

**EMBA 4<sup>th</sup> Semester Project Report on**  
**DIGITAL TRANSFORMATION –**  
**PENETRATION STRATEGY FOR SMB/SME**  
**DELHI-NCR**

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**May 2018**

## **DECLARATION**

I hereby declare that this Project Report entitled “**Digital Transformation - Penetration strategy wrt SMB/SME Delhi-NCR**” submitted by me to Delhi School of Management, New Delhi, is a bonafide work undertaken by me and it is not submitted to any other university or institution for the award of any degree, diploma /certificate or published any time before.

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## CERTIFICATE

This is to certify that the project report work certified “**Digital Transformation - Penetration strategy wrt SMB/SME-Delhi-NCR**” done by **Abhishek Kumar** is an authentic work carried out by him/her under my guidelines and supervision. The matter embodied in this project report has not been submitted earlier for the award of any other degree/diploma to the best of my knowledge and belief.

Date:

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**Name of the Supervisor**

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**Signature of the Supervisor**

## **ACKNOWLEDGEMENT**

I, Abhishek Kumar, wish to extend my gratitude to Mrs. Bhavneet Kaur, Delhi School of Management (DSM), Delhi Technological University for giving me all the guidance and valuable insights to take up this Semester Project.

I also take this opportunity to convey sincere thanks to all the faculty members for directing and advising during the course.

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## ABSTRACT

The coming of ICT upheld by new innovative enhancements like IOT, Big information registering, Industry 4.0 is changing the everyday usefulness of our lives drastically. Make in India activity of Indian government and further help to startup's can take the Indian economy to the new apexes and make huge work openings. In view of its ideal approach, it has begun getting consideration from everywhere throughout the world. Having objective at the top of the priority list to change India as the worldwide assembling center point, the Government of India (GOI) has propelled the huge dream venture by name "Make in India".

The push for computerized from GOI is making disturbance unavoidable, new companies with solid immaterial resources are testing the market. Innovations like distributed computing, IOT, Big information, blockchain has disturbed the way business works. Recent college grads and computerized locals are requesting more custom item which suites their necessities and that too instantly.

The business-centric policies and the conducive environment for the investment are expected to play a major role in the realization of this project. Make in India campaign is immensely benefited by disruptive technology 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 Digital Transformation on entrepreneurship. Moreover, this research article focuses on definitions, characteristics, business value, relevance to manufacturing sector and adoption of Digital transformation process in India. The main objective of this paper is to provide an overview of digital transformation in India, and opportunities made available for startups through Make in India campaign.

## **PREFACE**

The point of this examination is to look into, break down, and gauge the computerized change techniques of Indian SMB/SME – assembling and asses offer from the supply side that address desires for the SMB/SME changing their business forms.

This report contains the business comes about because of an online overview of IT and business officials of in excess of 30 firms in north India over the assembling vertical and prime admissions from provider and end clients.

The report survey the advanced availability score of the vertical adjusting its procedure, framework and plans of action to use computerized change opposite worldwide benchmark.

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## 1.0 INTRODUCTION

The financial improvement of the nation relies on the modern development, which thusly identifies with the entrepreneurial abilities of the general population. Therefore the business enterprise goes about as a building hinder for the monetary development of the country. As indicated by Santhi N. et al. a business visionary changes thoughts into reality with his entrepreneurial aptitudes which incorporate creation, development, business skill and the hazard taking capacity [4]. The Government of India, with a plan to change India into the worldwide assembling center, has begun a yearning leader program called 'Make in India' under the authority of good Prime Minister of India in the year 2014. Each conceivable endeavors is made by the legislature to start probusiness open doors for opening assembling plants in the nation. Be that as it may, the Government is just concentrating on pulling in the business and maintaining the development of the assembling in the nation. Then again, the administration should imagine the new courses with the assistance of forthcoming advances to help the Manufacturing Companies to advance their exercises which will support their maintainability of working together in India. The new innovation called Internet of Things can be ended up being helpful in upgrading the business capacities of the associations by expelling the present hindrances which they are confronting. This innovation gives round the clock administrations to the assembling associations by partner them with their shop sections of flooring. This causes producing organizations to get the constant data about their units. This encourages them to control the assembling unit by taking the right choice in exact time, bringing about an enhanced assembling activity.



## 1.1 Roles of Digital Transformation in India

The period of computerized change has changed our lives enormously. It affects the way we interface with each other. It has not just helped us to convey our every day tasks easily yet in addition to tackle business issues and settled different issues. Thus, finished the previous two years, the legislature of India, imagined the significance of data innovation as the principle main thrust for the development of the nation. The innovation goes about as an empowering influence for giving different administrations extending from a computerized instructive material, better resident administrations to proficient and gainful work at the assembling units and consequently is link of changing the whole situation of working together. Indian economy, for as long as couple of years, has been changing towards turning into a computerized economy. This has prompted the appropriation of another advances in region of being social, portable, Analytics, Cloud, and called Internet of Things (IoT). The innovation encourages association of different gadgets to the Internet and in this way consequently shares information among every one of the general population who are utilizing those gadgets. A portion of the well known IoT gadgets; wellness band, smartwatches, sunlight based knapsack, associated glucometers, shrewd autos and significantly more are picking up ubiquity among the new age. The key innovations utilized as a part of IoT incorporate Wi-Fi, Bluetooth Smart, NFC, and GPS. It was anticipated that by 2019, wrist– worn wearables which incorporate watches, groups and wrist trinkets are probably going to increment by 80%.

Territories to be secured for Digital Transformation (SMACi)

Social

Mobile

Analytics

Cloud

Internet of Things

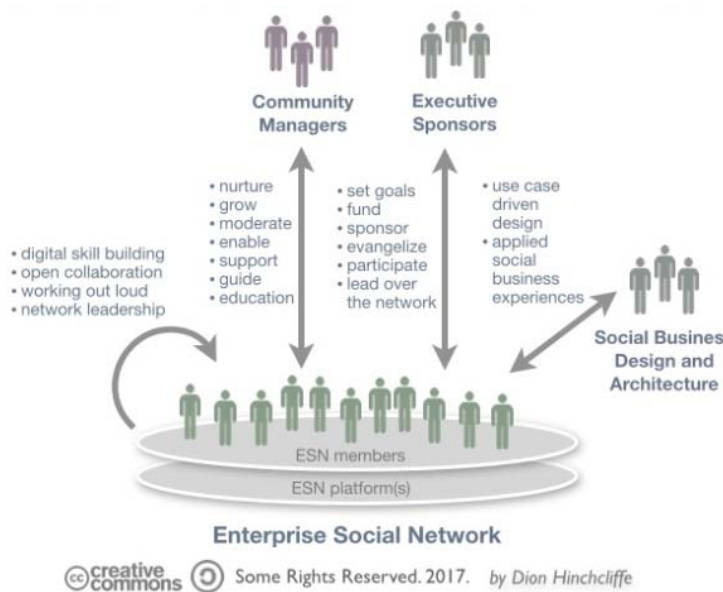
## 1.2 Social

**Social Collaboration** effort alludes to forms that assistance different individuals or gatherings communicate and share data to accomplish shared objectives. Such procedures locate their 'common' condition on the web, where joint effort and social dispersal of data are made simpler by current advancements and the expansion of the web.

Sharing ideas on a computerized coordinated effort condition frequently encourages a "conceptualizing" process, where new thoughts may develop because of the changed commitments of people. These people may hail from various strolls of life, distinctive societies and distinctive age gatherings, their assorted points of view help in adding new measurements to thoughts, measurements that beforehand may have been missed. A significant idea driving social joint effort is that 'thoughts are all over the place.' Individuals can share their thoughts in an unhindered situation as anybody can get included and the exchange isn't restricted to just the individuals who have area information.

Social cooperation is otherwise called undertaking long range informal communication, and the items to help it are frequently marked endeavor interpersonal organizations (ESNs).

It is imperative that we comprehend the cadence of social coordinated effort. There should be an adjust, easily to move from centered lone work to conceptualizing for critical thinking in gather work. This basic adjust can be accomplished by making structures or a workplace where it isn't excessively inflexible, making it impossible to avert conceptualizing in aggregate work nor too free to bring about aggregate disarray. Social coordinated effort ought to occur at the edge of mayhem.



### 1.2.1 Indian manufacturing Sector and Social Collaboration

Associations require a proactive approach, deftness, and the capacity to foresee the future and guarantee feasible business development. Yard Club, a California startup, made a shared commercial center that enables clients to gain wage on sit out of gear development hardware by leasing it to checked club individuals, amplifying the budgetary profits organizations get for armada speculations. With no certification that an association's rivals may come just from inside the business, social item improvement stages enable makers to run a progression of lean development tests including representatives, start-up accomplices, providers, and clients over the globe to foresee future business drifts and approve it with their objective markets.

Pro skill and consistent coordinated effort are basic to create cross-disciplinary future items, forms, plans of action, and cost advancements.

Such ability won't not be accessible on the finance of an association, or even locally. Social item improvement empowers consistent joint effort that use differing skill from past the limits of the assembling endeavor to help make convincing items, administrations, and procedures

Advanced social coordinated effort stages progressively offer demonstrated models of group commitment.

On First Build, a crowdsourcing item advancement stage for the machine business worked by GE, people plan and submit thoughts, and the group tries out these thoughts and makes items utilizing 3D printing. To begin with Build at that point fabricates and conveys the up and coming age of significant home apparatuses to clients. Crowdsourcing, crowdfunding, and co-creation are demonstrated models to draw in with a bigger biological system to make esteem.

Socially-wise workers, accomplices, clients, and different partners have grasped an open culture

Generation Y, Generation Z, and millennial workers, accomplices, and partners are socially wise advanced locals—OK with and familiar with conveying everything that needs to be conveyed on computerized coordinated effort stages. By receiving social item improvement, producers can guarantee that their contributions resound with that of their groups of onlookers' persona and culture.

Advancements keep on becoming capable, include rich, available, and financially savvy.

A social item improvement stage that is adaptable and replicable can be assembled utilizing for the most part open source advancements, diminishing operational overheads and expenses.

#### Social Product Development Platform Component Checklist

A perfect social item improvement stage must be sufficiently adaptable to convey either independent or end-to-end administrations to big business partners in light

of their needs. This is conceivable on the off chance that it is worked of segments that can be immediately designed, for example,

- Social media tuning in
- Data acquisition
- Collaboration with groups
- Gamification
- Data Modeling
- Analytics and bits of knowledge disclosure

### **1.3 Mobility**

Mobile Computing is human– PC cooperation by which a PC is relied upon to be transported amid typical use, which takes into consideration transmission of information, voice and video. Versatile figuring includes portable correspondence, portable equipment, and versatile programming. Correspondence issues incorporate specially appointed systems and foundation organizes and in addition correspondence properties, conventions, information arrangements and solid innovations. Equipment incorporates cell phones or gadget segments. Portable programming manages the attributes and necessities of Mobile applications.

