

NON-FUNGIBLE TOKEN ECONOMY IN A DEVELOPING COUNTRY

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Abstract

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Non-fungible tokens (NFTs) are a form of cryptocurrency that is commonly employed in sectors such as collectibles, art, and gaming (Pinto-Gutiérrez et al., 2022). The purpose of this study is to analyse the factors that affect NFT holdings in Thailand. The data was collected from 812 Thai residents who owned digital assets, and it was analysed using binary regression. The results indicated that NFT ownership could be predicted by NFT proficiency, marital status, age, and education, while occupation, monthly income, and savings were not significant. The paper proposes that the Thai government should collaborate with policymakers and regulators to create an extensive plan for the NFT industry, taking into account the significant factors (NFT competence, marital status, age, and education) in analysing investor behaviour, and blockchain companies may use the findings to increase NFT users through marketing.

Keywords: Non-Fungible Token, NFT, NFT Holding, Developing Country, Thailand

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1. INTRODUCTION

One of the first digital assets to become well-known was Bitcoin. In the early days of the digital asset era, Bitcoin's blockchain appeared to be simpler to understand. With the help of Bitcoin, it was possible to create digital assets and transfer them without the usual "middleman", or financial institutions. One of the major digital asset management companies today is Ethereum. As a brand-new digital asset, Ethereum has introduced "non-fungible tokens", or NFTs (Brown et al., 2022). NFTs are blockchain-based assets that are used to represent ownership of special physical or digital goods. There are various points of view regarding what NFTs might be. On the one hand, NFTs are viewed as a crucial component of the metaverse and Web 3.0 as well as a revolution in the marketing and monetization of digital assets. Critics, on the other hand, see them as a fad propelled by celebrities and a means of

money laundering and tax avoidance. NFTs and cryptocurrencies are very similar, but they differ significantly in that they are not fungible or interchangeable with one another (Borri et al., 2022). Furthermore, since each NFT is singular and indivisible by definition, there should theoretically be an infinite variety of NFT types. Typically, NFTs can be divided into six broad categories based on the situations in which they are most frequently used, including art, collectibles, games, metaverse, other, and utility (Bao & Roubaud, 2022). In essence, an NFT is a digital file with ownership rights. Anything in digital format qualifies, including artwork, sports cards, memes, videos, and audio, and once "tokenized", they can be purchased and sold online (Liberto et al., 2022).

"Everydays: The First 5000 Days" by Beeple is a well-known NFT. This work is significant for visual artists worldwide because it is the first purely NFT digital artwork to be auctioned at a major auction

house. Mike Winkelmann — or Beeple — is now known as one of the most successful artists of all time, thanks to this NFT, which sold for more than \$69 million at Christie's. Beeple is a household name in the NFT world, with several NFTs selling for millions of dollars. Another NFT, "HUMAN ONE", sold for nearly US\$30 million (Hickey, 2022; Lyubchenko, 2022). CryptoPunks are another example of an NFT. They were introduced to the market in 2017 by the product studio Larva Labs. The project was one of the first NFT generative art collections to be released, and it was a direct inspiration for the current crop of popular generative PFP projects, such as Bored Ape Yacht Club. It is one of the most influential NFT projects of all time in this regard. Each Punk is algorithmically generated and completely unique, with some traits being rarer than others. CryptoPunks remains one of the most sought-after NFT collectibles, with any NFT from the collection regarded as a rare and exclusive item in the community. Punks typically sell for hundreds of thousands of dollars, with some trades easily reaching millions (Creighton, 2022).

With crypto assets re-entering the bull market in late 2020, NFT has also seen explosive growth, becoming the most popular fintech application and crypto asset in 2021 (Bao & Roubaud, 2022). According to Aharon and Demir (2022), the market value of NFTs has fallen from its highest point but still remains active. The number of unique purchasers, in particular, has continued to grow, seemingly signaling that the story has not yet stopped. As marketplaces sprang up around NFTs, creators exploited their potential in a variety of ways. The best-known examples are the digital art market, described above, and digital collectibles platforms, such as Dapper Labs' NBA Top Shot, which enables users to collect and exchange NFTs of exciting plays from basketball games — videos called "moments", which are effectively digital trading cards. Top Shot has been incorporating gamified challenges and other reasons to own the cards in addition to their collectible value, even hinting that moment holders may eventually receive real-world benefits from the NBA (Kaczynski & Kominers, 2021). Some academics anticipate that NFTs will expand at a comparable rate to cryptocurrencies and will represent a more significant use of blockchain technology, further leveraging the capability of decentralized, distributed ledgers (Chohan & Paschen, 2023). Given the current research and development trend, it is believed that NFT is most likely to be a disruptive breakthrough in the fields of economics and finance (Franceschet, 2021).

