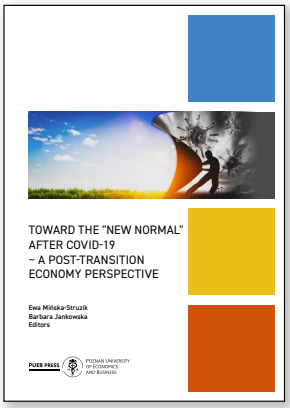

TOWARD THE "NEW NORMAL" AFTER COVID-19 – A POST-TRANSITION ECONOMY PERSPECTIVE

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2. Effects of the Covid-19 pandemic on sport, video game, and tourism industry: Sentiment analysis of press, internet articles, and Twitter data

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Abstract

Purpose: The chapter examines the extent and level of the pandemic impact on sport, video game, and tourism industry by analyzing the emotional narration of articles related to Covid-19 effects on these industries so as to assess and predict the situation of industries during the pandemic and in the following years, but also to explain sources of positive sentiment for a given industry.

Design/methodology/approach: The study provides a sentiment analysis of the global disclosure of the Covid-19 pandemic in the press, online articles, and social media (Twitter) with

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the use of three independent R packages. The final sample consisted of 142 articles; the oldest was published on January 23, 2020, whereas the newest one on October 14, 2020.

Findings: Sentiment analysis revealed that the emotional tinge of the articles is much more positive for video games and soccer than in the case of tourism. In the case of video games and soccer, positive emotions such as "trust" or "anticipation" prevailed over much more common emotions of "fear" and "sadness" used about tourism. The impact of the pandemic was similar for video games and soccer, which was a mixture of negative and positive events.

Research limitations/implications: Further research should use other resources such as the mass media or other data sources in addition to social media information and include a long-term analysis divided into stages of the pandemic as reactions and moods have been changing over time. Moreover, the factors influencing the perception of situations in different sectors of the economy should be identified in future research.

Practical implications: The use of sentiment analysis shows that such quantification may be performed for new social phenomena before any hard (e.g., financial) data are available.

Social implications: An approximation was obtained for quantifying the societal "general feeling" with regards to specific sectors affected by the pandemic.

Originality and value: The chapter compares the response to the pandemic crisis of different sectors that reveal the sentiment contributing to the growth or difficulties of a given industry. The use of sentiment analysis enabled us to assess and predict the situation of industries during the pandemic before the hard and comprehensive data will occur.

Keywords: pandemic, sentiment analysis, sport, video game, and tourism industry.

2.1. Introduction

Covid-19 is a humanitarian crisis on a global scale that affects the global economy and continues to threaten jobs, businesses, and the health and well-being of millions. An unprecedented decline in global GDP was estimated in the first half of 2020 at around 13% (OECD, 2020). As the impact of the pandemic is significant and multi-dimensional, global news spread rapidly in traditional and social media. Numerous posts, tweets, and comments were published by e.g. firms, governments, organizations, and citizens. Although the nature of the crisis following the pandemic is in general negative, its disclosure does not need to be necessarily negative and may depend on the industry. Sport and tourism count among the hardest hit industries due to e.g. the cancellation of events worldwide, the closure of borders, tourist attractions, restaurants. On the other hand, the video game industry (incl. esports) seems to benefit from the lockdown. The response to the crisis of the pandemic in industries reveals a sentiment contributing to the growth or difficulties of an industry for which the pandemic and related restrictions are a turning point in long-term development.

The analysis of sentiment in publicly available streams enables us to measure the public sentiment as a good measure of the quantitative assessment of the phenomenon before hard data like financial data are available, as indicated by previous studies, including those on public perception of the Covid-19 pandemic on Twitter (Boon-Itt & Skunkan, 2020; Samuel et al., 2020). However, not only social media can provide a subject rich in data for sentiment analysis. In fact, any published document may be analyzed in terms of the level of emotional content. Consequently, sentiment analytics provides a significant arsenal of tools to better understand the expectations of the society.

