EUROPE'S VIDEO GAMES INDUSTRY

ISFE observations to the draft report from the Joint Research Centre - ICT Task Force Study on Task 12 – Policy recommendations

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1. ISFE shares the views of the European Commission that climate change is one of the most critical challenges of the 21st century. The video games sector is committed to contributing to the EU green transition, and launched in 2019 the UNEP-facilitated Playing for the Planet Alliance, encouraging studios and players across the globe to learn more about the impacts of climate change through in-game content. Our members also provide guidance to help studios reduce their environmental impact.

2. Video game companies have long been at the forefront of innovation and incorporates cutting-edge technology into their games to improve the quality and immersion provided to players. This includes for instance the use of Artificial Intelligence, of more powerful components such as Graphics Processing Units (GPUs) or Central Processing Units (CPUs), or heavy investment in new graphic engines to make the most of the latest available components.

3. Players reasonably expect video game companies to use such technology to improve the quality of the games they play over the years. This high level of expectations is also what drives competition among video game developers, who will want to make the best use of these innovations to provide for a unique experience which will meet players' expectations and allow for their product to stand out from their competitors'.

4. ISFE welcomes the work undertaken by the Joint Research Centre to ensure that ecodesign requirements for ICT products are fit for the purposes and objectives of the EU Green Deal. However, ISFE is disturbed by several recommendations made in by the report, which would unduly impact video game developers and hardware manufacturers by preventing them from providing the experiences that players have come to fairly and reasonably expect. In particular, ISFE is concerned by the shift proposed in the report from the device-level to the system-level, especially when considering the lack of clarity of what such horizontal measures applicable to software across the whole product category would look like.

5. Video games companies should be given the latitude to mitigate their environmental impacts without degrading the player experience, the company's reputation or its sales. A good example of a coherent approach resides in the current Ecodesign framework: Following the adoption of the current Ecodesign Directive (Directive 2009/125/EC), console manufacturers[1] agreed with the European Commission to further improve the energy efficiency of games consoles. Their engagement is embodied in the Games Consoles Voluntary Agreement, (GCVA) which applies to both current and future generations of games consoles[2]. The GCVA has proven to be an effective self-regulatory measure that is more flexible, rapid and cost-effective than mandatory regulation. It has generated significant results, including greater energy savings in the consoles used for the playing of video games, without entailing players' experience.

[1] Microsoft, Nintendo and Sony Interactive Entertainment

[2] More information on the Games Consoles Voluntary Agreement can be found at https://efficientgaming.eu/

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I. On the proposed product grouping

6. ISFE disagrees with, and questions the feasibility, of the proposed product grouping , which suggests including video games consoles, Desktop PCs, Workstations, Notebooks/Laptops, Slate Tablets, Smartphones, Mobile Phones, and Fixed Phones under the category "Personal ICT Equipment". Using "personal ICT equipment" as a catch-all term to group together and regulate disparate product categories is impractical as it does not take into account significant functional differences of the products. A phone (whether smartphone or fixed phone) and a video game console have fundamentally different applications and functionalities, the first being designed primarily to communicate, while the latter being primarily designed to play video games.

7. Even when various devices can be used as platform to play video games (i.e. a PC, laptop, video game consoles, or smartphone), the differences in components among these devices makes their range of applications and functionalities completely different, therefore making the introduction of horizontal energy and material efficiency[3] requirements impractical, as shown by the examples below:
    - On energy efficiency: A smartphone cannot launch the largest video game productions, because a smartphone's GPU is significantly less powerful in terms of computing capacity than the GPU of a PC, even when GPUs for both devices have been released in the same period[4]. Any energy efficiency requirements imposed on such a various range of products would likely be (1) either too constraining for more powerful devices such as PCs (2) and/or not enough constraining for

[3] For instance, a requirement on % of hardware use during active mode.

