GHANA'S BLOCKCHAIN SCENE ON WHATSAPP: A SPACE FOR CONVERGENCE AND DIVERGENCE

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ABSTRACT

Social media sites with global reach like Twitter and WhatsApp are playing a paramount role in the communication, socializing, and business practices of Ghana's blockchain community. Specifically, WhatsApp has become the platform powering the principal instantiation of blockchain in Ghana, which is trading and investing in cryptocurrencies. Considering the country's high internet fees and sometimes unreliable network access, WhatsApp is a particularly endearing platform to facilitate the blockchain scene due to the low internet data usage that it requires. Drawing on empirical research data from 33 semi-structured interviews with blockchain enthusiasts in Ghana, this paper analyzes the particularities of blockchain's adoption and spread in its primarily virtual scene. Key to this examination is the consideration of the affordances and constraints of WhatsApp as the primary spatial frame driving and shaping blockchain's adoption and use in Ghana. As coagents with the digital sphere they transact and interact on, members of the blockchain community are collectively and individually perpetuating processes of knowledge creation and communal exchanges interspersed with values of competitive innovating.

Keywords: Ghana, blockchain scene, WhatsApp, cryptocurrency trading and investment.

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1   INTRODUCTION

The Ghana blockchain community consists of individuals and organizations engaged in various aspects of the innovation, with an emphasis on cryptocurrencies. While not a particularly cohesive community, members connect and transact with each other at in-person meetups and/or other events, and via digital communication channels. The commonality of their interest in economic activities based on blockchain unifies them as a community whose primary means of interacting and transacting blockchain business is through WhatsApp. In my participant enlistment efforts, I attended a blockchain meetup in Accra organized by the leadership of Afroblocks (formerly Blockchain Society Ghana), from which I gained a preliminary insight into the community. I also joined Afroblocks' WhatsApp group, and my participation here, together with interview respondents' accounts of their blockchain activities on WhatsApp, provided an interesting illustration of the dynamics of the blockchain community. Participants are primarily urban dwellers. A small subset of members engages in other aspects of blockchain such as designing and building blockchain-based applications, as well as organizing and facilitating training programs and other events. The majority are entrepreneurs who are attracted by the pecuniary value of cryptocurrencies. It is important to note that the members of Ghana's blockchain community do not fall neatly into categories. Many application designers are also traders and investors since they buy cryptocurrencies and sell them when the value rises appreciably. Their varying relationships with blockchain highlight the fluidity that it affords the community. The wide applicability of the base technology, the tokenization of assets that it has enabled, the multiple access points for participation, the ease and speed of exchanging goods, etc., have ushered in a space where participants are at liberty to traverse hitherto bounded categories. They can, therefore, create and embody different socioeconomic identities and engage in multiple activities according to their interests and capabilities.

Ghana's blockchain scene is a uniquely digital configuration, galvanized by the social media platform WhatsApp. The principal instantiation of blockchain in Ghana, investing and trading in cryptocurrency, occurs primarily through individual and group level interactions on WhatsApp. It thus constitutes a digital scene because it frames the activities of enthusiasts with a shared interest in blockchain innovations. The scene is characterized by a dynamic web shaped by the qualities of its digital space, and the embeddedness of the community of enthusiasts in contexts of sociality, economic pursuits and the sociocultural. The instrumentality of WhatsApp as a communicative and transactional tool makes it the engine ensuring the existence and operation of the blockchain community in Ghana. The results from the data demonstrate that, based on the qualities of the digital space and contexts of community members, this is a scene serving as a market sphere on one hand, while facilitating dynamic processes of collectivization on the other (Peter, 2021; Subirats, 2012). In many cases, however, the associations of

enthusiasts with groups and to each other are not firmly established. They are bound by their interactions with blockchain, and this affiliation therefore evolves and is transformed depending on the dynamics of their interests. Ultimately, as coagents with the digital sphere in which they transact and interact, members of the blockchain community who participate in the digital scene are collectively and individually perpetuating processes of knowledge creation and communal exchanges interspersed with values of competitive innovation. Ghana's blockchain scene is essentially a fluid, transient and evolving space where digital spatial realities connect with physical world realities.

2   DIGITAL SCENES

Owing to its foundational traditions in popular music studies, scene as a theoretical framework has experienced vigorous application in such areas as analyses of the complexities of disruptions and affirmations in moments of musical transformation (Shank, 1994), collectivization of music fans around their enthusiasm for particular artists (Kibby, 2000) or affinity for certain music genres, as seen in Bennett's exploration of virtual fan cultures based on the rock music and musicians associated with England's Canterbury scene (2004). Indeed, scene theorization runs the gamut of examinations of the sociocultural dimension of music environments, including the evolving cultural, national, and other boundaries that delineate the communities of people involved in musical spaces, the intersection between spatial cultures and their engagement with cultural production and consumption, etc. (Bennett & Peterson, 2004; Blum, 2001; Shank, 1994; Silver & Clark, 2016; Straw, 2004). Glass (2012) places a specific emphasis on the microprocesses involved in the construction of a scene space. Her work investigates the interactions and practices of youth punk aficionados, their disruptive spatial organization, and their negotiation of identities and power relations. Other studies elucidate intrinsic characteristics of urban scenes such as the performativity of situated attitudes and actions, the unique affordances of the spatial amenities which members of scenes inhabit, like cafes, and the imagined and real communal ties that connect members to shared ideals (Blum, 2001; Irwin, 1977; Silver & Clark, 2016; Woo, 2012).

