# EXPANDING HORIZONS IN THE WORLD OF MOBILE GAMING
## // A CROSS-CULTURAL GUIDE

## Summary

Mobile games comprise the single largest segment of the global games market, with over 2.8 billion players downloading 80 billion games yearly. Despite its prevalence and estimates indicating that mobile gaming accounts for at least 50% of total games-related revenue, little is known about how playtime varies globally. This present study explores cross-cultural patterns in mobile playtime using a large-scale dataset provided by Unity Technologies covering 118 billion hours of mobile playtime recorded across 214 countries and regions between October 2020 to October 2021. To provide a multivariate view of mobile gaming habits worldwide, we utilized unsupervised machine learning, specifically cluster analysis. Data were clustered along three axes: Hours of yearly playtime per capita (HPC); minutes of average daily playtime per active user (MDP); and playtime inequality (PI) i.e., the proportion of playtime that comes from the top 1% of players. The findings significantly advance the understanding of global mobile gaming patterns by establishing 8 distinct clusters, revealing previously unidentified gaming cultures, and by challenging assumptions about the prevalence of excessive gaming in East Asian populations.

## Key Findings

- This study provides a detailed view of the global distribution of mobile playtime (See Figure 1-5), with 118 billion hours of mobile playtime data provided directly from the most widely used mobile game engine in the world.

- The world of mobile gaming is extremely diverse, however, as shown by the results of the cluster analysis, it can generally be divided into 8 different clusters (A-H Type) with their own defining characteristics (See Table 1).

- These clusters could reflect the influence of technology trends on gaming access, e.g., B-Type, D-Type, and F-Type clusters, mainly composed of developing countries, are characterized by low HPC likely due to limited internet infrastructure. However, broad infrastructural differences are not able to explain all the variations observed between clusters/countries.

- This study reveals a number of highly differentiated global gaming cultures which have not previously been identified or studied (e.g., island based nations with high playing activity).

- The results dispel the assumption and informal theory that East Asian countries have exceptional gaming cultures in terms of playtime; China is clustered with primarily European countries, while Japan is grouped with US and Canada. South Korea does conform to the stereotype with high levels on all three measures: HPC, MDP, and PI.
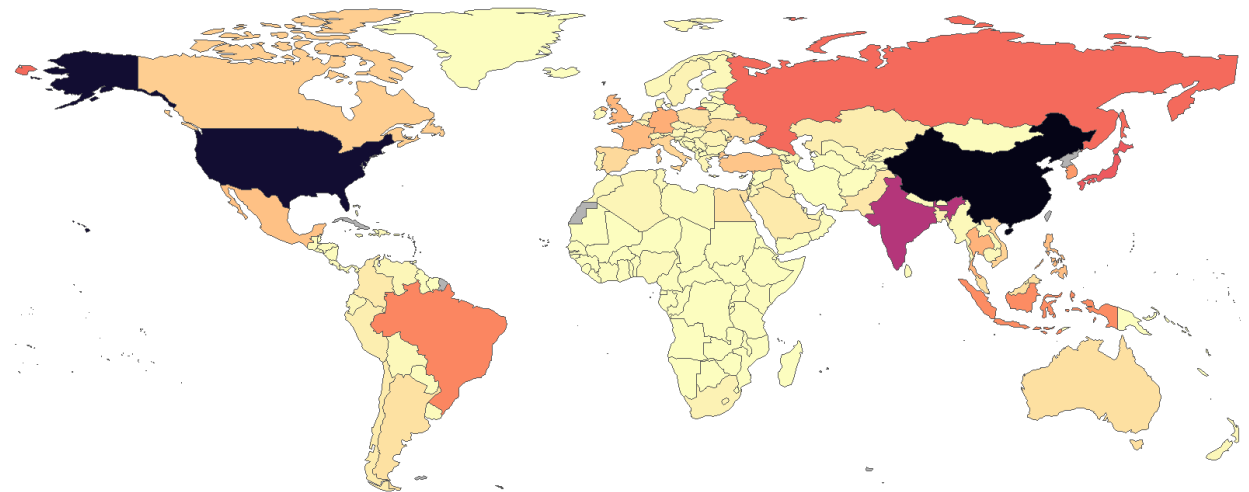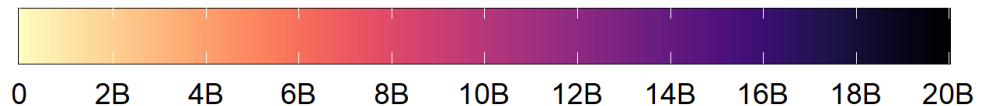


**Figure 1:** Heatmap of total mobile gaming hours, Oct 2020–2021. B = Billion. Countries/regions with no data in grey colour.

