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LEVERAGING INFORMATION COMMUNICATION TECHNOLOGIES FOR BOOSTING THE GROWTH OF INCUBATION/STARTUP PROJECTS

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Abstract: In this paper the research gap is perceived and investigative questions are framed to find the impact of the use of ICT for business enterprise incubation/startup happening in India. In light of the above theories are proposed. Hypotheses are the assumptions characterized about the possible direction of the results that might be jumped on the climax of the investigation system. The hypotheses have been formulated for verifying the research constructs.

The research goes for the basic investigation, examination, and adaption of ICT driven practices and techniques to be a piece of prepared reference for business practitioners. To examine how ICT can be utilized to make the business procedure increasingly proficient and profitable [1]. Also examines how ICT helps in building systems and procedures in performing examination of the discoveries and innovations to make business model offer market feasibility.

Adequacy of ICT instruments are explored for pre-handling before the hatching of startup adventures. Studying and testing for recognizing the barriers associated with setting up startups is done. [2]

Keywords: Incubation, Startup, Hypotheses, Entrepreneurship, Risk metrics

I. INTRODUCTION

It is observed that that the world growing economies depend heavily on startups and business incubation. India's majority of startups are in the realm of Information and Communication Technologies sector, essentially catering to digital economy. Startup ecosystems are to be revamped to nudge potential entrepreneurs to have startups in other industrial and business sector in massive way too. Leveraging ICT will help to go a long way in creating a robust platform to launch startups. ICT shall be leveraged to finalize business plans, models, risk mitigation strategies and market surveys. ICT shall also be leveraged to understand the markets and cultures of various geographies. [1]

India has figured out how to hold its situation as the third biggest start-up environment on the planet with increasingly experienced experts taking the innovative course. It has additionally looked up three places in 2018 to position itself in the 57th position in the Global Innovation Index from 60th position in the earlier year [2]. The general startup base in the nation is assessed to surpass 7500, a development of 12- 15% from a year ago. The number of female organizers has increased to 14% in 2018 from 11% a year ago just as more Tier 2/Tier 3 urban areas are rising as start-up accommodators.

An astounding figure of 7200-7700 startups incepted amid 2013-18, with generally speaking base multiplying at a rate of 12-15%. The advancement of the Indian economy may be extended by the better utilization of benefits with new developments and adventures of

startups [2], [3]. Startups may add to improved fiscal noteworthiness and can support budgetary straightforwardness and aptitudes improvement subject to mechanical and business advancement.

II. CONTEXTUALIZING ICT FOR ENTREPRENEURIAL ACTIVITIES

ICT represents a brand-new general-purpose technology, with the capacity of reworking monetary methods right into a new economy, thus generating a sustained growth in monetary boom via procedures of technological development and innovation. ICT has contributed substantially to productiveness growth and competitiveness. Technology is the riding pressure of development in this period of globalization. ICT has turn out to be a practical requirement for the socio-economic growth and sustained improvement.

According to International Monetary Fund (IMF), India is the 1/3 biggest financial system within the international. A large degree of this development may be accredited to the achievement of the ICT region. As per the statistics of a file, the ICT enterprise in India contributed to approximately 9.5% of the national Gross Domestic Product (GDP), which is six times its contribution as seen in 2000 [5],[13].

ICT performs a crucial role in facilitating the modernization and improved economic performance of corporations in transition international locations. ICT in itself is frequently inadequate for improving economic overall performance. ICT use amongst companies in transition international locations is by and large geared toward stepped forward production and transaction strategies. Companies use ICT to serve clients and the market. ICT usage is influencing financial performance amongst companies. ICT is a significant contributor to productiveness, profitability, and boom. A new advertising strategy, capital funding in the gadgets and organizational change are the three elements which might be most essential for correctly translating the adoption and utilization of ICT into superb economic outcomes. [8]

Entrepreneurs are people who recognize possibilities in which different people will see chaos or confusion. They are aggressive catalysts for alternate inside the marketplace, challenging themselves to interrupt new boundaries.

The entrepreneur is a catalyst for financial change, cautious making plans, and sound judgment while sporting out the entrepreneurial technique. The entrepreneur is uniquely optimistic and his dedicated works creatively, to set up new assets or endow vintage ones with a new ability, concerned about the reason for creating wealth [11].

