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# Alternative Finance Technique in the Logistics Sector: Blockchain

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# Abstract

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- As a new generation financial concept “**Blockchain and Cryptocurrencies**”, which have rapidly entered into the world recent years, have intense effects on our social norms, financial system and business models in the industry.
- In this research, it is **aimed to examine the effects and contributions of innovative financial technologies that have developed with the intense digital transformation, which started with the concept of Logistic 4.0, through the sector.**
- Actually innovative solutions to be developed by the fintech companies are expected to emerge in the logistics sector in the coming years. As we are experiencing the financial opportunities offered by fintech companies in the world, the logistics industry can also take new financial steps forward in our country with the help of great technological opportunities.
- However, logistics service providers traditionally focus on the delivery of goods and can quickly adapt to the realization of the opportunities so that Fintech’s can present new techniques to their business processes. Both **fintech and logistics companies can provide significant added values to the industry by bringing their forces together.**

# Post-Pandemic Global Logistics Sector Overview

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- In Covid-19 period, ships from China that normally reach the US and European ports in **4 weeks** failed to travel to Europe in **12 weeks** during the full closing period of the countries. A container that was worth **\$2,500** was traveling to Europe for over **\$10,000**.
- China has become the world's factory in the last 30 years, making it able to do one-third of global production alone. Manufacturing and supply problems in South Asian countries such as China and Taiwan have resulted in the failure of Western automobile factories to produce for months. On the other hand, the world's e-commerce volume exploded with the Pandemic.
- For example e-commerce penetration came at **%50 in China**, surpassing **%30 in the Europe** and the **United States**. In **Turkey**, it went from **6% to 20%**. The pandemic has once again demonstrated that how the strategic logistics services are important. If you can't send the goods to your client in time, the fact that it's not yours indeed actually dominated the world economy.

# Post-Pandemic Global Logistics Sector Overview

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- Production had unwittingly shifted overseas (offshore) over the past 40 years. But the pandemic created a new concept: “**NearShore**” (**Close Production**). The global logistics market size grew by 4.5% year-on-year to **\$5.2 trillion in 2022**, according to the research results from the international market research firm called IMARC Group. The logistical ecosystem size exceeds **8 trillion dollars** when indirect market components are included.
- Road transports remains a global leader in the logistics sector. Globally, the road remains the dominant industry in transferring the products from one point to another. On an average worldwide, **70% of freight transport is done by roads**. The European Union average is about 75%. It's 70% in the United States and 60% in Britain. **In Turkey, 90% of the transports is done by roads.**
- The impact of COVID-19 on global trade and all labor has been highlighted as a major factor increasing **the pressure for digital transformation in logistics**. E-commerce is growing at a rapid rate beyond predictions. Not only has the pandemic accelerated growth in e-commerce, it has highlighted visibility and operational transparency among firms on the B2B side, the supply chain leading to acceleration and prioritization of innovation agendas.

# Digital Logistics Solution Platforms



# Fintech Services

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- **Fintech means financial technology** as a word and incorporates many innovative innovations in the financial sector. Over the past 10 years they have signed many new financial solutions, especially in the financial literacy and education sector, retail banking, financial investments and digital currency encryption, the decentralized financial world, digital crediting and logistics sector.
- As the logistics industry has continued to grow and become more complex in recent years, we may see more and more of the **supply chain processes** develop with the confidence in the **power of blockchain technology** in the coming years.
- While globalization has caused problems for shipping companies and retailers in the past, increased links between countries and trade, the blockchain has largely raised inefficient practices, cyber attacks, and other issues. In addition, the **blockchain application provides companies with healthy data to track the movements of shipping containers, identify time-wasting steps, and plan simplified routes for the future.**

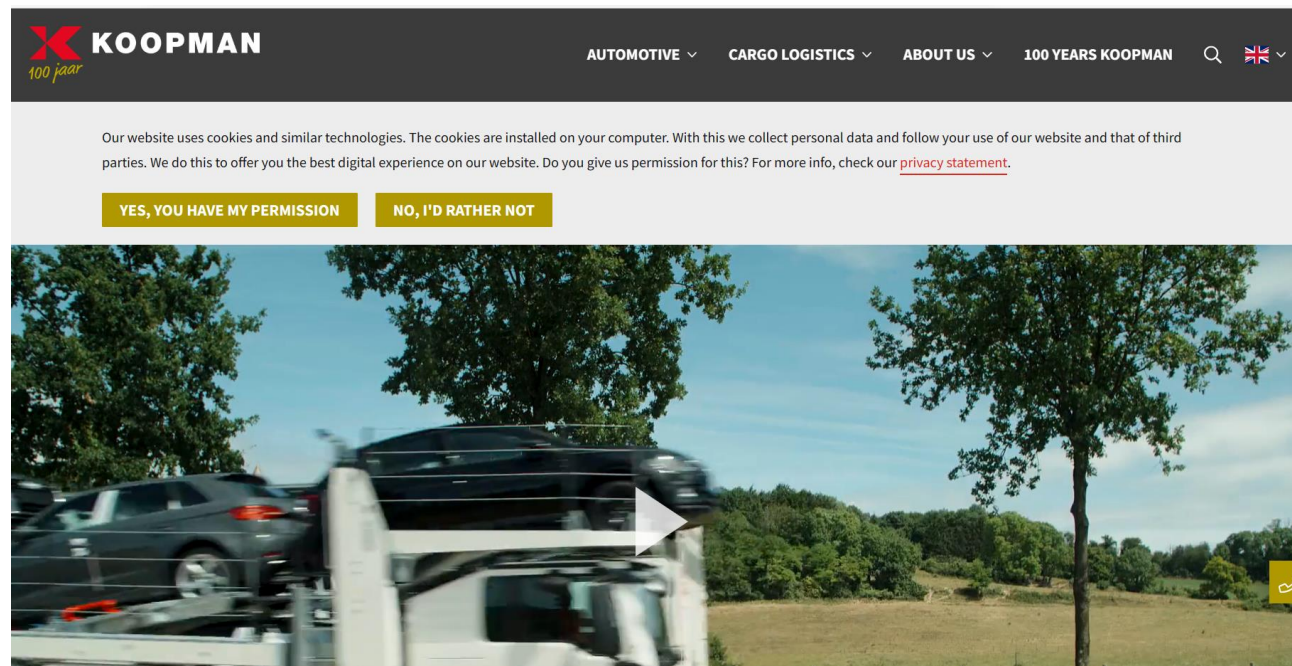
# Slync.io (<https://www.slync.io/>)

- Slync.io brings together **Blockchain** and **Artificial Intelligence** to provide retailers, manufacturers and suppliers with real-time information about all their local and global shipments. The platform allows movers to automate monotone workflows, anticipate bottlenecks or challenges in the logistics process, and even provide a real-time perspective on shipping activities. Slync.io is a SaaS operating platform for global carriers and logistics service providers that deliver greater productivity and process efficiency through intelligent automation systems.