0   2B   4B   6B   8B   10B   12B   14B   16B   18B   20B
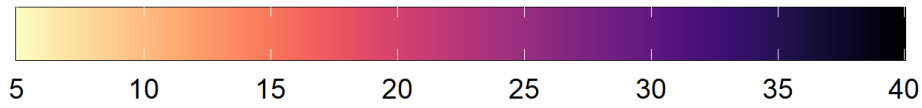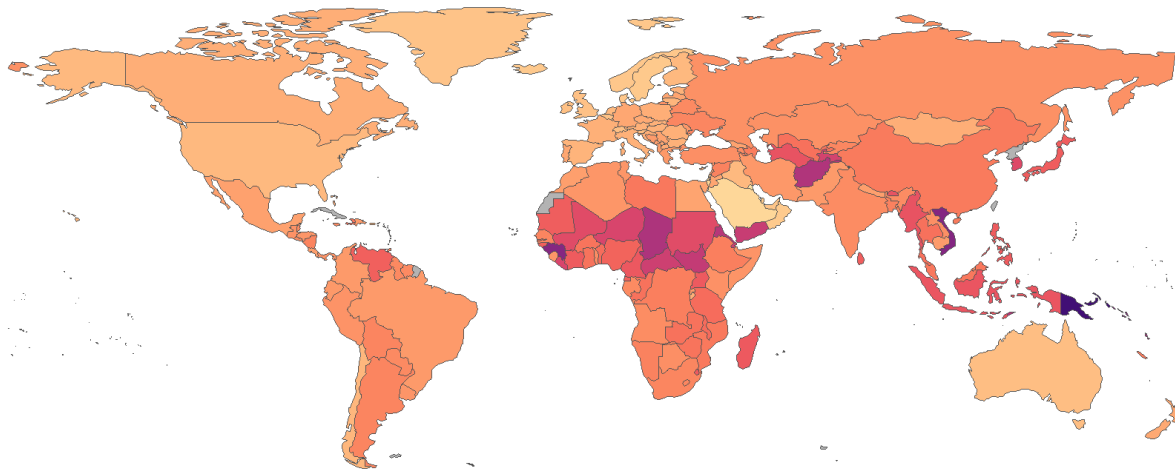
**Figure 2:** Heatmap of minutes of average daily playtime per active user (MDP), Oct 2020–2021. Countries/regions with no data in grey colour.
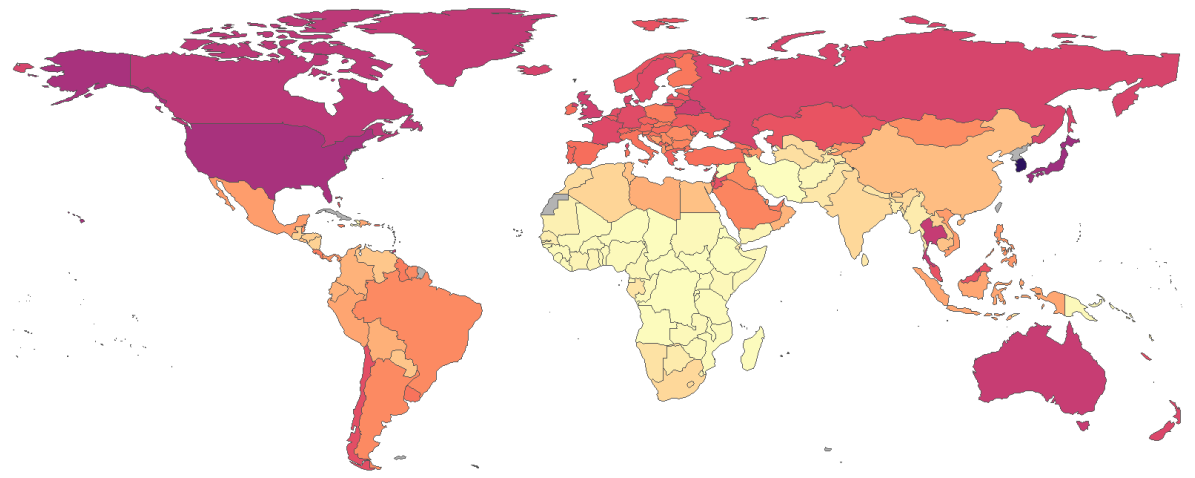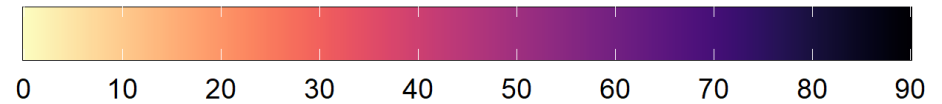


