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Photography Strategies in the Challenges of Industry 4.0 and Society 5.0

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ABSTRACT
Photography faced significant challenges during the COVID-19 pandemic due to restrictions on space for in-person meetings, while previous photo shoots required in-person meetings. During this period, technological and industrial developments began to be introduced in the era of Industry 4.0 and Society 5.0, but their popularity was overshadowed by information about COVID-19. This paper aims to determine the strategies of photographers in facing the challenges of Industry 4.0 and Society 5.0. The method used is qualitative, with data collection through archival/document studies and literature studies. Albert Joseph Toynbee's challenge and response theory is used to discuss these issues. COVID-19 has also influenced photography in finding strategies for professional photography practice. One of these is virtual photoshoots or remote photography. The challenges of photography have become increasingly complex with the emergence of Artificial Intelligence (AI). Photographers are also facing new challenges. This condition is addressed by considering the convenience offered by AI, namely, combining AI results with photography for photo functions used for promotions or business.

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INTRODUCTION

Photography always faces significant challenges due to its parallels with technology. The primary photography tools, such as cameras, light generators that create images, and supporting equipment, require practitioners to adapt to rapid technological developments. Another challenge faced is social issues, including the 2019 COVID-19 pandemic. The pandemic seemingly halted nearly every aspect of human life worldwide. The pandemic's impact also led to the Fourth Industrial Revolution, better known as Industry 4.0, and the concept of Society 5.0. The global community largely overlooked these two social dynamics due to the pandemic. However, the pandemic also significantly increased the presence of technology, particularly the internet. Everything, especially communication and interaction, is connected through devices and the internet. After the pandemic, the Industrial Revolution 4.0 and Society 5.0 re-emerged.

The presence of technology in various aspects of society is increasingly strong. One such area is education. Initially limited by circumstances, online learning has become an option because it facilitates national and global connectivity. Furthermore, it can be

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developed to make the learning process more effective and efficient. Furthermore, the entire teaching and learning process can be accurately recorded in a digital footprint. Learning resources are also increasingly numerous and diverse. These technology-based learning innovations facilitate students' learning regardless of time, place, or space (Teknowijoyo, Felixtian, & Leni Marpelina, 2021).

Industry 4.0 is a series of advanced manufacturing models encompassing a broad range of technologies, integrated with each other, characterized by virtual, digital, and technological performance. This era offers potential technologies that assist human work. Industry 4.0 includes six design principles (Carvalho & Edson Walmir Cazarini, 2020) in its framework: decentralization, virtualization, interoperability, modularity, real-time capabilities, and service orientation. These principles are then referred to as design 4.0 principles because they contribute to the design or transition process of general industry, or 3.0 to 4.0. The framework shows that the principles of Industry 4.0 are primarily aimed at large-scale industries with technology as the leading actor. However, they indirectly influence other sectors in society, especially technology users. Industry 4.0 began in 2011.

In line with this, the concept of society 5.0 has also re-emerged after COVID-19. 5.0 or society 5.0 positions humans at the center of technology and innovation for the benefit of humanity itself. The concept of society 5.0 or society 5.0 emerged in 2019. Its main goal is to improve society's quality of life by utilizing the potential obtained from Industry 4.0. In this 5.0 era, society faces technological challenges offered by Industry 4.0 (Pereira, Andreia G.; Tânia M. Lima; Fernando Charrua-Santos, 2020). The era of society 5.0 gives rise to various dynamic social dynamics. For example, there is concern that humans will be replaced by robots (Ahmadi in Teknowijoyo, Felixtian & Leni Marpelina, 2021). In photography, a debate has arisen on social media about artificial intelligence (AI), which suggests that we can produce visual products, including photography, without taking pictures. The desired image or photo will appear by writing instructions (prompt) for the AI model.

This paper aims to determine the strategies of photography practitioners in the challenges of Industry 4.0 and Society 5.0. Narsa (2008) defines strategy as a generic term, a synthetic concept, problem-solving, and a proactive tool for management. However, its use cannot be limited to one perspective; it must be multidimensional. It depends on the context and must adapt to environmental changes. In this paper, strategy can be limited to tools or efforts that can be made to solve problems in photography practices in the context of technology. Therefore, the results of this study are expected to provide an overview of the relationship between several fields, namely photography in practice, the technology offered by Industry 4.0, and the dynamics of Society 5.0 in Indonesia.