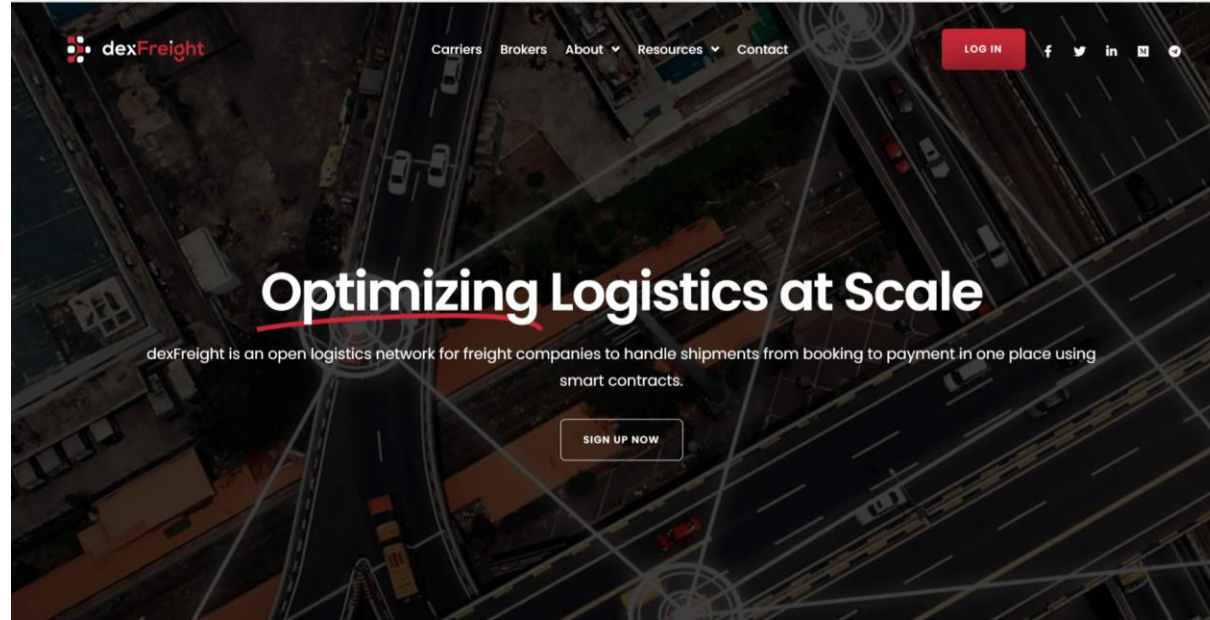
# Koopman Logistics (https://www.koopman.eu/en)

- Koopman Logistics is an automotive transport company that uses a **blockchain technology to transport cars around the world**. Utilizing general ledger technology, it reduces paper supply, speeds up payment processing and makes shipping operations more secure. In April 2018, Koopman became the world's first automotive logistics company to deliver a vehicle over the blockchain by completely paperless way.



# dexFreight (<https://www.dexfreight.io/>)

- The DexFreight platform includes the **blockchain-assisted end-to-end (P2P) market**, the first in the industry for shipping and transport. Contains everything from encrypted identity management to smart contracts and token payments, all helping to alleviate disruptions and increase transparency in the P2P supply chain market.



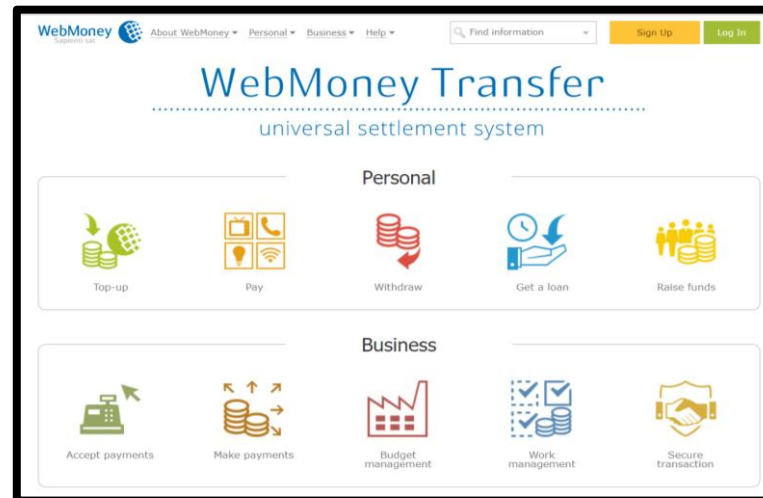
# Transition to the World of Digital Money