2.1 Startup scenario in India

India is the third biggest startup hub. India has almost 12,000 to 15,000 startups. Annually 800 to 1000 new startups are launched. It is predicted that it could boom to 2000 per year by 2020. The startups are broadly divided into two kinds i.e Tech startups and Non- Tech startups. The Tech based startups have an approximate share of 45 to 48%. It is predicted that overall Tech startups will growth to 11,500 in 2020. With the boom in the new Tech startups 250,000 new jobs will be created. Hence ICT plays a major role in sales generation in addition to activity advent [11]. As in keeping with the World Bank's report: Doing Business out of 189 economies India is ranked 130th on the benefit of doing enterprise, 133rd on the convenience of buying and selling throughout borders, 157th on the benefit of paying taxes and most importantly 155th in case of beginning an enterprise. Starting a brand-new enterprise is a herculean mission because of various issues.

III. GAPS/ISSUES OF STARTUPS IN INDIA

The entrepreneur may face a lot of problems and demanding situations. Some of the fundamental issues which a startup can face are listed beneath:

1. Startup Capital

   Whenever an entrepreneur wants to begin a new business the first trouble, he'll face is the startup capital. He might also have some startup cost, but he may also want full size capital, infrastructure, system, permits & licenses, or a minimum quantity of personnel. [6]
2. Competition

   The largest undertaking faced by way of any start-up is opposition. There will constantly be reduced throat opposition. If startup started in India finds a niche marketplace and show themselves compared to their competition, the praise is top notch. There will usually be new startups which will attempt to supply the equal product cheaper than yours.
3. Recruiting the right expertise

Recruiting a right person is a difficult process but hiring for startups may be very tough. For a young enterprise which has a restrained cash glide, hiring the wrong employee can doubtlessly ruin startup. Recruiting the proper or gifted humans is critical for any business; however, startups particularly can't manage to pay for hiring errors. If a startup has now not yet hooked up credibility and has less cash, then a wrong lease can set the startup again for months or preserve the commercial enterprise from commencing altogether. [8]

4. Rapid growth of startup

When a startup find's a niche market, then the demand for its services and products may be excessive, and the growth of the agency can be exponential. So, it will be very hard for the startup to evolve to such conditions. Expanding at a totally fast price is a huge mission for a startup. Though the demand for the product or service from a startup skyrocket the entrepreneur must always try to get customers, supply the services or products and reach the breakeven factor as quickly as viable. The startup can start earning profit only after the break-even point is achieved. [14]

5. Fast-paced market

Another largest challenge for a startup is to suit its velocity with the changing technology. The era is converting at a brilliant pace and retaining up with the adjustments is a very difficult assignment for the startups. The startups should always try for innovation.

6. Customer Cost of Switching

The endeavour condition is portrayed by methods for an extraordinary challenge, in such surroundings building supporter charm needs to end up being a key region of cognizance for most of the fiscal foundations. At the give up the customer must be glad, and the startup ought to constantly attempt it's exceptional to make the client happy [6]. The marketplace location is very competitive, and all agencies compete for clients. The purchaser delight is a key differentiator and increasingly has come to be a key element of commercial enterprise strategy.

7. Access to Materials and Distribution Channels

Distribution refers to a company or set of groups, this is concerned inside the procedure of making services or products to be had to be used or intake by means of a patron or commercial enterprise person. Distribution is essential for purchasing the enterprise's product into its customer's arms. A smart distribution method is necessary for fulfilment and may be a source of aggressive advantage.

8. Patents and Government Regulations

Every entrepreneur should have a patent it is of extreme importance. There is a heavy hazard of infringement and if a brand-new concept or products of any startup get infringed then the entrepreneur will bear a large loss. To avoid the patent infringement the startup must innovate by way of developing its very own model of the product or part. A patent for an entrepreneur is a need, so that the start-up may be included from its competitors.

9. Culture and awareness

The Indian way of life and the Indian humans' attitude is completely distinct than the people of the western countries. The threat taking capability of Indian humans may be very low. The way of life has conditioned human beings to appearance down upon failure. What to do, why to do and a way to do are very not unusual amongst Indian entrepreneur. India is called a price touchy marketplace. Indian humans are unaware of how they could contribute to economic increase and a way to generate employment.

10. Social troubles

Indian markets are fragmented and unorganized. Lack of right steerage and mentorship is not there. There is a loss of satisfactory mentorship in phrases of industry knowledge/ assist. This is a major purpose behind the failure of Indian startups.

