Eurasian Academy of Sciences
Eurasian Business & Economics Journal
2019 Volume:18 S: 25- 41
Published Online April 2019 (http://busecon.eurasianacademy.org)
http://dx.doi.org/10.17740/eas.econ.2019.V18-03

A framework of IoT implementations and challenges in Warehouse Management, Transportation and Retailing

Anas Abdelhadi* , Erkut Akkartal**

* Yeditepe University
** Doç.Dr. Yeditepe University

E-mail: anasalajore@gmail.com, akkartal@yeditepe.edu.tr

ABSTRACT

In the warehouse management system, there is a number of processes to implement and opportune in all kinds of retailing business based on the flexible inventory counts and automated order workflows. Connected devices provide retailers with the chance to help optimize operations in the expression of a more complex supply chain and a more exacting client. RFID technologies, for instance. Its impact on our daily life is really diverse. RFID technology has been gradually applied in many areas, especially in Logistics and Supply, Manufacturing, Marine Terminal Operation, Transportation, Retailing, and Warehousing.
The purpose of this report is to create a framework concerning the IoT (Internet of things) implementation in Transportation, Retailing, Warehousing and Distribution Systems. Such implementation of connecting the internet based devices to each other will generate cost reduction, saving human power and increase asset velocity through enhanced transparency visibility and insights. By the uses of sensors, the power to actually monitor goods in a supply chain will go live then a supplier can expect at the balance sheet much more efficacious. As a method, a qualitative approach was employed to assess the results of this report. The outcome of this work will evaluate the pros and cons of the IoT process in the supply chain.

Keywords: Internet of Things, Smart Environment, Warehousing Management
JEL Classification: L81, J91, M15

We are seeing a vast revolution in the information technology sector, particularly in the last few years in phones and internet connection ways. Today, virtually everyone owns a device plugged into the internet and approximately in 7 or 10 years from now, not just the phones, but also most everything will be connected and that's the Internet of Things {IoT} technologies. For practising this, we need ways to associate the objects together like Wi-Fi, Bluetooth, 4G-LTE wireless and the RFID. Only in 2011, the number of interconnected devices on the planet overtook the actual number of people. Presently, there are more than 18 billion interconnected devices and it is anticipated to hit 24 billion devices by 2020. (Jayavardhana Gubbi, 2013)

The benefits of RFID are best in industries, such as retail, health care, logistics, military, constructing, and shipping. A big scope of RFID applications has been applied; each industry has a limited interest in the technological benefits of their job. These features include unique identification of each tagged element and position control, traceability and improved inventory visibility at any level of the supply chain, automatic inventory count, increased information accuracy, participation, automatic receipt and scanning. (K. Lim, 2013)

As a leader in RFID adoption, Wal-Mart and the US Department of Defence conducted experiments on RFID implementation in their own supply chain and reported promising effects. Early adopters include Procter & Gamble and Marks & Spencer UK. Recently, large-scale RFID projects have been utilized. DHL has marked the platforms for legal transfer to all 89 Metro Cash & Carry in France. (K. Lim, 2013)

Some people say in the following few years, eventually, everyone will be tagged with french fries. These RFID chips are a little electronic device consisting of a small microchip that is the antenna, and a microchip capable of storing information while allowing the antenna to beam and get data. When this object is transplanted into the body. It's about convenience that will be marketed and at least everyone will deliver one. Thither is a company in Wisconsin called Three Square Markets, which proposes an offer onto their employees plant an RFID chip the size of a grain of rice. The chip acts as an NFC / NFC multi-purpose credit card and identification tool, which the company considers the future. (Strickland, 2017). This company sells a small market technology that operates more than 2000 cabins and restrooms. In other locations around the world, chips have been picked up by at least 50 employees from Chip Company, which will tolerate them to buy in their company's booth market. Certainly looks to be an alpha trial of a potential product, extending as much as an unusual perk employee. Also will be able to use the chip implanted between the thumb and index finger to open doors, log into computers, use, copy machines, share business cards and store health information. The chip contains personal data and offers admission to IT systems as well as corporate headquarters. The microchips fused that new fusion will cost around 100 euros, inserted between the thumb and index finger, very similar to thrones made by three square markets. In 2015, a Swedish company implanted microchips in its staff, which permitted them to use the photocopier, open security doors and even pay for their lunch. It had been going on for years. Today it is thought there are about 10000 people across the globe, using microchip technology inside their bodies and this number could drastically increase a great deal. Employees at Three Square Market, a vending service company that makes micro markets, will soon have the opportunity to become cyborgs. (Strickland, 2017). Started from Aug. 1, 2017, workers can opt into getting a special microchip surgically implanted under their skin, between the thumb and index finger. The plant will take mere seconds, sends out the company's blog post, and it will permit employees to make purchases from the break room micro market, essentially a cluster of self-service vending machines and booths. Employees with the implant also will be able to open electronically locked doors and access computers without having to type a password. (Strickland, 2017)

Connectivity is now the new oxygen and in many ways, people say connectivity is now the new opium. The internet of things definitely increases convenience for people. Particularly, when it

gets to the house and cultural life wearable devices. For instance, promise accurate health, exercise tracking and work efficiency. In this aspect, there will be more people signing up for IoT services, concerning security issues. Experts say more modern protection technology such as iris or fingerprint identification will be grafted on to IoT devices in the future, that would include cars quarter of a billion cars, and 250 million cars are going to be connected by 2020. From four-five years from now, all of those communicating predict that by the year 2025, there will be no such thing as traffic, we'll have to explain this to our grandchildren as a phenomenon that we all grew up with and suffered. Some say by 2025-2030, we'll never wait for another red traficlight again. That's all enabled by these devices connected with one another and producing meaningful intelligence, the other enabler what's setting up IoT is mobile. (Arirang news, 2017)

