Taxonomy of digital signage message execution and media placement considerations

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ABSTRACT

Digital signage is a commercial promising field in marketing. Yet, it is a little researched topic, with an incomplete understanding of the factors to consider when planning digital signage message executions or media placements. There is no systematic, cohesive foundation to describe and study the features of this promising contemporary digital platform. This paper addresses an academic-practitioner divide by developing an orderly categorisation of digital signage message execution and media placement considerations and research. It offers a well-ordered conceptualisation of digital signage types and guidelines for selecting content types, formats, display quality and technical interactive designs. The resulting taxonomy is of relevance to retailers and marketers aiming to optimise utilitarian or hedonic value. Some guidance for prospect research is provided, particularly assessing the varies opportunities offered by different digital signage content types; designing experiments compare the effectiveness of digital display quality, sizes, placement and designs at different locations. The possible obstacles of interactive digital signage also deserve future research.

Keywords: out-of-home advertising media, media planning, way-finder technologies, digital marketing, advertising, communication

INTRODUCTION

Contemporary out-of-home (OOH) advertising evolved from of being predominantly static traditional advertising boards to digital signage (Roux 2018:17). Digital signage refers to electronic networked displays in public spaces used for community information, brand visibility and product offerings (Dennis, Michon, Brakus, Newman & Alamanos 2012:454). The global market for digital signage has grown remarkably and this is expected to continue (Marketwatch 2020). The global market size, valued at 7762.4 million USD in 2018, is predicted to reach 11380 million USD in 2024, growing at a compound annual growth rate of 7.9% between 2019 and 2024 (Marketwatch 2020).

African markets such as Kenya, Ghana Tanzania Nigeria are predicted to continue to grow rapidly, representing some of the most rapidly expanding digital out-of-home markets globally (PriceWaterhouseCoopers 2018:172-179). South Africa has also experienced a significant increase in the installation of digital signage across the country, as is evident by the replacement of traditional OOH signage with digital signage in various leisure and retail environments (Liebenberg 2012:243). Well-known companies, such as One Digital Media, have installed more than 7 500 digital screens in more than 1 500 stores countrywide and Primall Media has deployed 25 800 digital networks in over 24

malls and 8 500 retail outlets across the country (Liebenberg 2012:245). Various businesses in South Africa, ranging from airports, shopping malls, bars, restaurants, entertainment and healthcare providers, have also instated digital signage networks (Nelson 2016:10). Digital signage thereby contributed 30% of total OOH advertising revenue in 2018 and is predicted to represent 43% in 2022 in South Africa (PriceWaterhouseCoopers 2018:170). This evidence suggests that practitioners have begun to appreciate the advantages and benefits brought by digital signage. However, this appreciation is not yet reflected in contemporary global and South African academic literature (Roux 2018:18; Taylor 2015:170;).

PROBLEM STATEMENT AND OBJECTIVES

Despite increased usage, progressive growth and revenue in digital signage; there remains a lack of appreciation for digital signage applications and opportunities in the current literature (Taylor 2015:170). Only a few international studies on digital signage have been conducted (see Table 1), most of which focus on consumers' motivation and behavioural response to digital signage content (Bae, Jun & Hough 2016:252; Burke 2009:124; Roggeveen, Nordfalt & Grewal 2016:201; Willems, Brengman & Van de Sanden 2017:38). A few others examine the role of digital signage content in contributing to retail atmospherics (Dennis, Michon, Brakus, Newman & Alamanos 2012:454; Dennis, Newman, Michon, Brakus & Wright 2016:131). Scholars in the computer science field have examined the effect of digital signage technology formats on human interactions (Bauer, Dohmen & Strauss 2011:137; Gan, Lee & Lien 2018:186; Limerick, Hayden, Beattie, Georgiou & Müller 2019:1; Ravnik & Solina 2013:1).

