Literature Review of Blockchain Technology

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ABSTRACT: *Blockchain is another innovation with solid ramifications for the eventual fate of how we trade data and money as a comprehensively organized society. It is new to the point that there is moderately minimal scholastic work done on it, yet this is evolving rapidly. For this writing survey, we have started by gathering an example of principally peer-inspected sources, and additionally an educational diagram of articles from different channels. Our determination of articles enables us to give an agent perspective of three essential points. In the first place, a portion of the essential current themes being talked about with respect to blockchain innovation. Second, the agent classifications of said points. Third, the potential fate of blockchain improvement alongside its effect on society and innovation.*

Key Words: *Blockchain; Digital Currency; Bitcoin.*

I. INTRODUCTION

Blockchain innovation is very new. Wikipedia characterizes it as "a constantly developing rundown of records, called squares which are connected and anchored utilizing cryptography" (Wikipedia and Contributors, 2018b). In this paper, we will distinguish a delegate review of flow topics in blockchain look into and examine future ramifications and our proposals. While blockchain isn't surely knew, it is developing quickly as a medium, and it is an extremely hotly debated issue in current media. Be that as it may, drifts in media frequently don't line up with patterns in research, so this is likewise a great exercise in perceiving how slants in scholarly, peer-evaluated explore distributions covers an inclining subject. In the no so distant past there were not really any scholastic articles whatsoever on blockchain, anyway this is evolving rapidly.

In this paper we will give a diagram of current subjects in scholarly productions and considering three primary inquiries with respect to blockchain. We start with the subject of what blockchain is. We at that point portray the strategy that we used to gather our information and proceed onward to investigate the topics that we have found. This is trailed by exchange of the inquiries of why blockchain is essential and how it is as of now utilized, alongside our suggestions. We finish up with an outline and our musings about the potential and requirement for future research on blockchain.

II. WHAT IS BLOCKCHAIN ?

We intend to answer the accompanying inquiries top to bottom: What is the square chain? What are a few classifications and patterns of square chain? What are the social and mechanical ramifications of the innovation? What is the eventual fate of square chain? We are then prompted the inquiry, what makes these inquiries so vital? What is their significance? To begin, we can return to the start. The square chain was at first uncovered in a paper called "Bitcoin: A Peer-to-Peer Electronic Cash System" by an obscure creator utilizing the nom de plume Satoshi Nakamoto. It was never distributed in a companion explored diary (Nakamoto, 2008).

As to Bitcoin, Pierro portrays each Bitcoin as a number, and that these numbers are the answer for a condition. Each new answer for the condition creates another bitcoin and the demonstration of producing an answer is designated "mining." Once mined, a bitcoin can be exchanged or traded, and each exchange produces a section into the blockchain's action log. This is frequently alluded to as a "record." What makes the blockchain champion is that the record isn't claimed or put away by one organization, yet rather every exchange led has a duplicate of the points of interest of that exchange put away on each PC that was a piece of the exchange.

(Pierro, 2017) goes on help depict the blockchain as "a table with three segments, where each line speaks to a particular exchange, the primary segment stores the exchange's timestamp, the second section stores the exchange's points of interest, and the third segment stores a hash of the present exchange in addition to its subtle elements in addition to the hash of the past exchange. By giving a period stamp and the past exchange, parties wishing to confirm this information can gaze it toward any point, and since it says the past

exchange, it winds up conceivable to track the history without breaking a sweat. There is some security set up to keep the individuals who were not a piece of the exchange from survey insights about it. The hash said before as section three that gets populated amid the exchange is a scrambled series of letters and numbers that is created to conceal information about the exchange.

Since each exchange's hash would then be able to be utilized to distinguish the past exchange's hash, it makes it exceedingly impossible for misrepresentation to happen. With every exchange containing a receipt of the past exchange, sums can without much of a stretch be followed back to the simple start. An attribute that would make about each bookkeeper's activity less demanding as there would not be any more lost receipts or miscounted sums. Every exchange is a screen capture in time that all with the correct authorizations can see while stowing away on display.

(Pierro, 2017) Blockchain innovation isn't constrained to cash however; since every exchange in the record is only a string esteem, exchanges can simply be followed. Cook County in Chicago has been utilizing blockchain innovation to track land titles as they change proprietorship. Essentially, the blockchain is a connected chain of squares of information (Pierro, 2017).

