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## Article

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Journal of Risk and Financial Management

## Provided in Cooperation with:

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*Suggested Citation:* Król, Karol; Zdonek, Dariusz (2023) : Digital assets in the eyes of Generation Z: Perceptions, outlooks, concerns, Journal of Risk and Financial Management, ISSN 1911-8074, MDPI, Basel, Vol. 16, Iss. 1, pp. 1-14,  
<https://doi.org/10.3390/jrfm16010022>

This Version is available at:

<https://hdl.handle.net/10419/275118>

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Article

# Digital Assets in the Eyes of Generation Z: Perceptions, Outlooks, Concerns

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**Abstract:** The recent decade saw an explosion of digital assets and digitalisation of financial services. The present contribution poses several research questions incorporated into a survey questionnaire and grouped into two categories: (1) associations with, knowledge of, and familiarity with notions relevant to digital assets and (2) perceptions of digital assets and attitude towards investing in them. Invitations to participate were sent to a group of 570 random representatives of Generation Z with 387 correctly completed questionnaires employed in the study. The research demonstrated that it was not insufficient funds that posed the greatest barrier to the growth in digital assets investments. The respondents justified their concerns about digital assets with poor knowledge of cryptocurrencies and non-fungible tokens (NFTs). The scepticism is fuelled mostly by the nontangible nature of digital assets (approx. 23%). The respondents most commonly (123, approx. 47%) associated NFTs with digital works of art, virtual objects, and NFT graphics. Blockchain most often brought to the minds of the respondents databases, algorithms, data recording, transaction data transfer, data cloud transactions, cryptocurrencies, cryptography, and decentralised financial systems. The research seems to suggest a certain difficulty with representing (characterising) the digital ecosystem and virtual reality. The media narrative emphasises the intangible nature of the digital ecosystem, often depicting it as impalpable and unreal, which does not help with how prospective investors view it. Some recommendations emerge from the research that should be considered when drawing a strategy for presenting digital assets, cryptocurrencies, and NFT markets.

**Keywords:** non-fungible token; Generation Z; cryptocurrencies; digital assets; media narrative



**Citation:** Król, Karol, and Dariusz Zdonek. 2023. Digital Assets in the Eyes of Generation Z: Perceptions, Outlooks, Concerns. *Journal of Risk and Financial Management* 16: 22. <https://doi.org/10.3390/jrfm16010022>

Academic Editor: Sisira Colombage

Received: 24 November 2022

Revised: 23 December 2022

Accepted: 26 December 2022

Published: 29 December 2022



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## 1. Introduction

The expert literature usually presents the principles of the digital asset, cryptocurrency, and non-fungible token (NFT) markets and associated technologies from the point of view of potential opportunities and benefits (Ante 2022; Aliu et al. 2022). Authors most often enumerate advantages and applications of digital assets, although some voice concerns, criticism, drawbacks, and risks (Bunjaku et al. 2017; Tziakouris 2018; Chalmers et al. 2022). The opinions, commentaries, research results, and insights are offered most often by data analysts, investors, economists, observers, and market researchers but also other people, usually experts, who seek new business and investment models (Corbet et al. 2020; Pinto-Gutiérrez et al. 2022). There are much fewer opinions shared by Generation Z representatives who have the opportunity to witness the dynamic growth of the digital asset market and be part of it. It is consistent with the literature reviews. Bao and Roubaud (2022) reviewed contributions on NFTs. They demonstrated that most studies were published in economics and finance journals and focused on empirical asset valuation. In their conclusions, the authors pointed out the significant research potential of tokenomics and risks and regulations for the digital asset market. From this emerges the need for analysing

how users of new technologies perceive digital assets and diagnosing the issues they have with entering the market.

The research demonstrated that young people are interested in digital assets, but many find insufficient knowledge and lacking national and international market regulations that would improve investor trust and transaction security a barrier to active participation in the cryptocurrency or NFT market. On the other hand, institutional regulations may be at variance with the fundamental principles of blockchain (Budhiraja and Jain 2022; Kamau 2022). This poses a certain research gap worth investigating. The objective of the paper is to identify the level of knowledge and opinions of Generation Z regarding digital assets, including cryptocurrencies and NFTs. The present contribution poses several research questions incorporated into a survey questionnaire and grouped into two categories: (1) associations with, knowledge of, and familiarity with notions relevant to digital assets and (2) perceptions of digital assets and attitude towards investing in them. The proposed hypothesis is that improved knowledge of notions relevant to digital assets and a positive attitude and perception of digital assets (including associations) could be crucial for the future growth of markets and in shaping the media narrative. The paper is structured as follows: Section 2 shortly defines non-fungible tokens, blockchain, cryptocurrencies, and their interrelations. Section 3 outlines the methodological framework for the research. Section 4 presents the results, including responses to questions regarding the familiarity, associations, and perception of digital assets, NFTs, cryptocurrencies, and blockchain. Section 5 discusses the results. The conclusions additionally cover practical implications.