TABLE 1
SUMMARY OF DIGITAL SIGNAGE STUDIES

	Source	Key findings	Method	Context
Digital signage content	Burke, 2009	Utilitarian content (information, seasonal offers, promotions) increase sales of hedonic food (such as snacks and alcoholic beverages).	Commercial experiments	US in Store
	Dennis et al. (2012)	Entertaining content is effective for shoppers who are retired/not employed full time. Information-based content is more suitable for high-spending and high-income shoppers	Experiment	UK in Harrods
	Dennis et al. (2014)	Hedonic content performs better at enhancing in-store experiences and subsequent attitudes towards the ad and the advertiser compared to utilitarian content	Experiment	UK in Harrods
	Lee & Cho (2017)	Informativeness, involvement, entertainment and targeting affect consumers' attention to digital signage advertising content	Survey	Korea
	Roggeveen et al. (2016)	Price outperforms non-price promotions for in-store digital signage.	Experiments switching digital on/off	Sweden
	Willems et al. (2017)	Commercial settings (e.g. as stores and self-service restaurants) would benefit from aligning the content and location of the screens	Field experiment	Belgium
Digital signage format	Bauer et al. (2011)	Contextual adoptive signage -increases attention	IT simulations	Experiment in a laboratory environment/Austria
	Gan et al. (2018)	Integration of mobile applications increases performance of digital marketing and information dissemination	IT simulations	Experiment in a laboratory environment
	Limerick et al. (2019)	Haptic feedback significantly improves usability and aesthetic appeal of digital signage. Gamification also increase engagement	IT simulations	Experiment in a laboratory environment/ Germany
	Ravnik & Solina (2013)	Attention paid to content is influence by gender and ages of viewers	Computer vision enhanced digital signage experiment and survey	Slovenia

However, studies on this novel digital platform in an emerging context are limited. Roux, Van der Waldt & Ehlers (2013:383) propose a classification framework for OOH advertising platforms in South Africa. More recently, Roux (2018:17) explored the perspectives of selected advertising practitioners on the digital signage market. However, none of these studies offered recommendations regarding the unique content and media features of digital signage for using or considering this new medium.

There is still not a complete understanding of the factors to consider when planning digital signage message executions or media placements. Designing digital signage without a proper understanding of optimal placement or uninteresting irrelevant content in a specific context will results in "display blindness", ignored by viewers (José, Otero & Cardoso 2017:1; Müller 2009:1).

The opportunities for using different content, contemporary formats, displays and interaction features are also not apparent. Practitioners might thus not be aware of the available formats and content types they can use to communicate or the technical interactive design features to consider to maximising engagement. Furthermore, there is no orderly, integrated basis to describe and research the features of this promising contemporary digital platform. This article aims to overcome these identified gaps by developing an orderly taxonomy of digital signage message execution and media placement considerations and research. Message execution involves a process of translating a brand, communicated as a value proposition or a positioning in the consumer's mind, into a message that is delivered through a certain medium (Malthouse & Calder 2010:1). The media placement is more of a tactical concern of accomplishing the required reach and frequency against the target market (Malthouse & Calder 2010:1).

The aim of this article will be achieved by addressing the following two specific secondary objectives: 1) examining the message execution factors to be considered when using digital signage; and 2) examining the media placement factors to be considered when using digital signage.

Addressing the lack of guidance on digital signage message execution and media placement considerations is valuable, since closing the academic-industry divide remains a concern. Rossiter & Percy (2013:391) raise serious concerns regarding the considerable widening of the academic-industry divide, due to scholars continued disregard of industry practices and needs. Reconnaissance of this nature is critical in light of the claimed increasing gap between the knowledge offered by scholars and that which is regarded as useful by industry (Tapp 2004:579). Scholars indubitably view the integration of theory and practice as being equally valuable and needed, believing that it is they who should be driving marketing knowledge forward. This article contributes to limited theory on digital signage as modern digital OOH media and furthers the advancement of advertising and media literature by collation digital signage message execution and media placement research. From a practical perspective, this study can guide marketers, advertisers, and brand managers regarding the key critical considerations to optimise the effectiveness of this unique digital channel. The article proceeds as follows. Digital signage message execution and media placement factors are examined and relevant studies are reviewed. Practical guidelines and suggestions for future research are also presented.

DIGITAL SIGNAGE MESSAGE EXECUTION FACTORS

Contemporary advertisers must take into consideration the effectiveness of the advertising messages delivered as well as the media where the messages are placed (Malthouse & Calder 2010:1). Both these crucial aspects should also be considered when using digital signage as medium to deliver a message and have thus been included in the taxonomy of digital signage (Figure 1).

