SwipeCrypto

## *Blockchain-based Mobile Lockscreen Advertising*

Abstract

Current mobile advertising models are ineffective. Mobile websites and most mobile applications typically display advertisement on the side or as banner ads, where users' true attention cannot be captured. In the era of duopoly by Google and Facebook controlling almost 60% of the global digital advertising, advertisers are hoping for emergence of legitimate third player to help keep prices in check [1] and delivering more effective brand exposure. Ad Fraud is another major issue in the mobile & digital advertising space. Malicious click-bots and fake traffic have cost advertisers $6.5 billion globally in 2017, according to a report [2] from Association of National Advertisers (ANA) and White Ops (a cyber security firm which exposed the "Methbot" operation).

This paper presents a solution by introducing a decentralized mobile lockscreen advertising solution leveraging blockchain & ERC20 token technology. The proposed solution is built on top of an existing mobile lockscreen advertising platform developed by SwipeRich[3] which has been in production deployment in multiple countries with proven higher engagement. SwipeCrypto Token (SWC) will be introduced to reward the lock screen users for viewing the advertisement, as a payment token to publishers, while allowing transparency with the advertisers through a blockchain ledger system that provides audit trail to counter ad fraud.

1. INTRODUCTION

1.1. THE STATE OF MOBILE ADVERTISING

The world of advertising has undergone a seismic shift over the recent years. Widespread internet access and exponential growth in smartphone use has seen spending on digital advertising increasing. While digital continues to disrupt the advertising world, mobile digital advertising spend is expected to overtake desktop in 2017, reaching 56% global digital advertising spend according to Dentsu Aegis Network's forecast [5]. By 2018, mobile advertising spend will continue its growth to account for a total of USD 116.1 billion. With the continuous shift of consumer behavior towards mobile where mobile channels now represents almost 2 out of 3 digital media minutes [6], mobile advertising spend will continue to see double-digit CAGR (compound annual growth rate) growth for the coming years.
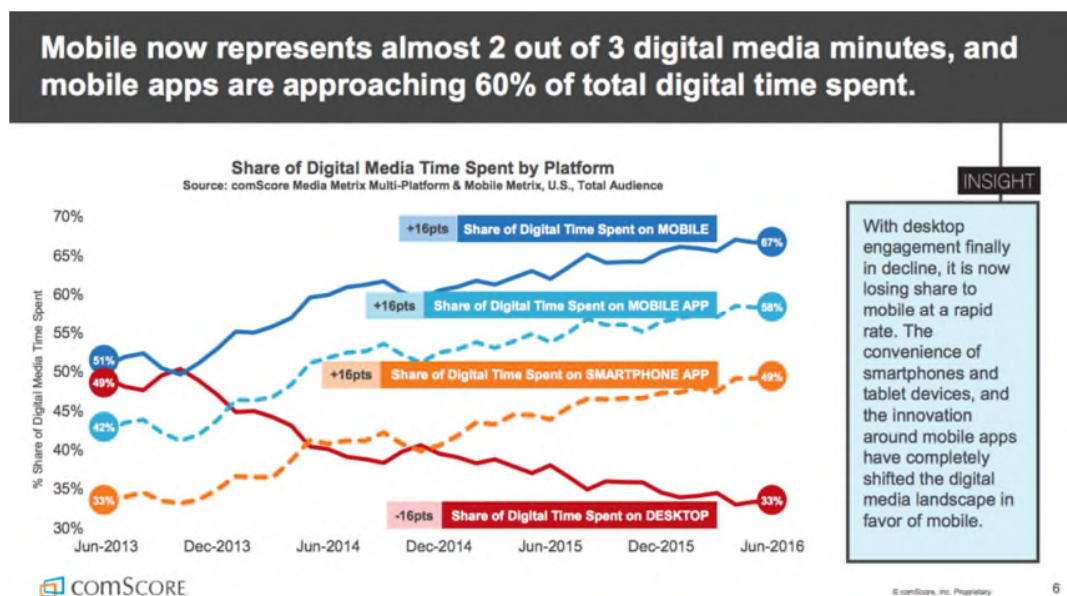
Share of Digital Media Time Spent [*ComScore*]

Mobile App Model is Ruling, Lockscreen the most Valuable & Effective Channel

For mobile marketers and advertisers, the big swing is the shift towards apps. Various market research and literature review have proven that banner ads or side-loading ads are ineffective advertising format, further impacted by small form-factor of mobile smartphones [7]. Mobile app usage accounts to about 86% of the total time spent by users on mobile devices, relative to mobile web. Mobile experience has also improved with smooth transition from one app to another, thanks to technology the likes of deeplink and maturing UI/UX design.