## 2. Background

Non-fungible tokens (NFTs) are cryptographic assets on a blockchain that represent proof of ownership for digital objects (Chalmers et al. 2022). NFTs represent the ownership of unique digital objects, but they usually are not the underlying resource. Non-fungible tokens provide technical means to own and trade digital assets (Valeonti et al. 2021). Valeonti et al. (2021) combined and expanded definitions of NFT proposed by Bal and Ner (2019), Regner et al. (2019), and Leech (2022), defining the non-fungible token as ‘a cryptographically unique, indivisible, irreplaceable and verifiable token that represents a given asset, be it digital, or physical, on a blockchain’ (Valeonti et al. 2021). NFTs can be any type of digital asset. The most common ones include items in virtual worlds, collectables and works of art, and digitalised characters from sports, mass media, and games. The story of an NFT starts when ownership of a digital asset is registered on a blockchain. Next, the digital asset can be sold, and each change in ownership and cryptocurrency payment is registered on the blockchain (Dowling 2022).

NFTs revolutionise how digital assets are traded. They embody invariable rights in unique digital resources, such as digital art or collectables, presented as digital tokens tradable on various markets using blockchain technology (Wilson et al. 2022). Blockchain is a platform for digital assets in the form of cryptocurrencies and tokens. Tokens are usually created on a blockchain with smart contracts. Assets on a blockchain are represented by tokens to streamline transactions. There are two main categories of tokens: fungible tokens (FT) and non-fungible tokens (NFT) (Bouraga 2021). FT are non-unique, identical in all aspects, and divisible. NFTs, on the other hand, cannot be replaced by other tokens of the same kind and are non-divisible (Karandikar et al. 2021). Even though the NFT market emerged from cryptocurrencies, NFTs are considered a separate class of assets. The primary idea behind cryptocurrencies is to function as currencies, even if they retain some asset-like properties. NFTs, on the other hand, are designed as pure assets. The term ‘non-fungible’ in the NFT is the clue to this difference. The non-fungibility of NFTs is one of its key valued characteristics (Dowling 2022).

Blockchain is a decentralised transaction and data management technology intended to provide security, anonymity, and data integrity with no third-party organization controlling the transactions (Chalmers et al. 2022). Blockchain can be defined as ‘a distributed, immutable ledger that is maintained and verified among a network of peers’

(Bal and Ner 2019) or put simply: ‘a commonly shared database that is accessible by everyone and cannot be compromised by anyone’ (Valeonti et al. 2021). According to other definitions, a blockchain is a decentralised immutable database that can store references of all types of records (Crosby et al. 2016).

Cryptocurrency is an encrypted digital currency. The first cryptocurrency, Bitcoin, was invented by Satoshi Nakamoto in 2008 (Berentsen 2019). Since then, it has become the most famous cryptocurrency and the representative term for cryptocurrencies/digital currencies (Hassani et al. 2018). Since its introduction, the exponential growth of Bitcoin and other digital currencies has aroused interest among governments, academics, investors, traders, and portfolio managers (Kyriazis 2019).

In general, as a blockchain creates a ledger of immutable records, it can be diced up into portions that can be assigned value as currency (e.g., Bitcoin), coded to execute automated transactions (e.g., Ethereum), and tied to assets as a record of ownership (e.g., NFT) (Cornelius 2021). NFTs are widely used to represent unique and non-fungible assets. Today, NFTs can represent assets as their owner’s property with a unique identifier (Arcenegui et al. 2021). NFTs provide new ways to organise, consume, transfer, program, and store digital information that went through increasing adaptation for arts, sports, transmission, content creation, and technology-cryptographic business (Wilson et al. 2022).

### 3. Materials and Methods

#### 3.1. Sample Profile and Sampling

We invited a group of over 570 random representatives of Generation Z to participate in the study. Generation Z is those born between 1995 and 2010 who are now 18–25 years old (Cilliers 2017; Król and Zdonek 2021; Hysa et al. 2021). At the same time, it is rather difficult to determine the age range of this generation, which remains largely unresearched as one of the youngest generations in the labour market. Generation Z exhibits a strong ‘virtual bond’ and its early, regular, and intensive exposure to technology yields varied consequences. Generation Z embraces the world and innovation as well as technology innovation (Hysa et al. 2021). According to experts, Generation Z can function in the real and virtual world, being able to switch between the two relatively easily because it perceives them as complementary (Dolot 2018).

The results show that Generation Z significantly stimulates the growth of cryptocurrencies and the popularity of NFTs. Generation Z is also more financially aware, both in terms of their knowledge and areas in need of improvement (Philippas and Avdoulas 2020). Research shows that a significant portion of Generation Z has experience in investing in digital assets (Auer and Tercero-Lucas 2022). It is mostly due to the nature of the youth who seek new ways to invest and accept more risk. Investment gamification is also an important factor, turning investments into a kind of entertainment for young players (Rosdiana 2020). Still, is Generation Z, as a whole, enthusiastic about investing in digital assets? The study seeks to answer this question.

