Chapter 3

MOBILE MEDIA AS A DIGITAL COMMUNICATION TOOL

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Introduction

Communication is an essential part of science that has always existed as a focal point of information exchange among parties at different physical locations. The invention of telephones brought a new chapter of communication since they replaced traditional media like telegrams and media. Similarly, the term mobile has wholly changed communication by creating opportunities for creative applications that are limited to an individual's imagination. Mobile telephony, tablets, and other handheld devices swept the world in a short time.

Studies show that the first cellular network in the world was developed in 1977, but the mobile phone has dominated the history of the fastest diffusing communication technologies with over 6 billion subscribers since 2011 (Ahmad et al., 2016). Today, experts have regarded mobile communication as society's backbone. All mobile system technologies have improved the lifestyle of humans. Most importantly, portable media has privileged a lot of people in the community (Badawood, 2016). Mobile media is improving lives and catalysing sustainable development. Since its introduction, the internet has changed the global society at an alarming rate, with mobile as a primary tool supporting its rapid acceleration.

The internet improves life by making information and other significant services available by a click of a button. Mobile internet also helps users to communicate efficiently, receive news and information, improve their education, and access health information and financial (Farman, 2015). This paper is grounded in the idea that mobile media is built on conceptual and taxonomical bases. Within this context, the paper employs previous fragmented approaches to studying mobile media, analyses them. It develops a set of definitions as well as applications of mobile media to consolidate this concept.

Literature Review

More than 6 billion people in the world use mobile phones, making it the most common and rapidly adopted communication in history. This development has impacted internet usage Flora et al. (2014). Farman (2015), in his study, projected that within the next decade, more people worldwide would access broadband internet through mobile devices than they do via desktop and laptop.

In addition to Farman's (2015) view, Steinkuehler & Squire (2019) pinpointed that today's mobile users have escalated, and this number is likely to double in the next few years. In this regard, Steinkuehler & Squire (2019) noted that more than half of mobile users rely on their mobile technology as sources of information, implying that in the next

decade, mobile media will be used by many as their primary sources of obtaining information.

According to Goggin (2010), smartphones, such as Droid, iPhone, and Blackberry, are on their way of becoming a mass mobile phone market in developed countries. Badawood, (2016), in his study, found that mobile users have rapidly increasing options in mobile devices and available mobile services, which is one of the contributing factors to the growth of mobile media. However, Humphreys et al. (2013) assumed that the growth of mobile media depends on the compatibility of technology with the understanding of the user and appropriation of mobile devices.

History of Mobile Media

Communication between humans has existed since the beginning of time. The increase has influenced the advancement, accessibility, and user-friendliness of information transferred from one party to another in technology. According to Jones et al. (2013), information has transformed into media, and media has transformed into mobile media. Today's widespread availability of advanced mobile media would be impossible without the various achievements of inventors and business professionals (Jun & Lee, 2017). History depicts that the first mobile media occurred when the ancient Egyptians used papyrus as an alternative to stone tablet inscription (Farman, 2015). This idea of transporting written media is later shown by the invention of Johannes Gutenberg of the printing press in 1440 (Ling & Donner, 2018). The printing press was a significant advancement for media distribution because it allowed for mass printing and supply of newspapers.

A few centuries later, the Chappe brothers developed the first working mechanical telegraph (Farman, 2015). The telegraph changed the world of mobile communication since it speeded up the transfer of information between two people who were at further distances. Towards the end of the nineteenth century, the telephone, invented by Alexander Graham Bell, replaced the telegraph, thus, bringing another revolution in mobile media. Bell first demonstrated the telephone in 1877 (Goggin, 2010). Later, he founded the American Telephone and Telegraph Company (AT &T).

At the beginning of the twentieth century, Bell legitimised his invention, though, after some turmoil and competition with the dominant telegraph company during that time (Farman, 2015). Initially, the use of the telephone was not widely adopted across the globe. Approximately 10 million telephones were available in the entire world in 1910, and the U.S. accounted for about 70% of the telephones (Ling & Donner,

2018). According to Flora (2014), a handheld radio telephone service was envisioned in the early stages of radio engineering.

In 1917, Eric Tigerstedt, a Finnish inventor, filed a patent for the pocket-size folding telephone with a very thin carbon microphone (Farman, 2015). Early predecessors of cellular phones included analog radio communications from trains and ships. In 1921, the Detroit Michigan Police Department first used mobile radio in a vehicle (Goggin, 2010). Although a few people used telephones when it was first discovered, its usage later increased rapidly. By 1922, more than 20 million telephones were available worldwide (Ling & Donner, 2018). The number grew to approximately 50 million in 1939 to around 75 million in 1950 (Farman, 2015).