1. A brief history of RFID technology

RFID is cutting-edge technology for stock management and tracking, but it has been about since World War II, In 1889 RFID technology was emerging as Frederick Hertz. Found the presence of radio frequency during his experience. It was developed for defence during World War II. Radar was usually used to detect other aircraft approaches in the 1980s. Many American and European companies realized the importance of developing RFID technology and began manufacturing RFID tags. Several years later, RFID was used to track hazardous materials and dumping in the last two decades brought further progress. RFID technology has been expanded in more friendly uses, such as hotel card systems, cattle tracking and pre-fee speed system. When two Massachusetts Institute of Technology professors saw the possibility of utilizing RFID for supply chain purposes, technology has reached a huge jump in the fabrication and retail environment. With the biggest retailers in the world embracing a new wave information pool. Only most of the researchers report said that the first marketing of RFID technology was performed by Wal-Mart because it launched RFID in 2005. (Kwangho Jung, 2015)

A brief history of RFID technology

Date	Event
1886	The idea of using Radio Frequency to reflect waves from objects was started from Frederick Hertz's experiment.
1930–1940	American naval research laboratories developed a system known as IFF (Identify Friend or Foe).
1940–1950	The first application of RFID consisted of identifying allied or enemy planes during WW2 through the use of IFF system.
1973	Charles Walton, a former IBM researcher registered patent using RFID technology, a radio-operated door lock.
1980–1990	Many US and European companies began to manufacture RFID tags.
2003	The Auto-ID centre for MIT became EPC global, an organization whose objective is to promote the use and adoption of RFID technology.
2005	Wal-Mart launched an RFID pilot.

(Kwangho Jung, 2015)

2. Limitations and Challenges of RFID

There are still many issues related to RFID implementation that even Wal-Mart may have problems dealing with despite its decision to move forward with the use of new technology. Current restrictions and challenges in RFID implementation are:

2.1. Worldwide standards:

A global RFID standard is unlikely to evolve. Like a barcode, RFID standards may vary among many regions of the world. Multinational companies such as Wal-Mart may need to use a variety of RFID standards and applied sciences through their worldwide organizations. (lathigara, 2014)

2.2. Technology problems:

Troubles such as signal distortion, reader accuracy, velocity, and tag transmission capabilities persist, making RFID not practical for widespread usage. Some of the major technical limitations are: (lathigara, 2014)

2.2.1 Read-range distances are not sufficient to take into account for consumer surveillance:

Most of the RFID tags currently in use have read ranges from less than 5 feet. The read range of the RFID tags depends on the antenna size, transmission frequency, and whether they are passive or active

2.2.2 Limited information contained in tags:

Although some RFID researchers support this aspect of technology by pointing out that labels associated with most consumer products will contain only a serial number. Nevertheless, this figure can reveal a great deal of data, which is more often than not applied as a reference number that matches data in one or more databases connected to the Internet. This implies that the information associated with Wal-Mart supply chain management at that number is theoretically unlimited, and can be augmented as new data is gathered.

2.2.3 Defective and poorly performing RFID tags:

RFID tag manufacturers continue to produce faulty tags. Failure rates in early RFID pilots have been as high as 30%. Unfortunately, "relatively high reliability" is unacceptable if an RFID mandate calls for a 100% read rate.

2.2.4 Imaged RFID tags:

Reading a tag occurs automatically without a line of sight and without human interaction. May be difficult to know when some of the tags are not read. This becomes a serious problem for RFID-based business applications if 100% readability is included as part of the core design of business applications. (lathigara, 2014)

2.3 Data management:

Lack of development of right information management tools to manage the data effectively, making it difficult to realize the full potential of RFID in generating a wealth of information. “Companies planning to adopt RFID face technical concerns related to effective data capture (or reading), and to the data volume (in database management and transmission)”

2.4 Cost:

Any development technology that is associated with high costs such as RFID interacts, may be very expensive. "The cost of individual cards is about 30 cents per person; this will be reduced to between one and five cents per mark when billions are produced." Depending on the jobs, readers can borrow from several hundred to hundreds of thousands of dollars. However, the biggest cost problem remains in the required size of the database, their integration with existing company systems and effective transmission of information. The associated costs can approach the millions of dollars, but they are unavoidable if the full benefits of RFID are to be realized. (lathigara, 2014)

2.5 Industry Standards:

Many privacy advocates are insisting the companies state their intended use of the technology due to lack of industry standards regarding the use of personal information that could be encoded on the chips.

2.6 Privacy and civil liberties:

One of the main positions of RFID technology is to deal with threats to consumer privacy and civil liberties. RFID tags can be embedded inside / into objects and documents without knowing the individuals that grasp these items. Must be programmed, applied and verified individually, and data synchronization is usually required. A final barrier to implementation that may need managing is employee acceptance, particularly in light Of potential job losses.