#### **1.2.1 Indian manufacturing Sector and Mobile**

Mobile Technologies advancements upset all process/procedure they touch upon. Manufacturing is a procedure depending intensely on machines, people and their collaboration. Putting Mobile Technologies to use in the mechanical production systems, on the shop-floor and in the acquirements and overhauling changes the way fabricating businesses fill in as well as gives a catalyst to tight coupling between the divisions and in addition better coordinated effort between workers over the endeavor scene.



The manufacturing industry faces unique challenges with the newer expectations of the markets and a true globalization because of technology.

- The Modern Day Challenges for Manufacturing Industry
- Competing in a global market
- Combating the expectation of short product introduction cycles
- Catering to a diverse clientele with their own set of preferences
- Quick services and support
- Periodic introduction of technological advancements
- Extending the enterprise solutions beyond the boundaries of the premise

#### **1.4 Analytics**

Analytics is the revelation, translation, and correspondence of significant examples in information. Particularly significant in zones rich with recorded data, examination depends on the synchronous utilization of insights, PC programming and activities research to evaluate execution.

Associations may apply examination to business information to portray, anticipate, and enhance business execution. In particular, regions inside examination incorporate prescient investigation, prescriptive examination, endeavor choice administration, unmistakable investigation, psychological examination, retail investigation, store collection and stock-keeping unit streamlining, showcasing enhancement and advertising blend demonstrating, web investigation, call examination, discourse investigation, deals drive measuring and advancement, cost and advancement displaying, prescient science, credit chance investigation, and misrepresentation examination. Since investigation can require broad calculation (see huge information), the calculations and programming utilized for examination bridle the most current strategies in software engineering, insights, and arithmetic.

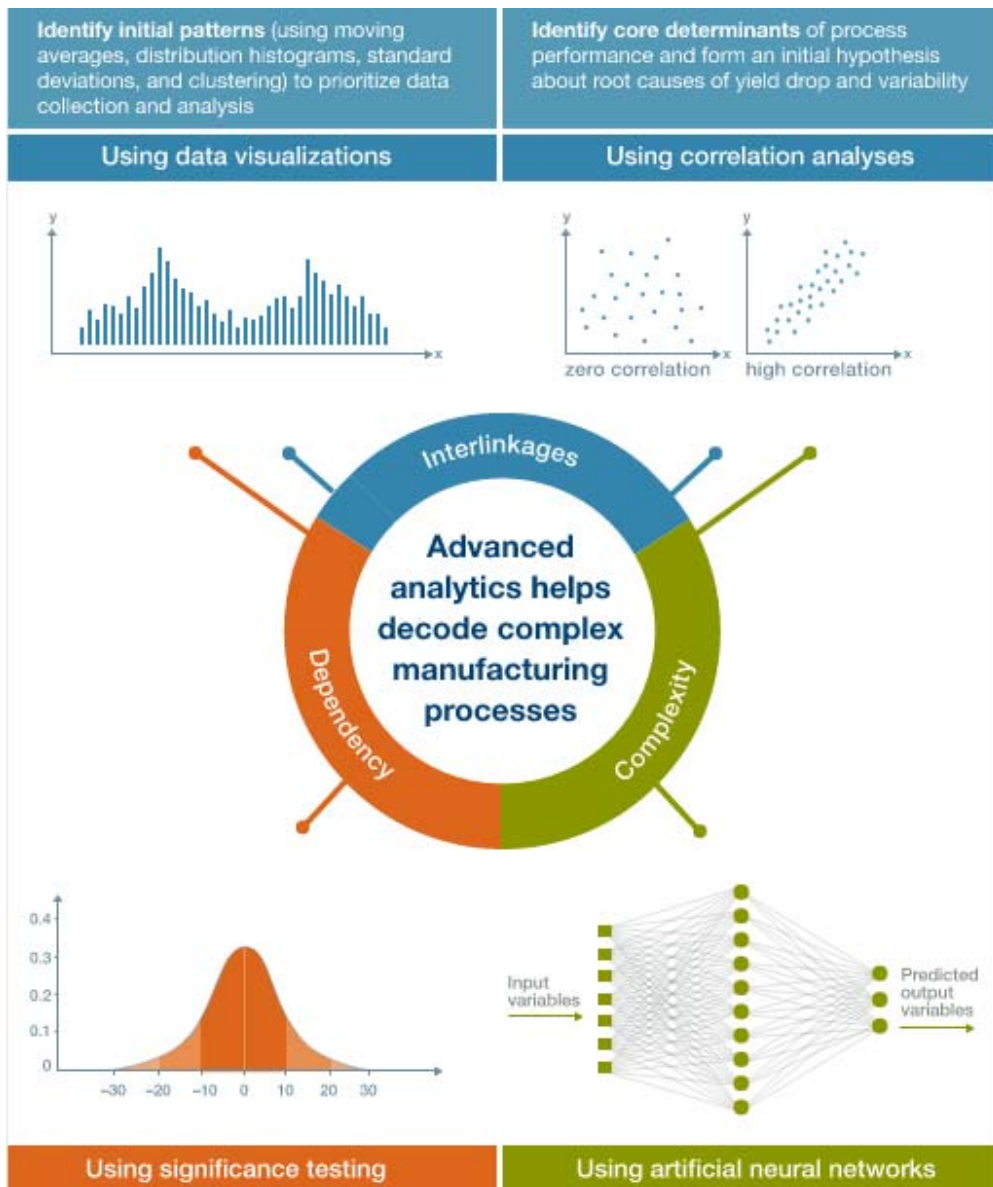
#### **1.4.1 Indian manufacturing Sector and Analytics**

The Industry of manufacturing has made considerable progress from the time of specialty enterprises. In any case, in those days, the assembling procedure included a moderate and monotonous generation forms which just yielded constrained measures of items.

Robotized forms alongside automation have brought about an age of extensive heaps of information, which is, substantially more than what most assembling endeavors recognize what to do with them.

Be that as it may, such information can yield advantageous bits of knowledge for the assembling units to enhance their activities and increment their efficiency.

Here are a couple of striking ones:



**Savings in cost:**

Big DATA analytics can truly help change the assembling procedure and upset the way they are done. The acquired data can be utilized to lessen the cost of creation and bundling amid assembling. Additionally, organizations which actualize information investigation can likewise decrease the cost of transport, bundling alongside warehousing. This is thusly can help stock expenses and return in immense investment funds.



### Improvement in safety and quality:

A lot of manufacturing companies are now building use of computerised sensors during the production to sift through stumpy quality products while on the assembly line. With the right software analytics enterprises can use the data generated from such sensors to improve the superiority and safety of the products instead of simply throwing away the low quality products afterward the production.

### Tightening up the workforce efficiency:

They can also use this data to improve management and employee efficiency. Big data analytics can be used to study the error rates on the production floor and use that information to analyse specific regions where employees are good when they perform under pressure.

Moreover, data analytics may help to speed up the production process n the production floor. Analytics will be especially useful for large firms, which work with large volumes of data.

### Better collaboration:

A great advantage of having an IT based data collection and analysis infrastructure is improved information movement within the manufacturing organization. The synergy of flow of information within the management and engineering departments as well as in the quality control sector and between the machine operators and other departments of the company helps them work more efficiently.

The manufacturing industry is much more complex than any other industry, which have implemented the big data analytics. Companies must effectively time the implementation of this software so that there are no losses. And should also pay attention as to from where they can mine the data and the right analytics tools to use for producing feasible and actionable results.

## **1.5 Cloud**

Cloud computing is a sort of processing that depends on sharing figuring assets as opposed to having nearby servers or individual gadgets to deal with applications.

In Cloud computing, the word cloud(also stated as "the cloud") is utilized as an illustration for "the Internet," so the expression cloud computing signifies "a kind of Internet-based processing," where diverse administrations —, for example, servers, storage and applications — are delivered are delivered to an organization's computers and devices through the Internet. The cloud framework is kept up by the cloud supplier, not the individual cloud client.

In its most basic depiction, distributed computing or cloud computing is taking administrations ("cloud benefits") and moving them outside an associations firewall on shared frameworks. Applications and administrations are gotten to by means of the Web, rather than your hard drive. The administrations are conveyed and utilized over the Internet and are paid for by cloud client (your business), ordinarily on an as-required or pay-per-utilize plan of action.

Distributed computing is equivalent to matrix figuring, a kind of registering where unused preparing cycles of all PCs in a system are tackles to take care of issues excessively concentrated for any remain solitary machine.

Distributed computing applies conventional supercomputing, or superior figuring power, typically utilized by military and research offices, to perform several

trillions of calculations for every second. In customer situated applications, for example, money related portfolios, to convey customized data, to give information stockpiling or to influence extensive, immersive online PC diversions.

To do this, distributed computing utilizes systems of substantial gatherings of servers commonly running minimal effort purchaser PC innovation with specific associations with spread information preparing errands crosswise over them. This mutual IT foundation contains extensive pools of frameworks that are connected together. Frequently, virtualization strategies are utilized to boost the energy of distributed computing.

### **1.5.1 Indian manufacturing Sector and Cloud**

The manufacturing Sector is embracing all the premier changes and adjustments which are persuaded by IT and numerous rich innovations. A standout amongst the most detectable advances incorporate Cloud processing. The stipulation and state of assets are the principle power of Cloud figuring. It likewise gives the most dependable and the requesting assets.

Be that as it may, there are such a large number of perspectives or factors because of which selection of Cloud registering in the assembling business wound up critical. The openness and direct appealing costs of the pointless or unneeded assets, increment the request and oversee briskness.

In our nation, the ventures have been presently altered and customized exceptionally well, and this is all a direct result of the present and current advancement in the IT segment, which incorporates numerous things, for example, collaboration and the cooperation addressing or Analytics and exquisite assembling. Distributed computing Platforms have a capacity to lift and improve mastery, readiness and furthermore to extend flexibility. They likewise diminish the overheads and expenses, as it were, and the creation is enhanced a great deal. Fundamentally a distributed computing proposition assumes an exceptionally real part in a various industry like Manufacturing.

In India, over the 17-18 nations, there are 67%-68% individuals out of 593 respondents who completely receive people in general mists and this execution rate is appeared by the IDC overview on overall Cloud appropriation.