Bell died in 1922 before witnessing the real impact of his invention in the world, but his company, Bell Labs, continued to develop various significant technologies (Farman, 2015). After World War II, the company's work on computers, computer languages, and software provided a framework for a network of mobile telephones (Goggin, 2010). This period marked the beginning of the race to create truly portable telephone devices with developments occurring in many countries. Partners of the firm programmed software that could switch calls, charge radio frequencies, turn radios on and off, and connect receivers to the telephone system automatically (Ling & Donner, 2018). These technologies created room for the development of a cell phone. Research shows that the cell phone is another invention that completely transformed how people transported media.

A study by Wei (2013) showed that digital wireless and cellular roots began in the 1940s. During this period, new frequencies between 30 and 40 MHz were available (Wei, 2013). More channels were available in the police systems. Mobile units were also available within private companies, public agencies, and individuals (Wei, 2013). In 1945, the first mobile telephone system was introduced in St. Louis, US (Humphreys et al., 2013). Along the highway between Boston and New York, a public mobile system carried a higher frequency distance in 1947 (Jones et al., 2013). In 1949, the Federal Communications Commission (FCC) authorised separate radio channels to common carriers (Wei, 2013). A new system with automatic channel selection was created in 1964 (Farman, 2015). This new system allowed customers to dial a call for themselves, and it eliminated the need to push-to-talk operation. A study by Ling & Donner (2018) indicates that the advances of mobile media and mobile telephony have been traced in successive generations starting with the early Zeroth generation (0G) services like Bell System's Mobile Telephone Service and its successor, the Improved Mobile Telephone Service. These 0G

systems supported a few simultaneous calls and were expensive (Memon & Otho, 2017). However, they were not cellular.

In 1973, John F. Mitchell and Martin Cooper of Motorola demonstrated the first handheld mobile phone using a handset weighing c. 4.4 lbs 92kg (Jones et al. , 2013). This year marked the origin of the modern cell phone when Motorola invented the first cellular portable telephone known as DynaTAC 8000X (Wei, 2013). Cooper is believed to be the inventor of this mobile phone for use in a non-vehicle setting. Wei (2013) asserted that there was a long race between Motorola and Bell Labs to produce the first mobile phone. Cooper and Mitchell together pushed Motorola to develop wireless communication products that would be small enough to be used in an open environment (Wei, 2013). On April 3, 1973, Cooper made the first cellular phone call on a handheld mobile phone using a heavy portable handset. His success in creating a cellular phone call showed the inception of mobile media, as inventors were certain that information could be passed from one person to another in a free environment using a mobile phone (Farman, 2015).

In 1978, AT&T proposed the advanced mobile phone system based on the cellular idea conceived earlier (Goggin, 2010). In the same year, the first commercial telephone systems were tried in Bahrain and other regions in the U.S. such as Newark, New Jersey, and Chicago, where the first cellular service was provided. In 1979, Nippon Telegraph and Telephone launched the first commercial automated mobile network (Goggin, 2010). In 1980, Cellular systems were constructed in the Washington D.C. area, where cell phones received a significant demand (Farman, 2015). This was followed by the simultaneous launch of the Nordic Mobile Telephone (NMT) system in Denmark, Sweden, Norway, and Finland in 1981 (Wei, 2013). This first-generation (1G) system could support simultaneous calls, although it still used analog technology.

At around the 1990s, cell phone technology continued to advance (Wei, 2013). Cell phones began to have features like multimedia and cultural exchange of information through text, touch, sound, and voice (Memon & Otho, 2017). In 1991, the second generation (2G) digital cellular technology was launched in Finland by Radiolinja on the Global System for Mobile Communications (GSM) standard (Wei, 2013). This launch sparked competition in the technology industry as the new operators challenged the 1G network operators.

In early 2000, access to the internet and Global Positioning System (GPS) technology became available for users of cell phones (Ling & Donner, 2018). In 2001, NTT Docomo, a predominant mobile phone operator company in Japan, launched the third-generation (3G) on

the Wideband Code Division Multiple Access (WCDMA) standard (Wei, 2013). This launch was succeeded by the 3.5G, 3G+ or turbo 3G enhancements based on the high-speed packet access (HSPA) family, thus, enabling Universal Mobile Telecommunications Service (UMTC) networks to have higher data transfer speed and capacity (Peters & Ben Allouch, 2005).

