

Computer Game Industry and Economy Growth: A Study on How Blockchain Computer Games Make Impact on Current Economy Crisis in Sri Lanka

BMTN Rathnayake^{1#} and GIF de Silva¹

¹Department of Information Technology, Faculty of Computing, General Sir John Kotelawala Defence University, Rathmalana, Sri Lanka

#thisurn@kdu.ac.lk

Abstract: Globally computer gaming industry is a vast industry which rapidly changing with new technology. At first, gaming was just for entertainment purposes. Over the years people played games but did not earn money from them. Cryptocurrency and blockchain technology are game-changers here and created the economic system around the computer gaming industry. At present gaming industry is growing rapidly changing with these new technologies and gamers are allowed to earn income from playing games. On the other hand, introducing this play-to-earn game model for computer game developers and game development companies increased and still increasing their annual revenue. Here the game changer is the blockchain gamification known as NFT games or W3 games. Blockchain gamification created an entirely new economic system around the globe and created a direct impact on economic growth. Meanwhile currently Sri Lanka going through an economic crisis and need solutions to become normal and grow back. The researcher's goal is here to identify the impact of blockchain gamification on the economy, and how to implement and identify what is the business model suitable for Sri Lanka. Implementing blockchain gamification gives a solution to the current economic crisis and changes the current economic ecosystem. Globally even in covid 19 pandemic other countries started blockchain gamification and even business owners moved to it to earn their daily income and succeed. With the current situation in Sri Lanka, as a solution to the economic crisis, people can move to blockchain games, earn income, and help Sri Lanka's economy.

Keywords: Computer Games, economic crisis, Blockchain, NFT(Non-Fungible Token)

1. Introduction

The computer gaming industry is a rapidly growing industry worldwide. Mainly popular and functioning as a wide industry in United States and Japan. Other than that, in many countries the gaming industry impacts on their economy similar to software development industry or even make greater effect to the county economy. Considering county like Japan and computer gaming industry the game development companies always go beyond with the technology, even create a game culture and make it as one main source of income while popularizing their games in local and global aspect. When considering Sri Lanka's computer game industry, it is still in the young stage but growing rapidly with the new technology. But when

considering the economic impact to the Sri Lankan economy still has not created a greater effect and still functioning under IT industry in Sri Lanka. When considering the gaming companies there are few or there is a separate game development division in an IT company which is not sufficient to make an impact. But if industry experts, game enthusiasts, game developers gather up and form this computer industry as a firm industry there is a possibility to make an impact to the Sri Lankan economy. In present days Sri Lanka going through an economic crisis and if implement a good business model, new technology this computer gaming industry can grow and with that growth it can impact on the economy and helps to overcome with the current economic crisis. Before going to the solution should get an idea about current global market overview of the computer gaming industry.

A. Global Market Overview

In the 2021 the gaming market was valued at USD 198.40 billion and it is expected to reach a value of USD 339.95 billion by 2027, registering a CAGR of 8.94% over 2022-2027[2]. Starting 2019 due to covid 19 pandemic people turned to game platforms to pass their time. Mainly because of this reason the gaming platforms attracted thousands of new visitors and even cause online traffic. because of this cause the gaming industry revenue and market value increased.

With the technological advancements the gaming industry facing a rapid growth and enhance the gaming experience of the users. When considering gaming experience, the game developers continuously launching and rewriting codes for diverse platforms such as PlayStation and Xbox incorporate into a standalone product and provide gamers a cloud platform. Providing cloud technology in the gaming market is helps to drive the demand and engagement of multiplayer for different games. This helps to boost the market growth specially during the covid 19 pandemic period. Also, Cloud gaming services focus on providing hyper scale cloud capabilities, streaming media services, and global content delivery networks to build social entertainment platforms. These factors have an anticipated positive impact on market growth.