III. METHODOLOGY

We started our inquiry with a question on the UT library online server. Scanning for the watchword 'blockchain' yielded a strong blend of media sources. As anyone might expect, daily paper articles were the most astounding with more than 23,000 passages. Add up to diary articles were numbered about a tenth of that for daily papers, coming in at a little more than 2,000. There were almost the same number of magazine articles enrolled as the diary articles, yet this isn't illustrative of aggregate magazine articles in nature. Pamphlets had just shy of 800 passages and books around 150. While peer-investigated diary articles were our center, it was intriguing to see the numbers as an examination. In the wake of investigating the aggregate number of sections, we balanced our question to just show us diary articles. We worked our way down from the best, and chose articles that appeared to be both important and valuable. At the point when at that point started to download articles and search for subjects. We at that point made a rundown of topics and we abstained from downloading in excess of one article for each subject. We gathered around 20 articles from associate explored diaries that we feel to be illustrative of the present writing. From these articles, we could locate various agent topics inside the present writing. While these subjects in no way, shape or form speak to the majority of the patterns in current blockchain writing, they do give an extremely delegate review.

IV. FINDINGS/THEMES

As said previously, our hunt yielded around 20 current subjects in the writing. We have incorporated a table demonstrating every one of the topics underneath, which incorporates everything from past surveys, to ideas of back, administration, advanced education, to story. Also, we included surveys for about portion of them in this rendition of our audit, and will incorporate them all in the last form.

4.1 Current Research - A Systematic Review

Yli-Huumo, Ko, Choi, Park, and Smolander present a methodical audit peer-looked into papers distributed up until 2015. It appears as though they could just discover 41 peer-surveyed articles distributed by 2015. A standout amongst the most fascinating things that they call attention to is that 80 percent of the articles they found were on the utilization of blockchain for Bitcoin – a digital currency. In spite of the fact that concentrating essentially on digital currency was a solid plausibility for such a survey, they picked rather to center around specialized issues with blockchain – security, execution, adaptability, and so on. They additionally found that the examination was essentially concentrating on protection and security in blockchain and uncovering confinements.

After a broad prologue to blockchain, they give an outline of the strategy they utilized for their orderly mapping examination – which is very like what we are improving the situation this present investigation. Their four research questions tended to: themes tended to in flow investigate, applications produced for blockchain, momentum inquire about holes, and future headings for blockchain. They started by laying out the databases they used to scan for their writing, at that point depicted their screening procedure. They at that point removed catchphrases and information from modified works. Notwithstanding themes and distribution date, they additionally considered the source – industry or the scholarly world – and the geographic area. Besides, they considered the production compose: gathering, workshop, diary, book part, and so forth. At last, they distinguished three diverse paper composes: blockchain report, blockchain change, and blockchain application. A great deal of this procedure was mapped out in broad data stream outlines and tables.

In their survey, they found around five essential points in the blockchain writing: security; squandered assets; convenience; protection and brilliant contracts, digital forms of money, and dependability. They found that the greater part of the examination concentrated on enhancing current blockchain advances, and a considerable measure concentrated on security and protection issues. Conversely, very little of the examination concentrated on alternate issues, similar to ease of use and squandered assets. Curiously enough, a ton of the examination around then centered around Bitcoin (Yli-Huumo et al., 2016).

4.2 Themes

Table 1: Matrix of Current Topics and Potential Future Ones

Current research - review	Food Security	Banking
Securities services	Adoption of blockchain tech	Product traceability
Economic Benefits	Property - legal ownership	Narrative
Beyond blockchain	Regulation	Corporate governance
Environmental governance	Real estate	Socialism
Finance	Higher education	Sharing services
City Planning		Management / employment

4.3 Current Research - A Systematic Review

Amid primer research we found an article examining the ebb and flow condition of blockchain explore. In it Yli-Huumo et al. present an efficient audit of 41 peer-explored papers distributed up until 2015. From the manner in which they talk, it appears as though they could just locate an aggregate of 41 peer-investigated articles now. A standout amongst the most intriguing things that they bring up at the simple start of the article is that 80 percent of the articles they found were on the use of blockchain for Bitcoin – a digital money. In spite of the fact that concentrating principally on digital currency was a solid probability for such a survey, they picked rather to center around specialized issues with blockchain – security, execution, adaptability, and so forth. They likewise find that the exploration was fundamentally concentrating on protection and security in blockchain and uncovering confinements.

