Journal of
Theoretical and Applied Electronic Commerce Research

MDPI

Article

The Effects of Cryptocurrency Trading Websites on Airlines' Advertisement Campaigns

Damianos P. Sakas [1], Nikolaos T. Giannakopoulos [1,*], Dimitrios P. Reklitis [1,*] and Thomas K. Dasaklis [2]

[1] Department of Agribusiness and Supply Chain Management, School of Applied Economics and Social Sciences, Agricultural University of Athens, 118 55 Athina, Greece; d.sakas@aua.gr
[2] School of Social Sciences, Hellenic Open University, Bystreet Aristotelous 18, 263 35 Patras, Greece; dasaklis@eap.gr
* Correspondence: n.giannakopoulos@aua.gr (N.T.G.); drekleitis@aua.gr (D.P.R.); Tel.: +30-694-001-3673 (N.T.G.); +30-698-801-9428 (D.P.R.)

Abstract: In future years, airline companies will be leaning more and more towards cryptocurrencies to implement their digital marketing strategies as leaders seek to gain an understanding of the factors affecting airlines' visibility parameters. Cryptocurrency investment websites are currently experiencing rising demand, making them an appropriate site for paid advertisements. The above factors suggest the need for airlines to harvest cryptocurrency investment and platform users in their favour. To this end, it can be beneficial for airlines' web promotions to link certain web analytics metrics to cryptocurrency trading site metrics. For research purposes, web analytics data were monitored and gathered for 2 consecutive years from 10 globally leading cryptocurrency trading companies and 10 airline websites. A three-stage model was adopted by the authors. In the first stage, statistical analysis was implemented using cryptocurrency and airline metrics, followed by fuzzy cognitive mapping and agent-based modelling stages. The findings of the study indicate that engagement with cryptocurrency trading websites has a positive impact on airline websites' global ranking and visibility parameters. The outcomes of this research provide noteworthy digital marketing strategies which can be addressed by airline companies to increase their website visitors and optimise visibility parameters with the assistance of cryptocurrency trading websites.

Keywords: blockchain; cryptocurrency; big data; web analytics; e-commerce; airlines; digital marketing; strategy; fuzzy cognitive mapping; agent-based modelling

Citation: Sakas, D.P.; Giannakopoulos, N.T.; Reklitis, D.P.; Dasaklis, T.K. The Effects of Cryptocurrency Trading Websites on Airlines' Advertisement Campaigns. *J. Theor. Appl. Electron. Commer. Res.* **2021**, *16*, 3099–3119. https://doi.org/10.3390/jtaer16070169

Academic Editor: Jani Merikivi

Received: 25 September 2021
Accepted: 1 November 2021
Published: 12 November 2021

1. Introduction

Many corporations are turning to the internet nowadays, both as a valuable tool for providing information for advertising and marketing, and as a commercial channel to generate more revenue. They have created websites to assist their operations, but a large number are unaware of how competitive their websites are [1]. Airline developers, marketers, and strategists, as well as the aviation sector in general, can employ a variety of tactics to improve their websites' customer engagement [2], brand name [3], and profitability [3,4]. Furthermore, the numerous methods of online payment that websites provide along with their goods or services create value for such businesses [5].

Cryptocurrencies are comparatively recent payment methods that provide companies' websites with a competitive advantage [6]. Blockchain 2.0 is a system that is based on contracts within the current economic market, and banking transactions that use more complex than basic cash transactions. Cryptocurrency acceptance is highly reliant on favourable relative benefits, compared with traditional payment systems, such as use compatibility and simplicity, while negative attributes that keep it from being accepted include complexity in comprehending the technology underlying it. This study considered big data and web analytics in order to dissect all of the characteristics that play a critical role in the performance of a website, such as user engagement. Big data is described as

a large volume of information with high volume, diversity, and speed that exceeds the capabilities of current technologies for proper handling [7].

Web analytics involves the accumulation and evaluation of large amounts of data in order to successfully detect and improve on-site and off-site web usage [8]. Unprocessed utilisation data, such as web server admission log files and click-stream reports, may provide excessive information for most applications. Metrics are used by online analytics tools to simplify web traffic statistics into basic figures that are simple to cope with. Therefore, a web analytics key performance indicator (KPI) [9] is a useful statistic for determining whether a website's targets are reached. In web analytics, several metrics and KPIs are utilised to aggregate online usage data via comprehensible and efficient methods. Different studies have been conducted to examine the implications of web analytics and big data in the aviation, logistics, and cryptocurrency domains [4,10,11].

Due to the utilisation of big data from websites, many businesses have been able to manage their marketing programs more efficiently. This is due to a considerable quantity of information that people submit to websites once they visit them. The adoption of cryptocurrency as a payment mechanism may have an effect on the business's user engagement and loyalty [12]. For example, when a website receives a significant volume of organic visitors, its worldwide rank rises in terms of search engine optimisation (SEO) and search engine marketing (SEM). Marketers may utilise this information to enhance the value of the firm's brand name and user engagement [2,3].

In this study, the authors primarily focused on the effect of cryptocurrency trading websites' visibility on the airline sector's visibility and advertising. The correlation between cryptocurrency trading websites and airline websites is elucidated. This was considered from a consumer standpoint and addressed both the theory and existing literature on these topics. Previous research has highlighted the correlation between gambling and investments [13,14]. In this study, the authors took into consideration airline advertisements that connect investing behaviour with cryptocurrency trading websites. For instance, it could be useful for cryptocurrency trading websites to create and introduce advertisements on their websites related to casino destinations such as Monaco or Las Vegas. Previous studies [13,14] have highlighted the correlation between investing and gambling; in this research, we innovatively suggest that airlines use more advertisements related to gambling and investment destinations on cryptocurrency trading websites, in line with users' consumption habits.

More specifically, airlines' advertisements and web visibility can be affected by visitor behaviour of cryptocurrency trading websites, which is illustrated by studying websites' analytics data. Visitors and possible users of cryptocurrency investment platforms seek to gain financial and other types of benefits from investing in cryptocurrencies, thus spending a considerable amount of time on these websites. There is a significant possibility of airline firms exploiting the status of cryptocurrency trading websites in order to place paid advertisements. In order for such a decision to be finalised, an extensive analysis of cryptocurrency trading site analytics in terms of visitor behaviour should occur, in accordance with airline websites' analytics. Accordingly, the paper is organised as follows: Section 2 concerns the sample selection and model exploration methods that were used in this research; Section 3 shows the results of the regression, correlation analysis, and prediction model development, based on the sample and the exploratory model, followed by Section 4, in which the results are discussed; the paper's main conclusions and possible research implications are presented in Section 5.

1.1. Digital Marketing in Airline Firms

1.1.1. Digital Promotion of Airlines' Websites

Maintaining corporate websites has numerous advantages for airlines. For example, a corporate website saves the firm's expenses when there are no suppliers operating between the company and the client [15]. Digital platforms had a market capitalisation of USD 2.6 trillion in 2020 [16]. The need for airlines to engage in digital marketing techniques and

digital ads in order to gain new consumers and retain existing ones is critical. With the help of digital marketing, a company's ongoing connection with its clients is established. Digital marketing promotes products and services using mobile apps and corporate websites in order to gain more visibility [17]. This will result in an enhanced digital brand name and visibility for the airline company.

Marketers utilise digital technology to develop a range of direct and online advertising in order to capture the attention of consumers and increase customer loyalty [18,19]. For example, web analytics in digital marketing allows one to tailor the client experience [20]. Consumers started to incorporate digital marketing during the booking process (by smartphone or computer), luggage and boarding procedure, and even entry to hotels and auto renting. Airline businesses collect and analyse data from third-party firms, social networks, departure and arrival times, and other sources in order to develop new personalised services for their customers [21]. Airline companies should move towards investing in novel areas, which could provide considerable opportunities for digital promotion and marketing, such as cryptocurrency and cryptocurrency trading websites.

As it is simpler to build brand awareness and viral marketing on social media, social media advertising is one of the most important and powerful means of attracting new customers [22]. Furthermore, by implementing social media advertisements, airline businesses may generate brand awareness in a way that benefits them while also minimising misconceptions that harm a company's brand name [23]. Regardless of the fact that airline firms have had a rising number of supporters, engagement and visibility have remained rather low [24]. This may have been avoided if advertising were "driven by ad content," which implies that consumers pay close attention to the ad content, particularly if the ad can address a specific issue or fulfil a particular consumer demand [25].

In a similar manner, advertising on uprising websites and networks can be extremely beneficial. Digital marketing could implement advertising strategies. As profit margins are very low, especially during the COVID-19 pandemic, digital marketing advertisements are frequently employed in the airline sector, which is one of the most competitive industries [26]. The quality of the services offered on the airline businesses' websites, along with their alignment with the intended consumers, impact website traffic, user engagement, and visibility [2,25]. Multiple findings demonstrate the need of creating successful advertising with the help of neuromarketing, which has a good influence on user engagement and visibility [27,28].

1.1.2. Web Analytics Importance in Airlines' E-Commerce

The aviation sector is vast and continually developing across the world. According to the International Air Transport Association [29], the airline sector will increase at a rate of 3.9% each year until 2039. The continuously increasing industry contributes significantly to the global economy's expansion. As a result, airline companies are in a highly competitive industry. Digital commerce managers may thus use big data analysis techniques to open up new avenues for analysing behaviour and tactics that are not apparent to the company [30]. Digital marketing, big data, and web analytics all play critical roles in the growth and stability of businesses' digital brand names and profitability in the airline and logistic industries [3,4,31].

Hence, the need arises to display and evaluate big data that contributes to the competitive advantage of airline firms in e-commerce. Big data may be characterised using the 3Vs concept, which stands for volume, velocity, and variety [7,32]. The capacity to store vast amounts of data separates big data from other conventional methods in the airline industry [33]. Airlines are concerned about how to create an ideal e-commerce website by thoroughly analysing a website's function in technology, service, and marketing structures [19]. They are gradually turning to web-based marketing methods to increase their competitive advantage in the e-commerce sector.

In terms of volume, the growth of data created by airline businesses has always been rapid, from a byte to a massive quantity produced per minute with the inclusion of diverse

and numerous data sources including booking, advertisement, fuel, flight route, etc. [34]. In terms of velocity, a large volume of airline data is generated, and it is important that it be reviewed, evaluated, and processed rapidly, with a linkage to previous data used to predict the outcome based on the airline businesses' capabilities [4,35]. As regards variety, the produced airline data are not homogeneous in terms of the types of data.

