Public Perception of Decentralized Finance in Ireland: MSc in Fintech Research Project

MSc Research Project

MSc in Fintech

Pancham Nalawade

Student ID: X21225753

School of Computing

National College of Ireland

Supervisor: Victor Del Rosai

National College of Ireland

MSc Project Submission Sheet

School of Computing

Student Name:	Pancham Devidas Nalawade
Student ID:	X21225753
Programme:	MSc in Fintech **Year:** 2022-23
Module:	Research Project
Supervisor:	Victor Del Rosai
Submission Due Date:	14/08/2023
Project Title:	Public Perception of Decentralized Finance in Ireland: MSc in Fintech Research Project
Word Count:	6133 Excluding References **Page Count** 22 Pages Including References

I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.

<u>ALL</u> internet material must be referenced in the bibliography section. Students are required to use the Referencing Standard specified in the report template. To use other author's written or electronic work is illegal (plagiarism) and may result in disciplinary action.

Signature:	Pancham
Date:	14/08/2023

PLEASE READ THE FOLLOWING INSTRUCTIONS AND CHECKLIST

Attach a completed copy of this sheet to each project (including multiple copies)	□
Attach a Moodle submission receipt of the online project submission, to each project (including multiple copies).	□
You must ensure that you retain a HARD COPY of the project, both for your own reference and in case a project is lost or mislaid. It is not sufficient to keep a copy on computer.	□

Assignments that are submitted to the Programme Coordinator Office must be placed into the assignment box located outside the office.

Office Use Only	
Signature:	
Date:	
Penalty Applied (if applicable):	

Public Perception of Decentralized Finance in Ireland: MSc in Fintech Research Project

Pancham Nalawade
X21225753

Abstract

This study explores the emerging field of Decentralized Finance (DeFi) in Ireland, with the objective of understanding public attitudes and factors influencing its adoption. Built upon the foundation of blockchain technology, Decentralized Finance (DeFi) presents a transformative shift in the realm of financial transactions by eliminating conventional intermediaries, consequently fostering a more inclusive and accessible landscape for financial services. This study aims to examine the perceived risks, benefits, and their impact on the adoption of decentralized finance (DeFi) by individuals. This study employs a combination of the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) to examine the patterns of acceptance towards technology within the realm of Decentralized Finance (DeFi). The data for this study were obtained through a survey conducted among 44 computing students from NCI. The collected data were then processed using the Python programming language and subsequently analysed using various statistical techniques, including Exploratory Data Analysis, Descriptive Statistics, and Factor Analysis. Initial results indicate a complex interaction between technological concerns and potential obstacles that shape the adoption pattern of decentralized finance (DeFi) in Ireland.

Keywords: Decentralized Finance, blockchain, risks, benefits, adoption

1 Introduction

In the contemporary financial landscape characterized by swift progress, Decentralized Finance (DeFi) emerges as an important trend promoting financial inclusivity and democratization. DeFi, or decentralized finance, seeks to revolutionize the current financial systems by utilizing blockchain technologies to establish financial instruments and services that are characterized by increased openness, transparency, and accessibility (Zetzsche, Arner, & Buckley, 2020). This study examines the field of Decentralized Finance (DeFi) with a specific focus on the public perception of this emerging technology in Ireland.

Throughout history, there have been numerous barriers like limited financial access, resulting in marginalized communities being excluded from mainstream financial systems. Due to their fundamental principles, decentralized financial services possess a distinct advantage in bridging this divide. The inherent capacity of online accessibility, which allows individuals with internet connectivity to access financial services, not only promotes the democratization of financial access but also aligns seamlessly with the principles of inclusivity and equality. This paradigm shift holds the potential to dismantle traditional barriers and expand the accessibility of financial services to a more extensive demographic.

Nevertheless, despite the unquestionably ground-breaking potential of DeFi, the domain is not without its share of obstacles. The DeFi sector has witnessed notable developments that have brought to light concerns related to inadequate accountability, coding vulnerabilities, susceptibility to manipulation, and the emergence of questionable schemes reminiscent of conventional financial fraud (Chohan, 2021). The aforementioned intricacies emphasize the urgent requirement for a thorough analysis of the DeFi industry, particularly in regions such as Ireland where its adoption is gaining momentum.

However, in order to fully comprehend the transformative capacity of Decentralized Finance (DeFi), it is imperative to first grasp its comparison with Centralized Finance (CeFi). Centralized financial systems typically necessitate individuals to entrust their trust and assets to centralized entities or exchanges. The current arrangement, which emulates conventional financial custodianship, frequently results in constraints on the accessibility and control of assets. In sharp contrast, decentralized finance (DeFi) provides individuals with the ability to exercise direct control over their assets, thereby obviating the necessity for intermediary institutions. Nevertheless, the increased independence can also give rise to technical susceptibilities (Qin et al., 2021).

Against this contextual backdrop, the primary motivation for undertaking this research becomes apparent. The current body of literature provides valuable insights into the technical complexities and worldwide ramifications of decentralized finance (DeFi). However, there is a noticeable lack of concentrated research on public perceptions, specifically within the Irish context. Gaining insights into the perceptions, acceptance, and resistance of the Irish public towards this financial revolution can provide valuable knowledge for policymakers, financial institutions, and technological innovators. Therefore, the primary objective of this research is to address the existing disparity by examining the various determinants that impact the acceptance and implementation of Decentralized Finance (DeFi) within the context of Ireland.

In summary, the research holds importance not only for its potential impact on the academic community but also for its practical implications in the realm of financial practices. The comprehension of the reception of DeFi in regions such as Ireland becomes crucial as it undergoes further development and transforms the global financial landscape. This research aims to elucidate the intricacies and provide a comprehensive comprehension of the trajectory of Decentralized Finance within the Irish context.

1.1 Rationale of the research

The decision to investigate the field of Decentralized Finance (DeFi) in Ireland is motivated by an acknowledgment of its capacity to bring about significant changes in the financial industry. The significance of DeFi is underscored by its rapid global ascent and its potential to democratize financial access. However, despite the growing body of literature on global perspectives of Decentralized Finance (DeFi), there remains a noticeable lack of comprehension regarding its reception in particular regions, such as Ireland. Ireland, characterized by its rapidly growing technology sector and dynamic financial environment, offers a distinctive backdrop for the examination of this subject matter. The primary motivation for this study is to provide a comprehensive understanding of the Irish public's perceptions. By doing so, this research aims to contribute significant insights to the ongoing regional and global discussions surrounding the adoption and challenges of DeFi.

1.2 Research Question

R1a. What are the perceived risks and benefits of using Decentralized Finance in Ireland?

R1b. How do these perceptions influence DeFi adoption?

R2. To what extent are people comfortable to use financial applications without intermediaries?

1.3 Research Hypothesis/Development

Hypotheses for R1a:

H1a: The majority of individuals in Ireland perceive significant benefits in using Decentralized Finance (DeFi).

H1b: The majority of individuals in Ireland perceive considerable risks associated with the adoption of Decentralized Finance (DeFi).