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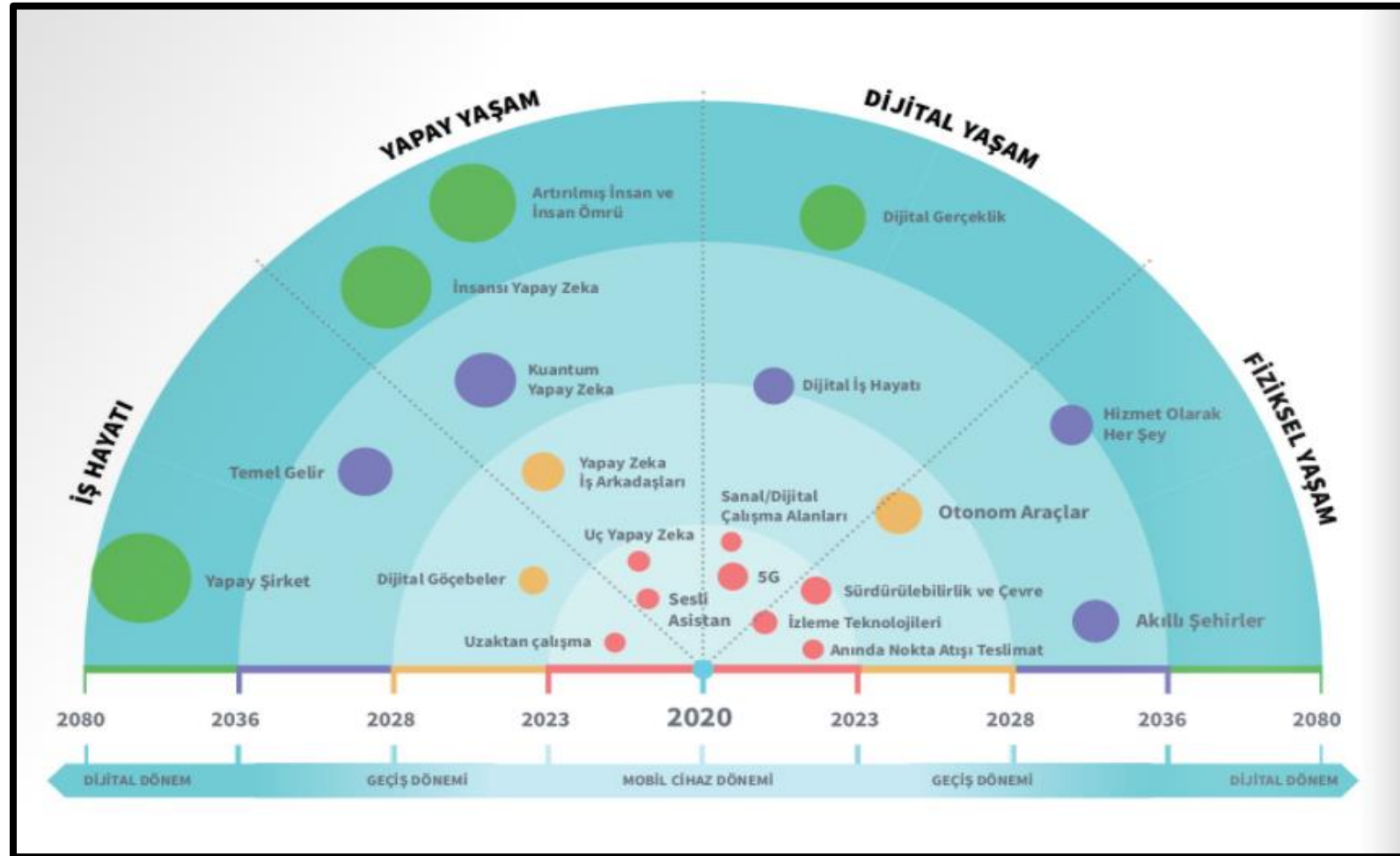
- A lot of research has shown that we're accelerating towards the structure of "**cash-free society**." We're all going through a process where money digitizes very quickly. In Canada, known as the world's most "cash-free" country, all transactions without cash are estimated to **weigh up to 60% of the total amount of money**. Developed countries are following Canada, including Sweden, the United Kingdom, France and the United States.
- Digital coins are classified into two groups: "**electronic money**" (e-money) and "**virtual money**". This distinction is based on whether there is government credibility behind it.
- The virtual currency itself is also passed through a classification. Some of the plants are connected to the outside world. Other virtual coins are closed outside. Virtual money that is externally closed (non-convertibl virtual currency) **cannot be returned to credited currencies such as Euro and Dollar**. Virtual currency can't touch the real economy, so you can't buy goods or services with them. Online gaming examples can be classified in this group. (such as Warcraft, etc.)

# Cash-Free Society

- It is possible to switch from explicit virtual currency (convertible virtual currency) to virtual currency such as Dollars and Euros. They can also interact with the real economy.
- Externally open virtual coins are also divided into centralized and distributed fabrics. **WebMoney** is a great example of a centralized version of the open virtual currency. It provides services such as keeping track of payment instruments, converting payment instruments, funding flow, resolving disputes, and performing secure business transactions.



