IoT: Challenges and Issues in Indian Perspective

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***Abstract*—Internet of Things is the Connections of embedded technologies that containedphysical objects and is used to communicate and intellect or interact with the inner states or the external surroundings.Rather than people to people communication, IoT emphasis on machine to machine communication. This paper familiarises the status of IoT growth In India, and also contains security issues challenges.Finally, this paper reviews the Risk factor, security issues and challenges in Indian perspective.**

Keywords—Internet of Things (IoT), Challenges, Interoperability, Authenticity.

I. INTRODUCTION

In the succeeding coming years, it will have major effects on business models, infrastructure,security,and, trade standards, during the complete IT computing and networking systems. The Internet of Things is a new light of technology progression in the early stages of market growth. IoT has the potential to speed up the "sharing economy." So as offering new techniques to manage and track minor things, it will also allow the sharing of new, minor and economical items outside the communities, aircrafts, cars and motorbikes. As it trends go on, it will offer exclusively novel applications, that will drive new business prototypes and profit prospects .It pushes devices and sensors to more granular levels and enables the creation of new uses, new applications, new services and new business models that were not previously economically feasible. It will also dangerous for lots of current industries.

Today, in worldwide IoT Technology is among top 5 technologies according to Gartner's Chart. That means, It is highly used in different sector in different role either it is in smart homes or vehicle tracking, kids and old age peoples monitoring or daily routine job. However at present the actuality is that these segments hire several IoT enabling devices, and future is already fragmenting of the new revolution.

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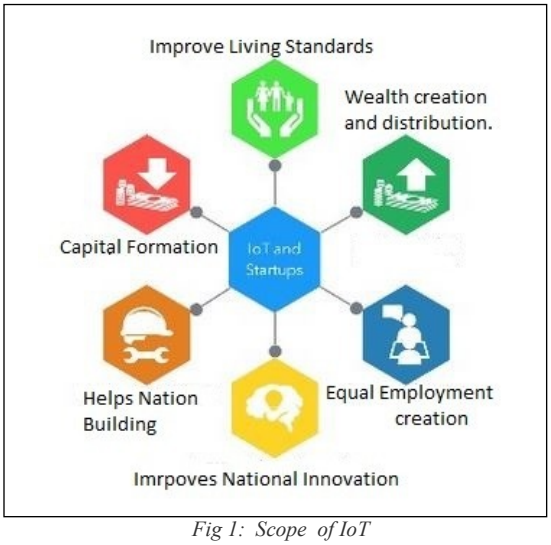

Fig 1: Scope of IoT

II. ROLE OF IOT IN INDIA

Government initiatives, supporting environment, good living standards and increasing approval of smart applications plays the vital roles in the growth of market. According to the report of COMSNETS in 2015 [1], Government think about to invest in IoT for developing approximate 100 Smart cities its approximate proposed cost is Rs.7060 crores.

Fig 2: Future of IoT in India

Although according to Indians requirement, IoT product are useful in each domain and various companies invest in lots of sector and this percentage is increase day by day[2], but focus on Smart Water Management, Smart Environment, Healthcare, Smart Agriculture, Smart Waste Management, Smart Safety, Smart Supply Chain, etc. but according to the Indian economy factor affordability to a billion population is very difficult. Supporting environment and Indian Infrastructure like power supply, poor pollution,extreme temperatures, high levels of humidity and dust, No clean and poor telecom coverage.