Hypotheses for R1b:

H2a: Positive perceptions regarding the benefits of Decentralized Finance (DeFi) in Ireland lead to higher adoption rates.

H2b: Negative perceptions regarding the risks of Decentralized Finance (DeFi) in Ireland act as deterrents to its adoption.

Hypotheses for R2:

H3a: A significant portion of individuals in Ireland are uncomfortable using financial applications without intermediaries.

H3b: The comfort level of using financial applications without intermediaries directly correlates with the willingness to adopt Decentralized Finance (DeFi) platforms.

1.4 Research Objective:

The primary objective of this study is to thoroughly investigate the perspectives and opinions of the Irish population regarding Decentralized Finance (DeFi). The primary objective of this study is to ascertain individuals' levels of comfort in relation to the inherent risks and benefits associated with this financial innovation. Furthermore, this study aims to investigate the impact of individuals' perceptions, whether they are positive or sceptical, on the Irish public's propensity to use financial platforms that operate without traditional intermediaries. This investigation aims to offer a comprehensive examination of the Irish populace's perspective on the shift towards decentralized financial systems and their level of confidence in these emerging platforms.

2   Related Work

Decentralized Finance, or DeFi, represents a paradigm shift within the financial domain. We examine the nuances of DeFi, its intersection with the traditional financial system, its global implications, and its specific relevance to the Irish financial ecosystem through this lens.

2.1   The Development of DeFi and Its Foundational Technology

Blockchain technology is the foundation of DeFi, offering a transformative approach to diverse financial activities (Ozili, 2022). This decentralized model's primary allure is its capacity to eliminate delays and reduce transaction costs, thereby democratizing access to financial services. DeFi platforms are distinguished by their use of smart contracts, a software that enables automated execution. These contracts guarantee uniform outcomes and have broad applicability (Auer et al., n.d.). DeFi challenges the conventional reliance on centralized intermediaries such as banks and brokers. It envisions a peer-to-peer financial system that mitigates counterparty risk and fosters a more equitable financial environment (Schueffel, 2021).

2.2   DeFi in comparison to the Conventional System

Yousaf, Nekhili, and Gubareva (2022) demonstrate a weak relationship between DeFi and conventional finance by comparing the two. This raises questions regarding DeFi's current maturity and its potential as a currency market risk hedge. The changing role of traditional intermediaries is central to this discussion. Grassi and Lanfranchi (2022) investigate whether these intermediaries can maintain their relevance in the face of blockchain developments. Decentralized Finance (DeFi) presents several benefits in comparison to traditional financial systems (Liu, Szalachowski and Zhou, 2021).

2.3   DeFi's Potential Benefits

The public ledger-based infrastructure of DeFi paves the way for a distributed trust system. This system enables participants to conduct transactions without relying on pre-existing relationships or intermediaries, thereby expanding the potential for financial interactions (Chen and Bellavitis, 2020). In addition, Decentralized Exchanges (DEXs) have established themselves as a key component of the DeFi landscape. The most significant benefit they provide is user control over private keys, which is absent in centralized alternatives (Makarov and Schoar, 2022). In contrast to conventional financial IT solutions, DeFi applications possess publicly accessible source codes, thereby enabling verification and auditing by any interested party (Katona, 2021).

2.4   Challenges and Ethical Considerations

However, DeFi is not devoid of obstacles. Werner et al. (2022) call attention to monetary manipulations in DeFi that frequently go beyond simple transactions. Governance and regulations complicate the landscape further. While some nations take a hands-off stance, others strictly regulate or outright prohibit crypto-asset transactions. Salami (2021) stresses

the importance of a global regulatory framework to prevent financial misconduct and protect investors. The modification of a DAO's code becomes highly challenging once its system is operational, resulting in a significant level of inflexibility inherent to the DAO. This rigidity is somewhat ironic considering that digital systems are designed to be adaptable, and decentralized systems are intended to be dynamic (Chohan, 2017).

2.5   Using technological frameworks to evaluate DeFi adoption.

Adoption rate is a crucial factor in the development of DeFi. The Technology Acceptance Model (TAM) provides insight into user intentions and motivations (Taherdoost, 2018; Wallace and Sheetz, 2014). One significant limitation to consider is the prevalence of cross-sectional studies(Lee, Kozar and Larsen, 2003). The Unified Theory of Acceptance and Use of Technology (UTAUT) sheds light on individuals' perceptions and eventual tech adoption, especially in blockchain contexts (Kabir et al., 2021). The findings of this study indicate that Effort Expectancy is the sole variable that has a significant impact on students' behavioral Intention to utilize Information and Communication Technologies (ICTs) for educational purposes (Attuquayefio and Addo, 2014).

2.6   Historical Interlude Regarding the Role of Intermediaries

Historically central to the financial sector, banks and insurance companies have undergone significant change. In addition to accepting deposits and making loans, banks now engage in a multitude of other activities, thereby expanding their operational scope (Allen and Santomero, 2001). As exemplified by the Glass-Steagall Act after the market crash of 1929 (De Jonghe, 2010), such changes are frequently reactive.

2.7   Global DeFi Landscape in relation to the Irish Situation

DeFi's potential to streamline global payment transactions has the potential to revolutionize money transfers. It promises to reduce the current global remittance fee of 7%, making transactions more economical (Abdulhakeem and Hu, 2021). Ireland in particular has become a significant DeFi and fintech hub. Increasingly, multinational corporations choose Ireland for their EU operations, a sign of the country's ascending stature in this field (McMahon, 2022). This rise corresponds with the statistic that over 120,000 people in Ireland own cryptocurrencies, a threefold increase over the past four years (Walsh, 2018).

2.8   Policy, Industry Implications, and Future Direction

Current DeFi systems frequently conflict with existing regulations, creating risks for individuals and market participants (OECD, 2022). While blockchain alleviates some

security concerns for the future, it is not a universal solution. Therefore, any adoption must be based on a comprehensive analysis of requirements (Puthal et al., 2018; Sriman and Kumar, 2022).

In conclusion, the DeFi wave, bolstered by blockchain, promises to have a revolutionary effect on the global financial system. The literature provides a rich tapestry of insights into DeFi's potential, challenges, and global and Irish context implications. However, as with all innovations, its ultimate success will be determined by judicious implementation guided by research and policy.

3   Research Methodology

This study investigates the Irish public's perception of Decentralized Finance (DeFi). Here, we detail the procedures, tools, and analytic approaches used to decode and interpret the collected data.

3.1   Steps Followed in the Research:

Foundational to the formulation of the research objective was a comprehensive examination of the perceptions, attitudes, and comfort levels of the Irish public. The goal was to comprehend the potential risks and benefits of DeFi, as well as how these findings impacted financial transactions conducted without traditional intermediaries.
Survey Design: Using Tally forms, a comprehensive survey questionnaire was designed. This ensured that critical aspects of public perception were addressed in a consistent manner, thereby improving the quality and consistency of responses.
Data Collection: Using a method of convenience sampling, 44 NCI computing students from the class of 2022-23 were surveyed. Although this sampling strategy may not be representative of the entire population, it was deemed effective for capturing the insights of a specific demographic within the constraints of the study.
https://tally.so/r/3xjE4v
Data Cleaning and Processing: Once collected, the data were thoroughly cleaned in Python. This phase was essential for eliminating inconsistencies, addressing missing values, and preparing the final dataset for analysis.