Studies have traditionally applied the theoretical framework of scenes to embodied place-based phenomena (Blum, 2001; Straw, 1991, 2004), an example being Stahl's analysis of Montreal's music-making scene (2004). As well, Woo's study presents an ethnographic investigation of the practices, intermediation, and promotion of gaming cultures enacted by members of the nerd culture scene through their multifaceted engagements with digital game stores and organizations (2012). Straw described media artefacts like internet mediated spaces as "way-finding aids" (2004, p. 413) in the production and reproduction of scenes. I daresay that in the prevailing environment of the network society, such spaces have become the intrinsic contexts of scenes. Grazian's work confirms this in its explanation of the temporal development of urban music realities in postindustrial cities which is

engineered by participants' networking efforts via digital media (2013). These sorts of connections establish shared understandings of identity-making, styles, and practices that produce virtual community scenes around common interests (Kibby, 2000).

In this paper, I expand on the theoretical idea of scenes with a blockchain scene facilitated by the sociocultural, economic, and other modalities mediating the digital world of blockchain via the WhatsApp social network. This is in line with Straw's description of the ephemeral configurations of communities and the making and remaking of alliances in the evolutions of sociocultural narratives and practices of the contemporary digital world. In this context, the notion of scene explicates the informal and formal unities that outline the network of economic interactions enacted by blockchain enthusiasts (Stahl, 2004; Straw, 1991). Indeed, with the ebb and flow of transnational and trans-local linkages, especially framed by the virtuality of the network society, scholarly endeavors have transcended the question of whether a setting can be defined as a scene or not. They elucidate those qualities which warrant an analysis through the prism of scene theory (Bennett & Peterson, 2004). Grimes' (2015) study of the online world of LittleBigPlanet is particularly illustrative of the dynamics that underline the interactions, transactions, and construction of shared meanings that characterize digital scenes.

Scene theory is pertinent to this analysis because of the interconnections between economic relations as material phenomena and the symbolic dimensions of a digital space; the notion of scene allows us to capture the socio-spatial underpinnings of local and transnational connections among actors on WhatsApp (Grimes, 2015; Stahl, 2004; Straw, 2004). Although in reference to music making cultures, Stahl's assertion that "[s]cene's elasticity enables a more nuanced analysis of the webs of connectivity" found in digital spaces aligns with the present study (2004, p. 52). The loosely constituted sociability occurring in the digitally enabled network of people engaging with blockchain produces this unique scene. Thus, the elasticity of a scene framework allows us to delve into the fluidity of affiliation (to groups and professional relationships) and the impermanence of belonging that participants espouse (Silver & Clark, 2016; Woo et al., 2015).

Although approximately 37% of the world's population do not have access to the internet, over 4.9 billion people exist in a veritable network society (Castells, 2009; International Telecommunication Union (ITU), 2021; van Dijk, 2020b). Digital technologies have such a profound presence that their application in diverse aspects of society's life processes appears to be second nature. The innovations and capabilities that digital systems have made possible expand economic, health-oriented, and communication opportunities. These changes consequently impact the evolution of technology, and their mutual actions participate in the rapidly advancing phenomenon of the present digital-minded society. Developments in digital technologies thus constitute and construct sociocultural, political, industrial, and other realities (Castells, 2009; Thomason, 2017; Zuboff, 1988). The concept of the network society encapsulates this; it names a social structure of

interconnectedness among nodes of people, societies, and political and industrial entities, which are organized and shaped by information and communication technologies (Castells, 2002, 2009). The concept of networks in themselves is not a new phenomenon (Hassan, 2008; Rainie & Wellman, 2012), but the novelty of the network society lies in the influence of new information technologies, whose logic of networking and speed mediate the functioning and experiences of society. The surge in social networking via platforms like WhatsApp presents the new 'social operating system' of the network society. This is a sociotechnical system in which the boundaries of physical social networking and online social networking collapse into each other to form a new layer of reality (Rainie & Wellman, 2012). These assertions offer key perspectives for understanding the sociotechnical scene of blockchain through its production and existence on WhatsApp.

Digital connectivity is however not so ubiquitous for many African communities. The continent has over 90% of the world's digitally marginalized population with only about 22% connected (Delaporte & Bahia, 2021; International Telecommunication Union (ITU), 2021). The National Communication Authority (NCA) in Ghana reports that, at the end of the third quarter of 2021, the mobile voice subscription penetration rate was 135.67%, while subscribers of mobile data represented a penetration rate of 75.62% (2021). Notwithstanding the high digital access rates that these figures signal, factors such as the large swathes of rural regions with meager connectivity demonstrate that access is not ubiquitous. On a positive note, the continent also has the fastest digital growth rate in the world, averaging 20% since 2019 (ITU, 2021). Indeed, many urban communities live largely networked realities owing to the spectacular diffusion of mobile technology (GSMA Connected Society, 2020; Ngari & Petrack, 2020). It is safe to say that "[t]he local cannot be considered without the global in Africa today and local realities are being shaped and reshaped in view of global connections" through the appropriation of digital innovations (de Bruijn & van Dijk, 2012, p. 5).

