IoT and Make in India: Exploring new horizons for sustainable Entrepreneurship Development in India

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ABSTRACT
The advent of Internet of Things (IoT) is changing the day to day functionality of our life dramatically. IoT and Make in India project are creating waves by spreading its range to different sectors from homes to smart homes, from health to smart healthcare and much more. With an objective to transform India as the global manufacturing hub, the Government of India has launched the significant dream project by the name ‘Make in India’. Make in India initiative has the ability to take the Indian economy to the new pinnacles and create enormous employment opportunities. Because of its favorable approach, it has started getting attention from all over the world. The business-centric policies and the conducive environment for the investments are expected to play a major role in the realization of this project. Make in India campaign is immensely benefited by IoT for providing innovative ways to the sustainable development of manufacturing organizations. Taking into account the current scenario of technology, this review addresses the impact of IoT on entrepreneurship. Moreover, this research article focuses on definitions, characteristics, business value, relevance to manufacturing sector and adoption of Internet of Things in India. The main objective of this paper is to provide an overview of Internet of Things, digital transformation in India, and opportunities made available for startups through Make in India campaign.

Keywords
IoT, Make in India, Sustainability, Entrepreneurship, Economy

1. INTRODUCTION
The economic development of the country depends upon the industrial growth, which in turn relates to the entrepreneurial skills of the people. Thus the entrepreneurship acts as a building block for the economic growth of the nation. According to Santhi N. et al. an entrepreneur transforms ideas into reality with his entrepreneurial skills which include creation, innovation, business expertise and the risk-taking ability [4].

The Government of India, with an aim to transform India into the global manufacturing hub, has started an ambitious flagship program called ‘Make in India’ under the leadership of honorable Prime Minister of India in the year 2014. Every possible efforts is made by the government to initiate pro-business opportunities for opening manufacturing plants in the country. However, the Government is only focusing on attracting the business and sustaining the growth of the manufacturing in the country. On the other hand, the government should envision the new ways with the help of upcoming technologies to help the manufacturing companies to optimize their activities which will boost their sustainability of doing business in India.

The new technology called Internet of Things can be proved to be useful in enhancing the business capabilities of the organizations by removing the current obstacles which they are facing. This technology provides round the clock services to the manufacturing organizations by associating them with their shop floor boards. This helps manufacturing companies to get the real time information about their units. This facilitates them to control the manufacturing unit by taking the correct decision in precise time, resulting in an optimized manufacturing operation.

2. ROLE OF DIGITAL TRANSFORMATION IN INDIA
The era of digital transformation has changed our lives tremendously. It has a significant influence on the way we interact with each other. It has not only helped us to carry our daily chores smoothly but also to solve business problems and resolved various other issues. Hence, over the past two years, the government of India, envisioned the importance of information technology as the main driving force for the growth of the country. The technology acts as an enabler for providing various services ranging from a digital educational material, better citizen services to efficient and productive work at the manufacturing units and thus is cable of transforming the entire scenario of doing business.

Indian economy, for the past few years, has been transforming towards becoming a digital economy. This has led to the adoption of a new technology called Internet of Things (IoT). The technology facilitates connection of various devices to the Internet and thus automatically shares data among all the people who are using those devices. Some of the popular IoT devices; fitness band, smartwatches, solar backpack, connected glucometers, smart cars and much more are gaining popularity among the new generation. The key technologies used in IoT include Wi-Fi, Bluetooth Smart, NFC, and GPS. It was predicted that by 2019, wrist-worn wearables which include watches, bands and bracelets are likely to increase by 80%.

3. INTERNET OF THINGS
The Internet of Things (IoT) though does not have a standard definition acceptable to the world, was the term first coined by Kevin Ashton, an expert on digital innovation in the year 1999. The Internet of Things is a system of physical devices having sensors and built-in intelligence and people connected to the Internet. They talk to and monitor each other over the mobile Internet thereby conserve resources, take better decisions, and increase the efficiency and productivity [3].
During the last ten years, the technology which is growing exponentially in the IT world is the Internet of Things. It has envisioned the global network of physical objects which can be linked to facilitate a new concept of round the clock connectivity from anywhere at any time for all. It has made possible to have communication between almost anything; be it between human-to-human, human-to-things and things-to-things in this world by providing the unique identity to each and every object. IoT is a world of connected devices which are commutating intelligently with each other using sensors and actuators embedded in them. These devices include electronic devices such as servers, computers, tablets, telephones and smart phones which are linked through wired and wireless networks of same Internet IP used to connect the Internet. These networks generate the massive amount of data that can be analyzed with the help of computers. These devices are tools designed in such a way that they can recognize the changes occurring in the surroundings and respond to them quickly. The advent of IoT has revolutionized the IT world by making these physical systems work on their own without human intervention. These everyday objects are connected and coded using IoT so that they can become machine readable and traced individually using the Internet. [3] [1].

4. INDIAN MANUFACTURING SECTOR AND IoT

The global trend is switching over towards IoT which is foreseen to generate favorable prospects for the manufacturing sector in India. IoT is believed to bring the ‘fourth industrial revolution’ widely known as ‘Industry 4.0’. An extensive survey carried out by Forrester Consulting suggests that the organizations using IoT applications and operations have better profit rate, healthy and long-term customer relationships, improved strategic decision-making ability and efficient process execution.

