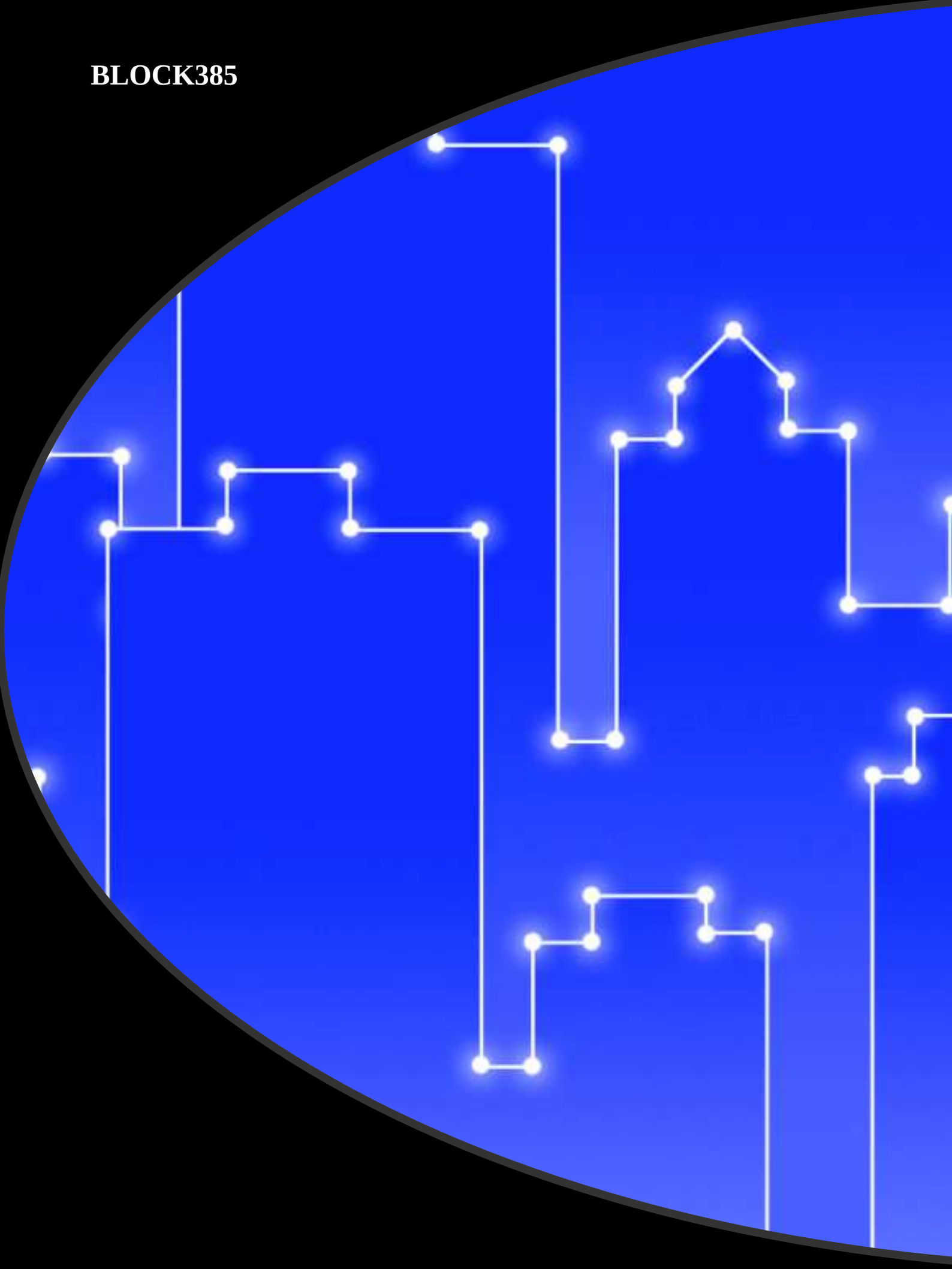


**BLOCK385**



1.....	<b>Smart Cities</b>
2.....	<b>ICT Technology</b>
3.....	<b>DLT</b>
4.....	<b>Internet of Things</b>
5.....	<b>Blockchain</b>
6.....	<b>Smart Grid</b>
7.....	<b>Smart Measurements</b>
8.....	<b>Smart Industry</b>
9.....	<b>Medical Data Sharing</b>
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14.....	<b>Digitalisation</b>
15.....	<b>Implementation</b>
16.....	<b>Privacy Problem</b>
17.....	<b>Food Supply Chain</b>
18.....	<b>Consumer</b>
19.....	<b>Conclusion</b>

Each city must insist on building an own identity that will be recognised and attractive to investors, citizens and tourists.

A smart city status in a city does not represent the same status in another, nor does it constitute the conditions for their exercise.

**Smart cities** are the most bound by the vision of those who create this concept, those who know what a given city is missing, giving it many advantages.

A well-developed smart city strategy is therefore an indispensable solution.

Smart city provides sustainability by increasing the potential of individuals and of the community as a whole. The focus on delivering such a smart city on citizens is also on their needs, the growth of the economy and on quality management and the optimal use of resources.

This means, smart transport networks, the upgrading of water supply facilities and recovery of waste and more effective lighting and heating of buildings.

It also means an more interactive and responsible city administration, safer public spaces and meeting other populations needs.

It is often an innovation that makes the first easy and swift acceptance of citizens, while forgetting that they have been forgotten.

Examples in Croatia are indeed in the payment of the SMS parking, smart benches (which have a solar panel capable of charging smart devices) and smart trees (wood have a canopy cover of solar panels and the possibility of free connection to the internet via Wi-Fi), and it has recently been accompanied by traffic density in Rijeka.