The rapid expansion of digital connectivity in Ghana powered by mobile technology operates in tandem with the possibilities for growth and innovation with blockchain. Digitization trends highlight the immense value that information and knowledge have in the global system of informational capitalism (Castells, 2009). It is noteworthy though that such concepts operate with universalistic perspectives on the value and effectiveness of new digital technologies. They propagate prevailing value systems especially from the Global North which could contribute to creating and concretizing digital divides (Birhane, 2020; Dutta, 2011; Schech, 2002). Critical scholars roundly criticize these dominant paradigms as intellectually ethnocentric and self-seeking, with hegemonic ideals that mostly favor the interests of the Global North (Birhane, 2020; Dutta, 2011; Melkote & Steeves, 2001; Rogers, 2006). Additionally, the focus on the phenomenal possibilities of digital innovations is an exercise in conjecturing rather than offering evidence of reality (Graham et al., 2014; Schech, 2002). Flor (2015) for example, emphasizes the

inherent difficulty in examining macro-level economic data to establish a direct link between the objectives of information communication technology (ICT) interventions and positive outcomes. In this respect, although adulatory claims about blockchain's potentiality to enable agency at grassroots levels are increasingly commonplace (Kewell et al., 2017; Kshetri, 2017; Swan, 2015), the power dynamics of the society could generate a contrasting account, as this paper's empirical data on blockchain's sociotechnical scene shows. Certainly, this innovation is experiencing deep interest which is spurring rapid expansion, but it is primarily urban and participation in its scene appears to be limited to specific groups.

3   METHODOLOGY

As a social inquiry, this study took an interpretive approach involving approximately one-hour semi-structured interviews with 33 participants from March 2019 to May 2020. Employing the digital domain is a research instrument (Quinton & Reynolds, 2018), my initial recruitment efforts were through social and professional media platforms like LinkedIn, and Twitter. I searched for people who identified themselves with such terms as blockchain enthusiasts or professionals or aficionados. I also read through news articles on blockchain in Ghana and searched for persons mentioned who worked in some capacity with the technology on social media. These online communications, however, proved largely unsuccessful. I then attended a blockchain meetup event, and through my socialization with other attendees, I connected with my first participants. From this point on, I employed the snowball method by asking participants at the end of interviews if they could connect me with other contacts.

Interviews as a qualitative method are vital for revealing the contextual intricacies of respondents' motives, behaviors, and actions. Hence, I chose semi-structured interviews to achieve an adequate exploration of the perspectives and meanings that undergird the processes and structures involved in the sociotechnical environment (Wong, 2008). The research's units of analysis were blockchain enthusiasts who work as independent traders or were involved in various blockchain-based projects. Beyond excluding minors, I did not exclude any respondents because of age. In addition, I was open to interviewing people regardless of their socioeconomic or educational standing, nationality, or belonging to any other social grouping, as long as they engaged actively with blockchain in Ghana. I sought to interview 15 men and 15 women to present a balance of lived realities and gendered perspectives. It was, however, very difficult enlisting female participants due to the underrepresentation of women in the space. I eventually engaged with 33 participants because three women responded to my participant recruitment communication after I had already interviewed 30 respondents. I decided to interview them anyway because they boosted the number of women participants. I ended up with 12 women and 21 men.

Considering that this is a snapshot of the blockchain ecosystem in Ghana at the beginning stages of its diffusion curve, an in-depth semi-structured interview format was valuable in widening the breadth of information that respondents gave. It also enabled rich descriptions and an exploration of the perspectives and meanings that frame processes and structures (Wong, 2008). The multiplicity of meanings and interpretations that I obtained from respondents' experiences lends credence to a system of validity that does not privilege single perspectives (Boddy, 2016; Eisenhardt, 1989). Additionally, I consider my sample to have been largely illustrative, in that 33 people of such diverse backgrounds, interests, and experiences offered a splendid vista of the blockchain community without claiming representativeness. However, this number of participants also established adequacy in my description of the scenescape on the basis of commonalities in the information (Boddy, 2016; Morse & Field, 1995). To wit, by the 20th interview, I had reached information saturation. Conversations with respondents did not provide fresh insights beyond the data given by the previous informants (Creswell, 1998; Taylor et al., 2015). This, therefore, bolsters the generalizability of this study's outcomes as the parameters of the data collection, analysis, and contextual interpretation of the findings are transferable (Carminati, 2018; Delmar, 2010). In carrying out the investigation, I sought to answer the following primary research question: what is the role of WhatsApp in enabling a digital scene for the circulation of information on blockchain and cryptocurrency-activities? A secondary question guiding the analysis was: what are the relational dynamics of members of the scene?

4   CONTEXT OF BLOCKCHAIN IN GHANA

The introduction of blockchain in Ghana was largely erratic. One would be hard-pressed to pinpoint a cohesive entity or event as the main initiator of blockchain's introduction and spread as it occurred in uncoordinated spurts of adulations and enthusiasm. The primary data on which this paper draws reveals that participants either got to know about blockchain from reading online articles and blogs to keep abreast of emerging digital technology or through conversations with friends and family. Over 90% of participants emphasized that irrespective of how they found out about the innovation, they educated themselves by researching the characteristics of blockchain and the possibilities that it presents. Members of the blockchain scene have very varied professional and educational backgrounds. For instance, Ayebia[1] is an assistant program officer with the Environmental Protection Agency and Ebo is a chartered financial analyst. A university professor, Lamptey, teaches courses in design and entrepreneurship and heads his university's design lab, while Yao is a veterinarian who used to be a forex trader and saw the opportunity to transfer his trading skills into the crypto sphere. There is also an accountant, students, and several self-employed entrepreneurs. One of the most interesting

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[1] All participants' names are pseudonyms

cases of professional crossovers is a nurse who opted not to practice in his field to dedicate himself fully to trading in cryptocurrencies.

Most people's engagement with blockchain is on an individual or small-scale level, with the exception of a few major organizations. An example of the latter is Ghana.com. A participant, Nhyira, provides client support for two of the company's blockchain platforms. One of these is a blockchain-based agro-industry supply chain platform which connects agents like farmers, transportation providers, creditors, and donors. Another notable organization is Kumasi Hive, which specializes in fast-tracking the adaptation and contextualization of digital technologies in the Ghanaian context. Adom explained the strides they have made in propounding blockchain through training programs.

