Social Media in the Context of Industry 4.0

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Since the beginning of the 21st century, the means of communication has evolved significantly if we compare it to the past when people communicated through letters or phone calls. Nowadays, social media has become the new and advanced trend of modern-day communication. With the new and advanced tool as well as technologies, incorporated with cheaper and faster internet access, the use of smart phone and social media application has enabled people to interact with each other easily at their finger tip. This revolutionary also comes with different types of platforms that allow people, not only to connect with each other, but also to gain various benefits from it, including those for business and political purposes that have been integrated into the daily usage of social media. Gradually, it has become a part of our daily life. Despite the frequent usage and popularity of social media today, however, this term is still a blur to some users. Now, with rapid advancement of the technology, specifically in the context of the fourth industrial revolution, the typical usage of social media will be shifted once again. Thus, to provide a better understanding of social media, this paper will briefly discuss on social media's definition and features as well as its history and evolution before looking specifically on how the current social media phenomenon functions with the technologies of the fourth industrial revolution.

❖ Definition and Features of Social Media

Social media refers to an internet-based platform where users can communicate with each other using websites or applications where they create and share content such as personal information, documents, photos and videos (Dollarhide, 2019). These platforms range from blogs, discussion forums, video sharing sites, gaming networks to social networking sites. Furthermore, it covers six main features such as networking, publishing, sharing, messaging, discussing and collaborating (as shown in the Social Media Landscape 2019 below). Networking feature allows people to connect with each other as we can see on social media platforms like LinkedIn or Tinder while publishing feature such as Wikipedia or Fandom allows users to create contents. Sharing feature, on the other hand, can be found in websites like Pinterest and Spotify. Gmail and Viber, for instance, are classified as messaging feature. Quora and Reddit are examples of discussing feature that allows users to post questions and answer them like a discussion forum. Last but not least, collaborating feature allows a group of people to track and complete their work together and can be found in Trello or Microsoft Teams. In some cases, we can find multiple features on the same site or application. For instance, Facebook and Instagram have multiple features that allow users to publish their content in either text, photo or video, and share them with other people, in addition to connecting with friends, family members and colleagues with messenger or direct message. Other popular social media platforms that have multiple features are video sharing sites such as YouTube and TikTok, which allow users to upload and share their videos as well as engage with online audiences through views and comments either on their video post or on their stories.

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Social Media Landscape 2019

Source: Social Media Panorama 2019, FredCavazza (2019)

❖ Historical Evolution of Social Media: Beyond a Communication Channel

The origin of social media can be traced back to the early 1970s. It began when the founder of the first major internet service provider in the United States, CompuServe, created programs and services for online news and online communication in the form of email and public bulletin board systems (McIntyre, 2014). Although CompuServe was popular in the 80s and the 90s with its user-friendly feature, because of its expensive charge by the hour, it had lost the online service competition to its competitor, America Online (AOL), before AOL bought it in 1998. According to McIntyre (2014), after their domination, AOL later developed new functions of instant messaging and chat boards that gathered more than 30 million subscribers during its peak. In around the same period of time, SixDegrees was introduced in 1997 as the first social networking site that focused on personalizing profile and on

making friends with other users (McIntyre, 2014). It is hard to talk about social media without mentioning UseNet, which was targeting the general population by hosting discussion groups that allowed users that shared similar interests to engage with each other. For instance, UseNet hosted different discussion group forums for scientists, government officials, activists and even for travelers and sports fans respectively. These forms of online communication had paved a way for the modern-day social networking as it enabled users to communicate and discuss in a forum format on specific topic. These initial forms of social media platforms allowed users to have their own profiles, upload and discuss content with each other online at any time and from anywhere. Owing to the popularity that these social platforms had brought, many other new social media platforms were established – including MySpace, Facebook, Hi5, and Friendster, etc.[1]– in order to provide users with different contents and functions so that they can keep connecting with people in many different ways. Nevertheless, not all of them survive through the evolution of technologies as people started to demand and expect more from social media to follow global trends and the dynamic context of development of advanced technologies and innovation, which most of the social media platforms as a result could not live up to the demands and expectations. Among these survived social media platforms, furthermore, only a few of them has managed to reach more than a billion users. Facebook in this case is on the top of the list of those that have dominated the social media picture and eventually defined the role of social media platform in the contemporary context.