However, smart cities have almost never been a single solution, but a combination of related technologies so that citizens feel more comfortable.

The initiative (**EIP-SCC**) has an important role to play in the creation of smart European cities.

It aims to improve life in **European cities** through sustainable integrated solutions.

It aims to address the specific urban policy issues, energy, transport, mobility and ICT technology.

In 2013, IBM made a research and reached 22,5 years of peoples waiting for lifts. As a result, Allied Market Research expects the market for smart lifts to double its value from USD 12 billion in 2015 to USD 23 billion in 2020.

By far the best use of smart architecture and infrastructure is a smart grid that helps to preserve resources. Amsterdam was experimented with home energy storage units and solar panels for households that are connected to the smart grid in the city.

These stores have reduced the load on the grid in hours when the most energy is spent, allowing residents to store energy during more peaceful hours. Solar panels also enabled residents to sell their energy collection back into the grid.



Europe is a leader in the development of smart cities, and Amsterdam is just one example of many in Europe. The European Union has been proactive in encouraging Member States to develop smart cities. Great efforts have already been made to deliver results.

Paris has launched an electric car sharing programme, known as “Autolib” in 2011, and its fleet today has around 3.000 vehicles. Connected vehicles can be monitored via GPS, and drivers can reserve a parking area in advance by a dashboard. The London authorities have announced that this year will start testing the smart car parking project, which will enable drivers to find parking spaces quickly. This will also reduce congestion.

In the meantime, Copenhagen has started to use traffic monitoring sensors on urban bicycles, which provides meaningful information to monitor the improvement of the urban cycle route, which is crucial, with over 40 % of the population travelling every day.

When it comes to America, New York has introduced technology revealing gunfire in the police cells in Brookfield and Bronx, and the mayor wants to expand this technology in all parts of the city.

San Diego has started to use traffic lights to monitor pedestrian traffic and redirect cars during peak hours to avoid pedestrian accidents and reduce traffic jams.

Many cities in Croatia have identified the importance of digitalisation and development aimed at effective, smart and transparent urban administration, digital infrastructure, smart energy management, utilities and sustainable urban mobility, the economy and education.

From 2007 onwards, the river introduced free Wi-Fi to selected urban locations.

Last year, Rijeka was awarded the “Smart city” reward for the surveillance of timber traffic and the actual monitoring of the situation on the ground.

The potential of **smart cities** is almost unlimited and the growth of cities such as these needs to be increased in the course of the years. The realisation of “**smart cities**” represents a substantial stage on the path to building future integrated and complete cities, enabling the coordinated operation of complex systems from different areas (energy, transport, environment, governance, health, culture and education). The aim is to unite the slopes and the spirit of the city and make it a place of life for the satisfaction of citizens .

**Smart cities** are only the stage in developing towards full and sustainable cities where the quality of life, but also the relationship to a natural environment, will be distant more, so that the concept combines the following elements:

**ICT technology**  
**Intelligent Smart Grid**  
**Blockchain**  
**Smart Grid Measurement**  
**IoT**

To optimise the deployment of sensors per city (air pollution and congestion, video cameras, etc.) and machine learning methods (AI) optimise urban traffic.



Data collected from different sensors and e.g. social networks, help urban administrations to better understand vehicle and pedestrian mobility in the city and thus improve the quality management of traffic (channelling traffic to less congested areas).

The developed service module shall inform citizens and users of services through different channels of all necessary information about the functioning of the city. The level of overall safety of cities shall be raised by a security and safety module enabling the linking of technical protection systems (video surveillance, etc.) operated by other entities than the city administration.

Open and closed parking facilities provide information on the occupancy of the parking area and channel the user to the free station by the most rapid route. In addition, parking areas are provided with precise information on the occupation of the individual (disabled), the charging station for electric cars .

The sale channels module connects the sales and billing systems of the different (urban) services using various advanced technologies (smart terminals, mobile applications etc.) and the carrying out of financial transactions through integrated sales channels provides easy monitoring of the operation and reception and transmission of data required by third systems (business applications, financial institutions )

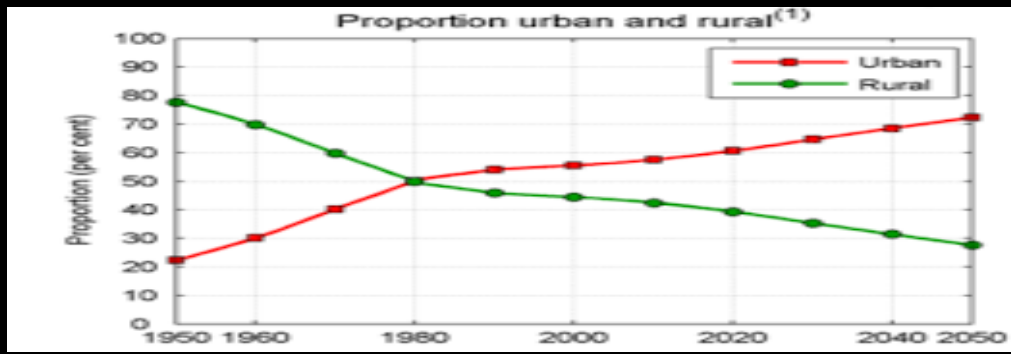
For intelligent transport systems or **ITS**, the systems in which information and communication technologies are applied in the field of road transport, including infrastructure, vehicles and users, traffic management and mobility management, as well as interfaces with other modes of transport are identified.

Its worldwide use of **ITS** is used to overcome the challenges of modern society in the domain of mobility, with a focus on reducing congestion, traffic accident and harmful gas emissions from the use of vehicles, with the aim of increasing competitiveness, economic efficiency and employment. Its interest in ITS comes from the problems caused by traffic congestion and congestion around the world as a result of increased motorised urbanisation, urbanisation, population growth, and population change.