Following an in-depth analysis of the returned questionnaires, we removed incomplete responses and questionnaires from non-members of Generation Z. Further analyses involved 387 responses from respondents aged 18 to 25, which is above the minimum random sample size estimated at 386 questionnaires (for the margin of error of  $\pm 5\%$  and confidence level  $p = 0.95$ ).

It is a quantitative study. Quantitative research tackles the magnitude of phenomena, respondent behaviour, or popularity of an opinion. They are characterised based on quantifiable parameters (numbers or percentages). Quantitative research is often used to standardise data collection and result generalisation (Queirós et al. 2017).

We employed operational definitions for analytical purposes to convert abstract notions, such as perception, feelings, or associations, into quantifiable measures by adopting a scale and normalising replies. Responses to open-ended questions were ordered according to categories. Others were summarised by categories. Such research can be reproduced in other cultural contexts and with various respondent populations.

### 3.2. Questionnaire Survey and Research Method

The digital asset market grew rapidly from 2020 to 2022, mostly fuelled by increasing media and public attention. Established brands, artists, and manufacturers of consumer goods released their NFT collections. Digital assets open new opportunities for significant profits but may plunge as well (Ante 2022). Therefore, digital assets and the way they are distributed, presented, and promoted should be improved to meet the profile and expectations of markets and potential users.

Better identification of recipient, consumer, and user opinions can foster effective improvements in products and services and a higher target conversion (Cooper 2019). The same principle applies to digital assets. Improved knowledge of the perception by the technology-proficient audience may be of importance (Das et al. 2022). Hence, questions concerning the knowledge of the digital asset ecosystem structure are just as relevant as questions about the mechanisms behind these structures and questions about subjective purchasing preferences in this regard. Insight into the knowledge, skills, investor moods, associations, and opinions may provide hints on how to mould the media message, reveal weaknesses in communication, and identify growth directions for new services, markets, and products. This was the philosophy behind the survey questions aimed at improving the understanding of digital asset perception among Generation Z (Appendix A).

The most popular quantitative research method is the survey. The survey was administered with an electronic questionnaire. Participation was voluntary and anonymous; questionnaires were completed by people who accepted the invitation. The survey was taken at computer stations in the presence of the authors of the research (survey moderators).

When taking online surveys, respondents often ‘catch up on the go’ by expanding their knowledge while completing questionnaires, which may affect results. One of the crucial methodological aspects of the research was that the survey had to be administered to the respondents unaware of the investigated topic. The respondents were not allowed to use any educational aids, literature, or online sources when completing the questionnaires. We assumed this approach should improve research reliability the most. The questionnaire consisted of 13 knowledge questions: five open-ended and seven close-ended ones. The close-ended questions employed a five-point Likert scale.

## 4. Results

### 4.1. Familiarity with and Perception of Digital Assets and NFTs

The survey took place from December 2021 to October 2022 and involved young adults aged 18 to over 29. The total number of returned complete surveys was 398. The population consisted of 226 women (approx. 56.8%) and 172 men (approx. 43.2%). Eventually, we used 387 returned questionnaires filled by persons aged 18 to 25 (Table 1). It was a group homogeneous in terms of age (Generation Z).

**Table 1.** Age of respondents.

Age Bracket	18–21	22–25	26–29	>29	Total
Number respondents	261	126	5	6	398
Percentage (%)	65.58	30.40	1.26	2.76	100

When asked ‘Would you be inclined to buy digital assets (digital objects), such as digital real property, a digital bicycle, or a digital yacht?’, 125 respondents (approx. 32%) answered ‘no’. Moreover, 108 respondents (approx. 28%) were probably not inclined to such a purchase. It means that 233 respondents in total (approx. 60%) were not interested in buying digital assets. As many as 106 participants (approx. 28%) could not decide and offer an explicit response. A relatively small group of 18 respondents would be willing to buy digital assets (Table 2).



**Table 2.** Quantitative statistics for the first question: Would you be inclined to buy digital assets?

Response Type	1—NO	2—Probably NO	3—Fifty-Fifty/Hard to Say	4—Probably YES	5—YES	Total
No. of responses	125	108	106	30	18	387
Percentage (%)	32.30	27.91	27.39	7.75	4.65	100.00