4   Design Specification

Data Analysis: A multifaceted approach to analysis was utilized, including:

a. Exploratory Data Analysis (EDA): A preliminary examination of the data to identify inherent structures, outliers, patterns, and relationships. This step was crucial for guiding subsequent, more comprehensive analyses.
b. Descriptive Statistics: An overview of the central tendencies, distributions, and variances of the data was obtained, providing a quantitative summary of the primary characteristics of the dataset.
c. Factor analysis was used to identify potential underlying relationships and patterns among multiple variables in the dataset.

d. TAM and UTAUT Analysis: By employing these well-established models, we aimed to quantify the acceptance and receptivity levels of participants. In addition, the models assisted in comprehending the primary factors influencing their perceptions of DeFi.

Data Tools and Software:

a. Tally Forms: This instrument was essential for designing and distributing the survey. Its user-friendly interface and organized layout allowed for efficient data collection.

b. Python: Due to its proficiency in data science, Python was chosen to clean, process, and analyze the dataset. Its extensive library of functions and libraries enabled in-depth data investigations.

c. Google Collab: This recognized cloud-based platform for data science projects was used to execute Python scripts. Its collaborative nature and robust computational backend facilitated the research procedure.

The research methodology, which has been carefully crafted, aims to comprehensively explore the intricacies of Ireland's public perception regarding Decentralized Finance (DeFi). Through the utilization of a targeted demographic and the implementation of a comprehensive analytical methodology, our objective is to elucidate the complexities surrounding the perception of DeFi and its potential ramifications for the financial framework of Ireland. This systematic investigation serves as an initial step towards understanding the wider implications of decentralized finance (DeFi) in influencing the future of the financial sector in Ireland.
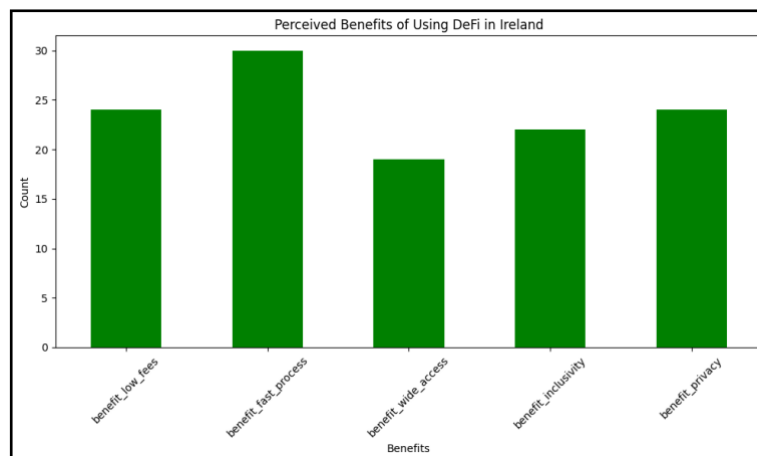
5 Implementation

Exploratory Data Analysis

Fig.1 Perceived benefits of using DeFi in Ireland

The presence of a high value for the parameter 'benefit_fast_process' suggests that the participants perceive faster transaction processing as a significant benefit. The findings indicate that a significant proportion of the participants consider both transaction fees and privacy to be equally important aspects of decentralized finance (DeFi). This implies that many of the respondents view the reduction in transaction fees and the preservation of

privacy as valuable advantages offered by DeFi. This observation suggests that the issue of traditional banking fees is a matter of concern for a significant portion of the population in Ireland. The findings indicate that a significant number of respondents do not perceive a wider range of financial services accessible through DeFi platforms as advantageous, as evidenced by the smaller 'benefit_wide_access' bar.
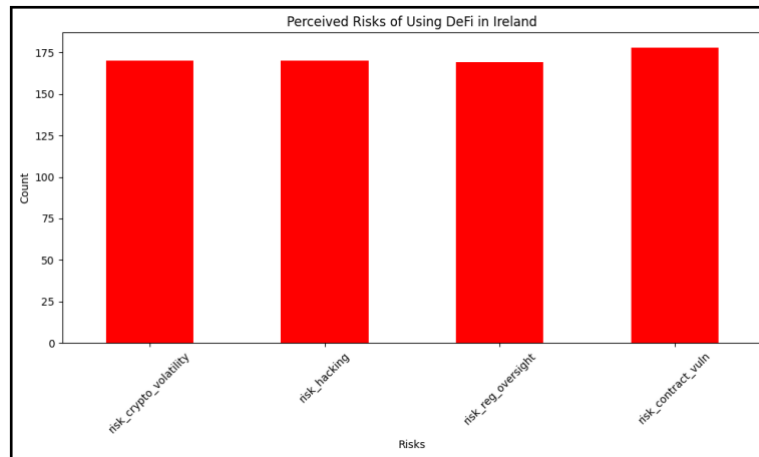

Fig.2 Perceived Risk of Using DeFi in Ireland

The predominant number of instances of 'risk_contract_vuln' highlights the apprehensions expressed by participants regarding the susceptibilities linked to smart contracts within decentralized finance (DeFi) platforms. The presence of a high level of risk in terms of regulatory oversight, crypto volatility, and hacking raises concerns about the absence of regulations in the DeFi sector, the inherent instability of cryptocurrencies, the possibility of security breaches or hacking incidents within the DeFi domain, and the subsequent implications for the DeFi ecosystem.
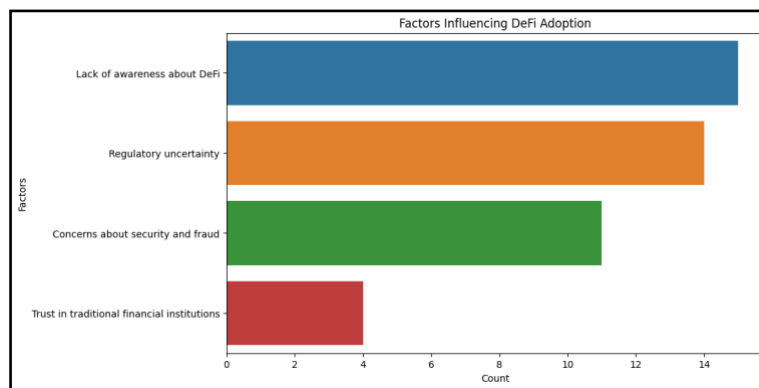

