Proposing a Phase Model for 360° VR Journalism: Resources and Challenges of Production

Schäbitz, Til; Planer, Rosanna; Godulla, Alexander

Erstveröffentlichung / Primary Publication
Arbeitspapier / working paper

Proposing a Phase Model for 360° VR Journalism: Resources and Challenges of Production

Til Schäbitz, Rosanna Planer and Alexander Godulla
Leipzig University, Institute for Communication and Media Studies, Germany

Abstract

The emergence of 360° technology and marketable virtual reality (VR) glasses has enabled 360° VR journalism to develop unique storytelling possibilities and to generate heightened levels of immersion and empathy for the audience. Nevertheless, the technology and therefore the journalistic output have difficulties in reaching a larger market of users. Exploring possible reasons for this, the article provides insights into seven guided interviews with journalists experienced in the production of 360° VR content in Germany. Based on these insights, it proposes a production phase model and considers the resources of time, personnel and technology, the special features of storytelling, the new job description of 360° VR journalists, and the dependence of these aspects on the current situation of 360° VR journalism. It thereby provides both inspiration for further research and practical points of reference for journalists.

Introduction: A format with so far unexploited potential

360° VR journalism offers new possibilities of storytelling through which new target groups can be reached (Feyder & Rath-Williams, 2018, p. 23). While a story in classical journalism is still brought to the audience by journalists, 360° VR journalism is said to bring the audience "into the story" (ibid., 22). Instead of remaining passive and distanced, the recipients can actively explore their surroundings and thus gain an immersive insight into a world that would otherwise remain hidden (Staschen, 2017, p. 241). This immersion (Ambrosio & Fidalgo, 2019; Baía Reis & Coelho, 2018; De la Pena, 2011; Shin & Biocca, 2017) has them react in that virtual world in a way they would react in the physical world (Ambrosio & Fidalgo, 2019, p. 6).

Nevertheless, the big 360° VR boom in journalism is currently not taking place and some media companies are even withdrawing from the 360° VR market. Although technical development with affordable 360° cameras and VR headsets are advancing steadily (Feyder & Rath-Wiggins, 2018; Hardee, 2016; Mabrook & Singer, 2019; Roose, 2020), there is a lack of interested parties and, above all, of established guidelines, routines and standards for high-quality productions, which are, however, indispensable for the full development of the inherent potential.

Previous research on 360° journalism and immersive journalism has rightfully focused on the specific potentials of the format, such as generating empathy (Alsever, 2015; Hassan, 2020, Lecheler, 2020, Mabrook & Singer, 2019; Sánchez Laws, 2020) and immersion (Ambrosio & Fidalgo, 2019; Baía Reis & Coelho, 2018; De la Pena, 2011; Shin & Biocca, 2017). The present study takes one step back and intends to analyze the current practices as well as challenges of 360° VR production as identified by the producers. Therefore, it first assesses the development, characteristics and classifications of the format, before introducing it in light of the Gartner hype cycle (2018a).

The difficult (re-)start of 360° VR journalism

While the beginning of the journalistic use of media such as radio or television is often times linked to a specific date, the emergence of 360° VR journalism has been a rather creeping process. The form of 360° VR journalism that is known today came about through a gradual combination of already existing technological developments that were successively adopted and integrated into journalism (Feyder & Rath-Wiggins, 2018; Wolf & Godulla, 2016).

The first Head Mounted Display (HMD), which can be seen as a predecessor to today's VR glasses, was presented as early as in the 1960s (Schart & Tschanz, 2015, p. 26). The so-called "Sword of Damocles", however, which was developed by computer scientist Ivan Sutherland, was so heavy that it had to be attached to the ceiling (ibid.) and hung above the user's head. The basic principle of VR already existed at that time, but the technological development

was not yet sufficiently advanced to become marketable. An upswing occurred in 2014 when Facebook bought the company Oculus VR, and the VR headset and the platform could be combined. Although Oculus is referred to as the most promising approach to mass market VR (Pavlik, 2015), the launch of the first glasses was rather slow due to the high sales prices.

Nevertheless, the corresponding journalistic productions and applications increased (Feyder & Rath-Wiggins, 2018). The *New York Times* experienced the most successful app launch in its history with the launch of the NYT VR app. Other media companies such as *Al Jazeera*, the *Huffington Post, ARTE,* the *BBC* and *Blick* also published their first 360° productions during this period (ibid.). In addition to the large media companies, some of which set up their own laboratories for the production of 360° VR content, smaller startups also increasingly tried to enter the market. The number of productions continued to rise, but basic definitional and practical standards did not yet exist (ibid.). Since there was also a lack of reach and refinancing options, *Google* and the *BBC*, for example, scaled back their efforts in this field in 2019 (BBC News, 2019).

Characteristics of the format: New potentials through hybrid online media

In addition to the innovations that affect hardware, the history of 360° VR journalism is also shaped by the development of the Internet as a distribution, storage and communication platform. For it is only through the development of new carrier media, which are used to distribute journalistic content, that "new formats are gradually developing" (Wolf & Godulla, 2016, p. 227). This led, for example, to the emergence of online journalism at the beginning of the 21st century through computers and smartphones with online capability (ibid.), which is now also referred to as digital journalism (Kaiser, 2017, p. 1811). The digitalization and the technical potentials of the Internet offer unique storytelling possibilities, which are highly relevant for 360° VR journalism.

Stories in the digital world can for example be told using multimedia (Meier, 2002), which makes it possible to combine individual media elements such as texts, audios, photos, videos and graphics for each topic in a meaningful way so that their respective advantages complement each other (Meier, 2003; Wolf & Godulla, 2016, p. 228). Furthermore, through the internet-specific potentials of interactivity, participation and selectivity, the recipient becomes a more active part of the story rather than merely being a distanced viewer (Feyder & Rath-Wiggins, 2018; Nash, 2012; Neuberger, 2009).

