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USE OF THE SPATIAL DATA IN THE VIDEO GAMES ENVIRONMENT – INTELLECTUAL PROPERTY LAW ISSUES

Abstract: Article focuses on the problem of copyright protection of spatial data used to create and perform multimedia works. Multimedia are hybrid works because they are constructed from two main layers (audiovisual work and computer program) but should be treated as one product according to the copyright. Thus spatial data included inside such a works have to be protected within them as a one product. Video games were chosen as an example of multimedia (hybrid) works. First chapter shows crucial role of (mostly) artificial spatial data in the creation and usage of video games. Spatial data describe game environment's location of every (audio)visual object but are encoded in, and used by computer program to perform video game properly. As such spatial data are one of the reason for treating video game as unified product, consisting amalgamation of its elements. Because spatial data are binder of the video game both layers, they should not be subject of separated copyright protection. Thus to protect spatial data included in video game, the video game itself needs to be protected properly. However, because video games are hybrid works, they legal nature is not determined yet. There is also no legal definition or specific copyright regulation for video games. Because of this legal loophole, different doctrinal concepts together with European Court of Justice judgements, on the video game's copyright protection, were analyzed. This was analyzed in chapter two. Conclusions consist statement that lack of video games legal nature's determination, and caused by this lack of specific copyright protection of video games may lead to not enough copyright protection of the video game as a whole product as well as spatial data included inside. Specific regulation instead of casuistic judgements is needed, for ensure the video games market grows.

Keywords: video games, multimedia works, hybrid works, artificial spatial data

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Introduction with analysis of the state of the problems

For the needs of this research paper author focused on the "typical" video games which gameplay is set in the virtual interactive environment with many objects, living creatures and player character. Most of the nowadays games are like these. However video games are complex category of multimedia products. Some of them looks more like interactive scenarios without typical interactive environment. They have "slides" with text and illustrations descripting the plot. Depending on players choices those slides change, leading player to the end of the story (Text games). Video games and spatial data share more commons than it could be expected. For example they share vulnerabilities. Both, as a products recorded and distributed mostly digitally, are vulnerable to violations of copyrights (Matlak, 2007) as their duplication is easy (Gienas, 2008). Beside that, violations include also unauthorized access, usage, and distribution. All those violations together, are often called "Piracy" (Haber et al., 2003; Holm, 2014; Moshirnia, 2018). Pirates actions could lead to loss of developer's profits from the official, legal selling (Greenspan, 2014). Moreover, both, video games and spatial data are expensive in production and in retail sales, so violations of their copyrights may be lucrative for pirates, as they may easy find clients for pirated products. Therefore piracy is very dangerous for those markets (Pekka, 2020). Researches indicate that in 2012 up to 95% of video games for personal computers could come from illegal sources (Darroch, 2012;.Kuehl, 2016; Holm, 2014).

Big value of accurate spatial data assets (not only in terms of money) was indicated by the European Union (EU) law maker in the Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) (Directive 2007/2/EC, 2007). According to the points 1–3 of introduction and article 17 point 4–5 of Directive 2007/2/EC main purpose of Directive was to ensure integration, availability, quality, accessibility, organization, and sharing possibilities of spatial data from different sources, and moreover its opening to the public as much as possible. However in the article 13 point 1 letter (e) of Directive 2007/2/EC, EU law maker pointed out that in some cases, including protection of copyrights, this open access can be restricted. Also development of the video games (especially "AAA" category – "Triple A" video games, are the most complicated, complex and expensive video games) may be very expensive (counted in tens of millions dollars) and takes many years of investments (Targosz, 2015). For example according to the official CD Project Red reports, development of the "Witcher 3" took three and half year and cost around 80 million dollars (Cd Projekt group, 2015). Newest game of this Producer "Cyberpunk 2077" cost approximately 300 million dollars (Cyberpunk jedną z najdroższych gier w historii, 2020). Thus, strong and effective copyright protection of spatial data and video games is needed.

Video games and spatial data share more commons than just vulnerabilities. Spatial data are crucial during the creation and usage of video games. Every visual object in every video game have an exact location in the virtual environment (which can be constant e.g. virtual house or variable e.g. virtual character which moves from one place

to another), depended on artistic vision of developer's team. Video game's engine to screen those objects properly needs data asset regarding to their localization. To meet those needs every object has to be described by spatial data referring to its current in-game's localization. Spatial data from one hand refer to visual objects, but from another hand are part of the source code and may be used by the video game's objects tracking mechanics also encoded in the source code. This makes spatial data a crucial part of any video game, which bind video game's audiovisual and computer program layers. As such, spatial data are inseparable from the video game as a whole product. This leads to the idea of a comprehensive research about their joint copyright protection. Because to protect video game's spatial data from copyright violations, video game as a whole product must be protected properly.