Fig.3 Factors influencing DeFi Adoption

The graph provides insights into the primary determinants influencing individuals' choices regarding the adoption or non-adoption of DeFi in Ireland. For example, the most dominant factor is "Lack of Knowledge," which is 14, it suggests a requirement for increased availability of educational resources pertaining to DeFi.
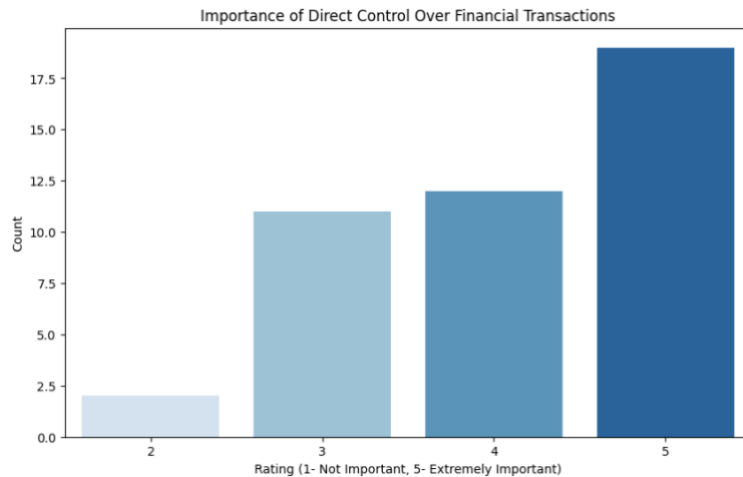
Fig. 4 Importance of Direct Control Over Fianincal Transactions

One notable advantage is the convenience and ease of use associated with using financial applications without the need for intermediaries.

Based on the graphical representation pertaining to the exercise of direct control over transactions:

A tendency for higher ratings (4 and 5) suggests that respondents place importance on maintaining direct control over their financial transactions and exhibit a preference for minimizing reliance on intermediaries. A diminished rating could potentially signify a reliance on intermediaries or a sense of unease towards the decentralized structure of DeFi.
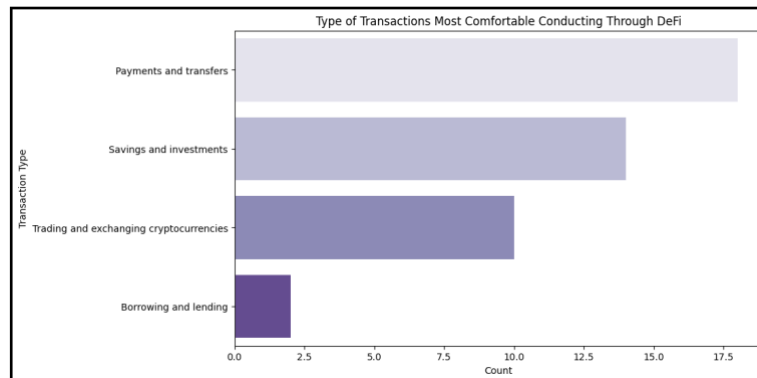

Fig. 5 Type of Transaction Most Comfortable Conducting Through DeFi

The type of transactions that the respondents express the highest level of comfort with.

Based on the graphical representation illustrating various types of transactions that are deemed comfortable, it can be observed that. The examination of dominant transaction types offers valuable insights into the potential adoption rates of various DeFi services within the context of Ireland. For example, the survey respondents rank Payments and Transfers as a prominent choice, it may suggest that DeFi Payments and Transfers platforms could potentially attract a favourable reception among the population in Ireland.

In brief, these findings offer an initial comprehension of the sentiment, apprehensions, and inclinations of the participants regarding DeFi in Ireland. These findings have the potential to inform the development of DeFi-related policies, educational initiatives, and strategies for DeFi platform providers.

6   Evaluation

Let us now move forward with a comprehensive analysis, prioritizing the comprehension of interrelationships among variables and deriving more nuanced insights.

A. Exploratory Data Analysis

One method for examining the relationship between perceptions of De-Fi benefits and risks and their impact on adoption is using correlation analysis. Use visual aids such as graphs, charts, plots and so on to show the results.
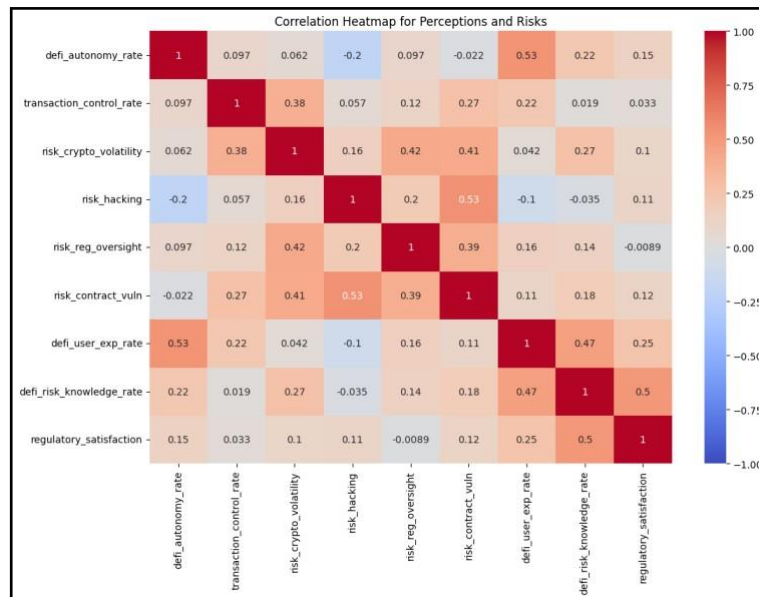
Fig. 6 Correlation Heatmap for Perception and Risks

The interpretation of the results is based on the correlation coefficients obtained from the correlations heatmap.

Interpretation: The Autonomy and Adoption of Decentralized Finance (DeFi)

A moderate positive correlation of 0.53 exists between the variables defi_autonomy_rate and defi_user_exp_rate.
This finding implies that individuals who hold the belief that decentralized finance (DeFi) provides greater financial autonomy are more likely to have a positive experience when utilizing DeFi platforms. As the conviction in the benefits of financial autonomy grows, there appears to be an enhancement in the user experience with Decentralized Finance (DeFi)

platforms. Nevertheless, despite the statistically significant correlation coefficient of 0.53, it is important to acknowledge that there may be additional factors that exert an influence on the user experience.

6.1 The Importance of Risk Awareness and Adoption in Academic Contexts

There is a minimal positive correlation of 0.042 observed between the variables risk_crypto_volatility and defi_user_exp_rate.

This finding suggests that the impact of concerns regarding cryptocurrency volatility on the user experience rating of the DeFi platform is negligible. There appears to be a near absence of correlation between the two variables.

6.2 The Relationship between Regulatory Satisfaction and Risk Concerns:

A modest positive correlation of 0.11 exists between regulatory satisfaction and risk hacking. This suggests that individuals who have a slightly higher level of satisfaction with the regulatory environment in Ireland could have heightened concerns regarding the risks associated with hacking in the decentralized finance (DeFi) sector. Nevertheless, considering the limited correlation coefficient, the association lacks substantial strength and may not hold practical significance in real-world situations.

