Title :

Blockchain development to enhance the performance of logistics service provider networks

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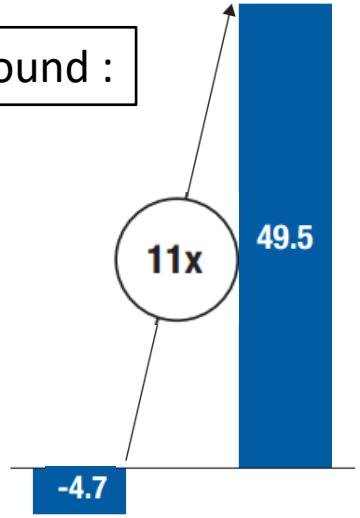
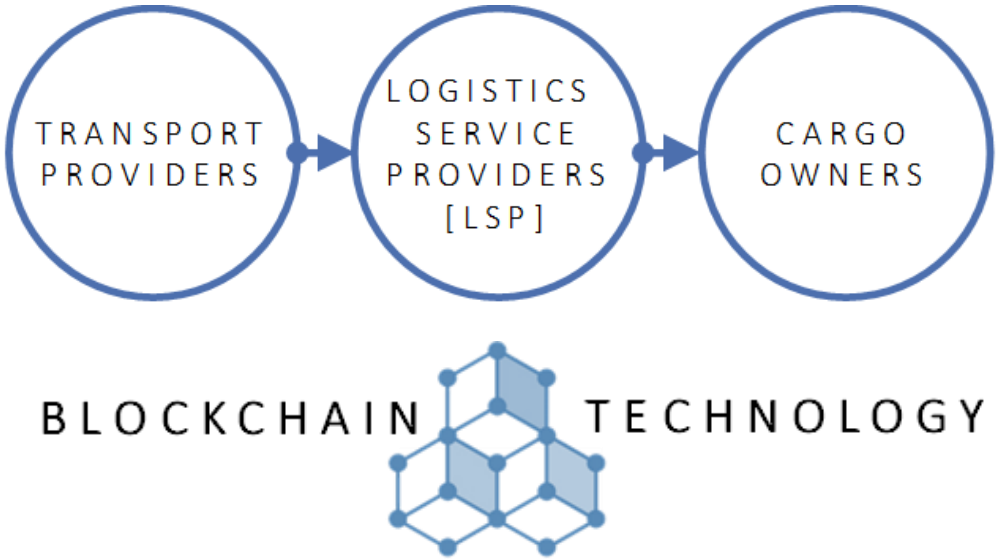
Project Title: Blockchain development for the LSP network

Background :

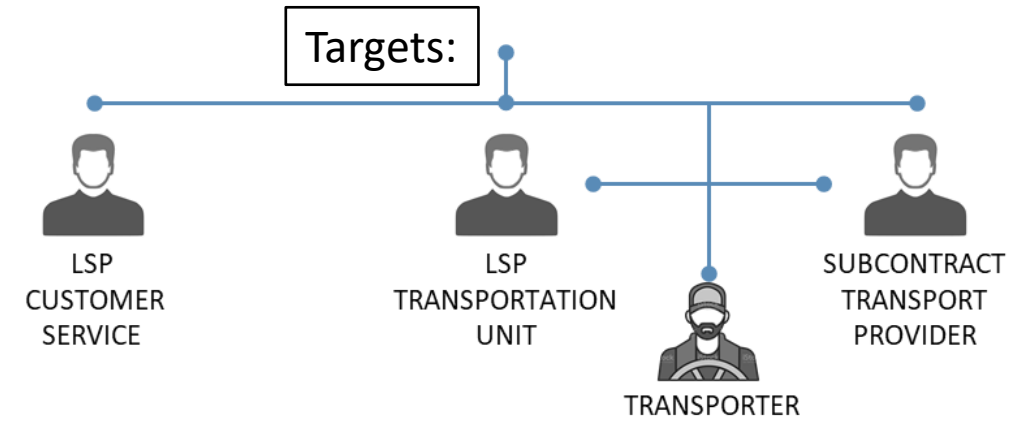


ASEAN: cross-border sales, 2020 to 2021 (Billions of dollars)
Source: UNCTAD



- Logistics services the most important contributors to ASEAN's exports and imports, accounting for the majority of *ASEAN trade* such as cross-border sales
- Blockchain can handle an issue of *information loss* from start to finish of chain due to the numerous of supply chain players
- Companies reduce *logistics expenses* around 25% through blockchain technology, lead to outstanding performances in transaction cost reduction (*Volt Technology, 2019*)
- A *prototype blockchain* for a logistics service supply chain, the goal of improving efficiency, traceability, and real-time sharing in the local small and medium logistics service supply chain to drive ASEAN's economy