# Technology Radar

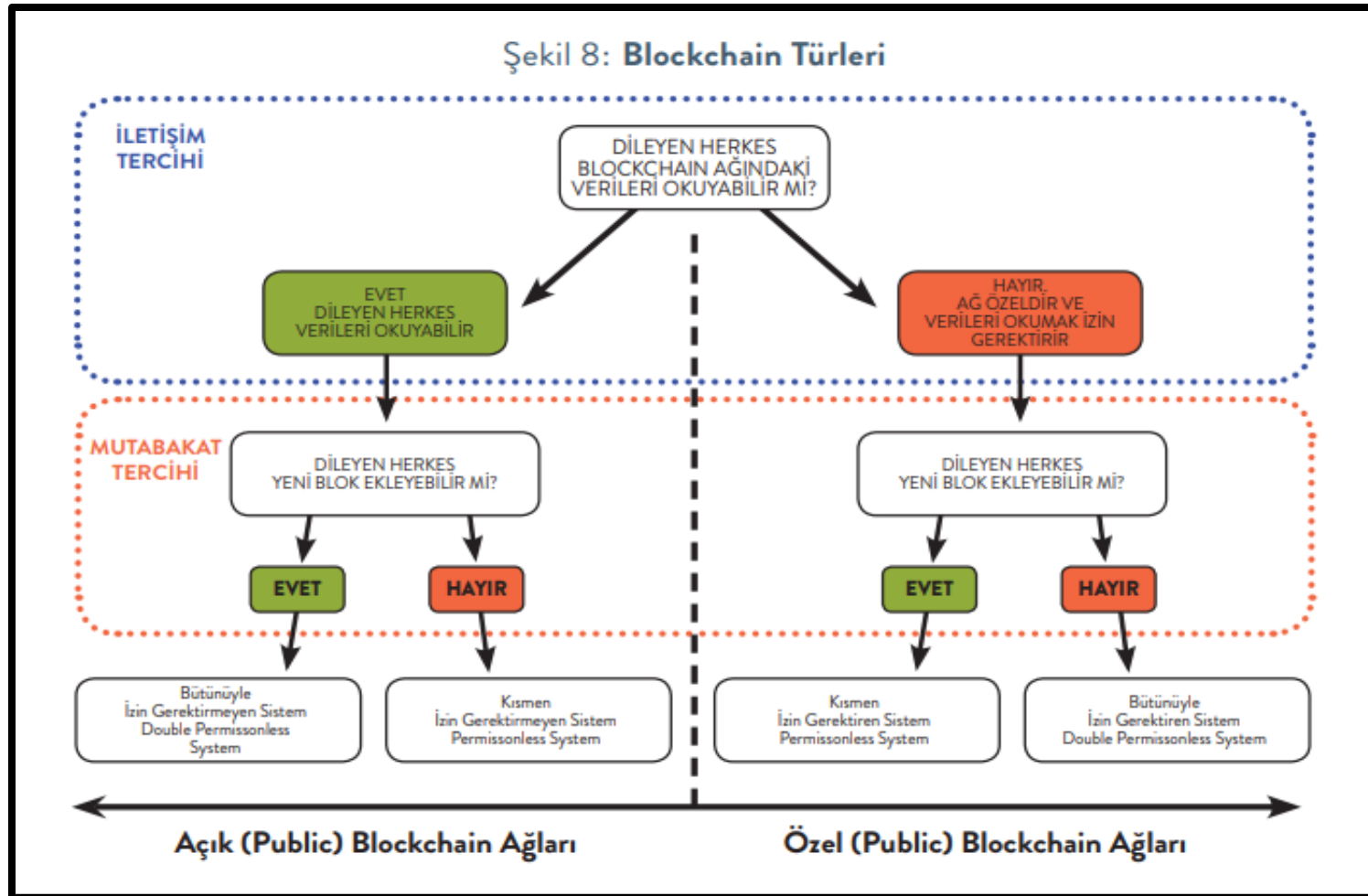


# Blockchain Practices in Finance

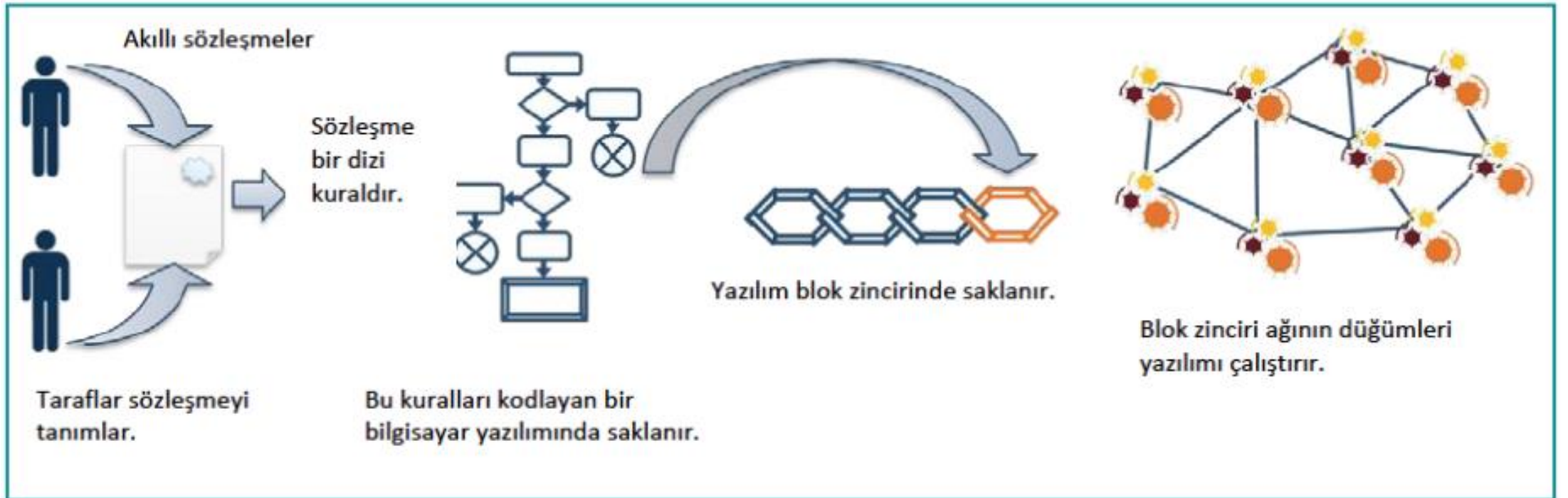
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- Blockchain was the technology of the new period—a software architectural structure, to say the least. It is becoming more and more widespread. The ultimate impact is that it brings together transaction and shopping (not physical, of course). It will either eliminate the agents altogether or cause the structure to change.
- Vitalik Buterin, born in 1994, was designed to be an Ethereum inventor and described as a Blockchain. **"This is a magical computer that anyone can install programs and leave them to work on their own. It makes it possible for everyone to see all the existing and past situations of every program on this computer. It also carries a crypto-economically ensured warranty that programs in this chain will continue to function in a way that the Blockchain protocol fully explains."**
- The blockchain is essentially a **database system**. Saving data into blocks in a sequential fashion. There's a timestamp on each record. One block is full, the next block is built. Blocks are bound together in chains. Just as there are databases all over the world today, the same is true for Blockchains.

# Blockchain Types

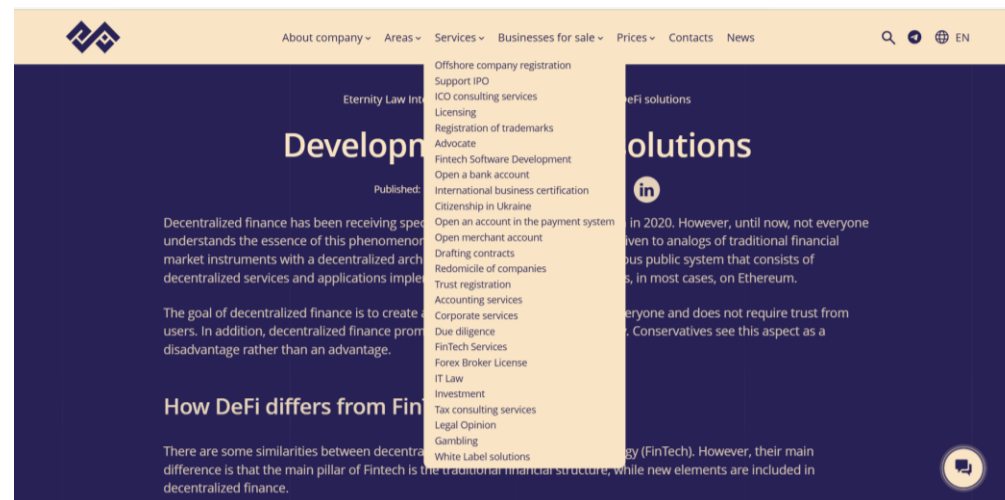


# Smart Contract on Blockchain Network



# DeFi Finance System

- As it is known, Bitcoin is a peer-to-peer electronic cash system. DeFi, is a **peer-to-peer electronic financial tool system, referring to projects that use encryption tokens and blockchains that allow everyone to publish, transfer and own financial instruments.**
- Many other networks with EOS, Cardano, Dfinity and smart contract functionality are potentially available to DeFi projects, but for now Ethereum is the market leader, mainly because it has the largest developer mentality and many ETH owners who want to put their money to work.