6.3 The correlation between risks.

A moderate positive correlation of 0.53 has been observed between the variables risk_hacking and risk_contract_vuln.

This observation implies that individuals who express concern regarding the potential for hacking are also inclined to exhibit concerns regarding the susceptibilities associated with smart contracts. This observation highlights a prevailing trend of risk awareness, wherein individuals who exhibit concern regarding a specific type of risk also demonstrate awareness and concern for other associated risks.

6.4 Direct Financial Control without Intermediaries:

The concept of direct financial control without intermediaries refers to the practice of individuals or entities managing their financial affairs without the involvement of intermediaries such as banks or financial institutions.

There is a modest positive correlation of 0.097 between the variables transaction_control_rate and defi_autonomy_rate.

This finding suggests that the inclination towards exerting direct control over financial transactions without intermediaries is only weakly correlated with the perception that DeFi provides greater autonomy. However, the correlation between the variables is weak.

There is a minimal negative correlation of -0.022 observed between the variables risk_contract_vuln and defi_autonomy_rate. This observation implies that as apprehensions regarding vulnerabilities in smart contracts intensify, the confidence in the autonomy of decentralized finance (DeFi) experiences a marginal decline. Nevertheless, it should be noted that the correlation between these variables is relatively low and may not have substantial implications in practical contexts.

There is a weak negative correlation of -0.20 observed between the variables risk_hacking and defi_autonomy_rate.

This suggests that as concerns regarding hacking risks intensify, the confidence in the autonomy offered by DeFi diminishes. Respondents who exhibit a higher level of concern regarding hacking might have certain reservations regarding the autonomous capabilities of DeFi.

In summary, it is important to recognize that the observed relationships between the variables are solely correlational in nature. The observed correlations do not necessarily indicate a causal relationship, and additional investigation is necessary to gain a more comprehensive understanding of these associations. The weak correlations, particularly those with limited strength, should be approached with caution due to their potential lack of significant practical relevance.

B. Descriptive Statistics

Regarding Levels of Comfort:

We can examine the descriptive statistics for transaction_control_rate to gain more insight into the extent to which individuals are at ease using financial apps without intermediaries.

Transaction_Control_Rate	
Name	Value
count	44
mean	4.090909
std	0.935556
min	2
25%	3
50%	4
75%	5
max	5

Fig.7 Transaction Control Rate

The figure depicts a descriptive statistical analysis of the variable transaction_control_rate, which appears to quantify the significance respondents place on having direct control over their financial transactions without relying on intermediaries.

The interpretation is:

There are 44 responses or observations for transaction_control_rate in the data set.

Mean (Median):

On a scale from 1 to 5, the average rating from respondents is 4.09 stars. This suggests that, on average, respondents value direct control over their financial transactions.

Approximately 0.9355 is the standard deviation. This represents the variance or dispersion of the responses. Given the scale (1-5) this standard deviation indicates a moderate dispersion among responses, although the majority are close to the mean.

Minimum and Maximum: The minimum score is 2 and the maximum is 5. No respondent has given the lowest possible score of 1, indicating that everyone places some significance on transaction control.

25% (1st Quartile): Twenty-five percent of respondents gave a rating of three or less.

50% (Median): Half of the respondents rated transaction control's importance as a 4. This further demonstrates that the majority of respondents tend to value transaction control.

75% (3rd Quartile): 75% of respondents gave a rating of 5 or lower, indicating that a substantial proportion of respondents consider direct control over transactions to be extremely important, with many giving the highest possible rating.

In accordance with the research question "To what extent are individuals at ease utilizing financial applications without intermediaries? ":

According to the data presented above, a sizeable proportion of respondents in Ireland value direct control in financial transactions. The average rating is closer to the upper end of the scale, emphasizing the significance that many places on decentralized, intermediary-free financial systems. The absence of ratings on the lower end and the concentration of ratings around 4 and 5 indicate that financial independence is highly valued.

C. Factor Analysis

Factor analysis is useful when reducing the dataset to fewer dimensions and determining which risks or benefits respondents tend to group together.

By reducing the dataset to fewer dimensions and determining which risks or benefits respondents tend to group together, factor analysis is beneficial because the dataset will become more meaningful. The technique of factor analysis is used to determine the underlying relationships between observed variables. Identifying underlying factors that may explain patterns of correlation between multiple DeFi-related variables. It is specified that two factors exist (n_components=2). The matrix that is printed is the loading matrix, which depicts the relationship between each variable and the latent factors.

Factor 1:	
1	defi_autonomy_rate: 0.05235014
2	transaction_control_rate: -0.30755523
3	risk_crypto_volatility: -0.53721962
4	risk_hacking: -0.70171189
5	risk_reg_oversight: -0.454848
6	risk_contract_vuln: -0.71602984
Factor 2:	
1	defi_autonomy_rate: 0.32344038
2	transaction_control_rate: 0.30901384
3	risk_crypto_volatility: 0.43765378
4	risk_hacking: -0.50194681
5	risk_reg_oversight: 0.21608089
6	risk_contract_vuln: -0.04653109

Fig. 8 Factor Analysis

Factor 1: The variables with the highest negative loadings on Factor 1 are risk_hacking and risk_contract_vuln. This suggests that Factor 1 may represent a general "Risk Concern" factor, in which individuals with higher scores are more concerned with hacking risks and contract vulnerabilities in DeFi.

Variables related to autonomy and control (defi_autonomy_rate and transaction_control_rate) have lower (and in the case of autonomy, almost negligible) loadings on this factor, indicating that it does not adequately represent autonomy/control attitudes.

Factor 2: risk_crypto_volatility has a positive loading, indicating it is strongly associated with this factor, which may represent concerns about volatility or market-based risks.

Both transaction_control_rate and defi_autonomy_rate have positive loadings on Factor 2. This suggests that DeFi contains a factor underlying perceived benefits and desires for autonomy. The negative loading of risk_hacking suggests that those who perceive greater autonomy and control may be less concerned about hacking, at least in relation to this factor.

In accordance with the study questions:

R1a.What are the risks and benefits of utilizing Decentralized Finance in Ireland?

Factor 1 appears to cluster risks such as hacking and contract vulnerabilities, indicating that these are respondents' primary risk concerns.

Factor 2 indicates a combination of perceived benefits (autonomy and control) and concerns regarding cryptocurrency volatility.

R1b. How do these perceptions affect the adoption of DeFi?

To answer this, it must correlate the factor scores with DeFi adoption metrics. However, these factors provide insight into the most prevalent concerns and interests, which can influence adoption.

R2. To what extent are people comfortable to use financial applications without intermediaries?

The positive loading of transaction_control_rate on Factor 2 suggests that many respondents may be comfortable with or even prefer financial platforms without intermediaries, as it relates to a factor also associated with the advantages of DeFi.