The emergence of new technologies in the past decades has changed social media from its initial purpose as a mean of communication among friends and families. Starting from what was initially meant to be just a small part of people's lives,
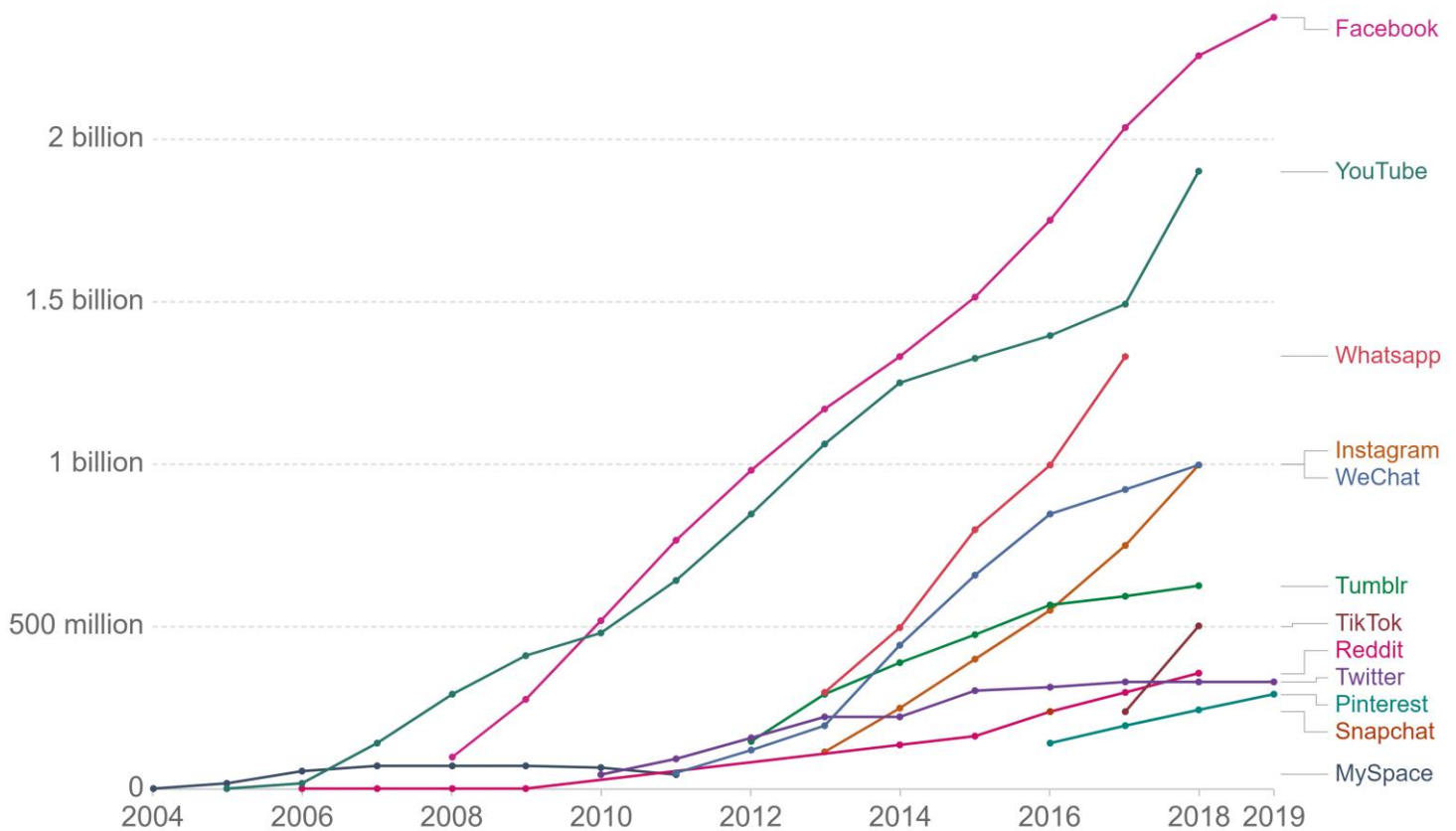
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[1] For more information regarding the evolution of social media from Six Degrees to TikTok and everything in-between, please see: Vamps. (n.d.). *Infographic: The evolution of social media.* Retrieved from https://vamp-brands.com/blog/2020/02/28/evolution-of-social-media/