Mobile gaming is the most using gaming form globally. Main reason for mobile gaming's popularity is accessibility. Also the increasing demand for mobile games results to use technologies such as AR, VR, cloud gaming to improve user experience [2]. Between year 2020 and 2021, many

changes occurred in the mobile game development sector. One important thing is found a way to reduce the cost of the development process through conducting an early CTR (click-through rate) test for hyper cause mobile games and it helped to increase market value.

Meanwhile Asia Pacific region is anticipated to hold the largest market share in the gaming industry, with China, Japan, and South Korea showing high potential for market growth. Economically China is one of the Asia's most important country which increasing technological usage and adopt to new technologies in short time period. With covid 19 China found an opportunity to spread gaming industry throughout the country and it helped to increase users and increase the annual revenue from the gaming industry. In china many use the WeChat mobile app and people has started to play mini games within the app. These mini games have large following across the country. Considering Japan, has best gamers and has a rapid growth with technology adaptation. For example, the computer game revenue from 1982 - 2013 illustrate from following diagram and can see how much higher revenue Japanese companies earned even in 80's.

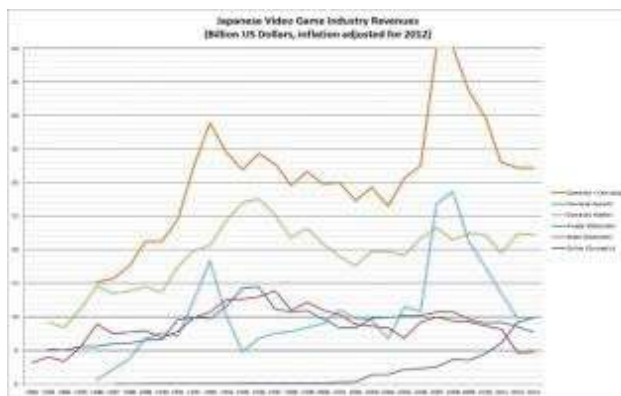


Figure 1: Japanese video game industry revenues from 1982 to 2013, adjusted for inflation.

Source:

https://vgsales.fandom.com/wiki/Video_game_industry

- Blue** - Domestic Japanese arcade market
- Red** - Domestic Japanese retail market, including the console, handheld and computer sectors (hardware and software)
- Purple** - Domestic Japanese mobile game market
- Green** - Total domestic Japanese video game market, including all sectors
- Cyan** - Japanese retail exports (hardware and software) to overseas markets (console, handheld and computer sectors)
- Orange** - Overall Japanese video game industry, including both domestic Japanese market and overseas retail exports

Korean computer game giant NCSoft Corp. released Blade & Soul 2, the sequel to its famous multiplayer online role-playing game (MMORPG), for PCs and mobile devices. According to the company, the highly anticipated cross-platform game had drawn 7.46 million pre-

registrations, a record in the country, trumping NCSoft's other hit MMORPG "Lineage 2M", which drew 7.38 million users[2] and that is how Asia Pacific region leading the gaming market.



Source: Mordor Intelligence

Figure 2: Gaming Market - Growth Rate by Region (2022 - 2027)

Source: Mordor Intelligence

2. Computer Gaming Industry In Sri Lanka

Globally gaming industry has entered the golden age of gaming. The past year have given rise to a massive influx of new gaming media, gamers, developers, and gaming companies worldwide. The advancement of technology and the high level of adoption of games have led to gaming becoming a multi-billion-dollar industry. Regardless of the form of gaming; PC gaming and Console gaming and Mobile gaming will be the front line in present and future which evolves faster than one to other.

Even though there are many gaming studios who built local and global games in Sri Lanka the data and statistics about the industry, growth of the industry throughout the years are fluctuating gradually. The one reason behind this is the gaming ecosystem in Sri Lanka is still quite young. Meanwhile some of the mobile service providers such as Dialog (example: the axiata Game Hero tournament with PUBG mobile) operate and have their own gaming tournaments and run their own gaming platforms. Specially since 2019 covid pandemic situation to up to date in 2022 the mobile gaming growth increased due to internet penetration and digital payment. There are key factors to boost the turnover to the mobile games such as; online education increased the screen time, increased popularity of e-sports, use of advanced technology which captures the attention of the youth, innovative concept-based games, and games which offer monetary rewards.