There are certain structured types of data, such as flight route and fuel usage [36]; however, there are also several unstructured forms, such as user engagement [37]. In the aviation sector, for example, organisations should examine all key web analytics, as well as operational expenses such as fuel usage, in order to decrease costs and maximise profit [38]. Airline businesses, on the other hand, should locate, collect, and evaluate any web metrics that may impact their websites' user engagement and [39]. This research focused on data related to airlines' website visibility, via cryptocurrency trading site analytics.

1.2. Contiguous Background in Cryptocurrency Trading Site Metrics and Blockchains

1.2.1. Background of Cryptocurrency as an Alternate Payment Method

Cryptocurrency is virtual money, secured by cryptography and could be described as a digital piece of information with value, provided that no one has access to the codes that yield this value [39,40]. Cryptocurrencies differ largely in terms of value and speed of transaction [39]; moreover, each cryptocurrency has a unique market capitalisation [40]. Cryptocurrencies are built on blockchain technology, and one of their major features is transaction security, which is a significant benefit when compared with conventional payment systems [41]. The blockchain offers a number of important features, such as auditability and decentralisation [42].

In the aviation sector, multiple payment mechanisms are commonly utilised. Card payments were among the first payment methods launched in 1920, when oil companies began offering them to their customers [43]. Another payment option that is utilised is mobile transaction, which is favoured by customers since they do not require a computer to complete the purchase and are sometimes invoiced through telecommunication operators [44]. Furthermore, e-wallets such as Apple Pay, which enable customers to share data and conduct purchases, are the most recent types of payment. The above payment methods have had exponential development in companies since their inception, thanks to the introduction of mobile trading software and their creative marketing strategy [45].

Blockchain technology enables payments to be performed without the involvement of a third party, such as a financial institution or PayPal, and it has the potential to be utilised in a wide range of financial services [46]. Furthermore, blockchain will play an important role in the future in a variety of fields, such as energy [47], agri-food traceability [48], the healthcare sector [49], as well as in government and security services [50,51]. Despite the fact that blockchain is seen as the upcoming game changer, there are several possible difficulties [42]. Initially, miners were proven to earn more than their due proportion through greedy mining, and then every block is generated every 10 min, which hampers scalability. Eventually, with the introduction of cryptocurrencies in recent times, numerous studies have highlighted certain characteristics that may be used to build confidence in cryptocurrencies [52].

1.2.2. KPIs for Airlines' Advertisement and Cryptocurrency Trading Websites

Blockchain technology allows cryptocurrencies to operate. Nevertheless, the scope of blockchain is far broader than those of cryptocurrencies. It has several potential appealing uses [53] and may be utilised in a wide range of industries (e.g., trade and commerce, healthcare, aviation, etc.). Individual investors are drawn by the high projected gain from cryptocurrency, but also by pertinent knowledge and hazards revealed by cryptocurrency market authorities and distributors. Thus, it is the responsibility of cryptocurrency market authorities and distributors to implement marketing strategies to boost individual investors' approval and acceptance [54]. In this perspective, the aviation sector might be a modern-day trailblazer by strengthening its research and innovation of tomorrow's connectivity:

decentralised blockchain technology [55]. As airlines make their way towards digital distribution directly through their websites and mobile apps, they are taking advantage of the cryptocurrency market [56] and peoples' trading habits [13,14], through effectively complementing new business models [56], one of which is advertising on cryptocurrency trading websites.

The majority of website traffic is driven by search engines. Advertisements lead a substantial number of people to the website, whether they are social media or search engine advertisements. Search engine marketing (SEM) measures the success of a digital marketing campaign by analysing website visitor metrics such as bounce rate, average visit length, and average pages per visit [57]. Users of cryptocurrency trading websites are able to trade cryptocurrencies via contracts of differences (CFDs), by speculating on whether a cryptocurrency will rise or fall in value. CFDs are leveraged products, which means web visitors can trade any fracture of their value, modelling a vast variety of behavioural data through their web analytics.

Satisfying the purposes of this research, we selected, on the one hand, unique visitors, bounce rate, and global rank as proper KPIs for airlines' web advertisement campaigns performance, due to their ability to present newcomers to a website and their possibility of abandoning the website, as well as the site's overall web impact. On the other hand, for monitoring the user engagement of cryptocurrency trading websites, we measured the KPIs of returning visitors, bounce rate, average time on site, and average pages per visit, which enable observation of a website's loyal visitors/consumers, their abandoning ratio, and the amount of time visitors spend on the site, as well as the number of pages they view.

Provided that airline firms seek to advertise at cryptocurrency trading websites, they should aim at analysing web analytics that indicate strong correlation patterns. Airline firms can then link cryptocurrency trading site analytics to their own web metrics, such as global rank, returning visitors, and bounce rate, in order to acquire several insights regarding the formation of their digital advertisement campaigns. Key performance indicators are quantifiable measures of performance over time for a specific objective and must fulfil specific requirements for web analytics and digital marketing [58]; thus, we characterised, illustrated, and analysed the impact of the selected KPI rates per month. For this research, the examined KPIs are illustrated in Table 1.

Table 1. Description of the examined web metrics.

Web Analytics/KPIs	Description of the WA/KPIs
Global (web) rank/month	Measures the popularity of a website, by ranking millions of websites in popularity order; the lower the number is, the more popular is the website. Web rank compares the competitiveness of a website relative to other sites, making it a useful KPI for benchmarking and competitive analysis [59]. The lower the global rank of a website, the better it is for its visibility.
Returning visitors/month	These types of visitors are considered website users that return again and again to the same website and are tracked through IP addresses, cookie files, and usernames [60]. The performance of a website is enhanced with the increase in returning visitors' metrics.
Unique visitors/month	Unique visitors can be seen as newly entered visitors in a website, never having visited the site before, by not activating session cookies on their browsing device [61]. Companies need this metric to achieve higher rates over time.
Bounce rate/month	A bounce rate of a website shows how efficient a webpage is, with lower bounce rates meaning more content-captivated visitors, while higher rates lead to more visitors exiting the website at a smaller period of time [8]. For increased website performance, the bounce rate metric must follow a reducing rate.
Average time on site/month	This metric measures the average period of time a visitor stays on a website. It starts counting the moment a visitor land on the website and continues until they exit or stay inactive for a while [59]. Increased website performance can be discerned from the increased time that visitors spend on a website.

Table 1. *Cont.*

Web Analytics/KPIs	Description of the WA/KPIs
Average pages per visit/month	Pageviews track how many times a page on a site, or by a certain user, has been viewed in a specific time period [62]. As a sign of engagement, the number of pages visitors view on a website should be kept at high volumes.

1.3. Research Hypotheses

There is an imminent necessity for the airline industry, and many other relevant sectors, to take advantage of the rising cryptocurrency markets. People visit cryptocurrency trading websites so as to trade and invest in a plethora of existing cryptocurrencies, for various personal reasons. A behavioural pattern can be distinguished from the website analytics of these visits. Airlines, in their quest to advertise in web spaces such as cryptocurrency investment, should analyse their web analytics and search for possible connections with their websites. Since cryptocurrencies became accepted as means of payment in many platforms and markets, including some airline firms, the commercial aviation market could benefit from cryptocurrency trading websites. This can be performed by accepting, on the one hand, various cryptocurrencies for online airline ticket payments, and on the other hand, by placing paid ads on websites for trading and investing in cryptocurrencies. Thus, by monitoring users' web analytics and their behavioural characteristics, airlines could form and start effective advertisement campaigns on cryptocurrency trading websites. More specifically, the findings of this research aim to assist the following:

- Decision makers and business strategists to better comprehend the behaviour of cryptocurrency trading website users, measure their impact on airlines' website metrics, and assess the decision of placing ads;
- Web developers and marketers to implement effective advertising campaigns to cryptocurrency trading websites for maximum advertisement efficiency in electronic commerce.

Therefore, the following hypotheses are presented in order to examine the influence of web analytics from cryptocurrency trading websites on airlines' web analytics and global rank. Research hypotheses aggregate combination can be observed in Figure 1 below.

Hypothesis 1 (H1). *Airline websites' bounce rates and unique visitors are affected by the combination of cryptocurrency trading platforms' returning visitors and bounce rate metrics.*

By setting the first research hypothesis, our goal is to examine the effects causing visitors to abandon airline websites and keeping first-time visitors from becoming loyal users and visitors by leaving cryptocurrency trading websites, and whether bouncing rates of airline websites, as well as newcomer visitors, can be predicted from cryptocurrency trading websites' returning visitors and bounce rates (Hypothesis 1).

Hypothesis 2 (H2). *Airline websites' bounce rates and unique visitors are affected by the combination of Cryptocurrency trading platforms' average time on site and average pages per visit metrics.*

Next, to achieve the same objective, we sought to examine the extent to which new visits on airline websites and abandoning visitor rates can be explained by the time visitors of cryptocurrency trading websites spend on sites and the and number of pages they view (Hypothesis 2).

Hypothesis 3 (H3). *Airlines' global rank, as an important search engine metric, is affected by the combination of cryptocurrency trading platforms' returning visitors and bounce rate metrics.*

Another web metric important for airlines is the global rank. Again, we aimed to find the impact on global rank metrics of airlines caused by long-term visitors of cryptocurrency trading websites, as well as those that leave these websites too soon. In other words, we

sought to analyse the effect of cryptocurrency trading websites' returning visitors and bounce rates on airlines' global ranking (Hypothesis 3).

Hypothesis 4 (H4). *Airlines' global rank, as an important search engine metric, is affected by the combination of cryptocurrency trading platforms' average time on site and average pages per visit metrics.*

Likewise, the fourth hypothesis is based on airlines' global rank impact caused by the time users spend on cryptocurrency trading websites and the average pages they visit during that time. Therefore, we strived to understand the effects of the average time on site and pages per visit of cryptocurrency trading websites' users on airlines' global rank metric (Hypothesis 4).

Hypothesis 5 (H5). *It is beneficial for airline companies to add paid ads to the cryptocurrency trading platforms based on the outcome of the examined user engagement and global rank metrics.*

With respect to the above hypotheses, for the last one, we assembled a set of previous research questions to answer an utmost important hypothesis, i.e., whether the placement of paid advertisement on cryptocurrency trading websites regarding airline firms could be proven effective and beneficial, by examining airlines affected global rank and user engagement metrics (Hypothesis 5). The answer to this last hypothesis is estimated by the results/answers given to the previous four hypotheses.