The industry is in search of a more effective form-factor and engagement channel where this paper presents mobile lockscreen as the most effective advertising medium in smartphone, proven with a higher click-through rate (higher CTR of 5x or more) and engagement metrics

through data collected in existing production deployment in 2 countries. When strategically implemented, full-screen lockscreen contents deliver better user experience by seamlessly integrating to the smartphone interfaces, and are less intrusive than the banner ads.

Mobile lockscreen advertising also tremendously reduces the issues of accidental clicks due to fat-fingers. Research estimates that 47 percent of small banner clicks are accidental, reducing the effectiveness of mobile ads and advertising budget wastage. This also impacts mobile attribution in campaign effectiveness measurement.

Transparency in Jeopardy - Need for Alternatives

With Facebook & Google duopoly controlling close to 60% of the global digital advertising budget, it does not take an economist to know that the risk of pricing rise is real with less competition. Advertisers are hoping for the rise of a legitimate third player to provide competition that can give them more leverage and help keep transparency and prices in check [1]. While the current 3rd player in the digital advertising pace cannot even crack 3% of the global digital advertising space, It is believed that a true contender may need to compete on different ground, where a new innovative media such as mobile lockscreen advertising can play a part.

"... "P&G doesn't want to waste time and money on a crappy media supply chain", Mr Pritchard said. In August, Mr Pritchard moved P&G away from ads on Facebook that target specific consumers, concluding that the practice has limited effectiveness..."

Advertisers are now suffering the consequence of the duopoly and complex advertising network filled with middleman and exchanges. Advertisers are starting to ask simple questions that could rattle the digital advertising industry to its very fundamentals. Simple questions can be left unanswered 'Where are my ads appearing?'; 'Who's seeing those ads?'; 'Are they in view?' Advertisers are now demanding quality metrics and factors that have been completely ignored in today's duopoly ecosystem, where digital advertising landscape has all been about cheap low cost audiences at scale without considering the context [9].

This paper proposes that a more effective alternative mobile advertising based on mobile lock screen with higher engagement, contextualized content with transparency of mobile attribution through blockchain ledger.

Ad Fraud is Real

Advertisers continue to grapple with fundamental issues in their digital campaigns: whether their ads can actually be seen and whether the ads are even reaching real people. Association of National Advertisers (ANA) and bot detection outfit White Ops in their annual joint study on the state of digital ad fraud projected that $6.5 billion in financial losses due to ad fraud. The most alarming statistics is a persistent trend where every 3rd visitor of a website is an attack bot, and 94.2% of websites experiencing at least 1 bot attack over period of 90 days [10].

The most common type of ad fraud involves automated software, or "bots", that simulate the activity of a person browsing using a mobile app or browsing web pages. Army of bots ("botnets") are deployed to generate estimated 56% of the advertising traffic globally. Some of

the bots are malwares that run quietly in the background of the infected computer without making its presence known to the owner, others are "bot-farms" which simply are racks of servers running automation software to run sequence of actions on the advertisements.

More work can be done to reduce the wastage in advertising spend due to ad fraud. Each user can be assigned a unique digital signature to track who is viewing the ads and further engaging with the ads, without compromising user privacy. Advertisers should be given the right to audit all the advertising engagement records, giving the assurance that all users views & engagements are genuine and accurate. This will rebuild the trust between the advertisers and publishers that is diminishing in the digital advertising space.

Publishers face difficulty to monetize their traffic due to ad fraud

Publishers suffers economic losses due to rampant ad fraud in the industry. Ad injection is a common fraud practice whereby hidden insertion of ads occur when a third party intercepts the web content before it is being rendered to the user. The fraud-operator injects ads without publisher's' consent and gets paid for these unsanctioned impressions at the expense of the publisher.