Responses to the open-ended questions varied significantly. Having analysed responses to the second question: ‘Why would you be inclined (or not) to buy digital assets?’, we divided them into the following categories: (1) I would not be inclined because of—(1a) fear for data security, market risk; (1b) their intangible nature; (1c) insufficient funds; 1d) no knowledge, interest, need, or conviction; (2) I would be inclined to buy digital assets because of—expected profits. The research demonstrated that the greatest barrier for new investors was not financial. The respondents justified their scepticism towards digital assets with insufficient knowledge of digital markets, cryptocurrencies, and NFTs, but they also were uninterested in these matters and did not feel the need for possessing digital objects/assets. It was an answer given by 119 respondents (approx. 38%). Another reason for the respondents not to be inclined to buy digital assets was their intangible nature (approx. 23%). In their responses, the respondents asked how they would use digital assets, enjoy them, or interact with them. They pointed out the advantage of tangible objects over digital assets in terms of being able to ‘interact with the object in reality’. Furthermore, the respondents were concerned with data safety and availability of digital assets, pointing out the market risk of the assets losing value (approx. 9%). Those respondents who were interested in digital assets were guided mostly by investment prospects (Table 3). Their belief in the inevitable and rapid growth of the digital asset market and anticipated profits outweighed any concerns.

**Table 3.** Responses to the second question: Why would you be inclined (or not) to buy digital assets?

Response Type	I Would Not Buy Digital Assets Because of				I Would Buy Digital Assets Because of	Total
	Concern with Data Security and Market Risk	Intangible Nature	Insufficient Funds	No Knowledge, Interest, Need, or Conviction	Expected Profits	
No. of responses	28	73	8	119	84	312
Percentage (%)	8.97	23.40	2.56	38.14	26.92	100.00

The third question ‘Can you name examples of a digital work of art?’ was answered by 212 respondents (approx. 55%). Seventy-four of them were unable to recall an example of a digital work of art. Other responses varied. The respondents most often remembered the Bored Ape Yacht Club, although most of them were unfamiliar with the name of the brand and only recalled ‘bored apes’, ‘personalised portraits of people as apes’, ‘pictures of apes’. It means that these 21 respondents came across this phenomenon in the media. Other responses were more universal. Some respondents suggested ‘pictures, memes, graphics, advertisements, cartoons, films’ as digital works of art. Certain responses were much more detailed and referred to NFT projects of some YouTubers and celebrities, the World of Women project, ‘nyan cat’, Fancy Bears Metaverse, or works published on such websites as DevianArt or Reddit ITPM.

When asked ‘Would you be inclined to buy a digital work of art?’, 21 respondents answered definitely yes and 38 probably yes. It was 15% of the respondents. The others were either undecided or pessimistic. About 35% of the respondents were not interested

in buying digital artworks, and about 23% would probably not buy one. Twenty-seven percent were undecided (Table 4).

**Table 4.** Responses to the fourth question: Would you be inclined to buy a digital work of art?

Response Type	1—NO	2—Probably NO	3—Fifty-Fifty/Hard to Say	4—Probably YES	5—YES	Total
No. of responses	136	88	104	38	21	387
Percentage (%)	35.14	22.74	26.87	9.82	5.43	100.00

The fifth question ‘If you were inclined to buy a digital work of art, how much would you be able to pay for it?’ was answered by 241 people, but only 209 indicated an amount they would pay. The research shows that most respondents would be prone to spending a small amount up to PLN 100 (EUR 20–22 according to the mean exchange rate in November 2022). It was the answer from approximately 48% of the respondents. Moreover, a relatively large group of 78 people (approx. 37%) would spend as much as PLN 100–999 (EUR 20–22 to 200–220 according to the mean exchange rate in November 2022). Some respondents declared even greater amounts (Table 5). The respondents pointed out that should they understand and know the digital artwork market better, they could be more prone to buy some, even for a larger amount. Those in favour of investing in digital assets would look for ‘something cheap with a significant value increase potential’.

**Table 5.** Responses to the fifth question: how much would you be inclined to pay for a digital work of art?

Cost Bracket *	PLN 1–99	PLN 100–999	PLN 1000–9999	PLN 10,000–100,000	>PLN 100,000	Total
No. of responses	100	78	16	9	6	209
Percentage (%)	47.85	37.32	7.66	4.31	2.87	100.00

\* Mean exchange rate as on 28 October 2022 1 EUR to PLN = 4.73.

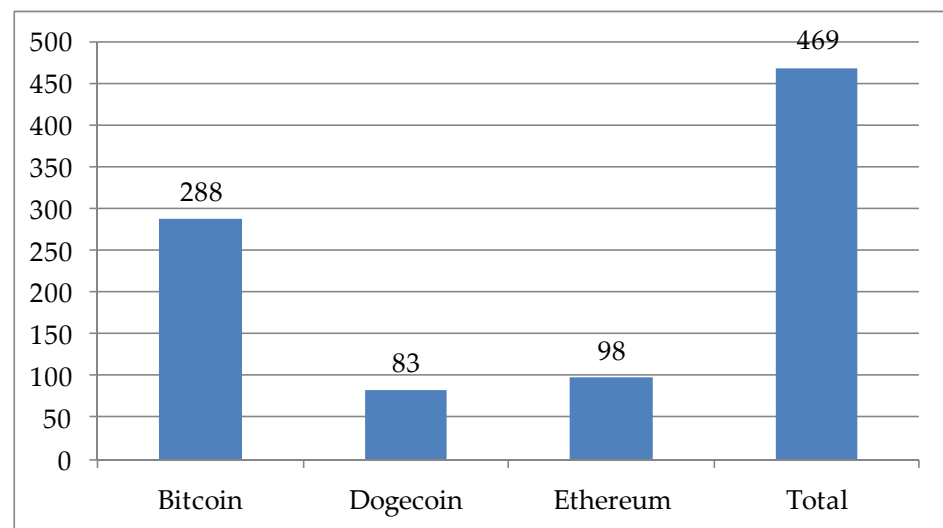
#### 4.2. Familiarity with and Perception of Cryptocurrencies