The system providing services and information to users through an information system using an interface friendly interface to the user or mobile facility. It must be convergent and open, by offering on the one hand the use of different interactive and multimedia feature technologies and on the other hand, ensuring the integrity of the action throughout the geographical area. The core purpose of ITS deployment is to raise the quality of traffic and transport, improve the experiences of drivers and passengers, improve procedures for travel by people, exchange goods and services, and increase overall transport information transparency.

Energy efficiency requires the choice of the most favourable energy mix. this is a rather complex issue, not only depends on energy resources in its possession, but also on energy market opportunities, potential procurement routes, available technologies, environmental impact, economic power, energy security and everything that constitutes energy strategy and policy components.

According to **ISO 50001: 2011** on energy management, the requirements for the establishment of energy management systems in different organisations are drafted and an estimated 60 % of global energy use will have an impact on energy management. In order to reduce the use of traditional energy sources and to mitigate the harmful impact of excessive energy use on the environment, the development of new and renewable energy sources is increasingly encouraged at global level. However, the development of such sources requires a considerable amount of time and, in addition to investing in new renewable energy sources, good management of the use and consumption of energy is an important element in trying to tackle problems arising from the use and consumption of energy.



Such improvement in energy performance can quickly lead to cost reductions and mitigation of global energy use and consumption, such as global warming and over-spending of natural resources. One of the most important parts of the European Union's energy policy agenda is the integrated climate and energy policy adopted by the European Council on 24 October 2014. Based on this document, specific objectives are to be achieved by 2030:

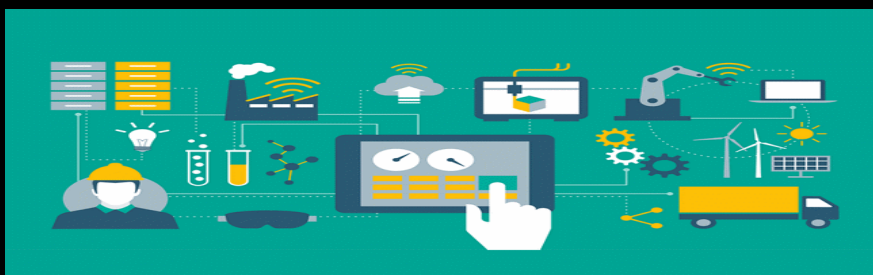
- **Greenhouse gas emissions should be reduced by 40 %**
- **The share of renewables in energy consumption should be increased to 27 %**
- **Energy efficiency should be increased by 20 %**
- **Establishing an energy system connectivity of 15 %**

**Smart Grid** were developed in 2006 by the European technology platform engaged in electricity networks that are intelligent to integrate all network users activities and carry a wide range of facilities to facilitate the use and consumption of electricity. A smart grid is a key component in the field of renewable energy sources, being one of the fundamental pillars that underpin the idea of linking it to renewable energy sources (solar rays, wind, sea currents) which are in nature in the coming years and can continuously be renewed and closed with the energy loop. A smart grid will build on ICTs and merely build on the existing system. It tends towards the possibility for advanced networks to be able to repair themselves at any time when there would be a failure, thereby reducing the human factor in the system and would have the role of monitoring the system of the network.

With regard to the operating system, automation shall allow the monitoring and control of all network nodes and users in order to allow bi-directional flow of information and electricity from the power plant to all nodes in the transmission and distribution. A precise and complementary power supply, high energy utilisation coefficient, high quality of electricity,.

### Smart Measurements

Accurate data on the used resource or accurate monthly accounts and not as far as now accounts with estimated consumption. As we can read their consumption at all times by the operators, it is more possible to optimise gas or current use in the course of the year. On the basis of the consumption profile thus obtained, suppliers may offer individualised tariffs, leading to a more efficient energy consumption with all the positive consequences on the environment and on human health



For example, a smart or advanced meter defining as an electronic meter (electricity, water, gas, heat) that is measured and storing measurement data cumulative or intersops and through two-way communication channels with the central surveillance and accounting system. Advanced meters have further installed specific functionalities: Meters for controlling operation of meters, recording events and failures of voltage, monitoring the quality of delivery to the enduser, the ability to communicate with customer consumption display devices, the ability to communicate with other energy products.

## IoT

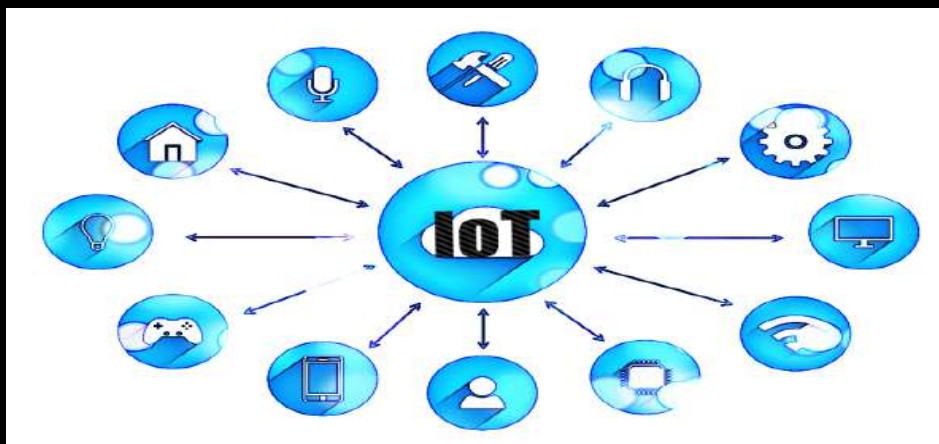
As one of the two emerging technologies to be gaining significant traction, **Internet of Things** seems poised to join cloud computing and mobile devices as a permanent part of the modern technology landscape. Businesses are quickly discovering the value in digitizing their environment and their operations, collecting data that can help with future decision-making. The trend is also showing positive returns for companies that sell and support technology. Half of these firms report either major or minor levels of **IoT-related** sales in the last year, with others experimenting internally.