By 2009, it became evident that the 3G networks would be overwhelmed by the developments of bandwidth-intensive applications like streaming media (Przybylski & Weinstein, 2013). Subsequently, the industry started looking to data-optimise 4G technologies with the promise of improving speed (Memon & Otho, 2017). The first two commercially available technology bilked as 4G included the WiMAX standard offered in North America by Sprint, and Long-term Evolution (LTE) standard, first provided by TeliaSonera in Scandinavia (Wei, 2013). Research indicates that the advancement of cell phones, together with the network technology, has continued through history, which has made it possible for the existence of smartphones used today (Quesada-González & Merkoçi, 2017). These advancements show the evolution of mobile media.

The Concept of Mobile Media

Jones et al. (2013) defined mobile media as a media content consisting of audio, image, and video that is captured with or shared through a mobile interface or device. According to Wei (2013), portable media is a range of handheld devices, from mobile phones, tablets, and e-readers to game consoles, primarily used as personal, interactive, internet-enabled, and user-controlled portable platforms that allow interconnected users to exchange and share information. Based on Jones et al. (2013) and Wei's (2013), definitions, mobile media-supported communication is communication through a mobile platform that allows for information exchange between interconnected users. The mobile platform also enables users to access the internet due to media convergence.

Paul Levinson, in his book, ''Cell phone'', termed mobile media as ''the media-in-motion business'' that has occurred ever since someone thought to write on a tablet that could be lifted and hauled instead of writing on a cave wall, a monument or a cliff face that was usually stuck in place (Levinson, 2004). For a time, mobile devices like mobile phones and personal digital assistants (PDA's) were the primary sources of portable media from which the users could communicate with each other (Rau & Gao, 2008). Presently, the smartphone, which combines many characteristics of a cell phone with the PDA, has made the PDA archaic (Steinkuehler & Squire, 2019). The advancement of new mobile media as a real factor in society was influenced by the sale of smartphones, which

outpaced the sales of personal computers in 2011 (Watkins et al., 2012). Whereas independent technologies and functions of a mobile phone may be new and innovative, the need and desire to access and use media devices have existed for centuries.

(Rukzio et al., 2007) outlined that Levinson's (2004) remarks concerning the inventiveness and intelligence of telephonic communication applied to the need of users to communicate irrespective of their location. This concept led to the growth of mobile devices used today for communication. Levinson (2004) further noted in his book that Kodak Camera and transistor radio also bear portable information. Another device is the smartphone that is widely used today. (Scolari, Aguado, & Feij, 2012) stated that that smartphone, along with other portable devices, is key to mobile media as they enable the users to share media content using the internet and other applications. These devices have applications such as Bluetooth that allow interconnected users to share videos, music, images, and other files (Steinkuehler & Squire, 2019). The devices also enable users to stream download or stream the media over the internet.

In the United States, more than half of the population can access the internet through mobile media devices like smartphones and tablets (Wei, 2013). Studies show that there are more than 6 billion users of the mobile web in the world (Steinkuehler & Squire, 2019). According to this study, the experience of interconnection is what makes mobile communication fascinating. What Steinkuehler & Squire (2019) imagined sociologically in nearly a half-century ago is that mobile media renders individuals uniquely available, accessible, and subject to each other. The previous research indicates that mobile phone provides a unique social reward: - it grants instant membership to those who are poorly connected socially in society (Westlund, 2013).

A critical feature of mobile media as compared to classical mass communication is the back-staging of social organisations as producers and distributors of information to users of mobile phones (Wei, 2013). As such, mobile communication represents a new paradigm of human interaction with mobile media as user-generated communicative space (Watkins et al., 2012). It differs from the common carrier model of the plain old telephone (POT), which does not consider the content or mass media model controlled by a few reputable companies (Steinkuehler & Squire, 2019). Mobile media puts users in the middle of participative and interactive communication for the presence and co-presence experience.

The Characteristics of Mobile Media

Mobile media has come a long way from the days people primarily used cell phones to make calls. Today, the growth of technology has led to the advancement of mobile devices such as smartphones, which can support different communications (Steinkuehler & Squire, 2019). Through smartphones, users can send text messages, exchange emails, access the internet, take videos and pictures, and update their statuses in social media platforms such as Facebook and Twitter (Wei, 2013). The specific characteristics of mobile media are illustrated as follows.