**Figure 3:** Heatmap of hours of yearly playtime per capita (HPC), Oct 2020–2021. Countries/regions with no data in grey colour.
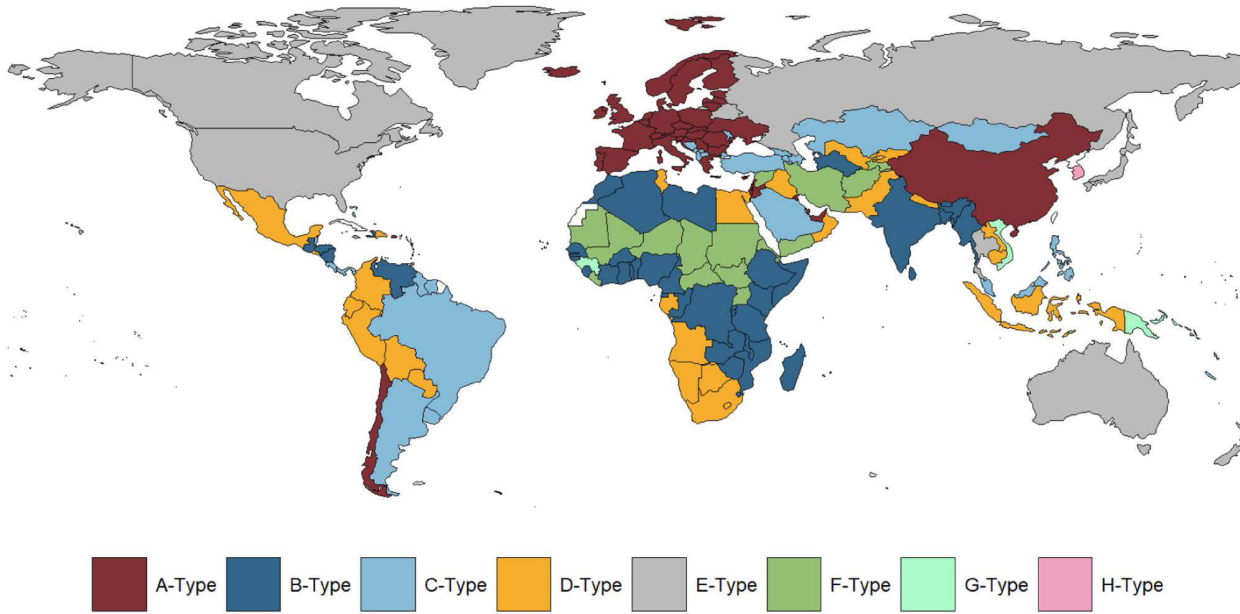
**Figure 4:** Global cluster membership on the basis of a combination of HPC (hours of playtime per capita), MDP (minutes of daily playtime per active user), and PI (playtime inequality).

Legend: A-Type, B-Type, C-Type, D-Type, E-Type, F-Type, G-Type, H-Type

## Table 1: Cluster descriptions

- **A-Type Cluster** (51 countries/territories): Characterized by highly unequal gaming cultures with a strong layer of extremely engaged players (High PI). Outside the top 1% of heavy gamers, mobile gaming tends to only be moderately common (mid-range HPC and MDP.).

- **B-Type Cluster** (47 countries/territories): Low HPC, indicating mobile gaming is uncommon. PI is moderately low, with playtime relatively equally spread among gamers. Includes India and mostly developing countries in Africa, Central and South America, Central, and South Asia, and the Pacific Islands.

- **C-Type Cluster** (36 countries/territories): Comparable HPC to A-Type cluster members, indicating moderate mobile gaming culture. Lower PI than A-Type, without a strong concentration of playtime within a heavily engaged group. Consists of a geographically diverse set of countries.

- **D-Type Cluster** (27 countries/territories): Developing countries with low HPC and MDP, indicating mobile gaming is uncommon. Despite low levels of playtime per capita, they spend more time per year playing mobile games than B-Type and F-Type clusters.

- **E-Type Cluster** (23 countries/territories): Very high HPC, making mobile gaming more common than in almost any other part of the world (only exceeded by the small, but extreme H-type cluster). Includes a well-established layer of heavily engaged players (High PI). Contains the USA, Canada, Japan, and the Russian Federation.

- **F-Type Cluster** (19 countries/territories): Lowest HPC, indicating a lack of overall mobile play. Lowest PI, with playtime evenly distributed among players. Members tend to be some of the world's least developed countries or those affected by conflict.

- **G-Type Cluster** (7 countries/territories): Largely composed of Pacific Island states, not many people play mobile games (Low HPC), but those who do play more per day than in any other part of the world (High MDP). Gameplay is relatively evenly distributed among players (Low PI). Includes Guinea and Vietnam.

- **H-Type Cluster** (4 countries/territories): Wealthy East Asian territories with the highest HPC and MDP, indicating extreme gameplay. High PI, with the top 1% of players accounting for almost 58% of total playtime, showcasing the presence of the world's most extreme gamers. Made up of Wealthy East Asian territories with an on-average high standard of living.