Evidently, NFTs have grown in popularity, particularly in Thailand. The Thailand NFT Market Intelligence and Future Growth Dynamics Databook reported in 2022 that the NFT market in Thailand is anticipated to reach US\$1,112.1 million with an annual growth rate of 47.1% ("Thailand NFT market intelligence", 2022). During 2022-2028, the NFT market is projected to expand at a compound annual growth rate (CAGR) of 33.7%. The NFT expenditure value in the country will rise from US\$1,121.1 million in 2022 to US\$5,783.1 million in 2028. Hence, NFT may contribute to Thailand's digital asset industry, as well as its digital economy. Therefore, it is significant to explore NFT markets in

Thailand, especially factors influencing the adoption of NFT, as this may help to enhance a digital economic ecosystem in Thailand.

Several studies explore the factors that influence digital asset investment, particularly cryptocurrency. Bhimani et al. (2022), for instance, employ linear regression analysis to examine the association between several macro-national development indicators and the adoption of cryptocurrencies in 137 countries. Al Shehhi et al. (2014) examined the variables that influence the selection of a cryptocurrency. This study attempted to answer two primary questions addressing the factors that impact online users' decisions to adopt cryptocurrencies as well as the major aspects that influence cryptocurrencies' popularity and value. Connolly and Kick (2015) performed a study to determine the factors that differentiate firms that embrace cryptocurrency from those that do not by comparing their information technology (IT) readiness, innovativeness, and social media engagement. However, there are only a few studies that investigate NFT. This study may fill a gap and therefore intends to analyze the factors that influence Thai investors' NFT ownership. A binary regression analysis was performed to determine whether or not demographic factors and NFT literacy influence NFT possession. The results reveal that marital status, age, education, and NFT competence are significant factors in NFT ownership. This research may be useful for blockchain enterprises and NFT creators seeking to comprehend the characteristics of their clients or investors. For instance, a thorough understanding of the behavior of investors can improve the efficacy of marketing initiatives designed to attract new users. Moreover, Thailand's government agencies relating to digital asset investment, such as the Securities and Exchange Commission (SEC), may use these findings to construct regulations aimed at promoting investors in digital assets; hence, Thailand's digital economy will develop significantly and in a sustainable way.

This study is divided into six sections. The first section offers an introduction. The second section gives a review of the literature. The third section presents the research methodology, and the fourth section the results. The fifth section discusses the findings, and the last section provides a conclusion, as well as limitations and research recommendations.

2. LITERATURE REVIEW

Traditionally, a fungible asset, like money, has value and is simple to exchange. A prime example of this is the dollar. The US\$1 bill could be exchanged for four quarters or ten dimes. You would still be in possession of one dollar (Brown et al., 2022). In contrast, non-fungible goods are non-exchangeable since their value surpasses their real material worth (Ante, 2022). Examples from the physical world include objects with artistic or historical importance, as well as rare trading cards, all of which have a long history of selling in auctions and other marketplaces. In the digital realm, it has been challenging to trade and auction non-fungible items since their validity has been impossible to prove. NFTs currently open the way for the digitalization and online exchange of unique assets.

A non-fungible token (NFT) is a digital token that can be used to prove ownership of something and is cryptographically distinct (Brown et al., 2022). NFTs are non-fungible, meaning each token is unique and cannot be exchanged for another. Since each NFT has a single owner and is supported by blockchain, the ownership of the digital asset gains value and traceability. The market for NFTs is currently worth an estimated US\$1.2 billion. The creative industries are one of the prominent sectors utilizing NFTs (Alnuaimi et al., 2022). By May 2021, hundreds of thousands of NFTs valued at over US\$800 million had been traded in less than half a year. The majority of these terms pertained to digital art, collectibles, music, in-game objects, or metaverses (digital property or assets) (Ante, 2022). As their digital infrastructure, NFTs rely on blockchain technology and smart contracts, similar to cryptocurrencies and other forms of tokens (Ante, 2021). In some areas, however, they differ greatly from typical cryptocurrencies such as Bitcoin and Ethereum. NFTs act as assets rather than currency, commodity, or technology (Dowling, 2022).