social media now serves a variety of purposes and has become inseparable from our lives. At initial stage, most social networking sites had focused on the connectivity between friends with a hope to increase global connectivity. If we look at the data, connectivity and the sharing of information have attracted more than 30 percent of the global population to engage on Facebook platform (Ortiz-Ospina, 2019). Facebook itself has over 2 billion active users, while other platforms such as YouTube, WhatsApp, Instagram and WeChat have more than a billion users each (Ortiz-Ospina, 2019). As the graph below indicates, around one third of the population has engaged in social media platforms, a statistic that demonstrates a significant rise of social media, especially in the last 15 years. Social media has so much to offer to users ranging from personal communication to marketing and from boosting skills to advancing knowledge and education. Social media manifests our needs to constantly bring our lives to the internet.

Number of people using social media platforms, 2004 to 2019

Estimates correspond to monthly active users (MAUs). Facebook, for example, measures MAUs as users that have logged in during the past 30 days. See source for more details.

Our World in Data

Source: Statista and TNW, 2019

On personal level, not only can the users still utilize the social media to keep in touch with their friends and families, but may also use it to expand their networks by engaging in conversation with new friends who share common interests on social media platforms. By getting to know more new friends, an individual can use social media, especially social networking to build network and connection, broadening their radius of opportunity. In this connection, social media serves as an opportunity platform for users to see jobs, search for scholarships, exchange programs or other grants to pursue their academic path. Social media users, in addition, can take to social media to share or publish their

desired content, or receive the published content. This has to do their opportunity to receive and access to information on the one hand, and the rights to expression on the other. Currently, with the global attention being put into effort to combat the novel coronavirus pandemic, for example, Facebook has launched a COVID-19 Information Center, which provides Facebook users with the latest updates and guidelines from global and local health organizations so that people can better protect themselves from the COVID-19 pandemic. Another perk of being on social media is that users or followers can look for and receive recommendation towards a particular issue that they want to know. For instance, the 'recommendation function' in Facebook allows users to ask for a location of a particular place or food on their newsfeed so that their friends can offer a variety of recommendations which may fit to what they need but never actually thought of.

Nevertheless, opposed to its initial purpose to connect people and with the introduction of new technology that come along with the fourth industrial revolution that enhanced accessibility and openness of engagement, social media nowadays is able to serve a variety of roles, both for better and worse, depending on the intention of the owners and users. Social Media has moved itself from the traditional communication tool to very much beyond just a communication channel, including its offer of modern means for business, political and education purpose, for instance.

The rise of internet has allowed businesses to bloom significantly on social media platform. It was around 2010 that business began to find themselves in social media scene. Social media addresses such as Facebook, YouTube, Twitter, and Instagram started to be listed down the business website – or vice versa – in addition to email and phone number to provide customers a wide variety of choices to connect. For business-wise, social media has been a tool used by the sellers, including individual level, small, medium, and large-scale businesses, to find