According to statistics of AdColony, one of the largest global mobile advertising platforms, there are 4 million active mobile gamers in Sri Lanka, who spend 20% of their time on the mobile on gaming. The statistical data gathered locally through gamer.lk shows that two to three million Sri Lankan youngsters between the age eighteen to twenty four are very interested and involved in gaming. Because of this trend by the end of 2022 worldwide mobile game development companies will highly lean towards into the gaming industry to target the youngsters. These youngsters are mostly from urban areas. So, there is a large untouched market that resides in rural and suburban areas of Sri

Lanka. The smart phone usage because of the online education and the growth in mobile gaming, streaming will help to reach this untouched market. If Sri Lankan gaming companies take these demographic factors into consideration, the organizations will be able to easily access to a wider user base. Meanwhile there is a sub market for gaming equipment that has started to develop due to the gaming industry growth. The increasing number of gamers make these purchases through online channels.

Globally, the use of VR (Virtual Reality) gaming increased but the lack of access to required technology and the high cost of VR headsets preventing such gaming experience in Sri Lanka. But as a solution for this fact can introduce mini gaming centers which provide VR gaming experience and through that strategy gamers can experience the VR gaming and can earn income than the PC game, console game or even than the normal mobile games.

Meanwhile gamers enjoy gaming, worldwide people enjoy watching gaming. For example, techno blade who was Minecraft gamer and game streamer, the twitch streamer Byron who knew as Reckful passed away and when they die, they had millions of followers in their YouTube channels who watched these gamers live streams and become their fans. Even in Sri Lanka there are popular game live streamers who showcase their talents virtually to those who enjoy watching gaming others extraordinary gaming skills, or who spend time to learn strategies to win next levels of the particular game levels, and some are just engaging personalities to gain a following. Many game streamers earn money from these live streams.

Even though there are such gamers still there is a lack of knowledge among gamers, potential gamers and even the viewers on the games are not much aware of the depth of the game and both Sri Lankan gamers and viewers are not aware about several gaming platforms that are available in Sri Lanka. If gaming companies pay attention to these factors and address them companies will be able to achieve possible benefits. Meanwhile as per Sensor Tower's Industry Trend Report in this year 2022 gaming industry expected to be dominated by Hyper casual games. In nature Hyper casual games are easy to play and allows people to have fun and relax without using the left brain or called the intellectual side of the brain. These types of games are yet to dominate the Sri Lankan gaming market and at least one gaming company introduce this game that will be beneficial to them.

The rapid growth of the gaming industry has created the path for international gaming competitions and has become a such sport which able to draw large audiences quite similar to physical sports. Gaming industry is a profitable industry with international tournaments and large cash prizes. In Sri Lanka Gamer.lk and The Sri Lanka eSports Association support Sri Lankan teams and have taken part in international tournaments. But the tradition should improve to make impact on the economy.

3. Business Model to Grow Computer Game Industry

Either PC gamer or Console gamer with the current situation in Sri Lanka it is impossible to afford needed items such as; Play Station 5, VR headsets, SteelSeries Apex Pro Keyboard or PC gamers to do a system upgrade with new NVIDIA RTX 4000 GPU (Graphics processing unit) with current high market price. With this situation for gamers have to stick to mobile games or play games which are suitable for their existing systems. As a solution game developer communities can focus on mobile game development and develop PC games such as Arimac Digital, Sri Lanka's flagship PC game NERO to play in the existing gaming computers. Meanwhile developers should focus on to develop advanced games which able to go globally and form a unique computer game development industry and gain a recognition and through the recognition earn income. These aforesaid method of introducing more mobile games to the community is good but need more solid business model to secure, improve the computer game economy in Sri Lanka.