Since video games are intended to be sold in more just one country, the EU copyright regulations have been chosen for analysis. The main indicated problem is the fact that EU copyright regulations are different for the computer programs and for other works, also audiovisual works (Grzybczyk, 2020). Video games however contain both of them bound by spatial data. Thus, legal nature of video games is difficult to determine, and EU law maker still have not done it. In 2014 even the European Court of Justice (ECJ) had to take a stand in this topic (European Court of Justice Judgement from 23rd January 2014. Case c-355/12, 2014), which shows its importance. However lack of specific regulation for video game's copyright protection still exists. Thus, legal nature of video games topic of doctrine's discussions and researches. However there is a lack of a comprehensive research approach to the protection of video games and spatial data included in them, although both those products are inseparable bound. Intention of this paper is to fill this research gap, and verify the hypothesis that present lack of video games legal nature's determination, and caused by this lack of specific copyright protection of video games may lead to not enough copyright protection of the spatial data included in the video games.

Material and methods

To verify the hypothesis the joint analysis of the EU copyright provisions, ECJ judgements and research papers, under the dogmatic method was conducted. To analyze the role of the spatial data in the video games, the case study, about creation of chosen video games and video games creator documentations under the empiric method was conducted.

Results and discussion

Spatial data's role in video games. Inctroduction notes. Before the analysis of the legal provisions applicable to the video games and spatial data included in them, it is needed to analyze the role of spatial data in the creation and usage of video games. Goal of this analysis is to show that spatial data included into video games are bound with them so tight that should be protected within the video game itself as a whole product.

At the beginning of this analysis, the understanding of the spatial data for the needs of this research should be introduced. Article 3 point 2 of the Directive 2007/2/EC, defines Spatial Data as any data with a direct or indirect reference to a specific location or geographical area. In article 4 point 1 letter (a) it is also indicated that spatial data must relate to an area where Member State has and/or exercises jurisdictional rights. This legal definition correspond to spatial data based on the terrestrial coordinate system (0,0,0 point related to cross point of the equator and the zero meridian on the sea level).

For the needs of video game's spatial data analysis, the broader understanding of spatial data is needed, and cover not only terrestrial spatial data but also artificial spatial data (point 0,0,0 in the center of the fictional Cartesian plane). Usually for the needs of video games the artificial spatial data are created within the game creator and later are using by video game's engines to perform the game. In some cases, indicated later, also terrestrial spatial data may be used for the needs of video games.

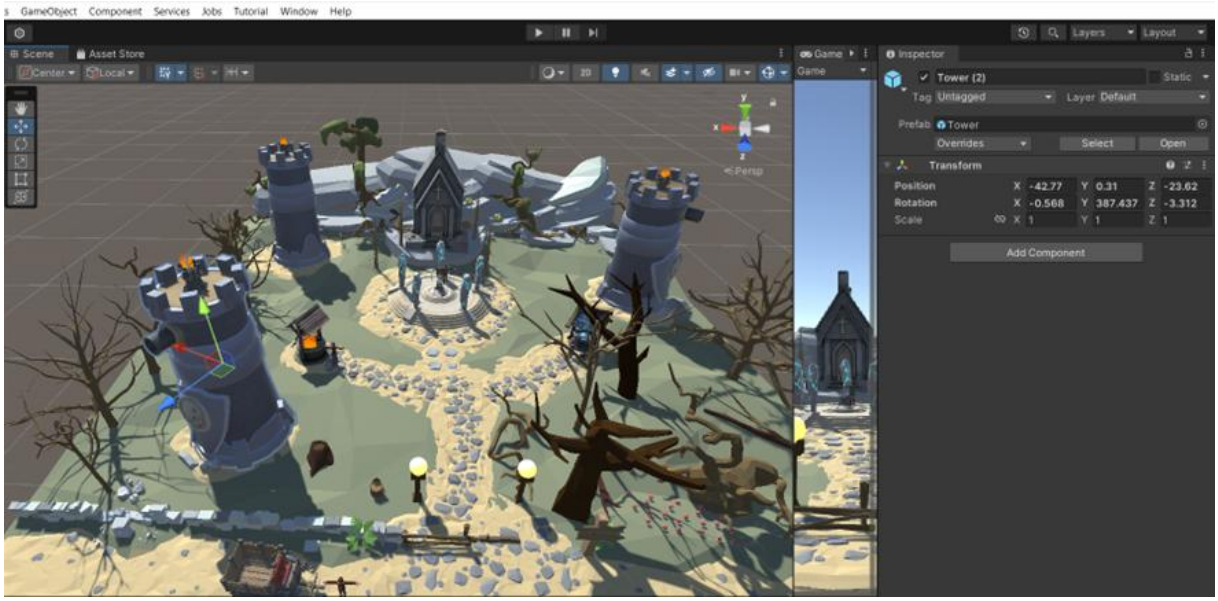

Fig. 1. Example of the artificial spatial data usage for the creation of the video game. On the right side in the "Inspector" window, artificial spatial data of the marked object (tower) are visible
Source: Own study