By understanding the strategies, photographers can know how to face the challenges of 4.0 technology. Furthermore, understanding the challenges allows appropriate responses to explore the creative industry and economic opportunities. This paper is a series of research findings entitled "The Virtual Photoshoot Phenomenon during the Coronavirus Pandemic: A Study of Challenge and Response, and Cyberculture in 2020." Albert Joseph

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Toynbee's challenge and response theory is used to address the issue. The object of study is the photography practices of professional photographers in the industrial business world.

Challenge and Response Theory is Toynbee's conceptual framework that explains how civilizations rise and fall. For Toynbee, a challenge refers to an unexpected factor or event that threatens how a group of people has made a living in the past and the well-being of the entire population. It can even threaten the continuity of the existing system. However, not all of these are negative, as they also bring opportunities. Meanwhile, a response is an action that the same group of people takes to address a new situation. This can take the form of new technologies, social organizations, and economics, which can bring about change within a social group (Schmandt & CH Ward, 2000: 1). This theory is considered capable of understanding the challenges faced by the field of photography, allowing for strategies to be developed in Response to the challenges of Industry 4.0 and Society 5.0.

Challenge and Response can be used to understand social change. He describes the causes of cultures' emergence, growth, and decline in history. By emphasizing intelligible historical reasoning, humans can give rise to civilization when faced with complex, challenging situations, leading to the growth of creative activities to undertake unexpected endeavors in the process of " challenge and response " (Sutrisno in Sutrisno & Hendar Putranto, 2005: 70). The categories in this concept allow us to focus on essential dimensions of civilizational change that will help understand today's challenges. First, significant challenges do not always emerge. Transformations in the environment, technology, economy, and society drive them. Second, several responses are possible. All reactions, including no action, can carry risks and unknown outcomes. Third, a successful response must be bold enough to overcome threats and point the way to "new ground."

Capra (in Kusmarni, 2008: 6) explains that civilization continues to grow when the Response to initial opposition successfully generates cultural momentum that moves society out of equilibrium and into an overbalance, which emerges as a new challenge. In this way, the initial challenge and response pattern repeats itself in subsequent growth phases. Each Response successfully creates a disequilibrium that demands new creative adjustments. It is stated that the growth of civilization is primarily determined by factors such as economic and technological development, supported by the society supporting that civilization.

In this concept, civilizations can either collapse or rise due to the responses of their societies to emerging challenges. Responses have a better chance of success if they allow for mid-course corrections. The changes in our era are closely linked to the emergence of a global economy dependent on the flow of information, technology, and capital. An inappropriate response to Industry 4.0 and Society 5.0 can hinder growth opportunities. A proper response, on the other hand, involves a match between the technology offered, the social conditions of the society, and economic development, and will create opportunities for strategic action.

Technology can provide many conveniences, from knowledge and information to promotion for economic actors. They can utilize assets available online for promotional purposes and business development. However, from the perspective of professional photography practitioners, this phenomenon presents its own challenges because the ease

of access to photography can be seen as reducing market demand for photographic documentation practices. Nevertheless, professional photography practices continue to exist, even during and after the COVID-19 pandemic. Regulatory aspects include a discussion of photography as a rapidly growing subsector, as outlined in the Regulation of the Minister of Tourism and Creative Economy (PermenParekraf) of the Republic of Indonesia No. 11 of 2022 concerning the Strategic Plan of the Ministry of Tourism and Creative Economy/Tourism and Creative Economy Agency for 2020-2024.

The explanation of the creative economy subsector included in the Potential for Creative Economy Development explanation states that the Internet of Things (IoT) catalyzes creative economy products in the Industrial Revolution 4.0. The digital era is expected to reach all countries, and social media can be impactful in developing creative economy businesses. The industrial revolution 4.0 is seen as a driver for the growth of new creative economy businesses. Meanwhile, Law No. 24 of 2019 concerning the Creative Economy states that the creative economy embodies added value from intellectual property sourced from human creativity based on cultural heritage, science, and/or technology.

