost, greater comfort, and increased sense of safety they experience at K-Live's concerts. In enjoying these benefits, they agree to suspend disbelief and immerse themselves in the flow of the experience as they interact with the

holographic images, live staff, and other audience members to collectively co-create what, in the end, becomes their own quite real experience of a virtually realized performance.

Certainly, there are limitations to and concerns about virtual experience and holographic representations of the performing arts. The introduction of innovative technologies can generate social anxieties. Holographic concerts disrupt the prevailing paradigm of performing arts by replacing live artists with digital representations. This challenges both the economic structure of production and aesthetic expectations of the audience. Will the human artists be fairly compensated? Will owners of conventional venues lose market share? What does it mean to have a relationship, however fleeting, with a person conjured out of light and bytes? What happens when human performance becomes capturable and infinitely reproducible and re-performable by a reified, seemingly corporeal, virtual presence? The answers to these questions are unknown and many of the implications of this emerging technology are unclear. A full exploration of these issues will have to await future work by ourselves and other scholars.

What is apparent from our research is that there are many fans and concert goers who are ready to embrace and immerse themselves in the pleasurable and participatory virtual world of the holographic concert that KT, the tech platform provider, and the entertainment companies YG and JYP, the content providers, have constructed for them. Our findings further suggest that, arts entrepreneurs and cultural managers would be well-advised to embrace the potential of holographic presentations. K-Live has demonstrated the successful deployment and management of audience virtual experience in the popular music sphere, but there are other potential uses, such as creating holographic representations of historic performers in all genres, an application that is likely in the future to enrich formal music and theatre education, and provide unprecedented levels of cultural access to even the most disadvantaged and isolated communities and groups. It is clear that someone has to invest the time and money into creating these virtual simulations. At present, it is an expensive and labor-intensive process that is accessible only to organizations with deep pockets. But looking forward, as the technology improves and is more widely adopted, and the price comes down, arts entrepreneurs and cultural managers would be well advised to gain the skills and tools to create virtual experiences for audiences in the performing arts.

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¹⁶ We conducted 72 interviews between July 18 and 21, 2016; 43 between December 1 and 6, 2016; and January 12 and 18, 2017.

¹⁷ Interview with KT's Virtual Culture team manager, Kieun Jung, September 21, 2016.

¹⁸ Interview with KT's Vice President, Mi-yeon Lee, September 21, 2016.

¹⁹ Interview with a Ukraine fan, July 21, 2016.

²⁰ Interview with a Chinese K-pop fan, January 18, 2017.

²¹ J. Park, "Holograms Enrich Pop Culture Content," *Korea Times*, March 18, 2016, http://www.koreatimes.co.kr/www/news/culture/2016/09/201_200680.html.

²² Interview with a musician from the United States, July 20, 2016.

²³ Interview with an operating team staff from Idea Interactive, Inc., January 18, 2017.

²⁴ Interview with a Japanese T.O.P. fan, July 21, 2016. T.O.P. (Choi Seung-hyun) is a member of Big Bang.

²⁵ Interview with KT's Virtual Culture team manager, Kieun Jung, July 20, 2017.

²⁶ Largely thanks to R&D efforts by Korean telecommunication companies, on April 3, 2019, South Korea launched the world's first nationwide 5G mobile network and started many services that take advantages of the new technology.

²⁷ Interview with an assistant manager at KT, July 20, 2017.

²⁸ Interview with KT's Vice President, Mi-yeon Lee, September 21, 2016.

²⁹ Interview with KT's Vice President, Mi-yeon Lee, October 31, 2016.

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[40] Interview with a French visitor, January 18, 2017.