Among the use of spatial data for the needs of video game two main categories may be distinguish. First category is the use of spatial data for the creation of video game environments. Artificial spatial data (X, Y, Z) are using to set objects with stable location for example: houses, entrances to another location (e.g. dungeons), player character starting location, etc. Spatial data may be also used to set movement path networks of the objects with variable location especially non player character (NPC), for example humans, animals or monsters. Use of spatial data for the creation of video games can be seen by analyzing the cheat codes syntax. To illustrate it, "Teleport" cheat codes from game "Gothic" were chosen. By those codes player character can be moved immediately

to any object or non player character in the game environment, without care of the game rules. Syntax of this "Teleport" cheat code require to provide destination's coordinates (code: "goto pos <X Y Z>"), or object's individual number ("goto waypoint <object or NPC code>") (Lista kodów do Gothic, 2011). Object individual number is enough because every object in video game is described by its own coordinates). Example of cheat codes was used because it shows clearly and in easy way (without the need to use game creation tools) that during the creation of video games every objects gets its own coordinates, which are in use during the usage of the video game. However, cheat codes are not recommended to use, because they may destroy overall perception and fun from the video game. They may lead video game to crush and/or bug, but also (in case of on-line games) are perceived as an unsportsmanlike conduct and may lead to exclusion from competition, or video game's account blockade. Because of that, another examples spatial data rol in creation and usage of video games are provided in the next subsections.

Use of spatial data in creation or modification of video games. Example of "The Elder Scrolls IV Oblivion". Game environment of "The Elder Scrolls IV Oblivion" has been chosen to illustrate the crucial spatial data role in the video game creation and modification. Environment of this game was divided into external world and internal locations.

Fig. 2. World map of "The Elder Scrolls IV. Oblivion"
Source: https://en.uesp.net/wiki/file:ob-map-cyrodiil.jpg [access: 06.11.2023]

Entire external world has been divided by a rectangular "geographic" artificial grid along the meridians and parallels. This grid created squares with coordinates (X,Y) (The Elder Scrolls Construction Set, cell co-ordinates, 2006) (According to the owner of The Elder Scrolls Construction Set, "Bethesda Softworks": *The Elder Scrolls: Oblivion Construction Set is provided AS IS and technical support is not available for it. For more information on The Elder Scrolls: Oblivion (TES) Construction Set, visit TES Construction Set Wiki* (BETHESDA SUPPORT). Because of that references to this wiki where made in this research)). Like in real world coordinates refer to the zero point (0,0) however in

case of the game this point is fictional and set on the cross of the red lines in the map above. Also similar to the terrestrial system there are four geographical directions, but instead of naming them north, south, west and east, the game creator use Cartesian plan where negative values (-) are used to describe South and West, and positive (+) for North and East. As it is visible on the map presented in the figure 2, zero point is set exactly in the middle (cross of the red lines) of the whole virtual world (both light and dark brown). However only the light brown part of the world if available for the Player (around 2/3 of the game world). Rest of the world (dark brown, around 1/3 of the game world) was left empty, probably for later additions to the game (The Elder Scrolls Construction Set, cell co-ordinates, 2006). This lead to the specific situation, where zero point is exactly in the center of the virtual world but it is not in the center of the Player's available world.

Designing the game environment with the coordinates system gives many advantages to the development of the game.

Firstly, every object, animals, or non player character have its own location's coordinates.

Fig. 3. Screen from "The Elder Scrolls Construction Set", showing coordinates of the object marked by the mouse (white lines)
Source: http://www.skyrim.pl/images/stories/TES4_Kurs/rys3_4_zaznacz_obiekty.jpg [access: 06.11.2023]

For example on the figure 3 the rock formation (visible object) inside the white frame is set stable on the square with coordinates (-3,19), which is information for the game engine (computer program) where the object should be rendered and where physical engine should enable collision model for object (the green and red frame around the trees in the figure 3).

Secondly in video games like the analyzed "Oblivion", coordinates of the external world are used to settle links between objects in the external world (e.g. door to the house. figure 4) and the internal worlds (e.g. interior of the house).

Fig. 4. Screen from "The Elder Scrolls Construction Set", showing placement of the door connecting external and internal worlds of "Oblivion"
Source:
http://www.skyrim.pl/images/stories/TES4_Kurs/rys3_8_drzwi_po_str_zewn.jpg
[access: 06.11.2023]

Interaction with door_1 on coordinates (X, Y) will moved player to the interior of the house which is linked to those door_1. In reversed way it will work similar, after interaction with the door_2 inside the house player will be moved to the external world in front of the door_1 on coordinates (X, Y). Doors are "connection" points between internal and external worlds (The Elder Scrolls Construction Set, linking, 2006). Linking allows developers to set empty maquettes of the building in the exterior world and set their interior as another small "world" out of the main map. This has a positive effect on the game performance, because rendering and physic engines would have less calculation to do at once.

Thirdly, use of in game coordination system allow developers to set movement path network of humans and animals and track their movement (e.g. figure 5).