(lathigara, 2014)

3. The interaction between the Human and the Internet of Things (IoT)

IoT deals with the dissemination of information and participation within and between opportunistic communities (with pairs of devices) that are formed on the basis of movement and the opportunistic nature of man. Various personal devices, such as mobile phones, wearable devices, and vehicles, can be the Internet of opportunistic objects when equipped with short-range communication and sensing units. Many IoT devices (with short-range communication capabilities and sensors) are woven deeply into the fabric of daily life. The various characteristics of these devices present unprecedented opportunities to understand the aspects of the interaction between humans and real-world entities.

These human-centric interactions have been qualified as human-object, human-environment and human-human interactions. By analysing the collected interaction data with modern machine learning and data mining techniques. (Bin Guo, 2013). IoT technologies will affect 120,000 jobs in countries by 2012. The Internet will create fresh jobs and many of these businesses will have functions that never existed earlier. The new functions that IoT will support are Agricultural Technology, Cloud Computing Specialist, Pirate Counter, Robot Coordinator, etc. On the other hand, some current jobs will go. As a start, it may be boring and difficult. Some tasks that may extend: Administrator, secretarial, finance adviser and online customer service. Just the way how automated voice solution replaced human voice operators over a decade ago. (TBIPI, 2017).

4. Opportunistic IoT

With regard to topology properties, a network connection can be broadly classified into two types: an infrastructure-enabled connection and a dedicated or opportunistic connection.

Opportunistic IoT, which addresses information dissemination and sharing within and among opportunistic communities (with pairs of devices) that are organized based on the movement and opportunistic contact nature of human. Various personal devices, such as mobile phones, wearable devices, vehicles, can form opportunistic IoT when they are equipped with short-range communication and sensing modules. (Bin Guo, 2013). The opportunistic IoT is equipped with three sensing capabilities: user awareness, ambient awareness, and social awareness. The characterize attributes are: User awareness refers to the ability to understand personal contexts and behavioural, in accession to the rules. Examples include human activity, human popularity, preferences, and so on ambient awareness

concerns status information on a particular space. Examples include space status and traffic dynamics (e.g., Traffic jams).

Social awareness goes beyond personal contexts and extends to group and community levels. The objective is to reveal the patterns of social interaction (e.g., Group detection, friendship prediction, situation, and reasoning), human mobility, etc. (Bin Guo, 2013)

Figure (1): Everything becomes connected, intelligent, observed, efficient, optimized, etc.

5. IoT implementation in maritime transportation

In the past, we were used to asking if the technology can do this and that. But today the question turns to what else can be managed.

IoT means the turn of infrastructure from dumb to smart. There have been major research that if Unilever at Procter and Gamble integrates logistics and Internet activities that can provide 50% of the global logistics cost. Today there are more than 850 funded companies bringing technology to the rug. (Gerd Leonhard, 2015). 90% of the world's shipments are shipped by sea, in an ecosystem where great efficiency becomes the name of the game. However, critical maritime transport data from vessel location, cargo IDs to maintenance data and the availability of ports are still sent from point to point. Well, it's time for a change. The marine IoT cloud is a complete ecosystem that benefits from the transfer of Internet objects from land to ocean. Transforming the logistics assets of the shipping industry and stakeholders throughout the supply chain can be linked to ascertain that every delivery process is equally as effective as possible. Ericsson's marine IoT cloud enables stakeholders to access sophisticated real-time analysis, where they can transform primary data into executable information when time passes. For example, roads can improve fuel efficiency on the go, reducing fuel costs and reducing delays across the logistics chain. Ships can communicate automatically with parts manufacturers for quicker maintenance, shorter delivery times, and faster port delivery. Insurance providers will recognize that the insured vessels are always kept up in good order. Freight and logistics data can likewise be automatically

shared at each phase of the journey, helping to simplify the entire Supply Chain. Trucks will spend less time exercising at the porthole, and cargo will spend less time during transit. The manufacturers can design their next shipment better and the shipbuilding industry will examine more advanced and innovative in the future automated.

Transforming the transportation industry with real-time data n2n brings automation and intelligence to the entire ecosystem, when raw data become real information won by everyone, it will transform under control abroad. (Ericsson, 2015).

6. IoT implementation in Railway transportation

It is one of the fastest and oldest transportation ways. In the present, many companies became to specialize in building and manufacturing railway transportation, for example, HITACHI. They are deploying on creative trains to make maintenance of those trains cheaper and better customer experience. IoT will enhance Railway management on the trains and on the infrastructures of it.

6.1 On the trains:

With the execution of (IoT) on trains, it nowadays provides the opportunity to open all the information and overview of the comprehensive rail system coming from buying a ticket until arriving at terminal access to banned trains and reservations to take off at the last goal. This smart technique gives this information to be proactive and the end result is less delay for the passenger. Vodafone is a key supplier in this plan. It provides cloud-based infrastructure in the solution. The second is to provide the mobile phone solution for the program, that is to say how to fetch data from trains at 100-120 miles per hour. They monitor thousands of sensors across all train systems, and these sensors are updated five times per second, giving some trillions of data points that can be analysed to increase efficiency. By 2020 there will be 242 of those trains that travel about 120 miles per hour providing real-time views of what is happening on this train. (Hitachi-Consulting TV, 2017)

6.2 On the infrastructures:

- **The safe control of a level crossing; by using the safety control systems will reduce the investment and the operating costs.**
- **Uninterrupted rail operation**
- **Modern communication between interlocking system; the operations will be safe and reliable.**
- **Industrial safe technology for railway operation and the benefits will be:**
  - **Standardized solution.**
  - **Simple project configuration and scheduling.**
  - **Low investment and performance costs.**
  - **Compliance with an increased environmental requirement: Temperature, EMC, Mechanical lode.**
  - **A standard-complaint control system in accordance with CELENEC allows application up to SIL4.**
- **(Pilz Belgium, 2014)**