# Literature Review

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- Research in this area is often done through **data security, financial technologies, logistics solutions, and public policy**. In today's logistics, the customers' first demand is **flexibility**. It is important, however, to facilitate taxation and other obligations within the business process. (Toppen et al., 1998)
- The innovative financial services developed by the Fintech companies **through financial technology** provide significant contributions to the logistics sector. The differences in entrepreneurship, with the help of fintechs, are a major contributor to the development of services and products. Susilo et al., 2019. In recent years, we have also seen significant contributions to the development of economic innovations. (Bernanke 2009); (Awrey, 2013); (De Haan et al., 2020); (Board, 2017); and (Board, 2017)
- The main factor affecting the industry buyer's demand for innovation is that buyer alternatives are showing changes. Industry-wide innovation is a pricing technique developed for customers using **mobile pricing**, mobile phones, tablets, etc. (Rahayu vd., 2014) The mobile quote process is a positive development for users. (Fontes and others, 2017)

# Literature Review

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- Many financial technology applications are especially used in the industry, including **paperless accounting processes, best large data processing and analysis systems, process automating for business processes**, systems in a modular structure that can be integrated with each other, **real-time reporting, visualization business tools**, and **cloud computing database infrastructure**. (Kreher, 2017) (Tsing, 2016), particularly at this point, came up with the idea of chain capitalism to explain the old configuration of capitalism.
- Financial capitalism has many approaches associated with the field of logistics. Supply chain capitalism relies heavily on financing because it supports buyers with capital. (Tsing, 2009) Also in logistics finance depends on **earnings made during the delivery chain period**. Another critical aspect is that among the activities of capital in the field of finance and logistics, monetary markets become so critical. The reason for this is that there's actually a trend in global trade to **develop a security mechanism** to avoid the dangers that are at stake. (Lee & LiPuma, 2004)

# Research Findings

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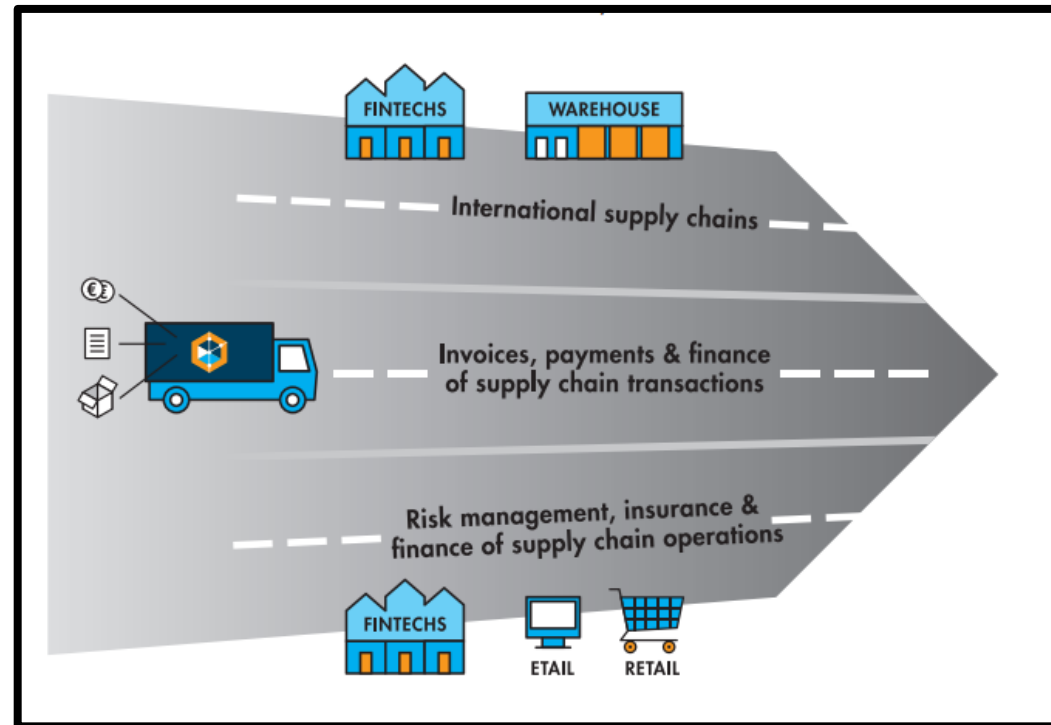
- **Success factor # 1: Creating a Culture of Collaboration:** When a logistics company agrees to work with blockchain technology, it enrolls in an intensive collaborative effort. This is because much of it involves facilitating reliable co-operation between multiple entities, including state institutions of all types, industrial organizations, regulators, partners, and even competitors public and private organizations.
- **Success factor # 2: Building Blockchain Knowledge and Capabilities:** Knowledge and capabilities enable organizations to determine and realize the value of new operating models. Therefore, it is important to provide the time needed to successfully contribute to each blockchain project to the partner organizations and individual contributors who strengthen the tools and resources.
- **Success factor # 3: Focus on Value and Interact with Stakeholders on Blockchain Opportunities:** By participating in blockchain-based prototypes, stakeholders can prove and understand the business value of a new initiative and establish technical feasibility. It is important to establish realistic expectations and to acknowledge that blockchain technology remains in an early stage of the software maturity lifecycle.