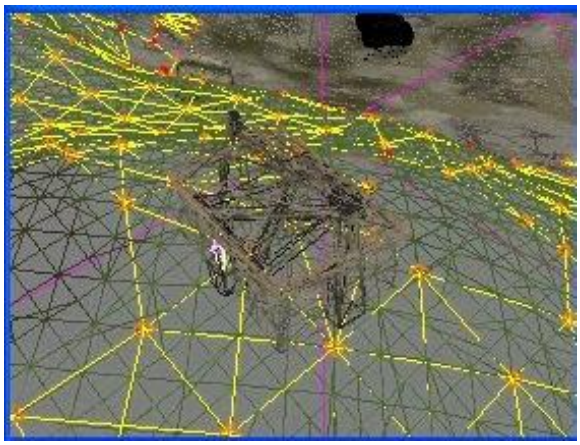

Fig. 5. Screen from "The Elder Scrolls Construction Set", showing movement path network of some NPCs In "Oblivion"
Source: http://www.skyrim.pl/images/stories/TES4_Kurs/rys3_9_gridpath_na_zew.jpg
[access: 06.11.2023].

As seen moving object goes from one yellow point to another one using the yellow lines as a path. Every yellow point has its own coordinates. Thanks to it, game engine knows how to move living creatures without the need of human interaction, which help developers to create living and more immersive game environment (The Elder Scrolls Construction Set, path grids (simple), 2006; The Elder Scrolls Construction Set, path grids, 2006).

Use of GIS tools (QGIS) to modify game world of "The Elder Scrolls II Dagerfall". Another example of spatial data importance, and also GIS tools in the development of video game is "The Elder Scrolls II Dagerfall".

Fig. 6. World Map of "The Elder Scrolls II Dagerfall"
Source: https://i.redd.it/lzx6y4ngcjc61.png [access: 07.11.2023]

"Dagerfall" world is One of the biggest game world ever created (figure 6). Crossing its environment from the most South-East point to the most North-West point takes around 70 real world hours. For such a big world it was hard for developers to create immersive, living environment. That is why fans start to do modifications to fulfill this huge, but empty world with more life. Size of this world is to big to work also with conventional modding tools. To solve this problem QGIS extension was created (GIS construction set description, 2021) (e.g. figure 7).

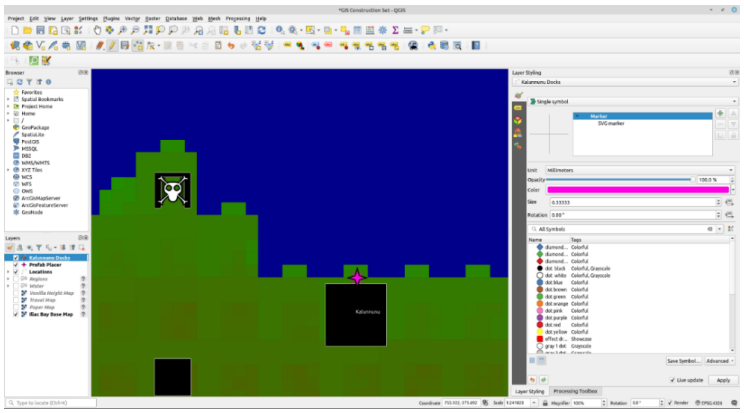

Fig. 7. Screen from QGIS "GIS Construction Set". Visible fragment of "Dagerfall's" map loaded into QGIS
Source: https://imgur.com/u90Ay6Q [access: 07.11.2023]

Thanks to the game's coordinates system Modders can use serious spatial data tools like QGIS to easily hand-settle single objects with considerable precision by coordinates. Or they can use QGIS's random and algorithmic point placement functions to place objects by the dozens, hundreds, thousands, or tens of thousands. Effect of object's placement by the QGIS in the game world is visible on the figure 8.

Fig. 8. Screen from the "Dagerfall" game showing the object (harbour)
set by the use of QGIS
Source: https://imgur.com/e25xizf.png [access: 07.11.2023]

Spatial data usage during gameplay. Spatial data are crucial also during the usage of video games. Thanks to the fact that every object is described by coordinates, its movement in the game environment can be tracked in the real time. This leads to many in-game features important for the gameplay. For example in strategic games, and player-vs-player (PvP) on-line games, enemies and allies movement is under constant tracking. This allow players to plan strategy, respond to changes on the battlefield which are visible in the environment itself but also on the real time mini-map. Constant tracking affects also another gameplay features, like range of enemies spotting and sending this information to allies which position is close enough. For on-line games constant tracking of objects is crucial, because players have on their computer only game itself with coordinates of stable objects. Coordinates of player character, allies and opponents as well as information about places of hits or information which objects are destructed are uploaded from players computers and stored on game's server from where other players download it. All those spatial data needs to be upload and download so players could see changes in environment on their screens.

Object's tracking helps player to navigate the game environment. Thanks to spatial data, player and mission objectives location can be marked on the map. In some games developers include even working navigation system, which indicates and shows the shortest route to the mission objective.

In some games, for example "Heroes" series most of the gameplay takes place on the "map". Whole world with its elements is settled on the rectangular grid hidden beneath

the artistic map. Grid and spatial data are use to settle object on the map and to calculate for example player's and NPC's range of movement. Similarly augmented reality games for example "Pokemon GO", takes place mostly on the "map". However in this case map is based on Google map and terrestrial coordinates system is in use to set objects location and track player movement in the real world.