and attract customers on the internet through advertisement, promotion, service and support. With more than 2 billion users on Facebook alone, the business market on social media is huge for marketers to exploit. Through the utilization of the advertisement on social media, business owners or digital marketers would be able to reach wider audiences compared to the traditional way of advertisement on newspaper, radio, or television. Besides, this kind of advertisement is also cheaper compared to the old-style way of advertisement that charged the advertisers based the air-time and time-slot for the products that were placed for broadcast. While medium and big businesses can afford the payment for billboard or television prime-time advertisement, individual sellers and small businesses are unlikely to have the capacity to do the same way. On social media, however, individual and small businesses can boost and promote their products with an appropriate amount of budget set by themselves and be able to compete with bigger businesses to certain extends. Seeing the potential of marketing on social media, big businesses has changed its strategic move to social media platforms as well in order to advertise their products in addition to their existing advertisement on television and billboard. In a latter part, we will discuss in details about how businesses can use social medial to level up their advertisement strategy and boost sales. But, in addition to advertisement, marketers can take to social media for crowdsourcing to gather business ideas for future products or improve the current ones.

Apart from business, social media has also been widely used for political and PR purpose. Almost every public figure now has a Facebook page, a Twitter or an Instagram account or even all of them combined. Not only has it been used by most celebrities across the globe, social media has become an important mean of communication and public relations for politicians worldwide, which at times brings the controversies of misinformation and disinformation at a regular occurrence about

the use of social media for political purposes. For example, American presidential election in 2016 was a case that the blame about influencing political scene of the United States was put on social media, especially on Facebook. The US House Intelligence Committee has deliberately linked Russia with alleged involvement in paying for advertisements of the posts that were in favor of Donald Trump (Shane, 2017). In the most recent Facebook- Cambridge Analytica privacy breach scandal, up to 87 million Facebook users claimed to have their personal data exposed and extracted to the third party without their consent for political purposes (Chang, 2018). The use of social media platform to sabotage political agenda is not entirely new and does not occur only in the Western countries. It is the case that happened in Cambodian politics as well. After the election campaign in 2013 that the Cambodian opposition party had used Facebook as a gateway to gather new supporters and encourage youths, who are the majority of the voters, to use Facebook as a platform to share their political agenda, express their opinions and rally for more support for the political party, Cambodian prime minister has become a prominent Facebook page owner who has moved to utilize Facebook as a media campaign platform to run his popularity and public relations to the Cambodian public opinion. As of the date of writing, Cambodian Prime Minister official Facebook page has reached almost 13 million followers. In a sense, because of the openness of social media usage, the political propaganda and public relations strategies from both the ruling and opposition parties were able to reach to many Cambodian Facebook users than what it used to be in the past decades.

In light of the advanced roles and uses of social media in our lives, it would be incomplete to overlook another important asset that social media offer us: the opportunity to learn. If we reset back a little further to when social media was not a thing, education remained largely limited to physical school/classroom or face-to-face method. Nonetheless,

as globalization and modernization become more and more integrated in our daily lives, most people – even the children and elderly – can access to smartphone, one of the most convenient and affordable devices to connect to a digital world. While most people believe that social media is for entertainment purpose, its role in diversifying learning opportunities and methods is worth mentioning. With that said, people, especially the learners can easily access to and share information needed for their studies. It is also an effective and convenient way to connect between teachers, students, and parents regarding the learning progress and improvement of the students. YouTube, for instance, is largely known for its video and music content, but educational and inspirational videos are also posted there. Additionally, social media has also become a platform where you can share a content of journal, news or files on your newsfeed, page, group messenger, or Facebook group so that they are accessible to a wide variety of audiences. In the midst of COVID-19 and school closures, for instance, almost all educational institutions have to turn to online platforms to provide lessons to the students so that they can still learn despite being in lockdown or quarantine. Social media is in a such huge help during the crisis caused by COVID-19 that enables teachers and students to interact through its platforms despite the fact that various measures by respective governments across the world has banned physical learning classes.