NFT is a digital asset that can give artists and guests immediate financial gain. Unique digital assets, which are one-of-a-kind and cannot be duplicated or copied, are the highlight of this asset class. There is only one genuine manuscript, even if the original is copied. Although it lacks a physical form, NFT can be traded like any other asset. In terms of proving ownership of the artwork, NFT tokens are similar to title deeds. NFT trading will have the ability to keep track of any transactions or changes to the exchange. In this scenario, an individual makes a purchase using a system known as "Blockchain", which can use digital files like pictures, videos, music, collectible cards, or even artwork to create assets by generating fresh experiences in undertaking activities, earning money from producing stories, crafting a narrative of the product, and applying to the arts and many games. YouTubers and live streamers also use it. NFT enables buyers and sellers to conduct direct transactions. You can trade your portfolio more freely online, where exchanges can be made quickly and easily without regard to time or distance as long as you have access to an internet connection. A new method of investing in the digital world, trading will be conducted through a cryptocurrency wallet (Inthason & Yousukkee, 2022). Furthermore, NFTs are enabling new ways for fan engagement. NFTs are merely digital collectibles. NFTs, however, are distinct from programmable tokens or cryptocurrencies. There are more differences than just semantic ones. A new way of thinking about fan engagement is made possible by this distinction, and it has a significant potential impact on popular culture. This invention's strength does not lie in the development of yet another cryptocurrency or game component. Even if they are not gamers or collectors, it is in providing new avenues for fans to interact with one another and express their love for their preferred television series, motion pictures, and sports teams (Borri et al., 2022).

There are numerous reasons why investors would want to purchase assets that have been tokenized into NFTs. Everyone can invest in tokenized assets. Asset ownership that has been tokenized into an NFT can be transferred more

easily and efficiently among people all over the world. Furthermore, NFT ownership is secured by a blockchain. Using blockchain technology to digitally signify ownership can make an investor's ownership of an asset more secure. Blockchain technology can also make asset ownership more transparent. Besides, it provides an opportunity to learn more about blockchain technology. By allocating a small sum to tokenized assets, investors can gain more knowledge about blockchain while diversifying their portfolios (Garnett et al., 2022). Artists can mint and sell their work independently using NFTs, allowing them to retain intellectual property and creative control. Additionally, artists can earn royalties on all secondary sales of their work. Moreover, NFT ownership has social benefits, as many creators have turned their NFT projects into vibrant communities. The Bored Ape Yacht Club is perhaps the best example of community building in relation to an NFT project. Collectors gain access to a members-only discord, exclusive merchandise, a vote in the project's future, tickets to virtual meetups, and more. As a result, for many collectors, owning an NFT is a matter of identity and how they socialize with friends (Creighton, 2022). Despite the fact that NFTs are a new technology with a rapidly growing industry, studies on consumer protection and promotion are insufficient. Thus, based on the unified theory of acceptance and use of technology (UTAUT) model, Cho and Lee (2022) examined the relationship between variables that affect intention to use NFT, as well as the moderating effect of NFT types and crypto investment experience. Subjects of this study are limited to potential NFT users. Although the independent variables of performance expectations, network externality, and innovation are statistically significant, no moderating effect is suggested. Subject tendencies lead to adoption rather than technical understanding when there is low awareness. Furthermore, Zheng (2022) examined the impact of a brand (leading vs. non-leading) on the relationship between instrumental need for touch (NFT) and online purchase intention, as well as the influence of situational involvement. The two experimental studies found that a leading brand increased consumers' intention to purchase for those with high instrumental NFT but not for those with low instrumental NFT, and consumers with varying situational involvement levels differed in their relative evaluation of leading and non-leading brands.