Digital signage consists of electronic displays, a media player and mechanisms that allow the uploading and managing of content appearing on displays (Bauer, Dohmen, & Strauss 2011:137). The digital signage content refers

to the messages displayed on the screens such as advertising, information or entertainment, while the medium features include display quality and interaction with the audience when viewing the messages on the medium. In the following sections digital signage formats and content will be discussed, while integrating previous research.

FIGURE 1
CONCEPTUALISED FRAMEWORK
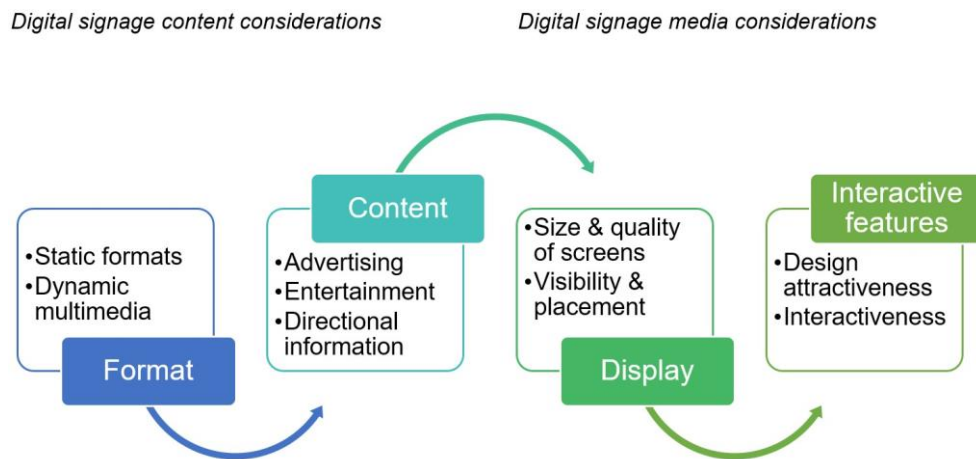
Digital signage formats

Static versus dynamic multimedia formats

Static advertising content displayed on digital signage does not change or incorporate any moving video or multimedia features (Bauer et al. 2011:216). This implies that no matter how much the target consumer engages with the content, it still remains static. Static content is relatively easy to control and has a low time commitment (McTigue 2013:1). This type of content is suitable for highly regulated industries where content must be carefully reviewed and approved by relevant stakeholders, such as the pharmaceutical industry. Dynamic multimedia formats, on the other hand, use video and animated messages that can be used as marketing messages for audience engagement that in turn can be converted into sales leads to follow up (Lui, Shi, Teixeira & Wedel 2018:144). Video content can be integrated as a communication strategy to produce useful, entertaining and interesting messages to target audiences (Dennis et al. 2012:213).

Research on signage formats

Several academic scholars regard the ability of digital signage to display information in the form of dynamic multimedia presentations containing audio, video and animations as one of the major benefits compared to traditional static content. Bauer et al. (2011:141) assert that contextual signage with sensors and technologies, allowing digital signs to adapt to a specific context, such as time and location, could increase audience attention. Newman, Dennis, Wright & King (2010:50) advise shopping malls to use audio, video and animation content displayed on digital screens to enhance shoppers' experiences and the atmosphere in the mall. Roggeveen et al. (2016:128) also found that dynamic content, such as video, can mentally transport shoppers to create a stronger emotional connection with the brand or product that in turn can reduce customer price sensitivity and enhance their consumption of more holistic options. These formats also seem to be effective for digital signage in higher education. Digital signage used as a campus information delivering system is more likely to be noticed if the message is incorporated with moving images, animated logos and video clips accompanied by audio and interactivity to increase the aggregation of personal attention (Nec, 2015).

Digital signage content

Newman et al. (2010:50) classify digital signage content as advertising, entertainment or directional information (see Figure 2). These major digital signage content types are reviewed in the following sections.

Advertising on digital signage

Digital signage, as one of the most economically promising fields in advertising (Bauer et al. 2011:137), offers the following unique advantages. First, advertising displayed on the digital screen can be transformed at any given time, since the content is preloaded (Ogunlade 2015:8). Advertisers can thus design customised localised content or display content obtained from a global network across locations in an environment (Bauer et al. 2011:140). This means that with just a click of a button brands can select customised local or global advertisements they wish to expose to their target audience. Secondly, the retailers inside and outside the mall can rent advertising space to display their advertisements on digital signage. This offers them opportunities to swiftly advertise their market offerings to the targeted audience (Cho, Kim, Mohammed, Adeli, Ho & Lee 2012:187). Thirdly, digital media location-based technologies and the improved implementation of technological devices (e.g. smart phones and tablets) enable consumer interaction and engagement (Roux 2018:21).