Today, **IoT** as a managed services play is driving the most revenue in this category, but looking ahead to the next two years companies are predicting that analytics on data captured by **IoT** sensors – then shared with customers – holds the most financial promise.

The first wave of **IoT** adoption is making good progress, but the next stage will require a keen understanding of digital BizOps.

Rather than treating **IoT** installations as separate projects, businesses will have to recognize that they are dealing with an expanded architecture. This will dictate networking structures, storage options, data policies, and security decisions.

These changes will drive both channel firms and internal IT departments to invest in skills training in order to fully establish a successful data-based analytics practice. As with cloud computing and mobile devices, the groundwork has been laid for IoT to advance digital transformation.





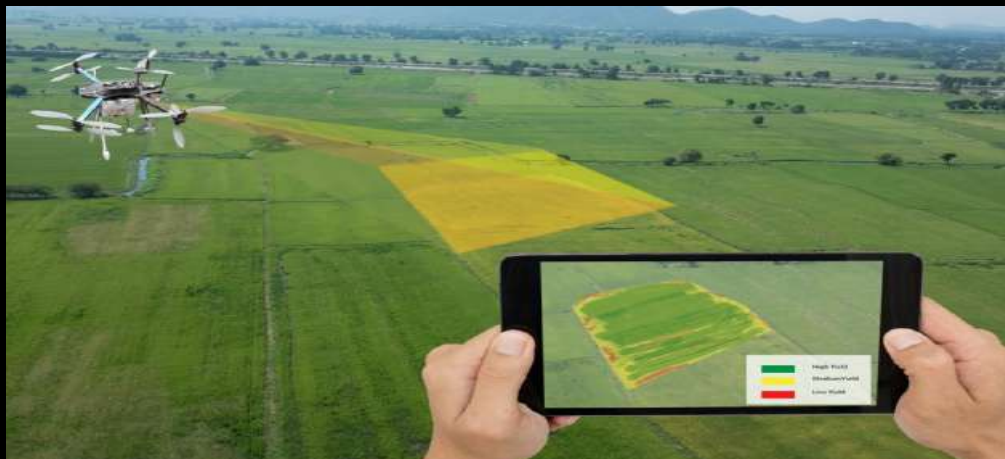
**Internet of Things (IoT)** - to connect all devices over the internet, enabling a new possibility to interact with different systems and their enhanced monitoring and control, 3 types of communications:

**- Communication of Things with Human Beings - Communication between things - The communication between the devices (M2M)**

**Smart Houses** have become an indispensable trend over the last few years and the concept of modern household and daily life in it. The house or flat shall become „smart“ by adapting daily human activities, mood, habits and lifestyles, while on the other hand giving the impression of a luxury and generating energy savings.

**Smart Farm** Relies heavily on smart devices and used by farmers in livestock farming. Drones, various tools to check soil composition and predict climate change, as well as applications to detect herds, and to monitor their location, are the Internet of things that have been successful and effectively affected by the development of modern and smart agriculture.

This type of agriculture can potentially help farmers produce more goods with less damage to crops and less inputs such as water, fuel and manure. The European Research Centre estimates that smart farming will make a major contribution to the saving of carbon dioxide in Europe’s agriculture by 2030.



**Smart Industry**

The objective of this industrial revolution is massive production without a map.

It is essential for the production process that it is flexible as it must be capable of producing as many different types of devices as possible and able to make changes on the product at the latest due to a change in the buyer’s preference.

The smart products produced by Industry 4.0 will be able to send a large set of data to their producer, and suggest improvements needed in the future by means of this information. It is thus important for the successful implementation of Industry 4.0 to have a good quality organisation of work.

The material in the production process now travels from the machine to the machine, showing each machine the way it wants to be treated.

Intelligent machinery reduces the unnecessary overload of workers and enables them to concentrate on a more creative part of the job, which will lead to an increase in the added value of products.

The intelligence that machines own means that machines take decisions themselves up to a level, but at all times under the supervision of operators that respond to possible errors.



The key to success and the idea is the general digitalisation of society and process, with the aim of improving production, reducing costs and developing smart retail map.

### Smart Retail

The example of IoT applications in the retail sphere, and there are a number of use of smart devices to improve sales in shops. In particular, various IoT applications mean that a variety of IoT applications can be used here, facilitating communications between traders and customers, and thus demand for the most popular goods and services

Smart retail offers the possibility of accurate advertising, an improved supply chain cycle and real market demand analysis, ultimately, just a NFC is used, and a wireless technology that allows data transmission at short distances between the two devices. One of these data is the payment of services or products between a mobile phone or a smart hour and the point of sale of the terminal, all through radio waves. There is no study on the future of health, which does not cover three fundamental problems, but also their solutions, which currently burden all health systems in the developed world and increased health care.

### Smart Cars

Today's car is impossible to imagine without multimedia, travel computers, parking sensors and cameras that have become part of car everyday. No future is a more advanced use of computer technology on the path towards a final goal, which is an autonomous vehicle or a driverless vehicle. In recent times, no one is expected to require their own car, but the user will, when needed, call the closest autonomous car through a mobile application that will then drive it to its destination. Once the vehicle is brought to a specific location, there is no parking need for the vehicle than the car leaves it, the new user. All of this contributes to a better use of the capital invested, to the better use of capacity (a possible transfer of multiple persons at a time) and at the end of a better utilisation of the energy input for the launch of the vehicle (in the future electricity).