3. METHODOLOGY

3.1. Population and samples

The population consists of Thai citizens who possess digital assets and are at least 20 years old. This group was chosen because their degree of maturity and familiarity with digital assets was considered adequate. The sample of 812 participants was selected using accidental sampling. The sample size for this study was established using Yamane's formula (Uakarn et al., 2021). The chosen minimum number permits 384 participants; so, the sample size of 812 is sufficient to deliver reliable and exact outcomes while minimising the chance of abnormal data distribution.

3.2. Data collection

An online questionnaire was used to gather the data, and it was created and developed using the following procedures: At first, academic journal articles, books, and reliable websites relating to the adoption of NFTs and other related topics were reviewed. On the basis of these papers, questions for the questionnaire were subsequently constructed. After that, three experts evaluated a draft of the questionnaire to ensure that all questions were appropriate with regard to context, language, and layout by scoring the questionnaire to determine the index of item-objective congruence (IOC) (Limna et al., 2022). The minimum acceptable IOC score is 0.50 (Wangkawan et al., 2020), and this study provides IOC values in the range of 0.80 to 1.00. Thus, a pilot test with 30 non-sample individuals was carried out to assess Cronbach's alpha coefficient and the reliability of the questionnaire (Kaewnaknaew et al., 2022; Sitthipon et al., 2022). Approved questionnaires must have an alpha coefficient of at least 0.70 (Salloum et al., 2021). With an alpha score of 0.720, the final version of the questionnaire may be used for data collection. The questionnaire was then sent via Internet platforms, including email, LINE, and Messenger. Before completing the questionnaire, respondents were required to provide consent for the publication of their responses. They have the option of not completing the survey if they decline.

3.3. Data analysis

The data were analyzed using a binary logistic regression analysis, which determines the correlation between one or more explanatory variables and a single binary output variable (Boateng & Abaye, 2019; Gomila, 2021). Holding NFTs, which is referred to as whether an investor currently owns NFTs or not, is a dependent variable. If the answer is "yes", the investor is in possession of at least one NFT. If the investor answers "no", that means they do not own any NFTs. Demographic variables (marital status, occupation, age, education, monthly income, and savings), as well as NFT competence, are independent variables. Occupation is a dummy variable in this study. The number one was applied to being a student, whereas the number zero was applied to other jobs (1 = student and 0 = other occupations). NFT competence can be defined as how well a participant knows about NFT, and it can be evaluated by ten multiple-choice questions relating to NFT.

3.4. Alternative method

For a more in-depth investigation of NFT adoption, an in-depth interview or focus group interview may be undertaken. This might show why individuals accept or reject NFTs and other virtual currencies. By conducting interviews with professionals in NFTs or similar disciplines, it is possible to get a thorough understanding of the NFTs market in Thailand and their potential to contribute to a sustainable digital economy in the country.

4. RESULTS

The holding of NFTs was examined as a dependent variable in this study. Table 1 displays the frequency and proportion of legitimate NFT holdings.

Just 252 participants, or 31.0%, out of 812 total respondents possess NFTs, whereas 560 respondents, or 69.0%, do not hold NFTs.

Table 1. Frequency of holding an NFT and valid percentage

NFT	Frequency	Percentage
Not holding NFT	560	69.0%
Holding NFT	252	31.0%
Total	812	100%

On two models, a binary logistic regression analysis was conducted to figure out what factors affect Thais' NFT holdings. Model 1 includes all independent variables, including marital status, occupation, age, education, monthly income, and savings. Model 2 only includes the independent variables that were significant in Model 1.

The results of an omnibus test of the model coefficients that is used to evaluate the goodness-of-fit of logistic models are shown in Table 2. The results indicate that Model 1 has a good fit as there is a significant improvement in fit as compared to the null model, $\chi^2(7) = 83.546$, $p = 0.000$.

Table 2. Test of the performance of Model 1 using all independent variables by the omnibus test

		Chi-square	df	Sig.
Step 1	Step	83.546	7	0.000
	Block	83.546	7	0.000
	Model	83.546	7	0.000

Table 3 displays the pseudo-R-square values, both Cox & Snell R-square and Nagelkerke R-square, which may be used to determine the variation that is explained (Hasan, 2020). In general, the Nagelkerke R-square, a modified version of the Cox & Snell R-square, is employed for interpretation. Hence, Model 1 explains 13.8% of the variance in the dependent variables.