[4] For instance, the latest Samsung Galaxy Z Fold2, one of the most powerful smartphones commercially available, includes a Qualcomm Adreno 650 GPU, released in Q1 2020. This GPU is abysmally less powerful than an entry-level PC GPU such as the Nvidia RTX 3060, released in Q1 2021, and even less than a high-end GPU such as the Nvidia RTX 3080, released in Q3 2020. See a quick comparison offered by a third party website between the Qualcomm Adreno 650 and the Nvidia RTX 3060 https://gadgetversus.com/graphics-card/qualcomm-adreno-650-vs-nvidia-geforce-rtx-3060/

less powerful devices such as a smartphone, therefore limiting the ability of said requirement to achieve energy savings.

- On material efficiency: The CPU of a game console or a PC can easily reach temperatures ranging from 65°C to 85°C, whilst a product with less computing capacity (such as a smartphone) will reach lower temperatures. Therefore, thermal design requirements (such as for heat sinks, fans, flame retardancy grades) differ as these devices are not designed with the same set of constraints in mind. This example shows again how different such products in this category are, therefore limiting the possibility to design efficient and adequate horizontal requirements.

8. The differences in terms of computing power could be significant within the same category of products, such as PCs or laptops. Two different laptops may have very different applications and functionalities based on their embedded hardware (presence or absence of a GPU, computing power of the CPU, amount of RAM available, etc.) but also software (version of the Operating System). For instance, a laptop with no dedicated GPU cannot smoothly run any of the latest video game titles, and its main functionalities would mostly be limited to navigation and basic office work. This shows that developing energy or material efficiency requirements for a specific type of product is already a complex task on its own, further outlining how difficult it would be to design, and enforce, horizontal requirements for a whole group of differentiated products.

9. This proposed grouping also ignores that the application software run on each of these devices are fundamentally different one from another. A video game designed for a smartphone fundamentally has different properties in terms of minimum computing power requirement than a game designed for the latest generation of games consoles or PC. Therefore, most of the proposed horizontal requirements suggested by the authors would unduly impact software developers of each of these devices, and would most likely prove impractical, if not impossible, to implement[5].

10. **Based on the above, ISFE believes that several of the horizontal recommendations made further down in the report may be inapplicable for a product category that encompasses such different products. This is why ISFE supports the approach taken by the European Commission in the current Ecodesign framework, and in its proposal for Ecodesign for Sustainable Products Regulation, which focus on product specific requirements.**

II. On Recommendation 11: Material and energy efficiency requirements for application software products

11. ISFE does not share the interpretation of the authors of the report that application software should be in scope of the current Ecodesign Directive based on the definition of "Energy-related product". In particular, ISFE believes that the environmental footprint of an application software, such as a video game, cannot be assessed independently of the device on which it is run.

12. Data shows that the device and networks on which the game is played constitute one of the major, if not the primary, source of energy usage when playing[6]. Therefore, energy efficiency improvement implemented by hardware producers, as seen under the EU Games Console Voluntary Agreements,

[5] Please refer to section II for more details.

[6] See for instance the statement from Ubisoft in its 2021 Universal Registration Document and Annual Financial Report, p. 180: "Ultimately, it is estimated that the Group 's direct operations (scopes 1, 2 and 3 upstream) account for 5% to 10% of total greenhouse gas emissions. The remainder (90% to 95%) comes from scope 3 downstream: emissions beyond Ubisoft's scope, mainly related to the manufacture and use of networks and terminals to access and play games."

will likely be the most efficient way to achieve significant energy gains, and will ultimately lower the energy consumption (and, by extension, the emissions) of application software, such as games. Therefore, the current approach proposed by the EU Commission to focus on physical products only is sufficient in leading to a reduction of emissions resulting from the playing of video games.

13. ISFE is also concerned that any horizontal requirements designed for application software would not take into account the vast diversity in scope and functionalities of all application software. A video game does not rely on the same processes, hardware requirements and computing power than a media player or a text office application.