> I just saw the possibility of it after reading it, in our local context, what it can do. So, I just pushed for it. So, I got some of our team members to specialize in it. We got content and all that, so then we built the content and then, we run some of the first blockchain training programs. And then built further content, and then built applications from it (Adom).

Notwithstanding the broader permutations that these organizations are spearheading, blockchain in Ghana has a decidedly fintech face, it is primarily used as a digital technology in the financial sector. This mirrors its dominant global implementation as a technology for monetary transactions (Poux & Ramos, 2022). A respondent, Sisi, points out that "[S]ome do investments in the blockchains, some also are merchants because basically, here in Ghana… what we do is we patronize blockchain mostly in cryptocurrency." The other participants' quotes below explain the primacy of cryptocurrency trading (especially Bitcoin).

> In terms of the different sectors within the blockchain space itself, there are people who are involved with the day-to-day trading of cryptocurrency. And that is actually very huge here in Ghana. I would say that it's probably the bigger sector in the space (Azindoo).

> So far, the people I've met, especially in Ghana, are people who (are in) the cryptocurrency bubble, they were interested in 'I want to buy Bitcoin, so what's blockchain?" Then they started getting into it (Nhyira).

The predominance of cryptocurrency merchants evinces the perception of low barriers to participation in the scene. Some participants explained that one does not need specialized education to buy and sell cryptocurrencies. As Manste put it, "[A]nyone can take it up. You don't have to be an IT person, so even a nurse and a janitor and all these people, and a lot of students, go out taking up trading now." The singular focus on cryptocurrencies has resulted in many members' insufficient knowledge about blockchain's multifaceted applications. Correspondingly, the interview data shows that Bitcoin, cryptocurrency, and blockchain appear to be interchangeable terms for some. Participants also recounted that the emphasis on cryptocurrencies is largely due to enabling socioeconomic circumstances in the financial sector which played the most prominent role in the innovation's adoption

and spread. Advocates hyped blockchain as an indubitable solution for mitigating these deficiencies.

One of the enabling factors is the substantial gap in financial services for the huge economically marginalized population. A significant percentage (80 – 90%) of Ghanaian workers is reportedly employed in the informal sector (Ghana Statistical Service, 2016; Osei-Boateng & Ampratwum, 2011). This means that most workers are subject to varying levels of vulnerability including low and irregular wages, and a lack of written contracts to ensure job and income securities. In addition, many do not have the identity and other formal documentation necessary for accessing financial institutions' services like bank accounts, investment, and credit facilities. Cryptocurrency schemes therefore provided investment prospects for people for whom the more established investment avenues are inaccessible. The study's respondents noted that with the increasing popularity of cryptocurrency trading, public opinion framed it as an avant-garde innovation with high profit margins. This impression attracted a lot of attention and caused people to invest in cryptocurrency assets.

The hype of blockchain being a get-rich scheme came to a head when Bitcoin's value first skyrocketed to about $20,000 at the end of 2017. Several small-scale financial institutions emerged with investment offerings based on Bitcoin and other cryptocurrencies. With minimal accessibility to investment options, people turned their attention to these new opportunities.

> I'm very curious so I turned out to be researching on new technology. So, it was much more of a research work. And also, well, what actually drew my attention was when Bitcoin was sold at $20,000 per coin, it actually made me think that oh, this is something that is profitable (Ayebia).

> So, I was in this (WhatsApp) group, and somebody told me that, oh there is this… get rich scheme. Yeah, it sounded interesting to me, like, I spoke to the guy, and I joined, like, I wanted to learn more about Bitcoin. But because these people normally they do not want to explain things to you, they just need your money, so … I got into the crypto space after I decided to do my own research (Baaba).

According to respondents' submissions, information about these companies and their high-profit margins spread through WhatsApp. They were successful especially because of people's propensity to make transactions through brokers or middle persons rather than doing so in their own stead.

Another factor that fueled the hype is its promise to address society's bottlenecks, an example being the high instances of land insecurity due to the insufficient digitization of land records. In general, the formalization of land titles is low in Ghana. In peri-urban areas, about 80% of land transactions are informal and not legally registered (Aitken, 2016; Picarelli, 2017). Meanwhile, the largely paper-based registration system is beset with issues such as inconsistencies in demarcation and location coordinates, misallocations of ownership, and double

selling of plots with consequent conflicts involving the different owners (Obeng-Odoom, 2016). In 2018, the Government of Ghana signed an agreement with IBM to develop a land registry database on a blockchain platform. Bitland Ghana is a start-up that has also leveraged the capabilities of blockchain as a decentralized ledger for land registration (Amlanu, 2018; Bates, 2016). These initiatives highlight the advantages of blockchain as the technology's decentralized nature and immutability mean that corrupt interests cannot change records. Legitimizing land ownership with the improved registration system that these projects offer will create additional value for properties, thereby generating capital. Owners could use them as loan guarantees, for instance. However, as one of this study's participants asserted,

> You cannot just come in and migrate old records that have issues into a blockchain that will be immutable and transparent forever. No. So everything needs to be … reset. So, if we are talking about lands, education, finance and all that, look, the authorities, the regulators, they don't even have the will to reset everything. So, it doesn't work here (Yoofi).

Yoofi is doubtful that blockchain would work in this sector because digitizing the already existing records would need an extensive overhaul as the many errors in demarcations and inconsistent ownerships taint the records considerably. Corrupt data does not become accurate just by putting it on a blockchain network. If errors are included at the point of digitization, blockchain's immutability quality will further compound this and make contestation a difficult arena to navigate (Kriticos, 2019).