The respondents were much more willing and certain to declare familiarity with cryptocurrencies. Regarding question six, ‘Do you know what cryptocurrencies are?’, 187 of the respondents (approx. 48%) were positive about their knowledge. Those who were less certain but still familiar with the topic counted 101 (approx. 26%). Only eight respondents (approx. 2%) believed they had no idea what cryptocurrencies were (Table 6).

**Table 6.** Responses to the sixth question: Do you know what cryptocurrencies are?

Response Type	1—NO	2—Probably NO	3—Fifty-Fifty/Hard to Say	4—Probably YES	5—YES	Total
No. of responses	8	11	80	101	187	387
Percentage (%)	2.07	2.84	20.67	26.10	48.32	100

In the seventh, open-ended question, the respondents were asked whether they could name any cryptocurrencies (Figure 1). The most often given examples were Bitcoin (BTC, 61.41%), Dogecoin (DOGE, 17.70%), and Ethereum (ETH, 20.90%). Other than that, some respondents proposed Solana (SOL), DuckDuckCoin (DUCK), Litecoin (LTC), MetaHero (HERO), Polkadot (DOT), Shiba Inu (SHIB), Solana (SOL), and Terra (LUNA). It was not uncommon for respondents to know multiple cryptocurrencies.



**Figure 1.** Responses to the seventh question: Can you name any cryptocurrencies? If so, please do.

When asked in the eighth question whether they had a portfolio of cryptocurrencies, 23 respondents (approx. 6%) decided to remain silent. Of the others, 64 (approx. 16.5%) declared some portfolio. The remainder (77.5%) did not have any cryptocurrencies (Table 7).

**Table 7.** Responses to the eighth question: Do you have a cryptocurrency portfolio?

Response Type	NO	YES	No Response	Total
No. of responses	300	64	23	387
Percentage (%)	77.52	16.54	5.94	100

Many fewer respondents were able to name a digital wallet that could be used to keep cryptocurrencies (question nine: Do you know a service offering digital wallets? If so, what are they?). The most common digital services for cryptocurrency trading were Binance, Revolut, BitBay, Coinbase, 4coins, Exodus, Ledger, Trust Wallet, and Zonda.

#### 4.3. Familiarity with and Perception of NFTs and Blockchain

A total of 123 respondents (approx. 32%) knew what the NFT abbreviation means. As many as 224 respondents (approx. 58%) declared no knowledge of NFT. The others (approx. 10%) were unsure what NFT means (Table 8).

**Table 8.** Responses to the tenth question: Do you know what the NFT abbreviation means?

Response Type	1—NO	2—Probably NO	3—Fifty-Fifty/Hard to Say	4—Probably YES	5—YES	Total
No. of responses	168	56	40	51	72	387
Percentage (%)	43.41	14.47	10.34	13.18	18.60	100

Responses to the eleventh question: ‘What does NFT bring to your mind?’ came from 260 respondents and varied significantly. They clustered around several categories, but as many as 44 people (approx. 17%) failed to associate NFT with anything specific. The respondents most commonly associated NFT with digital works of art, digital assets, virtual objects, digital graphics, and digital collections. It was an association given by 123 respondents (approx. 47%). About 17% of the respondents (44 people) declared that they associated NFT with digital value, digital currency, digital property, digital market, and cryptocurrencies. Thirty-one respondents (approx. 12%) associated NFT with a digital



ecosystem, the Internet, metadata, blockchain, and new technologies. Some respondents had clearly negative associations; 18 of them (approx. 7%) connected NFT with investment risk and speculation, lack of real value, and potential scams.

A total of 249 respondents (approx. 64%) did not know what ‘blockchain’ means when asked about it in the twelfth question. Only 91 respondents (approx. 23.5%) declared they were familiar with the notion of blockchain. About 12% of the population were undecided (Table 9).