There are numerous reasons why the assembling Industry is always being subject to Cloud Models. A portion of the reasons incorporate

- There are unlimited fabricates that seek after the strategy or plan of cloud to accomplish numerous things. Those things incorporate finishing the objectives of business, more on the portrayal and forms and expanding the standard association and connection with their customers.
- Cloud registering is exceptionally gainful and critical, particularly by then of time when the vast majority of the achievement is required in making material or physical products and in arranging and overseeing the life cycle of the stock.
- Cloud figuring is embraced by the makers with the goal that they can emerge among the other and can make due in an aggressive market. They as a rule receive this to have more development, and to find the most recent patterns in the commercial center.
- The Clouds are exceptionally useful to facilitate the difficulty level and supply an efficient and controlled stream of data.
- It likewise helps in actualizing the unrestrained motorized and programmed work processes in activity.
- In assembling all inclusive, the appropriation of cloud situation
- The undertakings which are for the most part inclining towards IT, the IDC learning gives them the essential approach on different systems of Cloud particularly in the assembling divisions. Be that as it may, in alternate parts, for example, designing, the measures and dealings are done, yet with a tad bit of concern and minding. For mounting and expanding bit by bit the most recent plans of action and incorporating the available structure, the dependence is embracing the cloud.
- There are such a large number of associations and ventures that incline toward cloud benefits over whatever else as a result of its readiness and unwavering quality. A current report has uncovered that there are around 66% of the association and business who embrace cloud administrations.
- The assembling bits of knowledge to clear up that the Industries associated with assembling are the focal point of fascination of the computerized upset where producers need to work in such a way, to the point that they can serve their clients universally and around the world. The utilitarian expenses are kept low in spite of there is such a great amount of subjugation on the cloud administrations.
- There are numerous advantages of cloud administrations, for example, it causes the producers to understand the quickness, rate and accommodation.
- The Adoption of Cloud situation in assembling in India
- There are such a significant number of reasons why there ought to be an appropriation of cloud benefits fundamentally in India. There are such huge numbers of dares and difficulties which are to be crushed, for example, the

short generation each time and the mounting consumption, the incongruent structure and numerous such things.

- One reason by Indian Manufacturing organizations for receiving cloud administrations is that they need to execute and set in motion the collaboration and collective endeavor. There is such a great amount of association of the assembling division to the aggregate cloud ERP advertise in India. Very nearly 24.1% assembling businesses are there which add to the cloud models.
- In 2016 and past, there was an enormous usage of cloud models and administrations in the situation of Indian assembling.
- Notwithstanding, not just this, there are sure advantages that Cloud offers to the producers. A portion of those advantages incorporate
- In late circumstances, we have heard a great deal about distributed computing for makers, yet its vision isn't generally clear. Be that as it may, there is a regularly mounting settled cost of generation information and distributed computing is an innovation which is essentially set up to give an answer for this issue. Cloud is exceptionally useful for the producers as it encourages them to expand the suppleness improve the fundamental execution and furthermore, it drives you towards the major beneficial ventures.
- The cloud offers makers one of the greatest points of interest which were genuinely necessary and that are the preferred standpoint or advantage of cost or costs. Despite contributing and paying the sum set on an on location transportation, makers have now built up another system of paying. They presently don't pay a colossal sum on the double rather they pick cloud since now the consumption winds up far less demanding to be computed. It keeps your costs of doing business to least and most reduced and you even need not to introduce any equipment or keep any consistent everyday upkeep.
- Many of you might be astounded knowing the way that cloud has contracted numerous producers a simple access to the best and the most legitimate assets. The procedure is dependably in a rapid as the distributed computing is extremely extraordinary in diverting the entire thing from programming to natural regulation power. The cloud is exceptionally rich is democratizing the very created equipment and programming Information Technology. It conveys those product and equipment to the makers inside a simple access.
- There are numerous associations which have inconceivable or boundless assets with them and cloud is one of the arrangements or system that gives numerous uncommon and selective advantages for every one of the associations even the one with such huge numbers of assets.
- There are endless organizations who spend a ton of cash on keeping up its framework and waste a ton of their cash. The cash is squandered as well as the time and endeavors are likewise exhausted in the entire procedure. These things expend a great deal of cash particularly, on the off chance that we endeavor to keep up them all the time. Yet, exceptionally lucky and favored we are that we have cloud administrations with us. They are to a great degree moderate and sensibly evaluated. Cloud without a moment's delay simply

defeat every one of those extremely costly assets which are required for support of IT Infrastructure and spares expenses of all the checked licenses of the master work force.

- The benefits of cloud, on the off chance that we endeavor to number will be interminability since they are innumerable, incomprehensible and so forth. And furthermore a current report has uncovered that the customers who embrace the procedure of cloud have accomplished such a great amount in their business and have been profited billions times in excess of a typical industry without the selection of cloud administrations.
- A cloud based application is said to be extremely advantageous to the assembling business. The producers who embrace cloud are sparing \$1 million. There is one million of lessening in the cost of the organizations who have received cloud since quite a while. Analysts have discovered that distributed computing has profited such a great amount to the general population that now they can spare 54% of the costs which they were prior spending on its foundation. There were tremendous costs which they spent on the standard upkeep, life cycle, and for enhancing numerous pending ventures what not. Be that as it may, all on account of Cloud. Cloud has dependably been an accomplice particularly to the assembling Industries and helped them a ton in sparing the consumptions.

## **1.6 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

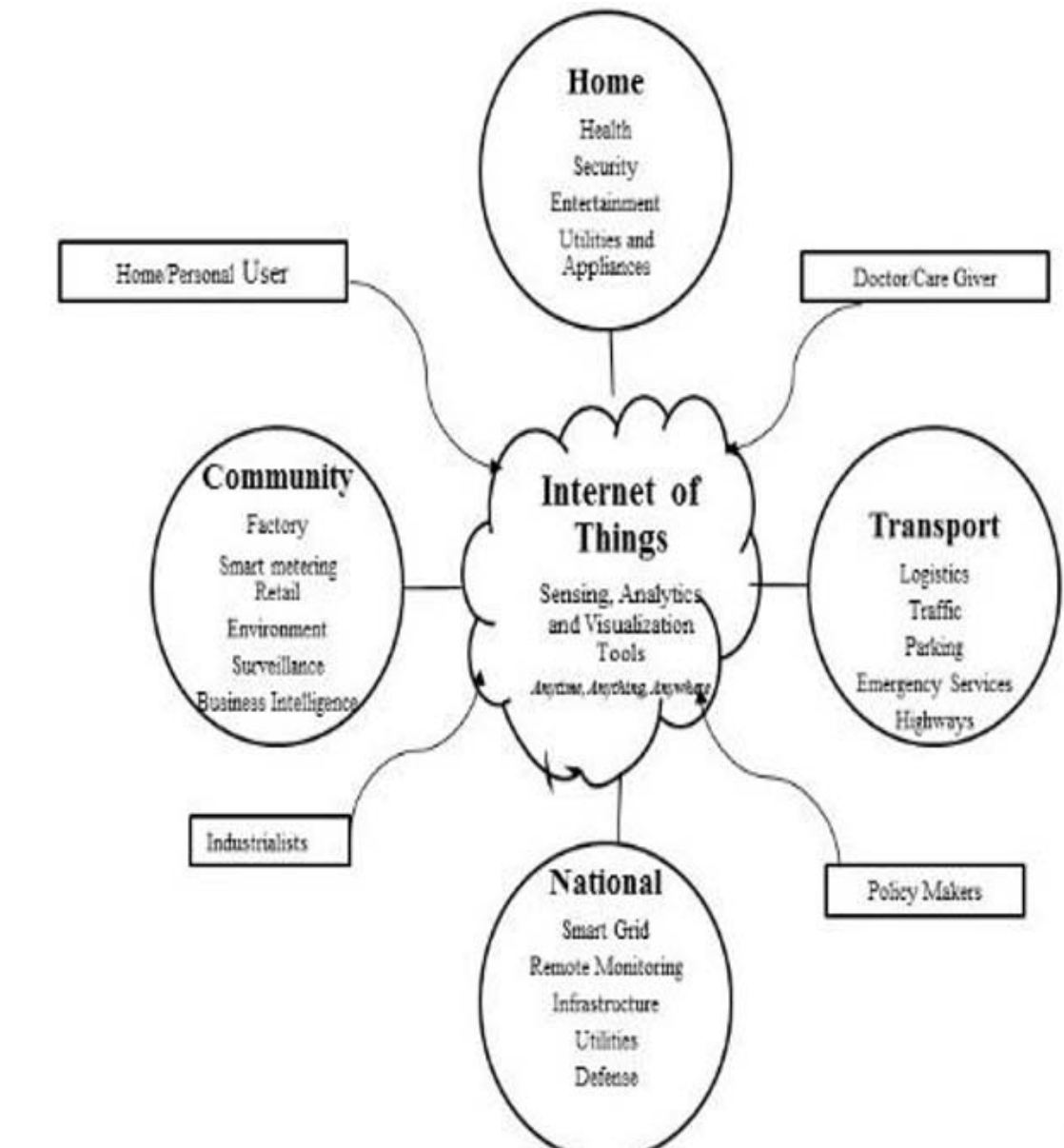


Figure 1: Applications of Internet of Things [2]

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 anyplace 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

communicating 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.

#### **1.6.1 Indian manufacturing Sector and IoT**

The worldwide pattern is exchanging over towards IoT which is anticipated to produce good prospects for the assembling segment in India. IoT is accepted to bring the 'fourth modern upset' broadly known as 'Industry 4.0'. A broad overview did by Forrester Consulting recommends that the associations utilizing IoT applications and tasks have better benefit rate, solid and long haul client connections, enhanced vital basic leadership capacity and effective process execution. Make in India crusade gives every conceivable road it could to pull in business and transform India into a world-class fabricating center point. Aside from this, we have abundant openings; right off the bat, as fourth modern insurgency which is probably going to have the higher effect at the respectably lesser substitution of hardware and furthermore Industry 4.0 and IoT will have a noteworthy offer of IT and programming for making framework for it. India is one of the significant programming makers of the world; which will turned out to be profitable for us. After very nearly 30 years, fabricating has begun taking force as Industry 4.0 and IoT. It can streamline store network in this way encouraging the creation of superb merchandise at low expenses. This, thusly, supports up the capacity of assembling plants. The diminishing expenses of IoT sensors and



availability have made the advanced change of assembling in India a reasonable and non-cost serious alternative.