In online journalism, interactivity is understood as the communication between users, e.g. through chat forums, commentary functions or further links (Wolf & Godulla, 2015, p. 245). Users can thus switch flexibly between the role of communicator and recipient (Neuberger,

2009, p. 23). Participation, on the other hand, describes the possibility of “incorporating feedback, comments or self-generated material” and thus becoming a communicator oneself (ibid.; Wolf & Godulla, 2015). Selectivity gives users the opportunity to put together topics according to their own interests and to choose the depth and sequence of the content themselves (Wolf & Godulla, 2016, p. 227). “The linear reception of contributions is thus partially or completely replaced by a non-linear reception” (Wolf & Godulla, 2016, p. 227 f.).

The combination of the hardware innovations of 360° VR technology with the use of internet-specific potentials described above have led to the development of 360° VR journalism as a sub-form of online and video journalism. As a result, “the understanding of the role of the journalists concerned has also changed” (Lechtenberg, 2018, p. 146). After journalists had to exchange their gatekeeping for a gatewatching function with the establishment of online journalism (Bruns, 2009, p. 113), they lost “the function of sole guidance through journalistic history” (Feyder & Rath-Wiggins, 2018, p. VI) due to the enormous selectivity in 360° VR journalism. “The journalist is not a conductor, he offers a world of experience in which the user – depending on the degree of immersion – can act freely and interactively. The user is […] active and present” (ibid., p. 58). In 360° VR productions, the user is both shaping the content (Auer, 2016, p. 489) and receiving the content in the form of a personal story. Thereby, the informative and emotional impact of a production can be far greater than that of a conventional video (Aitamurto, 2019; Staschen, 2017, p. 242).

Classification of 360 VR productions based on technology

The technology of preparing content in an immersive manner using 360° and VR technology has only really become production- and market-ready in the last five years. Therefore, journalism associated with this field is still in its infancy. So far there are only a few approaches to differentiate and classify the various forms of 360° VR journalism. Feyder and Rath-Wiggins (2018) see the term VR journalism as an umbrella term for immersive journalism (De la Pena et al., 2010) and differentiate between 360° productions and volumetric productions based on the form of production. Thereby, 360° productions allow a panoramic view, horizontally and vertically, in a 360° sphere (Feyder & Rath-Wiggins, 2018). The user can therefore change the direction of view, but not his or her position in space, which is also called "3 degrees of freedom" (ibid., 4). Here, 360° videos are not "virtual worlds, but the real, filmed image of our world" (Staschen, 2017, p. 240).

In contrast, volumetric productions enable the user to move freely in space and interact with objects, called "6 degrees of freedom", in addition to the 360° view (Feyder & Rath-Wiggins, 2018, p. 4). Volumetric productions can be divided into photogrammetry and CGI (Computer

Generated Imagery) content. In photogrammetry productions, real environments, people or objects are imported with the help of a 3D scanner and then processed in a game engine (ibid.). From a multitude of single images, a model is calculated (INVR.SPACE has constructed the Cologne Cathedral as a VR experience). In CGI productions, a game engine is used to generate entire virtual spaces (ibid.). Since in practice, however, many productions have a combination of the above-mentioned characteristics, the term 360° VR production is chosen as a definitory basis in this study. CGI content is therefore not considered, nor are the forms AR (Augmented Reality) and MR (Mixed Reality) known from games (see Table 1; Milgram et al., 1994, p. 283).

Classification of immersive journalism	**Reference to the real world**
360° Virtual Reality (VR)	Single images taken in a real environment, which are merged by means of computer software
Virtual Reality	Purely virtual computer-generated rooms, which do not necessarily relate to a real environment
Augmented Reality	Real environment, which is enriched with computer-generated additional information
Mixed Reality	Hybrid form of VR and AR

Table 1: *Classification of immersive journalism by reference to the real world*

Classification of 360° VR productions based on story and content

Similar to other innovative digital formats, 360° VR productions are developing particularly in story-based journalism, as the reduced pressure to be up-to-date leaves more room for experimenting with new forms of presentation (Wolf & Godulla, 2016, p. 231). In the field of online journalism, this for example applies to digital storytelling or longform storytelling (Godulla & Wolf, 2018; Hiippala, 2017; Planer & Godulla, 2020). There has been little research on the specific content, practices and challenges of 360° VR productions, despite the mentioned potentials of immersion and empathy. The practical handbook *VR Journalism* by Manuela Feyder and Linda Rath-Wiggins (2018) offers a differentiated overview of the specific field and divides the new challenges of 360° VR journalism into *workflow, medium, craft* and *job description*. This study put 360° VR journalism in a phase of trial and error back in 2018, and since then, research has focused on the reception of 360° VR productions (Aitamurto, 2019; Kaiser, 2017; Staschen, 2017). Hence, the present study aims at adding scientific knowledge to the specific production practices, content and challenges of 360° VR journalism, such as workflow or storytelling.

Hype and diffusion: 360° VR on the way to the mass market?

In order to explain the success or failure of a new technology on the market during the early stages of establishment, the assumptions of the *hype cycle* can be used (Bresciani & Eppler, 2008; Linden & Fenn, 2003), which describes the different phases of public attention that a technology goes through after being introduced into the market (Linden & Fenn, 2003, p. 7). Compared to the field of technology consulting, the hype cycle has so far received little attention in communication science, where the diffusion of innovation theory (Rogers 1995) is used more frequently (Linden & Fenn, 2003). The hype cycle is characterized by exaggerated expectations of innovations and offers an assessment of market maturity; it thus provides information on when the introduction of new technologies is worthwhile (Bresciani & Eppler, 2008, p. 10).