Protection of spatial data included in the video game. Inctroduction notes. Previous chapter illustrated that spatial data are actually binder between source code which includes them and the audiovisual part which is described by them in order to be properly screened. This crucial role as a binder of video games layers however lead to potential copyright protection problem. As a binder video game's spatial data can not be separate subject of trade or infringement and possible protection actions or court dispute. As an integrated, crucial part of the video games spatial data can be only subject within and together with video games itself, as a whole product. Thus in order to protect video game's spatial data properly, the whole video game needs to be protected properly. This leads to the need of video game's protection copyrights analysis in order to also determine video game's spatial data copyright protection.

EU Copyright doesn't express directly if video game is work and if so, what specific kind of work it is and what copyright's provision should be applied to it. Also legal nature of video games (and spatial data incorporated into them) as a whole product is not determined by law. There is also no legal definition of video games. In order to analyze EU copyright to find which provision could be applicable to the video games, firstly the analyze of the video games nature and attempt to define them should be done.

Video game nature. Spatial data usage in the video games helps to understand doctrinal concept of video game's dual: artistic and technical nature, which can be illustrated as an iceberg (figure 9).

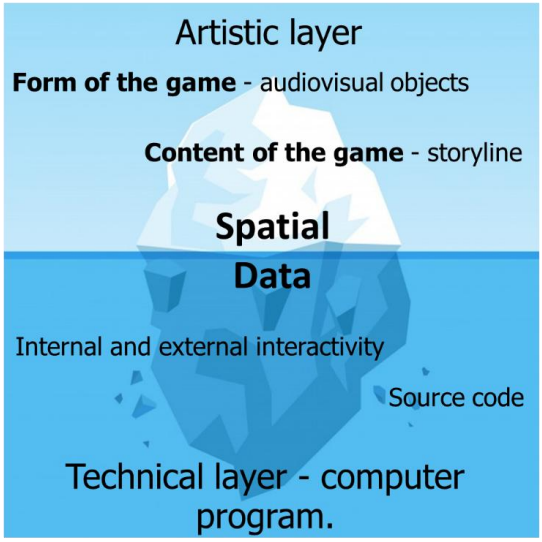

Fig. 9. "Iceberg scheme" presenting video games construction from the legal point of view
Source: Own study

Above the surface is the artistic layer visible to the player. It contains graphical objects, music, cutscenes etc. (Wąsowska, 2013; Szpyt, 2018) In terms of copyright theory, this should be perceived as a form of the video game. Form of the work is used to expresses its content, which, in case of video game, is interactive storyline. "Beneath the surface", invisible for the player, is technical layer which consist game engines (rendering and physic engines as well as other scripts), which for the need of this research are together treated as one computer program. This part of the video game is responsible for communication between the player and the game which is called "external interaction". Computer program is also responsible for "internal interaction" so for the fusion and proper interaction between video game's all, visible and invisible, elements – so that the player can perceive video game as a whole product correctly. As it was analyzed in the previous chapter interaction is possible also thanks to the spatial data's use. Every visible object (which belong to the artistic layer) is described by its own spatial data which are encoded and possible to read and use to execute tasks by game engines (which belong to the technical layer). That is why in the figure 9 spatial data are placed exactly in the middle between two layers – like a binder which bond both video game's layers together as a one product. Moreover, also according to the law doctrine, video game should be perceived by the law as an united product, despite its double-layers construction (Matusiak, 2013; Wachowska, 2015). Firstly, players mostly do not percept and do not want to use just one element but they want to play game as a whole product. Thus usage of the video game as a whole product (to play the game) is the main business purpose of the video game's development. Secondly, both video game's layers strictly cooperate and refer to each other and video game as a final product amalgamate (Barta, Markiewicz, 1998; Ramos et al., 2013) all those elements with the synergy effect. The game as a whole working product made by join cooperation of its elements has much bigger value, quality and complexity than just separate elements uploaded in one catalog without any cooperation between them. Thus video games are sale as an one product (Wiśniewski, 2012; Wąsowska, 2013; Greenspan, 2014; Grosheide et al., 2014; Ramos, 2014; Piechówka, 2014; Stein 2015; Wachowska, 2015; Barta, Markiewicz, 2016; Szpyt, 2018; Corbett, 2019; Markiewicz, 2019; Biliński, 2021).

Copyright protection of every elements under its own regime, would lead to big problems with construction of agreements for development and publishment of the video game (Targosz, 2015). However there are some exceptions, of the video game as a united product rule. Independent exploitations of video game's particular elements, where they are protected independently exist. For example video game's logo can be protected separately as a trademark when it is sell on the collectible items like t-shirts, cups etc. Video game's soundtracks, as a musical work are often released and sell separately from the game as a music albums (Tarkowska, 2019). Video game's screenshot and/or concept arts are often publish in as book called "artbook", and are protected as a literature work and pictures. Some of video game's assets like 3D models of player character, allies or enemies, monsters etc. are releasing in the real world as a figurines or illustration on t-shirts, cups etc. In those cases assets may be protected separately by the intellectual property law for example as an industrial designs

(registered in different categories beside the video games and electronic use); Nowadays streaming and/or lets-playing became very popular. In both of those categories one person plays the game on its own device, and in case of streaming, lets other people watch it on-line in real time (live), and in case of lets-playing, record its screen and himself while playing and later upload it to some hosting platform ("Let's play") (Ostrowska, 2019). In this case only artistic layer of video game is shared with the audience, so there is no need to protect technical layer. Thus those materials could be protected as a audiovisual works. Similarly, in case of Cloud-gaming (e.g. Geforce Now or Google Stadia) in which game is running in the datacenter and player see on its home screen only the live streaming of audiovisual layer of video game (Krysińska, 2019; Barta, Markiewicz, 2021). Those exceptions however will not be analyzed more deeply in this research, as every of them could be material for separate analysis. In this paper only the use of the video game as a whole unified product will be further analyzed in terms of its copyright protection.