Publishers lose money, and worse, lose data integrity and credibility of their brand in the process. Ad fraud operators spoofed premium publisher domains (hijacking the brand power of prestigious publishers) and then supplied fake traffic (advanced bot behavior complete with browser sessions, mouse movements, geolocation data, and social logins to make it look like real people) to the fabricated inventory. As data is the new capital for digital companies, the publisher's' data becomes unreliable due to the injection of these fake traffic. This dilutes a publisher's brand in the industry as advertisers and platforms see a mix of metrics that don't accurately represent a publisher's traffic.
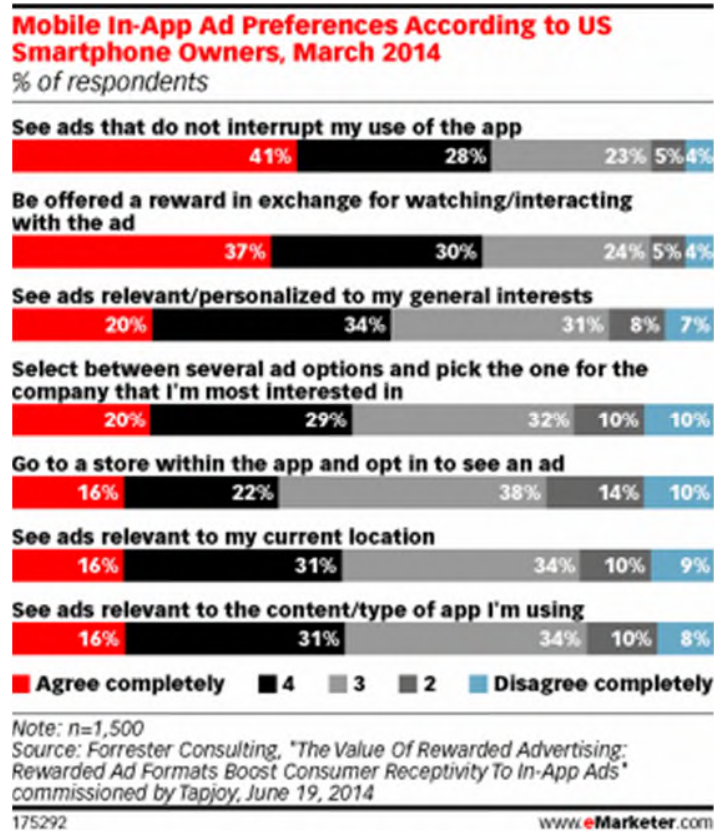
Users are not Rewarded for their Engagement with Advertisement

Fundamentally digital advertising evolves around 2 key success metrics - viewability and engagement that eventually lead to conversion. Media Rating Council (MRC) proposes that an ad is considered viewable when 50% of it is in view for one second or longer. This arguably serves as an improved metrics over cost-per-mile (CPM) that simply measures impressions delivery.

The engagement rate metric defines the level of users' interaction with the advertisement. Engagement can include a number of different interactions, indicating not only that consumers saw the ad, but that they have conducted certain actions — such as click (CPC), install (CPI), video views (CPCV), actions such as open app/register (CPA). The underlying concept is that engagement with ads create a lasting impression of the brand. Besides the interaction with an ad, engagement includes an ad's ability to capture a consumer's attention effectively (action), and drive towards conversion.

While viewability and engagement are essentially the result of the user's action in engaging with the content, today's advertising world continues to ignore and shortchange users without rewarding them for engaging with the ads. According to a research carried out by Forrester Consulting, more than two-thirds of US smartphone owners surveyed said that if they had to see in-app advertising, being offered a reward for viewing or engaging with an ad was their top preference. [11]

The same research also considered ads with rewards to be far more relevant, especially when the rewards are tied to relevant real-world vouchers or in-app digital rewards personalized to user's interest, specific user-engaged ads, location or app content. For example, 77% of smartphone users who had watched an ad in exchange for a reward received something that could be used in-app, and nearly seven in 10 received currency that was used in the game [11].

Mobile In-App Ad Preferences According to US Smartphone Owners, March 2014
% of respondents

See ads that do not interrupt my use of the app
41% | 28% | 23% | 5% | 4%

Be offered a reward in exchange for watching/interacting with the ad
37% | 30% | 24% | 5% | 4%

See ads relevant/personalized to my general interests
20% | 34% | 31% | 8% | 7%

Select between several ad options and pick the one for the company that I'm most interested in
20% | 29% | 32% | 10% | 10%

Go to a store within the app and opt in to see an ad
16% | 22% | 38% | 14% | 10%

See ads relevant to my current location
16% | 31% | 34% | 10% | 9%

See ads relevant to the content/type of app I'm using
16% | 31% | 34% | 10% | 8%

■ Agree completely ■ 4 ■ 3 ■ 2 ■ Disagree completely

Note: n=1,500
Source: Forrester Consulting, "The Value Of Rewarded Advertising: Rewarded Ad Formats Boost Consumer Receptivity To In-App Ads" commissioned by Tapjoy, June 19, 2014
175292   www.eMarketer.com