The market research company Gartner divides the simple hype cycle into five phases: the innovation trigger (1), the subsequent peak of inflated expectations (2), the subsequent through of disillusionment caused by immature technology leading to a valley of disappointments (3), the slope of enlightenment (4) resulting from new, more realistic assessments of the potential of technology, and finally the plateau of productivity (5), which describes the spread of a technology (Gartner 2018a). In summary, the hype cycle advises, on the one hand, that investments in technologies should not be made solely on the basis of a given hype about them and, on the other hand, that technologies should not be ignored if the initially exaggerated expectations are not met (Bresciani & Eppler, 2008, p. 10; Linden & Fenn, 2003, p. 5).

The technological trigger for the hype cycle of 360° VR technology and 360° VR journalism was probably the mentioned merger of Facebook and Oculus VR in 2014. In the following years, more and more 360° cameras and VR headsets were developed, but their adoption within the market was rather slow due to the high price and the relative lack of corresponding content and distribution platforms. While the number of journalistic 360° VR productions also increased steadily until 2017 (Statista, 2016), some technology and media companies withdrew from the 360° VR market in 2019 (BBC News, 2019). It seems reasonable to assume that the 360° VR market was in a valley of disappointment at that time.

The Gartner market research institute publishes an annual publication on the hype cycle, in which current technological developments are classified. Although the 2016 hype cycle predicted a breakthrough of VR technology in five to ten years at the earliest, the technology was no longer listed in the 2018 publication (Gartner, 2018b; VDC, 2018). The reason for this was the fact that VR was already nearly mature (ibid.). However, the fact that sales figures for HMD and production figures in journalism have tended to decline since then (VDC, 2018) contradicts the assessment that an actual adoption has taken place in the mass market and that the

productivity plateau has been reached. Instead, it might be that 360° VR will remain a mature niche technology in Gartner's forecast, which cannot reach a higher plateau than the current one.

At this point, a differentiation must be made between the 360° VR technology and the field of 360° VR journalism. With regard to 360° VR journalism, several different developments are considered simultaneously: On the one hand, there is the technological development and adoption of HMDs on the side of the recipients, and on the other hand, there is the technological development and adoption of production hardware on the side of the producers (e.g. 360° cameras); furthermore, the ability of journalists to use the existing technology correctly is an intervening variable. Such a subdivision can lead to "radically different positions in different cycles" (Linden & Fenn, 2003), since theoretically, each of these three subareas could be considered in their own cycles. For example, the 360° VR hardware might already have left the hype cycle and reached the plateau of productivity (Gartner, 2018a; VDC, 2018), while at the same time, 360° VR journalism might be in the valley of disappointment or on the slope of enlightenment. According to the hype cycle, the existence of a technology does not imply that it can be used properly (Linden & Fenn, 2003, p. 10).

One reason why 360° VR journalism has possibly gone less far through the hype cycle than the technology associated with it could be the inertia principle of journalism, according to which every new medium first tries to imitate an existing one and only later finds its own form of storytelling (Kaiser, 2017, p. 1812; Wolf & Godulla, 2016, p. 228). The fact that the potentials inherent in the new medium are only marginally exploited at first (Deuze, 2004; Kaiser, 2017) can have a negative effect on the recipients' experience (Wolf & Godulla, 2016). This is because, by using comparable applications, such as journalistic 2D videos or the video games in 360° VR (Kaiser, 2017, p. 1813), users place certain expectations on 360° VR journalism, which it cannot fulfill at first.

In order for 360° VR journalism to reach its potential and a broad audience in the future, the search for guidelines for an effective production process is just as essential as the search for its own form of storytelling. Both areas are likely to have developed in the past months and years, which makes it even more worthwhile and relevant to conduct research in this field. Hence, the present study aims at answering the following research-guiding question: *Which current practices and challenges exist for high-quality journalistic 360° VR productions?*

Methodology

The mentioned differentiation made by Feyder and Rath-Wiggins (2018) into workflow, medium, craft and job description has been adapted to the implementation of 360° VR productions, hence it serves in this study to specify the research-guiding question:

RQ1: *What phases are involved in the implementation of journalistic content as 360° VR productions? (workflow)*

RQ2: *What resources are needed in the different phases of journalistic 360° VR productions? (medium)*

RQ3: *What are the special features of storytelling that have to be kept in mind during 360° VR productions? (craft)*

RQ4: *Which new competencies do 360°-VR journalists have to unite in their person? (job description)*

The aim of the study is to find and name current definitional guidelines for high-quality journalistic 360° VR productions. In order to be able to set these in relation to the current situation of 360° VR journalism, a fifth research question (F5) is to be used to ascertain the perception of this very situation:

RQ5: *How do journalists assess the current situation of 360° VR journalism and its challenges beyond the production of content?*

These research questions have been transferred into concrete test questions that provide the guiding questionnaire for the expert interviews (see Table 2).

Aspects of the research questions	***Test questions in the questionnaire***
Narrative phase	How did the first contact with the 360° VR area come about? What have been your favorite projects in this area so far? What is the fascination of this medium?
RQ1: Workflow	Is 360° VR journalism really still in the frequently described trial phase or are there already routines that run similarly in every production? Creative task: Does the model built here match your personal workflow? What are the differences in your case (sequence, missing steps, additional steps)?
RQ2: Medium	In relation to the previously built model: How long do the respective phases last? What kind of personnel is involved in the respective phases? What technology do you use in the respective phases? To what extent has the development of technology changed/facilitated work processes? Which phases are still too costly? Where do you hope for innovations in the near future?
RQ3: Storytelling	How does storytelling for 360° VR productions differ from classic linear storytelling (e.g. 2D videos)? How can the attention of the recipient be directed despite the lack of linearity of a story? Which topics are particularly suitable and why?
RQ4: Job description	What skills should or must a good 360° VR journalist have?
RQ5: General situation	What are the greatest challenges at present? Why are 360°-VR productions not yet so widespread in the "traditional" media? What would be necessary to reach a wider audience? Why is 360° VR journalism important for the future?

