**Introduction**

In a rapidly evolving technological environment, the processes that support software development are constantly transforming to meet the demands of on-time and budget-conscious project completion while maximizing product quality. Despite the critical role of these processes, the complexity and dynamic nature of software development projects create significant challenges in effectively measuring and rewarding the contributions of developers. Traditional methods are often inadequate in assessing these contributions in a fair and transparent manner, thus negatively impacting project productivity and quality of results (Hann et al., 2002). This study aims to design an innovative system that leverages blockchain technology and tokenomics concepts to measure and reward developers' contributions in software development processes, overcoming existing challenges and initiating a transformative wave in the software development industry.

The success of software development processes is at the heart of today's technology ecosystems, and completing projects on time and within budget constraints requires maximizing product quality. Effective management of these processes is vital for organizations to remain competitive and innovative, especially in large-scale software development projects. Researchers such as Wang et al. (2019) stated that the success of software development processes depends on the scope and complexity of the projects and that the efficient management of these processes has a direct impact on software quality.

The current paradigm for measuring and rewarding the contributions of developers in software development projects is based on various metrics such as code quantity, code quality, defect rates, and contribution time to the project. However, the measurement of these metrics is often based on subjective assessments and lacks consistency across projects (Nicolette, 2015). Furthermore, current systems do not sufficiently encourage collaboration and knowledge sharing between developers, potentially hindering the overall success of projects.

In this context, incentive systems that increase the motivation and engagement of developers are of great importance in order to continuously improve the success and performance of software development processes. Motivational factors are known to directly affect developers' productivity and job satisfaction, and in this context, it is often emphasized in the literature that incentive mechanisms can significantly improve the overall success rates of software projects (Mahaney & Lederer, 2001), These incentive systems, usually by providing financial or non-monetary rewards, create a positive competitive environment among software developers, which can increase overall productivity.

Innovative incentive systems are becoming increasingly important in the field of software development. In particular, incentive systems combined with more effective use of metrics used to measure success in projects (such as code quality, defect rates, and project delivery times) can encourage developers to work to high standards. These metrics provide an objective measurement, avoiding subjective evaluations, and facilitate the fair distribution of incentives. Kogon et al. (2015) detail the impact of such innovative incentive systems on managing software development processes more effectively and increasing the success rates of projects.

Blockchain technology is a promising solution in this context, characterized by its transparency, fair measurement capabilities and tamper-proof records. A blockchain-based system can record developers' contributions in real time and facilitate a fair reward mechanism based on these records (Nakamoto, 2008). However, tokenomics offers economic models and mechanisms that incentivize deeper participation and contribution from developers.

Tokenomics refers to the economic models and mechanisms that govern the creation, distribution, acquisition, and use of tokens in a blockchain ecosystem. This concept helps to understand how tokens gain value, motivate user behavior within the ecosystem, and support the overall economic soundness of a project (Au & Power, 2018). As defined by the researchers, tokenomics is crucial to the success of a project; it offers a set of strategies and principles used to increase engagement, reward users and developers, and thus ensure the sustainability of the ecosystem.

The application of tokenomics to software development processes suggests an innovative approach to measuring and rewarding developers' contributions. Specifically, in a blockchain-based system, developers' contributions can be directly measured, and rewards can be distributed in the form of tokens based on these contributions. This aims to motivate developers to contribute more significantly and provide high-quality inputs, thus increasing the overall success of software development projects. In this context, tokenomics serves as a mechanism to increase developer motivation and engagement while underpinning the economic model and sustainability of the project. This approach represents a paradigm shift in evaluating and rewarding developer contributions and exploring the potential of blockchain and tokenomics in software development processes.

Blockchain and tokenomics-based incentive systems, when applied in software development, can significantly improve the performance of developers and the overall success of projects. These systems use metrics to objectively and fairly measure developers' contributions, while at the same time rewarding those contributions with economic values. This two-way approach increases the motivation of developers as well as encourages the completion of projects on time and within budget (Luo & Zheng, 2023). This work is based on the integration of blockchain technology and tokenomics concepts to revolutionize the measurement and rewarding of developer contributions in software development processes. This integration aims to introduce an innovative model that has the potential to significantly transform project management and developer motivation.