Table 3. Model 1 summary using all independent variables

Step	-2 Log likelihood	Cox & Snell R-square	Nagelkerke R-square
1	922.321 ^a	0.098	0.138

Note: a. Estimation terminated at iteration number 5 because parameter estimates changed by less than 0.001.

The significance level of each independent variable is presented in Table 4, showing that NFT holdings can be described by four independent variables: NFT competence or score ($\chi^2(1) = 23.485$, $p = 0.000$), marital status ($\chi^2(1) = 7.968$, $p = 0.005$), age ($\chi^2(1) = 4.023$, $p = 0.045$), and education ($\chi^2(1) = 23.875$, $p = 0.000$). On the other hand, being a student, monthly income and savings are not significant. When there is an increase of one unit in the score, the intention to hold an NFT in Thailand will increase by 1.091. Moreover, when there is a single status, the intention to hold an NFT in Thailand will increase by 3.430. When there is an increase of one unit in age, the intention to hold an NFT in Thailand will increase by 1.413. Finally, when there is an increase of one unit in education, the intention to hold an NFT in Thailand will increase by 2.160.

Table 4. Variables in Model 1 using all independent variables

	<i>Variables</i>	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>
Step 1 ^a	<i>Score</i>	0.087	0.018	23.485	1	0.000	1.091
	<i>Status</i>	1.232	0.437	7.968	1	0.005	3.430
	<i>Student</i>	-0.215	0.227	0.899	1	0.343	0.806
	<i>Age</i>	0.346	0.172	4.023	1	0.045	1.413
	<i>Education</i>	0.770	0.158	23.875	1	0.000	2.160
	<i>Monthly income</i>	-0.034	0.107	0.099	1	0.753	0.967
	<i>Saving</i>	0.189	0.099	3.622	1	0.057	1.208
	<i>Constant</i>	-5.477	0.754	52.796	1	0.000	0.004

Note: a. Variable(s) entered at step 1: Score, status, student, age, education, monthly income, saving.

Since the significant variables in Model 1 are score, marital status, age, and education, they then were included in Model 2. Table 5 presents the overall test of Model 2. The omnibus test of the model coefficients, which is used to test the model's fit, indicates that the overall model is statistically significant with the chi-square of 77.568 at a significance level of 0.05 ($\chi^2(4) = 77.568$, $p \leq 0.05$) showing that Model 2 has a good fit.

Table 5. Test of the performance of Model 2 using significant independent variables

		<i>Chi-square</i>	<i>df</i>	<i>Sig.</i>
Step 1	Step	77.568	4	0.000
	Block	77.568	4	0.000
	Model	77.568	4	0.000

Table 6 shows the outcomes of the Cox & Snell R-square and the Nagelkerke R-square, which both compute the explained variation, from the model summary of Model 2, which included only significant independent variables. The Nagelkerke R-square, a frequently employed Pseudo R-square, indicates that the model might account for roughly 12.8% of the variation in the results with a significance level of 0.05.

Table 6. Model 2 summary using significant variables

<i>Step</i>	<i>-2 Log likelihood</i>	<i>Cox & Snell R-square</i>	<i>Nagelkerke R-square</i>
1	928.299 ^a	0.091	0.128

Note: a. Estimation terminated at iteration number 4 because parameter estimates changed by less than 0.001.

According to Table 7, when including only significant independent variables in the model, at the 5% level, binary logistic regression indicates that only score ($\chi^2(1) = 27.738$, $p = 0.000$), marital status ($\chi^2(1) = 4.603$, $p \leq 0.05$), and education ($\chi^2(1) = 36.703$, $p = 0.000$) are significant predictors of NFT holdings among Thais. Age is no longer significant in this model. The results also indicate that when there is an increase of one unit in the score, the intention to hold an NFT in Thailand will increase by 1.095. When there is a single status, the intention to hold an NFT in Thailand will increase by 2.172. When there is an increase of one unit in education, the intention to hold an NFT in Thailand will increase by 2.437.