14. ISFE has additional concerns regarding the minimum mandatory requirements suggested by the authors of the report:

a. On implementing minimum requirements on energy and resource efficiency for application software

i. Video games developers and studios creating video games cannot entirely reduce the energy use and associated carbon emissions of their products as this is influenced by elements that are mainly out of their control. Such elements include, in addition to the device on which the game is played (see paragraph 12 above), the carbon intensity of the energy grid from which the video game draws its power, or the energy required by the internet network on which the video game is played. This means that (1) the same application software launched on the same device but in different countries or that (2) the same application software launched on two different devices is highly likely to lead to different energy use and carbon emissions output depending to the context in which the application is run. This would make the imposition of a minimum requirement harmonised across devices impractical.

ii. A video game does not require a stable amount of computing power (i.e. energy use), throughout the entirety of a gameplay session. For instance, within a multiplayer online game, more computing power will be required in highly populated areas of the game to display other players and their actions, while less computing power would be needed in remote areas where the user would be least likely to meet other players[7]. An energy efficiency requirement for application software based on the average energy output of the said application would therefore be more stringent than what is required to deal with necessary computing peaks, severely impacting the gameplay and user experience.

iii. Imposing stringent energy efficiency requirements on application software could impact the creative freedom of game developers. The video games sector is known to be a fast-evolving environment, where many technologies and features are developed to ensure that players can enjoy more immersive interactive experiences (RTX, DLSS, higher resolutions, usage of AI…). Much of these technologies may consume more energy than technologies that were used prior their existence, but energy demand is ultimately reduced over time through improvements which lead to energy-efficiency gains. Too stringent energy efficiency requirements could lead to a situation where developers may be refrained to use the latest technologies at their disposal, and not use the full capacities offered by the hardware/device the game will be available on.

[7] This also applies for single player games: some areas within the game will have more elements to display/load and others less, leading to similar variations.

This in turn will ultimately impact players, preventing them from accessing a wider array of genres and features in their games.

iv. Points mentioned above do not mean that the impossibility to design and implement energy and resource efficiency requirements for application software, and in particular games software, limits the responsibility from video game developers to reduce their environmental impact. This is why many video game companies have taken steps to reduce their carbon emissions, by for instance reducing the amount of energy use spent on the workplace, investing into packaging solutions which are more respectful towards the environment, or by selecting respectable partners for their data centres need[8].

b. On implementing mandatory labelling and information requirements

i. Most video games companies already provide information on the system requirements required to run a game smoothly on PC or mobile, including on the required working memory (RAM), the minimum required local permanent storage (MByte), or on any requirements for other hardware, software or external services that are not available on the reference system (e.g. cloud services, storage services, API usage…). Additional requirements to this end would therefore not necessarily lead to any improvement.

ii. Any labelling or information requirement related to the % of hardware utilisation[9], which should be communicated before a game is purchased, would be impossible to apply in the context of video games. As previously mentioned, a game could run on multiple configurations, and a game will always require the same minimum amount of computing power to run smoothly[10]. This minimum amount may represent 85% of the available computing power of a given GPU or CPU, and not even 20% for another more sophisticated GPU or CPU. As configurations are endless, with new models of mobiles, PC components, being released every year, it is simply impossible for game developers to announce in advance how much computing power their game will use – that is the computing power *of the device on which it is played*.
In addition, ISFE doubts this measure would increase the durability of the hardware, as every manufacturer of components for PCs, mobiles and consoles already incorporate safety features within their components to prevent them from overloading. These features allow for the automatic shut down and reboot of the device should a certain threshold is met on a given component which could endanger its integrity (e.g. A PC will automatically shut down if its GPU is too hot, for instance).

iii. For the reasons mentioned in paragraph 12 and in paragraph 14a of this document, ISFE believes it is very difficult, if not impossible, for video games developers to provide in advance accurate information on the energy efficiency of their games.

15. Considering the above, ISFE encourages the authors to restrict the scope of application of the Ecodesign Directive to physical products only, for which requirements could be designed and met.

[8] See for instance the pledge done by Electronic Arts or by Ubisoft.
[9] For instance: this application does not use more than X% of the GPU computing power.
[10] If we consider that no optimisation updates are being performed after the release of the video game

III. On Recommendation 9: Consumer information on environmental impact of settings and data usage

a. Impact in terms of energy use of settings

16. The study proposes the implementation of a requirement to display, every time users modify the settings of a software, a warning message on the increase in energy use such change would lead to (e.g. resolution, vertical synchronisation, subtitles, etc.). The study takes as a source of inspiration the Regulation (EU) 2019/2021 on ecodesign requirements for electronic displays, which also refers to "normal configuration" as a point of comparison to establish whether there is an increase in energy use or not.

