Conceptualization of Integrating Knowledge Blockchain and Big Data Analysis in Agriculture

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Abstract. The challenge and evolution of E-Agriculture in actions. E-Agriculture in 2018 Application of digital tool as blockchain and knowledge graph. Knowledge blockchain and big data in agriculture. Assessments may underestimate the annual global water scarcity, driven by seasonal water availability and consumption distribution heterogeneity. While remote water use sensors can yield vast amounts of continually refreshed ‘big data’, insights remain limited as does its accessibility to the non-specialist public. Yet, artificial intelligence (AI) can accelerate the discovery of complex patterns in big data on shifting water distribution by consistently executing small-scale scientific processes.

1. Introduction
Agriculture 4.0 all connected farming and internet of things [1]. Assessments may underestimate the annual global water scarcity, driven by seasonal water availability and consumption distribution heterogeneity [2]. These assessments however do not reflect how climate induces change in multi-scale water availability [3], since multi-scale irregular water resource spatial distribution escalates under climate change conditions, and irregular climate change impacts are related to geographic location. Using blockchain technology for a decentralized immutable public water transactions record [1], additionally ensuring trust and involvement in its data fidelity, data security, and data verification, may be advantageous even though it is argued that inefficiencies and ethical issues exist if applied in science [4]. Combining these mutually reinforcing technologies can demonstrate how we may increase public trust with automatic and conditionally implemented water use ‘smart contracts’, based on secure, immutable data; and how we may increase efficient optimization and validation of local water use data—a key driver in global scale ecosystem change studies and informed decision making. With a distributed intelligent approach to global water management, blockchain data securitization protocols converge with AI algorithms trained by remote sensor water data to distribute water [1]. This technology integration can yield advantages in efficient water abundance and scarcity pattern identification for equitable multi-sale water resource management under climate change conditions.

The economy and agriculture development process in Taiwan in 1950 until now. Self sufficiency production, light industry export, large scale industry development, economic liberalization promotion, information industry development, re-engineering and globalization.

2. Result and Discussions
E-agriculture or ICTs in agriculture is about designing [5], developing and applying innovative ways to use ICTs with a primary focus on agriculture. E-agriculture strategis will facilitate achieving the goals
set by national agriculture plans by addressing holistically the ICT opportunities and challenges for the agriculture sector. It would further enhance the potential for innovation in services and rational use of resources thereby increasing business opportunities, reducing risk and improving the lives of people in rural communities.

Big data in agriculture in essence, digital agriculture relies on quality data to gather information, improve decision making, enable innovative services and enhance communication amongst agriculture sector stakeholder [6]. Over the years, the role of information and communication technologies (ICTs) has evolved from using telephones, television, radio, computers and internet for end-user communication to using sensors and data analytics to help drive precision agriculture, improve yields, of supply chains, solution and management.

Big Data in Agriculture is a paradigm for enabling the collection, storage, management, analysis and visualization, potentially under real-time constraints, of extensive datasets with heterogeneous characteristics. The characteristics for Big Data in Agriculture are three as volume, variety and velocity. Volume is the amount of data collected, stored, analysis and visualized, which big data technologies need to resolve. Variety is a different data type and data formats that are processed by big data technologies. Velocity refers to both how fast the data is being collected and how fast the data is processed by big data technologies to deliver expected results. More data is not always better. In many instances, collecting a selected set of data streams regularly provides more value than aimlessly gathering a broad set of data. Accordingly, we need tools to deal with the data issues [6].

Application of digital tools. Blockchain new technology and Innovation was started in 1990 as the concept of distributed computing has been around. In 2009 Satoshi Nakamoto created bitcoin and introduced the concept of a blockchain to incarnate a decentralized ledger maintained by anonymous consensus. 2011-2012 the deployment of cryptocurrency in applications related to cash. 2012-2013 currency transfer and digital payment system. 2013-2014 financial market and application using blockchain beyond cash transactions. 2014-2015 was a smart contract. 2015-2016 permissioned blockchain network solutions. In 2016-2017 market consolidation and further sub developments. Concept of knowledge blockchain implementation in farm products. The product distributed ledger and traceability software network. Based on the analysis presented in the previous sections concerning the expansion of the cloud-based IoT networks created by new communication paradigms, we found that existing clouds cannot meet the need to ensure a completely distributed infrastructure for their executions [7].

![Figure 1. Distributed ledger and traceability software network (modified [7])](image-url)
Blockchain is a decentralized peer-to-peer ledger system of transaction record, which is distributed across a network of computers or databases. Type of blockchain divide in public blockchain, private blockchain, and federated blockchain. The properties of blockchain are decentralization, information cannot be changed, transparent trade-offs, and trade-offs able to be traced back.

The characteristics of blockchain are decentralization, conflict resolution, time stamps, tamper resistant, and Public Ledger [8]. At present, the representative products of blockchain technology in the industry are mostly related to cryptocurrency, but its technical characteristics and development potential also attract public sector investment and promote many experimental projects [8].

Blockchain implementation in agriculture in heat map blockchain startups transforming agriculture. This heat map illustrates the geographical distribution of oval 150 blockchain startups disrupting agriculture [9]. Blockchain implementation in farm products divide in 6 (six) categories that is integrating IoT monitoring information, big data analysis, production safety traceability, simplify agriculture finance service, simplify agriculture insurance audit and supply chain management. all of them have an important role to play in production traceability, circular economy application, digital twin, decentralized cloud and supply chain.

Blockchain will change food supply chain applications with balancing market access and food traceability. The combination of IoT, blockchain, machine learning, and artificial intelligence with knowledge are used to improve the building of a fully-transparent food supply chain with Solution with knowledge. Some platforms are built to provide growers and different players along the value chain for sharing data and tracking progress [10]. Integration of data and knowledge graph [11]. Agriculture production and ontology.

Application in traceability agriculture product. Knowledge blockchain and big data in agriculture. Which benefits do big data technologies offer for digital agriculture? Big data technologies and services offer significant benefits and can address challenges of heterogeneity and incompleteness of data [6]. Who are key actors in the big data agricultural ecosystem? Big data stakeholders more actors in the agriculture ecosystem. Big data services providers and big data services customers are more important than other big data.

![Figure 2. Traceability Agricultural Product](image_url)

3. Conclusions
Big data area creating and spreading a new technology paradigm for innovation in agriculture. The ability to big data offers considerable promise for agriculture and the lives of its stakeholders. Big data also brings new actors into the ecosystem. Government needs to work together with the agriculture stakeholders to create an enabling policy environment.
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