Make in India campaign provides all possible avenues it could to attract business and turn India into a world-class manufacturing hub. Apart from this, we have got ample opportunities; firstly, in the form of fourth industrial revolution which is likely to have the higher impact at the moderately lesser replacement of equipment and secondly Industry 4.0 and IoT will have a major share of IT and software for creating infrastructure for it. India is one of the major software producers of the world; which will definitely proved to be advantageous for us. After almost 30 years, manufacturing has started taking momentum in the form of Industry 4.0 and IoT. It has the ability to optimize supply chain thereby facilitating the production of high-quality goods at low costs. This, in turn, boosts up the ability of manufacturing plants. The reducing costs of IoT sensors and connectivity have made the digital transformation of manufacturing in India a realistic and non-cost intensive option [6].

IoT offers a lot of opportunities like smart cities, smart logistics, and smart utilities etc. which provide the advanced infrastructure required to enhance the industrial revolution in India. Make in India is proved to be highly productive for the traders, major software companies, and their partners. IoT is acting as a promoter for the success of the most important campaign of ‘Make in India initiated by the government of India.

5. IoT OPPORTUNITIES IN INDIA

In India, IoT market is slowly increasing. People are also getting used to the change taking place in the technology every now and then and accordingly accommodating these changes in their life style. IoT solutions will always grow as there exist a continuous demand from end users and the industry. We are going to experience a day sometime in the near future when people will become used to IoT as they are to a smartphone [6].

The effective use and implementation of IoT proved to be beneficial for the large as well as small organizations. IoT by using sensors connect the different devices used throughout the manufacturing unit of the industry. In this way, this cutting edge technology is changing the entire working scenario of the enterprises by providing better customer service, enhanced processes, new avenues for business, well-structured insights and better control over others.
IoT can be visualized as the most innovative thing man has ever created on this earth after the creation of the computer. It can contribute considerably to energy consumption, security systems, wearables, surveillance office or home automation and technologies used in gesture recognition. Everything that we see can be controlled, monitored and interacted with the help of IoT. They offer a lot of opportunities to the business by creating a network of existing devices, technology and data.

A lot of opportunities in IoT space are bundled with massive challenges. India being a developing country faces unique challenges and opportunities which a business using IoT in developed country need not have to face. The lack of competent infrastructure, less enthusiasm about upgradation in technology, the absence of government-regulated policies are some of the obstacles which IoT has to face in the emerging market. Small-Medium-Enterprises have to develop widespread strategies to switch over to a new business model from the traditional data model of business. This technology-driven approach towards new business paradigm helps to create better-quality product design and novel ways of customer management.

6. IoT STARTUPS IN INDIA

IoT products like fitness monitors and smartwatches are becoming popular and easily preferred by consumers because of their ease of use. Our daily life will be largely affected by the usefulness of these wearables. AIM Smart City accelerator programme is created by Microsoft Venture in collaboration with DLabs at the Indian School of Business and Ashoka University. It will provide startups with technological support, financial assistance in the form of funding, essential skills, and direct access to investors as well as customers. By 2020, it is predicted to have 80 billion connected devices. There are noteworthy contributions by the Indian companies in the field of Internet of Things. Some of them are mentioned below.

CarlIQ Technologies: The CarlIQ is a Pune based company that has created an IoT for making cars smarter. It helps the car driver to take decisions based on surrounding real-time data. CarlIQ helps businesses to deliver personalized services to car owners as their cars are now connected. The key car manufacturing companies like Toyota, Mahindra, Tata, Hyundai, etc. have supported CarlQ after 2008 [5] [7].

RHL Vision Technologies: Incepted in 2012, Robotic Human Logic Vision has developed a Bluetooth-enabled device called Fin. This enables you to interact with appliances such as TV. The gadget is a ring that can be worn on fingers. The device is enabled with Bluetooth technology and thus capable of acting as a gesture interface or numeric keypad just by turning the whole palm into a keypad. The gadget would have three in-built sensors beaming signals into a TV loaded with the software developed by the company itself [5].

Connovate Technology: The company basically focuses on consumer electronics and home automation market founded in the year 2012. They have developed a multi-function Bluetooth device called Gecko that can be used as a camera trigger and warns on the motion. It also works as a track-and-find tether for android 4.3 devices [5].

Mango Man Consumer Electronics Pvt Ltd: The startup was founded in 2013, and allows users to channelize media wirelessly via a smartphone application to their television. The TV can also be used to play YouTube videos and files on users’ phones or laptops. The company enables the customers to watch digital content like movies, TV shows and live streams on their TV with its HDMI dongle called Teewe [5] [7].

Pluggx Labs: Pluggx incepted in 2012, suggest ways to use electricity efficiently. This smart device with the help of smartphone can control user’s home appliances and electronics. Both applications as well as manual switches can be used by the user. The device is tuned intelligently to take decisions according to the user’s habits, lifestyle, and schedule [5].

7. CONCLUSION

Our day to day life is changing because of the tremendous technological changes brought by Internet of Things. IoT with the help of various technologies and applications is making our life simpler and more comfortable. IoT offers the countless benefits to the varied range of diverse areas which include medical, manufacturing, industrial, transportation, education, governance, mining, habitat etc. In the coming days, the entire globe will be connected by the IoT. In the near future, we would not be able to imagine our life without IoT which will form an essential part of our day to day life. Hence it is predicted that entrepreneurs with the creative mind, potential to excel and take risks have the rare opportunity to capitalize on this to become industry leaders. Make in India is offering all possible avenues to the budding entrepreneurs, it is up to them to turn adversities into rewards.
8. REFERENCES