Despite the proclivity of blockchain to address identified problems, there is also a disparaging aspect of its hype which has prevented widespread adoption by everyday users in Ghana; a deluge of duplicitous schemes surrounding cryptocurrencies. The scams are as varied as people's imaginations. In some cases, they entice people into investing in cryptocurrency trading companies (mostly online) with the promise of shockingly high returns. The frauds flourished because many did not know exactly how to purchase crypto assets or understand the principles of owning and maintaining wallets. Hence, they would be deceived into paying monies to an entity to have them purchase coins on their behalf and manage their digital wallets without them having any access to them. After a period, they would find out that the company was fake, and the website had vanished along with their funds. The incidents are common because of the pervasive use of middle persons. These are essentially investment and trade brokers, a characteristic of finance sectors. Their entrenched popularity is particularly interesting because their presence contrasts with the decentralizing capabilities of blockchain. People's reticence to engage directly in the space reveals perceived barriers that do not align with blockchain's democratizing affordance.

Participants pointed out that fraudulent activities in the blockchain scene thrive because its operation in Ghana, particularly through cryptocurrencies

trading, does not conform to any specific regulatory framework. In fact, both the central bank, The Bank of Ghana (BoG), and The Securities and Exchange Commission (SEC) (which oversees the capital and securities market), have issued public notices cautioning people against holding and trading in cryptocurrencies. They stated that pending further investigations before integrating blockchain innovations into national digitization efforts, they are presently not regulated (Otoo, 2018; Securities and Exchange Commission, Ghana, 2019). Considering the magnitude of activities in the space, which prompted these notices, the government's inaction on providing policy oversight enables a tacit permission for their growth. While governments endeavor to spur a thriving climate for technological innovations, they intentionally or not enable permissive regulatory environments which facilitate digital progress while allowing negative acts to flourish (Donovan & Park, 2019). In Ghana's example, the laxity in providing guidelines makes it difficult to directly address the rampant scams.

> There are times that I have lost money to fraudsters and scammers... some friends who are not into Bitcoin, you know, when you talk to them about it, they think it is a scam. They think you are a fraudster (Afiba).

> About Ponzi schemes… it has dented some of my relationship with people… introducing somebody to invest his money, somebody invests like $200, $500… But then in the end whatever they put in they didn't get all back. So, the relationship with those people became somewhat, you can't tell them anything, they'll be like you made them lose their money and stuff like that (Kodzo).

Like Afiba and Kodzo's experiences, many traders shared stories about how they have convinced friends to invest in schemes that turned out to be hoaxes. In several instances, they play the role of brokers or middle persons for friends and family who are interested in investing in cryptocurrencies. These situations have tainted their relationships with these personal networks as scammers cause them to forfeit their investments. At the same time, these unfortunate occurrences have impeded their business progress due to the loss of crucial earnings. Although these incidents are deplorable, they show the tenacious faith that cryptocurrency merchants in Ghana have in the innovation's growth. Even with the losses they discussed, they reported that their negative experiences do not deter them from continuing to trade.

5   SCENE OF CONVERGENCE AND DIVERGENCE

WhatsApp is the most used social media platform in Ghana. A survey of internet users' self-reported social media usage showed that 89.9% of them are regular WhatsApp users, compared to 73.7% and 61.9% for Facebook and Instagram respectively (Kemp et al., 2022; Sasu, 2022). What makes WhatsApp particularly appealing is that it requires low internet data usage. This is significant considering the high internet fees and sometimes unreliable network access. As long as one's digital device has an internet connection, calls and messaging services are free.

WhatsApp is also the most common interpersonal source of news and entertainment with rampant sharing of texts, images, and videos. It has a voice message function and thus is the communication tool of choice for people who lack literacy skills as they can send messages without needing to type. WhatsApp groups are also popular for connecting large numbers of people around common interests. Added to these is the end-to-end encryption which protects users' calls and messages (WhatsApp LLC, n.d.-a). It is safe to say that the application has transformed the media and social interaction ecosystem in Ghana, given the extent to which it has contributed to interconnectivity among individuals and communities (Boyd, 2019; Koomson, 2020; Pindayi, 2017). It provides a sphere for interactions that are unencumbered by the structures and regulations of society. These values further enhance its usability in the decentralized and unrestricted peer-to-peer exchanges that are intrinsic to blockchain.

It is not surprising therefore that blockchain's adoption and spread in Ghana is principally engineered by the digital connectivity and communication channels presented by WhatsApp. Almost all research respondents asserted that WhatsApp is the primary location for their entire interaction with clients and colleagues for cryptocurrency trading activities. Thus, it not only facilitates communication in furtherance of their business, but it also serves as a cryptocurrency exchange platform. For instance, Yao and Dewa advertise their services and trade interests using the status update feature. The WhatsApp business app takes these affordances to an even higher level by giving users the ability to create business profiles with publicity catalogues to market services and products (WhatsApp LLC, n.d.-b). Similarly, the digital platform is a force in streamlining the activities of the Afroblocks community; the most organized and consolidated group of blockchain enthusiasts whose WhatsApp group platform has a membership count of 200[2]. This is where they share information on events and current affairs, broker deals, and establish business alliances. Perusing the contact numbers of members lends credence to the global linkages between this blockchain scene and others the world over. Although the majority of numbers are Ghanaian (142), the rest of the country codes are affiliated with 16 other countries: Nigeria, the Bahamas, Rwanda, New Zealand, Tanzania, South Africa, the United Kingdom, the Netherlands, United States, Canada, Mauritius, Senegal, Lebanon, Ireland, the Gambia, and France[3]. The foregoing qualities exemplify Straw's framework of features that are characteristic of a scene; while localized, they operate without specific boundaries, their activities inculcate commercial interests, and their operation is a mesh of varied but connected activities (2004). This is also a convergence of varying levels of situatedness. It is a community of people who operate in simultaneously multi-

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[2]As of May 1, 2022

[3] While these area codes do not prove the current locations of these contacts, they demonstrate the multiplicity of geographical affiliations of members.

dimensional localities via the interweaving of their physical locations and their virtual connectedness (Woo et al., 2015).