17. It is very difficult to define what is a "normal configuration" for settings in video games, as hardware configurations are almost endless. Some settings configurations of a given software could be considered as a high configuration for an entry-price level PC, and at the same time a low-level configuration for high-end PCs[11]. ISFE believes an alternative could be to adapt the wording to use as a point of reference the "recommended configuration of settings" when using the "recommended hardware configuration", which is an information already provided by game developers. However, such "recommended configuration of settings" should in any case be established by the developer itself, as every game has its own specific set of settings.

18. Many players expect video game to be immersive experiences with minimal friction between the player and the gameplay experience. Additional friction degrades the gameplay experience and may lead to dissatisfied players. Displaying a warning message every time that a setting is changed will likely become too cumbersome and frustrating for the player, leading to decreased engagement with the games and services that they want to play. Moreover, such message would do little in assisting the player in accurately assessing the relative impact of one specific setting on energy use compared to another, as players do not necessarily have the knowledge to compare efficiently the energy increase or savings brought by their choices.

19. Another solution could be to display this message only once, before confirming implementation of all the settings changes that were selected by the player. However, ISFE believes it would be very difficult for a game developer to say whether the energy use will increase, remain stable, or decrease when the player modifies a set of settings, typically when he or she increases some settings but decrease others. In particular, video game developers would not be able to accurately predict, in advance, the impact on energy usage of different settings because as such energy output depends also on the type of platform, energy grid, configuration of other settings on the platform itself on which the game is played.

20. The development work that would be required from video game developers to display such messaging every time settings changes are implemented would be completely disproportionate to any potential benefit particularly given the likelihood that players would ignore the messaging owing to frustration in the friction it brings into their gameplay experience.

[11] This also applies to smartphones, tablets, or laptops.

21. For the abovementioned reasons, ISFE believes providing such information would be inconvenient, technically difficult and would not bring significant added value to the consumer. ISFE therefore requests the deletion of such proposal.

b. Passive data usage

22. The draft suggests that users should be able to opt out from automatic "passive data usage" (or "background data usage"). However, some games rely on such practices, such as multiplayer online games (e.g. MMOs such as *World of Warcraft*, *Final Fantasy XIV*, *Elder Scrolls Online*, etc.), in which data must be continuously sent in the background to the server for the player to be able to interact with other players and partake into the games' activities. It would not be possible to enjoy such games without automatically sending this data on a continued basis.

23. This also applies in some extent to single player games. For instance, playing Microsoft Flight Simulator is made possible thanks to cloud technology, and the fact that the game will download from the cloud the in-game areas that the player will cross. The game could not work as smoothly if the player decides to opt out from the practice of automatic passive data usage.

24. In addition of point 23 above, ISFE doubts that, as a general rule, decoupling a game from its access to the cloud would lead to a reduction in energy usage, as increased local capabilities on the user's end would very likely be required for the same game to run smoothly. For instance, the in-game maps would need to be downloaded and in-game interactions to be calculated and processed locally rather than using the computing power offered by the cloud. For the same game to be run only locally instead of accessing to the cloud, this would likely lead to the need for users to have more powerful devices, as well as more data storage equipment available, both of which would very likely consume more energy than going through high-efficient data centers or data networking.[12]

25. Gameplay data, usually sent automatically to the game developer, usually consists of a set of non-personal metadata which will allow the studio to improve the features and functionalities of its game(s) in next updates. Opting out from the automatic sending of gameplay data would impact the amount of feedback developers will receive from players, therefore limiting their ability to ensure accurate quality assessment of their products, which would in turn indirectly impact users' experiences.

26. For the abovementioned reasons, ISFE suggests deleting the proposal from the report to allow for opting out from automatic passive data usage.