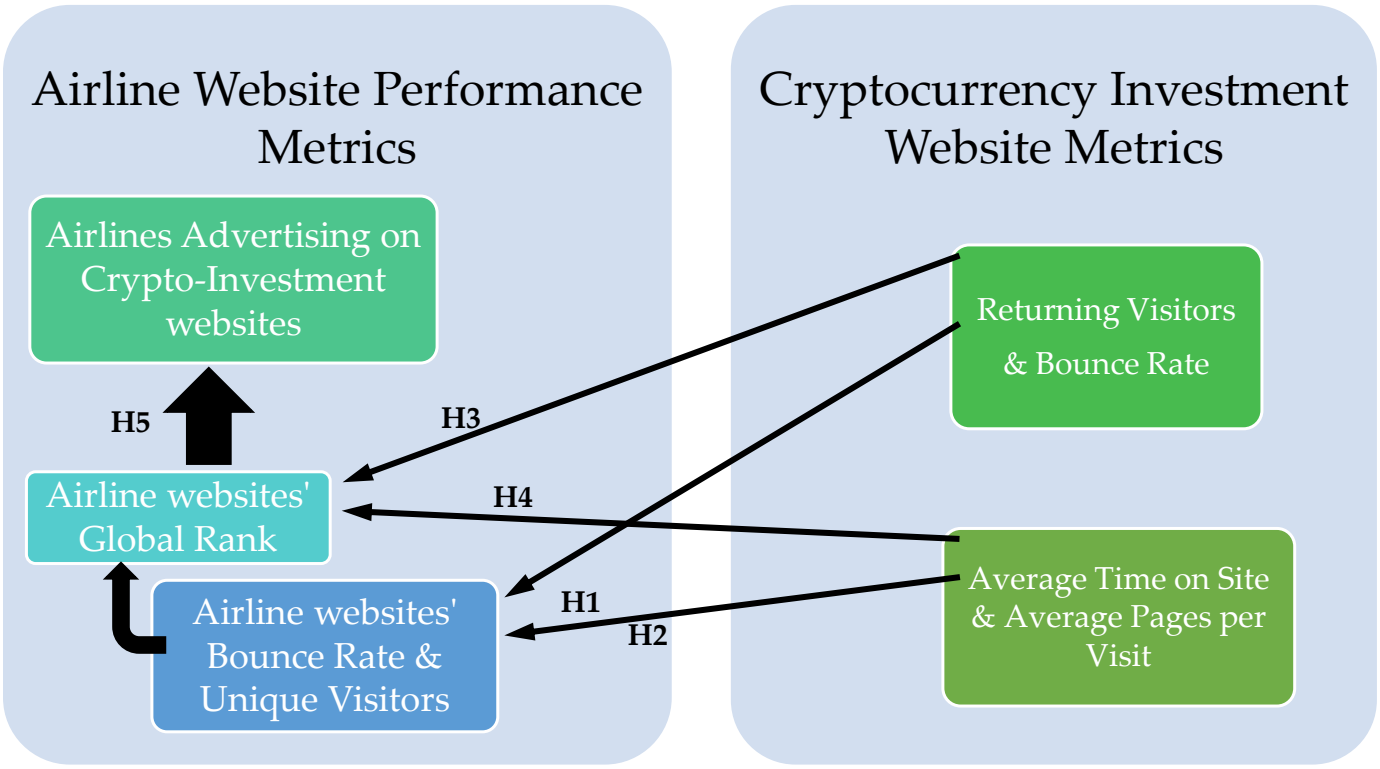

Figure 1. Conceptual framework.

2. Materials and Methods

Throughout this paper, we aimed to provide an alternative methodological approach for providing a comprehensive framework to airline firms' marketing sections, concerning the benefits of advertising on cryptocurrency trading websites. To this end, big data from cryptocurrency trading and airlines' websites were studied through web analytical tools. This enabled us to determine the possible connection among metrics of the various websites

collected. We distinguished the effects of cryptocurrency trading websites' returning visitors, bounce rate, average time on site, and pages per visit on airlines' global rank and bounce rate.

Moreover, we examined the deployment of a diagnostic and exploratory model, in order to calculate the significant cause-and-effect relationships of web metrics, by utilising fuzzy cognitive mapping [63] and linear regression modelling analysis. From this point, we advanced to the development of a simulation and prediction model, through agent-based modelling, which exploited regression analysis results to determine the impact of the above cryptocurrency trading metrics on those of the airlines. Thus, the first stage of the methodology aimed to inform airlines of their advertisement strategists about important cryptocurrency trading metrics, which affect considerably their brand name metrics. Therefore, after data collection, we examined their alignment with the paper's chosen KPIs.

The second part of the methodology focused more on metrics historical values and their statistical breakdown, where variations in the referred metrics of cryptocurrency trading sites appear to cause significant predictions for variations in airlines' global ranks and bounce rates. This can be discerned through FCM and linear regression models, with clear information for airlines' digital marketing advertisement regarding a precise decision-making process. The last stage of the methodology was to run the simulation and prediction model with metrics' intercorrelations and regressions' coefficients. The decision-making process based on data collection can highly benefit from micro-scale (ABM) and macro-scale analyses (FCM) [64]. Thus, we aimed to discover possible connections between cryptocurrency trading websites' visitors, their abandoning rate, and those rates of airlines' websites and their web rankings.

2.1. Sample Selection and Data Retrieval

In this stage of the paper, we collected web data from the most known cryptocurrency trading and exchange websites. Those websites were chosen based on their offerings and characteristics towards their users [65]. Data collected from those websites refer to analytic metrics originating from website visitors and their site behaviour, mostly known as web analytics, such as the pages they view, the time they spend on a site, etc. On the other hand, according to travellers' ratings for best airlines [66], we collected the same web metrics as before, from the most well-known airline websites, in order to compare them. To this end, we utilised specific decision support systems and various web platforms that provide these capabilities and run software on any website, enabling web analytics extraction. Therefore, our sample consisted of the following 10 cryptocurrency trading websites and 10 airline companies: Qatar Airways, Singapore Airlines, ANA All Nippon Airways, Cathay Pacific Airways, Emirates, EVA Air, Hainan Airlines, Qantas Airways, Lufthansa and Thai Airways, Binance, Coinbase, Kraken, Crypto, Gemini, Gate.io, KuCoin, Bitstamp, Bittrex, and bitFlyer.

Collection of the above data refers to daily metrics' values, thus enabling more precise examination and understanding of the used metrics. Data variation impels their daily observation and estimation, with our testing period ranging up to 180 observation days. Thus, data were observed and collected from the referred websites in a time period of up to six months. For research purposes, we recommend airlines' marketers to track their websites' global ranks' and bounce rates' fluctuations, in comparison with cryptocurrency trading websites' returning visitors, bounce rates, as well as their visitors' average time on site and pages viewed. In this way, they will be able to cut back on the volume of tracking data and gain more insights regarding advertisement strategies based on cryptocurrency trading exchange websites.

2.2. Diagnostic and Exploratory Model Development

In this section of the paper, we aimed to capitalise on available data for deploying a flexible and adaptable model. Through this, the model would make efficient use of

the positive and negative correlations of the data, so as to enhance its credibility. Model deployment began with assuring normality and linearity of data, followed by linear regression modelling. The next stage was to analyse the most significant regressions generated, where we discerned the higher impact of cryptocurrency trading websites' returning visitors, bounce rates, average time on site, and viewed pages on airlines' global rank and bounce rates. Apart from gaining additional insights into the effects of individual factors, more information can be extracted by combining models and factors in clusters.

To conform to the concept, we used the fuzzy cognitive mapping modelling, which included the total variables and factors studied. FCM models present a macro-scale analysis, relying on variables' correlations and thus providing an enhanced assessment of models. An FCM model depicts the entire system using a chart that shows the cause-and-effect relationships among concepts. Specifically, an FCM is a fuzzy-valued, ordered network with feedback that models existing concepts and their dynamic interactions [63]. Positive and negative relationships between variables appear with red and blue arrows, respectively. With that in mind, we drafted the fuzzy cognitive mapping for the depiction of cause-and-effect relationships between factors, which can be seen in Figure 2. FCM forms an essential macro-scale analysis' tool for marketers, which helps us identify in our paper the correlations among the most important factors. By presenting quantitative weights, FCM may be utilised to demonstrate the relationships between components in a straightforward and succinct manner. FCM is able to provide a macro perspective of the implemented business strategy by collecting and expressing a direct impact across the entities concerned.

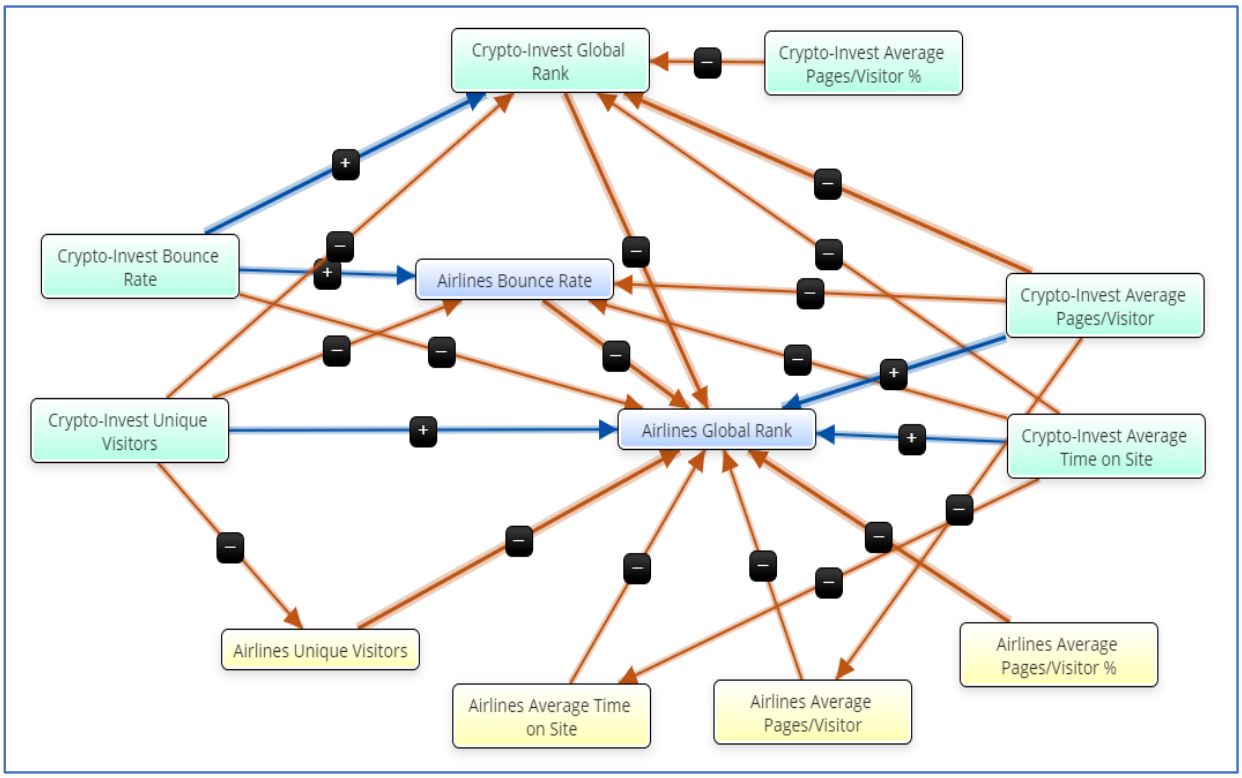

Figure 2. Fuzzy cognitive mapping depiction of macro-level approach.