Like the virtual scene based on common musical interests that Kibby (2000) analyses, a significant feature that delineates this digital space as a blockchain scene is members' participation in varying trans-local and international collectivization engagements through their shared enthusiasm for blockchain innovations. Some participants detail several instances in which they have collaborated with other members to advance their collective trading and investment interests. They regularly share information about price drops on popular coins and Initial Coin Offerings (ICOs) that seem like good deals. They also pool resources to invest in cryptocurrencies and share the profits after they sell them off.

> So, we are kind of helping each other. Because individually, most couldn't have afforded the minimum token, I think the minimum token that you need to get is either 30 to 50…tokens before you can participate. That will cost you around…$1,500 or so. So, some couldn't afford it on their own (Yao).

The group that Yao invests with is not always made up of people he knows. He trusts them because he has had previous dealings with some members. A key measure of trust on which they operate is that no one must be a stranger to everyone in the group; each member must know at least one other person. The group represents the need for necessary communality in specific instances where individual endeavors would not produce the gains that mutually beneficial solidarity could (Blum, 2001). Yao extoled the benefits of these alliances because of the monetary and social benefits he has gained, "for me I will say it has helped me because I have made new friends and my old friends have evolved now, we put funds together, make profits, and share."

Other collaborative actions in the scene include measures to protect their collective interests from fraudsters. Participants discussed instances in which they alert each other to possible scams. Afiba is a member of over 40 WhatsApp cryptocurrency trading groups, which has garnered her an extensive network of contacts. People therefore rely on her experiences to decipher who is trustworthy. Some traders even have her certify a group as reliable before they decide to join them. If she has never interacted with the administrator(s) and some traders on there, those seeking her approval would refrain from interacting with that group. Other respondents like Yao also discussed how they alert each other on their various group platforms by circulating the usernames and phone numbers of people who attempt to defraud them. They would do the same with a company which is offering investment schemes that seem too good to be true. These are iterative processes of resource and information exchange which members enact to sanitize and shape the space towards the maintenance of a mutually beneficial socio-economic structure (Grimes, 2015; Woo et al., 2015). Paradoxically, although studiously guarded against, the very disruption that fraudsters insert into the space is an attribute of the

scene in that it highlights the community consensus on the behaviors and actions that one must display to merit membership (Blum, 2001).

A third form of collective action is the educational and mentorship relationships that people establish with other members. Especially for those who are not well-versed in various aspects of blockchain, they described instances where people have been willing to show them the ropes. Such occurrences demonstrate that the blockchain scene is constructed in part by these practices of overt sociability that further their common economic interests (Straw, 2004). As Manza details below, the atmosphere of support and knowledge sharing has enhanced her experience as a trader.

> [E]ven though there isn't so much information out there yet because the whole industry is still young, people that are already in it, like your predecessors… are very eager to share knowledge… It doesn't really matter whether the person is a Ghanaian, is in UK, Canada… so long as you challenge the person, they want to tell you everything, their experience, they are happy to, you know, let you know what is there, what you should look out for… so that has… I guess contributed positively to my interaction (Manza).

Both Yao and Sedem stated that they are intent on widening participation in the blockchain space. Yao for instance is an ardent forager of ICOs. He has set up WhatsApp groups to educate cryptocurrency novices on how to make profits on airdrops and ICOs. Sedem is a teaching assistant at a public university and has also formed WhatsApp cryptocurrency meetup groups for students to disseminate information about trading and investment. I must note here that their activities are of course not entirely altruistic, as they both benefit from these assemblages they establish. Sedem invites his online contacts to his paid in-person meetups where he provides more extensive information than they would get on the virtual group chat. As for Yao, he sometimes earns more coins or tokens depending on how many ICO referrals he makes, hence his WhatsApp groups double as recruitment sites. The particularities of networking observed in these interactions, ease of trans-local assembly, transitions between types of relationships, while faithfully advancing commercial pursuits, combine to promote a 'scenic' perspective on the space. They outline specific affordances of the digi-spatial configuration of WhatsApp which connect community members in the scene via shared ideals (Woo et al., 2015).

Sedem and Yao's actions lead me to a discussion of the market principles that are thriving just as well as the gestures of collectivization in this blockchain scene. In applying the concept of scenes here, I elucidate the specific socio-economic relations enacted by community members, and how these are facilitated by the space that WhatsApp provides. Straw posits that scenes have embedded practices of commercial mechanisms and consumption which underlie the engagements between members (2004). In the specific case of this digital space, the market relations are key to sustaining the very existence of the scene as the main pull for participants is economic gains from blockchain innovations. This invites an orientation that acknowledges a structure of socio-economic networks and practices

as well as attendant conventions which identify its unique 'scene perspective' (Woo et al., 2015). As demonstrated above, members of this scene invest time, knowledge, and expertise to enrich the capabilities of other constituents. In the same vein, these mentorship relationships encourage a social formation where the social and cultural relations are not devoid of the focus on economic gains (Blum, 2003). Sedem and Yao's underlying motives for sharing their experiences and knowledge display varying levels of capitalistic self-interest in the commodification of interactions. Similarly, members also maintain loose and ephemeral affiliations especially with trading and investment groups insofar as those align with their objectives. With their activities being limited to economic collaborations, it is easy to switch from one group to the other depending on their interest, trust levels and the opportunities for trading and other deals. Despite this transient nature of their memberships, they are hardly completely disconnected from all groups since WhatsApp is their primary economic space. It is therefore a unique constellation of established and transient connections anchored in the enabling characteristics of WhatsApp which give meaning to their existence (Woo et al., 2015) and thereby facilitates a coherence that conforms to the specificity of the scene (Straw, 2004). The only personal information that they usually have concerning the other members is whichever identity markers they choose to use as their profile names. However, some of them develop wider relationships among themselves outside of their interactions on the group chats. These relationships remain almost entirely online or via phone calls; they hardly ever interact face-to-face. They have a more stable relationship with the Afroblocks group, however, since it is not a space dedicated to trading but to generalized networking.