The solid business model is developing NFT games or crypto games or name it blockchain games. This NFT games are predicated to become the predominant business model in gaming within ten years of time. Further, the NFT games are a better business model for funding games. For example, when someone invested in a new web3 game and inside of the game gamers building a mafia metaverse and raise \$3M in their initial NFT drop. NFTs allows access to new capital market and raise capital from the crowd. NFT games will open economy paths, and by building the games on programmable assets (tokens + NFTs) can create economic value than a single game. NFTs are beneficial for gamers. Gamers can have ownership of the assets they buy like in physical nature, earn through game and can go to next levels of the game while collecting assets. Years ago, game development companies switched to the model of selling game items, cosmetics to gamers. But currently the digital stuff gamers buying is not resellable. So now NFT ownership allows to resell the purchased items. With this NFT near future games will be fully robust and will have programmable economies. Developing NFT games will be a better business model and will be able to cause a good impact.

4. Modern Gaming Economy: Blockchain / Nft Games

From the beginning of blockchain game development and start of the games like CryptoKitties craze, NFT games have developed and started to offer play to earn models. That is the beginning of the mix of world finance and gaming, providing gamers to earn income as they play and increase the performance of the games.

Gamers no longer need to keep on winning, finding, or breeding a scarce collectible worth thousands of dollars. Gamers can experiment with multiple gaming models in various themes aside from collectible animals.

When considering about NFT, known as Non-Fungible Token is a digital, cryptographic token on the blockchain representing a unique item. The Non-Fungible means each token is unique and cannot swap identically for another token, but can trade 1 BTC (Bitcoin) for another 1 BTC which are equal. The case is when it comes to trading this is impossible specially in NFT art trading.

NFT can come with different forms. NFT could be a digital asset in a game, a collectible piece of crypto art, or even a real world objects like real estate. Also, NFTs have solved one issue of ownership in a game and creating decentralized digital collectibility.

Play to earn NFT games give a chance make income stream through playing. A gamer is rewarded with tokens. They can earn more the longer they play. Normally the tokens earned are often needed as part of the games crafting process. Token method is more stable and tokens can be earned through play.

NFT games are especially popular with the users in low-income countries. The reason behind is these NFT games boost fix income. By playing NFT games like Axie Infinity many gamers are making approximately 720\$ per month and \$8500 annually [5], and some even more than that depending on the market price and time invested. The most popular NFT games are Axie Infinity, Sorare, Evolution Land, Gods Unchained, CryptoKitties, Splinterlands and Alien Worlds.



Figure 3: Existing Blockchain Games

Source: <https://www.quora.com/What-are-some-NFT-games>

NFT games are having game assets that are owned (act like they held in custody wallets) by gamers in the form of Non-Fungible Tokens (NFTs) or Fungible Tokens. The function of this innovation is that player assets are tangibly owned and able to sell those assets or trade just like physical goods.

Worldwide, NFT games like Zeedz (a Play for purpose game) [6] are currently the most heavily invested sector of

the games economy. Considering information, gaming infrastructure technology companies have invested billions of dollars in NFT games in the early months of 2022.

When considering benefits of the NFT gamification should think in two ways. One is Gamer's perspective benefits and other one is developer perspective benefits. When considering gamers side gamers can invest through computer gaming by selling or trading gathered assets like skins or other equipment's. Also, some NFT games allow to make 100\$ approximately each day, and sell assets that have gone up in price which able to bring more income. All NFTs stored inside the code using blockchain technology. To see it have to decode it. Because the record is encrypted and stored in the blockchain codebase even NFT is transferred to new owner there is no place to a imposter. That is why NTF has Proven ownership. NTF games offer as asset collection. Therefore, the NFT owner can sell or trade when needed and earn revenue. With all these technology people will consider about the security of the gamer's wallet. For that also have given a solution using blockchain technology so that gamer can secure his digital assets and digital wallets.