The purpose of this chapter is to examine the extent and level of the pandemic impact on sport, video game, and tourism industry using emotional narration of articles related to Covid-19 effects on these industries. Specifically, the study provides a sentiment analysis of the global disclosure of Covid-19 pandemic in the press, online articles, and social media (Twitter) in order to assess and predict the situation of industries during the pandemic and in the following years, but also to explain sources of positive sentiment for a given industry.

2.2. Literature review

2.2.1. The impact of pandemic on the economy and industries

The Covid-19 outbreak causes negative consequences for many industries as consumers stay at home and economies are shut down (Tucker, 2020). The sport and fitness industry was one of the most restricted during the pandemic: gyms, swimming pools, and water parks were closed, sport mega-events were postponed or canceled, and soccer games were held without spectators. While some businesses are struggling, others are thriving, e.g. Internet-based businesses (Donthu & Gustafsson, 2020). Video game industry is the most dynamically developing industry included in the so-called creative sectors for at least several years. Thriving under lockdown, video games are something between a sport and a social network (*E-sports: Legends in lockdown*, 2020). Even before the pandemic, there was an increasingly frequent trend of seeking entertainment in the virtual world, which was only strengthened during the pandemic.

An extremely strong trend supporting the development of this industry is e-sport; the most qualified alternative to answer the needs of sportsmanship in the digital age and Covid-19 situation of reduced outdoor activities (Hulaj et al., 2020). According to the definition of the Cambridge Dictionary, e-sport is defined as playing video games against other rivals on the Internet, which is often watched by others and done for profit. According to the SuperData Research report, the value

of the electronic sports market is USD 1.5 bn, and by 2020 it will grow by 26%, as the estimated number of e-sports players will be 250 million people worldwide (*E-sports: Legends in lockdown*, 2020; Marta, Prasetya, Laurensia, Stevani, & Syarnubi, 2020). E-sports began to cooperate with traditional sports, which could improve the situation of traditional sports during the pandemic time. There are 196 sports teams involved in e-sports, 150 of which are soccer clubs (Kamiński, 2019). However, the most popular e-sports have no connection to traditional sports; there are e-sports that follow "traditional" sport (e.g. FIFA) and "non-traditional" sport. Although e-sports are not immune to the effects of the pandemic as a sector, it is certainly less affected than traditional sports and has seized opportunities to gain mainstream publicity. However, the lasting effects on the growth of the sector will depend on how governments respond to the pandemic and whatever is in store for the global economy (Grossobel, 2020).

Tourism industry has experienced similar restrictions as the sport sector. Since many tourism and leisure activities can contribute significantly to the spread of SARS-CoV-2, as tourism and leisure activities rely on people from distant locations coming into contact, corresponding business activities must endure a comprehensive and long lockdown: mostly the closure of borders and the closure of attractions and restaurants. As a result, according to the UNWTO (2020), the massive drop in international travel demand over the period of January–June 2020 translates into a loss of 440 million international arrivals and about USD 460 bn in export revenues from international tourism. Europe is the second-hardest hit of all global regions, with a 66% decline in tourist arrivals in the first half of 2020. The Americas (-55%), Africa and the Middle East (both –57%) suffered as well. However, Asia and the Pacific, the first region to feel the impact of Covid-19 on tourism, experienced the hardest hit with a 72% fall in tourists for the six-month period.

The response options of industries to the lockdown are limited (see Airey et al., 2020a). The impact of the pandemic will likely last longer for international tourism than for other affected industries, and the tourism industries should not only recover but also reimagine and adapt itself to the coming economic order (Donthu & Gustafsson, 2020).

2.2.2. Content and sentiment analysis in social reporting research

The use of content analysis in social research has a long history that evolved over time (Vourvachis & Woodward, 2015). Recent developments affected the validity and reliability challenges that researchers face when executing the method, which received significant contribution from the increasing availability of computer tools and archived online texts. Hence, the possible scope for the further application of content analysis seems vast. Content analysis turned out to be particularly useful

in social media (e.g. posts on Twitter) and in research on the perception of social and economic phenomena and processes (e.g. Gao, He, Chen, Li, & Lai, 2020). Content analysis is used in wide array of journal groups, finding application in the perception of the pandemic and the associated socioeconomic effects. Unlike text analysis, sentiment analysis gives insight into the emotions behind the words.