❖ Integration of Industry 4.0 Technologies into Social Media

From initially just a communication channel at the beginning, social media has transformed itself to a profit-oriented channel with the help from the cutting-edge technology, which helps expand the coverage and accessibility of social media to the people. Now, as we progress further, additional technologies of the fourth industrial revolution such as artificial intelligence, big data, blockchain and

cloud computing, etc., will continue to play an important role in reshaping the social media today as we know it, especially toward business and marketing purposes. Some of these technologies have actually been integrated gradually into the daily usage of social media, while some are still in the process of incorporating into social media. The following discussion will feature a number of emerging technologies of the fourth industrial revolution, which has been integrated into the social media platforms and further advanced the usage into the finest level at contemporary era.

Artificial Intelligence (AI): Artificial Intelligence[2] technology is being integrated into social media in many forms, more than we can expect. Widely known for being the integral parts of AI, machine-learning and natural language processing have been incorporated into and exploited by a number of social media networks in the forms of recommendation engines, chatbots, image recognition and preference analysis (Wang, 2019). It is of no surprise that just a single click on your social media account can impact many of what could potentially pop up in your newsfeed and notification bar, including friend suggestion, page suggestion and advertisements, among others. All of this is possible owing to the recommendation engines, which have a capability to do so with the assistance from AI machine-learning that studies the pattern of the users' past activities and predicts possible preference for them. A good example of this recommendation engine would be a 'friend suggestion' or 'people you may know' that subsequently appears on Facebook after you add or accept a new friend request. Another example of this recommendation engine is the advertisement that users see on their newsfeed after they like a certain post or page. By learning from users' previous engagement or interests, AI technology suggests similar advertisements or contents on users' newsfeed. This is a three-way-win strategy, where the users get to see the products that they

are interested in, and the business owners can get their products advertised to the right customers or target groups while Facebook or social media companies get their payments after successful advertisements and post-reach. However, this is just one tiny part that AI is actually transforming the way social media works. Another AI application worth looking into is the chatbots. In this context, chatbots are like auto-response mechanism that provides instant and friendly responses to the consumers. Without needing human to just sit and wait for inquiries from customers so that they can provide faster services, chatbot acts as a customer service provider on social media platforms with programmed answers, both audios and texts, which thus saves the efforts of the human who is supposed to do this job and allow them to perform other tasks while the customers are able to experience friendly and instant customer services at the same time. Chatbots, moreover, does not only give automatic response to customers, but it also reduces human errors, such as typos, or emotional influences during their work, which could affect the customer reviews. Supposed that you upload a group photo on Facebook, then the auto-tag function on Facebook will collect the data of the faces in that photo and generate automatic tag for the people in that particular photo without you having to manually tag them one by one. This is what an image recognition does on social media networks. In addition, learning from your past interests, say furniture, you will be suggested with a similar kind of chairs or tables that you previously liked, when you search for a chair or a table. On the other end, natural language processing allows the algorithm to detect and distinguish the language used by the users in posts and comments so that they can analyze the preference of the users towards certain things. However, this feature has more to do with analyzing the positive or negative languages that users use on particular things or products. For business purposes, it can

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[2] See more at Chan, P. (2019, October 28). What Do We Know About Artificial Intelligence? *Cambodia Development Center, 1*(7). Retrieved from: http://cd-center.org/en/what-do-we-know-about-artificial-intelligence/

scan the way consumers express their like or dislike of the products or services. For political purposes, the algorithm can be used to scan the language that users use on certain political issues or political agendas, then AI will learn this sort of things and sort out the agenda that fits with their preferences. Although the integration of AI into social media is more visible for business and marketing purposes, its role in advancing the political agenda should not be taken for granted.