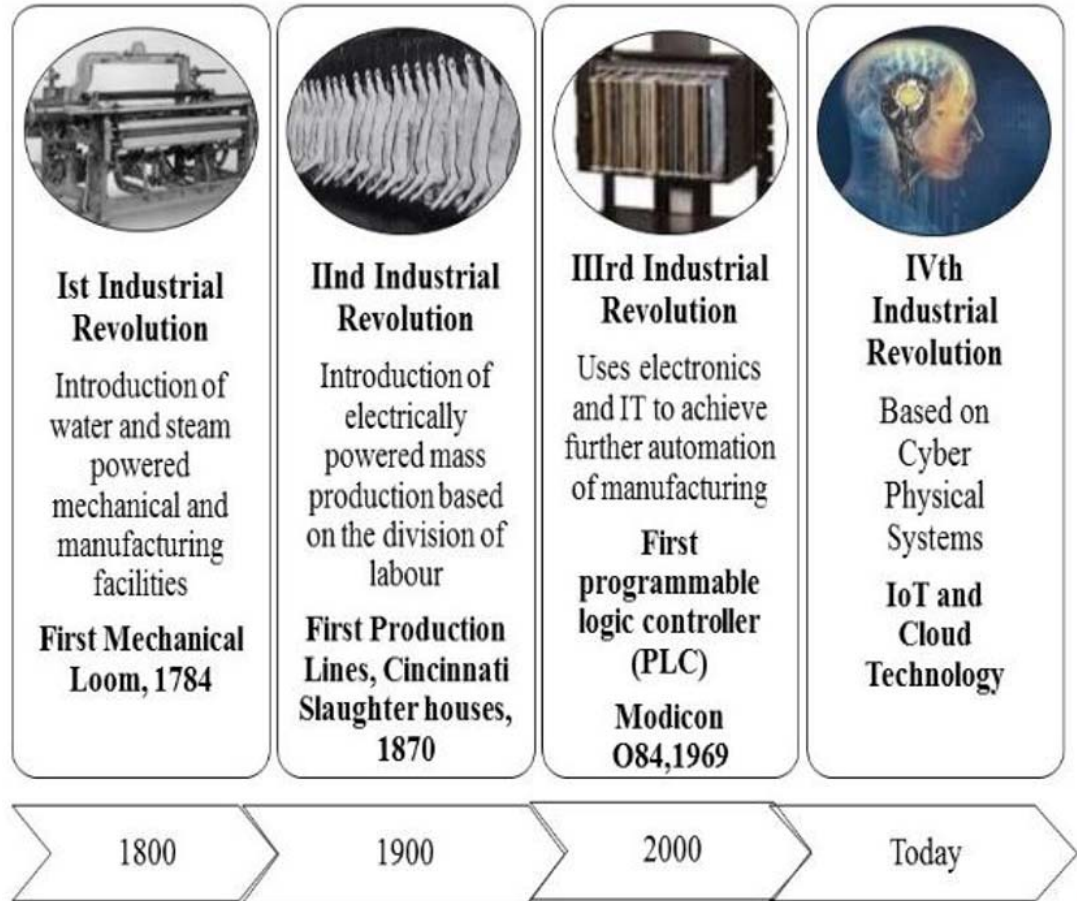


Figure 2: Industrial Revolution Timeline IoT offers a lot of opportunities like smart cities, smart logistics, and smart utilities etc. which provide the advanced infrastructure required to enhance the industrial revolution in India. Make in India is proved to be highly productive for the traders, major 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.

### 1.6.2 IoT Opportunities in India

In India, IoT showcase is gradually expanding. Individuals are likewise getting used to the change occurring in the innovation once in a while and appropriately obliging these adjustments in their way of life. IoT arrangements will dependably develop as there exist a nonstop request from end clients and the business. We will encounter a day sooner rather than later when individuals will end up used to IoT as they are to a cell phone. The viable utilize and execution of IoT turned out to be useful for the extensive and also little associations. IoT by utilizing sensors associate the distinctive gadgets utilized all through the assembling unit of the business. Along these lines, this front line innovation is changing the whole working situation of the endeavors by giving better client benefit, improved procedures, new roads for business, well structured bits of knowledge and better control over others.

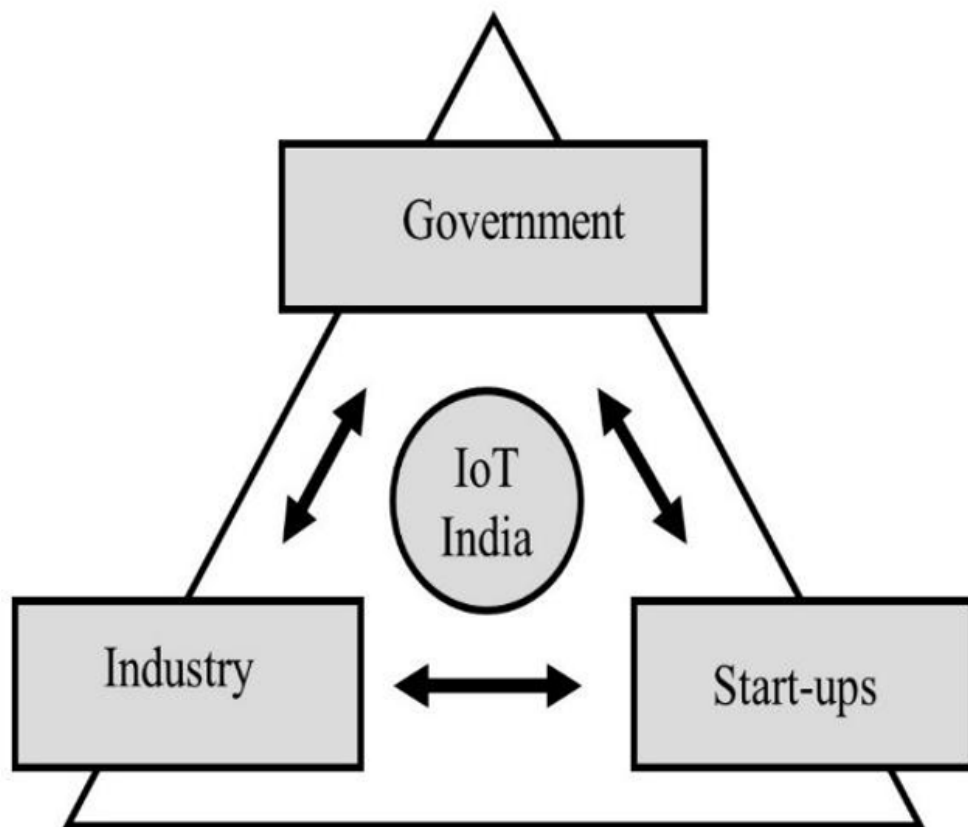


Figure 3: IoT ecosystem in India

IoT can be imagined as the most imaginative thing man has ever made on this planet after the formation of the PC. It can contribute significantly to vitality utilization, security frameworks, wearables, reconnaissance office or home mechanization and advancements utilized as a part of motion acknowledgment. Everything that we see can be controlled, observed and communicated with the assistance of IoT. They offer a great deal of chances to the business by making a system of existing gadgets, innovation and information. A great deal of chances in IoT space are packaged with gigantic difficulties. India being a creating nation faces exceptional difficulties and openings which a business utilizing IoT in created nation require not need to confront. The absence of able foundation, less eagerness about upgradation in innovation, the nonappearance of government-managed approaches are a portion of the deterrents which IoT needs to look in the developing business sector. Little Medium-Enterprises need to create far reaching techniques to change over to another plan of action from the customary information model of business. This innovation driven approach towards new business worldview makes better-quality item plan and novel methods for client administration.

## **2.0 LITERATURE REVIEW**

The manifest capacity of Small and Medium Enterprises (SME) around the world for driving economic growth and development at regional, national and global levels cannot be overemphasized. As India gears up to retrace the high growth path, the SME/MSME sector assumes a pivotal role in driving the growth engine. The SME/MSME sector in India continues to demonstrate remarkable resilience in the face of trialing global and domestic economic circumstances. The sector has sustained an annual growth rate of over 10% for the past few years. With its agility and dynamism, the sector has shown admirable innovativeness and adaptability to survive economic shocks, even of the gravest nature. The significance of SME/MSMEs is attributable to their caliber for employment generation, low capital and technology requirement, promotion of industrial development in rural areas, use of traditional or inherited skill, use of local resources, mobilization of resources and exportability of products. According to the estimates of the Ministry of SME/MSME, Government of India, the sector generates around 100 million jobs through over 46 million units situated throughout the geographical expanse of the country. With 38% contribution to the nation's GDP and 40% and 45% share of the overall exports and manufacturing output, respectively, it is easy to comprehend the salience of the role they play in social and economic restructuring of India. Besides the wide range of services provided by the sector, the sector is engaged in the manufacturing of over 6,000 products ranging from traditional to hi-tech items.

### **Performance of Indian SME/MSME Sector**

The Indian SME/MSME sector provides maximum opportunities for both self-employment and wage-employment outside the agricultural sector and contributes in building an inclusive and sustainable society in innumerable ways through creation of non-farm livelihood at low cost, balanced regional development, gender and social balance, environmentally sustainable development, etc.

### **The Diversity of the Indian SME/MSME Sector**

The SME/MSME sector in India boasts of diversity in terms of its size, level of technology employed, range of products and services provided and target markets. SME/MSME Tool Rooms have been credited to provide at least ten components that were used in India's Mangalyaan (Mars Orbiter Mission probe), the Indian Space Research Organization's (ISRO) most ambitious mission till date, which is the country's first inter-planetary space mission. The sector has also contributed vital inputs for other space satellites such as the Chandrayan. India's second moon mission, Chandrayaan II, set to be launched in 2016-17, will have a soft land over a wheeled robotic vehicle to explore the landing area. India

seeks to launch other ambitious projects like a global sea traffic monitoring system and an earth observation satellite, in cooperation with the EU. The projects envision significant contributions and convergence opportunities from the Indian SME/MSME sector.

India is one of the world's top ten countries in terms of military expenditure. According to the database prepared by the Stockholm International Peace Research Institute, which has listed the countries of the world in terms of their military expenditure at current US\$ millions in 2013, Indian ranks ninth.

With spending in Defence and Aerospace on the rise in India, it is estimated to become the third largest market by 2020, after the US and China. Increasing passenger traffic and military expenditures are expected to boost demand for new aircrafts. Investment opportunities of US\$110 billion are anticipated with US\$80 billion in new aircraft and US\$30 billion in the development of airport infrastructure by 2020, according to the Investment Commission of India. Many global companies are increasingly looking to Indian SME/MSMEs for strategic partnerships of mutual benefit due to the innovative capabilities in niche manufacturing, comparative advantages of advanced engineering, low-cost manufacturing and overheads, ability to speedily absorb new technologies and local skills and capabilities that set these enterprises apart from other national and international players in the sector.

With its vast resource pool of engineering talent and high skill labour at competitive costs, India has the potential to become a significant player in the global auto industry, especially in engineering and component manufacturing. India's close proximity to key automotive markets like the ASEAN, Japan, Korea and Europe provide an added fillip to the sector. Exports of auto components increased at a CAGR of 17% during 2008-13, reaching USD 9.7 Billion in 2012-13. SME/MSMEs assume a dominant position in the automotive and auto components sector.

Many more lucrative opportunities can be tapped by Indian SME/MSMEs in the foundry industry, electronics industry, chemicals, leather, textiles, agro and food processing, pharmaceuticals, transport and tourism industries, etc. The globalization of businesses has increasingly drawn SMEs into global value chains through different types of cross-border activities. Many entrepreneurs are recognizing the opportunities that this advent ushers and gaining access to global markets has become a strategic instrument for their further development. These opportunities have arisen as a result of the government's increased focus on the SME/MSME sector, larger investments in research and development, technological upgradation, thrust towards international collaborations and measures to boost competitiveness and propel growth.