According to Muafiqie (2022), the creative economy is a concept in the new economic era. The main pillars of this sector are information and creativity, ideas, and the stock of knowledge from human resources (HR), which are the primary production factors in economic activity. One subsector that has increased with increasing technological sophistication is photography. Photography equipment is no longer expensive; many relatively affordable gadgets have high-quality camera lenses. However, the photography subsector does not yet have copyright protection, so the Creative Economy Agency (BEKRAF) lists photography as one of the fields requiring archiving and IPR protection for photographic works.

Industry 4.0 and Society 5.0 require readiness. Rofaida et al.'s (2019) research on the digital creative sector in West Java during 2017-2019 provides an overview of the business strategies adopted. The entrepreneurs studied included innovation as part of their business strategy, but were unaware of how to implement business strategies for process development and production quality. This requires the involvement of all human resources within the company. The innovation strategy suggested by the researchers encompasses product, process, and marketing innovation. A systems approach is implemented through business incubators. Local government involvement through policy can create a conducive climate for the growth and development of the creative industry.

The photographic practices that are the object of this paper's study are virtual photoshoots and AI-generated photography. Virtual photoshoots are a process of photographing remotely or indirectly, using internet-based communication tools. AI-generated photography is part of the discussion because it relates to the visual imagery of the photograph produced during the photoshoot and the AI narrative that also produces the photographic visual imagery. Both methods—photoshooting and AI—produce photographic works that can be used in industrial or commercial settings. This makes AI considered a threat to the practice of photography.

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Virtual photoshoot photography behavior has become a visible phenomenon or event (Bertens, 2006: 3) and can be captured by the senses. Although conducted through cyberspace, the photoshoot takes place in real time between the photographer and model, in different spaces at the same or other times. The process of online (online) or online photoshoots has become familiar when viewed from the perspective of an information society with increasingly sophisticated communication technology. Virtual communities or virtual connections are easy to find. Even virtual interactions have become part of today's real society. One media platform that initially only opened for photo uploads was Instagram. The existence of virtual communities with social media, such as Instagram, has subsequently become a supporter of virtual photoshoots (Zen et al., 2021).

Sophia (2020) states that a virtual photoshoot is a photography style that practices shooting without direct physical interaction between the model and photographer. This type of photoshoot requires a good internet connection and adequate equipment for the model and photographer because the photo session is conducted via a video chat platform. In general, this photo session practice is carried out with instructions from the photographer to the model to pose in a particular style using an electronic camera. Then, the photographer takes photos from the laptop screen with the camera or screenshot feature. Hilma Sophia's article, published at the International Conference on Aesthetics and The Sciences of Art in 2020, analyzes photos from virtual photoshoots using the Male Gaze theory or the Male Gaze theory from John Berger and Laura Mulvey.

Sophia used a female model as the subject of a virtual photoshoot, creating an interactive atmosphere with the viewer and creating an intimate look. The analysis of both photographs reveals a tendency toward the male gaze in virtual photoshoots. This can be seen, among other things, in the presence of erotic codes and standards of female beauty within the visuals. In today's visual culture, the practice of the Male Gaze theory is a visual construct that is difficult to avoid within popular visual culture, which is then accepted by the public and reinforced as a culturally acceptable aesthetic value. The virtual photoshoots Sophia studied are photographs with personal models, so the analysis and theory used differ from those in this research. However, they provide a glimpse into the process of virtual photoshoots.

METHOD

This study uses a qualitative approach because it relates to social phenomena. This research will describe, collect data, and narrate to answer the research question. The research is descriptive, explaining something as it is, and the data collected is in the form of words or reasoning, images, and not numbers (Moleong, 2000). Data collection uses archival or document studies and literature studies. Visually, the collected archival or document data was analyzed by observing social media with the hashtag #virtualphotoshoot. As of June 13, 2020, at 07:41 WIB, the hashtag #virtualphotoshoot had been used 76,396 times on the Instagram social network. Documents/archives, photos, and videos related to virtual photoshoots.