Factor loadings indicate the relationship between each variable and the factor. High (positive or negative) loadings indicate that the factor is a significant predictor of the variable. The sign (positive/negative) indicates the relationship's direction.
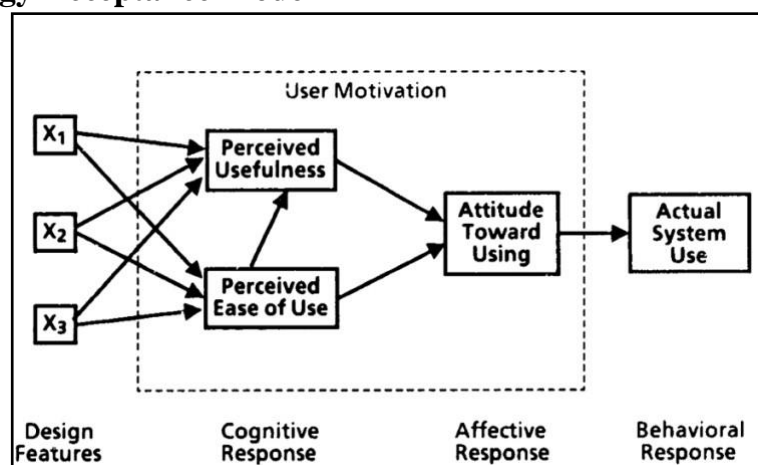
D. Technology Acceptance Model TAM

Fig .9 Technology Acceptance Model TAM (Davis, 1986)

The research objective aligns well with the applicability of the Technology Acceptance Model (TAM), which aims to comprehend the public's perception of Decentralized Finance (De-Fi) specifically within the context of Ireland. The constructs of Technology Acceptance Model (TAM), namely perceived usefulness and perceived ease of use, provide a direct framework for assessing respondents' perceptions of the potential benefits and user-friendliness of Decentralized Finance (De-Fi). By utilizing the Technology Acceptance Model (TAM), this study may clarify not only the level of awareness but also the inclination to adopt and utilize Decentralized Finance (De-Fi). The increasing adoption of decentralized platforms in the financial sector necessitates a comprehensive understanding of user perceptions. To achieve this, the utilization of a validated model such as the Technology Acceptance Model (TAM) is imperative. This approach enables the identification of factors influencing user adoption and facilitates the resolution of associated concerns.

```
        Mean Perceived Usefulness: 3.4545454545454546
        Mean Perceived Ease of Use: 3.7613636363636362
        Correlation between PU and PEoU: 0.3979503712800921
                    OLS Regression Results
===============================================================
Dep. Variable:   defi_user_exp_rate   R-squared:           0.663
    Model:                    OLS   Adj. R-squared:        0.646
    Method:         Least Squares   F-statistic:           40.29
    Date:        Sat, 12 Aug 2023   Prob (F-statistic):  2.10e-10
    Time:               21:47:53   Log-Likelihood:       -34.584
    No. Observations:         44   AIC:                   75.17
    Df Residuals:             41   BIC:                   80.52
            Df Model:                 2
            Covariance Type:      nonrobust
===============================================================
            coef   std err     t    P>|t|  [0.025   0.975]
    ---------------------------------------------------------------
    const  -0.5767   0.455  -1.268  0.212  -1.495   0.342
    PU      0.2238   0.086   2.611  0.013   0.051   0.397
    PEoU    0.8601   0.126   6.841  0.000   0.606   1.114
===============================================================
    Omnibus:            0.780  Durbin-Watson:          1.707
    Prob (Omnibus):     0.677  Jarque-Bera (JB):       0.586
    Skew:              -0.278  Prob (JB):              0.746
    Kurtosis:           2.898  Cond. No.               29.8
===============================================================
```

Fig. 10 TAM Analysis

Mean of Perceived Usefulness (PU) and Ease of Use (PEoU)
Average Perceived Usefulness: The average rating for perceived usefulness is 3.45 out of 5. This indicates that respondents view DeFi as having some benefits. It indicates that, on average, users believe that utilizing DeFi can improve their financial activities.

Mean Perceived Ease of Use: The average score for perceived ease of use is 3.76 out of 5. This score is marginally higher than the PU score, indicating that respondents find DeFi platforms to be relatively simple to use or comprehend. Regression Analysis:

The correlation coefficient between PU and PEoU is approximately 0.398, or $r = 0.398$. This correlation suggests that as people's perception of DeFi's usefulness increases, their perception of its usability also tends to rise, and vice versa.

From the results of the regression:

Value of R-squared: The model's R-squared value is 0.663. This indicates that PU and PEoU can account for approximately 66.3% of the variance in DeFi adoption (user experience rate).

Calculating Coefficients:

PU: For each unit increase in perceived usefulness, the user experience rate (an indicator of DeFi adoption) increases by 0.2238 units, assuming that all other factors remain constant. This correlation is statistically significant (p less than 0.05).

Every unit increase in perceived ease of use increases the user experience rate by 0.8601 units. This is also statistically significant and suggests that ease of use has a substantial impact on DeFi adoption.

The intercept of the model is -0.5767, but it lacks statistical significance ($p > 0.05$). This value represents the predicted user experience rate when both PU and PEoU are zero, this doesn't have much interpretative value.

R1a & R1b:Perceived risks and benefits and their influence on adoption: The positive coefficient for PU indicates that respondents who perceive greater benefits or utility from DeFi are more likely to have a positive user experience, indicating increased adoption or acceptance rates.

R2 - Comfort in using financial applications without intermediaries: The significant positive coefficient for PEoU indicates that respondents are more likely to adopt DeFi platforms when they find them easy to use or navigate. This is supported by the high mean score for PEoU, which indicates that respondents are somewhat at ease using DeFi platforms without intermediaries.

In conclusion, both the perceived benefits (usefulness) of DeFi and its perceived ease of use have a significant impact on its adoption by respondents. However, perceived ease of use (PEoU) appears to have a greater impact on DeFi adoption than perceived usefulness (PU).

E. Unified Theory of Acceptance and Use of Technology UTAUT:

The utilization of the Unified Theory of Acceptance and Use of Technology (UTAUT) is of great significance in this study, as it offers a comprehensive framework for evaluating the acceptance and usage behaviours of Decentralized Finance (DeFi) in the context of Ireland. The UTAUT model integrates various acceptance models, taking into account factors such as performance expectancy, effort expectancy, social influence, and facilitating conditions. The paramount importance lies in comprehending the societal influences, user expectations, and potential barriers to technology adoption, owing to the novel and decentralized nature of DeFi. The utilization of the Unified Theory of Acceptance and Use of Technology (UTAUT) provides a comprehensive perspective on the multiple factors that may impact the general

population's propensity towards Decentralized Finance (DeFi), rendering it an appropriate framework for our research aims.

```
                          OLS Regression Results
================================================================================
    Dep. Variable:    defi_user_exp_rate   R-squared:              1.000
         Model:                     OLS    Adj. R-squared:         1.000
        Method:           Least Squares    F-statistic:          1.266e+30
          Date:         Sat, 12 Aug 2023   Prob (F-statistic):      0.00
          Time:                21:50:59    Log-Likelihood:         1409.4
  No. Observations:                  44    AIC:                    -2811.
      Df Residuals:                  40    BIC:                    -2804.
         Df Model:                    3
  Covariance Type:            nonrobust
================================================================================
              coef     std err        t     P>|t|    [0.025    0.975]
        --------------------------------------------------------------------
  const   -6.661e-16   2.87e-15    -0.232    0.817  -6.46e-15   5.13e-15
  PE       5.412e-16   5.24e-16     1.034    0.308  -5.17e-16    1.6e-15
  EE          1.0000    6.3e-16   1.59e+15    0.000     1.000      1.000
  FC               0   7.67e-16         0    1.000  -1.55e-15   1.55e-15
================================================================================
     Omnibus:                  6.284    Durbin-Watson:            0.205
  Prob (Omnibus):              0.043    Jarque-Bera (JB):         5.353
        Skew:                  0.604    Prob (JB):               0.0688
      Kurtosis:                4.208    Cond. No.                  38.7
================================================================================
```