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4.4 Finance

Depending on Blockchain contends different money related advantages of blockchain innovation. The creators begin by utilizing a bank for instance and every one of the assets that are basically squandered because of putting away and represent all exchanges themselves. (Cocco, Pinna, and Marchesi, 2017) contend that less assets utilized, be it hard drives to store their data to the additional power expected to keep running in not just cost banks more cash than a record worked from a blockchain, yet result in less assets being utilized. Subsequently, this would help nature as it would mean less electronic waste and vitality utilization. Besides, the expense of a blockchain exchange has turned out to be more affordable as the normal of intensity utilization per exchange (estimated as Wattage over Gigahash every second, or the measure of power that one billion little assignments devours). As the innovation turns out to be more across the board, the innovation turns out to be more productive. In October 2014, this power utilization was appraised at 0.69 W/GHps and almost two years after the fact in September 2016 it was down to 0.099 W/GHps a meager 14 percent of the vitality cost . Because of the increasing expense of Bitcoin, intrigue has likewise risen bringing about more mineworkers which is the reason for the more effective exchanges which

the paper contends counterbalances the extra expenses of expanded power utilize and mining equipment costs. After the asset contention, the article turns to address the natural security inside the record because of its capacity to keep record of past exchanges in the prior one. This new record would enable the bank to keep more secure records that are less inclined to be messed with while likewise enabling them to have the capacity to have a more legitimate view into potential venture openings, it would be more obvious in the event that somebody attempted to rapidly cook the books (Cocco et al., 2017).

4.5 Securities

Another analyst Tranquillini expounds on the capability of blockchain innovation in the securities business, and less about blockchain innovation itself. He utilizes a past article by teachers Benjamin Edelman and Damien Geradin distributed in Harvard Business Review on the utilization of blockchain advances in the buyer merchandise industry as an establishment to display an attack into the capability of such advances into the securities business – of which he is a specialist. He investigates current issues with the wellbeing and soundness of European monetary markets and government control. His article serves more as an outlet for his scholarly   thoughts on the capability of the use of such innovation to the securities business as inserted inside the socio-administrative controls of European gauges. All things considered, he maintains a strategic distance from a specific ends and resolves that execution of such innovation would be troublesome, best case scenario, and that it won't occur whenever sooner rather than later. (Tranquillini, 2016)

4.6 Food Security

In a short correspondence with Nature magazine (Ahmed and Broek, 2017), a few scientists from Montana college sort out a few developing patterns to represent the need and potential for blockchain advances for sustenance security. The key issue in this issue is traceability of sustenance items, from their sources, on all through their circulation systems, and on to their last client. Blockchain could help forestall extortion and avert – or if nothing else address – issues of sustenance borne sickness.

4.7 Product Traceability

Lu and Xu give a case of how they sent blockchain innovation in an arrangement of item traceability in China (2017), yet call attention to that it has some inborn difficulties and restrictions. To reaffirm the constructive outcomes, it can help guarantee the security of traceability information that is both straightforward and sealed. Then again, on the grounds that the information on blockchains ceaselessly develops it is fundamental to consider what information is put away "on-chain" and "off-chain." While traceability information and brilliant contracts are perfect to store on blockchain, a ton of data is just too substantial to be put away in blockchain or should be kept private. This implies notwithstanding when blockchain innovation is utilized, it must be done related to other information stockpiling strategies. This a be extremely precarious and muddled, also the difficulties of appropriation of the innovation in general.Blockchain is new and dynamic, and this makes it an intense offer for gatherings who are impervious to change.

4.8 Environmental Governance

Chapron focuses to the difficulties of legislative debasement in natural supportability. He puts forth a defense for the one of a kind record capacities of blockchain in empowering "four wins" of cryptogovernance: proprietorship, traceability, motivating forces, and policymaking. Crypto innovations make an exceptionally solid potential for confirming responsibility for "from a birth endorsement to a fish or a woodland" (Chapron, 2017) Tracing physical merchandise all through their item lifecycle can likewise be more outright through such advancements. Impetuses are likewise solid for ecological administration, in that trades needn't bother with banks and can conceivably maintain a strategic distance from budgetary and legislative defilement through more straightforwardness. Policymaking concerning natural issues can likewise profit by crypto advancements through increment straightforwardness and responsibility.