# Blockchain Practices in International Trade & Logistics

İşlem türü	Temel paydaşlar	Diğer paydaşlar	İçlenen belgelere örnekler	Kullanım durumu	Şirket/ortaklar	Proje açıklaması
Ticari	İhracatçılar, ithalatçılar	Bankalar, sigorta şirketleri	Satış sözleşmesi ve ticaret şartları, sipariş emri, fatura	Merkezi olmayan pazar	OpenBazaar	Merkezi olmayan bir pazarda eşler arası işlemler için açık kaynaklı bir protokol
Ticari finansman	Kredi kuruluşları, ihracatçılar	Sigorta şirketleri	Akreditif, kambyo senedi, sigorta	Akreditif işlem sürecinin iyileştirilmesi	ING Brüksel ve HSBC Hindistan, Tricon Energy and Reliance Industries ile Volttron blok zinciri mutabakatı	Akreditif sürecinin hızlı, şeffaf ve güvenli hale getirilmesi amacıyla evrakların dijitalleştirilmesi.
				Açık hesap finansmanı risklerinin sınırlandırılması	UniCredit İtalya ve KBC Bank Belçika'nın, Gruppo ASA ve tedarikçisi Steelforce arasındaki ticareti kolaylaştırmak için we.trade blok zinciri platformunu kullanması	KOBİ'ler için uluslararası ticaretin altında yatan ticari finansman süreçlerini basitleştirmek, işlemler için güvenlik ve şeffaflık sağlamak
				Sınır ötesi ödeme için blok zinciri kullanma	Uluslararası ödemeler için Ripple blok zincirini kullanan ReiseBank Almanya ve ABT Kanada	Finansal kurumların müşterilerin sınır ötesi ödemelerini gerçek zamanlı olarak ve çok az maliyetle veya hiç maliyetsiz olarak işlemlerini sağlaması.
Lojistik	İhracatçılar, ithalatçılar, nakliye şirketleri, liman yetkilileri	Kredi kuruluşları, sigorta şirketleri, komisyoncular,	Kredi kuruluşları, sigorta şirketleri, komisyoncular,	Tedarik zincirinin dijitalleştirilmesi	Maersk, IBM ve mutabakat	İthalatçılar/ihracatçılar, nakliye şirketleri, liman operatörleri, gümrük ve diğer yetkililer gibi çeşitli tedarik zinciri katılımcılarının birbirine bağlayan TradeLens blok zinciri özellikli nakliye çözümü.
				Deniz sigortası	ZIM, Wave, Sparx Logistics	Konşimentoların blok zinciri ile dijitalleştirilmesi
					Maersk, E&Y, Guardtime, Microsoft ve diğerleri	Insurwave: Sigorta değer zincirindeki tüm paydaşları aynı doğru, güncel ve güvenli risk bilgileriyle birleştirmek için Azure üzerine inşa edilmiş deniz sigortası platformu.
Gümrük	Gümrük idareleri	İthalatçılar, ihracatçılar	İhracat/ithalat lisansları, menşe sertifikası, gümrük kıymet beyanı, gümrükleme	Gümrük vergileri için blok zinciri	Kore Gümrük Hizmeti, SAMSUNG SDS Co. Ve KNET mutabakatı	Kore Gümrük Hizmetleri tarafından pilot olarak dağıtılan belge paylaşımı ve bilgi çıkarımını kolaylaştırmak için blok zinciri tabanlı gümrük platformu.
					AB Komisyonu DG TAXUD, Uluslararası Ticaret Odası	Geçici kabul karnelerinin (ATA Carnets) bütünlüğünün doğrulanması.
İdari	Düzenleyiciler, ulusal ve uluslararası makamlar	İthalatçılar, ihracatçılar	Sahhi sertifikalar, uygunluk sertifikaları	Ticari belgelerin diğer ulusal ajanslarla değişimi	Singapur Uluslararası Ticaret Odası, vCargo Cloud	"eCO'ların anında doğrulanmasını ve dolandırıcılığı, değişiklikleri ve üçüncü taraf müdahalesini önleyen özel bir blok zinciri ağı üzerinde çalışmasını" amaçlayan elektronik menşe sertifikaları (eCO'lar) için blok zinciri tabanlı platform
				Hükümetten hükümete alıverişler için blok zinciri kullanma	Meksika, Kosta Rika, Amerika Birleşik Devletleri	YEO'ların yönetimi için Cadena platformu
İzlenebilirlik ve şeffaflık	Üreticiler, son kullanıcılar	Yetkililer	Orijinallik kanıtı, ticari marka sertifikaları	Ticari markaların ve mülkiyet haklarının uygulanması	Everledger	Elmaslar için güvenli menşe kanıtı ve etik kaynak sağlama amaçlı blok zinciri tabanlı sistem
				Ek izlenebilirlik ve şeffaflık sağlama	Modum.io	IoT, blok zinciri ve AI tabanlı izle & takip et tedarik zinciri çözümü. Orijinal olarak ilaçları izlemek için piyasaya sürülmüştür ancak aynı zamanda gıda, elektronik, sanat nesneleri ve değerli eşyalar için de uygundur.
					Wal-Mart, IBM	İz kaynağı ve gıda ürünlerinin bakımı (örneğin Çin'den gelen domuz eti), Wal-Mart gıdanın uygunluk bakımını kolayca ele alabilir. Wal-Mart, IBM tarafından geliştirilen Food Trust platformuna katıldı.

Ortaklar	Amaç	Lansman tarihi	Durum
ZIM, Wave, Sparx Logistics	Konşimentoların blok zinciri ile dijitalleştirilmesi	Kasım 2017	Ticari lansmana hazırlık
NYK (Nippon Yusen Kabushiki Kaisha, NTT Data Corp + mutabakatı)	Blok zinciri tabanlı ticari veri paylaşım platformu	Ağustos 2017 - Mart 2018	Pilot tamamlandı
AB InBev, Accenture, APL, Kuehne + Nagel, Avrupa Gümrük Örgütü	Nakliye belgelerini (konşimentolar ve gümrük beyannameleri dahil) birden fazla taraf arasında paylaşmak için blok zinciri tabanlı platform	Yok	Testler 2018'de tamamlandı
Scanlog, ShipChain	Scanlog'un yükünün şirketin küresel lojistik ağına izlenmesine yardımcı olmak için yan zincirler ve akıllı sözleşmeler kullanan Shipchain'in uçtan uca blok zinciri platformu	Şubat 2019	Pilot
Antwerp Limanı, T-Mining ve NxtPort	Terminaldeki kamyonlara teslim edilirken nakliye konteynerlerini izlemek için akıllı sözleşme tabanlı uygulama: lojistik ve nakliye topluluğunda varlıkların ve verilerin transferinin sağlanması	Haziran 2017	Pilot
Modum.io	IoT, blok zinciri ve AI tabanlı izle & takip et tedarik zinciri çözümü. Orijinal olarak ilaçları izlemek için piyasaya sürülmüştür ancak aynı zamanda gıda, elektronik, sanat nesneleri ve değerli eşyalar için de uygundur. Tüm sevkiyat süreci boyunca malları izlemek için IoT sensörleri ve web/mobil uygulamalar.	2016	Aktif