IV. On Recommendation 2: Energy efficiency requirements for active mode for ICT devices

27. As mentioned in paragraph 12 and paragraph 14a of this document, video games energy use depends largely on elements which are outside of the video game developers' control, and estimating an average energy use which could serve as a basis for a horizontal requirement applicable to all devices, and by extension to video games, is at best impractical, at worst impossible.

[12] This is why it is necessary to invest in cloud services that are well maintained for the long term as these would allow for the use of less powerful devices at home, therefore further encouraging a decrease in energy usage at micro and macro level, as shown by the result of a study in collaboration between Microsoft and the WSP USA "The Carbon Benefits of Cloud Computing: A Study on the Microsoft Cloud". Available here.

28. Whilst it may be possible to set minimum energy requirements for some ICT products, such as servers (excluding cloud gaming servers), it is because servers perform work output that can be more easily quantified and measured based on more simple computational metrics. In contrast, video games devices output is artistic, namely video games, and which cannot be consistently or meaningfully measured and compared in terms of quantifiable work output.

29. As mentioned in the introduction of this document, video games consoles, PCs or even smartphones rely upon technical innovations used by video game developers to provide with better quality and more immersive experiences for players. Energy efficiency requirements for active mode on such devices would most likely impact the gameplay experience for players (see point 31 below), in turn severely impacting the brand and reputation of game developers, game publishers and hardware manufacturers.

30. In addition, the dynamic nature of consoles and PCs creates extreme complexity for benchmarking gameplay efficiency and setting active gaming power caps. A study by Jon Koomey[13] determined "it is unlikely that meaningful metrics for comparing gaming performance can ever be developed for game consoles and gaming PCs. The complexity of these devices makes it difficult to define computational output in a way that can be accurately, consistently, and correctly compared across game consoles or between consoles and gaming PCs. Without consistent computational benchmarks, it's unlikely that a benchmark for active gaming will ever be good enough on which to base efficiency regulations or utility incentives to promote more efficient products".

31. Echoing the paragraph above, the Lawrence Berkeley National Laboratory, University of California, conducted in 2018 an investigation on video gaming performance benchmarks, concluding that "mandatory system-level standards for gaming devices are highly problematic given the inability to consistently and meaningfully benchmark energy use per service (performance) delivered (most of these services are highly subjective and difficult or impossible to quantify), together with technologies and software that are evolving more rapidly than standard-making processes can adapt. Moreover, selecting a single metric upon which to base standards could stifle innovation while failing to recognize true efficiency improvements and their relation to user experience."[14]

32. Elements mentioned in paragraphs 29 and 30 above can easily be illustrated through the following examples:
    - Not all video games require the same amount of computing power to be run smoothly. A game featuring a vast open world, displaying many elements on the screen and using numerous gameplay techniques and visual elements[15], is very much likely to require more computing power than a two-dimensional (2D) game developed by smaller teams[16], even if these are both released on the same device. Considering this, it will prove impossible to establish energy efficiency requirements which would be relevant for all types of games released on the same device, even less for different devices.

[13] Koomey, J., Mayers, K., Aslan, J. and Hendy, J. (2017). Performance benchmarks for consoles. 25pp.
[14] Mills, et al. (2018). Green Gaming: Energy Efficiency without Performance Compromise. Lawrence Berkeley National Laboratory, pp.11. Access at this address.
[15] Typical titles falling in this category include *Horizon Forbidden West* (SIE), *Forspoken* (Square Enix), *Assassin's Creed: Valhalla* (Ubisoft), *Red Dead Redemption II* (Take Two Interactive), and many others.
[16] Typical titles which could be considered as more modest in computing power requirement could include *Octopath Traveler* (Square Enix), *Binding of Isaac (*Headup Games), *Celeste* (Matt Makes Games), and many others.

- As mentioned in paragraph 14a, point (ii), of this document, too stringent energy efficiency requirements could lead the devices (consoles, smartphone, or PCs) to not deliver enough computing power to make a game run smoothly in all circumstances, therefore severely impacting the users' gameplay experience.
- In addition, and as mentioned in Paragraph 14a, point (iii), of this document, imposing too stringent energy efficiency requirement on active mode for video games devices would most likely negatively impact the creative freedom of video games developers, and stifle innovation.