7. IoT implementation in Airway transportation

The ascent of the connected traveller offers multiple opportunities for airports to create a more seamless personalized journey. A check-in kiosks are already processing passengers faster and more secure, they

can also be used to offer other services like priority lane access and since the kiosks are common use solutions even a child, enabled deployment is quick and the passengers only pay for what they need when they need it, bags are moving faster too. The kiosk's self-service bag drop system lets passengers tag and drop bags in around 30 seconds, while the introduction of biometric technology in passenger processing is cutting out the time-consuming document checking at security. To produce a more personalized journey need to link up with passengers, using IoT technology, and Airport apps can share location-based information as they go through the airport such as flight details, retail offers and wayfinding maps. Using a common use of IoT logs to apply kiosks, lighting, and data can also be shared with all airport stakeholders and the best media application booths. The rise of the connected traveller offers multiple opportunities for airports to create a more seamless personalized journey. A check-in kiosks are already processing passengers faster and more secure, they can also be utilized to provide other services like priority lane access and since the kiosks are common use solutions even a child, enabled deployment is quick and the passengers only pay for what they require when they demand it, bags are moving faster too.

The kiosk's self-service bag drop system lets passengers tag and drop bags in around 30 seconds, while the introduction of biometric technology in passenger processing is cutting out the time-cons Leading to new revenue opportunities, offering passengers the option to buy and download movies, magazines or even lance passes directly to their own devices. Elsewhere the flight info display system can provide precise, timely data and display targeted ad. But to attain a tangible difference in passenger experience, a better understanding of passenger behaviour is required.

The kiosks business intelligence portal lets the airport aggregate, analyse and access real-time information on the go. Due to that, reacting to passenger flow conditions at hotspots, gate changes and flight disruptions will become quicker, better and more informed during the real-time. And when there is a need to speed up adaptation to seasonal fluctuations or last-minute gate changes, the kiosks common use in the cloud lets to deploy passenger processing solutions anywhere and on demand. Impressively secure biometric self-service boarding gates can cut the boarding time on a 240 seater plane by 50%. On arrival, passengers want to get throughout the airport quickly or to the next flight on time. These technologies of common use, transfer kiosks give them the quick, easy transfer they want while maximizing utilization of place, while the automated gates and passport kiosks can cut waiting times at passport control by up to 40%. And it can even help reduce the pain of loss or late arriving bags with seater bag journey by giving passengers real-time updates on their whereabouts, and if a bag does go missing with the IoT applications, world tracer kiosk passengers that need to queue up to create a missing bag report, and with world tracer on a tablet staff can proactively process a passenger's missing bag report on the spot. By focusing on the passenger at every stair of the journey airports can have happier clients. (SITA, 2015).

Using document checking at security. To produce a more personalized journey need to link up with passengers, using IoT technology, and Airport apps can share location-based information as they go through the airport such as flight details, retail offers and wayfinding maps.

8. The four stages of adoption, usage impact framework of IoT

8.1. Individual level

Undeniably, at that place is a growing reluctance among individuals to adopt location/sensor devices because of concerns about privacy and security. In fact, emerging literature on this subject has identified privacy and security issues as among the key factors preventing widespread adoption of applications that support Internet objects using large data analytics. (Frederick J. Riggins, 2015)

8.2. Organization level

An interesting topic may include the disclosure of the importance of Internet things, despite the incentives to adopt large data, analyses the adoption mandate and regulatory readiness for the value of the work done by applications that support Internet objects. Early studies on the adoption of IT found that adoption incentives play a significant part in the adoption of IT by a potential adoption company. From an organizational user perspective, important questions include how organizations use this technology to better serve customers, to change the role of employees and how employee privacy can be threatened.

8.3. Industry level

For the future research questions on this topic are needed to be answered at the industry level separated by adoption, use and impact issues, what are the best strategies for adapting it incentives to embrace massive data analytics across industries? What are the key technological challenges for managing applications that support Internet access across multiple partners?

With respect to industry-wide adoption, it has been found that standards issues and standard-setting bodies guide common regulatory regimes. Again, foreign affairs are applied here to the extent that the incentives are influenced by the adoption and employment of other industry players. (Frederick J. Riggins, 2015)

8.4. Society level

For the future research questions on this topic are needed to be answered at the industry level separated by adoption, utilization and impact events, how will governmental agencies use the IoT to serve citizens in the chic city of tomorrow? Can humans keep up with technological changes? The queries here are from the perspective of use (policy) and impacts (socioeconomic sustainability) perspective. From a policy perspective, researchers need to examine governments around the world to develop laws and regulations that prevent applications that support Internet things through large data analysis of violating citizens' privacy and rights. The role of the Internet in creating smart cities is of fundamental importance in this area. (Frederick J. Riggins, 2015)

9. Block-chain and its integration with IoT

As the IoT continues to grow at a rapid rate, sensors and devices are becoming more commonplace to communicate information. In business networks where information such as position, temperature or other properties need to be shared, permissions, block-chain ledger can help produce a clear tampering record. This opens up novel ways to automate business processes between partners without the demand for costly setup, centralized IT infrastructure, and all participants have access to the same information. How supply chains benefit when data is shared through a permissions block-chain? Watson IOT enabled packages to transmit required status information as it passes through multiple carriers, the business contract specifies the conditions that must be met during the shipment from the factory to the grocery store and all parties must adhere to the terms of the contract. A temperature sensor embedded in the

package stores the data locally and sends it to the blockchain through the IoT platform add weight points upon receiving connectivity. (IBM Watson IoT, 2017)