Having deployed a macro-scale analysis, for a complete illustration of the situation under study, a micro-scale analysis was also needed. According to Giabbanelli [64], agent-based modelling (ABM) can produce an efficient simulation and predictive model, since it can show the dynamic relationships among selected factors. ABM analysis provides us with the capability to estimate the effect of cryptocurrency trading websites' returning visitors, bounce rates, average time on site, and pages per visit on airlines' global rank and bounce rates, during a 180-day observation period.

3. Results

In this section of the paper, we display the results that emerged from the collected data of both airline and cryptocurrency trading websites. Table 2 presents the chosen descriptive statistics such as mean, min, max, and standard deviation of metrics of interest.

Table 2. Descriptive statistics of the 10 airline companies' websites, during a six-month period.

	Mean	Min	Max	Std. Deviation
Cryptocurrency trading websites' returning visitors (% of total visitors)	0.9980	0.98	1.00	0.00181
Cryptocurrency trading websites' bounce rate	1.86	5.34	3.8305	0.579
Cryptocurrency trading websites' average pages/visit	28.10	64.00	41.0275	6.753
Cryptocurrency trading websites' average time on site	2163.00	5833.00	3428.83	650.40
Cryptocurrency trading websites' global rank	29,740.00	866,456.00	134,516.37	77,225.92
Airlines' bounce rate	0.47	3.23	2.0887	0.463
Airlines' average pages/visit	21.00	100.10	46.92	7.462
Airlines' average time on site	674.00	7324.00	3509.65	774.79
Airlines' unique visitors (% of total visitors)	0.000319	0.001948	0.0012	0.00043
Airlines' global rank	91,077.00	1,172,143.00	287,744.87	276,470.7

N = 1095 observation days for websites of 10 airlines and 10 cryptocurrency trading companies.

In Tables 3–6, we derive the impact of the linear regressions of cryptocurrency trading websites on airline' websites. More specifically, in Tables 3–6, we recognise the statistical significance of all regression models, with models' p values below 5%, as well as for all involved variables. Airlines' bounce rate has statistically significant correlations with cryptocurrency trading websites' unique visitors, bounce rates, and average time on site and pages per visit, with $p = 0.000$ and $R^2 = 0.187$, 0.232, respectively. Airlines' bounce rates' potential variation was -0.182 and 0.354 from cryptocurrency trading websites' unique visitors and bounce rates accordingly, while from average time on site and pages per visit, it varies up to 0.131 and -0.572 correspondingly. With every 1% increase in cryptocurrency trading websites' unique visitors, bounce rate, average time on site, and pages per visit, airlines' bounce rate decreases by 18.2%, increases by 35.4%, increases by 13.1%, and decreases by 57.5%.

The unique visitors variable in airline firms appears to have statistically significant correlations with all previous cryptocurrency trading websites' variables. Particularly, airlines' unique visitors' regression models have p levels of significance 0.000 in each case and $R^2 = 0.261$ and 0.320, respectively. The potential variation in cryptocurrency trading platforms' returning visitors and bounce rate is 0.108 and 0.476, while the average time on site and pages per visit is 0.195 and -0.702 correspondingly. This means that with every 1% rise in cryptocurrency trading websites' unique visitors, bounce rate, average time on site, and pages per visit, airlines' unique visitors increase by 10.8%, 47.6%, 19.5%, and decrease by 70.2% in each of the referred metrics. These results provide us with complete validation of our first and second research hypotheses.

Table 3. Impact of cryptocurrency trading websites' returning visitors and bounce rate on airline websites' bounce rate.

Variables	Standardised Coefficient	R^2	F	p Value
Constant (airlines bounce rate)	-	0.187	125.441	0.000 **
Cryptocurrency trading returning visitors	0.182	0.187	125.441	0.000 **
Cryptocurrency trading bounce rate	0.354	0.187	125.441	0.000 **

** indicate statistical significance at 95% and 99% levels, respectively.

Table 4. Impact of cryptocurrency websites' average time on site and pages per visit on airline websites' bounce rate.

Variables	Standardised Coefficient	R^2	F	*p* Value
Constant (airlines bounce rate)	-			0.000 **
Cryptocurrency trading average time on Site	0.131			0.002 **
Cryptocurrency trading average pages/visit	−0.575	0.232	164.969	0.000 **

** indicate statistical significance at 95% and 99% levels, respectively.

Table 5. Impact of cryptocurrency trading websites' returning visitors and bounce rate on airline websites' unique visitors.

Variables	Standardised Coefficient	R^2	F	*p* Value
Constant (airlines unique visitors)	-			0.000 **
Cryptocurrency trading returning visitors	0.108			0.000 **
Cryptocurrency trading bounce rate	0.476	0.261	192.743	0.000 **

** indicate statistical significance at 95% and 99% levels, respectively.

Table 6. Impact of cryptocurrency trading websites' average time on site and pages per visit on airline websites' unique visitors.

Variables	Standardised Coefficient	R^2	F	*p* Value
Constant (airlines unique visitors)	-			0.000 **
Cryptocurrency trading average time on site	0.195			0.000 **
Cryptocurrency trading average pages/visit	−0.702	0.320	257.442	0.000 **

** indicate statistical significance at 95% and 99% levels, respectively.

Next, in Tables 7 and 8, we clearly see the same pattern. Regression models are statistically significant, with models' and variables' p values below 5%. Airlines' global rank significant regressions with cryptocurrency trading websites' unique visitors, bounce rate, and average time on site and pages per visit, had all $p = 0.000$ and $R^2 = 0.211, 0.273$, respectively. The only exception was that of cryptocurrency trading websites' average pages per visit, which does not appear to significantly affect airlines' global rank, with $p = 0.666 > 0.05$. Potential variation in airlines' global rank was 0.229 and −0.351 from cryptocurrency trading websites' unique visitors and bounce rate accordingly, whilst average time on site and pages per visit caused a variation of 0.509 and 0.017 accordingly. With every 1% increase in cryptocurrency trading websites' unique visitors, bounce rate, average time on site, and pages per visit, airlines' global rank increases by 22.9%, decreases by 35.1%, increases by 50.9%, and also increases by 1.7%. As a consequence, our third and fourth research hypotheses were appropriately answered.

Table 7. Impact of cryptocurrency trading websites' unique visitors and bounce rate on airline websites' global rank.

Variables	Standardised Coefficient	R^2	F	*p* Value
Constant (airlines global rank)	-			0.000 **
Cryptocurrency returning visitors	−0.229			0.000 **
Cryptocurrency bounce rate	−0.351	0.211	145.735	0.000 **

** indicate statistical significance at 95% and 99% levels, respectively.

Table 8. Impact of cryptocurrency trading websites' average time on site and pages per visit on airline websites' global rank.

Variables	Standardised Coefficient	R^2	F	*p* Value
Constant (airlines global rank)	-			0.000 **
Cryptocurrency trading average time on site	0.509			0.000 **
Cryptocurrency trading average pages/visit	0.017	0.273	205.225	0.666

** indicate statistical significance at 95% and 99% levels, respectively.

The outcomes of data analyses supply us with useful information regarding research hypotheses' validation. From hypotheses 1 to 4, we conclude that airline websites' global rank, unique visitors, and bounce rate are highly affected (significant *p* levels) by cryptocurrency trading websites' returning visitors, bounce rate, and average time on site, with average pages per visit affecting significantly only airlines' unique visitors and bounce rate but not global rank. In particular, rising levels of cryptocurrency trading websites returning visitors, as a percentage of total visitors (excluding the unique visitors), enhance airline websites' web popularity (global rank) and unique visitors but deteriorate their bounce rate. The higher the cryptocurrency trading websites' bounce rate is, the worst the airlines' bounce rate becomes, and the better their global rank and unique visitors become.

Furthermore, the longer the average time visitors spend on cryptocurrency trading websites, the more increase is observed in airlines' bounce rate (deteriorating values), and the more improvement is seen in unique visitors and global rank (increasing web popularity). In the meantime, the more pages visitors view on average in cryptocurrency trading sites, the more decrease is observed in bounce rate of airline websites (enhanced values) and unique visitors, but global rank has no significant change. In this respect, given that cryptocurrency trading websites' bounce rates and returning to total visitors lead to enhanced levels of airline websites' global rank and unique visitors, airline firms could benefit from choosing to put ads on cryptocurrency trading sites. This finding, combined with the fewer pages visitors s view on average and the smaller amount of time they spend on cryptocurrency trading sites, shows that their audience is devoted and engaged to those websites and is object oriented. Moreover, despite the fact that a slight increase in airline websites' bounce rate can be induced by specific cryptocurrency trading site metrics, visitors return for specific purposes and not just to browse, spiking websites engagement. The above context answers the fifth and last research hypothesis set in our paper, highlighting an opportunity for airline firms to exploit cryptocurrency trading websites' vacant advertisement space.