Portability

A mobile device is defined by its ability to be moved frequently from one point to the other. Any mobile device functions and operates consistently while in motion, irrespective of proximity to a source of power or physical internet connection (Scolari et al., 2012). The devices also contain rechargeable batteries that allow several hours of operation without access to a power source (Westlund, 2013). The availability of rechargeable batteries in mobile devices aid in portability; thus, users can carry them anywhere they go. The long-battery life that comes with these devices supports video streaming, video taking, and internet browsing (Quesada-González & Merkoçi, 2017). That is the reason smartphones have a large battery capacity.

Small Size

Mobile devices have phone-like dimensions implying that they are small in size. A typical mobile device can fit in hand or pocket of the user. Some devices may fold or slide form a compact, portable mode, to a slightly larger size, projecting built-in keyboards or larger screens (Ahmad et al., 2016). Mobile devices also utilise torch screens and small keypads to receive input and maintain their small size as well as independence from external interface devices. According to Badawood (2016), the standard form of a mobile device enables the user to operate with one hand while operating its functions with the thumb.

Wireless Communication

Mobile devices have wireless connections that enable users to communicate with others through networks. Base mobile devices can access the internet via Bluetooth or Wi-Fi networks, and many models are equipped to access wireless data networks (Steinkuehler & Squire, 2019). Email and texting are typical ways of communicating with the mobile device. However, some devices capable of telephony and others, such as barcode readers and Radio Frequency Identifications (RFID), communicate directly with a central device (Wei, 2013).

Video Chatting

Mobile media has applications that enable the users to video chat in high definition with family and friends (Wright, 2005). The iPhone, for instance, is characterised with a face time-chatting feature. Smartphones also have applications such as Whatsapp that allows the users to video chat. Examples of smartphones that offer video and group chatting include the Windows Phone B.X. and Droid DNA (Westlund, 2013).

Beginning and Current Situation of Mobile Media

The first wireline telephone system was launched in 1877 (Farman, 2015). By 1934, mobile communications were based on Amplitude Modulation (AM) schemes contained in specific public organisations (Floran et al., 2014). During the Second World War, the demand for newer and better mobile radio communications increased (Wei, 2013). This demand, coupled with the development of the Frequency Modulation (F.M.) technique by Edwin Armstrong, influenced the changes in the mobile radio communication systems (Campbell & Kwak, 2011). In 1946, the mobile telephone was launched (Scolari et al., 2012). For more than 35 years, this system experienced low market penetration costs and various technological setbacks (Farman, 2015). However, with the developments of cellular concepts at the Bell Laboratories in the 1960s, mobile communication started to be a promising sector of expanse with an increase in customer-base (Wei, 2013).

Initially, mobile media was restricted to specific official users, and there were no plans to make the cellular concept a commercial project (Wei, 2013). Research by Steinkuehler & Squire (2019) found that the development of advanced technologies in the 1970 and the connection of the users to the Public Switched Telephone Network (PSTN) encouraged an astronomical growth in the personal communication systems and cellular growth. According to Goggin (2010), the first cellular telephone system in the U.S. was the Advanced Mobile Phone System (AMPS) deployed in 1983. Since then, wireless services have been experiencing more than 50% growth rate per year (Farman, 2015). The number of mobile phone users increased from around 2500 in 1984 to approximately 3 billion in 2007, and the demand is still on the rise (Campbell & Kwak, 2011).

In today's digital era, coupled with the speed-driven journalism, the mobility of information has been of great value. A study by Steinkuehler & Squire (2019) recently found how mobile technology has made new possibilities for journalism. Additionally, mobile devices have changed everyday life. In this context, mobile devices are not only used for fast

interaction, but they are also used for shopping (Flora et al., 2014). Due to the advancement of technology and the emergence of the internet, online businesses have emerged. Mobile devices currently have applications that allow users to conduct online shopping and transactions (Goggin, 2010). Basically, almost every activity people perform today is now connected with mobile digital devices.

Nowadays, it is incredible to consider how mobile devices have become significant. For instance, if one is heading out of the supermarket, they might check their phones for the closest location or confirm if their local store has everything they need in stock (Wei, 2013). Similarly, the individual might use a GPS application through their phone in the car or stream music from their device (Humphreys et al., 2013). Before shopping, the individual can compare the costs of products or pay through their device. These activities show how pervasive mobile media have become. Mobile media has also promoted the marketing of products. Companies are now finding it easy to communicate with their customers, market their products, and sell these products through the internet. In other words, mobile media facilitated the flow of information in every sector of the economy. Through it, customers can quickly gain knowledge about the product they would want to purchase (Steinkuehler & Squire, 2019).

