IoT : Barriers and Challenges in India

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Abstract: The Internet of Things (IoT) is a technology that connects to and interacts with things and exchanges data with other devices and systems over the Internet or communications networks. Rather than people to people communication, IoT emphasis on a machine to machine communication. This paper familiarises the status of IoT development In India, containing security issues challenges, and Opportunities. This paper analysis the Risk factor, security issues, and challenges from an Indian point of view.

Keywords: Internet of Things (IoT), Barriers Challenges, Interoperability, Authenticity

I. INTRODUCTION

In the upcoming years, IoT will have wide and major changes in business models, trade standards , security, and , infrastructure during the complete IT computing and networking systems . The Internet of Things is a new glow of technology advancement in the premature stages of market development. IoT has the possibility to speed up "sharing economizing." So as to suggest new approaches to managing and tracking minor things, it will also authorize the sharing of new, minor and economical entities outside the communities, planes, motorcars, and motorbikes. As it trends go on, it will contribute exclusively untried applications, that willpower drives new company prototypes and profit prospects. It makes devices and sensors to more powdery levels and helps the invention of new uses, new applications, new services, and new business prototypes that were not previously economically feasible. It will also be risky for lots of current industries. Today, worldwide IoT Technology is among the leading 5 technologies according to Gartner's Chart. That implies It is highly utilized in different sectors in the additional role whether it is in clever homes or vehicle tracking, kids and old age people observing or daily routine job. However, at present, the fact is that these features engage several IoT helping devices, and the future is already fragmenting of the new revolution.

Fig 1: Scope of IoT

II. ROLE OF IOT IN INDIA

Government endeavors, supporting the environment, good occupancy standards, and rising acceptance of smart applications play essential roles in the development of the market. According to the information of COMSNETS in 2015 [1], Government assumes about to invest in IoT for developing approximately 100 Smart cities its inaccurate proposed cost is Rs.7060 crores

Fig 2: Future of IoT in India

Although according to Indians necessities, IoT consequences are useful in each domain and various businesses sponsor in lots of sectors and this percentage is boosting day by day[2], concentrate on Smart Water Management, Smart Waste Management, Healthcare, Smart Agriculture, Smart Environment, Smart Safety, Smart Supply Chain, etc. but according to the Indian thrift factor affordability to a billion population is very challenging. Supporting the circumstances and IndianInfrastructure like power supply, poor pollution, extreme temperatures, high levels of humidity and dust, No clean and insufficient telecom range.
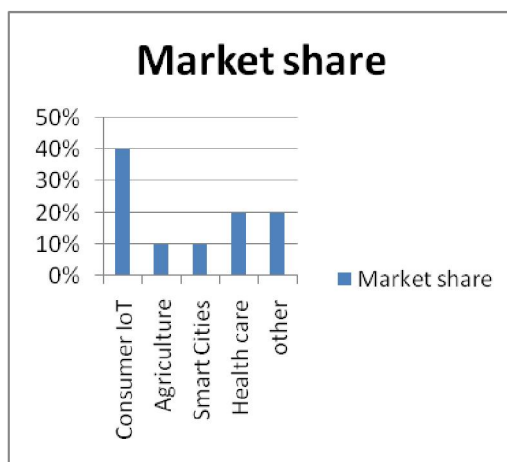

Fig 3: Market of IoT in India

The highest-rated priority project by Indian Governmentis **Digital India Program** which is used for the motivation of digitalization, and making India a digitally empowered country and knowledge economy, is wished to provide the required motivation for growth of the IoT productiveness ecosystem in the country.

Table 1: IoT Market in Global and in India **[3]**

S.N.	IoT Global	IoT India
1.	In global, IoT market will raise from a 15.4 billion devices in 2015 to 30.7 billion devices in 2020 and 75.4 billion in 2025.	By 2022 IoT market in India is expected to grow to $ 16 billion with 2.9 billion units from current $ 5.9 billion and 200 million connected units.
2	During 2016- 2022,Global expenses on IoT based products and services by initiatives are projected to reach $125 billion- $259 billion attaining a 16% CAGR.	During 2015 – 2022,IoT market in India is Expected more than 28 % to grow at a CAGR And business is expected to touch $300 billion by 2022.
3.	IoT will increase $10 to $15 trillion to global GDP in	The Indian government's objective is to generate an

	the next 20 years.	IoT production in India of $ 15 billion by 2022.
4.	In 2022 automated driving and IoT enable vehicle will be increased globally.	In India utility sector and oil sector slowly reach on top 5 sector like Electronics and telecom,Both are revenue generate sector.

III. CHALLENGES OF THE INTERNET OF THINGS

3.1 Security:

Security is a vital pillar of the Internet while the primary challenge for the IoT. As time goes the craze of IoT boosts from millions of devices to tens of billions. As the growing the count of number of interconnected machines, the chance to manipulate safety susceptibilities is also raised, like in cheap or low-level organized devices, due to incomplete data streams the possibility of data-stealing is increased by which people's health and safety can be dangerous. Multiple IoT arrangements will also contain groups of similar or adjacent matching devices. This uniformity expands the potential impact of any single security flaw by the total number of devices that all have the same features

3.2 Privacy

As Authenticity, trust, and Confidentiality are vital aspects there are some other necessities also necessary like determining access to specific facilities, preventing them from being transferred with other things at certain Times and business communications involving smart objects would need to be rescued from opponents'.