### **Supportive Role of Government of India**

Recognizing the potential of this sector for the nation's development, the Government of India, through its various agencies, has taken many key steps to strengthen the SME/MSME sector and promote innovation and capacity building in this sector. Regular dialogue is facilitated between various stakeholders through the constitution of specific task forces and inter-ministerial committees. The Micro and Small Enterprises-Cluster Development Programme is being implemented by the government for the holistic and integrated development of these enterprises in clusters through soft interventions, hard interventions and infrastructure upgradation for enhancing their productivity and competitiveness. During the year 2014-15, 43 new clusters have been taken up for various interventions. So far, around 966 clusters and 171 infrastructure development programmes have been initiated by the government. Provisions are also being made to strengthen the framework of virtual clusters with an aim to assist SME/MSME accessibility of the Ministry from the remote location of their operation. The Credit Linked Capital Subsidy Scheme also assists in the technological upgradation on SME/MSMEs. The National Manufacturing Competitiveness Programme is another flagship programme of the Ministry of SME/MSME which endeavors to equip these enterprises with technology-based tools in the areas of quality upgradation, productivity, design development, energy efficiency and marketing. To ensure better flow of credit to SMEs, the Ministry has introduced a Policy Package for Stepping up Credit to Small and Medium Enterprises (SMEs) under which it operates schemes like the Credit Guarantee Fund Scheme and the Performance and Credit Rating Scheme.

### **Initiatives for Nurturing Indian SME/MSMEs by Confederation of Indian Industry (CII)**

For over 120 years, Confederation of Indian Industry has been persistently engaged in creating and sustaining an environment conducive to the development of Indian industry through advisory and consultative processes. Confederation of Indian Industry has undertaken a slew of measures for supporting the development of the Indian SME/MSMEs and enhancing their global competitiveness. The Indo-German Manager Training Programme (IGMTP), run with support from the Governments of India and Germany, aims at enhancing the international business and economic potential of Indian enterprises by bringing them in contact with German enterprises. SME/MSMEs have been guided to enhance their competitiveness through the time tested techniques of the Cluster Approach. Along with its strategic partners, about 245 clusters have been constituted by far impacting over 3000 SME/MSMEs. In partnership with the Overseas Human Resources Development Association (HIDA), Japan,

Confederation of Indian Industry is operating a training programme on Production Management for Manufacturing in India to enhance production management capability in the Indian manufacturing industry in order to achieve the idea of “Make in India” through Japanese-style Management. To enhance their leadership skills and awareness on diversity management as well as to provide them with networking opportunities, Confederation of Indian Industry also runs a training programme on the Empowerment of Women Leaders with HIDA. Confederation of Indian Industry has set up an online SME Finance Facilitation Centre to provide advisory and credit facilitation support to SMEs.

The advent of ICT supported by new technological improvements like IOT, Big data computing, Industry 4.0 is changing the day to day functionality of our lives dramatically. Make in India initiative of Indian government and further support to startup’s 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. Having objective in mind to transform India as the global manufacturing hub, the Government of India (GOI) has launched the significant dream project by name “Make in India”.

## **Conclusion**

The Make in India Strategy adopted by the Indian Prime Minister Shri Narendra Modi aims to facilitate investment, foster innovation, enhance skill development and build a sustainable eco-system for the manufacturing infrastructure in the country. These measures have succeeded in raising the business confidence in India. The stage has been set through these industry and SME/MSME interventions for a larger share of global business in India which presents opportunities for SME/MSME integration in almost all industry sectors. The Indian SME/MSME sector is poised for rapid growth and integration with major global value chains. Timely policy intervention and due support have promptly resulted in rendering the Indian SME/MSMEs globally competitive.

### **3.0 RESEARCH METHODOLOGY**

In this applied study on the importance of Digital Transformation we used survey research methodology and asked SMEs about their experience and road map of digital transformation in dealing with technical and Business problems.

In this section the methodology of the survey is described which includes the sample, measures, and data preparation. During the survey design some other IT-related business model surveys were used as a reference such as;(de Reuver, Bouwman, & Haaker, 2009; de Reuver & Bouwman, 2008; Madian, de Reuver, Bouwman, & Molina, 2015).

The data was collected through a self-administered online survey between the first week of April and last Second week of May 2018. Respondents were contacted via an e-mail distribution list on which two senior digital experts replied; stating the importance of filling out the survey. The first reply was immediately after the survey distribution and the second three days later which functioned as a reminder.

The intended respondents of this research are IT consultants. As explained in the introduction IT consultants are chosen as they are arguably the most knowledgeable group when it comes to bringing digital transformation into practice, and thus determining the effects of digital transformation on organizations. The sample of this research includes various consultants from manufacturing verticals that are well enough acquainted with digital transformation. Given the time and accessibility limitations no other IT consultants were included which makes the sample a convenience sample. As such it's difficult to determine whether the finding from this sample can be generalized for the entire population.



## 4.0 CASE STUDY

### 4.1 Introduction to the case

In this section, we will focus on the experience that Indian SMEs have with Digital Transformation practice, and on the opinion, they have about these disruptive technologies.

We will research on the effects of digital transformation on organizations is heavily focused on customer insight, customer relations and interactions, leaving the elements of products and service offerings, internal processes and the usage of resources and accompanied costs relatively untouched. In addition the effects described are mostly qualitative and it's uncertain if these are applicable outside their research scope.

Three questions are dealt with in our applied research:

1. What is the opinion of entrepreneurs on Digital Transformation?
2. How are the technological disruptions perceived by the CIO's/consultants?
3. What is their strategy to combat this challenge or to maximize their revenue using this?

Research Questions As presented in the research problem there is currently no literature that addresses the effects of digital transformation organizational-wide across industries in a quantitative way. The objective of this research is to address this gap. In order to do so a research question is formulated;

“What are the impacts of digital transformation on organizations' their business model?”

The sub questions of this research are described below and serve as a means to answer the main question. Each sub-question is followed by the used methodology, which will be explained later on. The first sub-question aims to clarify the

concept and phenomena of digital transformation which is currently only done holistically. Furthermore clarification is needed to determine what kind of technologies and what types of changes should be incorporated in this research. Sub-question two determines what business model framework is suitable for the impact measurement of digital transformation. The third sub-question aims to identify the expected impact of digital transformation to (a) form the hypotheses that are needed to answer the research questions and (b) observe based on the survey tested hypotheses what impacts are expected.

1. What is Digital Transformation? [Literature study]
2. What business model framework should be used to assess the impact of digital transformation on organizations [Literature study]?
3. What are the expected impacts of digital transformation on organizations [Literature study & Survey]

#### 1.4. Research relevance

From a scientific point of view this research contributes to understanding of the effects of Information Technologies on organizations. In literature there are many studies that explore the effects of the individual underlying technologies of digital transformation - social, mobile, analytics, and cloud - in isolation. Armbrust et al. (2010) i.e. describe the potential of cloud computing for organizations. Similarly there is research such as (Agarwal & Dhar, 2014; Kaplan & Haenlein, 2010; Sanakulov & Karjaluoto, 2015) for each of the underlying technologies that describe potential effects, provide a strategic view or identify barriers for adoption. This research differs from current academic research because it does not describe a single technology but a combination four technologies and the effect combined implementation has on organizations. Today there are no studies that do so for an entire organization across industries. Next to the scientific relevance, this research also contributes in a practical way. Currently only half of the organizations create a business case for their digital

transformation initiatives and many fail to compute key performance indicators such as Return on Investment. Merely 25% of businesses succeed in establishing key performance indicators (Fitzgerald et al., 2013) while those KPIs are needed to justify investments based on value and costs (Westerman et al., 2011). Due to the abstinence of sound economic business cases decision-makers can't make the decision to approve transformational IT project. The rejection of potentially profitable projects will hurt organizations in the long run since their peers will be outperforming them (Fitzgerald et al., 2013). Determining the quantitative effects of digital transformation should aid organizations in the identification of potential effects. This assists organizations to compute business cases more effectively and efficiently, enabling them to make better informed decisions on transformational IT Projects.

#### 1.5. Research Approach

In this paragraph the approach of this research is discussed. The different parts of the research are presented along with the steps that are taken to answer the research questions. The specific methodology is discussed in the relevant chapters. This research consists of three distinctive parts;

- A literature research to conceptualize digital transformation and its effects,
- The creation of a measurement framework based on business model literature and,
- Empirical research through a survey to determine the impacts of digital transformation on organizations.

This research starts with the exploration of the concept of digital transformation by reviewing the relevant literature and associated technologies. This will result into a definition and characteristics of digital transformation along with the technologies that enable digital transformation and the effects on organizations in general. The structure of the literature review and articles used can be found in chapter two.

The second part of the research consists of the development of a measurement framework to determine the impact of digital transformation on organizations'

their business model. This measurement framework will provide a clear and structured organizational overview enabling the identification of qualitative and quantitative effects on these respective components.

To do so four different business model frameworks are presented of which one is selected. The selected business model framework consists of nine building blocks and serves as the basis for the operationalized measurement framework. The nine building blocks that form the body of the framework are operationalized using business model literature from several relevant metastudies. After the operationalized framework is completed the hypotheses regarding the expected change of digital transformation are formulated based upon the literature review.

The third part of the research consists of empirical data gathering through a survey to test the hypotheses and quantify the effects of digital transformation on organizations. Based on the data the theory-formed hypotheses are tested. In addition, the data allows the identification of changes that occur simultaneously through correlations.

A survey is chosen as method because it's the most efficient method to collect a large sample of quantitative information on the effects of digital transformation on organizations. The survey aims at gathering the opinions of IT consultant on the expected impact of digital transformation on organizations. IT consultants are chosen as they are arguably the most knowledgeable group when it comes to bringing digital transformation into practice. This is due to the fact that they have specific expertise which they have used across different organizations and environments as opposed to other groups that lack knowledge or have limited experience in applying their knowledge outside their own organization.

#### 1.6. Research Demarcation

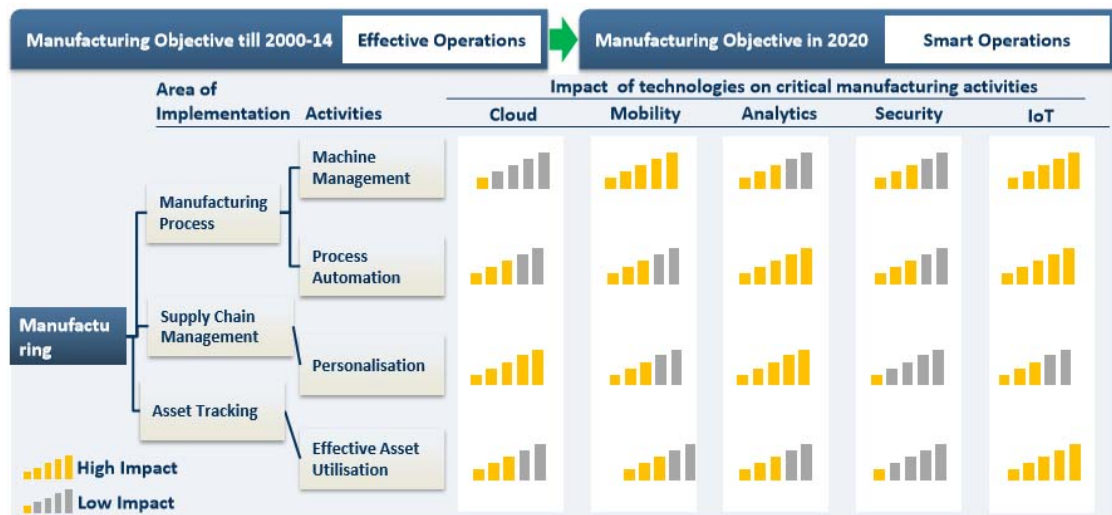
As with any research certain demarcations are set to study the research problems within a certain context and period of time.