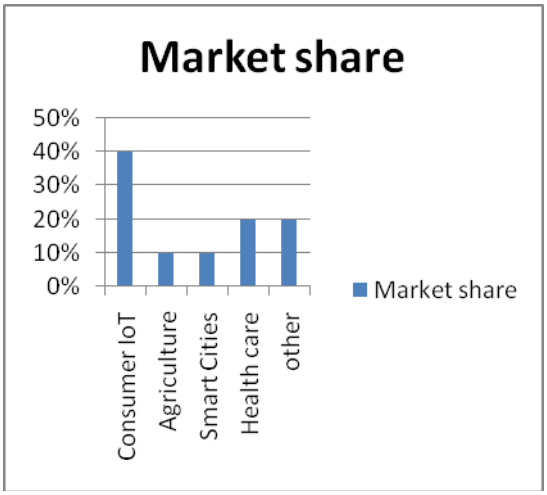

Fig 3: Market of IoT in India

The highest rated priority project by Indian Government is **Digital India Program** which is used for encouragement of digitalisation, and make India as a digital empowered country and knowledge economy, is expected to provide the required motivation for expansion 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 2020 IoT market in India is expected to grow to $ 15 billion with 2.7 billion units from current $ 5.6 billion and 200 million connected units.
2.	During 2016-2021,Global expenses on IoT based products and services by initiatives areprojected to reach $120 billion- $253 billion attaining a 16% CAGR.	During 2015 – 2020,IoT market in India is expectedmore than 28 % to grow at a CAGR andbusiness is expected to touch $300 billion by 2020.
3.	IoT will increase $10 to $15 trillion to global GDP in the next 20 years.	The Indian government'sobjective is to generate an IoT production in India of $ 15 billion by 2020.
4.	In 2020 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

A. Security:

Security is an essential pillar of the Internet while the major challenge for the IoT. As the time goes the trend of IoT inflates from millions of devices to tens of billions. As increasing the number of connected devices,the chance to exploit safety vulnerabilities is also increase, like in cheap or low standard designed devices, due to incomplete data streams the chances of data theft is increased by which people's health and safety can be risky.

Many IoT arrangements will also include collections of similar or adjacent similar devices. This homogeneity expands the potential impact of any single security weakness by the total number of devices that all have the same features.

B. Privacy:

As Authenticity, trustworthiness and Confidentiality are important aspects there are some other requirements also important like discriminatory access to certain facilities, preclude them from shared with other things at certain Times and business communications involving smartobjects would need to be secure from opponents'.The data networks are still delicate and also costly in comparison of other developed country. From an Indian perspective, the cloud storage operation is still in theemerging stage

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.Transmit the data to a cloud service for processing, sometimes includes a third party. The gathering of this information leaks legal and regulatory challenges facing data protection and privacy law. In order to realize the opportunities of the IoT, Some new strategies will be required for privacy choices through a broad range of expectations, while still development innovation in new technologies and services.

C. Standards:

Absence of standards and documents can assist Senselessactivities by IoT devices. Low standard or cheap designed and configured devices have undesirable consequences for the networking resources. Without standards to guide developers and manufacturers,sometimes design products that operate in disruptive ways on the Internet.When any technology have standard development process then it can be easily available everywhere and can used by all applicants, and increase the growth also. While in today's world, global standards are followed by every local station.

D. Trained workforce:

Implementation of every technology requires team of skilled persons those have ample 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 lean about it. So every organisation face lots of problem during their changeover phase from the legacy systems to IoT enabled systems.

Similarly Scalability, Fault tolerance and Power supply are also big challenge 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 not be as meaningful if it is not within the context of a full 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

Finally, the future of IoT becomes a worth but massive amounts of data increased its complexity in detection, communications, controller, and in producing awareness but its growth will be increased day by day.Although future of IoT will be predictable to be integrated, all-in-one, and ubiquitous. Service organizationrequired to be enclosedin a set of standards. So, As an Intelligent system,progresses of IoT can be decided with the cooperation of interoperability, awareness, skilled, teamwork, energysustainability,privacy, trust, confidentiality, and security. IoT have become an expected trend of development of information industry.This will outcome in quality of lifestyles. This paper surveyed some of the most important issues and challenges of IoT in Indian perspective like what is being done and what are the issues that require further improvement.

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Some possible improvements include adding a facility to handleunified, seamless, and universalinternet connectivity, standardization, withinteroperability. Energy sustainability,privacy, and security are also major point on which research can go on.

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

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