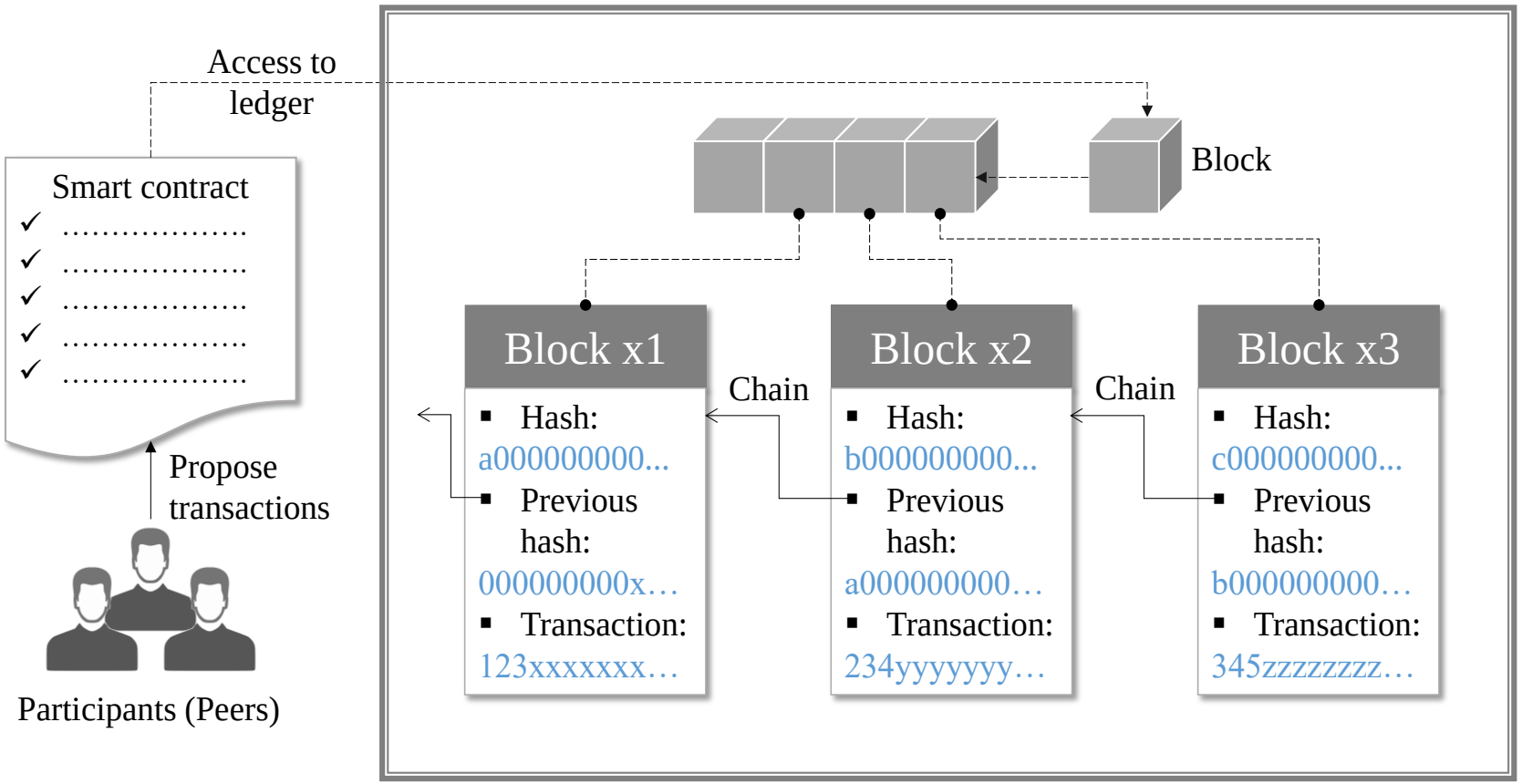
Project Title: Blockchain development for the LSP network