# Fintech Services and Opportunities in the Logistics



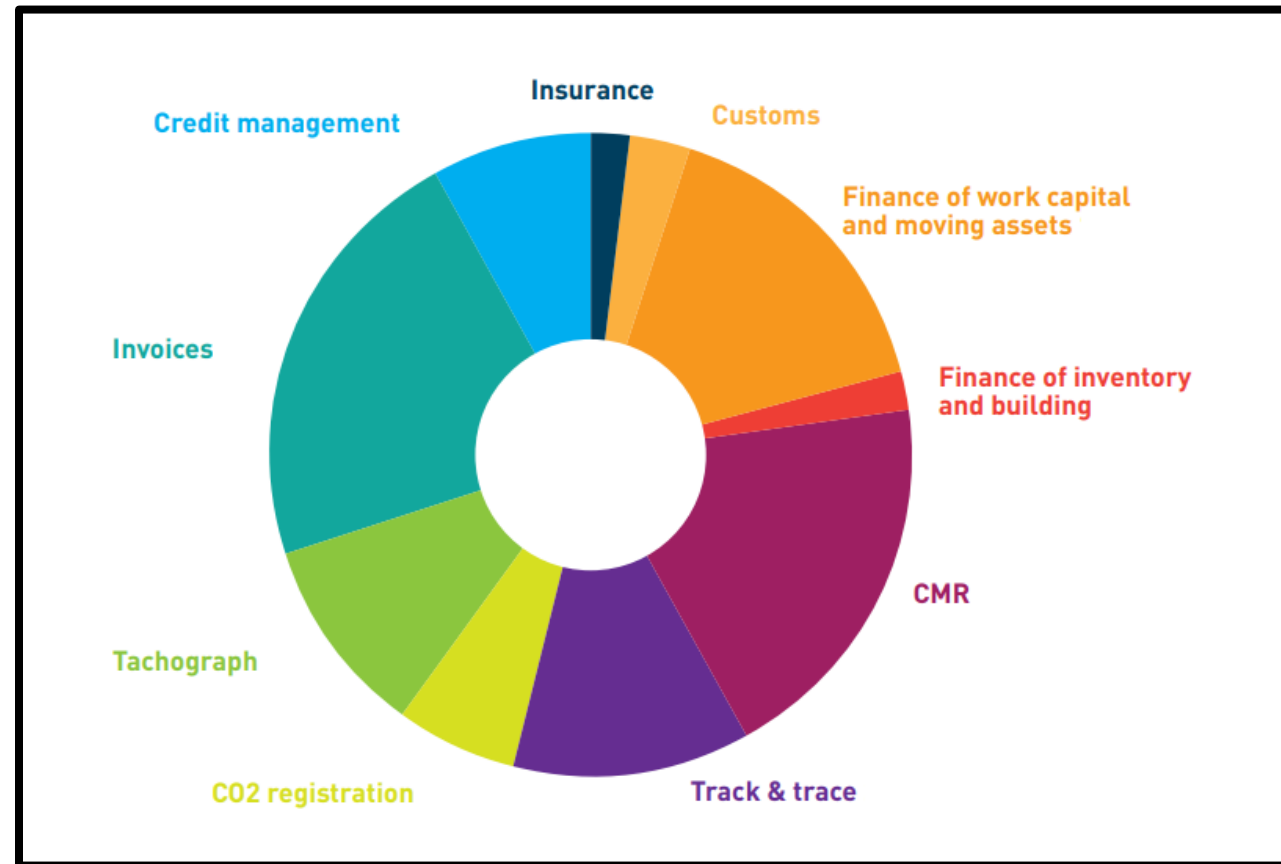
- There are **3 significant potential areas** for Fintech solutions;
  1. Improve management, operating capital, and supply chain financing,
  2. Provide financing for equipment, inventory, and real estate,
  3. Facilitate international trade, cross-border movement, and trust.

# Fintech's Service Areas and Opportunities in Logistics






















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- At this point, these are the first points that we can define to solve problems;
- 1. **Securing Business Capital:** Some supply chains include large loan-capable buyers. In a perspective intended to support "**Supply Chain Financing (SCF)**" regulations to effectively fund net working capital, logistics providers may be provided with capital and tax incentives from the public sector.
- 2. **Optimizing Administrative Processes:** A wide range of solutions are available at this point. Activities can be initiated by optimizing all processes, from purchase to payment and order to payment. Inefficient collaboration can be improved by developing a network of information about deliveries among supply chain partners.

# Key Contributions from Logistics Service Providers



# Ten Successful Solutions Provided in Logistics with Fintech Solutions

1	My invoices are sent late (and therefore paid late)	All invoice information quickly available  
2	It takes a lot of time to manually process my orders and invoices	Tools for automatic processing CONPEND  declaree
3	There are disputes about my invoices	Manage the diversity of contracts and invoices   
4	I need working capital for payments	Pre-financing of your invoices Debiteuren   FACTURIS 
5	I need working capital for growth	Real time insight for potential investors  SPARKHOLDER
6	My customers pay too late or not at all	Increase the power of your debtors management 
7	I have an unexpected shortage of cash for payments	More insight with cash flow management tools   
8	The pay moral of new customers is unclear	More certainty with online credit checks GRAYDON 
9	Charters want to be paid soon	Quick payments with the use of an external financier   
10	I need capital for investments in trucks or space	Online platforms for financing   