Legal loophole. Despite complex video game's construction, which consist two different specific kinds of works in one product, no legal definition or specific regulation for video games exist in EU law. The only mention about video games in the EU law is tax law.

Lack of definition and specific copyright regulation for video games may be reasoned by the concern of rapid obsolescence of the new technology's law (European Court of Justice Advocate Generale Yves A'bot, 2010; Polański, 2016). For example, computer program's EU copyright regulations does not define computer program although it is already more than 30 years old. However, it could have had define it because computer programs core concept has not changed since the first regulation in Directive on the legal protection of computer programs, 91/250/EWG, from the 14th May 1991 (91/250/EWG, 1991).

Another possible reason for the lack of video game's definition is "gamediversity". Video games as a category of multimedia product is very complex and diverse. Because of that for most of arguments trying to define game, other person can find examples of game which can be used as a counterargument. For example, in general it is true that every video game have graphic, but existence of text games (e.g. games made by Twine tool) which show its content only in form of interactive text with choices hyperlinking to the next slide with text and links.

Because of that, law doctrine instead of define video game, only determined its characteristic features, which help to understand its nature for the need of legal analysis. This consensus covers following video games features:

- Interactivity of video games.
- Qualification of video games as a source of entertainment (however some games, are also use for the need of education).
- Computer program based product. This feature is sometimes misunderstood as video game's qualification as a computer program, which is not correct according

to the most of doctrine representatives and will be discussed in the next subsections (Radomiński, 2021).

Video Game – an artistic work under the copyright protection. First problem is identify whether video games are works protected by copyright or not. Video games are not literally expressed in the legal catalogue of works in article 1.2 of the Act of 4 February 1994 on Copyright and Related Rights (Act of 4 February 1994 on Copyright and Related Rights, 1994). Polish legal act was mentioned because there is no legal catalogue of works in the Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society (Directive 2001/29/EC, 2001). Legal catalogue of works is open, which means that any artistic product can be found as a work if only meets prerequisites expressed in article 1.1 of Polish Copyright Act. According to legal literature, video games are considered as an artistic works, because they meet those prerequisites, which means that:

- They are created by a human being. The hardware and software are just an artist's tools.
- They has an independent creative character because their elements are created and then combined into whole coherent product in an artistic manner, according to the creators' pre-planned vision.
- Every video game has its individual character because developers create it in such a way that, despite similarities to other video games, it stands out of them thanks to its innovative plot development and/or distinctive graphics (Wiśniewski, 2012; Matusiak, 2013; Wąsowska, 2013).

Video Game – does it fit under the general copyright protection or under the protection for the special kinds of works? As artistic works, video games are protected by copyright. However EU law predicts specific protection for specific kinds of artistic works. Because of that, question occurs whether video games should be protected under general regulation as they are artistic works, but no specific regulation for them exist, or if they should be protected by specific regulations designed to protect both or one of their layers (Gry komputerowe – walka o status prawny, 2018)? UE copyright predicts specific protection for audiovisual works (artistic layer of video game), as well as specific protection for computer programs (technical layer of video games). Therefore both layers of one unified product – video game – are subject to two different specific regulations, which differ on important issues for the game developers (also from the point of view of spatial data protection) for example permitted private use, determination of the entity entitled to property copyright, and use of technical protection measures (Grzybczyk, 2020).

To solve this problem doctrine indicated three possible solutions. First, to consider that video game is general work and only the general regulation should be used. However, this solution will not fit the dual nature of video games. Second, to select

specific regulation of one – more important – layer to the game as a whole. Third, to use both specific regulations of both video game's layers together beside their differences.

In order to choose which specific regulation should be use for video game as a whole analysis of both is needed.

Concept of recognizing video game as a computer program. In popular opinion, video games are often qualify as a computer programs. Even developers and publishers often call their products "Computer program", especially in the "End User License Agreement". It is because computer program copyright protection is very strict and limit most kinds of fair use, which is beneficial for publishers, but doubtfully fair for video game's customers. This topic was already subject to previous research , so will not be analyzed deeper here (Radomiński, 2022a, Radomiński, 2022b). Main reason for those publisher's actions is fact that both, video games and computer programs share a lot in common, especially costly production as well as cheap and easy copyright violations possibilities. This is also why publishers want to benefit from their officially sold games as much as possible, and do not want people to for example borrow games from each others (fair use) instead of buying another copy.

In Rusia concept for qualify game as a computer program is supported by statements that computer program is the technical foundation so the crucial part of the video game (Federal Arbitration Court for Moscow District Judgement from 24th February 2009).