Predictive and Simulation Model Deployment

This section sheds light on the micro-scale analysis through agent-based modelling (ABM). ABM presents the fluctuation of variables caused by the dynamic nature of their relationships, which can lead to effective predictive and simulation model development [64]. Our focus shifted to the impact of the chosen cryptocurrency trading web metrics on airlines' global rank and bounce rate in the experiment's 180 days of observation. Based on ABM's importance in decision-making processes and the fact that it consists of groups of agents and their interaction system [67], ABM's use in our micro-scale analysis provided valuable knowledge over examined dependent variables. Those agents adhered to a predefined standard, formed by the parameters chosen by the user, and communicated using well-known operators (if, and, etc.). The results of statistical and correlation analysis are required input for agent-based simulation and prediction modelling.

Agent-based modelling offers a plethora of benefits to airlines' decision-making procedures, which include full-length capitalisation of certain cryptocurrency trading websites' metrics. This can help airlines in terms of discovering potential significant variations of their web metrics stemming from cryptocurrency trading websites. Furthermore, ABM enables firms to harness micro-scale prediction and simulation modelling, in favour of their

advertisement strategy while maintaining lower costs. Apart from that, by streamlining the prediction model with proper KPIs, airline firms can increase their adaptability in real-life situations, with multiple profits for their digital advertisement campaigns.

As far as the model's adaptability and efficiency are concerned, data and outcomes of the linear regression modelling and correlation analyses need to be inserted into the ABM. In this respect, and in alignment with [67], we developed our model, as can be seen in Figure 3, using the above statistical data and one-time snapshot measurement in experiments' observation days. Agents' movement was defined by atomic statistics implemented to each agent. This enabled our target of providing beneficial knowledge concerning the effects of specific cryptocurrency trading site metrics to airlines' websites and the latter's advertisement strategies.

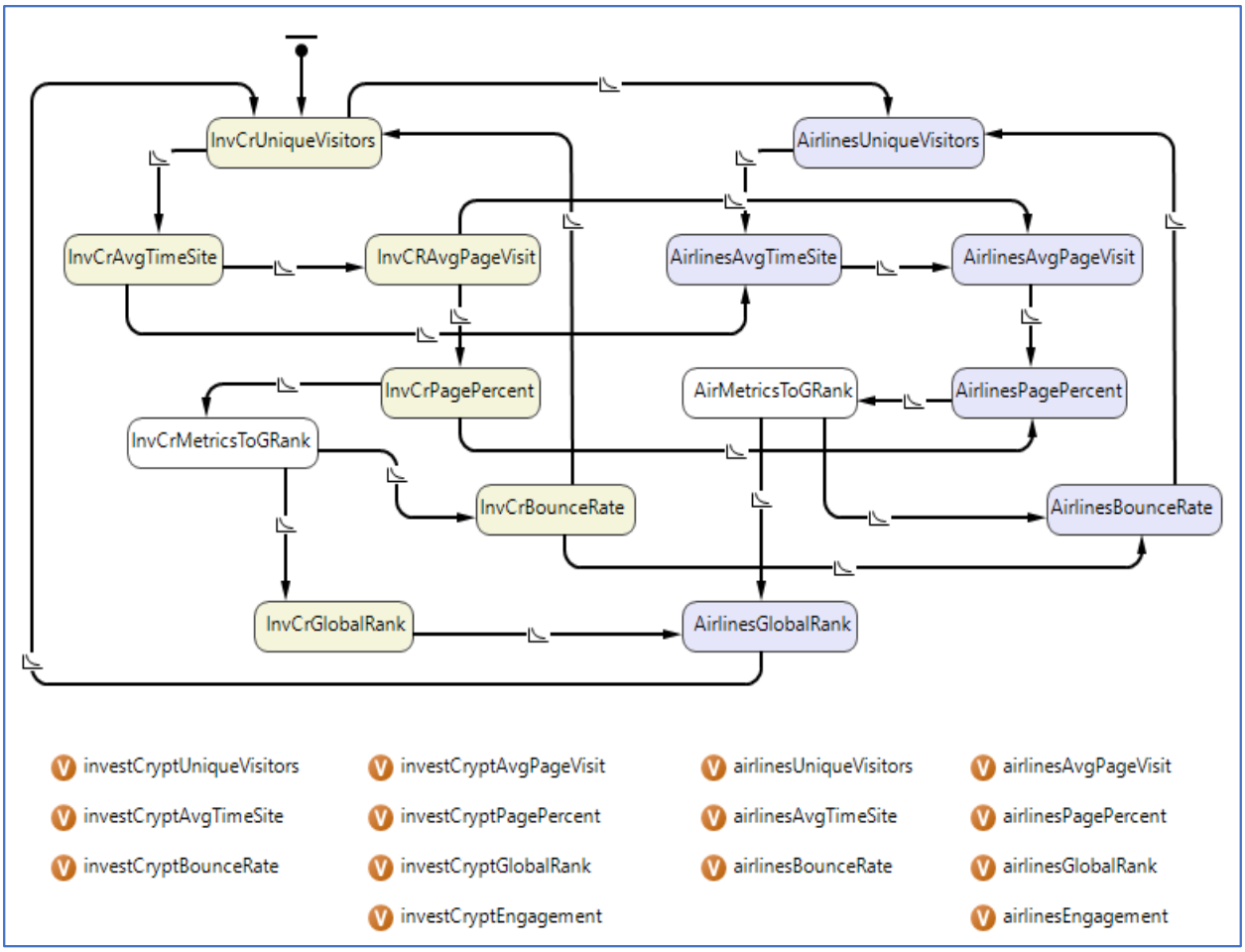

Figure 3. Agent-based model deployment for prediction of the influence of cryptocurrency trading site metrics on airline firms' websites.

As can be seen in Figure 3, our AB models began from cryptocurrency trading websites' unique visitor statechart, denoting the start of the procedure. Every time the model reaches cryptocurrency trading websites' unique visitor and airlines' unique visitor statecharts, those variables rise by one (visitor). When a new visitor enters a website, its web metrics are affected. Therefore, rising numbers of cryptocurrency trading websites' unique visitors and airlines' unique visitors impact cryptocurrency trading websites' average time on site, pages per visit, and bounce rate, as well as, airlines' average time on site, pages per visit, and bounce rate accordingly. Airlines and cryptocurrency trading sites metrics appear to have an impact on one another, thus changing their values. From that point, cryptocurrency trading site metrics end up affecting cryptocurrency trading websites' global rank, which

then impacts airlines' global rank, with the same occurring with the rest of airlines' web metrics referred. We can discern the variation in airlines' global rank and bounce rate in comparison with cryptocurrency trading sites metrics. The results of the simulation model produce an agent allocation, as seen in Figure 4, and a time graph shown in Figure 5, which illustrates the variation in the selected web metrics for our paper.

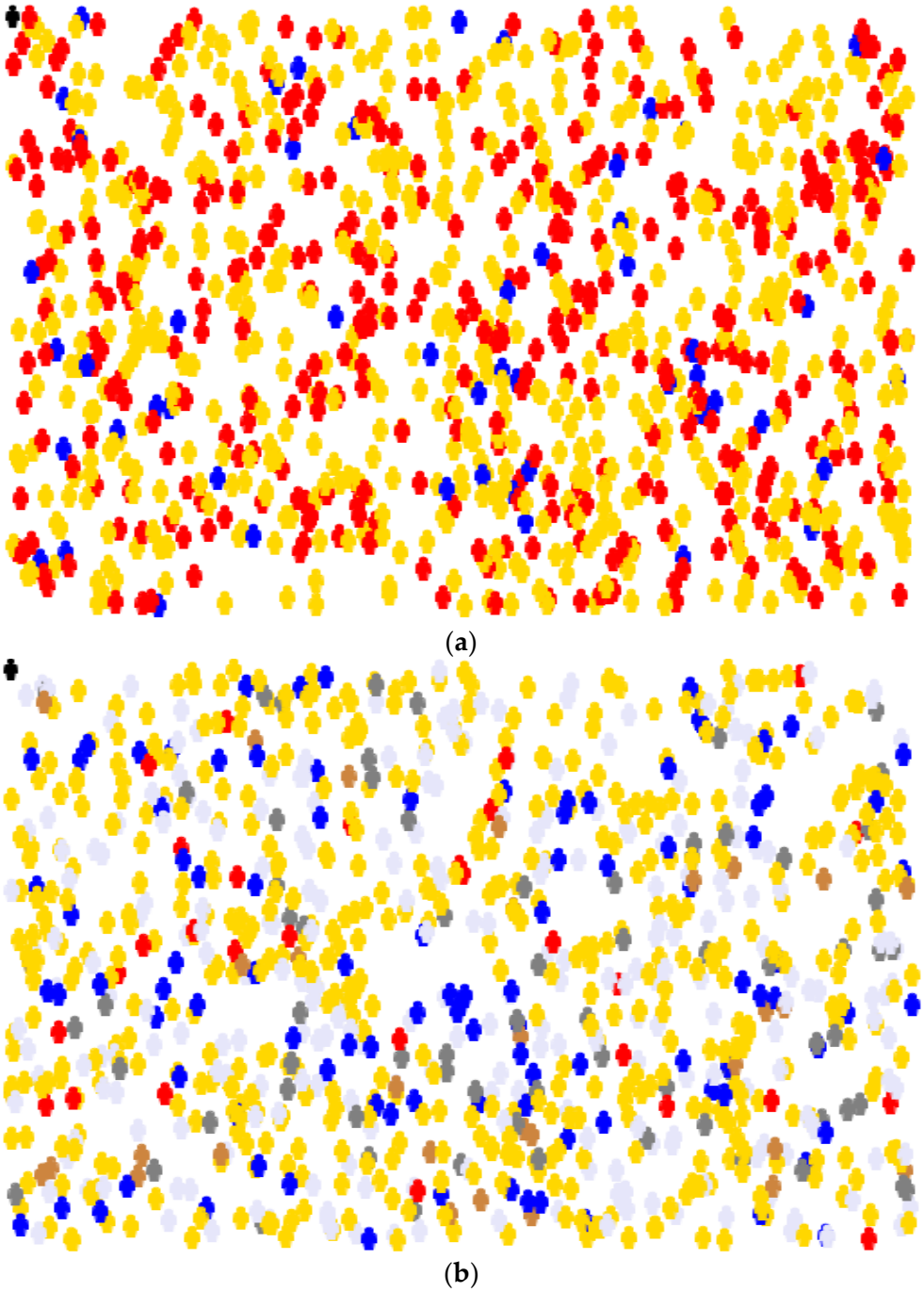

Figure 4. Population allocation in experiment with 1000 agents. (**a**) shows agent allocation without any connection between airlines and cryptocurrency trading websites, while (**b**) shows the agent allocation with the existence of a connection between them.