## Medical Data Sharing and Management

### Problem:

Behind cancer and heart disease, medical error is the third leading cause of death in the U.S. Part of the problem is the tremendous lack of transparency between medical institutions and the inability of hospital systems to safely and efficiently share data with one another.

EHRs were never conceived to manage lifetime medical data among multiple institutions. During a lifetime, patients scatter their medical records across a myriad of organizations and from one health system silo to the next often losing access to critical past data

Adding to the complexity of the issue is that different hospitals have their own ways of managing their data. A 2017. report by MIT discovered that twenty-six different EMR systems exist across the Boston area alone. With critical patient information being so costly and cumbersome to share, it's no wonder the flow of medical data is often stifled — leading to increased risks of medical error and fatalities.

### Solution:

Blockchain can securely ease the transfer of patient records among health systems both nationally and across borders, and boost the coordination of member health management, lower transaction costs and risks, and even support medical tourism.

A single entity doesn't control medical data stored on blockchains. Therefore, it can be distributed among groups of individuals and organizations. Every transaction on the chain is time-stamped becoming a permanent record of the entire whole that can't be altered afterward.

## Drug Development and Supply Chain Integrity

### Problem:

Counterfeit drugs make up a growing percentage of the U.S. drug market and even more so in developing countries costing pharmaceutical companies some 200 billion in annual losses. Despite the fact that anyone who purchases medicine can ask for a certificate of authenticity, bad actors have been known to falsify such documents.

### Solution:

Blockchain in healthcare could improve traceability and transparency in the supply chain, providing both the big picture and minute details of every transaction of any pharmaceutical product. Blockchain technology is already being used to optimize supply chain integrity by companies such as IBM Walmart, and UPS.

With supply data stored in a blockchain, patients could potentially access real-time information about any drug from production to arrival at the retail pharmacy. Barcode labeling would enable other features to be woven into the system such as:

- Monitoring the availability of medicines in polyclinics
- To whom medicine was transferred
- The quantity of medication transferred

In this way, blockchains can transform the system from disconnected data segments owned by a single entity to the life history of any resource whether it's a patient's health record or a drug moving through the supply chain.

## **Claims, Billing Management and Fraud**

### **Problem:**

Roughly 5-10% of healthcare costs are fraudulent, and in 2014, the federal government recovered \$5.7 billion in health care fraud cases. Medicare fraud accounts for some \$30 million in losses annually.

### **Solution:**

Using a blockchain automation-based system could substantially reduce admin costs related to claims, payments, and processing time and make intermediaries obsolete. As the Capital One-Gem Health collaboration shows, blockchain may be able to improve the significant logistical information tracking challenges of reliability-centered maintenance (RCM) operations.

### **Problem:**

As it stands now, all claims processing is done manually, and payer networks can break down when a provider relocates or moves into or out of the payer's network. An estimated contains errors or missing information. Payers also bear the costs of verifying provider details every year. And when the data does change a 40% of payers provided data e, it needs to get processed by a myriad of siloed systems among one or more payer networks. The result: higher costs and increased process time.

### **Solution:**

Blockchains could enable one accurate source of provider information. A Blockchain ledger could unify all stakeholders in the network: payers, providers, and patients, and increase the system's efficiency by requiring only one update throughout the network. Smart contracts on the blockchain could transform the manual fashion in which member claims and disputes are currently processed.

Every insurance policy could be embedded in a smart contract, or program, agreed upon and accessible to all stakeholders. Bills could be automatically be validated enhancing cycle time and reducing costs and practically doing away with disputes.

## **Medical Research**

### **Problem:**

Currently, half of all clinical trials go unreported, and researchers often neglect to share their results, creating knowledge gaps for all stakeholders and putting patient safety in jeopardy.

## **Solution:**

Having a secure and centralized storehouse of clinical trials and patient outcomes for new treatments could vastly enhance patient care and results. The unchangeable time-stamped blockchain records of clinical trials and outcomes could help reduce result switching, data snooping, and unethical reporting, lowering both fraud and error.

Blockchains could mobilize new and innovative research initiatives by sharing patient results more broadly (with patient consent). Moreover, fresh and innovative research initiatives would be catalyzed by sharing patient results more broadly (with patient consent) thus driving remarkable cooperation between participants and researchers.

## **Case Management**

Blockchains can also have a positive impact on patient case management. Once a patient consults a physician and a treatment plan devised, the treatment program can be added to the blockchain ledger as part of the patient's medical record.

Then, a smart contract can be developed using all the elements of the patient's case management. The contract specifies the framework of the patient's treatment goals coupled with the rules defined within the smart contract to track and evaluate the patient's progress. Once the patient's file is incorporated into the blockchain, it can provide chronological data about the delivery of care and the patient's response.

Another layer of benefit can be found where a patient's health information is culled from wearable monitoring devices and social media applications and then uploaded to the patient's personal blockchain ledger. Again smart contracts can gauge the patient's performance toward their health goals.

The great thing about the process is that anyone in the network can view the patient's data, but only once the patient gives their consent thereby removing the need for centralized control and lowering the chance of PHI data theft.

The increasing demand for healthcare services and integrated-care delivery along with a heightened emphasis on member health management has given rise to the need for an information management system not dependent on middlemen. The blockchain is already starting to deliver on these promises and its robustness and security show immense potential to boost healthcare performance, enhance the quality of care, and reduce the costs of delivery.