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Advertising content can be classified as utilitarian (rational) or hedonic (affective). A utilitarian approach typically focuses on communicating functional product performances, factual information and cognitively oriented benefits (Holbrook & Hirschman 1982:133; Chaudhuri & Micu 2014:3). The origin of utilitarian or rational advertising approaches can be traced back to the traditional information processing model of decision making (Miller & Stafford 1999:44), suggesting that a message can change consumers' beliefs through learning (Kotler & Armstrong, 2006:467).

The utilitarian approach to advertising is typically concerned with communicating the price, features, advantages and benefits of the advertised products or services (Bradley 2018:1). A utilitarian approach to advertising, as applied by Regenesys Business School, is depicted in Figure 2a. This type of advertising relies on the persuasive power of argumentation and reasoning about brand attributes (Lee & Bob 2018:91). Such advertising messages focus on brand performance, value and the economic benefits delivered (Kotler & Armstrong 2006:468), rather than emphasising its emotional or symbolic appeal (Voss, Spangenberg & Grohmann 2003:122).

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A hedonic approach to advertising execution is aimed at delivering fun, pleasure and excitement in the consumption experience and pertains to fantasy,

FIGURE 2
DIGITAL SIGNAGE CONTENT TYPES

a) Utilitarian advertising

c) Entertainment

b) Hedonic advertising

D) Directional information
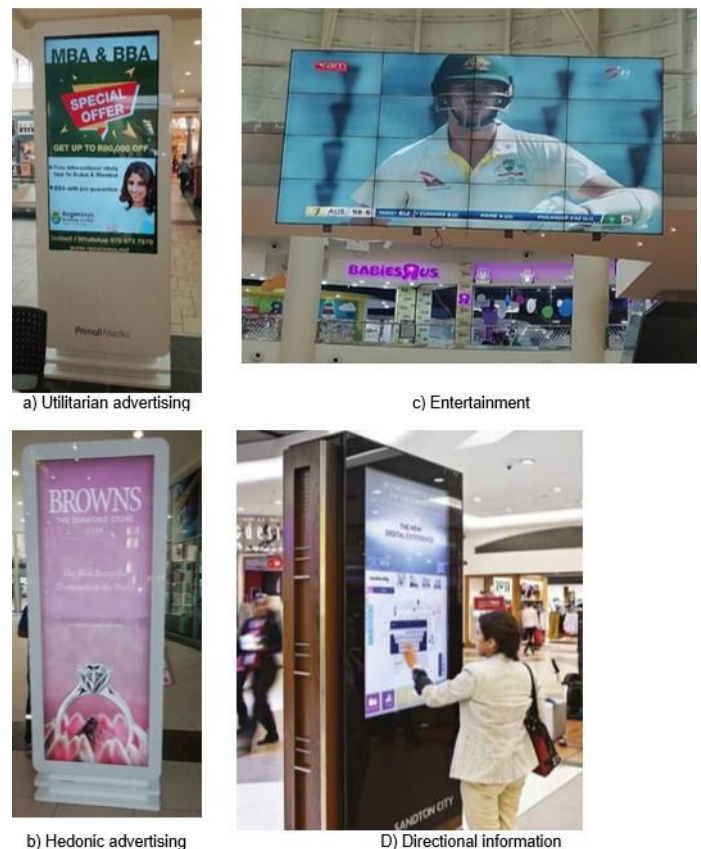
Source: PriceWaterhouseCoopers (2013:234)

imagination and emotion (Holbrook & Hirschman 1982:134; Chaudhuri & Micu 2014:4). Advertising for the diamond store Browns, as seen Figure 2b, serves as example and is aimed at communicating the hedonic dimensions of the brand. This type of hedonic advertising is aimed at creating pleasurable sensations related to experiences obtained from the consumption of the promoted brand (Voss et al. 2003: 121).