A global newspaper industry survey conducted in 2019 reported that approximately 80% of media managers found mobile platforms a significant priority in the future (Steinkuehler & Squire, 2019). According to the Pew Internet and American Life Project, over 91% of American adults now own a cell phone (Pewresearch.org). Globally, over 6 billion people own smartphones are connected to mobile internet (Badawood, 2016). Most of these individuals rely on their mobile phones as the primary source of information. This explains the current trend in mobile media, where over 50% of the world population depends on their mobile devices as the primary source of information (Steinkuehler & Squire, 2019). It can be noted that the current mobile media has replaced some sources of information like Newspapers and Magazines. Today, a large population use their mobile devices to obtain information from the internet.

Due to the emergence of mobile media, Scolari et al. (2012) highlighted that professional journalism had lost its monopoly on the production of news since many consumers believe that news should be available anytime and anywhere, particularly on mobile devices. Therefore, the days of desktop computer and mainstream media as the primary tools to obtain information seem to be numbered because cell phones have dominated the industry (Badawood, 2016). In this perspective, it is deduced that mobile media has become one of the latest news media that is available anywhere.

Moreover, following the advancement of mobile devices, widespread availability, and faster connectivity, these devices are broadly used for accessing the news (Goggin, 2010). Users turn to them for the updated news because the news in these media allows them to bypass the time and space problem of traditional media. Mobile devices have also been profiled as unique communication tools. This is according to Jun & Lee (2017), who determined that how people interact with news on mobile phones differs from news behaviour on other platforms. Currently, a lot of mobile news platforms have been created, including news alerts by SMS and MMS, as well as news available in mobile sites and applications (Memon & Otho, 2017).

Advantages of Mobile to the User

One of the advantages of mobile media is that it allows users to communicate by a principle call frequency reuse (Ahmad et al., 2016). This principle enables the use of the same principle by different cells without creating disturbance from other cells (Ahmad et al., 2016). Frequency can be used repeatedly. Mobile phones operate within cells and can switch calls while the user is in motion. The user of a mobile phone can move a long distance and maintain communication during the whole journey (Badawood, 2016). In this case, mobile media provides an effective and efficient way to communicate. The second benefit of mobile media is that the devices are portable. Digital cell phones can process multiple calculations within a second to process and decompress the voice stream. Mobile phones have a full-duplex. It implies that the user can use one frequency for talking and another rate for listening (Farman, 2015). Both individuals on a cell can speak once. Goggin (2010) outlined that a cell phone can communicate more than 1664 channels. It also uses a dual-band that allows it to function in both 800MHz and 1900 MHz (Flora et al., 2014).

A third advantage is that mobile media gives the user a wide variety of functions. For example, the user can save information, keep appointment track, make a to-do-list, and set reminders. Through mobile data, an individual can send text messages, receive calls, and get information about entertainment, current affairs, and stock quotes, as well as play simple games (Goggin, 2010). Mobile media is also vital during an emergency. In Westlund's (2013) view, a mobile communication device is essential in emergency issues. In case an emergency issue erupts, the mobile phone can be used to contact the party involved. Communication devices like mobile phones embedded in them can be used to catalogue the events of an accident scene to determine responsibility and evaluate damage (Campbell & Kwak, 2011).

Another advantage of mobile media is that it allows the sharing of information. (Watkins et al., 2012) argued that the internet has helped widen communication channels by connecting users across the globe via one computer network. Nonetheless, before the development of mobile devices, there is a need for information before transmitting it to the internet. With mobile devices, business professionals can promptly share information with customers and vendors regardless of their location (Flora et al., 2014). Similarly, friends can share messages, videos, images, and music instantly without waiting to access a computer.

Mobile media also allows for the sharing of leisure content ranging from digital literacy to songs, movies, and Television series (Watkins et al., 2012). Based on these benefits, mobile data has great influence on everyday life. The devices are faster and effective and are used as the best mechanism for communication today. Mobile devices have also played a significant role in uniting the world. Indeed, it is an extra resource that gives users huge benefits.