The first demarcation of this research is the concept of digital transformation. Digital transformation can be an ambiguous buzzword used by both academics and practitioners. To avoid misconception a definition of digital transformation is

used during this research: digital transformation is a social, mobile, analytics or cloud induced change that significantly affects three or more dimensions on individual, firm, and/or societal level. The research was conducted in the context of this definition; results and conclusions will therefore not, or in a limited way apply to other definitions of digital transformation one might have.

The second demarcation of this research is made with regards to the measurement of impacts of digital transformation. The effects of digital transformation are based on the opinions of consultants. There are a lot of moderating variables that can influence the expectations of these consultants; those moderating variables are not measured explicitly and not taken into account. In addition the outcomes are the combined view of numerous organizations across different industries. If one wants to determine specific organizational or industry effects to determine e.g. a business case, specific organizational or industry variables are needed which are outside the scope of this research

### 4.3 Data Analysis



Digitalization in manufacturing is an evolution of advanced manufacturing solutions, such as computer-integrated manufacturing, lean manufacturing processes, design for manufacturability (DFM), flexible manufacturing and other

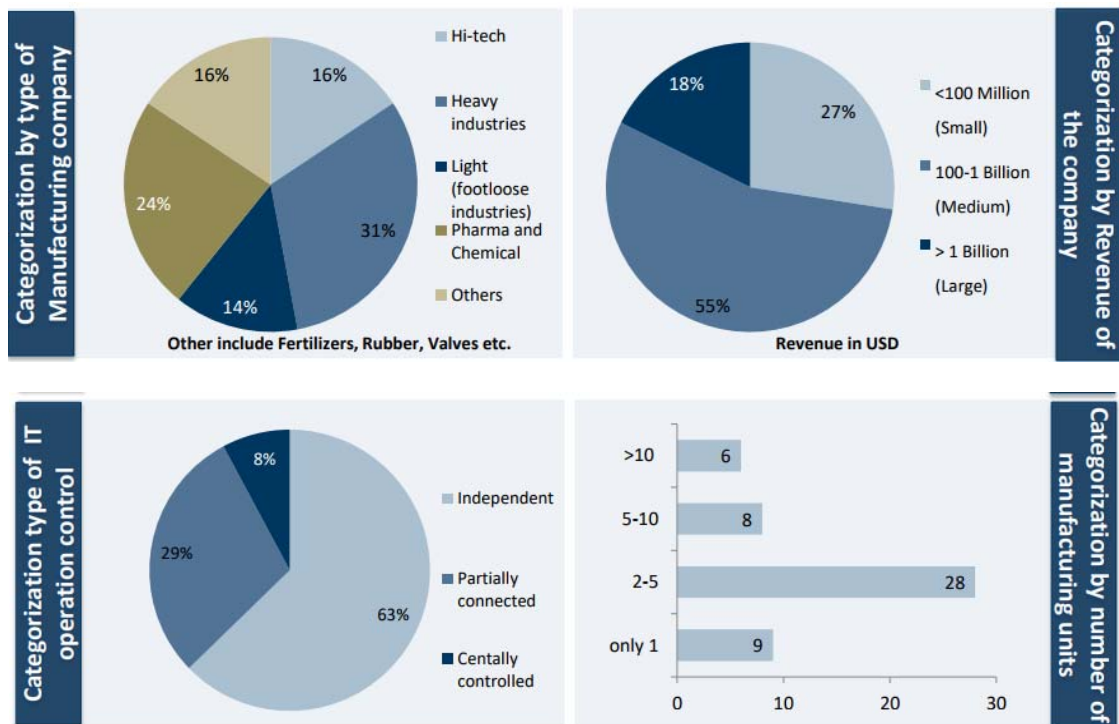
digital strategic solution which are used for achieving high standard and efficiency in any sector.

The Indian manufacturing sector has the potential to be a USD 1 Trillion industry by 2025, if it can emulate the usage of digital technology used in America and Europe.

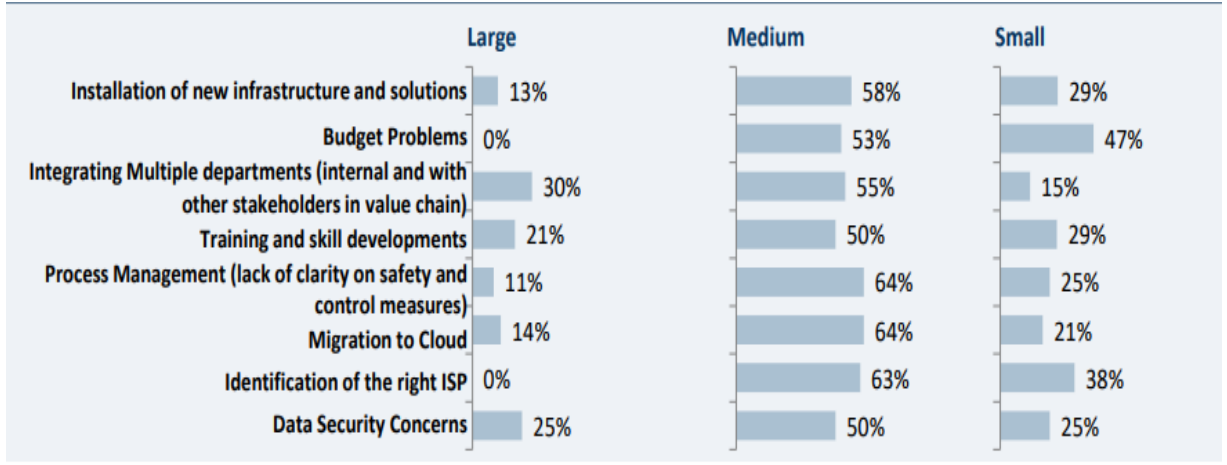
Manufacturing industries are adopting digital technologies for improving and efficiently optimizing design, production, assembly and supply chain related activities. This integrated approach involves various processes or components, such as designing, simulation, manufacturing processes and techniques, and software that centres on a computer system.

Digitization in manufacturing technologies have paved the way for industry to reach six sigma performance status.

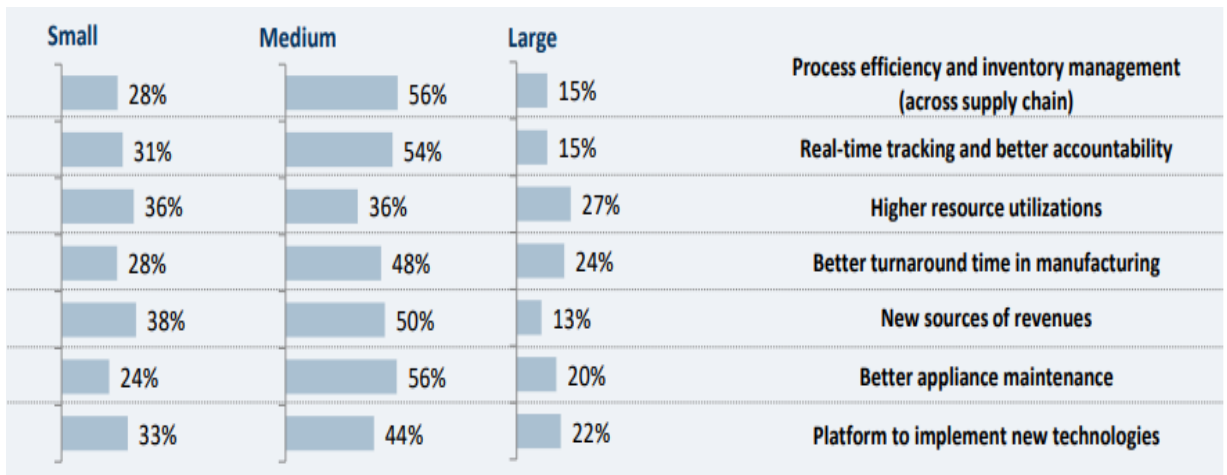
**Segments covered under Manufacturing in this study to analyze the impact of digital transformation.**



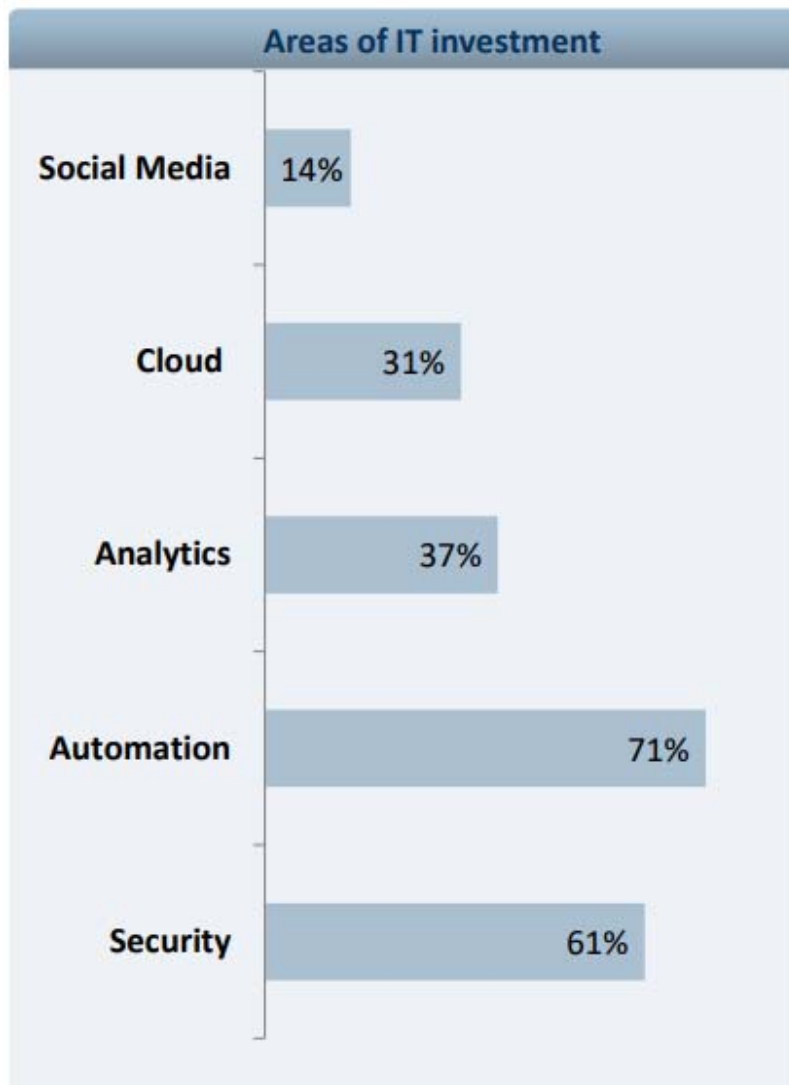
### Major challenges in Implementing digital Technology in Manufacturing Sector, 2017