In Ukraine is opposite, court and doctrine state that video games suppose to provide entertainment, but computer program is just virtual a tool (Kiev District Court Judgement from 27th October 2003).

Main disadvantage of analyzed concept lays in the fact that computer program is protected like a literary work. Copyright protects sequence of characters containing instructions to be executed directly or indirectly by the computer to achieve a specific result (Polański, 2016). That kind of protection should not be extended to the artistic layer of the game (graphic and sounds). Of course artistic layer is controlled and affected by computer program, and even encoded in it but it is not recorded as a text and does not containing any instructions for the computer to perform (Wachowska, 2015). To overcome this problem an idea to consider the video game's artistic layer as an expression of a computer program, was introduced. However ECJ in the case C-393/09 stated that computer program can be expressed only in a form of source or result code, since it is only way to see the syntax and structure of the computer program and acquainted with its structure to possibly reproduce it. The ECJ also indicated that the program and interface could be protected separately (European Court of Justice Judgement from 22nd December 2010. Case C-393/09, 2010). However this concept could not be used for the video games, which audiovisual part is not simply interface intended to help to control the computer program (Polański, 2016). It is actually opposite, computer program in video games is designed to create interaction possibilities and movement impression for what player see on the screen.

In France doctrine is also against analyzed concept, and states that video game beside computer program consists also an audiovisual layer, which require its own specific protection, and should not be treated as simple interface (Paris Court of Appeal Judgement from 20th September 2007. Case Cryo v. Sesam, 2007). After all it is hard to say that interface with some buttons (thanks to which user does not have to control the program in console) is equal in value and amount of work to the virtual environments, with hundreds of objects, independently moving creatures, working physics (astronomy included), fitted music and sound effects, etc.

Because of all mentioned above, especially because of the presence of the audiovisual layer, video games as a whole should not be considered just as a computer programs. However, some representatives of Polish doctrine think opposite and support the concept of recognizing video games as a computer programs (Rost, 2014; Wasilewski, 2015; Widła, 2017).

Concept of recognizing video game as an audiovisual work. Because main example of audiovisual work is movie, every other work considered as an audiovisual one is compared to it. Thus in order to analyze video game as a audiovisual work it is necessary to compare it to the movie.

As arguments for considering video games as a "movie like" product, doctrine points that video games have "movie like" developing and way of reception (Wąsowska, 2013). Both, video games and movies are made of elements which are synergically amalgamate into one unified product (Targosz, 2015).

Some researchers also point out that players are only interested in artistic layer (how it looks and performs). They are not interested what is happening in the technical part.

However in analyzed conception main dispute focuses about movement impression in movies and in the video games. Mostly if its passive and pre-planed or not. Researchers who supports analyzed concept point out that player can feel movement impression in the frames set by developers while playing video games (Ruling of Stern Electronic and Super Mario (United States Court of Appeals, Second Circuit Judgement from 20th January 1982. Case stern electronic, inc. v. Kaufman, 669 f.2d., 1982)). Opponents of this concept admit that video games give movement impression but they point out that in opposition to the pre-scripted and pre-recorded movie which is watched passively and nothing can change, video games movement depends on player and require its initiative to actively interact with game (Donkey King and Parodius rulings (Göttlich, 2007)). Nowadays this passive and pre-planed character of movies start to blur, because of introducing of the interactive movies like "Black Mirror: Bandersnatch" in which audience can "move" and make choices in pre-set frame just like in some games.

From the other side, because of "Gamediversity" it is possible to point out video games which are not „like a movie” and do not have movie’s movement impression because they are much more static. For example turn-based strategies games or text games.

Beside mentioned dispute, critics of analyzed conception point out that video games, beside they audiovisual part consist also computer program which is foundation of the video game performance. Because of that computer program copyright protection should not be excluded from the video game protection. Thus the movement impression dispute became mostly theoretical and most of the doctrine just point out that video game as a whole should not be considered just as an audiovisual work, because of the presence of the computer program which is very vulnerable for copyright violations and requires its own specific protection (Traple, 2015).

Concepts of parallel use of the both specific regulations. Both concepts of using only one specific regulation does not meet video games needs. Both layers need to be protected specifically for its needs, so nor regulation for computer programs nor for audiovisual works can be omitted. Moreover the presence of spatial data which bind both layers into one product also excludes those concepts. Also USA Copyright Office, states that video games are one product and should be protected by copyright in both aspects: audiovisual one and the computer program one (United states copyright office circular 61 – copyright registration of computer programs, 2021).

Thus concepts of parallel use of both specific regulations need to be analyzed.

First concept assumes separate protection of the artistic and technical layers (Angry birds należy objąć ochroną, 2013; Gry komputerowe – walka o status prawny, 2018). However this concept skips the fact that video game should be treated as an unified product (also because of the binding role of spatial data). As such this concept should not be taken into further considerations.