For example, Samuel et al. (2020) perform descriptive analytics to study public reactions and sentiments to tweets during the consequences of the pandemic. Similarly, relying on Twitter data from 100 NASDAQ firms, Sharma, Adhikary, and Borah (2020) with text analysis tools generate themes regarding the issues faced by firms and strategies they adopt. They found that firms are facing challenges in terms of demand-supply mismatch, technology, and the development of a resilient supply chain. Sentiment analysis was also used to identify trends in the discussion about the Covid-19 pandemic and alternative perspectives to investigate the pandemic crisis on social media, which created concern and raised public awareness about Covid-19 (Boon-Itt & Skunkan, 2020). Thus, content and sentiment analysis offer considerable opportunities for the preliminary assessment of the pandemic crisis from different research perspectives.

2.3. Method, sample, and sources of data

Sentiment analysis was adopted as a research method of this study. Also described as opinion mining, sentiment mining, opinion extraction, subjectivity analysis, or emotion analysis, sentiment analysis is the field of research that studies people's sentiments, feelings, and appraisals of entities, events, and topics usually gathered in large sets of documents (Ignatow, Evangelopoulos, & Zougris, 2016). Researchers indicated that this provides a relatively new avenue for future studies, with little large-scale text-based research performed on people's sentiments and opinions before 2000 (Liu, 2010). Sentiment analysis adopts machine learning techniques aimed at the evaluation and classification of attitudes and opinions in a given field of interest (Rambocas & Gama, 2013). The method utilizes standard lexicons of positive and negative sentiment terms. However, we should note that the meaning of sentiment phrases depends on various factors such as context, the use of irony, humor, or sarcasm. By extracting emotions from a text and classifying them into specific areas, the analysis puts final meaning into predefined, mutually exclusive categories (Liu, 2012). Dichotomous classifications of emotions (positive and negative) are typically represented by numeric values for further statistical purposes.

In this study, the process of sentiment analysis was automated. The analysis was performed in the R environment with the help of three independent R packages:

syuzhet (supported with the *dplyr* script), *SentimentAnalysis*, and *sentimentr*. The conceptual framework of the study is presented in Figure 1 below.

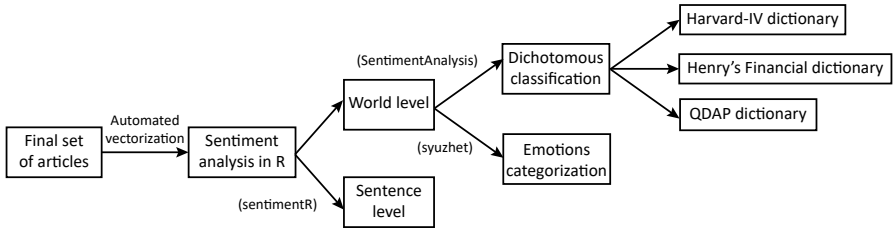

Figure 1. Study design
Notes: phrases in brackets indicate the names of the adopted R scripts
Source: Own elaboration.

The study encompassed a two-staged analysis. In the first part the analysis focussed on the level of separate words, which means that the script searched for words only and ascribed to them numerical values and categorized by emotions. In the second step, the sentence level was adopted in order to better capture the emotional polarity of entire phrases. The sample consisted of articles listed in the references of the three following Wikipedia sub-pages:

1) *Impact of the Covid-19 pandemic on the video game industry;*
2) *Impact of the Covid-19 pandemic on association soccer;*
3) *Impact of the Covid-19 pandemic on tourism.*

The articles were collected in November 2020. The final sample consisted of 142 articles. The oldest article was published on January 23, 2020, whereas the newest one on the October 14, 2020. As a result, the study covered a relatively significant period of the ongoing pandemic.