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4.10 Management

Another article we ran over is more fixated on being an utilization case. The article itself for the most part talks about how significant organizations in each industry (from Google to Disney) are putting genuine cash into looking into the new innovation to decide how it may profit them. It proceeds with a reproduced extract from 'Blockchain Revolution: How the Technology Behind Bitcoin is Changing Money, Business, and the World' by Don Tapscott and Alex Tapscott that takes up 80 percent of the site. In the passage, the Tapscotts discuss how blockchain innovation could be utilized by enrollment specialists recently. Given blockchain's capacity to return and take a gander at history, conceivable future managers could take a gander at a potential worker's whole history and look at conceivable examples. It could conceivably wipe out any worries about employing somebody who consistently substitutes their slip-ups onto others. They contend that this innovation when utilized in this way could upset LinkedIn as it would give an open history of all progressions a man makes and would not be liable to a similar security concerns or information pillaring that LinkedIn manages (Tapscott and Tapscott, 2016).

4.11 City Planning

"Smart cities" refers to city planning involving three primary factors that would allow a city to thrive through social sharing of goods and services. Those three primary factors being the human element, improvements and implementations of technology, and citywide organization to bring them all together (Sun, Yan, & Zhang, 2016).

As human populations worldwide continue to expand, "more than half of the global population now lives in urban areas, and an additional 2.5 billion people are predicted to move to cities by 2050" [Sun et all. citation here]. Due to the problems that come from these surging urban populations, residents find themselves with various problems such as traffic, pollution, and waste that are only getting worse (Sun et al., 2016).

Fortunately there seem to be a number of technological innovations that look to alleviate some of these problems. For the sake of simplicity, we will primarily focus on the platform of vehicle sharing which addresses the three big concerns mentioned previously. Through vehicle sharing, fewer cars need to be on the road, resulting in less pollution through exhaust, and less waste as fewer cars would need repairs. So while the human and technological aspects of a smart city have no been addressed, a perceived concern for this social model is a lack of public trust and this is where blockchain technology comes in.Through increased and decentralized record keeping that the blockchain affords, previous issues such as "fraud, liability, and unskilled service providers" (Sun et al., 2016) would no longer become a concern. With less risk and increasing reward, the third primary factor, a city-backed blockchain platform based at organizing and tracking all of these interactions could be the guarantee that would allow such a smart city to develop.

4.12 Property - Legal Ownership

Ishmaev in his paper brings up the notion that "implementation of complex systems of smart contracts and decentralized organizations may rewrite the basic tenets of property law, constitutional rights, and even judicial enforcement of law" (Ishmaev, 2017). The implications of this statement break down into two main possibilities. That through the blockchain ledger, smart contracts can exist where every step of a contract can be monitored and archived and additionally, once conditions are met (say building a website for a person) that payment can be automatically applied to the contractor. Automation of specific steps could be set to automatically update the ledger allowing real-time tracking of progress in a way that allows transparency for both parties. The second legal breakthrough mentioned is that this technology could allow absolute tracking of property. Goods and resources that are a part of this system could have their histories tracked. While this is somewhat practiced with certain high value goods such as houses, cars, and various antiques. A decentralized system would allow for much broader transparency of ownership. A bike could be stolen and all a potential new buyer would need to do would be to input the serial number and see what the history of the item is. It could be like a free CarFax for everyday items. Similarly, the implications are perfect for tracking arranties. No longer would laptops need to register for warranty, it could be automatically built in and automatically transferred to a new owner. With the concern of theft of goods, this would make it much easier for police to recover stolen devices. This would be a strong blow to counterfeiting as a decentralized archive of ownership would make fraud considerably more complicated to pull off as validation of authenticity would be easily available (Ishmaev, 2017).

4.13 Narrative

Maxwell, Speed, and Pschetz (2017) explore the theoretical possibility of applying blockchain technologies to narrative and storytelling. They use a Research through Design (RtD) approach to explore blockchain as an analogy for sharing information and stories. Through a series of workshops, they explore the possibility

of blockchain technologies being used to share culturally situated stories. The three analogies employed for their workshops were: the ledger, the blocks and the mining process. The ledger experiment looked at how an oral storytelling approach changes the way stories are shared across a network. Perhaps the most interesting insight in this study was that of Scottish storytelling. In traditional Scottish storytelling there is this idea that the ancestor who passed along the story you are telling is looking over your shoulder, and the one who passed that on to them is looking over their shoulder, all the way back to the original storyteller. This goes back all the way to the original storyteller, which is similar to the way hashes are carried over from the last block to the next, and this continues all the way back to the "Genesis block." Another interesting extension of the blockchain as storytelling device analogy is in their comparison to oral culture and collective memory. They make the point that group memory as a whole is a form of collective knowledge, functioning much like the way blockchain technology allows for the collective recording of transactions – beyond the capacity of what any one individual computer (or person) can store on their own. A collective knowledge system allows for cumulative information sharing as a whole, and provides relatively unlimited storage potential.The authors make it clear that their experiments were not intended as a validation of hypotheses on the potential of blockchain technology, but rather to explore the possibilities of how blockchain technologies might be used for such things as storytelling. They go on to explain that they are also very interested in how such technology can become an essential component of our modern culture.