Lastly, mobile media allows users to bypass news produced by institutionalised organisations to receive updated news (Badawood, 2016). The widespread use of mobile tweeting accessible enables the users to report criminal cases to the authority. Several high profile corruption cases in many countries, for instance, have been reported by mobile tweets by average citizens. Recently, a video of an American Citizen, George Floyd, who was murdered by a police officer, circulated over the internet and raised the attention of the authorities. Citizens who were available at the scene recorded the incident and posted the video on social media, attracting the attention of every mobile user. This case shows how mobile media is powerful, as it enables every citizen to capture and record any malicious activity to the internet for investigation.

Advantages and Disadvantages of Mobile Media to Media Industry

One advantage of mobile media to the media industry is that it assists the journalists to create content and distribute news to the public. Nearly every news media in the world rely on mobile media to create news and post the news to the company's website and other social media platforms like Facebook, YouTube, and Twitter for public access (Steinkuehler & Squire, 2019). It is worth noting that mobile journalism can be considered from a professional point-of-view or the user. In the first case, mobile journalism is a professional practice as it is involved in creating and diffusing news with simple portable devices (Westlund, 2013). The news created and delivered using mobile devices spread faster to a large population.

News items are often posted either in online publications, print editions of newspapers or social networks such as YouTube (Jones et al., 2013). For most journalists, standard portable devices like mobile phones are increasingly digital media toolkits with various combinations of multimedia and text message capability, Video cameras, GPS locator, T.V. receivers, and different application software ranging from games to personal organisers (Memon & Otho, 2017). Quesada-González & Merkoçi (2017) outlined that a mobile phone is increasingly becoming significant to the media industry as a production device.

To fight for their relevance and keep up with the pace of full-time news demand, media institutions have incorporated mobile media applications and websites for circulating professionally produced content (Wei, 2013). Tom Curley, the former president of the associated press, described the shortened news cycle by noting that the spread of a news event went from three hours in 9/11 to three minutes in the social media era (Jun & Lee, 2017). Still, a rising number of news organisations are making an effort to adapt to mobile communication technology.

Due to the portability of handheld communication devices, media organisations regard them as the best choices for professional content recorded in the field (Ling & Donner, 2018). Simply put, the primary advantage of mobile media to the media industry is that it enables news organisations to create content and deliver the generated content to the public domain through the internet. It also enhances the speedy creation and delivery of news to a large population since over 50% of the world population rely on mobile phones, specifically, smartphones as the primary source of information (Steinkuehler & Squire, 2019).

Another advantage is that mobile media enables the media industry to track the trend. Live streaming with mobile applications provides live games, live episodes, and T.V. shows (Humphreys et al., 2013). Through mobile apps, T.V. shows are getting more Target Rating Point (TRP) (Humphreys et al., 2013). By mobility, movie makers are productively creating buzz around the latest releases. This helps the mainstream media, some of which air T.V. shows, to expand their box office collection (Flora et al., 2014). Also, with the proliferation of online radio and music-listening stations, the media industry is earning steady followers and generating more profits.

Despite the numerous advantages, the media industry experiences some disadvantages with mobile media. One of them is the possibility of fake news, which damages the reputation of the affected organisations. Mobile media has created a platform where every internet user has the freedom to share information through various social media websites. In

the same way, freedom of the press is valued as news organisations are allowed to post any content considered worthy of public consumption. The media industry has a policy of editing information and validating it to ensure that it originates from a trusted source before making it public on the organisation's website or social media pages.

However, with the speedy flow of information influenced by mobile media, some news organisations do not have time to verify information passed to the public. This information may be fake if not verified, but since someone in the media industry posts it, the non-skeptical audience may find it easy to believe. This activity paints the image of the news organisation negatively when it is discovered that a false communication was made from a trusted news organisation. In the end, the reputation of the company is damaged.

Another disadvantage of mobile media to the media industry is a security vulnerability. Like any other technological tool, mobile devices used by media personnel to create and distribute news are vulnerable to security risks. These devices can be hacked and used to spread malicious content over the internet using the company's name. Among the malicious activities may be fake news. As a result, the followers may lose trust in the organisation affected, thus, reducing the productivity of the media in question. Another disadvantage is the uncensored content. The media industry has followers of all ages. Sometimes, sharing uncensored news such as violence and adult content may be challenging because the media personnel may not be sure if the shared content will be viewed by appropriate people (Goggin, 2010). Since everyone, including the minors, can access the internet, it becomes difficult for the media industry to share uncensored information deemed significant to a particular population.