Big Data Analytics: Big data[3] is another technology of the fourth industrial revolution that will also continue to shape the business market on social media platforms. In the first quarter of 2020, Facebook has reached 2.6 billion active users worldwide, an increase from 2.37 billion in the same period last year[4]. Imagine how many data can be generated from Facebook alone in a single minute. Thus, it is undeniable that businesses rely a great deal on this ocean of data to understand their customers. By incorporating big data into social media, it can process all the data and, in return, enable faster decision-making, personalization, product insights, effective social media campaign evaluation and future events planning for the marketers with most convenient way (Nicora, 2019). Big data – when combined with AI technologies – studies the users' online behavior with the information that have been collected, stored and analyzed. Understanding the customers' behavior is the key to boost the sale of the products and services. Business will be able to approach their customers in a much more personalized way based on their likes and preferences that have been captured in their activities on social media sites. Warner (2020) estimated that social media data would reach over 44 trillion gigabytes by 2020. With this huge amount of accumulative information and

enormous data, social media marketers will be able to develop a predictive and accurate pattern in targeting the consumers. By doing this, business can get a proper insight and holistic understanding of the customers; thus, targeting their right people with the right products. In addition to personalizing advertisement, big data also provides digital marketers with social media trends and insights of different groups of users so that not only can they decide which group to target on but also which platform is best suited for which group of people, allowing them to build the right strategic plan and implementation. Not only can big data understand the current needs and trends of the customers, but it can also give an insight about the future needs and expectations of the customers using predictive analytics tools. Moreover, business will be able to gain an insight about what the customers think of their products using the trace that the customers leave on their digital footprints, such as post shares, comments, their reviews of the product or their status updates.

Blockchain Technologies: With all of these vast amounts of data that are generated on social media, it is without doubt that it requires a system to check and control them. Therefore, blockchain[5] technology would be the key to these demands because of its main features of privacy and transparency (Dermoudy, 2018). However, one thing that we need to make clear here is that blockchain is not all about cryptocurrency or Bitcoin. Blockchain is defined as a "digital information (the "blocks") stored in a public database (the "chains")" (Reiff, 2020). Different types of information will be stored in different blocks as new information will be added to another bunch of different blocks, all of which are linked together and any attempt to alter one information on one block will not affect the

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[3] See more at: Kong, R. (2020, May 29). Big Data: Too Big to Ignore. *Cambodia Development Center, 2*(9). Retrieved from http://cd-center.org/en/big-data-too-big-to-ignore/

[4] See more at: Clement. J. (2020, April 30). Number of monthly active Facebook users worldwide 2008-2020. *Statista.* Retrieved from https://www.statista.com/statistics/264810/number-of-monthly-active-facebook-users-worldwide/

[5] See more at: Tan, M. (2020, May 07). Blockchain Technology: More Than Just Bitcoin. *Cambodia Development Center, 2*(6). Retrieved from http://cd-center.org/en/blockchain-technology-more-than-just-bitcoin/

information on another block. If someone wants to alter one block, however, they will have to edit all the blocks, which would be hard to do so given the vast amount of data in many blocks that are linked together (Reiff, 2020). Although this blockchain technology was originally and is predominantly used in digital currency for transaction tracking, the application of blockchain is later adopted on social media as well because of its power to decentralize the centralized social media platforms and the absence of third-party involvement. This new way to take control of the users' data on social media is known as "Blockchain Social Media" (Takyar, n.d.). Similar to what blockchain is used in digital transaction, information on social media will be collected into blocks and chained together so that only the sender and the receiver know the content they exchange, which is opposed to the previous form of the centralized social media wherein the owner of the site/platform can easily access your information without your permission and knowledge. Furthermore, it also offers a more privacy-oriented environment where the owner is enabled to establish control their own flow and distribution of information and data (Arnold, 2018). For this reason, blockchain offers the verification of information and data allowing users to create a secure environment for themselves on the internet. Essentially, it means that there will be no third parties who can gain access to your information without permission. The users themselves can either allow or restrict access of their information and data to the third party. The implementation of blockchain social media has recently become popular considering the concerns on the data breaches, privacy invasion and the likes on the traditional platforms social medial, which are highly centralized and prone to data violation. Against this backdrop, blockchain social media offers a greater privacy in sensitive areas, such as private chats, which is mostly targeted and shared for political purposes without the owners' consent. Blockchain

social media, in this connection, promotes and advances the freedom of speech and expression given the fact that neither the platform owner nor the government can censor the content made by the users in an attempt to eliminate traces of political dissent. Even though there has not been a widespread adoption of blockchain technology for social media platforms, especially those which are the most popular ones like Facebook, Whatsapp, and Instagram, this technology is surely a drive to a digital world offering every user a safer online community that better guarantees personal privacy.