Table 2: *Operationalization*

Qualitative Interviews: Sample

Altogether seven expert interviews were conducted with the help of the questionnaire; five of them were conducted with journalists who have specialized in the implementation of 360° VR productions in their own companies or start-ups for several years; two further expert interviews were conducted with a VR network director and a journalist employed by public broadcasting in Germany, who has already implemented several projects in 360° VR. For the analysis, the Grounded Theory according to Glaser and Strauss (2010) was used, combined with an inductive argumentation structure. The evaluation of the obtained data concentrated on a comparative analysis, whereby the data were coded in a three-part evaluation process (Strauss & Corbin, 1994). According to the Grounded Theory, coding and analysis took place simultaneously (Glaser & Strauss, 2010, p. 116). Thus, a mutual analysis of inductive and deductive categories could be performed to structure the data (Mayring, 2015; Meyen et al., 2019, p. 174). The software MAXQDA was used to evaluate the data material.

Results

New standards – new workflow?

360° VR journalism is, according to statements of the interview partners, still in a phase of trying out (expert 5). Nevertheless, there are editors who have been there from the beginning and have already integrated 360° VR into everyday wok routines (expert 5). In the last two or three years, it "has become increasingly clear what works", also within the production process (expert 2). In order to illustrate their personal workflow, the respondents were asked to create a standard workflow model with the help of printed cards with the words *order/topic definition, research/team definition, concept, production planning, production, stitching, cut/sound, final acceptance/final editing* and *publication*. The cards were laid out in that order in front of the interviewees, who were given the opportunity to move the cards, remove existing ones and add new ones in order to arrange their personal workflow.

It was noticeable that all interview partners had integrated each of the pre-printed steps into their model. However, there were some changes in the order and some additions, focusing almost exclusively on adding headlines or details. For example, *postproduction* was introduced as an umbrella term for *stitching* and *cut/sound*, and *social media* was added as a subset of *publication*. An adjustment of the sequence was made especially in the first phases, since journalistic productions often do not have a clear commission at all, but only their own impulse (expert 3). The only newly added work step, which did not represent a summary or subdivision of existing phases, was that of the *acceptance loops*. A production was added to

these loops if certain adjustments became necessary during internal testing or external acceptance (expert 7).

On the basis of the models and explanations of the interview partners, the construction of a new workflow model can thus be carried out, in which both the umbrella terms and the subdivisions are taken into account (Fig. 1). This model is primarily divided into five main phases: Start of project (1), planning (2), production (3), post-production (4) and publication (5). Within these phases, different work steps take place, which can be partly linear, parallel to each other or circular.

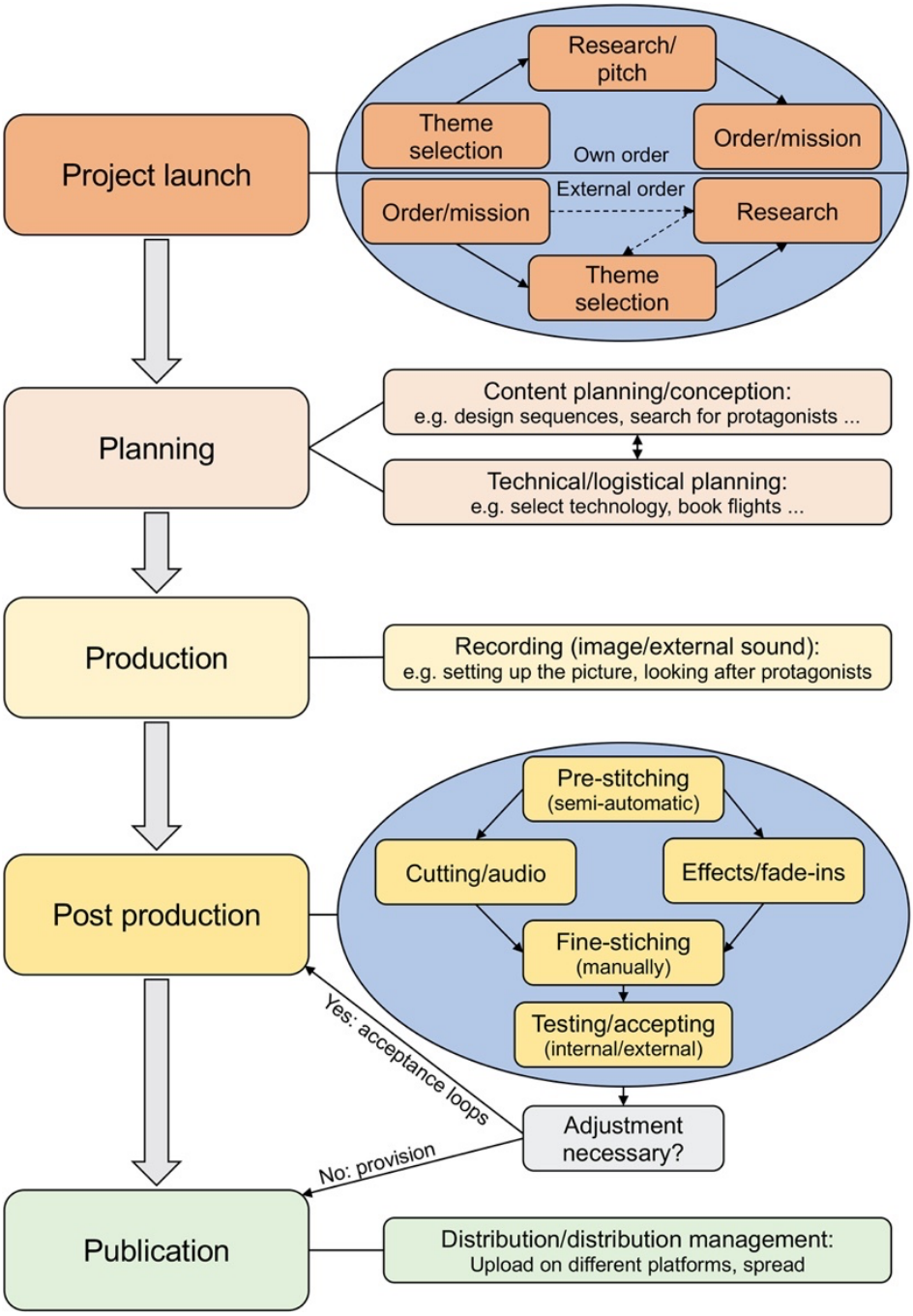

Fig. 1: *The different phases of the workflow for 360° VR productions*

Medium: Still no best practices available?