- A small and medium *Logistics Service Providers' (LSPs)* knowledge on blockchain technology
- Kick-start the blockchain adoption to reap the benefits of disruptive technologies in their *logistics business operations*

- *Customer service of the LSP* receives a requirement the cargo owner
- The information is distributed to the *transportation unit of the LSP*
- The transportation unit considers the company's trucks, provides detailed job information to the *truck drivers*
- Order the transport work to the *subcontractor transportation provider*
- The job is forwarded to the *subcontractor's truck driver*
- *Truck drivers* receive the information related to the loading and delivery of cargo according to customer requirements

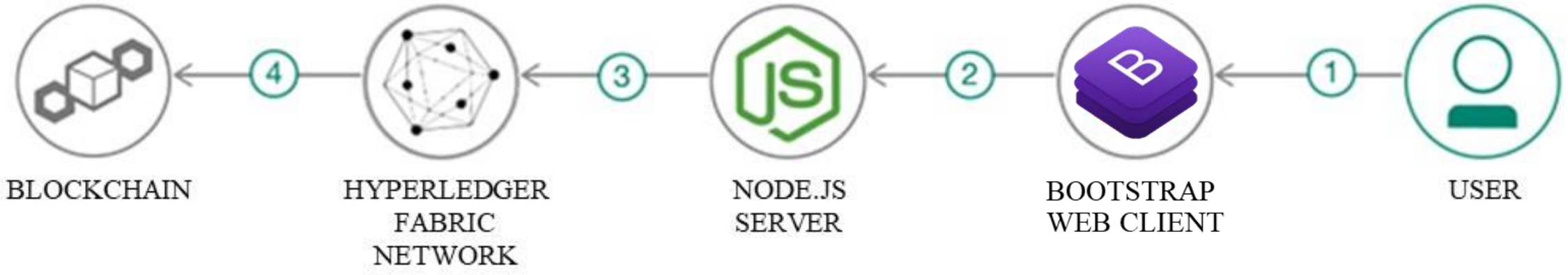
Proposed Method: Scientific and technological



A blockchain feature:

- A *peer-to-peer network* or a *decentralized* manner
- The peers host the *smart contracts* and *ledgers*
- The smart contract *(chaincode)* invoked to the *blockchain network*
- A *block linked* encloses its *hash* value
- Each block is linked to the one before it *(parent block)*, forming a *"chain"*

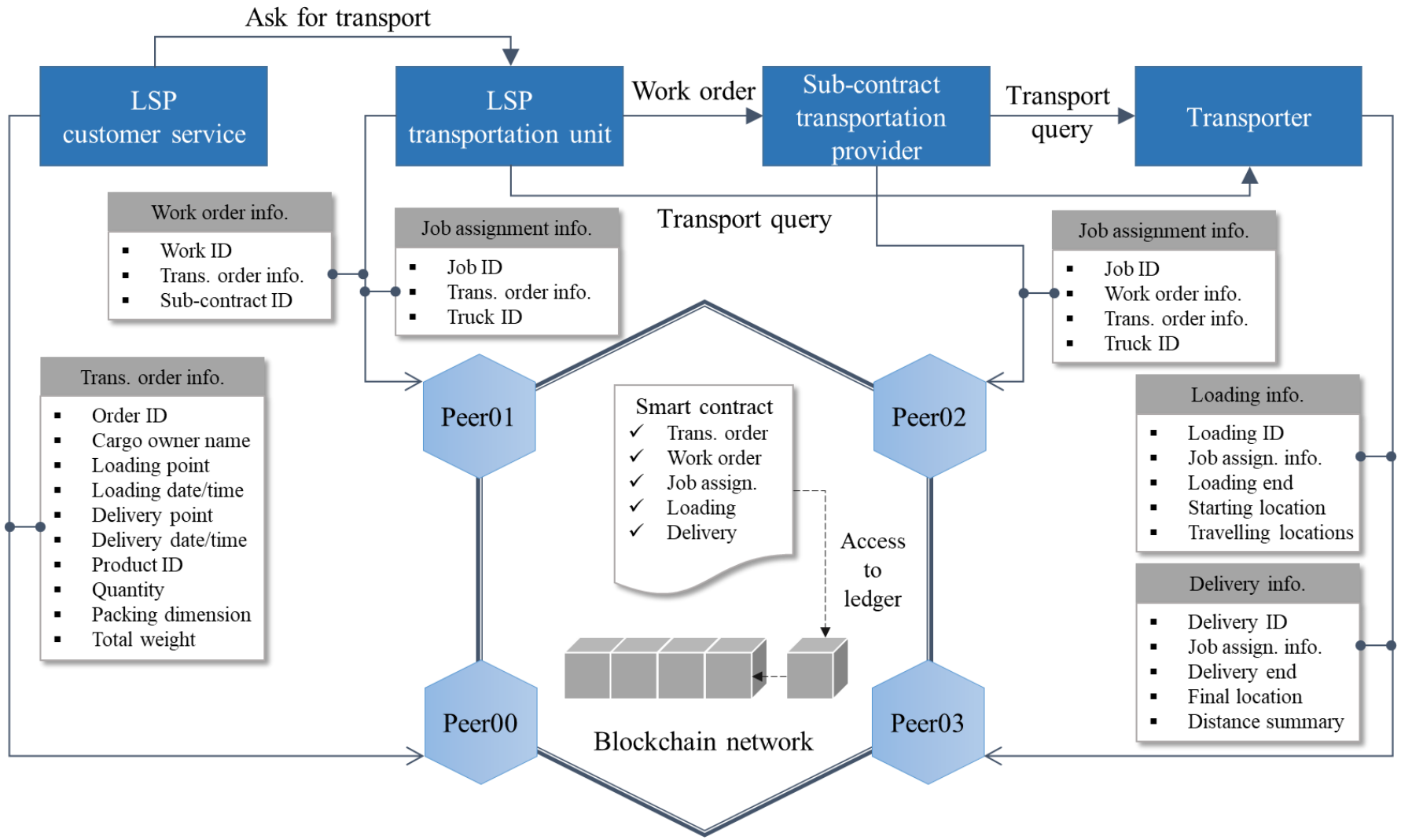
Proposed Method: Scientific and technological