Fig. 11 UTUAT Analysis

6.5 Discussion

Overall Model Fit:

R-squared: With an R-squared value of 1.000, the model explains 100 percent of the variance in the dependent variable (defi_user_exp_rate). A R-squared value of this magnitude is uncommon and often indicates multicollinearity or overfitting.

Personal Coefficients:

As indicated by the large p-value, the PE (Performance Expectancy) coefficient is extremely small and not significantly different from zero. This indicates that performance expectation, as we have defined it, may not be a reliable predictor of the defi_user_exp_rate in this dataset.

EE (Effort Expectancy): The coefficient for EE is 1.0000 and the p-value is very close to 0. This indicates that effort expectation (or perceived ease of use) and defi_user_exp_rate have a one-to-one relationship. The user experience rate increases by one unit for every unit increase in the perceived ease of use. This suggests that the user-friendliness of DeFi platforms is a significant predictor of their experience rate.

The coefficient for FC (Facilitating Conditions) is zero and not significant. This indicates that our measure of facilitating conditions has no discernible effect on the defi_user_exp_rate.

17

R1a & R1b: The findings suggest that the ease with which users find DeFi platforms to use (Expectation of Effort) has a significant impact on DeFi adoption in Ireland. However, neither the perceived benefits nor performance expectations appear to have a discernible effect.

R2: Given the importance of Effort Expectancy (ease of use), it can be concluded that people are more likely to adopt DeFi platforms when they find them simple and intuitive to use, even in the absence of intermediaries.

Additional Remarks:

Extremely high R-squared and a coefficient of 1 for Effort Expectancy (EE) may indicate multicollinearity; that is, our independent variables may be highly correlated with one another. This makes it difficult to distinguish the effects of each predictor individually.

Future analyses may include examining the correlations between predictors or employing techniques such as variance inflation factor (VIF) to diagnose multicollinearity.

7   Conclusion and Future Work

The research revealed a variety of perspectives regarding the benefits and risks of DeFi in the Irish context. Many respondents acknowledged DeFi's transformative potential in terms of democratizing access to financial services and decreasing transaction costs. In spite of this optimism, there was a palpable sense of apprehension regarding the challenges and risks, especially in terms of governance and potential market manipulations.

The importance of DeFi in reshaping financial landscapes cannot be overstated, as evidenced by the literature and survey findings. While there is a growing preference for DeFi due to its perceived benefits, many potential adopters are treading cautiously out of concern for regulatory oversight and potential risks. This dichotomy between optimism and prudence highlights the need for balanced education, strong regulatory frameworks, and more transparent DeFi platforms.The integration of TAM and UTAUT analyses yielded profound insights into the complexities of people's perceptions and eventual adoption of DeFi technologies. While technological advantages drive some adoption, trust, familiarity, and perceived ease of use play a significant role for the majority, highlighting the significance of user-centric designs and regulations in DeFi platforms.

Given the infancy of DeFi and its rapid evolution, future research can delve deeper into evolving perceptions, particularly as the industry matures and regulations become more clearly defined. The contrast between traditional financial systems and DeFi presents a fascinating area for investigation, especially in terms of the role of intermediaries in this evolving landscape.

On the commercialization front, there is a burgeoning opportunity to develop DeFi platforms that are tailored to the specific needs and preferences of the Irish market and are supported by robust security measures and user-friendly interfaces. Such platforms can bridge the current trust gap and promote wider DeFi adoption in Ireland.

In conclusion, the landscape of Decentralized Finance in Ireland is at a critical juncture, shaped by both the opportunities and obstacles it presents. With targeted efforts, informed regulations, and ongoing research, Ireland can maximize the potential of DeFi, serving as a model for other nations.

References

Abdulhakeem, S.A. and Hu, Q. (2021). Powered by Blockchain Technology, DeFi (Decentralized Finance) Strives to Increase Financial Inclusion of the Unbanked by Reshaping the World Financial System. Modern Economy, 12(01), pp.1–16. doi:https://doi.org/10.4236/me.2021.121001.

Albayati, H., Kim, S.K. and Rho, J.J. (2020). Accepting financial transactions using blockchain technology and cryptocurrency: A customer perspective approach. Technology in Society, 62, p.101320. doi:https://doi.org/10.1016/j.techsoc.2020.101320.

Allen, F. and Santomero, A.M. (1997). The Theory of Financial Intermediation. Journal of Banking & Finance, [online] 21(11-12), pp.1461–1485. doi:https://doi.org/10.1016/s0378-4266(97)00032-0.

Allen, F. and Santomero, A.M. (2001). What do financial intermediaries do? Journal of Banking & Finance, 25(2), pp.271–294. doi:https://doi.org/10.1016/s0378-4266(99)00129-6.

Amani and Arvanitis, T.N. (2011). Adapting the Unified Theory of Acceptance and Use of Technology (UTAUT) as a Tool for Validating User Needs on the Implementation of e-Trial Software Systems. BCS Learning & Development. doi:https://doi.org/10.14236/ewic/hci2011.1.

Attuquayefio, S. and Addo, H. (2014). Using the UTAUT model to analyze students' ICT adoption. International Journal of Education and Development using ICT, [online] 10(3). Available at: https://www.learntechlib.org/p/148478/.

Auer, R., Haslhofer, B., Kitzler, S., Saggese, P. and Friedhelm, V. (n.d.). THE TECHNOLOGY OF DECENTRALIZED FINANCE (DEFI) INDUSTRIAL ORGANIZATION, INTERNATIONAL MACROECONOMICS AND FINANCE AND BANKING AND CORPORATE FINANCE. [online] Available at:
https://repec.cepr.org/repec/cpr/ceprdp/DP18038.pdf [Accessed 15 July. 2023].

Chen, Y. and Bellavitis, C. (2020). Blockchain disruption and decentralized finance: The rise of decentralized business models. Journal of Business Venturing Insights, 13, p.e00151. doi:https://doi.org/10.1016/j.jbvi.2019.e00151.

Chohan, U.W. (2017). The Decentralized Autonomous Organization and Governance Issues. SSRN Electronic Journal. [online] doi:https://doi.org/10.2139/ssrn.3082055.