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Meanwhile, data excerpts or sampling of photographic works used purposive sampling or selection of excerpts based on research objectives. The photos were selected from the Instagram accounts of Michael Fabian Cools Photography under @michaelcools, Alvin Fauzie Photography under @alvinfauzie and @alvinphotography, and Heret Frasthio Photography under @heretf and @2h.production. The photos were selected because they are part of commercial professional photography practices that utilize virtual photography. Furthermore, data sources were reviewed from journal articles, news, research reports, books, and other writings related to virtual photoshoots, the Covid-19 pandemic, and Industry 4.0 and Society 5.0.

RESULTS AND DISCCUSION

Internet software simplifies all communication and interaction. However, a stable signal or connection is required for all processes to run smoothly. Understanding networks and their use is essential. The internet is a technology that holds many facilities that anyone in the modern era should understand and master. However, the internet is like a jungle. Inexperienced explorers need a map and an understanding of both the concepts and technicalities of access to avoid getting lost and enjoy exploring (Asa Briggs and Peter Burke, 2006). The internet's advantage is that it can shorten distances and time because it is real-time. This means that when specific content is uploaded to the internet, other users can immediately view it, even in different locations and at great distances. The internet enables super-fast communication between one party and another, without space and time constraints.

Photography is one field where the impact of information scattered across the media and the internet is immediately apparent. Various photographic works are easily viewed, downloaded, and reused. This indicates that photography is no longer the preserve of professionals. However, nearly anyone with a camera or a device with a camera can produce photographs. However, not all pictures produced meet the various criteria of photography's function, such as for promotional/advertising or commercial purposes, for journalistic information, or for photography itself, which veers into fine art or science. From a photo production perspective, the abundance of photos scattered across social media and easily accessible via the internet can serve as a kind of visual repository of photographs, providing convenience for anyone. This can pose both a threat and a challenge, as well as an opportunity for photography practitioners.

Industry 4.0, with its virtual, digital, and technological characteristics, is closely related to virtual photoshoots. This photography practice requires a virtual internet connection and full utilization of technology. The technological challenge lies in the ability of human resources to operate all technological equipment from a photographic perspective. For example, in photography, the primary factor is light source processing. In remote photography, sensing the amount of light required for the subject cannot be done directly, so information between the photographer and the client regarding space and time must be exchanged. This requires greater communication skills from the photographer. Meanwhile,

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composition and angle settings are also limited because distance and space are real but can only be seen virtually or through a mobile device.

The Virtual photoshoots emerged due to social restrictions that prevented photographers from meeting clients or models in person. This remote shooting practice also indicates the increasingly dominant role of internet-based communication tools in society. The use of devices as a means of communication and information seeking during the COVID-19 pandemic is suspected to have increased. The Ministry of Communication and Informatics of the Republic of Indonesia (Kominfo) stated via video conference on April 24, 2020, that there had been an increase in internet usage, with an estimated peak of 40% during the 2020 Eid al-Fitr holiday (https://kominfo.go.id/content/detail/26060/terjadi-pergeseran-penggunaan-internet-selama-masa-pandemi/0/berita_satker, accessed August 5, 2020, at 9:00 PM WIB).

The Indonesian Internet Service Providers Association (APJII), through its APJII Bulletin, Edition 74, November 2020, also released the results of a survey conducted in mid-2020 regarding the increase in internet users in Indonesia. It recorded a rise from 8.9% to 73.7% of the population in 2018, equivalent to 196.7 million users. This number almost reached 200 million users out of the Indonesian population of 266.9 million, according to the Central Statistics Agency (BPS) (https://apjii.or.id/downfile/file/BULETINAPJIIEDISI74November2020.pdf, accessed November 10, 2020, at 9:00 PM WIB). The APJII survey results also highlighted the behavior of internet users during the COVID-19 pandemic, showing that most users accessed the internet for more than 8 hours a day. Furthermore, there was a shift in the access to social media content. While there was previously more social media, there was more access to educational and learning content during the pandemic. Internet usage has increased during the pandemic, and everything is done online.

Virtual photoshoots have become commonplace during the pandemic for personal and industrial promotional purposes. Several methods for conducting a virtual photoshoot, ranging from the simplest to the more complex. The differences depend on the needs and intended use of the photos. A smartphone camera is sufficient for personal documentation, entertainment, and social media. The resulting quality and file size are typically enough for social media uploads. However, a more complex process is required for more serious purposes, such as advertising and other similar projects, but the resulting photos will be of higher quality. The illustration below illustrates this further.