Elements of Mobile Media

Broadband Multimedia Contents

The digitisation of the second-generation of mobile communication generated SMS being included in the mobile contents, thus, signalling the beginning of the transformation of this verbal dimension into new communication modes (Flora et al., 2014). After the success of SMS, the mobile industry applied linear logic and focused on extending the SMS model. These initiatives consisted of the MMS, in which it was possible to send pictures, videos, and texts simultaneously (Ahmad et al., 2016). At the beginning of the twenty-first century, the inclusion of multimedia in mobile devices progressed slowly in a complex process that researchers considered as one of the potential dimensions of general media

convergence. Today, mobile media is characterised by several multimedia contents like graphic image files, video clips, audio files, and texts.

3G and 4G Enabled Networks

3G and 4G networks are other elements of mobile media. In 2007, 3G mobile technology was launched to enable customers to use graphics, audio, and video applications (Badawood, 2016). 3G technologies make it possible for users to watch videos and make video calls. This technology maintains higher rates of data, offers global roaming, support packet and circuit-switched data transmission, and provides access to the internet applications from any location around the world (Campbell & Kwak, 2011). The 4G network was recently launched to offer high rates of transmission and accommodate the Quality of Service features (QoS) (Farman, 2015). This feature does not enable the use of mobile applications that include increased streaming of multimedia content, but it also improves the quality of video reference. According to Flora et al., (2014), the 4G mobile introduces wireless technologies to mainstream cell phones. It can work as television due to the wider bandwidth and high QoS it provides to access the internet and watch various T.V. channels.

Mobile News

Mobile news exists mainly in the form of mobile websites and applications. It has gained popularity in the whole world. For instance, the American adult population relying on mobile devices to obtain news has reached an average of 30% according to the Pew Research Centre's project for Excellence and in Journalism (Pewresearch.org). The Pew study found that about 44% of American adults own smartphones, while approximately 51% of smartphone owners use their devices as their primary sources of information (Pewresearch.org). Additionally, around 56% of tablet owners use their devices as the primary news source.

A study by Humphreys et al.,2013) found that the consumption of mobile news is highly personalised, subject to the preferences of the mobile owners. A recent study indicated that news is as common as receiving news through the smartphone (Steinkuehler & Squire, 2019). Smartphone users are today, not satisfied with simply receiving the news. They often use the phone to follow a news organisation or a particular journalist on social media, follow a news blog or blogger, and twitter updates from a journalist or news organisation (Steinkuehler & Squire, 2019).

Usage of Mobile Media

Mobile data has been applied in several areas, including education, media industry, business organisations, and health organisation. Presently,

mobile devices are the most common ways to communicate because they can be used anytime and anywhere.

Mobile Media in Education

While the recent shift from desktop and laptop computers to mobile devices has advantages based on cost and maintenance, the educational potential of this new platform has been extensively explored (Steinkuehler & Squire, 2019). In education, mobile media not-only allows students to access an unlimited amount of information, but it also interconnects students through the use of social media on their mobile devices (Steinkuehler & Squire, 2019). Peters & Ben Allouch (2005) claimed that the main focus of the new technology is the ability to share information. Mobile media is allowing students to get information from their peers. According to Memon & Otho (2017), introducing mobile media to learning has increased social interaction and the ability to balance schoolwork and other demands. As Steinkuehler & Squire (2019) noted, mobile technologies provide students with the flexibility to access information at a convenient time and place.

Moreover, mobile technologies strengthen the individual relationship with information as people use a customised media device with personalised access to social networks and media library Przybylski & Weinstein (2013). Mobile learning can embody a broad spectrum of multimedia contents, simulations, games, and applications. A specific example is Emergencia *112,* a feature phone game developed in Spain by group medical doctors in cooperation with health authorities to teach users about first aid techniques (Flora et al., 2014). In simple terms, students choose not just the kind of information to consumers, but also the source. (Jones, et al., 2013) added that mobile media had transformed educational practices through interest-driven learning. This has resulted in more connected educators and learners who are likely to succeed in an increasingly networked world.

Media Industry

The media industry uses mobile media to create not only news but also news alerts. News alerts refer to important information about current affairs delivered through a wireless handheld device. When mobile phones became widely used, many newspapers and media channels started their business online by sending news alerts on the consumer's mobile phones through a mobile application (Goggin, 2010). In the beginning, the information was sent to the customers from free. However, when the demand for information increased, some news organisations such as Fortune Magazine began to charge the cost from their mobile credit (Westlund, 2013). With portable media, news alerts have become part

of the daily routine of these media outlets. One of the merits created by mobile news alerts is that people receive first information on any news everywhere using their mobile devices. This means that the audience does not need a news schedule on T.V. or newspapers.