4.14 Higher Education

Tapscott and Tapscott (2017) assert that blockchain is the most important technology for higher education as we move into the future. They offer warnings of what will likely happen if such technology is not adopted, but also encourage us to explore the vast possibilities of how the state of higher education might be improved through blockchain technology. They identify four areas for innovators to focus on in higher education: student records, pedagogy, costs, and educational models (or the meta-university). Key to their argument is the concept of value and how the internet is very limited in this sense. The internet allows us to share information, but when we share documents and files, we're sharing copies, not the original. They point out that the blockchain can be used to store just about any type of information or data that is important to humankind. It can be used to store every single piece of data about people throughout their entire lives. This technology can, and in their view will be, used to record educational achievements throughout the course of How as well. As technologies like blockchain become more and more intertwined with jobs and employment in the 21st century, they also explain how higher education will be pushed to assimilate or lose its relevance. While it is not easy for institutions of higher education to change, they argue that the move to blockchain will likely force them to find ways to stay relevant.

4.15 Socialism

Huckle and White argue that blockchain as a currency is a boon for both Libertarian and Socialist ideologies.On the surface, it would seem like an odd correlation, given how the two are generally at odds about how the government should handle money. Yet, they argue that this technology is a boon for Libertarians, as it takes the money out of the government's hands and puts it back in the hands of the people. This allows for a reduced role of the government. Additionally, transactions would not need to be vetted by a financial institution in such a system. As a result, the government would not be on the hook for faulty transactions. This is similar to the current function of the Federal Deposit Insurance Corporation (FDIC). For these same reasons, Huckle and White believe that it is a boon for socialists as well. By removing these financial pillars of government and government-backed insurance, greater power would given to individuals. This could allow for greater transparency in banking, which would make sure that everyone is given fair treatment. In a different use case, blockchain's ability to function as a ledger could allow labored hours to be properly tracked and logged in a decentralized nature. Manipulation would be considerably more difficult to get away with, allowing citizens to make sure everyone capable of working was working (Huckle & White, 2016).

V. DISCUSSIONS, IMPLICATIONS, AND RECOMMENDATIONS

5.1 Why

We have discussed what the blockchain is, but why should anyone care? For seemingly being a rather ambiguous technology to the general populace, a monetary application of the blockchain has garnered a large financial backing. With the price of a Bitcoin currently being valued at about ten thousand dollars (Wikipedia & Contributors, 2018a), it seems important to see why people are investing in it. As illustrated by the thematic analysis above, blockchain has implications for a wide variety of fields. Some are more hopeful, or seem more useful, than others. While it might be too difficult to see applying blockchain to really

intricate and highly regulated industries like securities at the moment (Tranquillini, 2016), we can see that it has already had some degree of success with things like product traceability (Lu & Xu, 2017). We have also seen that many researchers are confident it can be applied to things like food security (Ahmed & Broek, 2017), city planning (Sun et al., 2016), property ownership (Ishmaev, 2017), and financial transactions (Cocco et al., 2017). The implications and challenges vary greatly between each industry. For food security, the benefits are largely tied to product traceability and preventing such issues as fraud and transmission of foodborne contagions. The benefits for city planning are largely social and focus on helping people to navigate both the infrastructure and social parameters of a city – such as trust and transparency in managing decentralized work-forces. Finances are the most obvious application of blockchain. This technology has risen to stardom primarily through blockchain and other crypto-currencies. Currencies like bitcoin and ethereum were created for blockchain, and have witnessed explosive growth. There is a greater potential for blockchain technology beyond crypto-currency itself, and it has huge implications – from increased transparency, to minimizing transaction fees by bypassing third-parties like banks. While there are challenges in implementing blockchain technologies in these industries, the benefits seem to outweigh the drawbacks in many instances. Certainly, in industries like governmental regulation, corporate governance, and securities blockchain is but one potential component of massive distributed systems, and implementation is a very delicate process that takes time. While it is unclear as to how blockchain technologies will be implemented over time, it is clear that there are enough benefits for certain industries and sectors to begin implementing it slowly and with attentiveness. The next thing to consider is how this can be done.