The primary technologies to develop the prototype blockchain model:

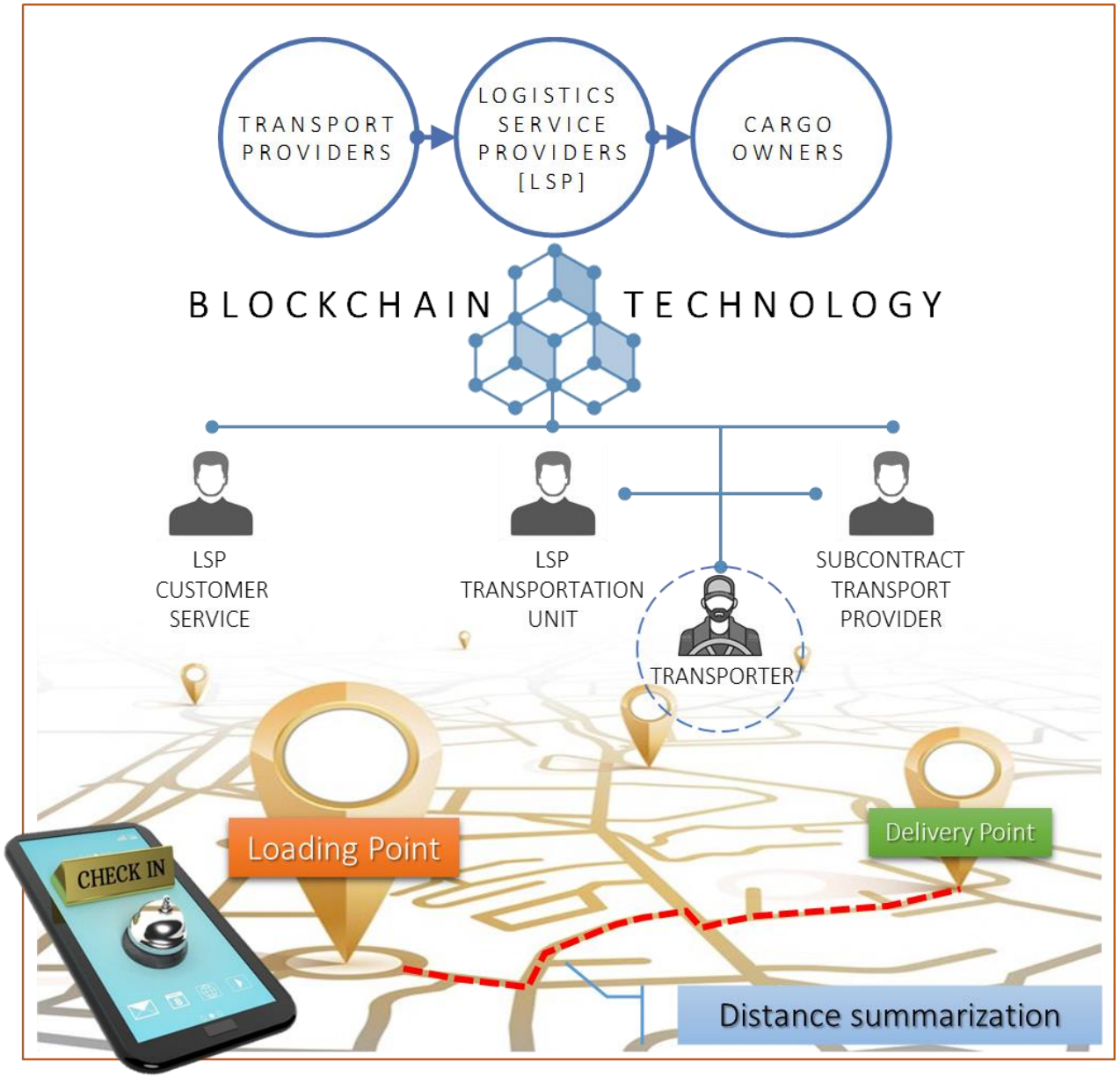
- *Hyperledger Ledger* is an open-source engine commonly utilized in commercial or private blockchain networks.
- *Node.js* is a free and open-source cross-platform Java Script runtime environment for executing server-side JavaScript code.
- *Bootstrap* is a framework for creating customizable responsive mobile and desktop web apps.