## **Challenges of Digitalisation**

In addition to development opportunities, intensive digitalisation brings new threats:

**Availability** — threats due to (unauthorised) access to resources

**Integrity** — unauthorised changes in data

**Confidentiality** — Disclosure of sensitive information to unauthorized agents

**Authenticity** — unauthorized access to ICT resources and sensitive information

**Responsibility** — Non-control of the transmission or receipt of messages by the relevant entity

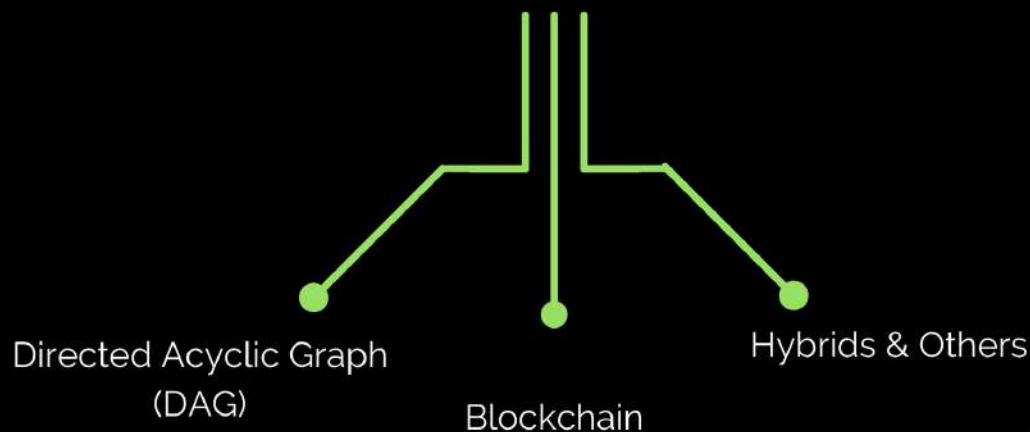
**DLT/Blockchain** is the most powerful means to counter these threats.



The main advantage of the use is the resilience of the platform to many threats. Furthermore, it provides a number of unique opportunities such as improved reliability, better fault tolerance, faster and efficient work and scalability.

Integration of **DLT** technology with devices in a **smart city** will create a common platform where all devices can communicate safely in a distributed environment.

## Distributed Ledger Technology (DLT)



nakamo-to

### **The regulatory authority, service provider, user and IoT network provider.**

Furthermore, financial institutions dealing with securities have even higher problems in their operations. Days may be required, sometimes even weeks so that transactions are entered after the conclusion of the contract. There are many reasons why banks are so rigid institutions which are slowly changing and adapting to changes in the market.

One of the reasons is that the banks now bridge several technologies from different technological players, so there are parts of the banking activities which have remained stable over a hundred years, one in the background, works on technology 30-40 years old, while the foreign side offers Internet banking to end users.

There was no clear transition in the banking sector. The second is because the banks are in fact monopoly organisations, which largely lacked the need to rapidly change.

We conclude that, in the financial crisis, banks work to increase transaction costs. banks in this way earn enormous profit.

Given the general benefits of using blockchain technology, its application in accounting would increase the reliability of financial and accounting data for all users.

Firstly, there would be no possibility for the introduction of “adhesive”, i.e. incorrect data in the system or changes to the existing ones, as it is expected that other participants on the network, before carrying out the transaction, are confirmed.

For example, if a blockchain accounting system would be created, with the implementation and registration of different transactions in the centralised database, the process of validating the involvement of national authorities such as the Tax Administration and other regulatory authorities would be significantly reduced as there would be no cheating possibilities when entering and processing data.

### **Blockchains will connect with existing financial systems**

Regulations will still play a very vital role. However, it is also very important to note that the treat of cryptocurrencies to banks and the current financial structure is real. One of the biggest stumbling blockchain cryptocurrency adoption is facing is unclear regulations.

Should governments push forward with clear regulations, banks and other financial institutions might find themselves losing business to cryptocurrencies like a Bitcoin.

As a result, many Banks are currently building and testing their own Private blockchains (a term we will discuss below). The main aim is to make use of the speed, trust and decentralization that cryptocurrencies benefit from. Some, however, claim they are trying to remain relevant within the financial system.

### **Implementation of blockchain**

A **Blockchain** is really nothing more than a decentralized and secure database.

It is a storehouse to validate events that happened in the past.

Except it has a few enhancements over your run-of-the-mill data warehouse:

- **It is decentralized: no single entity controls the flow of information**
- **It is consensus-based: different parties maintain exact copies of the same ledger, so everyone has to agree on the information being added**
- **It is 'add-only': you can't change a previous entry, you can only add to it**
- **New information can't conflict with what's already on the blockchain**
- **Anyone on the network can access and replicate the information stored there**

These attributes are what allowed the blockchain to act as the distributed accounting platform to record financial transactions for digital currencies like Bitcoin.

**Blockchain** technology circumvents the need for one central administrator, and it can effectively control who has access to any data stored within the shared ledger, giving it remarkable security and hacker-proof properties. To hack a single block in the chain, a hacker would need to infiltrate every other block in the chain's chronology — a virtually impossible feat.

## Blockchain vs. financial sector

### BLOCKCHAIN & BANKING

Developed as a tracking database in 2009, Blockchain is now drawing interest from established players in the banking industry. Here's what you need to know about this potentially disruptive technology:

#### WHAT IS BLOCKCHAIN?

Blockchain is basically a distributed and shared database of transactions that facilitates exchange of value. It's like a giant global spreadsheet which eliminates the need for third parties to validate transactions, reducing intermediary fees and increasing transparency.

#### KEY BENEFITS?

##### DECENTRALISATION

No single entity holds control over the system. All members of the Blockchain are equally responsible for enforcing and approving all the transactions.



##### TRUST

All transactions are recorded transparently on a distributed ledger, hence the trust levels among stakeholders are high.

##### SECURITY

Every transaction in a Blockchain is verified by all the members of the network which restricts manipulations and improves security.