The aspect of the medium serves here as an umbrella term for the resources time, personnel and technology. The interviewees were asked to provide information on an average production. In almost all cases, there were great differences in terms of the preparations of a production: Expert 7 stated that "the concept for something like a travel report is quite simple. I don't think too much about it in advance because I have to be a bit surprised [...]", and hence, the preparation time of one day was already considered rather long. If, on the other hand, on-site inspections and first test shots were to take place, it could be two to three weeks, according to expert 1. When particularly research-intensive projects were carried out, several months up to one year had already passed until the production could start (expert 5). Concerning the actual production, however, the interviewees all agreed on an approximate duration between one day and one week.

Regarding the personnel it can be mentioned that all interview partners had some permanent employees in their organizations as well as a certain team of free coworkers. There were, however, differences in the decision as to how much and which personnel was used for the production of a story. One company, for example, followed the VRJ (Virtual Reality Journalist) approach, which is based on the well-known concept of the VJ (Video Journalist), who as a single person is primarily responsible for all phases of the workflow and merely requests further support for feedback (expert 7). Other interviewees however chose a different path together with their organizations, where more people are engaged in the production, but exclusively work within specific phases and are not concerned from beginning until end. Hence, besides the project-responsible persons, the team can consist of e.g. direction, producer, clay/tone, camera and stringer (expert 1), or of a 3D artist, stitcher and designers (expert 3).

Regarding technological resources, the 360° camera was the core element for each project (experts 3; 7). Among the high-end cameras, the Insta 360 Pro 2 (5,600 Euro) was frequently mentioned among those surveyed. However, it was also possible to use so-called consumer cameras for particularly simple productions, some of which can be purchased for as little as 100 euros (experts 6; 7). In addition to the camera, elements such as tripods, external sound devices and playout equipment were used in the production, which were also used in classic 2D productions. In addition, a radio was mentioned as indispensable for media-specific reasons, since the journalists often have to withdraw from the location during the 360° recording. In post-production, semi-automatic pre-stitching was usually used to combine the images of the individual lenses and thus to provide editable images. These were selected, merged and enriched with external sound elements and fade-ins during editing, before fine-tuning such as tripod retouching was performed in the final fine stitching, e.g. with Mistika VR. For all resource aspects, it should be emphasized that this brief overview refers specifically to the investigation

period at the beginning of 2020. Due to the rapid technological developments, these remarks could soon be outdated, but reflect a certain point in time.

Storytelling: Take the user to another world, and do it gently

Consider the added value of the medium, or you might easily disappoint the user – this is how the core statement for storytelling can be summarized. Its added value lies in the immersion, "that I really immerse and submerge" (expert 7). The user becomes part of another world that he or she can actively experience. This is one of the exclusive strengths of the 360° VR medium. With good products, the panoramic view should trigger the feeling that the user is actually at the place where it happens, allowing him to "dive much deeper emotionally" (expert 2). The higher degree of user involvement can stimulate regions in the user's brain that give him or her the feeling that he or she is actually experiencing something instead of just having heard or read it (expert 3).

But for these listed strengths of the medium, the activity of the user always points to a central difficulty: How can a journalist specifically control the attention of the user? The interviewees' answer to that question were the so-called "theater tools": movement, sound and light (expert 7). The examples of a view-guiding element and a slamming door were mentioned frequently: "If, for example, I have already established the sound of a slamming prison door and then the sound comes again and the user perhaps already knows where this prison door is, then he will probably look there" (expert 7). In general, the use of sound plays a central role, since humans are "insanely good" at locating audios (expert 1). The same applies to the use of light effects, while arrows are rather frowned upon due to their striking nature (expert 2). In order to be able to rule out the possibility that the user misses relevant elements of the story, a slower narrative style was offered in addition to the theatrical means described (expert 1). Individual scenes should "stand for at least ten to 15 seconds" in order to have an effect on the user (expert 7). Overloading would also be harmful (expert 3).

In order to provide a particularly high added value, topics "that are somewhat more difficult to present in another medium" would be suitable (expert 5). This specifically applies to the representation of places which are difficult to access due to factors such as their distance or exclusivity, e.g. underwater photographs (experts 1; 5). Also, the transfer of the user into a different role is one of the central strengths (experts 2; 5). On the other hand, topics for which the location does not play a role were considered unsuitable (expert 1); similarly, too many facts (expert 7) or too strong emotionality (expert 2) can overwhelm the users.

Job description: Empathy required; technological know-how presupposed

The required basic skills of a good 360° VR journalist can be divided into two generic terms: journalistic skills and technical understanding. The journalistic handicraft in the 360° VR range is not at all so different from what constitutes a good journalist in general (expert 3). In addition to good research and objectivity, however, there are some media-specific requirements. "A great deal of empathy for the protagonists" (expert 7) and the target group (expert 5) are absolutely necessary. Furthermore, a strong sense of orientation and visual imagination are just as much a prerequisite as a basic understanding of the technology used (experts 1; 3).

In addition to the necessary skills, the job description of the 360° VR journalist is significantly influenced by the challenge that even in 2021 there will hardly be a functioning business model. That also explains why none of the interview participants was exclusively working in the field of the 360° VR journalism. They all developed their own strategies and work within secondary activities in order to be able to finance themselves and their enterprises. Besides providing classical photographs (expert 7) or 360° VR productions for marketing purposes (expert 2), one interviewee furthermore operated a technique rental business (expert 3) while another launched a VR platform that could be used by other editors (expert 5).