> [E]specially the Ghana Blockchain (society) and some other group that I am on…those ones sometimes we discuss other types of blockchain, how we can utilize other areas. But my other groups all that we care about is the crypto coins and currencies, how we can make our profits and go away (Yao).

Considering this dynamism of association, the blockchain scene does present a unique characteristic of linked fragmentation. During the breaks of the blockchain meetup mentioned in previous sections, I found out that most of the attendees with whom I spoke came solely to physically socialize with other enthusiasts because the social dynamics of the blockchain scene were grounded in anonymous virtual connections. This desire for more meaningful in-person networking that they espoused revealed the extent of the superficial virtual associations between participants. In operationalizing my snowball technique to recruit participants, many intimated that they did not have any relationships with the people they recommended to me beyond WhatsApp chats on cryptocurrencies. In most cases, they did not even know their real names. The culture of maintaining distances is so ingrained that out of the 33 interviews, only two were in-person. Almost everyone preferred to communicate via WhatsApp or, in a few cases, via phone call.

I found that it is not only the entrepreneurs who guard their privacy so intently. It was the same with the respondents who also engage in other activities besides trading and investment, like designing and developing blockchain programs. They do not readily share or disclose their blockchain innovations with other members of the scene even if they are acquainted. My first encounter with this mistrust was at the aforementioned meetup. An attendee mentioned he was working on a blockchain application, and I eagerly asked him for more details. He was resolute in his refusal to discuss it. He explained he did not want his ideas to be copied, he would only talk about the product after its launch. The quotations below illustrate this observation and show how their surreptitious activities are amplifying the impression that there is very minimal application design and building in Ghana. Apart from their personal endeavors, each participant only seems to know of the few standout applications that have had some publicity in the media.

> I've not seen anyone in the country with as detailed technical knowledge as he has, but if there are, maybe they are quiet. A lot of tech people are quiet, they sit down, and they don't say anything (Mantse).

> I don't know if you know so much about Ghana, people don't brag and walk around and do publications about things they do, like you do in Canada, no. Everybody keeps their thing until it's ready. Right, so currently there is no blockchain solution that's working in Ghana. Ecampus is the closest. Even that you don't want to claim we are working, we want to keep it on the cool. Because there's no legislation and all of that. So, if you make too much noise they'll kill it before you even start. So, we are all being careful (Yoofi).

> I do meet up with some people, but you see one thing is… most of these organizations they have their own hidden agenda. Sometimes you go, it seems you are there with them, the next time… they have taken your idea and they are doing it on their own, so that is why sometimes we become careful in terms of sharing or meeting (Atoapem).

Participants acknowledge here that it is common practice for people involved in designing and building blockchain applications to not share information on their projects. Yoofi's biggest concern is being shut down by the government due to the lack of legislation. In the instance where the government declares blockchain illegal in Ghana, he would not face any repercussions because he is carrying out his activities clandestinely, "on the cool". I found it interesting that about 64% of community members are connected to each other through their Afroblocks membership and are participants in the WhatsApp group platform. This is a highly interactive group with regular conversations on current national and international affairs on cryptocurrency and blockchain. In our conversations, they admit that they know (of) each other in some capacity and also connect at hackathons, workshops, and other blockchain events. These interactions appear not to have generated enough trust for open conversations about their projects, however. The contradictions in relational integrity expand scene thinking into an interrogation of

the conflict between competitive isolation and the desire for necessary collectivization. The ambiguous relational constitution of members is also an effect of the "insatiable drive for maximizing profit and minimizing loss" which is a peculiarity of scenescapes (Blum, 2001, p. 25). The preservation of concepts deepens competitiveness among blockchain enthusiasts and puts them forward as experts with unique competences in certain aspects of the innovation.

Some attributed these distanced relationships to a general mistrust born of the duplicitous schemes that have racked the space. Additionally, with people clamoring to be pacesetters in the game, safeguarding their intellectual property might guarantee their lead. These stories reveal an interesting contrast with interactions that some participants reported having with international contacts. Kobe for example refined his concept for a blockchain-based agribusiness platform by sharing ideas with a Japanese contact he met through a blockchain group on Facebook. This indicates that they do not perceive stakeholders from outside Ghana as threats to their advancement.