When considering game developer/ company perspective they invest lot of money on a NFT gamification platform and then again spends a lot of money on branding. After go live stage and branding other companies identify these NFT gaming solutions and tend to invest on the game specially because of the blockchain. Moreover, there are chances to attract venture capital. Suppose game developers newly added the feature of NFT. That opens new revenue opportunities, increase ratings and draw new gamers to the platform which is beneficial for both parties. When NFT token is exchanged or sold to another gamer the owner of the token can charge a transaction fee from the crypto wallet or exchange fee from the owner. Some such token transaction value might often reach millions of dollars which result big transaction charge. Meanwhile like for all apps the development team will get app store or play store earnings. The game owners receive a share of download charge and each new download will increase company income.

In Sri Lanka already have gaming portals with subscription models, but these models are not revised to be with accepted gaming industry standards where can experience clear options such as free to play, pay to play, play to win and play to earn. As mentioned before NFT games consider as play to earn, play to own, crypto, blockchain or Web3 games are digital games which use blockchain technology as game economy. Sri Lanka should set clear standerds for play to earn in computer gaming industry and allow gamers to play NFT games and in other hand facilitate game developers, companies to develop more NFT games, release them to the global gaming platforms and earn revenue from it.

5. Nft Gamification: How To Build a NFT Game

Considering the current economy situation in Sri Lanka game developer should pay attention to create NFT games. Here in this research, this section provides an insight about creation of NFT games. As the very first step should choose the game model; whether it is play to earn (P2E) or free to play (F2P). F2P games are rare because they do not require any initial cost and can start to play right away. But with the concept of P2E satisfy the fact of creating NFT game because to start playing the gamers must purchase first NFT. Further, P2E games allows gamers to earn utility tokens (utility token - considered more stable way of earning than the NFT only method) and buy NFTs which represent characters, perks, or power ups. After deciding the model next step is choose design for the game. Which means select the genre (strategy, combat, adventure, simulation, role-playing, or card games) of the future game. After that should conduct a competitive analysis to find similar games on the blockchain gaming and should not copy successful games and the features. Similar to normal game design all information should recorded in the game design document to avoid misinterpretations within the development team. There in that document can define the characters, their system, victory conditions and monetization features. Next the design phase. Game designing is an art form and developers are free to do anything. But have to consider about other existing NFT game character designs. For an example the most popular NFT game is Axie Infinity which consists fantastic NFT animals that can be bred or sold.

Then choose the platform; Web or Mobile application. Applications built on blockchain technologies are called dApps – decentralized applications. The main code and data (backend) of a decentralized application are stored and executed on the peer-to-peer blockchain, unlike client-server applications, whose data and code are processed on servers.[10] So both are valid. Web applications can be launched from any device meanwhile mobile apps (can be native or cross-platform) run much faster on smartphones but the development is expensive when considering the web application. There is another option called hybrid app or PWA (Progressive Web Applications) which works as both mobile app and web app. PWA allows to run the application using a mobile browser. First define the target group and the devices they use and then choose web or mobile or hybrid platform accordingly.

Then choose suitable technology, mainly the common dApp (decentralized application in blockchain) development platforms are Moralis and Truffle Suite. The most common dApp (decentralized application in blockchain) development ecosystems is Truffle Suite. Truffle Suite provides blockchain developers with a standardized testing environment and asset pipeline to create high-quality and reliable smart contracts.[10] This Truffle suit consists of three parts namely Truffle, Ganache and Drizzle. These three parts differ from the development environment, Virtual machine specializations, security and managerial interfaces.

Then create the virtual/crypto wallet which is locate in the blockchain ecosystem. This crypto wallet is a special software that allows to store digital currency and perform some related operations. Also, gamers use this wallet to register to the NFT games. Moreover, this should implement in the development phase. These crypto wallets should have high security, private and public keys. As an example, CryptoKitties uses the MetaMask non-custodial wallet. It works as an extension for the Google Chrome family of browsers.[10]