Hedonic content appeals to the interest and emotions of the targeted consumers (Mano & Oliver 1993:264). Hedonic advertising aimed at influencing the emotions of consumers (Bradley 2018:2) is regarded as emotional persuasion that relies on the subconscious minds of consumers to receive, process and evaluate messages (Hafer, Mantonakis, Fitgerald & Bogaert 2016:38). When conscious thoughts or the mind is not fully aware of the information being processed and evaluated, consumers make purchasing decisions relying on emotion, instinct and feeling rather than facts (Decker 2018:11). Digital signage with hedonic content could be used to facilitate affective engagement with brands or products, thereby evoking a positive response (Dennis, Brakus & Alamanos 2013:341). When consumers are emotionally attached to brands, they tend to be more loyal and invest their money and time in the brand (Park, MacInnis, Priester, Eisingerich & Lacobucci 2010:334; Thomson, MacInnis & Park 2005:325).

- ### Research on utilitarian and hedonic digital signage advertising content

Only a few studies examining the effect of digital signage advertising have been published, most of these examine the effect of content viewed by shoppers while inside retail stores and only one study considered digital signage advertising effectiveness outside of stores. Dennis, Brakus, Gupta & and Alamanos (2014: 2250) compared the effect of utilitarian and hedonic advertising on consumers' processing and experiences of stimulus inside a high-end store. They found that sensory-affective content performs better at enhancing in-store experiences and subsequent attitudes towards the advertisement and the advertiser compared to utilitarian content that evoked an intellectual experience. Burke (2009:129) proves that delivering utilitarian content such as newsworthy information, seasonal offers or promotions of new items on digital signage inside stores is particularly efficient to increase sales of hedonic food (such as snacks and alcoholic beverages). This is in line with the more recent findings of Roggeveen et al. (2016:128) who established that price outperform non-price promotions in the case of in-store digital signage advertisements. Dennis et al. (2013:341) focused on digital signage placed in the public areas of malls and found that hedonic advertising content with a strong sensory component can evoke affective brand experiences, while intellectual experiences can be evoked by utilitarian content.

Entertainment

Besides conveying commercial content, digital signage can also offer a strong entertainment component (Dennis et al. 2012:454). Digital signage content could for example include games, discounts and coupons to reward shoppers for participation. These could be used to increase brand recall at point-of-purchase and ultimately increased sales (Bauer et al. 2011:140). Live sport matches can also be broadcast via digital signage and thereby influence visitors to spend more time in a specific environment (Stahlberg & Maila 2012:217). Figure 2c depicts a digital screen installed at the food court of the Pavilion Shopping Mall displaying a live cricket game between South Africa and England.

Digital signage can also be used to display other types of entertainment activities such as music concerts, movie trailers and art (Dennis et al., 2012:426). On the aesthetic side of things, there are now even attempts to deliver art to the public via digital signage. An original industry-wide initiative in both the UK and US, called Art Everywhere, utilises high resolution digital signage to display paintings by well-known artists to the broader public (Taylor, 2015).

The need and mood of the targeted market must be considered when developing digital signage content. Dennis

et al. (2012: 466) found that entertaining content is effective for shoppers who are retired or not employed full time, while information-based content is more suitable for high-spending and high-income earning shoppers in malls. Viewers are more likely to devote their attention to digital signage content that is relevant, interesting and attractive (Meziani & Hussien 2017:63).

Directional information

Digital signage is not only helpful for entertaining and commercial purposes, but can also display other types of advantageous information such as directional cues, weather reports, news and emergency broadcasts (Kelsen 2013:4). Taylor (2015), one of the leading scholars in advertising and current editor of the International Journal of Advertising, argues that digital signage can also be used to deliver public safety and emergency information to community members. Digital signage space can for example be donated in order to help recover abducted children or deliver emergency notification in the case of weather disasters and threats to personal safety.

Meziani and Hussien (2017:54) assert that scholars in the fields of interior design, architecture and space management are eager to address the problem of "being lost" in various spaces. They consequently support the examining of indoor wayfinding solutions to make it easier for visitors to successfully navigate in malls, airports, hospitals and office blocks. Way-finder technologies can furthermore be integrated into digital signage to offer self-service activities (Kelsen 2013:232). Digital signage with way-finder technology can assist shoppers with directions in the mall by allowing visitors to view directions from their current location to their desired location through interactive touch screen monitors (Lundstrom 2013:142). It can even be designed to generate a print-out or interface with a mobile device to provide directions to visitors (Dwyer 2017:34).