Table 7. Variables in the model using significant variables

	<i>Variables</i>	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>
Step 1 ^a	<i>Score</i>	0.090	0.017	27.738	1	0.000	1.095
	<i>Status</i>	0.776	0.362	4.603	1	0.032	2.172
	<i>Age</i>	0.301	0.161	3.501	1	0.061	1.352
	<i>Education</i>	0.891	0.147	36.703	1	0.000	2.437
	<i>Constant</i>	-5.239	0.721	52.821	1	0.000	0.005

Note: a. Variable(s) entered at step 1: Score, status, age, education.

5. DISCUSSION

This study investigated the factors influencing NFT holdings in Thailand. As Model 1 demonstrates a higher goodness-of-fit than Model 2, it is used to explain the results. The findings revealed that NFT holdings could be described by NFT competence (score), marital status, age, and education. On the other hand, being a student (occupation), monthly income, and savings were not significant. In this research, an individual's education level and NFT competence are significant for NFT holdings. Those with more NFT literacy and a higher education level are more likely to own NFTs. These findings are in line with Shaikh et al. (2020) that discovered three emerging themes: consumers' level of knowledge, consumer awareness, usefulness, and ease of use of non-financial transactions. These aspects make it easier to learn things that can be used in many different situations and can make life easier. Prihatini and Widakdo (2022) indicate that

the purpose of learning is to figure out the best way to do a job-related task. Lin (2011) shows that a person's educational background influences their behaviour and perspective. The higher one's knowledge, the savvier one's handling of tasks. Hence, an individual with a high degree of education is more self-confident. In other words, the higher the formal education level, the greater the likelihood of pursuing more education and acquiring superior job-related information. This might be relevant for NFT holdings. Schrader-Rank (2021) stated that it is critical to educate people about the implications and expansion of NFTs in the arts, especially now that they are still new to so many people in their burgeoning period of growth.

The findings also indicate that being single indicates a greater determination to obtain an NFT in Thailand than other marital statuses. Single investors may differ from married investors in various ways, such as in terms of their abilities or preferences. These distinctions may influence both

the chance of marriage and the resultant level of attraction (portfolio allocation) (Aren & Nayman Hamamci, 2020). Chatterjee et al. (2017) found that unmarried individuals are more risk-tolerant than married individuals because married individuals prefer to take greater risks since they share more income and double their resources, which might encourage them to invest in risk assets. Dickason and Ferreira (2019) and Kannadhasan (2015) discovered that single people had a greater risk tolerance than married people. This may be due to the fact that married individuals feel more accountable for losses on riskier investments (Ahmad et al., 2020).

In this study, individuals who are older are more likely to possess an NFT than those who are younger. This is in line with Kubilay and Bayraktaroglu (2016) who found that there is a link between age and willingness to take risks because people who are younger have less money to handle short-term losses. However, other studies have found an inverse relationship between age and risk tolerance (Nobre et al., 2016; Awais et al., 2016; Chiang & Xiao, 2017). Bayar et al. (2020) discovered that financial risk tolerance decreases with age because the risk tolerance of those approaching retirement age is lower than that of younger individuals. This is partly attributable to the fact that older people have less time to recover from investment-related financial losses.

6. CONCLUSION

In order to investigate the factors affecting NFT holding among Thai citizens, a binary logistic regression analysis was performed. The study examined whether demographic factors (marital status, occupation, age, education, monthly income, and savings) and NFT literacy impact NFT holdings. The results reveal that NFT competence, marital status, age, and education have a considerable impact, but occupation, monthly income, and savings are negligible. Here are some suggestions based on the findings of the study: Thai government needs to cooperate with policymakers and regulators to create a comprehensive plan and roadmap for NFT markets. They might also consider investors' digital asset competence, marital status, age, and education in analyzing investor behaviour. In addition, blockchain companies may use the findings for their marketing to enhance NFT users. This study has limitations because its results only apply to Thailand. Further studies may investigate the worldwide and Asian expansions. It is also recommended that future research investigates other factors, such as the technology acceptance model (TAM) and the unified theory of acceptance and use of technology (UTAUT), which may lead to a better understanding. Furthermore, this study is based on a self-administered questionnaire. Consequently, qualitative studies could provide insight for future research.

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