Data is shared across all matches. All the carriers will run into the contractual obligations and the freight arrived at its final destination without exposure to access temperatures. Using IoT to block-chain will allow for all business partners to access the same temperature data without requiring central control. (IBM Watson IoT, 2017)

Block-chain is the mechanism that allows proceedings to be affirmed by a group of unreliable actors. It provides a distributed, immutable, transparent, secure and auditable ledger. The block-chain can be consulted openly and fully, allowing access to all transactions that have occurred since the first transaction of the system, and can be verified and collated by any entity at any time. The block-chain protocol structure information in a mountain range of pulleys, where each block stores a set of Bitcoin transactions performed at a consecrated time. Blocks are connected together with a reference to the previous block, making a string. The integration of promising technologies such as cloud computing technologies has proven invaluable. Likewise, we recognize Blockchain's enormous potential to revolutionize Internet things. Block-chain can enrich Internet things by providing a reliable sharing service, where information is reliable and traceable. Data sources can be selected at any time and data remains unchangeable, increasing their security. In cases where Internet information should share things securely among many participants, this integration will be a major revolution. All the interactions go through the blockchain, enabling an immutable record of interactions. This approach ensures that all the chosen interactions are traceable as their details can be queried in the blockchain, and moreover it increases the autonomy of IoT devices. IoT applications that intend to trade or rent such as Slack can leverage this approach to provide their services. Still, reading all the interactions in the blockchain would require an increase in bandwidth and data, which is one of the well-known challenges in the blockchain. On the other hand, all IoT data associated with these transactions should also be stored in the block-chain. (Ana Reyna, 2018)

*There are four challenges that have been identified as the combination of IoT and blockchain will bring to supply chain management:

- **Continuity of information**: Through a cycle of fixed and non-reversible characteristics of the block-chain, effective exchange of information among the various stakeholders involved in the global supply chain will be key to ensuring traceability and reducing underlying risks
- **Accessibility to information**: Block-chains will provide fast and transparent access to essential information in the future to effectively increase the huge amount of data produced along the supply chain.
- **The link between physical and information flows:** Thanks to a lot, data will be linked to materials and products in the supply chain stages where the material is converted physically
- **Code of conduct violations and fraud detection:** The need to ensure respect for human rights and codes of conduct along the chain is essential to reduce reputation risk effective fraud detection supported by appropriate technologies will become increasingly important to reduce business risk. This will be enabled through the transparent and audio features of the block-chain

10. The Experiences and the Projects Prediction of the Companies about the IoT In the Future

In the past, a few numbers of devices were connected. Gartner points out that the number of Internet devices has increased by 30% in 2016; the installed base of Internet devices will pass things across the industry to just over 1 billion devices, while devices with vertical limit will exceed 1.2 billion. At present, it's around 300,000 developers are contributing to the Internet. A fresh report from Vision Mobile, which extends 4.5 million Internet developers. On 2020, reflecting a 57% CAGR and a vast market opportunity. Lately, the blog of the industry's best computer science certification sites found 96% of senior business leaders stated their companies will apply Internet technology things within the succeeding three years. The new update, added to IDC's Worldwide Semiannual Internet of Things Spending Guide, predicts that worldwide spending on Internet of Things (IoT) will hit $772.5 billion (€658.3 billion) in 2018, an increase of 14.6 per cent of the $674 billion (€574.4 billion) which will have been spent in 2017. In summation, the update expects "Internet spending worldwide to hold a compound annual increase rate (CAGR) of 14.4% over the forecast period 2017-2021 surpassing the $1 trillion mark (€ 852 billion) and $ 1.1 trillion (€ 973.2 billion) in 2021."The IoTs will be "the largest technology category in 2018 with a value of $239 billion (€ 203.6 billion) going significantly towards standards and sensors along with some spending on infrastructure and security. "Services are the second largest category, followed by software and then connect. The industry expected most of the investment in (IoT) to be manufactured (189 billion dollars / 160.9 billion euros), transport (85 billion dollars (72.396 billion euros) and utilities (73 billion dollars / 62.175 billion dollars). According to IDC, "Internet spending among manufacturers will generally concentrate on answers that support manufacturing operations and asset management. Through the transport sector, two-thirds of Internet spending will go to shipping control, followed by fleet management. The facilities". Smart networks dominate electricity, gas and water. Online spending, which is common to all industries, such as connected vehicles and smart buildings, is close to $92 billion ($78.357 billion) in 2018, spending ranking among the highest areas five years consecutively". "By 2021, more than 55 per cent of spending on IoT projects will be for software and services. "Internet spending will reach $ 62 billion (€ 52.805 billion) in 2018, making it the fourth largest industrial sector," said Marcus Torchia, research director of customer analysis and statistics. "The main consumer use cases will be united to the smart home, "Smart devices will experience substantial growth in expenditure over the anticipated five-yr. Period and will help establish the consumer the fastest growing segment with a CAGR of 21.0 per cent," he stated. (INTECH, 2016)