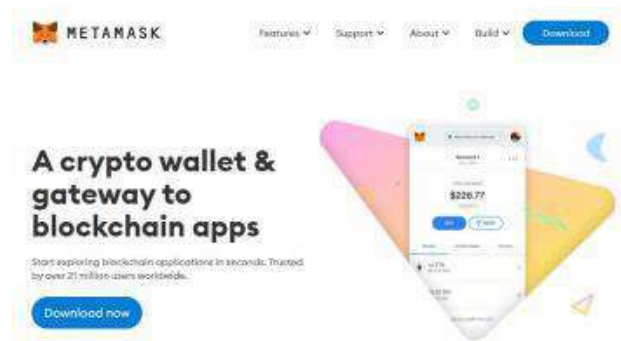


Figure 4: MetaMask crypto wallet

Source: <https://kevurugames.com/blog/how-to-create-an-nft-game/>

In mean time should consider about smart contracts. Smart contracts are programs which stored on the blockchain that run when certain conditions are met and smart contracts responsible for the NFT movement, the cyber-security of a game, and customization of transactions. Also, once smart contract built cannot be rewritten. When gamers accessing to their NFT first the front end receives the gamer's address from the crypto wallet, then front end sends the gamer's address to the smart contract and the smart contract gives the gamer the NFT address owned by the given user. To build smart contacts use programming language like Solidity. Solidity is a language which can create complex contracts in a well-defined code format as known as Turing complete language.

When considering the back end as mentioned already use smart contact and it deals with the URL of desired NFT. With this URL the front end makes a request to the back end to get the metadata for the required NFT. Then back end sends metadata to the front end. After receiving metadata, the front end can send another request to the server with the NFT URL. The interface can then display the available data and the user can see their NFTs name and image. To do this process for the back end can use node.js which translate javascript into machine code that runs on the server side.

Then should test NFT games. First developers conduct unit testing during game development phase. After developing each part of the game, test them and fix critical errors immediately. Then QA engineers do the alpha testing and do the Beta testing with real world gamers before launch it on the market. For this should use blockchain test methods

like Rinkeby or Ganache by Truffle. Other than mentioned main testing methods should do blockchain functional testing, security testing, UI testing and integration testing and API testing. Last not but least then the go live phase and the maintenance.

If summarize the steps to create a NFT game, the steps will be; Step 1: Pre-production - Bring game development expertise onto your team, gather data, Define the concept, Define the platform, Choose the right tech stack, Create a GDD (Game Design Document), Prototyping. Step 2: Development - Modeling/Art design, Level design (logic of a game, designing the quests), Setting up the wallet, Smart contract, Coding. Step 3: Testing - mainly do the Unit testing (Functional game testing and Non-functional game testing), Alpha testing and Beta testing. Step 4: Deploy and promote.

Suppose game development company needs to add NFTs to their existing game. Is it possible to add NFTs like that? Answer is yes. Turning a traditional game into NFT game is possible if the game developer is able to create smart contract and insert it into code which is bit similar to game porting. Both processes do is edit the game code and adapt game mechanics, content to the new game format. Transferring traditional game to NFT takes broad scope and resources. So to do this transformation game developer have to look into three main processes. First keep the game balanced. When NFTs inserted to traditional games it may imbalance games. Every game component must be adjusted to the new format so that new settings do not clash with each other. Second is maintaining structure and functionality. Even after implementing NFTs, developers have to keep quality of the factors like game structure, mechanics, functionality, device compatibility, load capacity and optimal performance. Finally, the third step is to maintaining an optimal size to quality ratio. After implementing NFTs the final game size must remain optimal for the platform. It is challenging to do so while maintaining the quality of each component of a game. according to aforesaid facts can turn the traditional game into NFT game but it takes many resources and such decision should take carefully.

6. Possible Economic Impact To Sri Lanka From NFT Computer Games

Globally there are many examples of communities which highlight the potential of NFT games building a new economy. The video called What play-to-earn gaming can tell us about the future of the digital economy — and the metaverse [12] describe about how Axie Infinity popularized in the Philippines and how the gamers play the game and earn income. According to the reports Philippines and Venezuela also facing for a economic downfall and people are unable to earn even daily wages. So some of them start to play NFT games like Axie Infinity and earn at least 60\$ per day. What they do is play the game, earn tokens, then sell it in crypto currency and then convert them into the real money. They use that money for their survival. Gamers in economically challenged countries like

Sri Lanka can earn income inside the digital word. That is far more significant than physical economy.

