ESSAYS ON WEB 3.0 BASED PLAY-TO-EARN GAMING PLATFORMS

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DEPARTMENT OF MANAGEMENT STUDIES
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by

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CERTIFICATE

This is to certify that the thesis entitled, **"Essays on web 3.0 based play-to-earn gaming platforms"** submitted by Mr. Zaid Bin Ahsan Rather to the Indian Institute of Technology, Delhi, for the award of the degree of **"Doctor of Philosophy"** in the Department of Management Studies, is a record of bonafide research work carried out by him. He has worked under my guidance and supervision in conformity with the rules and regulations of the Indian Institute of Technology, Delhi. To the best of my knowledge, the thesis has met the requisite standard. The research reports and results presented in this thesis have not been submitted in part or whole for the award of any degree or diploma in any other University or Institute.

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ABSTRACT

The third iteration of the internet, Web 3.0, is based on distributed technologies, like blockchains and cryptocurrencies. This has led to the creation of applications like play-to-earn games. Play-to-earn applications are essentially games, with rich graphics and gameplay, that allow its participants to be rewarded with tokens. These tokens can be a combination of economic tokens, governance tokens and other virtual assets. Users can convert these rewards in the cryptocurrency marketplace to real earnings or can claim governance rights within the platform by owning these tokens. My PhD thesis looks at three specific aspects of the play-to-earn games phenomenon.

My thesis starts by exploring the rewards earned by players of play-to-earn games. Players encounter uncertainty at two levels of earning rewards: whether they can defeat opponents and whether they can convert rewards into earnings of realistic monetary value. The theoretical context of reinforcement-uncertainty effect has elaborated on the decision making of one choice between certain and uncertain rewards. My first study explores uncertainty of earning rewards at two different levels of a play-to-earn game. The case considered for this study is Axie Infinity, because of the game's relevance, particularly in the global south, where earnings from the game outstripped income from their jobs. Some individuals even started to consider it as their full-time jobs. Semi-structured interviews were conducted with players of the game to understand their motivation of earning these uncertain rewards. Using thematic analysis based on descriptive phenomenological approach, the study builds on reinforcement-uncertainty theory and provide reasons for repetition of users in earning rewards, even when the earnings of these rewards are uncertain.

The second part of my thesis looks at the non-fungible token (NFT) and determines the factors that would lead to their breeding, production and subsequent listing in the marketplace.

Participation in play-to-earn games is possible through virtual assets acquired by players. These virtual assets are essentially NFTs and can be collected either by buying them from the marketplace or breeding them within the game. Different NFTs influence the number of rewards that can be won by a player due to the varying attributes of each NFT. These NFTs also act as investments as they are collectibles for the participants. This study investigates the perceptions of value for buyers and sellers of an NFT. Using the case of Axie, which are NFTs in the Axie Infinity game, the study determines the attributes of importance during its pricing. A mixed methods approach is used to arrive at the results, with qualitative data from secondary sources and quantitative from primary ones. The study finds that displaying transparent information and eliminating information asymmetry does not guarantee shared interpretations of value between buyers and sellers.

Lastly, the affordances of decentralized play-to-earn games are identified and the deficiencies for not achieving decentralized governance on these games are determined. Since play-to-earn games are formed over the decentralized technologies of Web 3.0 like blockchains, they are able to distribute governance rights to its players. Following on past information systems literature, the theoretical lens of polycentric governance is used to understand the viability of decentralized governance. Eight play-to-earn games are considered as case studies and then explored using the case study based methodology. The data is sourced from secondary data sources like whitepapers of these play-to-earn games as well as various news articles and blogs. The affordances that are identified are categorized along the three mechanisms of polycentric governance: decision making autonomy, processes of networked cooperation and common rules governance.

हिन्दी सारांश (Abstract in Hindi)

यह शोध Web 3.0 के इकोसिस्टम का अध्ययन करता है, जो blockchains, cryptocurrencies और अन्य distributed technologies पर आधारित है। इन तकनीकों के कारण play-to-earn (P2E) games जैसे applications संभव हुए हैं, जिनमें प्रतिभागियों को gameplay के माध्यम से tokens के रूप में rewards मिलते हैं। ये tokens economic tokens, governance tokens और अन्य virtual assets का मिश्रण हो सकते हैं, जिन्हें cryptocurrency marketplace में real earnings में परिवर्तित किया जा सकता है, या फिर इन्हें platform-based governance अधिकार प्राप्त करने के लिए उपयोग किया जा सकता है। मेरी PhD thesis play-to-earn games की इस उभरती हुई घटना के तीन प्रमुख पहलुओं की जाँच करती है।

पहला अध्ययन P2E games में मिलने वाले rewards की uncertainty का विश्लेषण करता है। खिलाड़ियों को अनिश्चितता दो स्तरों पर अनुभव होती है–(i) खेल में प्रतिद्वंद्वी को हराने की क्षमता, और (ii) प्राप्त rewards को वास्तविक आर्थिक मूल्य में बदल पाने की संभावना। reinforcement-uncertainty effect का सैद्धांतिक संदर्भ इस निर्णय-निर्माण प्रक्रिया को समझाने में सहायक रहा है। Axie Infinity के केस के आधार पर, विशेषकर global south में, जहाँ बहुत से individuals ने इसे पूर्ण-कालिक earning activity मानना शुरू किया, इस अध्ययन में semi-structured interviews और thematic analysis (descriptive phenomenological approach) का उपयोग किया गया है। निष्कर्ष बताते हैं कि reward uncertainty के बावजूद उपयोगकर्ता क्यों बार-बार भाग लेते हैं।

दूसरा अध्ययन non-fungible tokens (NFTs) पर केंद्रित है, जो play-to-earn games में भागीदारी के लिए आवश्यक virtual assets हैं। NFTs को खरीदकर या खेल के भीतर breed करके प्राप्त किया जा सकता है, और इनके attributes reward outcomes और marketplace valuations को प्रभावित करते हैं। Axie NFTs के केस के माध्यम से यह अध्ययन buyers और sellers की perceived value को समझता है और pricing को प्रभावित करने वाले attributes की पहचान करता है। qualitative secondary data

और quantitative primary data को मिलाकर mixed-methods approach अपनाई गई है। अध्ययन यह दर्शाता है कि transparent information और information asymmetry को कम करना marketplace में value की shared interpretations को सुनिश्चित नहीं करता।

थीसिस का तीसरा हिस्सा decentralized governance के संदर्भ में play-to-earn games की affordances और उनकी सीमाओं की पहचान करता है। Web 3.0-based platforms का सिद्धांत यह दावा करता है कि वे खिलाड़ियों के बीच governance अधिकार वितरित कर सकते हैं। polycentric governance के theoretical lens का उपयोग करते हुए, आठ play-to-earn games के case studies (whitepapers, news articles और blogs से secondary data) का विश्लेषण किया गया। पहचानी गई affordances को polycentric governance की तीन mechanisms—decision-making autonomy, networked cooperation processes और common rules governance—के आधार पर वर्गीकृत किया गया है।

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