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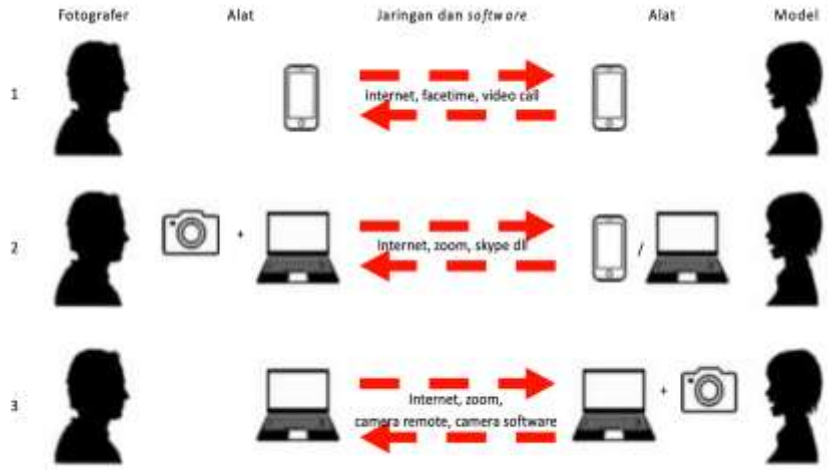

Figure 1. Illustration of a photo shoot after the pandemic

This illustration explains the process of a virtual photoshoot during the pandemic. The shoot is conducted using internet-based communication technology and a digital camera. The following describes each process. The first model is a virtual photoshoot using only a mobile phone camera. The photographer and model both use their phones to make a video call. The photographer directs the model to pose and position the phone during the video call. The photographer then presses the capture button if they find an interesting position and pose. The resulting photo is then further edited to achieve better quality. Using a mobile phone camera as a shooting tool, the quality is not as good as that of a real camera. Although the quality of a mobile phone camera is good, and image quality can also be adjusted, if the resulting photo is large, using a mobile phone camera is not recommended. This model of shooting is similar to a selfie.

The second type of photoshoot is a virtual photoshoot, which uses not only a mobile phone camera but also a laptop and a DSLR camera. The photographer uses a computer to make a video call with the model, who uses a mobile phone to receive the call. The photographer then directs the model to find a good angle or spot for the photo and also directs her to pose. The photographer then uses a DSLR camera to capture the model as she appears on the laptop screen.

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Figure 2. Example of a photoshoot by Michael Fabian Cools Photography in @michaelcools. This is an example of *a virtual photoshoot* using a laptop connected to the internet via the Zoom Meeting application. The photographer directs the model to pose and express herself, then uses the camera to capture the model's appearance on the laptop screen.

This second model photo shoot produces noticeably better quality photos. The screen display is typically wider. Furthermore, the photo size can also be enlarged. The model's expression is directed toward the camera (photographer), creating interaction during the shoot. The third photo shoot is quite complex compared to the previous two. This is because it involves extensive equipment, including computers and the internet. In this shoot, the photographer still uses a high-resolution camera to photograph the model to achieve optimal results. The studio is still used, with a complete *lighting setup* , makeup artist, and costume designer. However, each person is in a separate location, connected to the same internet network, and conducts all photoshoot activities together under the photographer's direct direction.

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Figure 3. Example of Alvin Fauzie Photography's photoshoot in @alvinfauzie @alvinphotography.

This photo is an example of a virtual photoshoot using a laptop connected to the internet via Zoom Meeting. The model's camera is then attached to the model's laptop. The photographer doesn't hold the camera, using only a computer with a camera software program (Capture One) installed to control the model's camera settings. The photographer directs the model to pose and adjust her position. Since the camera can't follow the model, the photographer presses the shutter button on the computer program to capture the model's image. The resulting photo is then further edited to achieve better quality.

This third shooting model allows for greater control over the depth and width of the frame. Furthermore, it's easier for photographers to experiment during the shoot, even if the camera is stationary. However, because the photographer can't directly control the camera, camera settings, and the creative process during the shoot, the results are less than optimal. However, this shooting model typically produces more optimal photographs, especially if all equipment, including a signal, is adequate, which maximizes photo quality. This third shooting model is also commonly used in virtual photoshoots for large-scale advertisements or photographs used for promotional purposes on large-scale media.