#### HOW DOES IT WORK?



Transaction is initiated



The transaction is unified like a block



This block is shared across the network



Monetary exchange is completed



The irreversible, approved block is added to the chain



The network approves the transaction



In India, the first step towards this disruption has already been initiated by ICICI Bank with its Middle Eastern counterpart, Emirates NBD.



References: [www.fi.com](http://www.fi.com), [www.timesofindia.indiatimes.com](http://www.timesofindia.indiatimes.com), [www.cognizent.com](http://www.cognizent.com), [www.forbes.com](http://www.forbes.com), [www.hbr.org](http://www.hbr.org)  
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**Identity and value authentication** — today rely on powerful intermediaries to carry out identification and to establish trust between transaction participants. Blockchain reduces or, in some cases, eliminate a trust factor as it is established on the blockchain of the network.

The establishment of identity in this way is a fine, verifiable and cryptographic collaboration between the actors involved.

**Transfer of values** — Blockchain can be done for the financial sector what container transport has done for the transport sector, reduce price, increase speed, reduce transfer resistance, thereby increasing economic growth and prosperity.

**Value retention** — a payment mechanism combined with reliable and secure storage of values reduces the need for traditional financial institutions, banking deposits and savings accounts to become unnecessary

Any individual will be able to issue, deal with classic financial instruments directly, without the intermediation of financial institutions, thereby reducing costs, increasing speed and transparency dramatically. Participants will be able to receive loans from other participants on the network. This is a highly significant factor for those who currently do not have classical approaches to financial institutions.



**Exchange of value** — time needed for financial market transactions, securities and other derivatives traded on financial markets to be recorded, to be measured days and sometimes in weeks. All this creates problems for financial market participants. Blockchain technology will reduce the processing time from weeks and days, to minutes and seconds.

**Investment** — today for any larger investments requires the participation of a third party, that is a financial institution. While financial institutions are already participating in a merger with investors and entrepreneurs seeking funds for the further development, the use of blockchain will increase the pool of actors on such markets. Every individual will be able to invest his money in a simple, fast and secure way into a venture. Moreover, the share and coupon payments will be more transparent and secure.

**Value and risk management** — Blockchain support decentralised insurance models, making use of risk management derivatives more transparent.

Using reputation systems that analyse the social and economic capital of the individual, their ventures and other attributes, the insurance company can have a clearer picture of their clients and the risks they take.

**Accounting** — traditional accounts will not withstand the challenges of modern business. Blockchain technology, using its distributed ledger, will provide real-time audit and financial reporting. Also, the full business of all market participants will become more transparent. Trend of development financial industry services is increasingly pronounced and faster than in the case of citizenship.

Mobile phones, smartphones and digital devices have become the basis for communication, but also a tool for carrying out financial transactions.

Expectations for connected services are growing constantly and the mobile industry is becoming increasingly competitive.

As a traditional mobile telephone services and data services become the norm, there is a growing demand for their upgrade. Additional, new and most advanced digital technologies, such as blockchain and artificial intelligence, announce fundamental changes, both in financial business models and in the services sector.

### **Blockchain and Privacy Problem**

With the advent of artificial intelligence and the ubiquity of the internet of things (IoT), at some point customers may be able to drive into a dealership for tire and rim repairs with minimal wait time and an automated check-in/check-out process.

That could be handled from the convenience of a smartphone or, better yet, by speaking to the car.

The mechanics will have already pulled replacement tires out, warmed up a preferred rental replacement, and even have a cup of coffee ready – just the way the customer likes it.

This level of luxury concierge service may set car manufacturers apart from their competition; however, personalized service like this requires enormous amounts of data, which automatically raises privacy concerns.

According to the IBM Institute for Business Value, 62% of consumers would consider one car brand over another if it had better security and privacy. Recognizing the need to get ahead of the privacy issues, in 2014, the Alliance of Automobile Manufacturers issued its “Consumer Privacy Protection Principles for Vehicle Technologies and Services.”



These principles commit Alliance members to the following:

**(a) transparency, (b) choice, (c) respect for context, (d) data minimization, (e) data security, (f) integrity and access, and (g) accountability.**

**Blockchain** is a decentralized digital ledger used to record transaction information across many computers.

**Blockchain** is touted as the silver bullet for all sorts of problems with big data, including traceability, “hackability” and human error.

In many ways, **blockchain** features may also offer a solution to privacy issues.

Take, for instance, the “integrity and access” principle adopted by the Alliance: “Participating Members commit to implementing reasonable measures to maintain the accuracy of Covered Information and commit to offering Owners and Registered Users reasonable means to review and correct Personal Subscription Information...”

The virtual immutability of data housed on a blockchain can ensure that the data are not tinkered with or otherwise rendered inaccurate. Any “corrections” that need to take place will accurately be reflected as such, a modification of preexisting data that cannot be erased.

Indeed, the immutability of data is one of many facets that makes blockchain “unhackable”—another one of the Alliance’s principles: “Participating Members commit to implementing reasonable measures to protect Covered Information against unauthorized access or use.”

When combined with the decentralization that is the hallmark of blockchain technology and powerful cryptography designed to obfuscate (if desired) the participants and the terms of the transactions, blockchain may offer one of the most robust solutions to cybersecurity issues that continue to disrupt business operations.

However, it is precisely the immutability of blockchain data that may also present problems.

Once written onto a blockchain, the data resides on the blockchain forever. One of the Alliance’s stated principles is to ensure that its members retain “Covered Information no longer than they determine necessary for a legitimate business purpose.”

Europe’s General Data Protection Regulation similarly requires that personal data be retained for no longer than is necessary for the purposes for which it was processed. How can blockchain square with consumers’ rights to have their data deleted?