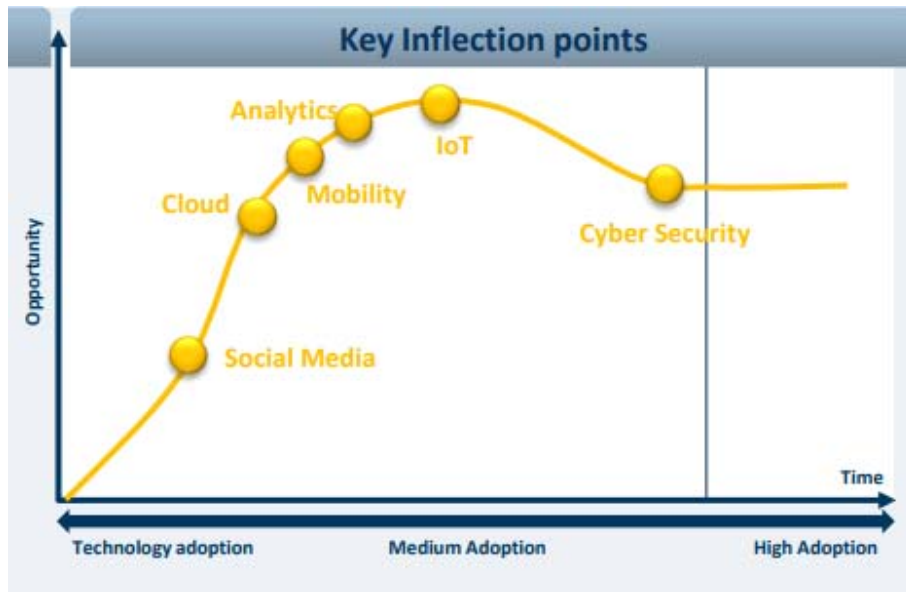
### Major Drivers in implementing digital technology in Manufacturing sector, 2017



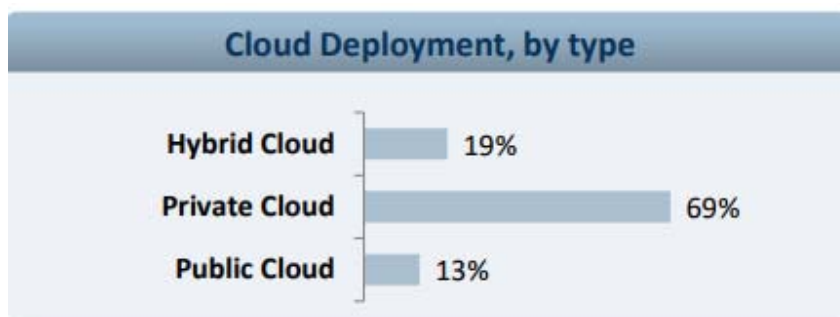
Indian Manufacturing is entering a new era of automation, sensors, optimized processes, integrated machines and IOT; Security will be an offshot of such large repositories of data and automation.







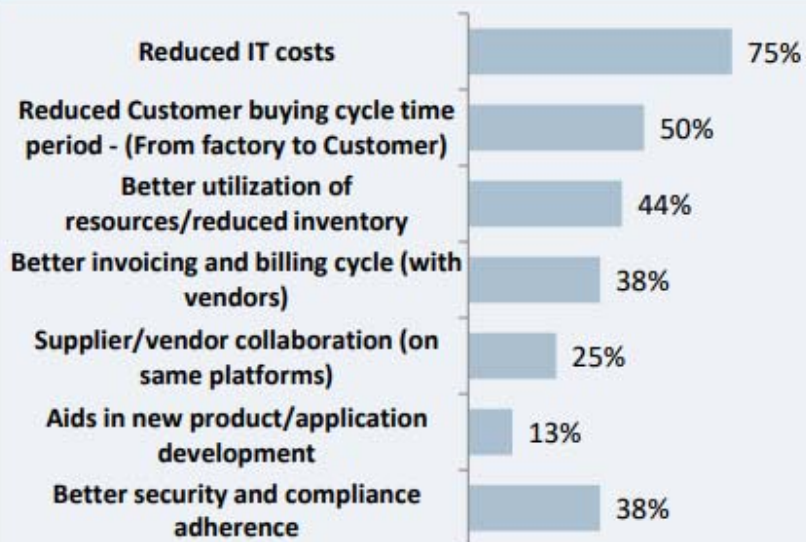
- Growing Digitization, connectivity, cloud computing, dynamic customer preferences, Internet of things(IoT), cyber security, and increasing automation are the key trends driving manufacturing sector to invest in IT.
- Make in India's vision in manufacturing is to increase the manufacturing sectors growth by 12-14 % per annum and add 100 million jobs. This can be achieved through increase in technological depth in manufacturing.
- Cloud Based Manufacturing solutions have the capability to reduce infrastructure, maintenance, and lifecycle costs by as much as 54 percent. However only ~30% of the manufacturing companies leverage cloud technology.

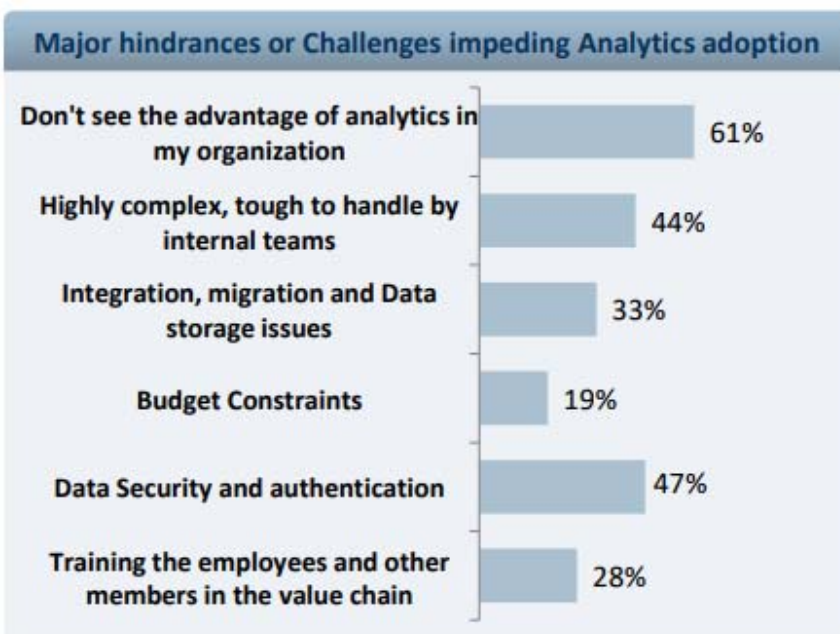
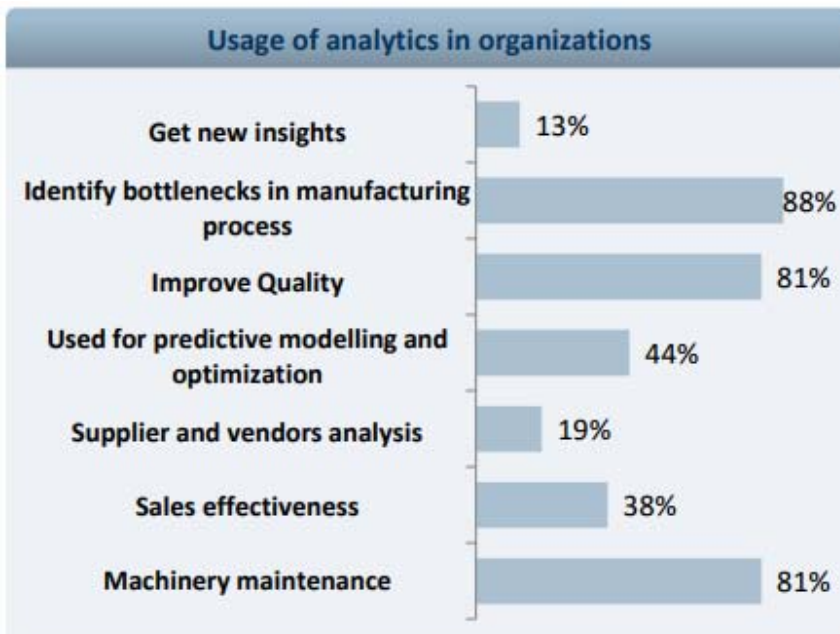