**Table 9.** Responses to the twelfth question: Do you know what ‘blockchain’ means?

Response Type	1—NO	2—Probably NO	3—Fifty-Fifty/Hard to Say	4—Probably YES	5—YES	Total
No. of responses	191	58	47	39	52	387
Percentage (%)	49.35	14.99	12.14	10.08	13.44	100

Question thirteen ‘what does blockchain bring to your mind?’ was answered by 217 respondents with about 27% of them (59 people) declaring that they did not associate ‘blockchain’ with anything specific. Blockchain was most often linked with databases, algorithms, NFT, computer performance, data recording, software, transaction data transfer, data cloud transactions, cryptocurrencies, cryptography, decentralised financial systems, and simply computer hardware. Nearly 50% of the respondents had such associations. A smaller group of nine respondents (approx. 4%) identified blockchain with privacy, anonymity, independence, transaction security, and access to data. Therefore, blockchain brings to mind mostly technology.

Some respondents (approx. 19%) interpreted the term rather literally and associated it with blocks of flats, metal chains, a ‘blocked chain’, a neck chain, a blockade, or an act of blocking some operations online. Others voiced negative associations and concerns regarding hacker or scammer activities, data unavailability, and frozen invested capital.

## 5. Discussion

### 5.1. The Growth Potential of the Digital Asset Market

Digital assets fuel new output markets, investment markets, opportunities for creation, and consumer behaviour and mechanisms, including socioeconomic and cultural ones. Furthermore, digital assets open a new market research domain, where creators of NFTs generate new needs and limited resources to satisfy them (Bao and Roubaud 2021).

NFTs can change or even dominate the value exchange between creators and consumers. NFTs are used in the creator economy and new business models, for example, where efforts of influencer marketing can be directly monetised (Bhargava 2022). They are also used as a pass to certain closed communities. What is more, an NFT can replace the traditional profile photo in social media (Casale-Brunet et al. 2022). Game developers can also use NFTs to build micropayment systems to distribute unique objects in the world of their games (Patrickson 2021; Chalmers et al. 2022). It often means that makers of play-to-earn games agree to transfer rights in selected in-game elements, more than mere individual items, to users. In some cases, it is the user community that invests in a product and joins the shareholders (Delic and Delfabbro 2022). Therefore, NFTs can be used to manifest one’s affiliation, beliefs, or social status.

Moreover, digital assets influence cultural changes and open an unlimited plane for new assets that might be of value to somebody. A review of NFT markets suggests that insufficient knowledge and skills combined with technological and legal complexity still pose a barrier for new users. Nevertheless, digital assets have the dark side of vulnerability to methods and mechanisms favourable to Ponzi schemes and economic bubbles (Chalmers et al. 2022).

### 5.2. Will NFT Become a New Way to Preserve (Digital) Artefacts?

One of the first digital artworks sold at an online auction by a famous auction house Christie's was a collage by Mike Winkelmann, also known as Beeple. Beeple is an American graphic designer and digital artist. 'Everydays: The First 5000 Days' or rather the non-fungible token (NFT) linked to it was sold for 69.3 million dollars in 2021. It made the collage the most famous and recognisable work of digital art in the world. The similarities between Winkelmann's work and 'The Million Dollar Homepage' created back in 2005 at the initiative of Alex Tew are too obvious not to mention them. Nevertheless, it was the nearly 70 million dollar sale of a digital file that commentators believe turned a new leaf in the history of art, or digital art to be more precise.

'Dlaczego jest raczej coś niż nic' (Why there is anything at all) by Paweł Kowalewski was sold at DESA Unicum. It would be an ordinary transaction was it not for the fact that the work was an NFT. DESA Unicum is the first auction house in Central and Eastern Europe to sell a virtual object, an NFT. There are, obviously, many more such transactions globally, and the number is growing, but in 2021, it was the first such official transaction at an auction house in Poland. Note that the original Kowalewski's 'Dlaczego jest raczej coś niż nic' was painted in 1986 and was destroyed in the great flood of 1997. According to DESA Unicum, the lost work has been restored and immortalised as a digital object thanks to blockchain. Will NFT become a new way to preserve (digital) works of art?

The survey and investigation into the 'restoration' of works of art and objects in the digital ecosystem pose several questions that are philosophical rather than technical in nature: Can one own electromagnetic pulses? Will NFT become a new way to preserve (digital) artefacts? Can all lost works of art be distributed as NFTs? Will blockchain and NFT 'resurrect' or restore irrevocable tangible (analogue) and intangible works of art—burnt, lost, flooded, digital and 'non-digital' artefacts? Finally, do all components of reality have their NFT counterpart? These questions remain open and will be eagerly discussed for a long time.