67% Users would like to be offered Rewards for interacting with the Ad [11]

SwipeRich mobile lockscreen advertising platform - the existing product of which SwipeCrypto SDK platform is built on, fundamentally adheres to this design principle. Users engage with the lock screen content, and they will get rewarded with points when they swipe left on the lockscreen to engage with the advertisements. This paper proposes an improved use case on top of the existing proven working mechanism where rewards will be given to users using ERC20 crypto-based token riding on Ethereum. Using Ethereum blockchain-based token technology as reward token presents a few advantages such as:- automatic distribution of tokens to users through smart contracts, transparency and auditability by storing the transaction in blockchain ledger, and ability to turn SwipeCrypto to a truly borderless global reward token system without suffering the hefty processing fees charged by payment gateway the likes of Paypal and others.

Rise of Blockchain in Digital Advertising

The future of digital advertising adopting blockchain looks promising. Blockchain will provide digital advertising industry with the capabilities of smart contracts, global and secure payment systems, token-based communities and transparent record keeping, transparent auditability with user privacy protected. While the digital advertising industry continues to suffer transparency and ad-fraud issues, blockchain being a trusted protocol represent a match made in heaven opportunity to marry the the two technologies to tackle the plague issues in the industry.

A key development to validate the concept of digital advertising blockchain:- Nasdaq announced that it was going to launch later part of 2017 the New York Interactive Advertising Exchange (NYIAX), which will let inventory be sold using blockchain technology. It uses blockchain in a different way: Smart contracts, which let you facilitate exchanges and when used on the blockchain, will let certain contracts execute automatically, as long as conditions are met.

SwipeCrypto adopts a blockchain-based multi-publishers mobile lockscreen advertising platform. Being a leader in the mobile lockscreen advertising platform, it is essential we work with ads exchanges such as NYIAX and other blockchain-based networks to fully leverage the benefits of token and blockchain technology.

2. VALUE PROPOSITION

2.1. BLOCKCHAIN ADDRESSING 'TRUST' IN MOBILE ADVERTISING

Fundamental Attributes of Blockchain relevant to Advertising

Blockchain technology is a decentralized database that is widely distributed across networks of computers called nodes. The key attribute of blockchain is there is no central authority or intermediaries that administers these networks and anybody can be a node to perform specific functions such as validating transactions. Data or transaction information are stored onto the decentralized database or public ledger. Being cryptographic in function, blockchain transactions on the blockchain network are immutable and it is openly available for all to audit the data. The transaction information are coded together to form blocks on the network which are continuously added sequentially to form a chain, hence the term "Blockchain". These attributes are critical in addressing trust and ad fraud issues prevalent in the digital industry currently.

Blockchain and Digital Advertising - A Match Made in Heaven

Our team intend to disrupt the digital advertising industry by applying blockchain technology to digital advertising. In the current industry practice, advertisers' budget are distributed to multi layer intermediaries before ever reaching the publisher. In most cases, publishers are not aware of what advertisements are being displayed on their sites and advertisers are not provided with the key metrics about the audience of their advertisements. Blockchain capabilities such as smart contracts & multi-signature cryptographic keys can be used for automated micro-payments/transactions between advertisers, publishers and users (globally) based on specific programmed conditions is a key attribute to facilitate payments globally. For example, global advertisers HQ can upload their advertising contents for different markets with a

certain amount of funds locked in a smart contract for each location. Whenever a user engages the advertisement content, the smart contract will automatically and instantaneously payout fees to the publisher and users without going through any intermediary or approval process. At the same time, the industry saves on all banking related charges of executing telegraphic transfers and currency exchange charges.

2.2. WHY SWIPECRYPTO?

Leveraging blockchain technology, the proposed solution aims to bring the key attributes of blockchain technology to address the trust issues in the current mobile advertising space. This paper studies the problem statements and SwipeCrypto's responses to these issues.

2.2.1. Decreasing Attention & Ineffective Mobile Advertisements Placement

A research by Microsoft found that since the year 2000 (or about when the mobile revolution began) the average attention span dropped from 12 seconds to 8 seconds now [17]. The attention span issue is worsened by the fact that today's mobile-centric and multi-screen world has resulted in us easily distracted by multiple streams of media. Research and literature review have also proven that mobile banner ads or side-loading ads are ineffective advertising format, further impacted by small form-factor of mobile smartphones [7].