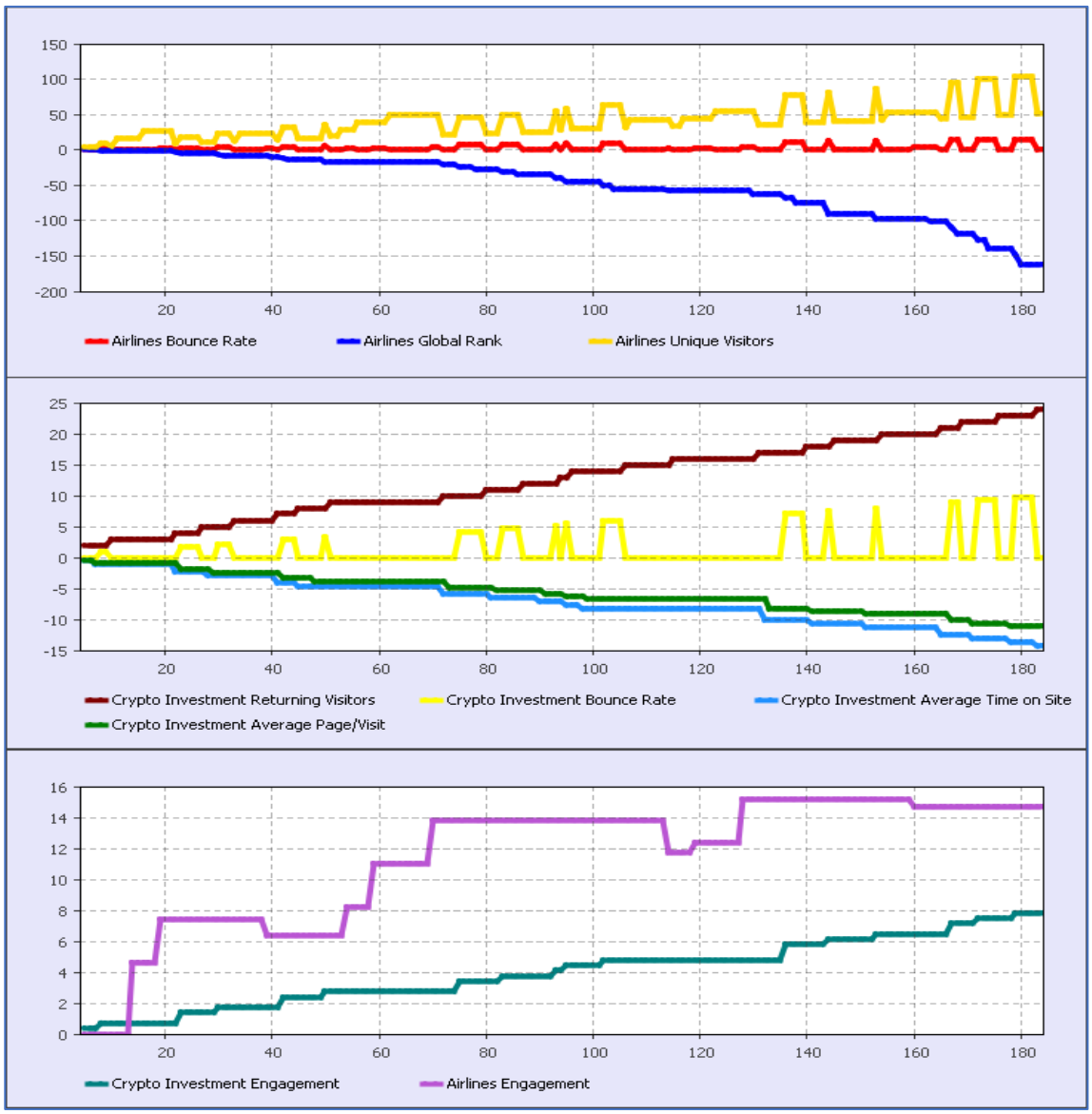

Figure 5. Depiction of cryptocurrency trading site metrics and their impact on airlines' websites global rank and bounce rate.

The dispersion of 1000 agents, in a period of 180 observation days, is visible in Figure 4. This involves crypto cryptocurrency trading websites' unique visitors, bounce rate, average time on site, and pages per visit, as well as, airlines' global rank and bounce rate. Gold colour represents potential cryptocurrency trading websites' returning visitors, while silver indicates the analogy of airline unique visitors, brown and red colours show those of cryptocurrency trading websites' and airline websites' leaving visitors, respectively, with cryptocurrency trading websites' and airlines' websites' global ranks portrayed by grey and blue colours accordingly. As shown in Figure 4a, first, the allocation of the agent's population is observed without any connection between airlines and cryptocurrency trading websites. After defining the proper connection status between the websites, there is an increased website performance for airlines, as can be seen from the numerous agents coloured blue, silver, and the lesser red coloured in Figure 4b. The model starts from zero cryptocurrency trading websites' unique visitors (beige) and adding one at a time, which affects the remaining metrics, average time on site, average pages per visit and bounce rate (brown), as well as airlines' unique visitors (silver) and bounce rate (red). Then, the model reaches cryptocurrency trading websites' global rank (grey) and of course airlines' global rank (blue).

As seen in Figure 5, the horizontal axes present the 180-observation days, while the vertical ones indicate the number of unique visitors, bounce rates, global rank, and average time on site and pages for airlines and cryptocurrency trading websites. Apparently, from the model's simulation, we deduce the following: as cryptocurrency trading websites' returning visitors increase, airline websites' bounce rate increases slightly, their unique visitors increase and global rank decreases. Rising levels of cryptocurrency trading websites' bounce rates tend to increase airline websites' bounce rates and unique visitors and decrease their global rank. Accordingly, as cryptocurrency trading websites' average time on site and pages per visit decrease due to simulation programming, airline websites' global rank decreases, while bounce rate and unique visitors increase. The desired results indicate the lessening of the bounce rate and global rank metrics and the increase in unique visitors, which indicate better website performance.

4. Discussion

Throughout this paper, emphasis was placed on the deployment of an accurate methodology, for providing appropriate insights and knowledge of web advertisement. Thus, airline websites could capitalise on the rising demand for cryptocurrency trading platforms and improve their online advertising campaigns and visibility. Gathered data originated from the most visited and known cryptocurrency trading websites and airlines' websites create a breeding ground for airline firms to gain benefits from exploiting those websites in their favour. Digital marketing strategy (SEM) implementation in cryptocurrency trading platforms can prove beneficial for airlines, provided that adequate analysis of the expedient web metrics occurs.

From the regression analysis, factors representing potential benefits for airlines in advertising on cryptocurrency trading websites, such as global rank, unique visitors, and bounce rate cope with rising up to 50.9%, 47.6%, and −57.5% (decrease indicates enhancement), respectively. Those findings are verified by the simulation and prediction modelling, where rising levels of cryptocurrency trading websites' engagement increase the engagement of airlines' website visitors. An increase in cryptocurrency trading site metrics, such as returning visitors, global rank, bounce rate, and average time on site and pages per visit, affect significantly airline websites' global rank, unique visitors, and bounce rate. Since cryptocurrency trading websites' metrics impact airlines' websites to such a substantial extent, placing advertisements on cryptocurrency trading websites could enhance airlines' website visibility, user engagement, hence increasing profitability.

Increased web traffic tends to rise airline firms' brand name and profitability through gross profit and global rank. In the same vein, specific types of web traffic data improve airline websites' user engagement, throughout paid advertisement campaigns (SEM) [3]. From this point, firms' digital marketing strategy, through advertisement campaigns, can be boosted by neuromarketing implications. Consumers find pictures and titles more attractive that are eye-catching and easily memorable [68] while expressing apparent emotions and facial countenances in such contexts [69]. Thus, the implications of future neuromarketing tools for advertisement campaigns could provide additional insights regarding website visitors' demand and result in a beneficial tactic.

5. Conclusions

5.1. Conclusions on Airlines Advertisement Campaigns through Cryptocurrency Trading Websites

Throughout this paper, it was made clear that airline firms can capitalise on cryptocurrency trading site metrics in favour of their digital marketing strategy. Digital marketing consists of campaigns and strategies focused on promoting firm websites, leading to increased business profit. Paid advertisements are an indivisible part of digital marketing; thus, an approach was adopted for the exploitation of cryptocurrency trading websites. We discern the role of cryptocurrency trading site metrics such as returning visitors, bounce rate, average time on site, and pages per visit, in order to identify significant variation in airlines' websites' global rank, unique visitors, and bounce rate metrics. The paper's

outcomes emphasise the importance of web analytic metrics for effective digital marketing strategies [30].

As shown in the paper, cryptocurrency trading websites' visitor engagement affects positively airline websites' visitor engagement. An increase in the engaged cryptocurrency trading website audience can cause more engagement in airlines' website audience. More specifically, individual user engagement metrics of cryptocurrency trading websites, such as rising levels of returning visitors, tend to enhance airline websites' global rank and unique visitors, with the improvement in airline websites' bounce rate influenced by the enhancement in cryptocurrency trading websites' bounce rate. Regarding the rest of the cryptocurrency trading site metrics, the less time visitors spend on these websites, the better airline websites' global rank and bounce rate become, and the fewer pages they view, the more airline websites' bounce rate is enhanced.

One of the main goals in firms is to reach out to customers, which is mostly achieved through search engine marketing and optimisation. SEM strategies occur through paid advertisements, where website metrics such as global rank, number of returning visitors, bounce rate, etc., play key roles [70]. In the same vein, analysing the preferences and characteristics of customers through SEM can lead to reaching more customers, hence increasing user engagement [71], without disregarding employees' part in customer satisfaction and service quality [72]. With that in mind, we suggest a methodology with three stages, in which defining KPIs of interest, collecting web data, and examining their correlations are the required stages [53]. Thus, insights could be drawn for whether airline firms should place paid advertisements on cryptocurrency trading websites, through analyses of specific key web metrics of websites involved, which can contribute to decision making in terms of placing paid ads on cryptocurrency trading websites.