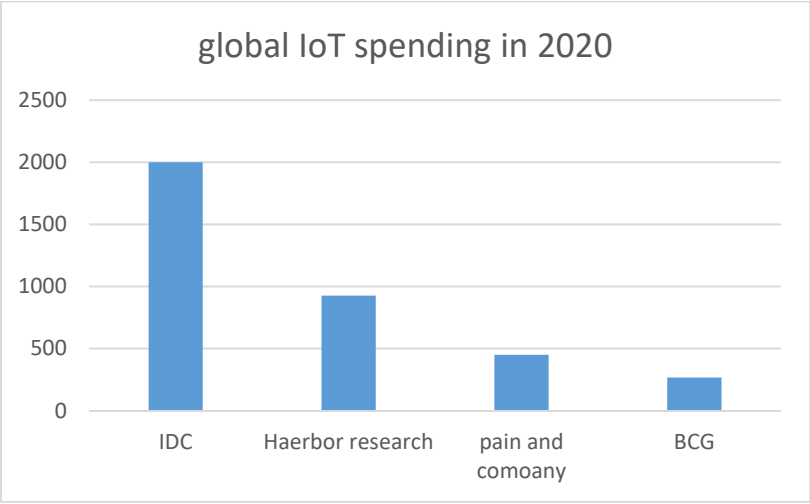

Figure (2): Global IoT spending in 2020 (wespeakiot, 2018)

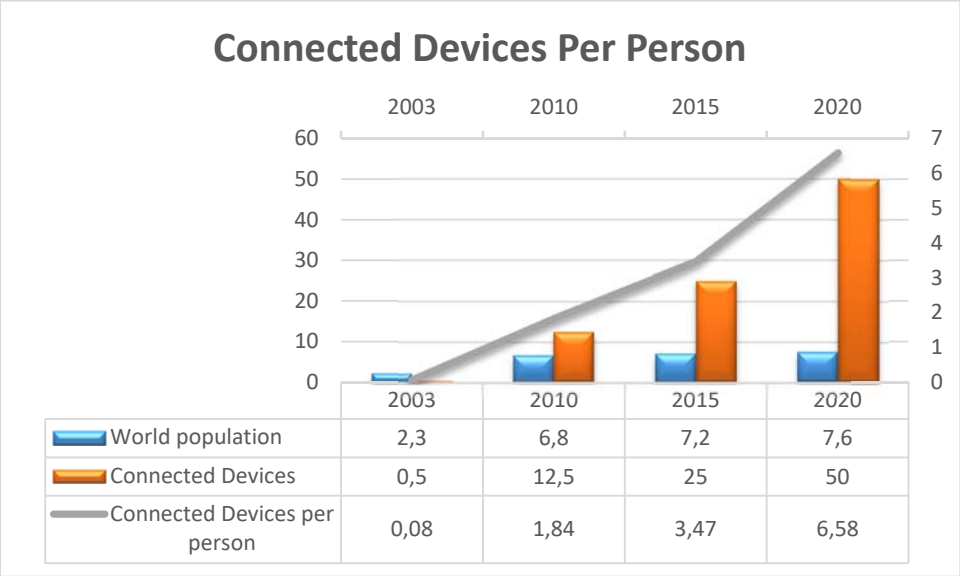

Figure (3): Connected devices per person (intorobotics, 2018)

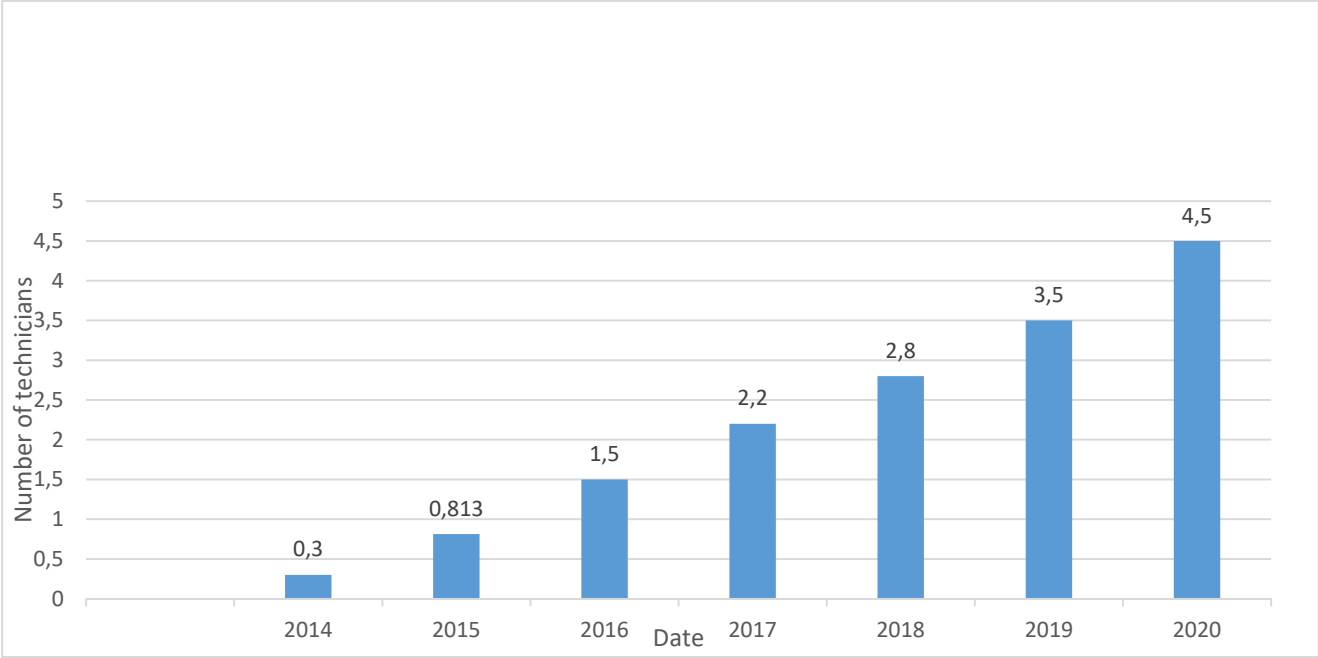

Figure (4): The number of skilled technicians required to envision, build, implement analyze and utilize IoT by 2020. * Numbers in a million (INTECH, 2016)