Digital signage with way-finder technology has been proven to enhance the attractiveness of a shopping mall by offering a sense of direction and decrease the time spent getting lost or looking for intended outlets (Bonfanti, Vigolo, Douglas & Baccarani 2017:546; Kelsen 2013:173; Meziani & Hussien 2017:55). Moreover, way-finder capabilities that enhance the shopping experience of mall visitors can ultimately lead to approach behaviour (Aradhana 2016:4; Jaffer & Timbrell 2014:211). Figure 2d shows a shopper interacting with digital signage to find directions in a super-regional mall (Sandton City) in South Africa.

Target audiences must be the focal point when developing this type of digital signage content. The directional information on digital signage must be helpful, useful and provide practical value to users. It must provide relevant and timely answers to their questions and needs in a specific environment (Dwyer 2017:34). These touch screens can also serve as suggestion boxes for expressing requests and suggestions (Dennis et al., 2012:340).

Relevance also implies a marketing orientated perspective. Shoppers can view and search catalogues with the click of a button to find their desired products or compare prices to other retailers. This automatically saves time for shoppers and simplifies their shopping search (Kalitcheva & Weitz 2006:422). This feature is particularly attractive to high-end and high-income shoppers who are usually in a hurry to complete their shopping errand (Dennis et al. 2012:454).

DIGITAL SIGNAGE MEDIA PLACEMENT FACTORS

When planning digital signage placement strategies, the actual quality of the displays and potential level of interaction with the audience must be gauged (see Figure 1). These key digital signage media placement considerations are reviewed below.

Digital signage display

Roux (2017:400) explored audience measurement practices of prominent media practitioners in the South African industry. The findings revealed that the level of media exposure is calculated by taking into account the relative size, visibility and placement of media in the different environments (Roux 2018:21). The application of these media planning factors as they pertain to digital signage is examined below.

Size and quality of the screen

The wide variety of screens types, shapes and sizes might confuse practitioners considering to use this platform, it is therefore of value to differentiate between the major types. The size and quality of the screen, as crucial dynamics of digital signage visibility, have a significant impact on the ability to obtain the desired media reach and frequency (Roux 2018:21).

The size of screens could significantly influence the response to the content displayed. Two decades ago, Reeves, Lang, Kim & Tatar (1999:32) found that larger television and movie screens led to an increase in the attention and arousal of viewers. More recently Muller, Wilmsmann, Exeler, Buzeck, Schmidt, Jay & Kruger (2009: 264) identified screen size of digital signage as one of the key features that influence the likelihood of noticing public displays. They found that people prefer to look at digital signage with large screens and interesting relevant content.

The quality of digital signage is improving continuously due to the rapid development of high definition screens such as liquid crystal displays (LCDs), light-emitting diodes (LEDs) and organic light-emitting diodes (OLEDs) (Karzazi 2014:2). LCD digital signage tends to be less expensive, wider in depth and lighter in weight than LED digital signage, but LED digital signage offer a sharper, clearer image as well as brighter colours and better contrast over LCDs (Nauticomp 2017). Shopping malls often install LED screens that provide better performance and economy compared to LCDs (Nelson 2016). The most commonly used indoor mediums include way-finders or digital kiosks with touch screens, electronic billboards with LCDs and LEDs ventilation displays (Lane, King & Reichert 2011:378). OLED technology has also gained momentum in the digital signage installed in shopping malls. OLEDs are brighter, more flexible, ultra-thin, highly energy efficient displays that offer slightly more than ordinary LED display (Chen, Lee, Lin, Chen & Wu 2018:176). The difference between LEDs and OLEDs is that OLEDs are manufactured with organic semiconductor material that allows prestige screen image and high quality (Karzazi, 2014:3).

Relative visibility and placement in the environment

Since shoppers are often bombarded with competing marketing stimuli, which can make it difficult to deliver messages effectively (Schaeffler 2012:73), digital signage must therefore be positioned to stand out relative to the environment and break through potential visual clutter (Kelsen 2013:15). Placing digital signage to be visible and impactful at a specific location significantly improves its effectiveness. The physical placement of digital signage should be scrutinised, because if the location is not right the effect will be lost (Risevision 2016).