SentimentAnalysis

The *SentimentAnalysis* script conducts a sentiment analysis of textual contents by utilizing various existing dictionaries like Harvard IV or finance-specific dictionaries. The Harvard-IV dictionary contains a list of 1316 positive and 1746 negative words according to the psychological Harvard-IV dictionary. Score values are binary. The Henry's finance-specific dictionary contains a list of positive and negative words. It is quite small, since it contains just 53 positive words and 44 negative words. The QDAP dictionary contains the 1280 positive words and 2952 negative words.

Consequently, the result of the study is a two-level factor outcome with "positive" and "negative" levels. Sentiment scores are divided into positive and negative ones and presented on a scale from 0 to 0.5, in which 0 means no emotional

content and 0.5 means the highest possible negative/positive score. The final score is calculated as the difference between positive and negative score. The greater the value above zero the more positive the final score. Similarly, the greater the value below zero, the more negative the final score.

Syuzhet

The *Syuzhet* script extracts sentiments and sentiment-derived plot arcs from text using a variety of sentiment dictionaries conveniently packaged for R. Implemented dictionaries include:

- "syuzhet" (default) developed in the Nebraska Literary Lab;
- "afinn" developed by Finn Arup Nielsen;
- "bing" developed by Minqing Hu and Bing Liu;
- "nrc" developed by Mohammad and Turney.

For the purpose of the study, the utilized dictionary was the "nrc," as the nrc lexicon does not only investigate the polarity of a text (by reporting positive or negative words) but also identifies sentiment type using eight additional categories: anger, anticipation, disgust, fear, joy, sadness, surprise, and trust. The dictionary encompasses 13,889 words distributed among the abovementioned eight different sentiment categories.

The script counts the occurrence of a word appearing in one of the categories in the text. If a sentence contains three words listed in the list of words for e.g. anger, the score for that sentence in the anger category will be 3. When using the "nrc" lexicon, rather than receiving the algebraic score due to positive and negative words, each sentence receives a score for each sentiment category. This is a major upgrade compared to the *SentimentAnalysis* script.

Sentimentr

The *sentimentr* package is a sentence level script that seeks sentences in a text. By disaggregation into sentences as a studied unit, the script determines the level of positivity/neutrality of the entire sentence. The dictionary contains 11709 words whose individual scores may take one of 19 values in the [-2, 1] range. The significant advantage of this package is the ability to evaluate the score of an entire sentence and not just of separate words.

2.4. Results

The first step of the study was devoted to the analysis of the polarity of single words by using the *SentimentAnalysis* script. Table 1 and Figure 2 below summarize the results.

Table 1. Polarity of single words by industries based on the *SentimentAnalysis* script

	Soccer	Video games	Tourism
SentimentGI*	0.110	0.111	0.031
NegativityGI	0.080	0.091	0.104
PositivityGI	0.190	0.202	0.136
SentimentHE**	0.006	0.006	–0.007
NegativityHE	0.005	0.006	0.017
PositivityHE	0.010	0.012	0.010
SentimentQDAP***	0.117	0.093	0.023
NegativityQDAP	0.033	0.047	0.060
PositivityQDAP	0.150	0.140	0.083

Notes: * GI – Harvard-IV dictionary; ** HE – Henry's Financial dictionary (Henry 2008); *** QDAP dictionary.
Source: Own elaboration.

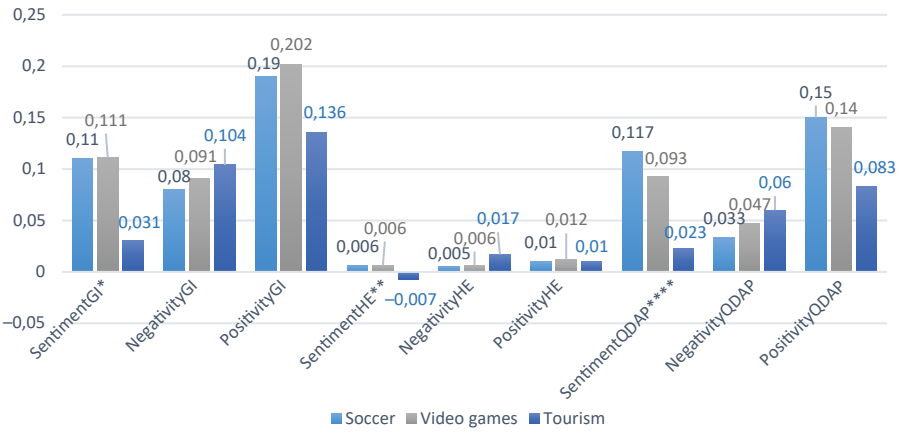

Figure 2. Distribution of polarity of single words between industries based on the *SentimentAnalysis* script
Source: Own elaboration.