V. On recommendation 8: Video streaming default settings

33. The study suggests a requirement to set the default resolution for video streaming to minimum resolution to save energy. This would impact in particular cloud gaming services, as well as some of the gameplay capture and sharing features embedded in video game consoles[17]. Players have high standards for the performance of video games and associated services. For many years, the video game industry has been at the forefront of technology, rendering high-quality experiences that players have come to expect. Research shows that video quality has a very little impact on the overall energy consumption and carbon footprint[18], ISFE is concerned that setting by default the resolution to minimal would severely impact the player experience, and potentially sales of games and services that are popular in the industry.

34. This is partly confirmed by the results of the survey presented as part of Task 7 of this study, where users indicated that the hardware and processing performance is the second most important factor, after price, when buying a video game console[19]. Indirectly, this shows that the ability for a console to display high quality level of graphics is an important element for players. Therefore, setting by default the resolution to its minimum would go against the interests of consumers.

35. In annex of this document are two screenshots from the game *Death Stranding* (published by Sony Interactive Entertainment), the first one in 720p resolution, which is one of the lowest resolution available on cloud gaming platforms (on some platforms, this go down to 480p), while the second one has been taken in 1080p, which is the usual resolution on cloud gaming platforms. The difference in quality, already visible here, is even more flagrant on larger screens. This shows that lower resolutions would significantly impact the gameplay and visual experience for the players, who again expect a certain level of quality from the games they play.

36. Considering the above, ISFE therefore believes that this proposed requirement would not necessarily be the most effective measure to reduce energy consumption, as players would most likely raise the resolution back to their liking. This would likely lead to the unintended consequences that players select a higher resolution than a default resolution pre-selected on the basis of the user's internet speed, as it is usually the case now.

[17] Such as Xbox Cloud or PlayStation Plus services
[18] See report from Carbon Trust on the carbon impact of video streaming, available here.
[19] Section 1.2 on Relative importance of factors, Task 7 of the ICT Task Force study, available for download here.

VI. On Recommendation 3: Material efficiency for consumer electronics

a. Repairability information and spare parts availability

37. Horizontal repairability requirements would not consider the differences between products which are suggested to be included in the 'personal ICT equipment' category. Repairability and durability requirements should be tailored to each specific product group, taking into account their complexity and technical characteristics. Consoles, for example, are durable products with long lifetimes, and manufacturers recognise the need to incentivise repair, hence why the committed, as part of the GCVA, to provide refurbishment or out-of-warranty repair services enabling consumers to easily repair their devices.

38. The study suggests that requirements may be implemented to make available, to end-users and independent repairers, information on electronic board diagrams, wiring and connection diagrams, technical manual of instruction for repair, component and diagnosis information, instruction for software and firmware (including reset software). **ISFE is deeply concerned by the absence of any reference concerning the need to protect consumer safety, product quality or IP rights when providing such information to end-users or independent repairers.**

39. The Waste Framework Directive (Directive (EU) 2018/851), which has been implemented in Member States on 5 July 2020, recognises the importance of preserving a product's safety and security, as well as the product's manufacturer's intellectual property rights. Its Article 9 establishes that technical information and repairs instructions should be made available, **if they do not compromise the product's safety and quality, "without prejudice to intellectual property rights"**[20]**.** These three boundary conditions of accepted European law must be reflected in any future proposal for information requirements related to repairability.

40. Games consoles are a complex environment, in which key internal components of a console form part of a secure system that consists of technological protection measures ("TPMs") and proprietary parts that are deployed to protect against copyright infringement. The deployment of TPMs by the video games console manufacturers benefits all those who create and develop games for consoles, and not just the platform holder. With a secure hardware system in which to create and publish new games, developers (who are often SME's) are more willing to make the financial investments necessary to support the development of new games. This in turn benefits the consumer who now has a wider array of games and interactive experiences to enjoy.