### 5.3. NFT beyond JPEG Files

NFT, blockchain, and cryptocurrencies are still treated as a rare phenomenon restricted to specialising computer and financial service users (Hilary 2022). It is a popular narrative in the mass media where cryptocurrencies and NFT are often discussed in the context of 'the first case of', 'the first such transaction', 'the first of its kind', and so on. This is not without a reason. The traditional notions of the market, transactions, goods, assets, or currencies increasingly often entwine and interweave, coexist, and collaborate with or complement their digital counterparts. NFT seemingly makes the 'digital ecosystem resemble the natural one more than ever'. Ever more (most, or perhaps, all?) components of the 'natural world' (intentional wording to avoid the term 'real world') will be reflected by their counterparts in the digital realm (digital ecosystem). NFTs are also more commonly used to represent ownership of tangible objects. One example of this can be an NFT as a digital certificate of real property acquisition (Home onChain) on the Ethereum blockchain. Here, an NFT takes the role of a traditional deed (Nwobodo 2022). Digital assets are easily traded. For instance, yachts in the Metaverse are luxury NFTs developed for The Sandbox, which includes also water skies, motorboats, and private islands with piers and beach clubs. The yacht is 'moored' at Fantasy Islands. The islands are part of a luxury 'development project' covering NFT islands and 100 unique 3D villas on Ethereum.

### 5.4. NFT and the Need for Touch

The media narrative includes seemingly 'regular' phrases, such as 'a real house sold as NFT' or purchase of an NFT carrying a title in a property that exists 'in the real world'. Such terms in the context of NFT may lead to certain confusion because they indirectly introduce a division into what is real, tangible, and material and what is digital, immaterial, and intangible. Such phrasing can evoke doubt and concerns in some audience members: is it not real? The research shows that a significant part of the young generation approaches

digital assets such as NFTs and cryptocurrencies with extreme caution, focusing on their intangible nature or the inability to use digital objects one owns, which puts potential investors off. The media narrative emphasises the intangible nature of the digital ecosystem, vicariously depicting it as impalpable and unreal, which does not help with how prospective investors view it.

A study shows that most people feel the need for touching and interacting with the object. The people with a high need for touch preferred to buy in brick-and-mortar stores, whereas their counterparts with low need for touch were comfortable with both online and in-store purchase experiences. The authors divided the touch into ‘real touch’ and ‘virtual touch’ (Rathee and Rajain 2019), but this narrative may be inconsistent with the present results. Because of this, the audience may, consciously or unconsciously, consider the virtual world as unreal, untrue, and thus unstable, unpredictable, unattainable, or dangerous. This way, the perception of virtual transactions can deteriorate. This narrative may lead to digital transactions, cryptocurrencies, NFT, or digital assets, in general, being perceived as unreal and less safe. Therefore, a certain issue with presenting the digital ecosystem and virtual reality exists. They should not be confronted with the ‘real reality’ (for example paying cash at a counter of a brick-and-mortar store). The barrier has already been breached for online shopping, which is no longer perceived in terms of being real or unreal. We believe this to be a challenge for the digital assets market.

Can virtual art be touched or decorate a home? Mike Winkelmann, also known as Beeple, delivers his digital works also in a material form and encloses a sample of his hair. When the package is unboxed, the collector sees a 3D graphic in a transparent body resembling a photo frame. Every purchase comes with a certificate of authenticity and a QR code with which one can interact with the digital work. Does it not illustrate the deceptive quality of digital art? People are inherently in need of experiencing matter through touch, smell, hearing, and vision (Rathee and Rajain 2019). One could venture an analogy with the book market, which now offers audiobooks, but a significant portion of readers would not think of a life with no book in their hands (Merga 2014). A work of art existing only in a virtual world remains impalpable. It cannot be without an electric circuit as opposed to a printed book or oil painting. Perhaps this is why many prospective investors are slightly sceptical about the NFT art market. Another valuable perspective on digital artworks would be available funds. Can a purchase of a digital NFT object manifest one’s social standing? Is there room for financial abuse in the digital art market? How susceptible is it to fraudulent practices? Has the anonymous and decentralised nature of blockchain and cryptocurrencies not made them powerful tools in the cyber arsenal of highly specialised criminal groups enabling them to pursue their illegal paths while remaining beyond the reach of law enforcement (Tziakouris 2018)? Then there are the practical implications. What about fiscal pressure? The questions remain open.

The research shows that NFTs have the potential to support new modes of value creation. However, this is undermined by speculation, fraud, and inadequate regulation (Chalmers et al. 2022). This finding is consistent with our study. Some respondents perceived NFTs in the context of dangers posed by dishonest Internet users. Especially people less familiar with the technology may have more concerns regarding transaction safety. The problem is substantial because frauds in the digital world are often sophisticated and refined, and it can be hard or even impossible to recover lost money/means and identify the perpetrators and bring them to justice (Tziakouris 2018).

## 6. Conclusions

The study demonstrated a relatively significant untapped potential of digital assets, including NFTs and cryptocurrencies, affecting Generation Z. Many young people remain unconvinced, unsure, and uneducated in this regard, which offers significant opportunities for targeted education. However, it will not be an easy task to educate them about digital assets because the ability to use digital devices is by no means tantamount to any knowledge of the intricacies of decentralised finances. Knowing how to make contactless payments

does not mean knowing how cryptocurrencies work. These services come with infrastructure, including hardware and software, institutions, and processes that use special, expert vocabulary and industry-specific terms, which makes them even more inaccessible. We believe the key to the popularisation of digital assets to be simplicity and transparency that follow usability and a multitude of everyday uses.