The data in Table 1 show that the average level of positivity in articles concerning the impact of Covid-19 is lower in the group of articles on tourism that in articles referring to sport. Consequently, the mean level of negativity was greater in articles concerning the impact of pandemic on tourism than those about sport.

These phenomena were observed in the case of two dictionaries (Harvard-IV and QDAP). The Henry's Financial dictionary did not provide significant differences. The plausible explanation is the fact that this lexicon contains a limited number of words, thus identifying large disproportions may prove difficult. This fact questions the usefulness and appropriateness of adopting this lexicon in social sciences research. The basic polarity of the analyzed articles was further developed by the sentiment content division into eight different categories. Table 2 and Figure 3 present the results.

Table 2. Breakdown of the various sentiment counts

	Soccer	Video games	Tourism
Anger	66	111	211
Anticipation	278	388	536
Disgust	40	67	135
Fear	167	191	406
Joy	137	190	277
Sadness	120	159	350
Surprise	81	139	201
Trust	368	455	669
Total	1 257	1 700	2 785

Source: Own elaboration.

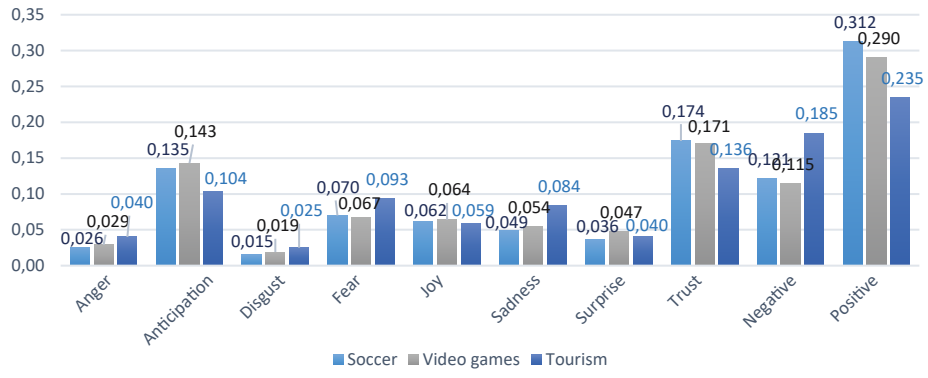

Figure 3. Shares of emotions with category breakdown (mean values)
Source: Own elaboration.

Data in Table 2 show that the general sentiment content – measured as the total score of eight categories – is the greatest in the group of articles devoted to the impact of Covid-19 on tourism. Articles devoted to tourism outperform other articles also when considering the level of separate types of sentiment. Therefore, the comparative analysis of scores of various emotional categories should be performed in relative measures (Figure 3).

Figure 3 provides a breakdown on the shares of eight various sentiment scores. In general, four can be classified as positive (anticipation, joy, surprise, trust) and four as negative (anger, disgust, fear, sadness). In the positive sentiment group, the average shares of scores were lower in the tourism than in the sport industry articles, with the greatest differences observed in terms of anticipation and trust. Meanwhile, in the negative sentiment group the average shares of scores were greater in the tourism than in the sport industry articles. The greatest differences were identified in terms of anger, fear, and sadness. Relatively similar scores in three groups of studied articles were determined in the case of disgust, joy, and surprise.

In the second step of the study, the analysis focused on the sentence level. Table 3 summarizes the results.