5.2 Maturity Model

Technology is inherently prone to change and evolution over time to fit the needs its users, and the blockchain is no different. Blockchain researchers Wang, Chen, and Xu come to the conclusion that the technology is not mature enough for widespread adoption. Instead, they propose a three stage adoption procedure for qualifying a new system and then implementing it.

Stage 1 - Feasibility Study: There are six primary conditions for feasibility, and at least four must be met to determine if there is sufficient use for blockchain implementation.

1. "Multiple parties share data." Multiple parties must be able to access the data.
2. "Multiple parties update data." Multiple parties must be able to submit data.
3. "Requirement for verification." Multiple parties can validate the authenticity of the information, like an always available receipt of goods sold.
4. "Intermediaries add cost and complexity." No third parties are required
5. "Interactions are time-sensitive." This is necessary when timing is a factor.
6. "Transaction interaction." Transactions are interdependent upon each other for proper function.
7. "If it is determined that at least four of these requirements are met, then the blockchain is likely a worthy platform for the task.

Second stage - Development: This is where the requirements are gathered and the system is designed Third stage - Operation: This is the final stage, where implementation takes place after the blockchain system has been designed and developed to maturity. They go on to suggest that any existing systems be allowed to continue running while implementation of the blockchain system functions as a backup. Once it has proven itself reliable as a backup system, then it can be deployed as the primary system (Wang et al., 2016).

5.3 How

There is ample evidence that blockchain is currently being, and should be, implemented in industries where it is a good fit. But now that we know why, the question is how will, or how can, blockchain technology be applied to various domains? Every field and industry will be different, and one of the biggest considerations is what other systems to these fields and industries use. As mentioned in the previous section, fields such as government, finances, and securities will be some of the most difficult. Blockchain technology provides a public ledger, which is great for accountability, but can be a nightmare for keeping information private. One of the biggest challenges with the literature so far is that most of the research is still theoretical, and not applied. The article on product traceability by (Lu & Xu, 2017) was written by engineers who actually built a system that they have applied to real systems for tracking products throughout their life-cycle, from producer to consumer. Lu and Xu point out that the system cannot be a stand-alone solution. Blockchain technology works great as a publicly open ledger that shows where all the products have been, but it is not a great place to store massive amounts of data and it also does not allow for private information to be siloed away from the public facing information. This example seems like a perfect corollary for implementing blockchain technology in any integrated, and largely complicated, system. City planning, property ownership and organizational management seem like they would be very similar. Citizens want to know

about what is happening in their city, but there are certain details and data that do not need to be, and cannot be, public facing. There is certain information that would be great to host on a distributed open ledger, but other information that should not be. Organizational management and other such domains are no different. It is hard to have much foresight beyond this at the moment because blockchain technology is so new, and we are just really starting to see both the pros and cons play out in real time.

VI. CONCLUSIONS AND FUTURE WORK

With blockchain technology possessing such a large appeal, we are already seeing widespread adoption. As nearly every industry utilizes some sort of agile, record keeping practices, it is not unreasonable to expect to see this technology applied to a wide range of applications some of which are hinted at in our previous sections such as the potential for a smart city, while others are either still in development or have yet to be discovered. Furthermore, due to the peer-to-peer nature of the technology this technology and every stakeholder having access to their block of the ledger, cooking the books or falsifying data has never been harder. This alone has the potential to increase consumer confidence in these new technological disruptions. As with any new technology, the underpinnings are not well understood and for that reason it is difficult to say how widely adopted the technology will be. Future research should delve into these topics and new applied applications, as well as study adoption rates of the technology. For those who do adapt blockchain, further study would grant us insights as to what increases (if any) in productivity have been recorded. Studies may also focus on roadblocks as to why this technology has not been adopted as well as investigate trends in consumer confidence. Additionally, as technology increases, future studies may help shed light on any security issues not initially discovered. With what started as some posted code by an anonymous programmer with a goal of creating a new currency platform, blockchain has skyrocketed in popularity, with nearly every industry from finance and healthcare, all the way to education and city planning. In conclusion, blockchain technology appears to not only improve tasks in current industries, but also hold the potential to revolutionize systems that keep track of the history of artifacts through a vastly improved, transparent ledger system.

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