IoT supported total services spending of 69 billion in 2015 and 263 billion by 2020. The economic impact will be approximately 11 trillion by 2025, it will reduce the maintenance cost by up to 25%, cut

unplanned outages by up to 50%, and it will prolong the lives of machines by years. (Jordan, 2015). Currently, there are more than 18 billion interconnected devices and it is expected to reach 24 billion devices by 2020. (Jayavardhana Gubbi, 2013). Experts say more modern protection technology such as iris or fingerprint identification will be grafted on to IoT devices in the future, that would include cars quarter of a billion cars 250 million cars are going to be connected by 2020. 94% of car crashes are caused in some style by human error that causes 37,000 Americans to die each year in automobile accidents. The cars have long collected data, nearly every car for decades has had an event data recorder and an onboard diagnostic system, but in the past few years, there's been an explosion in the variety the connectivity and the volume of data in the car.

These new features enable Jetson-like technologies. For instance, automatic emergency braking uses radar or camera-based detectors to observe if you're about to collide with an object on the road and you haven't braked quickly enough, they'll come apart automatically. Eye tracking technologies can tell if a driver is falling asleep at the wheel and alert them to take them to wake up. Vehicle the vehicle communication can send basic safety messages from your car to nearby cars on the road to notify them if you've had to brake suddenly or come into a crash so that the driver six cars back can know that he needs to slow down before he feeds into you what's preventing a pile up (TEDx Talks, 2017). And after that, eventually the cars will drive themselves like Olli, Olli its self-drive vehicle invented by IBM Watson IoT technology, it contains 12 comfortable seats with the ability to intercommunicate with the passengers. And it's created by the 3D printer. They sold the first 10 Ollie's after 3 months, it could be seen in Las Vegas, in Miami-Dade County and several other places around the world. (IBM Watson IoT, 2016). Not only the cars that drive themselves also the Aircraft they have the autopilot scheme, only the human pilot still needs. On the other hand, there is another case of the aircrafts the Drone's, the Drone's started as military objects, only today, there's a batch of projects for it like delivery Drone's especially the aid deliveries for how need help and fast, But because of the length or location of the accident is not easily accessible the Drone's become good selection.

11. RESEARCH

IoT is no longer a fantasy concept; it is one of the most critical constituents in the modern line. The aim of this paper was to make a framework concerning the IoT (Internet of things) implementation in Transportation, Retailing, Warehousing and Distribution Systems. What is the IoT? How far the trade business affected? In add-on, how far can affect our lives in the hereafter? I tried to find answers to these questions

11.1. Material and construction method

The material of this research consists of the experiences and the projects prediction of the companies about the IoT in the future. A qualitative approach will be followed for this framework. This pepper has made as an exploratory, descriptive and Qualitative by reading 25 Literature Search's and watching more than 9 hours of videos.

11.2. Findings

The IoT is the future of all kinds of business and there a lot of opportunities in a few years our life will differ. In the retail job, many retailers already started to use RFID like Wal-Mart. In airports, the electronic passports gaits and RFID tags on the bags. On the railway still in progress, although HITACHI company engineers are now deploying on creative trains to make maintenance of trains' cheaper and

better customer experience. In maritime if the IoT tools are applied it going to reshape the business in a fast and efficient way.

But even so at that place are some barriers in the business that holding the companies to convert like the global standards, Technology problems, data management, Cost, industry Standards and Privacy and civil liberties.

12. The Conclusion

It became obvious that IoT is not just like any technology, because it is the cooperation between many technologies that had been invented; it is not just a very effective way to enhance the supply chain but also in our daily life. And so we need to assemble the requirement in order to help us to collect more data and analyse it and will lead to cost reduction and better work field.

The autonomies industry spicily the vehicles sector, IoT is a core business. The transportation modes; railway, airway, roadway and even the maritime will be more effective and secure. In respect of linking up all of these devices, we need to devise fresh ways of connection and more sophisticated programs and software with more dependable ways to keep the information and the data in a safe from miss using or been compromised. Thus, we need more software engineers, techno companies and fund sponsors. It will generate many business opportunities. All societies must consider the technological revolution because not just the normal competitors in the same area almost any society takes in the proper tools and the fund could become one.

The most critical component of any business is the process of efficiency. Nevertheless, this should not delete humanity, without humanity business would not make. However, there is no reason not to do business if machines replace people, Allowing machine-to-machine trade-offs. The danger of producing millions of citizens who are plainly unable to contribute economically, and with heavier damage to an already declining middle-class estimate of worldwide rates of technical advance is always imprecise. These affairs should be taken in the near future.