User was flooded with excessive banner and advertisement on every page they visited, human attention become exhausted and start to ignore all banner in front of their eyes (i.e banner blindness). Banner blindness is not new to advertisers and the academic community. The first study on the topic was published in 1998 and "banner blindness" term is keep getting famous in the digital marketing community as customer became more educated and the average CTR continued to decrease.

[Solution] Lockscreen Advertising Delivers Maximum Brand Exposure

Smartphone has some unique features, lock screen is one of them. CNBC conducted a research together with an independent research firm Ampere Analysis indicating people typically check their phones about 30-50 times a day [16]. This presents an advertising impressions opportunity on lockscreen where users attention are maximum, making lockscreen the most premium and effective advertising spot on your smartphone. Based on the real-life user data collected by SwipeRich platform through its deployment in AGILA Rewards & CepatSwipe, lockscreen advertising CTR is about 5x - 10x higher than typical industry CTR, supported by data collected by other similar initiatives. By using multi-publisher through SDK, SwipeCrypto solution delivers lockscreen advertising opportunity to mobile app publishers through SDK.

2.2.2. Publishers Payment Method Limitations & Accountability

Typical advertising network and exchanges will require publishers to obtain banking account verification, or other banking facilities such as credit card and etc. This is particularly inconvenient in the emerging countries, the un-bank communities and smaller publishers.

[Solution] SwipeCrypto Token (SWC) as the Trusted Micro-payment to Publishers

Blockchain will enable advertising campaign to be tokenized and advertising contract to be represented as smart contract. Advertisements distribution transactions will be recorded on the blockchain, and the value of an advertising campaign will be represented on the blockchain by SwipeCrypto token (SWC). As the advertising contract being executed and advertisements continues to disseminate across the publishers, publishers will be paid in SWC accordingly based on the smart contract.

Blockchain token approach will allow transparency and auditability in the process of monetizing publisher advertising inventories. By using a decentralized blockchain ledger system, public accountability will be achievable. A lot of micro-publishers in emerging countries may not have access to credit cards or banking verification, and SwipeCrypto solution can have a higher chance to target these areas through the use of cryptocurrencies.

2.2.3. Users are not Rewarded for Engaging with Advertisement

As discussed earlier in this paper, viewability and engagement are essentially the result of the user's action in engaging with the content, however users' are not compensated for engaging with the ads.

[Solution] SwipeCrypto Token (SWC) as Loyalty Rewards to Users

This paper proposes a section of advertising spending to be distributed to the mobile lockscreen app users for engaging with the advertisements. According to a research carried out by Forrester Consulting, more than two-thirds of US smartphone owners surveyed said that if they had to see in-app advertising, being offered a reward for viewing or engaging with an ad was their top preference. [11]

SWC token will be used as micro-payments to the users, through the execution of the smart ledgers. The blockchain ledger will keep track of all transactions as audit against any payment claims or dispute. The mobile lockscreen app users can also exchange the SWC token with ETH through the public exchanges which will be subsequently identified.

The SWC tokens will also enable app users to have access to SWC-supported marketplace for subscription and membership to premium contents or digital merchandize. Publishers within the SwipeCrypto community can offer premium users contents at the marketplace where users can purchase with the SWC tokens.

For future roadmap exploration, this paper may consider leveraging blockchain technology to offer solutions to digital rights management for content creators, where content can be time-stamped and stored with a unique identification that becomes immutable when it is on-chain. This provides the opportunity to create a direct consumer-to-creator network where consumers are able to interact directly with content creators and have direct access to content without going through any intermediaries. Rights to particular piece of content can be viewed by every participant on the blockchain network instead of storing it on a central server by an intermediary.

2.2.4. Ad Fraud & Traffic Quality

There is no question that the current online advertising ecosystem is flawed, fraudulent behaviors can be committed by intermediary networks or publishers by not providing the much-desired transparency, by bots traffic, and malicious third party publishers. The digital advertising

industry is in need of a solution to ensure ads viewability transparency, accountable ads engagement measurement and tracking, and compliance to advertising campaign guidelines.

[Solution] Blockchain is Well-Positioned to Tackle Ad Fraud

Blockchain can disrupt the digital advertising industry as the underlying technology works on a trust protocol. Through individual user's unique identity and digital signature, it could accurately record the user's ad engagement behaviour in a decentralized blockchain ledger. The industry can then gain the trust of advertisers by ensuring that quality traffic is delivered and metrics accurately reflect the target audience's behaviour instead of worrying about fake/fraudulent traffic. Advertisers will only be charged in the exact proportion of the number of users engaging on their ads.