The ideal place to install digital signage in shopping malls is where there is heavy traffic (Jabbar 2016:17). Since the purpose of digital signage is to increase interaction and impact on shoppers, it must be placed at locations that are easy to access and offer natural pause points (Dwyer 2017:33). The entrance of the shopping mall is another key strategic area for placing digital signs (Abidin & Aziz 2012:361), due to the potential high foot traffic and opportunity to enhance consumer shopping experiences (Meziani & Hussien 2017). Shopping mall managers therefore typically place these screens around entrances, exits, food courts, parking lots, mall restrooms as well as near escalators and elevators (Miller 2017:1). Sung (2016:1) agrees and indicates that food courts and central areas that are convenient and act as gathering spaces for shoppers are good places for screens. Placement in these areas allows digital signage to be visible inside the shopping mall and attract the attention of shoppers while browsing in the mall space.

Interaction with the audience

According to Bauer, Kryvinska & Strauss (2016: 287), interaction with the audience refers to the manner in which viewers are able to reciprocate the information or instructions displayed on the digital screens. The level of interaction of a mobile audience with digital signage is influenced by design attractiveness and interactive features, as reviewed below.

Attractiveness of digital signage design

Digital signage that is poorly designed or mounted haphazardly can tarnish the appearance of any space, create ineffective messaging and do a disservice to a great marketing opportunity (Polger & Stempler 2014:67). If digital signage is attractively designed, on the other hand, it has the potential to capture the attention of passers-by and create positive atmospherics (Dennis, Michon & Newman 2010:205). Appealing contemporary digital signage inside shopping malls have been proven to add to the modern appeal and distinctiveness of these commercial spaces (Dennis et al., 2014:25). It can be employed to make a positive impression on visitors, capture their attention and offer them an opportunity to engage with content (Want & Schilit, 2012:21).

Interactive features

- ### Conceptualising interactivity

Researchers from fields as diverse as communication instrumental technology, human computer interactivity and marketing have defined and studied interactivity (Bea et al. 2016:362). Interactivity has consequently been defined in different ways. Some scholars focus on the objective features of a medium when describing interactivity. For instance, Lui & Shrum (2002:55) define interactivity as the degree to which two parties can engage in dialogue through communication mediums as the degree to which the message is synchronised. In this context interactivity is regarded as a computerised communication system that allows the exchange of roles between the sender and receiver. Interactivity is thus regarded as an objective feature that can be measured through observing the number of interactive features of the technology (Voorveld, Neijens & Smit 2011:74).

Other scholars focus on the subjective experience of interactivity by users of a medium. In this context interactivity is regarded as a psychological experience that users experience when they engage with a technological system, such as websites or interactive digital signage (Wu 2006:42). In other words, perceived interactivity is based on users' perceptions (Bae et al. 2016:323), rather than the objective features of the medium. Perceived interactivity typically relies on the experience a user encounters when engaging with digital signage. Wu (2006:91) distinguishes between three fundamental factors of perceived interactivity namely: i) perceived control, where consumers perceive themselves to have control over the content, navigation and the place of interactivity; ii) perceived responsiveness, which facilitates how the consumer perceives the medium to respond to his or her request or input; and iii) perceived personalisation that refers to the extent to which consumers perceive the response to be customised and appropriate to his or her request. Therefore, perceived interactivity is a subjective experience and is also referred to as experiential interactivity (Lui & Shrum 2002:55).

- ### Interaction possibilities with digital signage

Interaction possibilities with digital signage could enhance consumer value by raising consumer engagement or emotional perception (Bauer et al. 2011:292). Dennis et al. (2014:2243) distinguish between digital signage offering interactivity through touch screens and those using mobile devices integrated through near-field connection. Figure 3a illustrates a LCD touch screen displaying a L'Oreal advertisement. It is integrated with live camera feed so that

when customers walk towards the digital screen, the camera automatically captures the lower face of the customer and then recommends a suitable shade of lipstick according to the tone of their skin colour. Customers can also touch the screen to experience how they appear with different lipstick colours. It can be used with mobile devices to access information or advertisements on digital signage.