## Implications

The implications of this study are numerous and varied, offering valuable insights for multiple stakeholders in the gaming industry. A lack of large-scale data sets has arguably left policymakers without sufficient evidence for informed decision-making and instead, they have had to rely on perceptions of gaming habits and informal theories like the techno-orientalist gaming assumption, which was dispelled by the results of this study. Overall, this study addresses this knowledge vacuum and has implications for industrial, political, and research domains:

Game developers and publishers can now tailor their offerings to cater to the unique preferences and habits of gamers in specific regions, leading to more targeted marketing campaigns and better user engagement. This helps overcome the challenges of localization costs and potential misconceptions about regional gaming habits.

Policymakers can use the findings of this study to make better informed decisions regarding regulations and initiatives related to the gaming industry, which takes regional differences in gaming behavior into account. High-quality evidence regarding playtime can help guide policies like those implemented in China and South Korea to limit game use for children.

For researchers, this study's findings pave the way for further investigation into the cultural, social, and psychological factors driving observed differences in mobile gaming behavior worldwide. By exploring these factors and challenging preconceived notions about certain regions, we can better understand the complex interplay between gaming and various aspects of human life, which contributes to a more holistic understanding of mobile gaming's role in the contemporary world.

## Limitations

The present study has three main limitations:

1. The dataset used in this study only covers mobile titles, and no conclusions are drawn for the PC or console market, which may exhibit different cross-cultural patterns.
2. While Unity Technologies' game engine is widely used, the exact fraction of the mobile games market it represents is unknown, and the study makes no claims outside the data analyzed.
3. The dataset's anonymized and de-identified nature may limit the extent of the findings, as certain demographic information is unavailable.
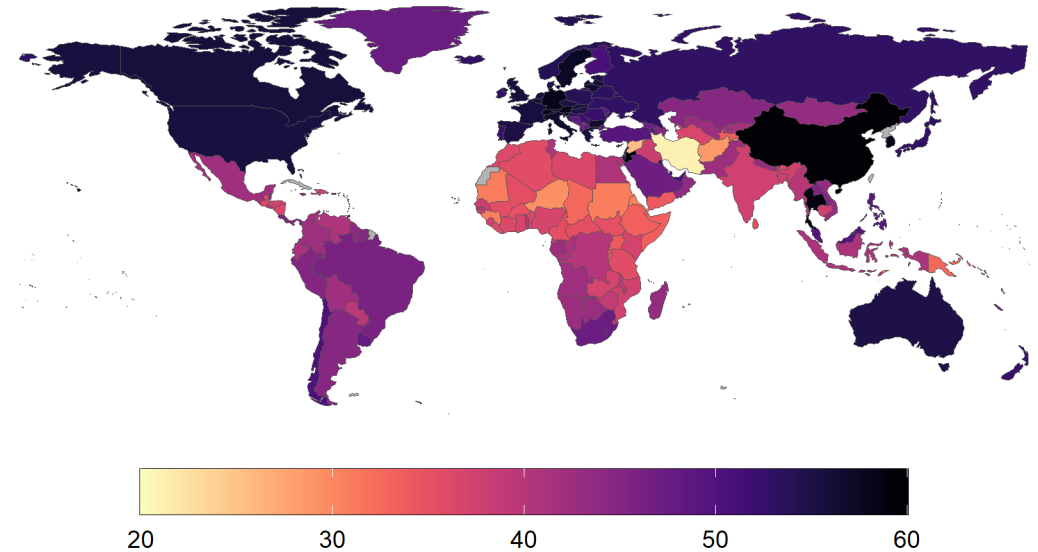


**Figure 5:** Heatmap of playtime inequality (PI) i.e., the percentage of a region's total playtime which came from the 1% of the players in terms of playtime. Countries/regions with no data in grey colour.

## Conclusion

The study demonstrates how factors of hours of yearly playtime per capita, minutes of average daily playtime per active user, and playtime inequality, differ across nations and cultures, highlighting the diversity of global mobile gaming patterns. The identification of eight distinct clusters has important implications for policymakers, researchers, and the gaming industry, helping to inform decisions and improve our understanding of the many ways people engage with mobile games worldwide. Furthermore, the results challenge techno-orientalist assumptions about East Asian gaming habits, emphasizing the diversity of mobile gaming cultures worldwide and the importance of large-scale cross-cultural data sets as evidence base.

## Read the Academic Paper

This whitepaper summarizes the findings of a 2023 research article by David Zendle, Catherine Flick, Darel Halgarth, Nick Ballou, Simon Demediuk and Anders Drachen. The full academic paper is available for download here:
https://www.nature.com/articles/s41598-022-26730-w