### Top 3 Challenges impacting Cloud Investment



### Impact on business due to Cloud adoption



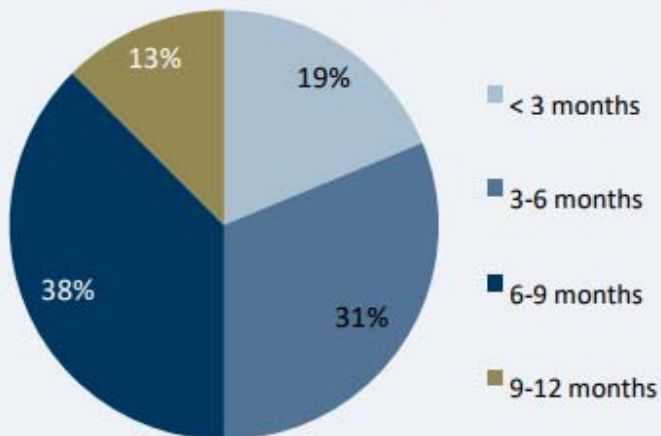


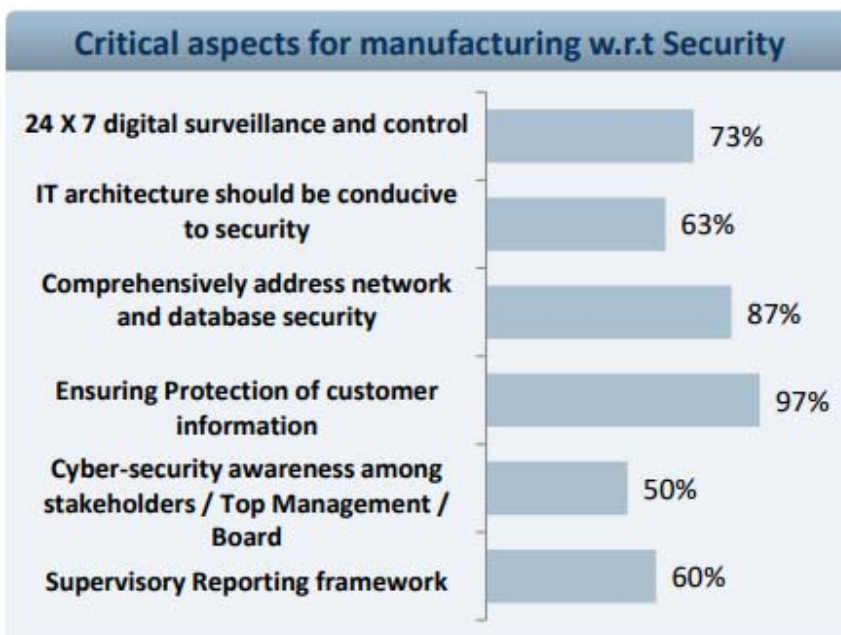
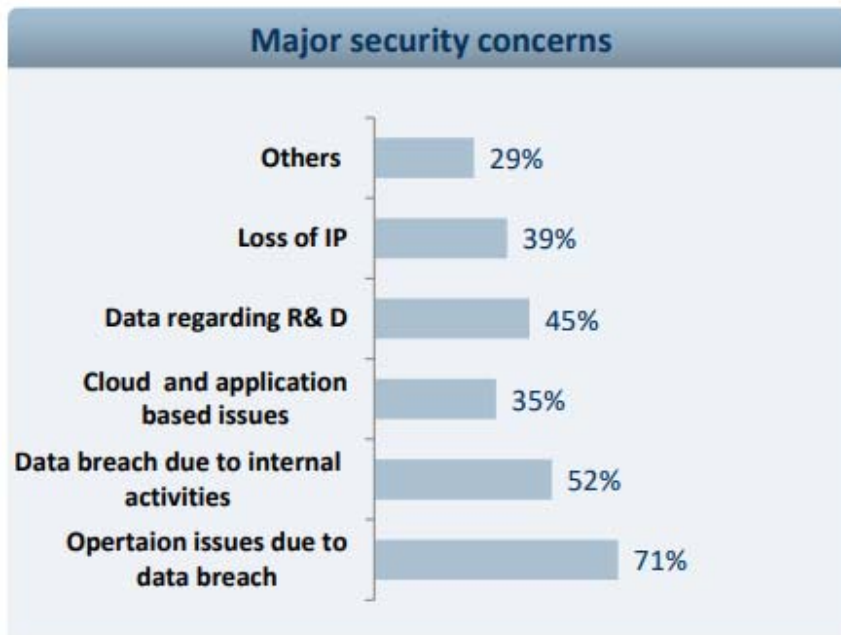
### Major reasons to adopt automation solutions



### Automation Solutions Adoption cycle

Average time taken to test , adopt and implement an automated solution





#### 4.4 Findings and recommendations

- Information Technology and operational Technology are currently isolated, but rapidly moving towards Digital manufacturing/Industry 4.0 fueled by IoT.

- Next generation manufacturing environment will use technologies that will improve efficiency, productivity, and production quantity; however, implementation and data security concerns are still large.
- Indian Manufacturing Sector is entering a new era of automation, sensors, optimized processes, integrated machines and IOT; security will be an off shot of such large repositories of data and automation.
- With automation and M2M seen as cornerstones in the manufacturing sector, analytics will be crucial to tie in the data and glean operational efficiencies and cost savings.
- Companies with less than 100 million USD have greater adoption of automation solutions; helping them to reduce cost and increase the production efficiency.
- The radical digitization of production- and of products, -- leaves manufacturing firms more vulnerable to cyber-attacks, making it imperative to re-appraise and re-align their security system and culture.

#### **4.5 Limitations of the study**

This study is based on Digital Transformation penetration study wrt SMB/SME of a particular region. Recommendations are based on study a specific geographical location. It might or might not be relevant to other verticals of society.

## 5.0 References

Tiwari, R., Prof., Trikha, R., Khokar, M., Bhardwaj, M., & Naosekpam, A. S. (2017). Industry-Academia R&D Ecosystem in India.....an evidence based study (1st ed.). Retrieved from <http://cpr.puchd.ac.in/wp-content/uploads/2017/05/Industry-Academia-RD-Ecosystem-in-India.pdf>

Acs Z.J., F.R. FitzRoy and I. Smith (2002) High Technology Employment and Knowledge Spillovers, in: Z.J. Acs, H.L.F de Groot and P. Nijkamp (eds.), *The Emergence of the Knowledge Economy*, Berlin: Springer, 155-172.

Argyres, N.S. and J.P. Liebeskind (1998) Privatizing the Intellectual Commons: Universities and the Commercialization of Biotechnology, *Journal of Economic Behavior and Organization*, 35 (4), 427-454.

Atuahene-Gima, K. (1996) Differential potency of factors affecting innovation performance in manufacturing and services firms in Australia, *Journal of Product Innovation Management*, 13 (1), 35-52.

Baron, R.A. (1998) Cognitive Mechanisms in Entrepreneurship: Why and When Entrepreneurs Think Differently Than Other People, *Journal of Business Venturing*, 13 (4), 275-294.

Bashkaran, S. (2006) Incremental Innovation and Business Performance: Small and Medium-size Food Enterprises in a Concentrated Industry Environment, *Journal of Small Business Management*, 44, 1, 64-80.

Bell, G.G. (2005) Clusters, Networks, and Firm Innovativeness, *Strategic Management Journal* 26 (3), 287-295.

Bercovitz, J., M. Feldman, I. Feller and R. Burton (2001) Organizational Structure as a Determinant of Academic Patent and Licensing Behavior: An Exploratory Study of

Duke, Johns Hopkins and Pennsylvania State Universities, *Journal of Technology Transfer*, 26 (1-2), 21-35.

Brand, M., Wakkee, I. and M. van der Veen (2007) Teaching Entrepreneurship to Non-business Students, in: A. Fayolle, P. Kyrö and J. Ulijn (eds.), *Entrepreneurship Research In Europe: Outcomes and Perspectives*, Cheltenham (UK): Edward Elgar. Brass, D.J., J. Galaskiewicz, H.R. Greve and W. Tsai (2004) Taking Stock of Networks and Organizations: a Multilevel Perspective. *Academy of Management Journal*, 47, 795–817.

Brush, C.G., I.M. Duhaime, W.B.Gartner, A. Stewart, J.A. Katz, M.A. Hitt, S.A. Alvarez, G.D. Meyer and S. Venkataraman (2003) Doctoral Education in the Field of Entrepreneurship, *Journal of Management*, 29 (3), 309-331.

Bruyat, C. and P.-A. Julien (2000) Defining the Field of Research in Entrepreneurship, *Journal of Business Venturing*, 16 (2), 165-180.

Busenitz, L.W., G. Page III, D. Shepherd, T. Nelson, G.N. Chandler and A. Zacharakis (2003) Entrepreneurship Research in Emergence: Past Trends and Future Directions, *Journal of Management*, 29 (3), 285-308.

Cappellin, R. and P. Nijkamp (eds.) (1990) *The Spatial Context of Technological Development*, Aldershot: Ashgate. Cho, H. J. and V. Pucik (2005) Relationship between Innovativeness, Quality, Growth, Profitability, and Market Value, *Strategic Management Journal*, 26(6), 555-575

Chrisman, J.J. (1999) The Influence of Outsider-Generated Knowledge Resources on Venture Creation, *Journal of Small Business Management*, 37 (4), 42-58. Chrisman, J.J., and W.E. McMullan (2004) Outsider Assistance as Knowledge Resource for New Ventures, *Journal of Small Business Management*, 42 (3), 229-244.

Churchill, N.C., and V.C. Lewis (1983) The Five Stages of Small Business Growth. *Harvard Business Review* May-June, 30-51.



Cooper, R. (1990) Stage-gate Systems: A New Tool for Managing New Products, *Business Horizons*, May/June, 44-54.

Corsten, H. (1987) Technology Transfer from Universities to Small and Medium-sized Enterprises: An Empirical Survey from the Standpoint of Such Firms, *Technovation*, 6 (1), 57-68.

Decanio, S. J., C. Dibble and K. Amir-Atefi (2000) The Importance of Organizational Structure for the Adoption of Innovations, *Management Science*, 46 (10), 1285-1299.  
Drucker, P.F., (1985) *Innovation and Entrepreneurship*, New York: Harper Collins Publishers.

Elfring, T. and W. Hulsink (2003) Networks in Entrepreneurship: The Case of High-technology Firms, *Small Business Economics*, 21 (4), 409-422.

Finkle, T.A. and D. Needs (2001) Trends in the Market for Entrepreneurship Faculty, 1989-1998, *Journal of Business Venturing*, 16 (6), 613-6340.

Garcia, R. and R. Calantone (2002) A Critical Look at Technological Innovation Typology and Innovativeness Terminology: a Literature Review, *Journal of Product Innovation Management*, 19, 110-32.  
Gartner, W.B. (1990) What Are We Talking About When We Talk About Entrepreneurship? *Journal of Business Venturing*, 5 (1), 15-28.

Gooderham, P.M., A. Tobiassen, A. Doving, and O. Nordhaug (2004) Accountants as Sources of Business Advice for Small Firms, *International Small Business Journal*, 22 (1), 5-22.

Geenhuizen, M. van, D. Soetanto and P. Nijkamp (2007) Diversity as a Critical Element in Stimulating the Role of Technical Universities in the Regional Economy, *Studies in Regional Science*, 37 (2), 501-518

Harmon, B., A. Ardishvili, R. Cardozo, T. Elder, J. Leuthold, J. Parshall, M. Raghian and D. Smith (1997) Mapping the University Technology Transfer Process, *Journal of Business Venturing*, 12 (6), 423-434.

- Hippe, E. Von (1988) *The Source of Innovation*, New York: Oxford University Press.
- ING Bank (2004) *Ondernemen in IJsselland, Regio in Economisch Perspectief*, ('Enterprising in IJsselland, Region in economic perspective'), Amsterdam, May.
- Jaffe, A. (1989) Real Effects of Academic Research, *American Economic Review*, 9, 957-970.
- Witt, P. (2004) Entrepreneurs' networks and the success of start-ups, *Entrepreneurship & Regional Development*, 16 (5): 391-412.
- Yap, C.M. and W.E. Shouder (1994) Factors influencing new product success and failure in small entrepreneurial high technology electronic firms, *Journal of Product Innovation Management*, 11 (5), 418-432.
- Zirger, B.J. and M.A. Maidique (1990) A Model of New Product Development: an Empirical Test, *Management Science*, 7, 867-883.

## 6.0 ANNEXURE

Map of Delhi-NCR