Consequently, this study aims to design a blockchain and tokenomics-based incentive system that can reshape software development processes. This system will be designed to objectively measure the contributions of developers and, based on these measurements, distribute tokens based on their performance. The methodology of the study will include a detailed literature review and the development of a prototype of the system, and the effects of these systems on software development performance will be examined in detail. This research is expected to have a transformative impact on the industry by providing innovative solutions to the current challenges in software development.

**The Importance of Quality and Developer Incentives in Software Development**

Software development processes have evolved significantly over the last few decades, moving from waterfall models to more agile and iterative methodologies (Sidky & Smith, 2009). This evolution is driven by the increasing demand for faster delivery times, higher quality products, and development practices that are more adaptable to changing requirements (Stellman & Greene, 2017). Agile methodologies have revolutionized software development by emphasizing flexibility, customer collaboration, and the ability to quickly adapt to changes. Despite these advances, challenges in measuring and rewarding developer contributions persist, underscoring the need for innovative solutions that can adapt to the dynamic nature of modern software development (Kalliamvakou et al., 2009).

Software development processes are complex activities that are critical for completing projects on time and within budget constraints while maximizing product quality in a rapidly evolving technological environment. Effective management of these processes is directly related to increasing developer motivation and engagement. Motivational factors can significantly increase the overall success rate of software projects by influencing developers' productivity and job satisfaction. Therefore, the design and implementation of effective incentive systems have become an integral part of software development processes, and the correct design of these systems can lead to more successful and efficient projects (Blau et al., 2011).

Open software development projects are particularly challenging because they are often carried out by developers from various locations and with different skill levels. This can lead to problems such as low participation rates, inconsistent code quality, and failure to complete on time. Open-source projects encourage innovation and are supported by a broad community by offering a wide network of collaborators and a high level of transparency. However, as noted by Hann et al. (2002), the high rate of voluntary participation in these projects further increases the importance of incentive systems. In this context, developer incentives have a critical role in improving quality and productivity, especially in open software development projects.

In software development processes, the successful completion of projects and the maintenance of high quality standards are directly related to the effective measurement and management of developers' performance. In modern software development environments, the integration of incentive systems offers great potential for objective and transparent performance measurement. These systems evaluate the contributions of developers based on defined metrics and reward these contributions with appropriate incentive mechanisms. Studies by Laird & Brennan (2006) have shown that effective measurement of developers' contributions significantly improves the overall success of software development projects.

Methods for incentivizing developer contributions have also evolved, from traditional compensation models to more complex systems that incorporate performance metrics and contributions (Wang et al., 2019). In the past, developer incentives were primarily based on output metrics such as lines of code. However, these metrics often failed to accurately reflect the quality or impact of the contribution, leading to the search for more qualitative evaluation methods (Fenton and Bieman, 2014).

Recent trends have focused on creating more holistic and fair systems that take into account various aspects of developer contributions such as code quality, collaboration, and innovation (Besker et al., 2022). In this framework, various metrics used to measure developer contributions in software development projects can directly affect the success of the project. These metrics include methods such as code quality, defect rates, amount of code contributed, and active participation in peer review processes. These metrics are vital for objectively assessing the performance of developers and ensuring consistency across projects. Moreover, the correct application of these metrics minimizes subjective evaluations and makes software development processes fairer and more transparent (De Bassi et al., 2018). Studies on these metrics in the literature show that ensuring objectivity and consistency in developers' performance measurement has a direct positive impact on the overall productivity and success of projects.

Developer incentives, which are one of the methods that can be used in this field and can increase the quality of software development and prevent problems and motivation problems, can be provided in various ways. Financial incentives can increase the motivation of developers in cases of achieving certain goals or showing exceptional performance in the project. Non-monetary incentives include elements such as career development opportunities or professional recognition and can increase developers' long-term commitment and satisfaction. An effective incentive system should harmoniously combine these various methods (Heroux, 2016). The use of innovative incentive systems can improve the management of developer incentives through technology-enabled solutions, especially by automating data collection and analysis processes across projects. By providing real-time feedback, these systems can facilitate developers' access to continuous learning and development opportunities (Besker et al., 2022).