# Portfolios of Logistics Service Providers

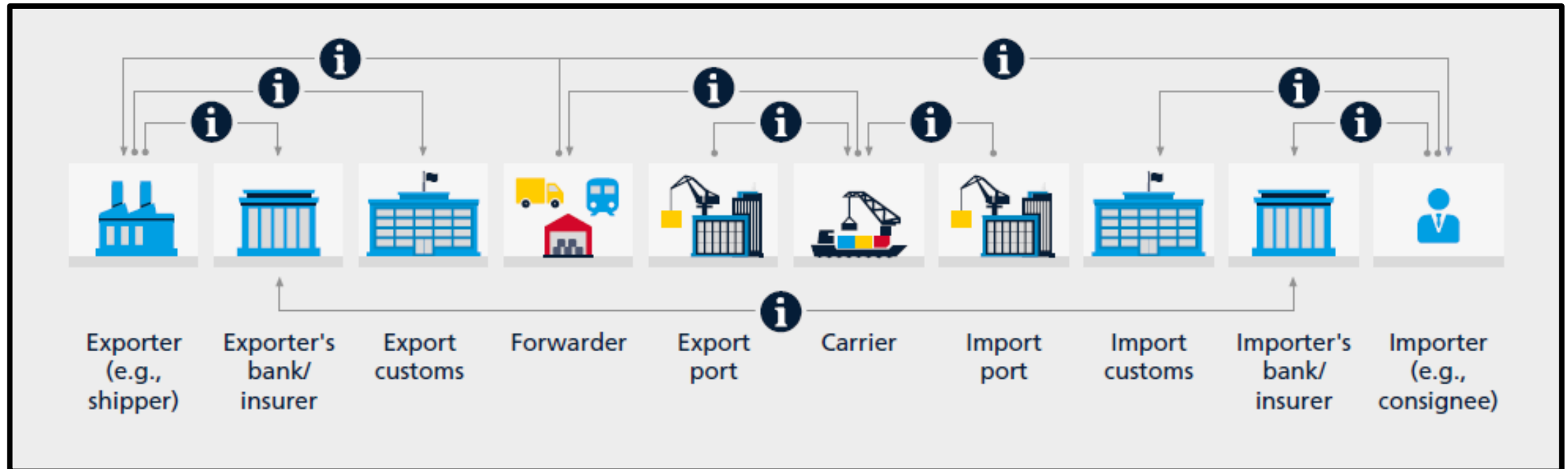
## FINANCE DRIVEN SERVICES

- 1 Invoice financing of customer's goods
- 2 Inventory financing
- 3 Credit management services
- 4 Enriched credit & transaction information
- 5 LSP-managed supply chain finance

## LOGISTICS DRIVEN SERVICES

- 6 Advanced customs clearance
- 7 Business intelligence services
- 8 Workflow services for SMEs
- 9 Insurtech data support
- 10 Enhanced fraud detection

# Work Excellence with Blockchain in Logistics



# Results

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- Fintech's provide logistics service providers with an opportunity to expand their service portfolio. In particular, they can increase their role in the **supply chain** and **add value to their business**. By reducing risks and costs, customers logistics service providers have real-time insight, **reliable supply-chain data** can provide them with **commercial opportunities for new enhancements**. These services can gradually change the role in the supply chain.
- Consequently, the parts in charge of financing functions in logistics are as follows;
  - Contracts and procurement,
  - Account payments and accounting records for the provision of goods and services,
  - Compensation claims,
  - Records for employees or contractors assigned in case of emergency.

# Results

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- Logistics service providers that want to make the industry strategic are trying to fully understand these markets in their decision to enter new markets. At this stage, it is important to enhance the infrastructure investments and to encourage governments to invest in transportation.
- According to the OECD, changes in infrastructure construction and investment decisions, including maintenance, will require investments in the industry globally from **2010 to 2030 of \$220 billion per year.**

# Results: Logistics Performance Index (LPI)

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- With a **maximum score of 5**, the **Logistics Performance Index (LPI)**; evaluates countries' logistics performance according to the following criteria. (World Bank)
  - Logistics infrastructure,
  - Efficiency of the customs process,
  - Quality and competitiveness of logistics services,
  - Timely delivery,
  - Easy transport organization with competitive costs,
  - Traceability of shipment.
- "According to the Logistics Performance Index (LPI), Turkey was ranked **34th in 2007**, but fell to **27th place in 2012**. Turkey ranks **47th in 2018**. This decline was characterized by customs criteria and customs blockages and cost factors. Shipping criteria and the quality of logistics services have also declined in recent years.

# Logistics Performance of Turkey (2007-2018)

Yıllar	Sıra	LPI Puanı	Gümrük	Altyapı	Uluslararası Sevkiyat	Lojistik Hizmet Kalitesi	Gönderi Takibi ve İzlenebilirlik	Zamanında Teslimat
2007	<u>30</u>	3.15	3.00	2.94	3.07	3.29	3.27	3.38
2010	<u>39</u>	3.22	2.82	3.08	3.15	3.23	3.09	3.94
2012	<u>27</u>	3.51	3.16	3.62	3.38	3.52	3.54	3.87
2014	<u>30</u>	3.50	3.23	3.53	3.18	3.64	3.77	3.68
2016	<u>34</u>	3.42	3.18	3.49	3.41	3.31	3.39	3.75
2018	<u>47</u>	3.15	2.71	3.21	3.06	3.05	3.23	3.63

# Logistics Performance of Turkey (2023)

- Turkey is ranked **42nd on the 2023** ranking and its Logistics Performance Index (LPI) score is:

Ülke	LPI Skoru	Gümrük Skoru	Altyapı Skoru	Uluslararası Gönderi Skoru	Lojistik Yetkinlik, Kalite Skoru	Zamanlama Skoru	Takip Skoru
Türkiye	3.4	3.0	3.4	3.4	3.5	3.6	3.5

# Logistics Performance Index of the World (2023)

Ülke	LPI Skoru	Gümrük Skoru	Altyapı Skoru	Uluslararası Gönderi Skoru	Lojistik Yetkinlik, Kalite Skoru	Zamanlama Skoru	Takip Skoru
Singapur	4.3	4.2	4.6	4.0	4.4	4.3	4.4
Finlandinya	4.2	4.0	4.2	4.1	4.2	4.3	4.2
Danimarka	4.1	4.1	4.1	3.6	4.1	4.1	4.3
Almanya	4.1	3.9	4.3	3.7	4.2	4.1	4.2
Hollanda	4.1	3.9	4.2	3.7	4.2	4.0	4.2
İsviçre	4.1	4.1	4.4	3.6	4.3	4.2	4.2
Avusturya	4.0	3.7	3.9	3.8	4.0	4.3	4.2
Belçika	4.0	3.9	4.1	3.8	4.2	4.2	4.0
Kanada	4.0	4.0	4.3	3.6	4.2	4.1	4.1
Hong Kong SAR, Çin	4.0	3.8	4.0	4.0	4.0	4.1	4.2

# Logistics Performance Index of the World (2023)

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- Finally, developments in the logistics industry and the **digitalization process** could also make a positive impact on **Turkey's trade volume**.
- Turkey may make the following moves to improve its logistics performance;
  - Expediting customs procedures and reducing bureaucracy,
  - Prioritizing infrastructure investments, especially sea ports, airports, and multimodal facilities,
  - Transition to digital technologies, digitization of the supply chain and improvement of end-to-end processes,
  - Increase incentives for environmentally friendly and sustainable logistics services, switch to transportation methods that reduce carbon emissions, and adopt energy-efficient storage solutions.

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# Thank You...

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# Alternative Finance Technique in the Logistics Sector: Blockchain

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