The data networks are still light and also costly in comparison of other advanced countries. From an Indian standpoint, the cloud warehouse procedure is still in the emerging stage

Transmit the data to a cloud service for processing, sometimes including a third party.

The gathering of this knowledge leaks lawful and regulatory challenges facing data security and privacy law.

3.3 Standards

The lack of standards and records can help Unconscious activities by IoT devices. Low standard or cheap invented and configured devices have unpleasant consequences for the networking resources. Without standards to guide developers and manufactories, occasionally design products that operate in disruptive ways on the Internet.When any technology has a standard development methodology then it can be easily available everywhere and can be used by all applicants, and boost the growth also.

3.4 Trained Workforce

Execution of all and every technology needs a team of experienced persons who have generous knowledge of network, hardware, software, and about that technology. And India is backward in this point where manpower think when technology is spread they lose their job and there is no life of new technology. So they don't take any initiative to learn about it. So every community face lots of trouble during their change over phase from legacy systems to IoT-enabled systems. Similarly, Scalability, Fault tolerance and Power supply are also big challenges in India

IV. REVIEW OF SURVEY ON RISK ,SECURITY AND CHALLENGES IN IOT

S. N.	Survey	Citation	Year	Security & Risk Factor	Challenges
1.	The Internet of Things for Health Care: A Comprehensive Survey.	[4]	June, 2015	-Computational Limitations -Memory Limitations -Energy Limitations -Scalability -Mobility -Communications Media -Data Protection	-Standardization -IoT Healthcare Platforms -Cost Analysis -Technology Transition -The Low-Power Protocol -Scalability

2.	A Survey on Challenges, Technologies and Applications of IoT.	[5]	March,2016	-Front end sensors and equipment -Networks -Backend of its System	-Scalability -Device heterogeneity -Energy optimized solution -Ubiquitous data exchange through wireless technology -Self-Organization capabilities -Semantic interoperability and Data management
3.	Internet of Things (IoT) : Challenges and Future Directions.	[6]	March,2016	-As IoT connects more devices together, it provides more decentralized entry points for malware -Trust and Privacy.	-Standards and interoperability -Complexity, confusion and integration issues. -Internet connectivity and power requirement.
4.	Smart Home Analysis in India: An IOT Perspective.	[7]	June,2016	-Unique identification - low security at the server side. -Privacy - Authentication	-Reliability -Co-ordination among connected objects, -Integration of several devices increases the system complexity and connectivity problem. -Cost and Storage -Self-organisation of network so that there is no data loss due to network failure.
5.	Challenges and Risk to Implement IOT in Smart Homes: An Indian Perspective	[8]	Nov, 2016	-Risk is to store the sensitive data either on local server or to use VPN in case using the remote server of vendor. -When Security system based on the CCS (Centralized Controlled System) for processing, application and data storage, then a risk of central point of failure is increase. -End point protection, Trust & Safety, Physical Security. -Hacking, DoS , updation, virus , password based attacks and phishing	-Internet connectivity, consistency and accessibility of necessary signals bandwidth. -Cost of technology. -Poor supporting organizational setup. -IoT adoption due to nonexistence of well- trained staff. -Lack of awareness of IoT Systems, Services and Applications.
6.	Health Care Systems Using Internet of Things.	[9]	December, 2016	Data security causes concerns in the implementation of IoT in healthcare.	-Lack of EHR system integration. -Interoperability challenges keep IoT data in different silos. -IoT data alone may notbe as meaningful if it is not within the context of afull health record. -Constant changes in hardware and connectivity technology.

This Survey is based upon the security issues and challenges face in India. Researchers face different problems like authenticity, interoperability, privacy, data confidentiality, low range of internet signal, power supply, power backup, fault

tolerance, reliability,cost, poor support, and most important awareness and skills.Here we discuss about some challenges and risk that already exists in India which must take care and improve by government, service providers and venders by which system provides market place of IoT and smart services in India

V. CONCLUSION

Ultimately, the future of IoT becomes a worth but huge amounts of data raised its complexity in detection, communications, controller, and in building awareness but its growth will be raised day by day. Although the future of IoT will be predictable to be merged, all-in-one, and ubiquitous. Service organizations needed to be enclosed in a set of criteria. So, As a Wise system, progresses of IoT can be decided with the cooperation of interoperability, awareness, skilled, teamwork, energy sustainability, privacy, trust, confidentiality, and security.

IoT has become anthe expected sensation of development of the information industry.This intention outcome in quality of lifestyles. This paper surveyed some of the most vital issues and challenges of IoT from the Indian perspective like what is being done and what are the problems that need further improvement.

Some likely improvements include adding a facility to handle unified, seamless, and universal internet connectivity, standardization, with interoperability. Energy sustainability, privacy, and security are also major points on which research can go on.

In the coming years, improving these challenges will be a powerful and bold step front working and communication in the commercial, industrial and academic areas.

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