Table 3. Sentiment analysis: sentence level

	FT clubs	Video games	Tourism
Means score	0.081	0.073	0.002
No. of sentences	606	886	1 396
No. of positive sentences (score>0)	334	480	588
No. of negative sentences (score<0)	182	286	571
No. of neutral sentences (score=0)	90	119	236

Source: Own elaboration.

The highest sentiment score was observed in the articles referring to the impact of Covid-19 on soccer, followed by articles devoted to video games. The lowest score was found in the group of articles concerning the influence on tourism. Moreover, the greatest number of positive and negative sentences was observed in articles about tourism. Therefore, the analysis was subsequently performed with the help of relative measures (Figure 4).

The highest share of positive sentences was identified in soccer and video games articles, whereas the lowest one in tourism articles. In turn, negative sentences were relatively more abundant in tourism articles than in the other studied group. Additionally, the ratio of positive to negative sentences was lower in the tourism group (1.03) than in the sport (1.84) and video games group (1.68).

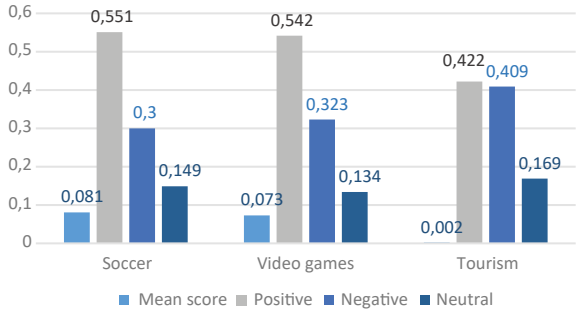

Figure 4. Mean scores, shares of positive, negative, and neutral sentences
Source: Own elaboration.

The results gathered in previous analyses provide an insight suggesting that, among other things, the sentiment score measured by various approaches in the soccer and gaming industries during the Covid-19 pandemic is relatively similar. This evokes further interest in the topic and calls for further research of the phenomenon. As indicated in the theoretical part of the article, numerous sentiment analysis studies were performed on the sample of tweets published during the period of pandemic. Hence, as an extension of the initial aim of the article, the sentiment analysis of tweets of the wealthiest soccer clubs and e-sports teams was conducted. Each group consisted of 20 entities selected from publicly available ranks. The purpose was to determine the possible similarity or difference between both groups by adopting a different sample, however still associated with the original set of industries. The total number of tweets amounted to 25,299 in the soccer group and 12,864 in the video games group. Tweets were collected with the help

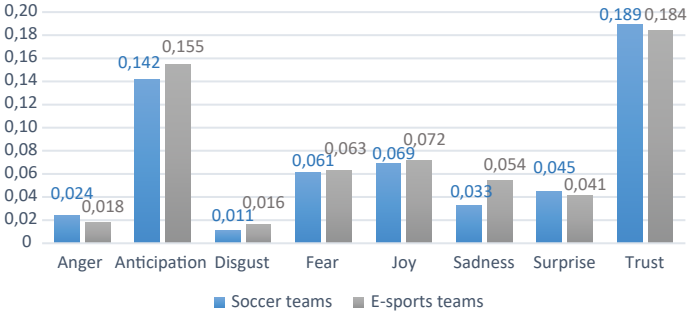

Figure 5. Sentiment breakdown of tweets among wealthiest soccer and e-sports teams
Source: Own elaboration.

of *rtweet* script available for the R environment. Similarly to the initial study, the *syuzhet* package was employed for the purposes of the tweets sentiment analysis. Figure 5 below shows the results.

Data presented in Figure 5 confirm our previous results. The level of similarity of various sentiment categories is relatively high. There can be observed some differences between both groups in certain sentiment categories, however they should not be perceived as significant. Hence, the results on tweets sentiment analysis in the soccer and gaming industry are in line with the conclusions derived from the article's initial study based on the Wikipedia articles.

2.5. Conclusions

The study consists of a comparison of three sectors of the economy differently impacted by the Covid-19 pandemic. Moreover, the three sectors differ from the perspective of "general feeling" about the impact of the pandemic.