REFERENCES

- Alexander Gluhak, S. K. (2014, February 17). A Survey on Facilities for Experimental Internet of. pp. 58-67.
- Ana Reyna, C. M. (2018). On blockchain and its integration with IoT. Challenges and opportunities. *Future Generation Computer Systems*, pp. 173–190.
- Bin Guo, D. Z. (2013, November 6). Opportunistic IoT: Exploring the Harmonious Interaction between Human and the Internet of Things. *Journal of Network and Computer Applications*, pp. 1531-1539 .

- C.N. Verdouw, J. W. (2016). Virtualization of food supply chains with the internet of things. *Journal of Food Engineering*, pp. 128-136.
- Carmine Sellitto, S. B. (2007). Information quality ttributes associated with RFID-delrived benefetits in the retail suply chain. *International Journal of Retail & Distribution Management*, pp. 69-87.
- Frederick J. Riggins, S. F. (2015). Research Directions on the Adoption, Usage and Impact of the Internet of Things through the Use of Big Data Analytics. *International Conference on Modern research in Engineering, Technology and Science (ICMETS)* (pp. 1530-1605). Kauai, HI, USA: IEEE.
- INTECH. (2016, July 6). *Prepare to Win – What Every Hiring Manager Should Know About IoT!* Retrieved from hollisterstaff.com: https://hollisterstaff.com/prepare-to-win/
- Intorobotics. (2018). */iot_trend*. Retrieved from intorobotics.com: https://www.intorobotics.com/iot_trend/
- Jayavardhana Gubbi, R. B. (2013). Internet of Things (IoT): A Vision, Architectural Elements, and Future Directions. *a Department of Electrical and Electronic Engineering, The University of Melbourne, Vic - 3010, Australia*.
- K.Lim, M. (2013, september 1). RFID in the warehouse: A literature analysis (1995–2010) of its applications, benefits, challenges and future trends. *International Journal of Production Economics*, pp. 409-430.
- Kwangho Jung, S. L. (2015, September 4). A stematic review of RFID applications and diffusion: key areas and public policy issues. *Technology, Market, and ComplexityTechnology, Market, and Complexity2015*.
- lathigara, N. (2014, october 12). *A Project on Supply chain Management at Walmart Industry...how to manage market demand on time within just in time process.*. Retrieved from slideshare.com: https://www.slideshare.net/nilesh9991/project-on-scm-at-walmart
- Strickland, J. (2017, Jul 24). *Wisconsin Company Encourages Employees to Become Cyborgs*. Retrieved from electronics.howstuffworks: https://electronics.howstuffworks.com/everyday-tech/wisconsin-company-encourages-employees-to-become-cyborgs.htm
- Temporal Management of RFID Data. (2005, August 31). *31st International Conference on Very Large Databases*.
- wespeakiot. (2018). *IoT numbers vary drastically: devices and spending in 2020*. Retrieved from wespeakiot: https://www.wespeakiot.com/iot-numbers-devices-spendings-2020/
- Xiaolin Jia, Q. F. (2018, July 25). RFID Technology and Its Applications in Internet of Things {IoT}.
- Yanming Nie, Z. L. (2011). Complex Event Processing over Unreliable. *School of Computer, Northwestern Polytechnical University,*, pp. 278–289.
- Zhanlin Ji, I. G. (2014, November 25). A Cloud-Based Car Parking Middleware for IoT-Based Smart Cities: Design and Implementation.
- Zheng Yan, P. A. (2014). A survey on trust management for Internet of Things. *Journal of Networkand Computer Applications*, pp. 120–134.
- Cram, J. [Enstoa]. (2015, November 23). IoT in Construction | Jordan Cram | Enstoa [vidio file]. Retrieved form: https://youtu.be/gPymvS5bT_o

- ARIRANG NEWS. (2017, August 7). 'Internet of Things' products shake up the pet market in Korea [vidio file]. Retrieved form: https://youtu.be/bZFJ13B0bZw
- TBIPI. (2017, August 11). Internet of Things impact on Jobs | IoT Training | TBIPI [vidio file]. Retrieved form: https://youtu.be/DZ5hPqTeukU
- HitachiConsultingTV. (2017, April 25). Smart Trains for a Smart Future – Predictive Maintenance for the Rail Industry [vidio file]. Retrieved form: https://youtu.be/aBq1CFgNkZI
- SITA. (2015, Jun 26). Smart technology smarter airports [video file]. Retrieved form: https://youtu.be/GPsmQAQRBt0
- Pilz Belgium. (2014, April 7). Railway industry : Industrial safety technology on railways [video file]. Retrieved form: https://youtu.be/1X53IvPyslY
- Ericsson. (2015, November 12). Maritime ICT Cloud transforms shipping [video file].
- Retrieved form: https://youtu.be/qnzlJS_eDow
- Gerd Leonhard. (2015, Jun 21). Digital transformation: ports, shipping and maritime. Keynote by Futurist Speaker Gerd Leonhard [video file]. Retrieved form: https://youtu.be/IBLyFRDTUjI
- IBM Watson IOT. (2016, Juley 8). Cognitive Mobility: Olli the self-driving vehicle and Watson the cognitive system [video file]. Retrieved form: https://youtu.be/9joEsWiYFEI
- IBM Watson IOT. (2017, December 7). Blockchain and the Internet of Things explained [video file]. Retrieved form: https://youtu.be/HJ1W4vHPDFY
- TEDx Talks. (2017, November 28). What's Driving the Connected Car? Data, It Turns Out | Lauren Smith | TEDxWilmingtonSalon[video file]. Retrieved form: https://youtu.be/Fyz2GcdhQjQ