Chohan, U.W. (2021). Decentralized Finance (DeFi): An Emergent Alternative Financial Architecture. [online] papers.ssrn.com. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3791921.

Choubey, Y. (2022). Analysis of Customer Perception and Satisfaction on Choosing Cryptocurrency in India. [online] norma.ncirl.ie. Available at: https://norma.ncirl.ie/5838/.

Davis, F. (1986). A TECHNOLOGY ACCEPTANCE MODEL FOR EMPIRICALLY TESTING NEW END-USER INFORMATION SYSTEMS: THEORY AND RESULTS. [online] Available at:
https://dspace.mit.edu/bitstream/handle/1721.1/15192/14927137-MIT.pdf.

De Jonghe, O. (2010). Back to the basics in banking? A micro-analysis of banking system stability. Journal of Financial Intermediation, 19(3), pp.387–417. doi:https://doi.org/10.1016/j.jfi.2009.04.001.

Grassi, L. and Lanfranchi, D. (2022). Do we still need financial intermediation? The case of decentralized finance – DeFi. [online] Available at: https://www.emerald.com/insight/content/doi/10.1108/QRAM-03-2021-0051/full/pdf?title=do-we-still-need-financial-intermediation-the-case-of-decentralized-finance-defi [Accessed 17 Jul. 2023].

Kabir, M.R., Islam, Md.A., Marniati and Herawati (2021). Application of Blockchain for Supply Chain Financing: Explaining the Drivers Using SEM. Journal of Open Innovation: Technology, Market, and Complexity, 7(3), p.167. doi:https://doi.org/10.3390/joitmc7030167.

Katona, T. (2021). Decentralized Finance : The Possibilities of a Blockchain 'Money Lego' System. Financial and Economic Review, 20(1), pp.74–102. doi:https://doi.org/10.33893/fer.20.1.74102.

Lee, Y., Kozar, K.A. and Larsen, K.R.T. (2003). The Technology Acceptance Model: Past, Present, and Future.Communications of the Association for Information Systems, 12(50). doi:https://doi.org/10.17705/1cais.01250. Liu, B., Szalachowski, P. and Zhou, J. (2021). A First Look into DeFi Oracles. 2021 IEEE InternationalConference on Decentralized Applications and Infrastructures (DAPPS). doi:https://doi.org/10.1109/dapps52256.2021.00010.

Long and short-term impacts of regulation in the cryptocurrency market. (2021). The Quarterly Review of Economics and Finance, [online] 81, pp.157–173. doi:https://doi.org/10.1016/j.qref.2021.05.005.

Makarov, I. and Schoar, A. (2022). Cryptocurrencies and Decentralized Finance (DeFi). [online] National Bureau of Economic Research. Available at: https://www.nber.org/papers/w30006.

McMahon, C. (2022). The decentralising effects of De-Fi Technologies after consideration of economies of scale, example population Ireland. [online] esource.dbs.ie. Available at: https://esource.dbs.ie/handle/10788/4331 [Accessed 19 July. 2023].

Momtaz, P.P. (2022). How Efficient is Decentralized Finance (DeFi)? [online] papers.ssrn.com. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4063670.

OECD (2022). Why decentralised finance (defi) matters and the policy implications. [online] Available at: https://www.oecd.org/daf/fin/financial-markets/Why-Decentralised-Finance-DeFi-Matters-and-the-Policy-Implications.pdf.

Ozili, P.K. (2022). Decentralized finance research and developments around the world. Journal of Banking and Financial Technology. doi:https://doi.org/10.1007/s42786-022-00044-x.

Puthal, D., Malik, N., Mohanty, S.P., Kougianos, E. and Yang, C. (2018). The Blockchain as a Decentralized Security Framework [Future Directions]. IEEE Consumer Electronics Magazine, [online] 7(2), pp.18–21. doi:https://doi.org/10.1109/mce.2017.2776459.

Qin, K., Zhou, L., Afonin, Y., Lazzaretti, L. and Gervais, A. (2021). CeFi vs. DeFi -- Comparing Centralized to Decentralized Finance. arXiv:2106.08157 [cs, q-fin]. [online] Available at: https://arxiv.org/abs/2106.08157.

Salami, I. (2021). Challenges and Approaches to Regulating Decentralized Finance. AJIL Unbound, 115, pp.425–429. doi:https://doi.org/10.1017/aju.2021.66.

Schueffel, P. (2021). DeFi: Decentralized Finance - An Introduction and Overview. Journal of Innovation Management, [online] 9(3), pp.I–XI. doi:https://doi.org/10.24840/2183-0606_009.003_0001.

Sriman, B. and Kumar, S.G. (2022). Decentralized finance (DeFi): The Future of Finance and Defi Application for Ethereum blockchain based Finance Market. [online] IEEE Xplore. doi:https://doi.org/10.1109/ACCAI53970.2022.9752657.

Taherdoost, H. (2018). A review of technology acceptance and adoption models and theories. Procedia Manufacturing, 22, pp.960–967. doi:https://doi.org/10.1016/j.promfg.2018.03.137.

Wallace, L.G. and Sheetz, S.D. (2014). The adoption of software measures: A technology acceptance model (TAM) perspective. Information & Management, [online] 51(2), pp.249–259. doi:https://doi.org/10.1016/j.im.2013.12.003.

Walsh, C. (2018). An Insight into the Key Motivational Influences Responsible for the Adoption of Cryptocurrency Among Irish Male Millennials. [online] norma.ncirl.ie. Available at: https://norma.ncirl.ie/3343/ [Accessed 19 July. 2023].

Werner, S.M., Perez, D., Gudgeon, L., Ariah Klages-Mundt, Harz, D. and Knottenbelt, W.J. (2022). SoK: Decentralized Finance (DeFi). doi:https://doi.org/10.1145/3558535.3559780.

Yousaf, I., Nekhili, R. and Gubareva, M. (2022). Linkages between DeFi assets and conventional currencies: Evidence from the COVID-19 pandemic. International Review of Financial Analysis, 81, p.102082. doi:https://doi.org/10.1016/j.irfa.2022.102082.

Zetzsche, D.A., Arner, D.W. and Buckley, R.P. (2020). Decentralized Finance (DeFi). [online] papers.ssrn.com. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3539194.

Beloglazov, A. and Buyya, R. (2015). Openstack neat: a framework for dynamic and energy-efficient consolidation of virtual machines in openstack clouds, Concurrency and Computation: Practice and Experience 27(5): 1310–1333.

Feng, G. and Buyya, R. (2016). Maximum revenue-oriented resource allocation in cloud, IJGUC 7(1): 12–21.

Gomes, D. G., Calheiros, R. N. and Tolosana-Calasanz, R. (2015). Introduction to the special issue on cloud computing: Recent developments and challenging issues, Computers & Electrical Engineering 42: 31–32.

Kune, R., Konugurthi, P., Agarwal, A., Rao, C. R. and Buyya, R. (2016). The anatomy of big data computing, Softw., Pract. Exper. 46(1): 79–105.