Second concept assumes that video game consists both artistic and technical layers. Neither of them can be omitted, so both regulations should be applied together. This concept is use for example in USA, Japan, Germany and France (Ramos et al., 2013). However because Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs (Directive 2009/24/EC) is declared as a Lex Specialis (also by ECJ (European Court of Justice Judgement from 3rd July 2012. Case C-128/11, 2012) to the Directive 2001/29/EC, comprehensive legal evaluation for example during the dispute in court would lead to priority of the Lex specialis Directive 2009/24/EC, which will lead to legal evaluation of the video game just like it would be a computer program.

Third concept introduced by the Italian Supreme Court assumes that a video game is a hybrid work of its own kind so called sui generis work. It is because video game is something more complex than just a computer program or just an audiovisual work. This concept is supported by most of the doctrine (Wiśniewski, 2012; Ramos et al., 2013; Matusiak, 2013; Markowski, 2016; Barta, Markiewicz, 2016). However this concept do not indicate which specific regulation should be apply when comprehensive evaluation of video game is necessary and the regulations for the two layers are contradictory. For example in case of video game's fair use, audiovisual part could be subject of it, but computer program could not. So in case of comprehensive evaluation of video game there is no good answer if it can be a subject of fair use as a whole product

or not. However there are some exceptions like streaming or sharing of screenshots and screen video. In those case only audiovisual layer is subject of fair use, so the choice of specific regulation is possible.

Video game as a sui generis work concept. ECJ C-355/12. In the Nintendo judgment c-355/12, the ECJ adopted the Italian conception of video game as a sui generis work. According to some doctrine, simple adoption of Italian concept without further analysis was lost opportunity to consider different possibilities of legal qualification of such a hybrid works like video games (Laskowska-Litak, 2019).

As a result of video game's qualification as a sui generis work, ECJ placed it under the protection of Directive 2001/29/EC so for the general works (and audiovisual ones). Protection under the 2009/24/EC for computer programs was rejected because the ECJ held that only works that are exclusively computer programs as a whole are entitled to be protected under the Directive 2009/24/EC (European Court of Justice Judgement from 23rd January 2014. Case c-355/12, 2014). The ECJ's Advocate General Eleonor Sharpstone, in her opinion preceding the judgment, indicated moreover that the rights of creators of sui generis works should be protected by a regulation that protects their works better and is more favorable to them (concept of more favorable regulation (effet utile))(European Court of Justice Advocate Generale Eleonor Sharpston, 2013).

This judgement however, may lead to interpretation problems in other disputes, such as those concerning fair use. From one hand, the ECJ has ruled that sui generis works should be protected under the provisions of Directive 2001/29/EC, while from the other hand, for example fair use protection is more favorable for the developers and publishers under the Directive 2009/24/EC. This is because fair use is generally prohibited under this regulation. Thus, in such potential case, another conflict of directives could appeared. This was just example of what may happens if copyright nature of video games would be analyzed from case to case only through the interpretation made by the ECJ.

Conclusions

Problem analyzed in this research paper applies not only to video games (which were used as an example) but to widely understood multimedia works combining computer program with complex audiovisual layer. As such, it may apply not only to the spatial data included in video games but also to some tools created within and for the framework of spatial data science.

For all multimedia products lack of the specific regulation may results in uncertainty about the law. Which is problematic for the potential developers and/or publishers who need to decide whether invest their money and time in product or not. For such investors interpretations of law made as late as at the stage of proceedings before the ECJ are not sufficient. Also judgements made by courts do not always correctly reflect the essence of the works under evaluation, which can lead to unfair treatment of developers and publishers or legal users, for example in terms of technical protection measures (Mayer-Schonberger, 2006; Radomiński, 2022b) or reselling of second-hand

games (Radomiński, 2022a). For example, since the ECJ judgment in case C-355/12, the ECJ and other EU authorities systematically recognizes multimedia works as sui generis works under the protection of Directive 2001/29/EC – and thus refers to this regulation in its other rulings on sui generis works, without some deeper technical analysis. Sometimes this leads to very "brave" theses, for example equating video games with ebooks (European Court of Justice Judgement from 19th December.2019. Case c-263/18, 2019), just because both products have and "visual layer" and computer program which controls it. However thesis like this ignore the issue of the complexity of video games. Both layers of video games are much more complicated and complex than ebook. Visual layer in case of ebook consist just letters on some one color background while in case of game visual layer is complicated environment composed in artistic way from hundreds of audiovisual objects). Similar, computer program for controlling ebooks is very simple while computer program for controlling video games is responsible for, proper interactions between elements and human with game, graphic rendering, physics rules and many, many more.

Because of that, the hypothesis stated in the introduction should be find as confirmed. Lack of video games legal nature's determination, and caused by this lack of specific copyright protection of video games truly may lead to not enough copyright protection of the video game as a whole product as well as spatial data included inside. This leads to the de lege ferenda postulates. Specific provisions dedicated to multimedia works are necessary to end present uncertainty about the law, which may stops a lot of potential investor from enter into multimedia market, as well as it may affects those who are already in it. Postulated regulation should be subject to the future analysis. However it can be pointed out already now that regulation should include at least: legal definition of multimedia works and video games; regulation on technical protection measures; regulation on fair use; regulation on determining the entity that holds the economic copyright of the game as a whole.

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