5.2. Research Implications

Paper's principal objective was the investigation of the supposition of whether placing an advertisement on cryptocurrency trading websites is beneficial for airline firms. To perform this task, we tested the impact of cryptocurrency trading site metrics such as returning visitors, bounce rate, average time on site, and pages per visit, on selected site metrics of airline firms. Those determinants consist of metrics such as global rank, unique visitors, and bounce rate. We concluded that cryptocurrency trading websites, as emerging web entities that potential investors visit, cause substantial variation in the above-mentioned airline web metrics. Regression outputs indicate that R^2 and model adjustment statistics vary from 0.824 to 0.999 (Tables 3–8), highlighting the significance of independent variables' impact on the dependent ones [73].

Airlines' digital brand name can be highly affected and explained by specific analytic metrics of airline websites [74]. Whether these metrics originate from mobile or desktop devices and applications plays no major role, since airlines' returning visitors, bounce rate, and visitor engagement can influence significantly airlines' digital brand name. Moreover, except for examining the effect of cryptocurrency investment websites' analytics on airlines' site metrics and global rank, a thorough review of electronic customers conversion rates should be carried out. In this respect, airlines could also monitor referral traffic and backlinks to their websites that originate from various cryptocurrency trading websites, for better assessment of their advertising campaigns.

To summarise, we suggest airline firms seeking to exploit emerging cryptocurrency trading websites to place advertising campaigns, after an extensive review of specific key metrics. Those metrics refer to increased visitor engagement, analysed to increase the number of returning visitors and reduce the bounce rate, average time on site, and pages per visit. Site metrics of global rank, unique visitors, and bounce rate provide an efficient framework for airline firms to measure potential benefits from paid advertisement campaigns. Thus, our methodological framework can provide airlines' marketers and marketing strategists with practical and empirical data and insights on utilisation of

cryptocurrency trading websites. This framework could potentially be applied to other websites of interest, depending on the market's influence on airlines' domain.

5.3. Future Work

This paper examined the contribution and the interrelations between the KPIs of cryptocurrency trading platforms and airline companies' visibility and global rank. The methodological procedure adopted within this research can be further applied in the green logistics sector [75]. Future research could adopt neuromarketing analysis tools such as electroencephalogram (EEG), which is a valuation of brain activity, and functional magnetic resonance imaging (FMRI), used for presenting changes in the brain's blood flow [76]. This framework would provide an interesting avenue for future research in the area of cryptocurrencies, through collecting participants' behavioural data to acquire a better understanding of the cryptocurrency trading website users' engagement.

Author Contributions: Conceptualisation, D.P.S. and N.T.G.; methodology, N.T.G. and D.P.R.; software, N.T.G.; validation, D.P.S., T.K.D.; formal analysis, D.P.S. and N.T.G.; investigation, D.P.R. and N.T.G.; resources, N.T.G. and T.K.D.; data curation, N.T.G. and D.P.R.; writing—original draft preparation, N.T.G.; writing—review and editing, N.T.G. and D.P.R.; visualisation, N.T.G. and D.P.R.; supervision, D.P.S. and T.K.D.; project administration, D.P.S. and N.T.G.; funding acquisition, D.P.S., N.T.G. and D.P.R. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Phippen, A.D.; Sheppard, L.; Furnell, S. A practical evaluation of Web analytics. *Internet Res.* **2004**, *14*, 284–293. [CrossRef]
2. Sakas, D.P.; Reklitis, D.P. The Impact of Organic Traffic of Crowdsourcing Platforms on Airlines' Website Traffic and User Engagement. *Sustainability* **2021**, *13*, 8850. [CrossRef]
3. Sakas, D.; Giannakopoulos, N. Harvesting Crowdsourcing Platforms' Traffic in Favour of Air Forwarders' Brand Name and Sustainability. *Sustainability* **2021**, *13*, 8222. [CrossRef]
4. Kasturi, E.; Devi, P.; Kiran, S.V.; Manivannan, S. Airline Route Profitability Analysis and Optimization Using BIG DATA Analyticson Aviation Data Sets under Heuristic Techniques. *Procedia Comput. Sci.* **2016**, *87*, 86–92. [CrossRef]
5. Liébana-Cabanillas, F.; Muñoz-Leiva, F.; Sánchez-Fernández, J.; Martínez-Fiestas, M. *Electronic Payment Systems for Competitive Advantage in E-Commerce*; IGI Global: Hershey, PA, USA, 2014. [CrossRef]
6. ElBahrawy, A.; Alessandretti, L.; Kandler, A.; Pastor-Satorras, R.; Baronchelli, A. Evolutionary dynamics of the cryptocurrency market. *R. Soc. Open Sci.* **2017**, *4*, 170623. [CrossRef]
7. Chaffey, D.; Ellis-Chadwick, F. *Digital Marketing*; Pearson: Harlow, UK, 2020.
8. Clifton, B. *Advanced Web Metrics with Google Analytics*; John Wiley & Sons: Indianapolis, IN, USA, 2012.
9. Kaushik, A. *Web Analytics 2.0*; SYBEX Inc.: Hoboken, NJ, USA, 2010; ISBN 978-0470529393.
10. Richey, R.; Morgan, T.; Lindsey-Hall, K.; Adams, F. A global exploration of Big Data in the supply chain. *Int. J. Phys. Distrib. Logist. Manag.* **2016**, *46*, 710–739. [CrossRef]
11. Sharma, S.K.; Modanval, R.K.; Gayathri, N.; Kumar, S.R.; Ramesh, C. Impact of application of big data on cryptocurrency. In *Cryptocurrencies and Blockchain Technology Applications*; John Wiley & Sons: Hoboken, NJ, USA, 2020; pp. 181–195. [CrossRef]
12. McGrath, S. 5 Ways Blockchain Can Increase Customer Loyalty. 2021. Available online: https://clutch.co/it-services/resources/5-ways-blockchain-can-increase-customer-loyalty (accessed on 24 August 2021).
13. Banner, S. *Speculation: A History of the Fine Line between Gambling and Investing*; Oxford University Press: New York, NY, USA, 2017.
14. Markiewicz, Ł.; Weber, E.U. DOSPERT's Gambling Risk-Taking Propensity Scale Predicts Excessive Stock Trading. *J. Behav. Finance* **2013**, *14*, 65–78. [CrossRef]
15. Rawool, S.; Boke, A.; Shejy, G. Gaining Advantages using Web Analytics: A case study on Ryanair. *Int. J. Eng. Dev. Res.* **2015**, *3*, 2321–9939.
16. Molchanova, K.; Trushkina, N.; Katerna, O. Digital platforms and their application in the aviation industry. *Electron. Sci. J. Intellect. Logist. Supply Chain Manag.* **2020**, *1*, 83–98. [CrossRef]

17. ITIF Technology Explainer. What Are Digital Platforms? Information Technology & Innovation Foundation. 2020. Available online: https://itif.org/publications/2018/10/12/itif-technology-explainerwhat-are-digital-platforms (accessed on 1 September 2021).
18. Abu-Dalbouh, M.A. Improving Digital Marketing Strategy in Jordanian Air Aviation Sector for Becoming a Regional Training Center. *Int. Bus. Res.* **2020**, *13*, p139. [CrossRef]
19. Tsai, W.-H.; Chou, W.-C.; Leu, J.-D. An effectiveness evaluation model for the web-based marketing of the airline industry. *Expert Syst. Appl.* **2011**, *38*, 15499–15516. [CrossRef]
20. Karaağaoğlu, N.; Çiçek, M. An evaluation of digital marketing applications in airline sector. *J. Hum. Sci.* **2019**, *16*, 606–619. [CrossRef]
21. Järvinen, J.M.; Karjaluoto, H. The use of Web analytics for digital marketing performance measurement. *Ind. Mark. Manag.* **2015**, *50*, 117–127. [CrossRef]
22. Medium. How Airlines Are Using Big Data. 2021. Available online: https://medium.com/@exastax/how-airlines-are-using-big-data-6bf47bb27d90 (accessed on 5 September 2021).
23. Marrs, M. 5 Ways to Wield More Word of Mouth Marketing Power. 2015. Available online: https://www.wordstream.com/blog/ws/2014/06/26/word-ofmouth-marketing (accessed on 21 August 2021).
24. Grieve, R.; Witteveen, K.; Tolan, A. Social Media as a Tool for Data Collection: Examining Equivalence of Socially Value-Laden Constructs. *Curr. Psychol.* **2014**, *33*, 532–544. [CrossRef]
25. Bühler, J.; Lauritzen, M.; Bick, M. Social Media Communication in European Airlines. In Proceedings of the AMCIS Conference 2014, Savannah, GA, USA, 7–9 August 2014.
26. Mao, E.; Zhang, J. What Drives Consumers to Click on Social Media Ads? The Roles of Content, Media, and Individual Factors. In Proceedings of the 48th Hawaii International Conference on System Sciences, Kauai, HI, USA, 5–8 January 2015. [CrossRef]
27. Agrawal, A. Sustainability of airlines in India with COVID-19: Challenges ahead and possible way-outs. *J. Revenue Pricing Manag.* **2020**, *20*, 457–472. [CrossRef]
28. Giraldo-Romero, Y.-I.; Pérez-De-Los-Cobos-Agüero, C.; Muñoz-Leiva, F.; Higueras-Castillo, E.; Liébana-Cabanillas, F. Influence of Regulatory Fit Theory on Persuasion from Google Ads: An Eye Tracking Study. *J. Theor. Appl. Electron. Commer. Res.* **2021**, *16*, 1165–1185. [CrossRef]
29. IATA. Optimism for Travel Restart as Borders Reopen. 2021. Available online: https://airlines.iata.org/news/optimism-for-travel-restart-as-borders-reopen (accessed on 28 August 2021).
30. Holland, C.; Thornton, S.; Naudé, P. B2B analytics in the airline market: Harnessing the power of consumer big data. *Ind. Mark. Manag.* **2020**, *86*, 52–64. [CrossRef]
31. Nasiopoulos, D.K.; Sakas, D.P.; Trivellas, P. The Role of digital marketing in the development of a distribution and logistics network of information technology companies. In *Business Intelligence and Modelling*; Springer: Cham, Switzerland, 2021; pp. 267–276. [CrossRef]
32. Esposito, C.; Ficco, M.; Palmieri, F.; Castiglione, A. A knowledge-based platform for Big Data analytics based on publish/subscribe services and stream processing. *Knowl. Based Syst.* **2015**, *79*, 3–17. [CrossRef]
33. Dou, X. Big data and smart aviation information management system. *Cogent Bus. Manag.* **2020**, *7*, 1766736. [CrossRef]
34. Badea, V.; Zamfiroiu, A.; Boncea, R. Big Data in the Aerospace Industry. *Inform. Econ.* **2018**, *22*, 17–24. [CrossRef]
35. Emani, C.K.; Cullot, N.; Nicolle, C. Understandable Big Data: A survey. *Comput. Sci. Rev.* **2015**, *17*, 70–81. [CrossRef]
36. Drivas, I.C.; Sakas, D.P.; Giannakopoulos, G.A.; Kyriaki-Manessi, D. Optimization of paid search traffic effectiveness and users' engagement within websites. In *International Conference on Business Intelligence & Modelling*; Springer: Cham, Switzerland, 2021; pp. 17–30. [CrossRef]
37. Kiss-Tóth, C.; Takács, G. A dynamic programming approach for 4D flight route optimization. In Proceedings of the IEEE International Conference on Big Data (Big Data), Washington, DC, USA, 27–30 October 2014; Available online: http://docplayer.net/12461445-A-dynamic-programming-approach-for-4d-flight-route-optimization.html (accessed on 28 August 2021).
38. Gómez-Carmona, D.; Cruces-Montes, S.; Marín-Dueñas, P.; Serrano-Domínguez, C.; Paramio, A.; García, A. Do You See It Clearly? The Effect of Packaging and Label Format on Google Ads. *J. Theor. Appl. Electron. Commer. Res.* **2021**, *16*, 1648–1666. [CrossRef]
39. Inci, A.C.; Lagasse, R. Cryptocurrencies: Applications and investment opportunities. *J. Cap. Mark. Stud.* **2019**, *3*, 98–112. [CrossRef]
40. Naveed, M.; Davidson, J. *The Digital Coin Revolution-Crypto Currency-How to Make Money Online*; JD-Biz Publishing: Mendon, UT, USA, 2014; ISBN 9781311774958.
41. Valdeolmillos, D.; Mezquita, Y.; González-Briones, A.; Prieto, J.; Corchado, J.M. Blockchain Technology: A Review of the Current Challenges of Cryptocurrency. In *Advances in Intelligent Systems and Computing*; Springer: Cham, Switzerland, 2019; pp. 153–160. [CrossRef]
42. Zheng, Z.; Xie, S.; Dai, H.-N.; Chen, X.; Wang, H. Blockchain challenges and opportunities: A survey. *Int. J. Web Grid Serv.* **2018**, *14*, 352. [CrossRef]
43. Furnham, A.; Argyle, M. *The Psychology of Money*; Routledge: London, UK, 2013; pp. 4–50.
44. Mallat, N. Exploring consumer adoption of mobile payments: A qualitative study. *J. Strat. Inf. Syst.* **2007**, *16*, 413–432. [CrossRef]
45. Shin, D. Towards an understanding of the consumer acceptance of mobile wallet. *Comput. Hum. Behav.* **2009**, *25*, 1343–1354. [CrossRef]