Figure 3b illustrates how digital signage equipped with interactive quick response (QR) codes allows interaction with mobile devices. This multi-screen display allows brands to deliver information via digital signage and mobile devices. Interactive digital signage can thus enable consumers to engage with products or brands in an enjoyable and playful way (Liebenberg, 2012:243). This also offers advertisers accurate measurement data that can used to improve the customisation of their offerings (Curran, Millar & Mc Garvey 2012:377; The Interactive Advertising Bureau 2016:7, Roggeven et al. 2016:215).

FIGURE 3
DIGITAL SIGNAGE INTERACTIVE FEATURES

a)   LCD touch screens with cameras
Source: Nachojc (2011)

b)   Digital signage offering interactivity via mobile devices
Source: OnActivity (2011)

c)   Digital signage that tracks human emotions and gesture recognition
Source: Ziico (2016)

Dynamic engaging content that is customised based on facial recognition software and traffic patterns can also be applied to increase consumers' level of attention and enjoyment (Kelsen 2013:75). The German food brand, depicted in Figure 3d, applied interactive digital signage to create an exciting consumer experience. The company installed digital signage in shopping centres to encourage consumer interaction through playing games that read the facial expressions, emotions and gestures of consumers. Consumers who participated in the games also received vouchers as reward (Ziicon 2015).

She, Crowcroft, Fu & and Li (2014:13) advise that the efficacy of interactive dynamic digital signage content should be tracked across different consumer behaviour stages: i) attraction (i.e. awareness and actions performed in preparation to engagement with interactive digital signage); ii) interaction (i.e. activities to explore and access the digital signage content); and iii) conation (i.e. the impact on behaviour after interaction with digital signage).

Roux (2018:35) recommends a few possibilities regarding the interaction with digital signage in a South African context. She explains that digital signage can be used to detect demographic characteristics of particular shoppers and their specific location within the mall environment. This information can then be used to place customised and relevant messages in spaces where the target customers are likely to be most receptive. This can be done if they opt to be identified via their mobile phone or RFID cards when they pass the signage, which then determines which content to show on the basis of the consumer's information as well as contextual factors (Bauer et al., 2011:292). Digital signage can also be integrated with mobile devices to transmit pertinent real-time information to shoppers.

Research on digital signage interactivity

Consumers' interaction with digital signage has been examined by only a few scholars. Schaeffer (2012:112) found that digital signage interactivity influences consumer engagement. Bea et al. (2012:328) conducted a study on the uses of and gratification with digital signage, the results of which showed that the engagement of consumers with digital signage is motivated by five factors namely: entertainment, information, o pass the time while waiting for something, participation and relaxation. Bauer et al. (2011:69) assert that consumers can be motivated to interact with digital signage if they are provided with the right message at the right time. Another study by Hough, Bea & and Yun (2016:322) on the behavioural intentions of consumers to interact with digital signage showed that consumers interact with digital signage to acquire convenient, useful, relevant, customised information and benefits, but not necessarily for the benefit of entertainment. Thus, interaction will only occur if consumers perceive digital signage content as valuable or beneficial in a specific context.

FURTHER RESEARCH AVENUES

This article is the first of its kind to propose message execution and media placement guidelines for current and potential users of digital signage, thereby contributing to the limited body of knowledge on the evolution of contemporary OOH advertising. It also lays the foundation for various further research avenues. The wide range of opportunities offered by different digital signage content types deserves further attention. It would, for example, be valuable for scholastic researchers from multiple disciplines to assess how effective formats and content types (e.g. aesthetic art, public safety or emergency information) can be designed and applied, and to determine which content the public finds most valuable at different locations and time periods.

Another opportunity is to create experiments to compare the impact of digital display quality, sizes, placement and designs at different places (e.g. retailers, airports, clinics, government offices, higher education campuses and sport stadiums). The potential drawbacks of interactive digital signage, such as privacy issues and information overload, are other areas that deserve future research.

CONCLUSION

The analysis of the existing academic literature revealed a lack of appreciation for digital signage applications and opportunities in the current academic literature. It also revealed the lack of a proper orderly, integrated codification basis to describe and research the features of this promising contemporary digital platform. For that reason, crucial digital signage, message execution and media placement considerations are examined. Digital signage content options, formats, display quality and interactive features were discussed, and relevant research findings were examined. It is envisaged that advertisers, mall owners and even non-governmental organisations can use the proposed considerations as guidelines when designing message executions or evaluating media placement options.

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