Proposed Method: Implementation



- *Peer00* first asks for transport to *Peer01*
- *Peer01* creates a transport query and share it to *Peer03* as one choice
- Another is *Peer01* submits a work order to *Peer02*
- *Peer02* creates a transport query and shares it to *Peer03*
- *Peer03* starts and completes the assignment
- All peers, especially *Peer00*, can monitor the entire process in real-time
- *Peer01* and *Peer02* can be tracked and traced right until the truck status to control and manage the fleet

Impact: Scientific and technological



- Suitable for collaboration and information-sharing platforms due to its main features of *decentralization*, *forge resistance* and *transparency*
- Overcome traditional client-server systems, data sharing between parties is a *complex process*, susceptible to a variety of cyber-attacks
- Required platform in the logistics domain because almost all data is *confidential* client data
- An important foundation for the development of *Logistics 4.0*

Impact: Societal and Collaborative

- *Communication* between LSPs and their partners is a key driver in developing *flexibility* and *collaboration* capabilities in the logistics service supply chain context
- LSPs must persuade their customers to share useful information about operations and logistics. An LSP, for example, can develop an information monitoring platform to facilitate *information sharing* with its suppliers and customers
- Local LSPs must *collaborate* with extensive business partners who have knowledge sources to provide *value-added* services to customers in the *innovative ecosystem*

Output: New applications of scientific

- A working model that satisfies the basic functions of a *tracking and tracing* system which is a key indicator of the performance of LSPs
- Improve the performance of the LSP blockchain by integrating the concept of IoT and cloud technology for *smart fleet management*

Outcome: Societal and Collaborative-technologies be transferred to companies

- A framework for blockchain development in the logistics service domain
- Aid in the *spread of development* for future development *costs will be lower*, the local logistics industry will benefit
- Global enterprises deemed blockchain technology critical, they made it a *top strategic priority* to increase their *annual revenues*
- Central to transaction performance and management, which will have a positive influence on *future costs and service times*

Conclusion:

- The development of *blockchain* technology for the logistics industry, i.e., a service sector that plays a key role in the development of the country such as *ASEAN*
- The application is realizable through the concept of a blockchain customization prototype model for *small and medium scale logistics service supply chain*
- The private blockchain platform of *Hyperledger Ledger Fabric* by integrating the concept of *IoT* and *cloud technology* is a consideration model
- Critical to improving the flow of *information* in the logistics business network and providing a higher *performance* of service *cost and time* to customers