### 6.1. Practical Implications

Some recommendations emerge from the research that should be considered when drafting a narrative strategy for digital assets, cryptocurrencies, and NFT markets. If these growing technologies aspire to become an integral part of our reality, also in the existential and practical dimensions, they should not be confronted with components (objects) of the natural ecosystem as the one that is ‘real, authentic, and palpable’, which makes it useful and usable in addition to being perceptible through touch, vision, smell, and hearing. Such a narrative makes the digital ecosystem ‘unreal, remote, inauthentic, and impalpable’ for many members of the audience. This can lead to negative feelings and concerns, such as ‘I could purchase an NFT, but I won’t be able to touch it or tuck it away in my drawer and use it, so maybe it’s not for me’. One way to promote digital assets faster could be through a greater number of everyday-use objects and services distributed as NFTs. Still, such objects and services must have everyday and universal uses. This way, knowledge, awareness, and trust in such transactions could grow.

### 6.2. Limitations and Further Research

Digital assets are usually presented with their advantages and potential profits emphasised. Expert publications on digital assets often refer to tremendous transaction values. The digital asset market is depicted as a place of (for) lucrative investments. The virtual art market attracts the greatest museums, auction houses, artists, galleries, and also individuals. Nevertheless, the digital asset market is changing rapidly, but not all market changes and trends are encouraging. Moreover, residents of different countries exhibit varied approaches to investing in digital assets. It is, therefore, necessary to constantly monitor market mechanisms and conduct further research.

The research shows that members of Generation Z display varied IT competencies, including computer, hardware, and software skills. Future research could investigate the relationships between personality, educational background (engineering/non-engineering, IT/humanities, etc.) and the perception of digital assets and the tendency to invest in digital assets. The research yielded a question of whether people with engineering or IT background are more or less inclined to invest in digital assets. Any correlations between the tendency to take risk and invest in digital assets could be investigated as well.

**Author Contributions:** Conceptualization, K.K.; methodology, K.K.; software, K.K.; validation, K.K.; formal analysis, K.K.; investigation, K.K.; resources, K.K.; data curation, K.K.; writing—original draft preparation, K.K.; writing—review and editing, K.K.; visualization, K.K.; supervision, K.K. and D.Z.; project administration, K.K.; funding acquisition, K.K. and D.Z. All authors have read and agreed to the published version of the manuscript.

**Funding:** Funded with a subsidy of the Ministry of Science and Higher Education for the Silesian University of Technology in Gliwice for 2023.

**Institutional Review Board Statement:** The study was conducted according to the guidelines of the Declaration of Helsinki, but has not been submitted to an Institutional Review Board.

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** All trademarks and registered trademarks mentioned herein are the property of their respective owners. The company and product names used in this document are for identification purposes only.

**Acknowledgments:** The author wishes to express his gratitude to the reviewers for their constructive criticism, which contributed to the final content of the paper. The paper was written at the Digital Cul-

tural Heritage Laboratory (<https://culturalheritage.urk.edu.pl> accessed on 22 November 2022) part of the Department of Land Management and Landscape Architecture at the Faculty of Environmental Engineering and Land Surveying of the University of Agriculture in Krakow, Poland.

**Conflicts of Interest:** The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

## Appendix A

Survey: Awareness of new technologies among Generation Z.

Please complete the survey. The questionnaire is anonymous. The results will be used for scientific purposes only. It should take about three minutes to fill in the questionnaire. Thank you for your time and input.

b1. Sex: Female, male, other: ...

b2. Age: <18; 18–21; 22–25; 26–29; >29

q1.\* Would you be inclined to buy digital assets (digital objects), such as digital real property, a digital bicycle, or a digital yacht?

q2.\*\* Why would you be inclined (or disinclined) to buy digital assets ( ... ) ?

q3.\*\* Can you name examples of a digital work of art? If so, please do.

q4.\* Would you be inclined to buy a digital work of art?

q5.^ If YES, how much would you be willing to pay?

q6.\* Do you know what cryptocurrencies are?

q7.\*\* Can you name any cryptocurrencies? If YES, please do.

p8. Do you have a cryptocurrency portfolio?

q9.\*\* Do you know a service offering digital wallets? If yes, what are they?

q10.\* Do you know what the NFT abbreviation means?

q11.\*\* What does NFT bring to your mind?

q12.\* Do you know what ‘blockchain’ means?

q13.\*\* What does blockchain bring to your mind?

\* Likert-scale questions: 1—NO; 2—Probably NO; 3—Fifty-fifty / Hard to say; 4—Probably YES; 5—YES. \*\* Open-ended questions. ^ Scale question: PLN 1–99; PLN 100–999; PLN 1000–9999; PLN 10,000–100,000; >PLN 100,000.

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