If some gamer cannot afford the game character or feature there are platforms called scholarship platforms which helps to purchase characters, features and educate gamers about this digital economy by encouraging to participate play to earn NFT games. In Sri Lanka's case this can happen and for global NFT games locals can build such platform and earn income. When it comes to game developers and game development companies, they can create NFT games and send to local and global platforms and contribute to the economy.

7. Conclusion

This paper aimed to give an insight about blockchain games, how to develop such game and how NFT computer games impact to country economy. Creating, playing NFT games there is a possibility to contribute to the current economic crisis in Sri Lanka. Also, can develop the existing computer game industry in Sri Lanka to the next level and make it a profitable business.

References

- [1] Video Game Sales Wiki. 2022. *Video game industry*. [online] Available at: <https://vg-sales.fandom.com/wiki/Video_game_industry> [Accessed 20 June 2022].
- [2] Mordorintelligence.com. 2022. *Gaming Market Size, Growth & Trends (2022-27) | Industry Analysis*. [online] Available at: <<https://www.mordorintelligence.com/industry-reports/global-gaming-market>> [Accessed 25 June 2022].
- [3] Chou, Y., 2003. G-commerce in East Asia. *Journal of Interactive Advertising*, 4(1), pp.47-53.
- [4] Bai, D., Chen, L., Wang, Y. and Guan, G., 2022. Esports Industry, Video Game Industry, and Economic Growth: An Empirical Research in China. *SSRN Electronic Journal*.
- [5] Sahid, O., 2022. *How Much Can You Earn Playing Axie Infinity?* [online] PlayToEarnDiary. Available at: <<https://playtoearn-diary.com/how-much-can-you-earn-playing-axie-infinity/>> [Accessed 10 May 2022].
- [6] Zeedz – Let's grow the future – NFT Game. 2022. *Zeedz – Let's grow the future – NFT Game*. [online] Available at: <https://www.zeedz.io/?gclid=CjwKCAjw2rmWBhB4EiwAiJ0mtcGP4OsBLeYR8MVYpqNaJ-3FGLUBfq14ficVs8UazcPNs_ZL43TiRhoCzPUQAvD_BwE> [Accessed 10 May 2022].
- [7] Game-Ace. 2022. *How to Create an NFT Game: Your Ultimate Guide* | Game-Ace. [online] Available at: <<https://game-ace.com/blog/how-to-create-an-nft-game/>> [Accessed 20 June 2022].
- [8] Games, W. and Know, H., 2022. *How to make an NFT Game: Full Guide* | Whimsy Games. [online] Whimsy Games. Available at: <<https://whimsygames.co/blog/how-to-create-nft-game/>> [Accessed 20 June 2022].
- [9] Angela Scott-Briggs, T., 2022. *How Much do NFT Game Developers Earn?*. [online] TechBullion. Available at:

<<https://techbullion.com/how-much-nft-game-developers-earn/>> [Accessed 10 May 2022].

[10] Kuru Games. 2022. *How To Make NFT Game: Full Guide* | *Kevuru Games*. [online] Available at: <<https://kevurugames.com/blog/how-to-create-an-nft-game/>> [Accessed 30 May 2022].

[11] Youtube.com. 2022. *PLAY-TO-EARN | NFT Gaming in the Philippines* | *English*. [online] Available at: <<https://www.youtube.com/watch?v=Yo-BrASMHU4&t=59s>> [Accessed 30 May 2022].

[12]World Economic Forum. 2022. *What play-to-earn games mean for the economy - and metaverse*. [online] Available at: <<https://www.weforum.org/agenda/2021/11/what-play-to-earn-games-mean-for-the-economy-and-metaverse/>> [Accessed 25 May 2022].