Current situation: No business model, hence no productivity plateau?

The 360° VR technology has only really become ready for production in the last five years (expert 4). The majority of today's active journalists only joined their respective companies at this time. According to this, 360° VR journalism could not yet have fully developed. Nevertheless, a lot has happened in recent years, especially with respect to camera technology (expert 2; 5), and the same applies to VR glasses. But despite the preceding technical developments, the interviewees stated that there is still room for improvement in this area as well. For example, the glasses continue to be "still quite clumsy and bulky" (expert 2) and are therefore not widespread enough in the everyday life of the recipients (expert 6). In addition to publishing platforms, there is a particular lack of a so-called killer application that could enable the breakthrough on a larger scale (expert 7). In addition to the aforementioned possibilities for improvement in the technical sector, there is a lack of acceptance and understanding on the part of the recipients as well as on the part of traditional media publishers and potential clients (expert 4). These "traditional media" are always interested in innovations, but as soon as they do not immediately reach a large target group, they will quickly reduce their efforts (expert 1).

Based on that, a classical hen egg problem results for the field of 360° VR journalism (experts 1; 2): As long as there is no sufficient offer of binding contents, no recipient will invest into the (expensive) hardware in order to be able to use it (expert 1). Also, the technical front will only

make further investments when there are enough new products and a market of recipients. However, as long as there is neither a potential target group nor a satisfactory technology, producers will struggle with further investments. All interviewees stress that there is currently no functioning business model, especially in the journalistic part of the 360° VR area (experts 1; 2; 7). Reach is particularly important at the moment, including when allocating budgets (experts 4; 6), in order to create awareness of the new medium among as many recipients as possible (experts 3). Even if many recipients can be reached via web-based platforms, the potential of the medium is not being fully exploited. As a result, the number of clicks has remained comparatively low, with the result that some producers have already scaled back their efforts (expert 1), which leads to a circle of costly mistakes.

In addition to trying to increase the reach, the production of content of highest quality is another approach that is currently being pursued (experts 6; 7). This content can be shown at events such as trade fairs or festivals and thus create a greater awareness of the advantages of the medium (expert 2). The aforementioned problem, however, also applies here as well: High-quality productions are more expensive, the reach at events is rather low. For 360° VR journalists, the establishment of functioning recruitment models is essential, but their implementation is associated with numerous difficulties. With all these challenges, many questions arise in 360° VR journalism up to date: How can money be earned? Do journalists have to work with sponsored or branded content? Where do 360° VR productions really make sense? Will they perhaps only be of added value for special projects? Do we have to say goodbye to VR glasses in the journalistic field? Despite all the uncertainties regarding the near future, the interview partners also radiate confidence: "VR will continue to exist, I am quite sure of that. And then there will also be a journalism that works with it" (expert 6).

Discussion

What complex journalistic projects have in common

Even if the workflow models produced by the interview partners were not the same, many similarities could be found. Contrary or contradictory opinions did not occur at all. By inserting generic terms and subdivisions, the workflow model thus set up describes the production process on a meta-level, so that it can potentially be valid beyond the selected interview partners. It is striking that there are no significant differences between journalistic 360° VR and more traditional multimedia productions in terms of work steps (Planer & Godulla, 2020). In comparison to the production of a normal 2D video, for example, only stitching was added as a media-specific part of postproduction.

Many roads lead to Rome

The statements on the use of different resources in 360° VR productions show great differences, which suggest the conclusion that in practice, even at the beginning of 2020, there are still no guidelines on production conditions in 360° VR journalism. The interviewees repeatedly emphasized that their statements were strongly project-dependent (experts 2; 3). Although they were asked to think of a production that was as average as possible for their circumstances, this still allowed for a wide range. It was precisely the lack of a budget framework that made the comparison difficult. "As much routine as necessary with as much freedom as possible" was already stated by Miriam Meckel as early as 1999 with regard to the production of high-quality content (Meckel, 1999, p. 43) – A basic assumption that more than twenty years later also seems to apply to the situation of journalistic 360° VR productions. Despite the sometimes completely different approaches to the strategic use of resources, the companies of the interview partners have managed to establish in the market with their respective approaches for several years. Therefore, besides the proposed model, this study (unfortunately) cannot provide precise, restrictive guidelines or routines on the aspect of resources, but it comes to a different conclusion, which could also encourage journalists: Many roads lead to Rome, also in 360° VR journalism.

It's all about audience development

In the field of storytelling, some themes and elements have already proven to be suitable. Since it is difficult to convey complex information at once and because special places and emotions are highly relevant, 360° VR journalism might be "nothing in the sense of breaking news, but rather something for background stories" (expert 6). Technological tools such as heat maps can help to analyze the user's line of sight and to better anticipate the future. The more subtly the attention is directed, the better the user can concentrate on the content and thus perceive the strengths of the medium. Certainly, it cannot be assumed that the current practices will remain unchanged forever. After all, they depend heavily on the viewing habits of the users. Just as one has become accustomed to the shot/counter-shot principle in linear video over the years, for example, the audience development also plays a role in 360° VR journalism. According to one interviewee, people who wear VR glasses for the first time are "flashed" anyway (expert 3), but as soon as the recipients' viewing habits are known, a more appropriate cut and more dynamic content is possible (expert 3).

Interaction is key

Where can we start to escape the hen-egg problem? There probably cannot be a simple answer to this question. None of the three sides (producers, recipients, and technology developers) alone will be able to ensure the further development of the sector, but rather a targeted and equal interaction of all those involved is required. On the producer side, with which this study is concerned, it can be assumed that it is not in their own interest to produce compulsively just to raise the awareness of the recipients for the new medium. One possibility would be to produce so-called lighthouse projects (expert 7). These are particularly qualitative productions that are shown at trade fairs and other events to show the recipient what "cool journalistic skills" one has (expert 7). Although this does not achieve an enormous reach, the added value of the medium is emphasized. New criteria for attention and its quality must be applied (expert 6). 360° VR does not necessarily have to be more expensive than a classic linear production. In traditional media, however, this knowledge must be carried into the small regional studios (expert 6). Taking into account the currently existing guidelines for qualitative 360° VR productions, more productions can appear on an everyday level, in addition to the lighthouse projects. By emphasizing the strength of the medium, a market of recipients can be built up, as long as the technology developers also do their part. This is not the exclusive task of journalists. In the same way, game developers or the industrial and educational sector can contribute to the 360° VR medium becoming more established in everyday life (experts 1; 6).