The final aspect of the scene that I would like to highlight is the embeddedness of their digital activities in the underlying sociocultural setting of the physical world. The interpersonal and other dynamics of a scene maintain a complex correlation with the arrangements of the broader society from which it emerges (Straw, 2013). This underscores the import of spatiality and the ways in which its contextual intricacies inform the assemblage of enthusiasts in this blockchain scene (Straw, 2015). Indeed, expanding scene analysis to digital spaces necessitates an interrogation of their attendant realities of hierarchy and disparity. Grimes (2015) asserts the pertinence of analyzing the enduring impact of power relations in the processes and practices that constitute online scene geographies. In the broader context of digital inequalities and attendant power differentials, the gender gap in basic internet access in Ghana is 5.8%, while the gap in meaningful connectivity (taking into account average scores for regular access to the internet, access to an appropriate device, adequate data and fast connection) stands at 12.5% (World Wide Web Foundation, 2020). Studies show that digital inequalities reflect the same indicators that define socio-economic inequalities, such as income, cultural norms, infrastructure, education, ethnicity, and gender (Castells et al., 2009; van Dijk, 2020a; World Wide Web Foundation, 2020). For instance, many participants in this scene recount gendered sociocultural norms which derail women's participation and advancement in digital spaces. Proponents indicate that blockchain innovations possess transformative affordances to counter and destabilize the determinants of digital disparities (Schwab, 2016; Wajcman, 2010). Women, for instance, have the opportunity to develop new relationships with digital technologies that remove them from the traditional hierarchical gender establishments due to the emphasis on "brain rather than brawn, on networks rather than hierarchy" (Wajcman, 2010, p. 146-7). However, considering the mutual impact that technology and society exert on each other, realities of the material world seep into the digital as well, thereby inhibiting the advancement towards

erasing hierarchies (Wajcman, 2010). I examine the power relations of the blockchain scene through the impact of social capital on participants' activities. Bourdieu conceptualizes social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (1986, p. 248). Here, the male hegemonies that are so ingrained in the present blockchain community could be a condition that side-lines women's fair access and engagement. All the participants acknowledged that the scene was male dominated, and some of them even found it difficult to remember if they had ever encountered any women working with blockchain.

> [F]or a few friends that I have, when you talk to them about BTC, the girls especially, they are not really interested. So, you can't blame them, they don't have friends that are interested in stuff like that. For me, I'm mostly surrounded with boys so getting into that was quite easy… Because at the end of the day even if I want people to sell it to, it was easier for me because I was already surrounded by boys (Dewa).

Dewa recognizes that the average woman whose social network does not include men is more likely not to encounter blockchain. With the ICT space being dominated by men, having the right connections means one has the benefit of access to information and a ready market. Other female respondents reiterated these assertions. Accordingly, Yoofi acknowledged that his social connections helped promote his professional development in ICTs. After he dropped out of school and moved out of his parents' home, he spent all his time with his network of friends at a popular ICT center, Busy Internet. This was integral to deepening his involvement with ICTs and his eventual uptake of blockchain. Kobe also credited his circle of friends for the successes he has had so far in cryptocurrency trading. As was the case with Yao's experience, they pool their resources together to invest in initial coin offerings and split the profit.

Many female respondents conversely affirm that they do not have access to appropriate social and professional networks especially in the ICT space. Thus, they are less likely to have the resources, information and relationships which would motivate their participation and augment their skills. Considering the negative connotation that blockchain has in Ghana, someone who does not belong to a social network in which a change agent has a favorable relationship with blockchain would be relatively less willing to adopt it (Atuahene & Owusu-Ansah, 2013). Edem's case exemplifies his social capital through a positive change agent that facilitated his membership in the scene. His initial encounter with cryptocurrencies repelled him because the person who introduced the innovation to him told him it was for fraudsters. He only got involved years later when someone else gave him a more positive perspective and taught him the necessary trading principles.

Ultimately, the affordances and constraints of Ghana's blockchain scene on WhatsApp have been integral to the development and evolution of blockchain activities. In Manza's words,

> [I]f we didn't have these kinds of platforms, the WhatsApp ones, to actually trade in with the coins that we buy or acquire… (it would) have been extremely difficult to actually get Bitcoins or any other coins in Ghana… So, they are like, they make things so much easier. So, this is a very positive thing. And there are good people there that are willing to do a few things. But at the same time there is the negative aspect which is, it's easy to get scammed or deal with fraud out there because… you don't know anybody there… but it's also very important.

6 CONCLUSION

As a new media innovation that is enjoying exuberant acclamation as the future technology to reconfigure all aspects of human societies, blockchain's fame is global. Its use in Ghana is a reflection of the worldwide emphasis on cryptocurrencies, although there are several blockchain-based projects in such sectors as agriculture and land registration. The fact of it being at the beginning of the diffusion curve makes this study opportune for establishing a baseline of relevant elements that make up its scene so as to understand the nature of its evolution. Due to the rapid transformations in digital innovations and corresponding mode of engagements that people have with them, this is a snapshot of the permutations of a scene at a specific moment in the early stages of blockchain adoption. Significantly, its scene in Ghana is primarily an urban space whose existence is driven by their use of the WhatsApp social networking application. It is constituted by a loosely connected collectivity of individuals and groups engaging in social and pecuniary activities with and around blockchain technologies. Members' activities are therefore influenced by a combination of their interests, the affordances and constraints of both blockchain and WhatsApp, and the sociocultural conditions of the material world. It is important to establish that respondents demonstrated their participation in a symbiotic relationship between the narratives and relational practices that shape the scene, and how the scene in turn impacts their engagement with blockchain. This is a predominantly virtual network of people whose activities and interactions in the sociotechnical environment are undergirded by principles of individualized entrepreneurship and buoyed by necessary (but superficial) communing to advance their individual economic pursuits rather than any notions of a fixed community (Straw, 1991). Indeed, their affiliations to their various groups are as dynamic as the rapid innovation that blockchain is experiencing globally. The worldwide interconnectedness that a social media platform like WhatsApp occasions also engenders an atmosphere of support and knowledge sharing with both local and international contacts. Moreover, participants of blockchain platforms like Ethereum and Bitcoin are primarily anonymous, which is a unique characteristic contributing to the mode and scope of its adoption in Ghana. This is seen in the

easy adoption of anonymity on a platform like WhatsApp which would ordinarily encourage more in-depth and personal relationships.

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