Business Organisations

Business organisations use mobile media for marketing their products and services. With a large population owning smartphones and other handheld devices that have internet connectivity, marketing experts believe that mobile devices are the best tools for promoting products and brand images (Badawood, 2016). Mobile marketing entails using mobile platforms for sending messages, downloading applications, or surfing the web for purposes of interactive adverting. Marketing activities in the mobile industry include advertising, mobile couponing, mobile direct marketing, mobile branding, mobile Corporate Social Responsibility (CSR), and other integrated actions in the digital sphere (Memon & Otho, 2017). Other than marketing, organisations use mobile media to enhance online shopping. In this case, companies develop an application that allows customers to order products and make purchases online.

Social Communication

The mobile application enables users to create groups, share ideas, and exchange information as well as unlimited videos, audio, images, and text messages (Wei, 2013). These applications also allow users to make free video and voice calls. Other social applications enable people to discover and connect with friends, families, and peers via social networks (Watkins et al., 2012). In other words, mobile media has created a channel through which people socialise using mobile phones and other mobile devices.

Healthcare

In healthcare, people use mobile devices to get fast access to their medical records and lab results. Mobile devices also help patients to store their essential medical files and save them through the email (Farman, 2015). Patients can have their health information during emergency cases. They can also use their mobile phones to schedule and receive medication reminders. Therefore, mobile media is useful in healthcare as it ensures proper record keeping and fast-tracking of patient information as most of the patient data are today stored electronically using handheld devices. In this case, mobile media prevents the possibility of data loss in a healthcare facility.

The Future of Mobile Media

Various researchers have envisioned that mobile media presently converges with the increase in the local wireless networks. In this perspective, Badawood (2016) speculated that the convergence would lead to a development that was not seen in the past when a universal mobile telephone system was the agenda. The researchers also believe that the convergence will continue to merge mobile phones and the internet. Ling & Donner (2018) postulated that there is a low possibility of the persistence of the strict distinction between mobile and stationary devices or their patterns of classification in the future. According to Ling & Donner (2018), this development will pose an increasing challenge for social education that plays a pivotal role in bridging various expanding technological potential and human-life worlds that set the final limits to what experts will consider appropriate, adequate, and desirable features of ubiquitous communication.

In the sector of education, researchers like Rau & Gao (2008) believed that books will drop dead in the future because the web is becoming easier to hold. They clarified that media tablets will turn books into multimedia, web-linked, and social-networking experiences. These researchers warned that people should be worried about books because the rate at which technology is evolving and e-learning is incorporated in schools is extremely high. Most researchers explained that mobile media is transforming the world, and soon, paperwork will end, and all services ranging from healthcare to education, business, and communication will be conducted electronically.

Conclusion

This paper has explored areas of research based on the following research questions**.** (1) What is the history of mobile media? (2) What is the concept of mobile media? (3)What are the key characteristics of mobile media? (4) How mobile media started, and what is the current situation in 2020? (5) What are the advantages of mobile to the user? (6) What are the advantages and disadvantages of mobile media in the media industry? (7) What are the key elements of mobile media? (8) What is the usage of mobile media in the world, maybe, historical statistics from the 2000s till 2020? (9) What do the professionals think and say about the future of mobile media? Findings show that mobile media evolved since the 15th century when the ancient Egyptians used papyrus as an alternative to stone tablet inscription. Various processes occurred until the twentieth century when technology began to take shape. The telephone system and cellular network, which shaped communication and influenced the innovation of mobile phones, were invented during

this period. Today, mobile media is dominated by handheld devices such as smartphones, mobile phones, tablets, and iPhones. These devices have internet connectivity and multimedia tools that allow users to share information and communicate efficiently. Mobile media has, therefore, formed a new face of engagement and extended the access points of users to news and information.

The media industry, individual users, business sectors, healthcare organisations, and education sectors have benefited from mobile media because it has increased access to information. Despite the benefits of mobile media in various industries, some professionals have projected that the education sector is one of the areas that may be affected by mobile media in the future. It is because most schools around the world are adopting e-learning. In this case, media tablets will turn books into multimedia, web-linked, and social-networking experiences, thus killing libraries and paperwork, which are equally significant in learning.

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