Conclusion and outlook

In this study, expert interviews showed that certain routines for the production of high-quality journalistic 360° VR elements are already in place. For example, the typical workflow differed only slightly from that of classic linear 2D productions. The interview participants also generally agreed on the possibilities for directing the attention of the recipients. The greatest challenge currently lies in developing a functioning business model. However, taking into account these guidelines and their future development, journalists could play their part in advancing the solution of the current hen and egg problem.

The overview of the current situation of 360° VR journalism in this study offers different starting points, both for journalistic 360° VR practice and for scientific research. This study provides only a rough orientation, which can be understood in both areas as an inspiration for further efforts. The scientifically closest approach would be to examine the actual implementation of the routines identified in practice. Also, the here only mentioned possibility of different representation forms in 360° VR requires further investigations. How does a 360° VR report, which was created in months of collaboration between different companies, differ from a piece whose

basic budget was only 500 euros? A question that can be investigated on the producer side as well as form the basis for comprehensive reception research, which is also currently lacking. Is the attention of the users really controlled by the elements that are specifically used by the journalists, or are there other factors? In which stories do the recipients see added value? Investigations into the motivation behind the adoption of 360° VR productions in the broadcasting structures of traditional media or the private purchase of a VR headset, for example, also seem promising. Due to the rapid development of the object of investigation, a reproduction of this study in a different country or at another point in time could lead to different results. Like the entire field of journalism, the 360° VR field is currently undergoing rapid change. In order not to lose its relevance and topicality, the associated field of research would be well advised to seize this opportunity by intensifying its research efforts.

References

Aitamurto, T. (2019). Normative paradoxes in 360° journalism: Contested accuracy and objectivity. *New Media & Society, 21*(1), 3–19. https://doi.org/10.1177/1461444818785153

Ambrosio, A. P., & Fidalgo, M. I. R. (2019). Proposal for a new communicative model in immersive journalism. *Journalism*, 1-18. https://doi.10.1177/1464884919869710

Auer, C. (2016). Internet und Journalismus. In M. Löffelholz & L. Rothenberger (Eds.), *Handbuch Journalismustheorien* (pp. 489-506). Springer VS.

Baía Reis, A., & Coelho, A. (2018). Virtual Reality and Journalism. A gateway to conceptualizing immersive journalism. *Digital Journalism, 6*(8), 1090-1100. https://doi.org/10.1080/21670811.2018.1502046

BBC (2019). *Making VR a Reality.* BCC. http://downloads.bbc.co.uk/aboutthebbc/internetblog/bbc_vr_storytelling.pdf

BBC News (2019). *Google and BBC scrap VR projects.* BBC News. https://www.bbc.com/news/technology-50080594

Bresciani, S., & Eppler, M. J. (2010). Gartner's Magic Quadrant and Hype Cycle. *Collaborative Knowledge Visualization Case Study Series, 2*. https://www.researchgate.net/publication/265407275_GARTNER%27S_MAGIC_QUADRANT_and_HYPE_CYCLE

Bruns, A. (2009). Vom Gatekeeping zum Gatewatching: Modelle der journalistischen Vermittlung im Internet. In C. Neuberger, C. Nuernbergk, & M. Rischke (Eds.), *Journalismus im Internet. Profession, Partizipation, Technisierung* (pp. 107-128). VS Verlag für Sozialwissenschaften.

De la Pena, N. (2011). Physical World News in Virtual Spaces. Representation and Embodiment in Immersive Nonfiction. *Media Fields Journal 3*, 1-13. http://mediafieldsjournal.org/physical-world-news-in-virtual/2011/7/22/physical-world-news-in-virtual-spaces-representation-and-emb.html

De La Pena, N., Llobera, J., Weil, P., Giannopoulos, E., Pomés, A., Spanlang, B., Friedman, D., Sanchez-Vives, M., & Slater, M. (2010). Immersive Journalism: Immersive Virtual Reality for the First-Person Experience. *Presence Teleoperators & Virtual Environments*, *9*(4), 291-301. https://doi.org/10.1162/PRES_a_00005

Deuze, M. (2004). What is Multimedia Journalism? *Journalism Studies, 5*(2), 139−152. https://doi.org/10.1080/1461670042000211131

Expert interview 1, Actrio Studio.

Expert interview 2, Omnia360.

Expert interview 3, INVR.SPACE.

Expert interview 4, VRBB.

Expert interview 5, Vragments.

Expert interview 6, Deutsche Welle.

Expert interview 7, IntoVR.

Feyder, M., & Rath-Wiggins, L. (2018). *VR-Journalismus. Ein Handbuch für die journalistische Ausbildung und Praxis.* Springer VS.

Gartner, I. (2018a). *Gartner Hype Cycle.* https://www.gartner.com/en/research/methodologies/gartner-hype-cycle

Gartner, I. (2018b). *Hype Cycle for Emerging Technologies, 2018*. https://www.gartner.com/en/documents/3887767

Glaser, B. G., & Strauss, A. L. (2010). *Grounded Theory. Strategien qualitativer Forschung*. Huber.

Godulla, A., & Wolf, C. (2018). Digitales Storytelling. Nutzererwartungen, Usability, Produktionsbedingungen und Präsentation. In C. Nuernberg & C. Neuberger (Eds.), *Journalismus im Internet. Profession – Partizipation – Technisierung*, pp. 81-100. Springer VS.