The immutability of data is a function of decentralization. Therefore, to provide for a “delete button” on blockchain data, the blockchain would need to become less decentralized.

These blockchains are dubbed “permissioned” blockchains or “consortiums,” where the nodes are not anonymous, access to the blockchain is subject to the consent of other participants, and the data may be more susceptible to change. However, as decentralization diminishes, so too will all its benefits, namely security.

With fewer nodes tasked with maintaining the integrity and security of the data, the more vulnerable to hacking the data become. Most agree, however, that blockchain’s game-changing traceability and security features merit a thorough investigation to see what privacy solutions can be developed to address this dilemma.

In the meantime, of course, the most important privacy feature of all remains consent. We can all choose not to give up our data, even if that means we'll have to settle for straight black coffee instead of our morning latte the next time we have a flat tire.

## Food Supply Chain

Many people involved with the global food supply chain herald blockchain technology as the perfect solution for major industry challenges.

That's because blockchain can prove food quality, track it to ensure safe handling and alert managers quickly if abnormalities crop up. It is almost a panacea, but stops short for one reason—it wasn't originally built to handle data.

And, for a data-heavy industry like the global food trade, blockchain's data problem has become an adoption-killer.

That doesn't mean that the industry should give up on the technology completely.

If anything, tracking the global food supply chain is more important than ever. Thanks to recent high-profile food fraud incidents, global customers are skeptical about the origins of their food.

Blockchain indeed has the potential to help create a more secure and transparent supply chain, but it's going to need a few tweaks. Major companies like Walmart are already implementing their own blockchain technology to set a new standard for transparency. Whether funding such a build in-house or compiling pieces from outside vendors, it is crucial that industry leaders understand blockchain's built-in weaknesses and how to combat them.

Its method of doing so — by recording cryptocurrency transactions in a public ledger — was revolutionary for its secure, transparent and decentralized approach.

However, the task was singular.

All blockchain had to do was track an asset as it transferred from one account to the next.

In terms of both development and information security, building out a blockchain solution that can natively manage and store this type of data and metadata is incredibly difficult. Many enterprises have developed a subpar workaround: they work layers of integration directly into their legacy stacks. Instead of complete data storage on the blockchain, they end pushing data related to blockchain transactions onto a centralized database.

This solves the problem of data storage, but opens them up to problems managing ongoing integration as well as security vulnerabilities. In addition, it prevents them from fully taking advantage of data insights.

Just because blockchain has limitations when it comes to managing data doesn't mean that industry leaders should write off what the technology can do. It just means that they should look into ways to take a data-first approach to keeping records using blockchain.

For example, some private companies use the best of both blockchain principles and data management principles to build blockchain-powered databases. Instead of multiple data layers or complex integrations, your data will be available in an enterprise application that you can easily query, making your data useful and usable.

At the same time, that application will be secured by unbreakable cryptography and built-in governance rules.



Using these principles, blockchain-based databases can provide tamper-free, end-to-end traceability for a product from origin to consumer. That can solve some of the supply chain's most pressing problems, like putting an end to fraud.

For instance, consumers buying lettuce will know that they're getting the real thing, and can even verify details like which fields the lettuce grew and how it was moved to the warehouse.

Additionally, if news comes out about contamination, it would be easy to figure out which products were affected and where they went, helping prevent any disastrous consequences.

### **Preventing a crisis in consumer trust**

Only by understanding blockchain's limitations and reckoning with how to combat them can companies fully and appropriately tap into its possibilities to transform the industry. Data-first solutions can help them do so just in time to prevent a crisis in consumer trust.

Transparency influences consumer behavior and improves customer sales and loyalty, especially in the current environment where skepticism abounds. At a time when 91% of people say they're not provided enough information about what's in their food and its origins, a data-first approach to blockchain is the perfect way to provide consumers with the transparency they desire without sacrificing data integration.

## Conclusion

Despite the challenges described here, the rise of the smart city constitutes a genuine revolution, comparable in significance to the birth of the major industrial cities in the 19th century and the emergence of the networked city as both an urban ideal and a physical process of city transformation.

While this revolution's impact on urban form is still shrouded in uncertainty, its influence on the temporal structures of urban experience can already be observed.

We live in cities that move to the rhythm of ever more numerous events which can be followed in real time. But the proliferation of happenings goes hand in hand with a glaring absence of historical perspective, as if the possibility of history had been suspended indefinitely in favour of an eternal present or a future so close to what we already know that it seems to be a mere intensification of current conditions.

The environmental apocalypse still remains the only notable prospect of change.

The European Union is in the background of large plans (long-term) in the development and implementation of such and similar solutions for the concept of smart cities.

Each individual has something worth of attention and a characteristic and specific feature that can be productive in the construction of a completely new system.

We have seen or heard stories of great businesses which either failed or die without any action taken due lack of funding.

Sometimes, getting funding for your project in the current financial system could be a nightmare given all the bureaucracy involved in seeking for funding either through banks, VCs or even getting into an IPO.

With the use of the blockchain in finance and its smart contracts feature, anyone in any part of the world can now easily fund or get funded via ICOs or STOs provided he or she has an exciting project. The current financial system is set up in such a way that over 1.7 billion people are left without access to financial services.

Though this may not be a major problem in the western world, in third world countries, this is a major problem. Part of the reason is that these people can't access a centralized system such as a bank is most of them live in remote areas where banks don't find it profitable to open up operations.

Looking at all the above developments, it is clear that blockchain in finance is not just a hype anymore but rather a reality. Banks are now joining the moving train and experimenting on how best they can make use of the technology in their operations. This, therefore, means for any bank or financial institution to remain competitive, they will need to implement this technology in their business proces.