The video game industry is often believed not to be impacted negatively by the pandemic but even to "profit" from stay-at-home and lockdown orders that made many people turn to video games as their pastime activity. Sport industry (soccer in the case of the article) is assumed to be impacted negatively, as many of its fixtures were postponed or canceled and held without spectators, i.e. without revenues from ticket sales. Tourism industry is generally seen as a symbol of an industry particularly severely hit by the pandemic, as people were forced to refrain from traveling by coronavirus mitigation regulations.

The sentiment analysis of press and online articles published in 2020 – chosen as references from Wikipedia entries on the impact on the pandemic on video games, sport, and tourism – shows that the emotional tinge of these articles is much more positive in cases of video games and soccer than in the case of tourism. After further breakdown of general positivity/negativity into several emotion categories, the data show that in the case of video games and soccer, positive emotions such as "trust" or "anticipation" prevail over much more common emotions of "fear" and "sadness" used about tourism. While these results may be seen as not particularly groundbreaking, they prove that sentiment analysis is a good approximation for quantifying the societal "general feeling." The main advantage of the methods using sentiment analysis is that such quantification may be performed about new social phenomena before any hard (e.g. financial) data are available.

The sentiment analysis also can highlight some of the more hidden phenomena: the sentiment of articles on video games and soccer are quite similar (positive in both cases), which may be seen as contrary to the "general feeling." Although, by the time of writing this article, detailed financial statistics on the impact of the

pandemic on the sectors selected for analysis are not available, some relatively scarce and scattered data begin to surface. According to that data, the impact of the pandemic was similar for video games and soccer, and it was a mixture of negative and positive events.

In 2020, the sales of videogames increased by 34% as a whole, but it was mostly driven by major AAA titles (games produced by the biggest developer studios), while many smaller developer studios postponed or canceled their projects as the pandemic decreased their abilities to secure external financing. E-sports events were postponed or canceled, similarly to soccer fixtures. Almost all game shows planned for 2020 were canceled which was a severe hit for smaller companies in the sector, as game shows are the most important marketing channel in the industry, except for the biggest players.

On the other hand, soccer clubs are relatively secure in case of losing revenues from gate receipts as the majority of their revenues are broadcasting payments. In the case of smaller clubs in major leagues, broadcasting payments constitute 70–90% of revenues due to equal share payments rule (e.g. 50% of the UK broadcast revenue is split equally between 20 clubs). Although the share of broadcast revenue is lesser in the case of top clubs, ticket sales do not exceed 30% of clubs' revenue; the third revenue source being sales of collectibles and club gadgets. Broadcast revenues are typically contracted in 3–5 years cycles and the terms are negotiated several years in advance. Thus, the 2019/2020 season did not show significant decrease in major league clubs' revenues as the payments were set long before the pandemic. Taking this into consideration, the revenue of 20 top European clubs increased in 2020 by 11% compared to 2019.

These numbers are in a stark opposition to tourism industry. According to the UNWTO, the massive drop in international travel demand over the period January-June 2020 translates into the loss of 440 mln international arrivals and about USD 460 bn in export revenues from international tourism. Travel has been a function of possibilities, not preferences. The response of tourism businesses to limit the economic impact, revealed some avenues of possible innovations such as: the innovative use of scarce existing physical infrastructure, move to digital for e-services and delivery services, preparing for a reopening under strict hygiene regulations and therefore capacity restrictions. This leads to small steps and drawbacks toward a temporary new "normal" (Airey et al., 2020a, 2020b). Stimulating aspects of the crisis caused by Covid-19 – like the need for innovation – are addressed from international business perspective (Marinov & Marinova, 2021).

This research collected data from selected press and online articles, along with Twitter. Further research should use other resources such as the mass media or other data sources in addition to social media information and include a long-term analysis broken down into stages of the pandemic as the reactions and moods

are changing over time. Such an approach will enable a quantified assessment of sentiment in sectors of the economy in connection with the response of companies and governments that limit the negative effects of the pandemic on the society and the economy. Additionally, it is cognitively interesting to identify the factors influencing the perception of situations in different sectors of the economy, and which of these aspects were crucial for the assessment of sentiment and the attitude on the market.

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