Hardee, G. M. (2016). Immersive Journalism in VR: Four Theoretical Domains for Researching a Narrative Design Framework. In S. Lackey & R. Shumaker (Eds.), *Virtual, Augmented and Mixed Reality. VAMR 2016. Lecture Notes in Computer Science*, pp. 679-690. Springer.

Hassan R. (2020). Digitality, Virtual Reality and The 'Empathy Machine'. *Digital Journalism, 8*(2), 195-212. https://doi.org/10.1080/21670811.2018.1517604

Hiippala, T. (2017). The Multimodality of Digital Longform Journalism. *Digital Journalism, 5*(4), 420–442. https://doi.org/10.1080/21670811.2016.1169197

Kaiser, M. (2017). Virtual Reality, Live-Streaming & Co. In M. Eibl & M. Gaedke (Eds.), *INFORMATIK*, pp. 1811-1821. Gesellschaft für Informatik.

Lecheler, S. (2020). The Emotional Turn in Journalism Needs to be About Audience Perceptions. Commentary – Virtual Special Issue on the Emotional Turn. *Digital Journalism, 8*(2), 287-291. https://doi.org/10.1080/21670811.2019.1708766

Lechtenberg, F. (2018). Produktion im Journalismus: Digital, mobil, crossmedial. In K. Otto & A. Köhler (Hg.), *Crossmedialität im Journalismus und in der Unternehmenskommunikation*, pp. 133-150. Springer VS.

Linden, A., & Fenn, J. (2003). *Understanding Gartners Hype Cycles. Strategic Analysis Report.* https://www.gartner.com/en/documents/396330/understanding-gartner-s-hype-cycles

Mabrook, R., & Singer, J. B. (2019). Virtual Reality, 360° Video, and Journalism Studies: Conceptual Approaches to Immersive Technologies. *Journalism Studies*. https://doi.org/10.1080/1461670X.2019.1568203

Mayring, P. (2015). *Qualitative Inhaltsanalyse: Grundlagen und Techniken.* Beltz.

Meckel, M. (1999). *Redaktionsmanagement – Ansätze aus Theorie und Praxis: Das Konzept des Total Quality Management*. Westdeutscher Verlag.

Meier, K. (2002). Herausforderungen des Internet-Journalismus. Das neue Medium denken lernen. In K. Altmeppen & W. Hömberg (Eds.), *Journalistenausbildung für eine veränderte Medienwelt. Diagnosen, Institutionen, Projekte*, pp. 145-155. Westdeutscher Verlag.

Meier, K. (2003). *Internet-Journalismus*. VS Verlag für Sozialwissenschaften.

Meyen, M., Löblich, M., Pfaff-Rüdiger, S., & Riesmeyer, C. (2019). *Qualitative Forschung in der Kommunikationswissenschaft. Eine praxisorientierte Einführung*. Springer VS.

Milgram, P., Takemura, H., Utsumi, A., & Kishino, F. (1994). Augmented Reality: A class of displays on the reality-virtuality continuum. *Telemanipulator and Telepresence Technologies*, 2351, 282-292.

Nash, K. (2012). Modes of interactivity: analysing the webdoc. *Media, Culture & Society, 34*(2), 195−210.

Neuberger, C. (2009). Internet, Journalismus und Öffentlichkeit. Analyse des Medienumbruchs. In C. Neuberger, C. Nuernbergk & M. Rischke (Eds.), *Journalismus im Internet. Profession, Partizipation, Technisierung*, pp. 19-106. VS Verlag für Sozialwissenschaften.

Pavlik, J. V. (2015). Transformation: Examining the Implications of Emerging Technology for Journalism, Media and Society. *Athens Journal of Mass Media and Communications, 1*(1), 9-24. https://doi.10.30958/ajmmc.1-1-1

Planer, R., & Godulla, A. (2020). Longform Journalism in the USA and Germany: Patterns in Award-Winning Digital Storytelling Productions. *Journalism Practice.* https://doi.10.1080/17512786.2020.1742771

Rogers, E. (1995). *DIFFUSION OF INNOVATION*. The Free Press.

Roose, K. (2020). *This Should Be V.R.'s Moment. Why Is It Still So Niche?* The New York Times. https://www.nytimes.com/2020/04/30/technology/virtual-reality.html

Sánchez Laws, A. L. (2020). Can Immersive Journalism Enhance Empathy? *Digital Journalism, 8*(2), 213-228. https://doi.10.1080/21670811.2017.1389286

Schart, D., & Tschanz, N. (2015). *Praxishandbuch Augmented Reality. Für Marketing, Medien und Public Relations.* UVK Verlagsgesellschaft.

Shin, D., & Biocca, F. (2017). Exploring Immersive Experience in Journalism. *New Media & Society 20*, 2800-2823. https://doi.10.1177/1461444817733133

Staschen, B. (2017). 360 Grad – Rundherum unterwegs. In B. Staschen, *Mobiler Journalismus*, pp. 239-257. Springer VS.

Strauss, A. L., & Corbin, J. (1994). Grounded Theory Methodology: An Overview. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research,* pp. 273-285. Sage Publications.

VDC (2018). *Virtual Reality ist kein Bestandteil des Hype-Cycles mehr.* VDC. https://www.vdc-fellbach.de/nachrichten/2018/09/14/virtual-reality-ist-kein-bestandteil-des-gartner-hype-cycle-mehr/

Wolf, C., & Godulla, A. (2015). Onlinemedien und Hintergrundinformation. Nutzererwartungen. Erwartungen mobiler Internetnutzer an Scrollytelling, Webdokumentationen und Multimediastorys. *Media Perspektiven*, (5), 241–249.

Wolf, C., & Godulla, A. (2016). Innovative digitale Formate im Journalismus. In K. Meier & C. Neuberger (Eds.), *Journalismusforschung. Stand und Perspektiven*, pp. 229-246. Nomos.