Furthermore, the editing process is more complex and extensive. Online photo shoots require multiple takes because the models or subjects are in different spaces and at different times. This is especially true if a single shot achieves the desired quality.

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Figure 4. Example of Heret Frasthio Photography's photography results in @heretf @2h.production. The photo in the advertisement is the result of a long-distance photo shoot for Indosat advertising purposes.

The visual advertisement for a cellular provider is an example of the most complex virtual photography process, involving many people from different locations. The model is in a studio with studio lighting, a green screen backdrop (for easy background changes), other supporting props, and a camera connected to a laptop. A makeup artist and a studio lighting and props designer assist the model. The photographer (at home) uses only a computer with a camera software installed (Capture One) to control the camera settings in the photo studio. The photographer directs the model to pose and position herself. He also directs the lighting designer to adjust the studio lights. The photographer presses the shutter button on the computer program to capture the model's image. The digital imaging team then edits the resulting image to replace the background, combine multiple photos, harmonize colors, and achieve the desired result.

The practice of virtual photoshoots demonstrates a shift in how society works in line with Industry 4.0. Industrial communities, which are commercial photography users, are also embracing internet-based photography practices. This can be seen as a viable strategy in the highly dynamic industrial world. Photographers no longer need to move to different shooting locations quickly, thus saving time and money. Another challenge of this photography method is collaborating with internet-based communication devices and equipment to produce photographs that meet photography quality standards.

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Photographers must have a greater mastery of communication media and applications related to virtual photoshoots. Furthermore, a stable signal and high-quality devices are required for shooting with other communication devices. This situation challenges photographers regarding skills, ideas, and economics, which also require creative financial management.

The creative practice of photography, which is also part of Industry 4.0 and Society 5.0, is the existence of AI. While technology makes combining words and visuals into desired images easier, the challenges that arise lie in the freshness of ideas and imagination, and the context of the photo's visual imagery. The visual logic of photography is not only related to the visible image and the use of the photograph, but also to the space and time that can be depicted as "real." Furthermore, it is necessary to trace back that the source of AI is big data that already exists, both verbally and visually, so that space and time can differ from real space in real time. In the industrial realm, it is undeniable that AI can be used for various promotional purposes, both purely AI and in combination with photographic works. However, in other genres of photography, such as documentation or journalism, AI cannot be applied.

CONCLUSION

Technology has significantly impacted all sectors of society, leading to behavioral changes. One area affected by Industry 4.0 and Society 5.0 is photography. The technology it offers has raised concerns about perceived threats to human existence, which robots could replace, and the emergence of AI, which is believed to displace creative fields. One such behavioral shift was particularly evident during the COVID-19 pandemic, which has connected nearly everything via the internet, even to this day. During that time, photography, as a creative subsector, was threatened with economic stagnation because photo shoots, which are typically conducted in person and in the same space and time, were restricted by pandemic regulations. The COVID-19 pandemic has been a driving force behind the rise of virtual photoshoots. The online community's response to various online communication methods has opened up opportunities for remote photoshoots, from the personal to the industrial realm. Virtual photoshoots can also be an alternative opportunity for the creative photography economy, both during the pandemic and in the future, in a society with a cyber culture. The virtual photoshoot phenomenon in society demonstrates that online photography, or the indirect (remote) photography process, can survive and thrive in terms of the number of users of virtual photoshoots and their quality. Photographers are also becoming more creative in their photographic ideas and gaining additional skills in operating tools/gadgets and other communication devices. The existence of AI, which is also considered another threat because it can create visual images equivalent to photographs, can be combined with the results of photography to achieve more attractive and imaginative photos. It is usually used for promotional or commercial purposes. Furthermore, the ability to freshen up ideas, compose stories, and use visual reasoning to link them to context to suit the intended use of the photograph are elements that photographers need to master. Visual editing skills are an additional skill that photographers

need to master to have the freedom to create pictures. Ultimately, it can be understood that the strategy to face the challenges of Industry 4.0 and Society 5.0 begins with mastering the technology.

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