As blockchain is able to support immutability of data, once you have agreed on a transaction and recorded it, it can never be changed. You can subsequently record another transaction about that advertising transaction to change its state, but you can never hide the original transaction. Through this ability to deliver provenance of assets, advertisers can carry out audit on where an advertisement is placed, what has happened throughout its life.

The current digital advertising auditing process on the effectiveness of ad campaign delivery is both costly and reactive to fraud. Blockchain technology provides an audit trail into the supply chain using a shared ledger boosting transparency throughout the delivery process. This ensures that the advertisements are delivered to the targeted audience at the right time in the right place through the right medium with the right content. The data is securely shared and distributed across the entire supply chain to all stakeholders. Blockchain data provides a single source of veracity that all participants can access together to eliminate fraud instead of relying on multi layer intermediaries reports that creates ambiguity while protecting the privacy of users and publishers.

2.2.5.Privacy Concerns & Data Misuse

Every click and every view on a website is spawning a fresh data we are leaving a trail of datas somewhere out there for someone to use. The same scenario on when we are sending chat messages, sending an email, purchase stuff online, or any other things you do on the internet, your data trail proliferates. Companies harvest these datas and sell to whoever has an interest on it. Giants like Google and Facebook have been collecting so much profit by utilizing our data and it is difficult for common user to understand on how to protect their privacy online.

Our private data stored online might be vulnerable to cybersecurity. Oftentimes, the injected tracking software utilized by marketers has security holes that can be exploited by hackers. Huge customer database are very attractive for hackers and other syndicates.

[Solution] Anonymity is Inherent in Blockchain

As the transaction data is stored in decentralized blockchain ledger, data privacy and deterministic user anonymity can be fulfilled by design. The idea is to produce verifiable audit on user transactions to measure effectiveness of advertising campaigns, where a special digital ledger is created to automatically record every interaction with users and transaction data in a cryptographically verifiable manner, without compromising users' privacy.

2.3. BENEFITS

2.3.1. <u>USERS</u> are rewarded, and get the most relevant information at the first sight with maximum privacy

Everytime the user see their mobile screen, they will see the most relevant information right away. Our advanced match making logic will analyze user behaviour and preference to decide which data to be presented.

Despite the advance logic afore mentioned above, user privacy still intact since data are not tracked by Ads Network. User data are encrypted, scattered, and distributed across blockchain network and almost impossible to be read by anyone.

2.3.2. <u>ADVERTISERS</u> Reach Real Customers

Impression data will only be counted when content served to real customer. Our sophisticated system will able to detect if request coming from robot or any fraud request. Targeting will be very real and user will more likely to see the content. Advertiser will have a clear vision on what they are paying for, how effective their marketing through SWC mobile lock screen advertising.

2.3.3. <u>PUBLISHERS</u> increase activation , increase advertising revenue

By implementing SwipeCrpyto SDK, 3rd party application can be a lockscreen mobile advertising publisher immediately without requiring to learn sophisticated mobile advertising jargons and without vast engineering investment. With SwipeCrpyto system, every publisher can monetize their app fast and easily, and at the same time publisher will get more revenue since there's no middle man between publisher, advertiser and user unlike the existing mobile advertising ecosystem.

3. CONCLUSION

SwipeCrypto blockchain-based mobile lockscreen advertising solution strives to address the current issues in mobile advertising by combining proven higher engagement (higher click-through-rate CTR) lockscreen advertising and blockchain technology as the agent of 'Trust'. With SwipeCrypto mobile advertising platform, advertisers will have transparency on the viewability and engagement metrics of their advertising spend, and have better visibility into the effectiveness of their marketing campaigns. Publishers of SwipeCrypto lockscreen SDK enjoy new ways to monetize their mobile application through frictionless micropayments with SwipeCrypto Token (SWC) which is ERC20 based. Micropayments can be executed faster coded through smart contracs. Users will be rewarded for engaging with the advertising content, and the SWC tokens earned can be exchanged with ETH or purchase in-app digital premium contents or merchandise through SwipeCrypto Marketplace SDK.

Addressing trust issues in mobile digital advertising requires a decentralized, transparent and secure way to record, review and execute a deal. Blockchain technology inherently built in these attributes by design. We acknowledge blockchain transformation will not happen overnight, nor will it eliminate intermediary 3rd party ads-buying altogether. Nevertheless, blockchain

revolution represents a paradigm shift in how digital advertising can be conducted more transparently towards a more accountable mobile digital advertising practice.

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