Cloud Computing: Another emerging technology of the fourth industrial revolution is the Cloud computing[6], which has also appeared significantly on social media scene in recent years. Cloud computing is a virtual space of the internet where data can be stored and accessed at any time and at anywhere (Griffith, 2016). The integration of cloud computing technology into social media implies that users' information and data will be uploaded to a shared virtual space of social media platforms. Given a large number of social media platforms in the present days, users will have to register for every single new platform that they intend to use. With the cloud technology storing all of your information, nevertheless, your information can be transferred from your existing social media accounts when you want to create a new profile at a new platform. It simply means that users do not have to reenter their personal information for registering on a new social media platform as the cloud already has all of their information stored (David, n.d.). Moreover, social media users can easily share files or documents from one social media site to another. For instance, files from Dropbox can be shared to Facebook messenger, Facebook post, Telegram and other similar social media platforms. Such practices provide flexibility for users to jump from one social networking site to another instantly. Besides, cloud computing on

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[6] See more at: Tan, M. (2020, May 20). Emerging Technologies of the Fourth Industrial Revolution. *Cambodia Development Center, 2*(8). Retrieved from http://cd-center.org/en/emerging-technologies-of-the-fourth-industrial-revolution/

social media networks also offer a free data backup and recovery for users in the event that files are lost in hard drives. Facebook, for example, has incorporated cloud computing technology in their application so that users have their own personal space on their profile to store their information, photos and videos, etc. (Kiranmayee, 2015). In term of operational aspect, cloud computing adds another layer of functionality to social media platform that is built based on collaborating feature like Google Drive or Microsoft Teams. Google Drive has its own virtual storage space and application for collaborating features such as Google Docs, Google Sheets and Google Slides where users can work on the same document at the same time, allowing the means for multiple employees to work from different places on the same documents. As in the case of Google Drive, this cloud technology is not something really new, and it has already been there for some times. While a number of social media platforms use this sort of technology in their operation, there are still plenty more platforms that do not have this technology yet. The next phase is to integrate it to all types of social media platforms to allow the ease of access to users.

With the assistance from all these technologies including AI technologies, big data analytics, blockchain and cloud computing, social media will transform itself in the new context of the industry 4.0 into a smarter, profit-oriented, cost-reduction, more accessible, more convenient and more sufficient platforms for online community across the globe. On an individual level, people are offered the content of their preferences and the capability to better communicate with their family and friends using more options – including texting, video calling, voice/video message, sharing of photo and video – while at the same time, they can also create a virtual personal space to store their documents and information with better means of access and with better guarantee for their personal privacy. On business level, the social media that emerges in the context of the fourth industrial revolution has revolutionized the way producers, suppliers and marketers in advertising their products and services with almost absolute details and understanding about their consumers' online behaviors and patterns based on their social media engagement, and in return, providing a strategic response to the current demands as well as the ability to predict the future trends accordingly. Although the implementation of these technologies into social media network is not holistic, most importantly blockchain, it is certain that social media network today has been through many stages of evolution before it comes to where it is today. As we have discussed in the introductory part, it has transformed itself from just a communication channel that connected people together into one of the most important parts of our lives that involves almost everything we do via online platforms, those of which that a lot of people in modern time cannot just simply disconnect from. Given the significance and continuity of update and technology breakthroughs, the evolution of social media network will not stop here at this stage, but it will definitely continue to transform itself even further and into more advanced forms integrating all the sophisticated and cutting-edge technologies that continue to be developed.

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