41. Authorised repair centres use proprietary diagnostic software that contain detailed proprietary blueprints to identify components within a console that require repair. In addition, because most parts of a console form part of an encrypted system protected by TPMs to preserve the device against hacking and game piracy, console manufacturers cannot directly provide spare parts or similar diagnostic software to independent repair companies without compromising consoles systems and technology. Furthermore, and as recognised by the Joint Research Centre in 2019, some repairs require "appropriate technical skills that most consumers do not have. If a product is not properly repaired, consumer safety could be compromised"[21]. Operators in authorised repair centres have

[20] Directive (EU) 2018/851, Article 9(e)

[21] Cordella, et al. (2019). Analysis and development of a scoring system for repair and upgrade of products, Joint Research Centre Technical Reports, 2019, p.132. Access here.

access to the necessary information and are adequately trained to perform repairs that meet the required quality and safety standards expected by the consumer and required by European law[22]. In addition, they do not compromise consoles' systems and their technology by adequately protecting both games developers' intellectual property and proprietary components.

42. Therefore, and considering the above, ISFE strongly recommends the authors of the study to incorporate similar safeguards to those embedded in Article 9 of the Waste Framework Directive within their report.

b. Use of standards components

43. The study suggests that specific product categories, such as the proposed "personal ICT equipment" category, should use standardised components. On page 22, the study explicitly refers to "EPS, batteries, SSD modules, RAM modules among others" as types of components which could be standardised across the whole product category.

44. ISFE is deeply concerned by this suggestion, as having the best quality of component in a given equipment is what drives competition among device manufacturers, and pushing for the use of standardised components would stifle innovation in the sector. Manufacturers would not be inclined to invest into R&D to improve their components if these are standardised across the whole product category, or if this would imply that the specificities of their components must be communicated to other device manufacturers to allow for standardisation.

45. Most of the components developed firstly with video games applications in mind, such as GPUs, have found applications beyond video gaming and are now used in various fields such as healthcare or research on artificial intelligence, or even genome sequencing[23]. Therefore, requiring standardised components within consoles, PCs, laptops, or even smartphones could lead to a decrease of spill-over effects to other sectors and applications, which were not originally foreseen.

46. The question of using standardised components is also fundamental in that it could negatively affect the gameplay experience. A faster SSD allows for reduced screen loading times; a more powerful CPU allows for the calculation of several tasks at once, therefore having a direct impact on the smoothness of the gameplay experience; a GPU with more cores allows the display of more elements on the screen, etc. It is not uncommon to see video game studios developing games with the use of specific components in mind[24]. Standardised use of components could lead to a stifling of the creative vision of video game developers, who would not be able to fully use the latest technological innovations brought by a new component to improve the gameplay experience.

[22] Directive 2001/95/EC on general product safety

[23] See this article from McKinsey, which explores how GPUs have been increasingly used in healthcare: https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/tech-forward/warp-speed-how-gpus-can-enable-large-scale-healthcare-enterprise-applications

[24] For instance, Marcus Smith, Creative Director at Insomiac Games, the studio behind *Ratchet & Clank: Rift Aparts*, explicitly referred to the PS5 SSD as a feature on which the game could build upon. See his interview to GamesRadar on 28 August 2020: "We knew that there was going to be an extremely fast SSD [in the PS5], so we were trying to leverage that as much as possible."

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About ISFE

The Interactive Software Federation of Europe (ISFE) comprises national trade associations covering 18 countries throughout Europe which represent in turn hundreds of games companies at national level. ISFE also has as direct members the leading European and international publishers, many of which have studios with a strong European footprint, that produce and publish interactive entertainment and educational software for use on personal computers, game consoles, portable devices, mobile phones and the Internet.

The video games industry represents one of Europe's most compelling economic success stories, relying on a strong IP framework, and is a rapidly growing segment of the creative industries. The European digital single market area is the third-largest market for video games globally. All in all, there are around 5,000 game developer studios and publishers in Europe, employing over 98,000 people. In 2021, Europe's video games industry was worth €23.3bn.

Annex: Screenshots comparing resolutions in *Death Stranding* (720p vs 1080p)