46. Peters, G.W.; Panayi, E.; Chapelle, A. Trends in Crypto-Currencies and Blockchain Technologies: A Monetary Theory and Regulation Perspective. *J. Financ. Perspect.* **2015**, *3*. [CrossRef]
47. Andoni, M.; Robu, V.; Flynn, D.; Abram, S.; Geach, D.; Jenkins, D.; McCallum, P.; Peacock, A. Blockchain technology in the energy sector: A systematic review of challenges and opportunities. *Renew. Sustain. Energy Rev.* **2019**, *100*, 143–174. [CrossRef]
48. Mirabelli, G.; Solina, V. Blockchain and agricultural supply chains traceability: Research trends and future challenges. *Procedia Manuf.* **2020**, *42*, 414–421. [CrossRef]
49. Hölbl, M.; Kompara, M.; Kamišalić, A.; Zlatolas, L.N. A Systematic Review of the Use of Blockchain in Healthcare. *Symmetry* **2018**, *10*, 470. [CrossRef]
50. Akins, B.W.; Chapman, J.L.; Gordon, J.M. A Whole New World: Income Tax Considerations of the Bitcoin Economy. *Pittsburgh Tax Rev.* **2015**, *12*, 24–56. [CrossRef]
51. Noyes, C. Bitav: Fast Anti-Malware by Distributed Blockchain Consensus and Feedforward Scanning. *arXiv* **2016**, arXiv:1601.01405.
52. Marella, V.; Upreti, B.; Merikivi, J.; Tuunainen, V.K. Understanding the creation of trust in cryptocurrencies: The case of Bitcoin. *Electron. Mark.* **2020**, *30*, 259–271. [CrossRef]
53. European Parliament. Cryptocurrencies and Blockchain, Legal Context and Implications for Financial Crime, Money Laundering and Tax Evasion. EU Publications. 2018. Available online: https://op.europa.eu/en/publication-detail/-/publication/631f847c-b4aa-11e8-99ee-01aa75ed71a1 (accessed on 25 October 2021).
54. Sun, W.; Dedahanov, A.T.; Shin, H.Y.; Kim, K.S. Switching intention to crypto-currency market: Factors predisposing some individuals to risky investment. *PLoS ONE* **2020**, *15*, e0234155. [CrossRef]
55. Cassar, R. Distributed Ledger Technology in the Airline Industry: Potential Applications and Potential Implications. *J. Air L. Com.* **2018**, *83*, 455. Available online: https://scholar.smu.edu/jalc/vol83/iss3/1 (accessed on 25 October 2021).
56. Nadeem, S.N. Can Blockchain Disrupt the Traditional Airline Distribution for the Better? If so, What Are the Benefits of This New Technology, and How Can It Be Implemented. Application of Blockchain Technology in Air Transport. 2018. Available online: https://www.researchgate.net/publication/328465366_Can_blockchain_disrupt_the_traditional_airline_distribution_for_the_better_If_so_what_are_the_benefits_of_this_new_technology_and_how_can_it_be_implemented (accessed on 25 October 2021).
57. Saura, J.R.; Palos-Sánchez, P.; Cerdá Suárez, L.M. Understanding the Digital Marketing Environment with KPIs and Web Analytics. *Future Internet* **2017**, *9*, 76. [CrossRef]
58. Mirkovic, M. KPI Examples—84 Key Performance Indicators for Your Business. 2018. Available online: https://www.cascade.app/blog/kpi-examples (accessed on 21 August 2021).
59. Slivka, M. What Is Alexa Rank and Its Value? 2020. Available online: https://attentioninsight.com/what-is-alexa-rank-and-its-value (accessed on 25 August 2021).
60. Omidvar, M.A.; Mirabi, V.R.; Shokry, N. Time Series Modeling of Visitors' Type on Web Analytics. 2012. Available online: http://worldcomp-proceedings.com/proc/p2011/IKE2533.pdf (accessed on 25 August 2021).
61. Gústafsdóttir, G. What Do the Different Metrics (Visits, Page Views, Unique Visitors, etc.) Mean in Analytics? 2021. Available online: https://support.siteimprove.com/hc/en-gb/articles/207866996-What-do-the-different-metrics-visits-page-views-unique-visitors-etc-mean-in-Analytics- (accessed on 9 April 2021).
62. Hotjar. What Is Average Session Duration in Google Analytics? 2021. Available online: https://www.hotjar.com/google-analytics/glossary/session-duration/#body-top (accessed on 21 August 2021).
63. Aguilar, J. A Survey about Fuzzy Cognitive Maps Papers. *Int. J. Comput. Cogn.* **2005**, *3*, 27–33.
64. Giabbanelli, P.J.; Gray, S.A.; Aminpour, P. Combining fuzzy cognitive maps with agent-based modeling: Frameworks and pitfalls of a powerful hybrid modeling approach to understand human-environment interactions. *Environ. Model. Softw.* **2017**, *95*, 320–325. [CrossRef]
65. Tepper, T.; Schmidt, J. Best Crypto Exchanges for 2021. 2021. Available online: https://www.forbes.com/advisor/investing/best-crypto-exchanges/ (accessed on 25 August 2021).
66. Skytrax. World's Top 10 Airlines of 2019. 2019. Available online: https://www.worldairlineawards.com/worlds-top-10-airlines-2019/ (accessed on 24 August 2021).
67. An, L. Modeling human decisions in coupled human and natural systems: Review of agent-based models. *Ecol. Model.* **2012**, *229*, 25–36. [CrossRef]
68. Lazar, L.; Pop, M.-I. Impact of Celebrity Endorsement and Breaking News Effect on the Attention of Consumers. *Stud. Univ. Econ. Ser.* **2021**, *31*, 60–74. [CrossRef]
69. Fabio, R.A.; Gullà, J.; Errante, A. Emotions and eye movements: Eye tracker and mnestic parameters. In *Memory Consolidation*; Nova Science: Hauppauge, NY, USA, 2015; pp. 3–38. [CrossRef]
70. Booth, D.; Jansen, B.J. A Review of Methodologies for Analyzing Websites. In *Web Technologies*; IGI Global: Hershey, PA, USA, 2011; pp. 145–166. [CrossRef]
71. Nyagadza, B. Search engine marketing and social media marketing predictive trends. *J. Digit. Media Policy* **2020**, *3*, 301–319. [CrossRef]
72. Reklitis, P.; Trivellas, P.; Mantzaris, I.; Mantzari, E.; Reklitis, D. Employee Perceptions of Corporate Social Responsibility Activities and Work-Related Attitudes: The Case of a Greek Management Services Organization. In *Sustainability and Social Responsibility: Regulation and Reporting*; Springer: Singapore, 2018. [CrossRef]

73. Rawlings, J.O.; Pantula, S.G.; Dickey, D.A. *Applied Regression Analysis: A Research Tool*; Springer: New York, NY, USA, 1998; ISBN 0-387-98454-2.
74. Sakasb, D.P.; Giannakopoulosb, N.T. Big Data contribution in Desktop and Mobile devices comparison regarding Airlines' digital brand name effect. *Big Data Cogn. Comput.* **2021**, *5*, 48. [CrossRef]
75. Trivellas, P.; Malindretos, G.; Reklitis, P. Implications of Green Logistics Management on Sustainable Business and Supply Chain Performance: Evidence from a Survey in the Greek Agri-Food Sector. *Sustainability* **2020**, *12*, 10515. [CrossRef]
76. Klinčeková, S. Neuromarketing—Research and prediction of the future. *Int. J. Manag. Sci. Bus. Adm.* **2014**, *2*, 53–57. [CrossRef]