11. Cyber safety

The Tech startup share is 45 to 48%. If we analyse the startups in addition it is discovered that E-commerce percentage is 33 to 35% while that of B2B is 24 to 26% and consumer internet being 12 to 14%.

12. Technology infrastructure

For the startup business ICT performs an essential position thus IT-infrastructure is must. It is discovered that Internet penetration in India could be very excessive and almost one out of three Indian has a smart cell phone. Hence a greater variety of consumer's is going online. The IT infrastructure is available simplest in metro towns only.

13. Regulatory issues

To set up a brand-new commercial enterprise it takes 30 to 60 days in India as compared to only four days in USA. India has a multi-window clearance machine. An entrepreneur will make more than one journeys to the authority's workplaces to sign in and get clearances.

14. Indian banking system

Before the release of start-up India program, the Indian banks have been very hesitant to provide loans to the new enterprise or startup. Bank lending rates in India are 10 to 10.5 % as compared to the best 3.3% in USA. In order to get a mortgage for beginning a new business, the budding entrepreneur must undergo a tedious method of mortgaging and collateral protection. Only after the release of a recent marketing campaign "standup India", all the public and private sector banks began offering loans to Indian startups. The startups can pay off their loan in 7 years with the most moratorium period of 18 months. [11]

15. Research and Development scenario

India is an outlier inside the pattern of R & D investment. R & D investment in India is executed in general by way of government even as inside the other growing and developed nations it is accomplished often via personal zone. In India R & D spending percent of GDP is 0.85 to 1% compared to 2.8% in USA. In India the advertising in studies task isn't a goal but it is an incentive. India has filed only 6 patents per million population compared to USA 950, Japan 1600 and South Korea filed 2000 patents per million. [4]

IV. SURVEY DATA

4.1 Survey Questions

The survey questions were administered to the people who are directly involved with the startups, which includes entrepreneurs, managers, venture capitalists. The survey explored various aspects of startups and covered a large set of questions.

4.2 Data Cleaning and Validation

To ensure the quality and validity of the survey data, we went through a careful data cleaning and validation process on the original dataset. The process was mainly automatized using R software package. I have removed suspicious data entries manually. To start with the data cleaning process, we have removed duplicate entries that might have been introduced during the data exporting process. I also fixed various obvious errors that may be attributed to the survey design or data exporting process. After this preliminary step, I did manual data cleaning question by question. After the initial cleaning, we checked the validity of the data using a set of validation cases that we discovered based on a close inspection of all the survey questions. The validation cases detected a set of unrealistic, impossible, invalid combinations of answers which rendered certain data entries invalid, which in turn were removed from the dataset. [12]

4.3 Data Analysis

The sample size was 250. I received 233 valid responses. The data analysis process was conducted using R software environment. Hypotheses were tested using Chi square test. The hypotheses are tested with 1 degree of freedom at 5% level of Significance. Ho Null Hypothesis is assumed to be less than 70% and H1 the alternate hypothesis is assumed to be equal to 70%. The hypotheses have been tested by using the acceptance of startup founders and senior managers associated with startups.

4.4Testing of Hypotheses

Hypothesis testing is an essential procedure in statistics. A hypothesis test evaluates two totally unrelated articulations about a populace to figure out which proclamation is best bolstered by the sample data [10]. A test outcome is statistically significant when the sample statistic is sufficiently bizarre with respect to the null hypothesis [1] – [5]. The chi-square ($\chi 2$) value can be calculated as is

$\chi 2= \Sigma$ (fi-ei)^2/ ei

Where fi is observed count and ei is expected count.

The Chi-square value, p-value and result for the respective hypothesis are as listed in the table given below:

Table 1 Testing of hypotheses-Chi-square test results (N=233, df=1, α =5% and χ2 =3.84)

Hypothesis	Chi-square (calculated)	p-value	Result
1.Risk capital and mitigation of risk.	25.01	5.70E-07	Ho rejected and H1 accepted.
2.Modeling and simulation tools for projecting the future.	26.46	2.69E-07	Ho rejected and H1 accepted.
3.Business analytics/business intelligence techniques for forecasting market behavior.	25.01	1.13E-06	Ho rejected and H1 accepted.
4.Open source technology for cost cutting.	31.06	3.40E-08	Ho rejected and H1 accepted.
5.Elimination of non-value adding procedures and processes.	8.16	0.0042	Ho rejected and H1 accepted.
6.Data mining tools in profiling markets before a startup venture out.	61.77	3.95E-15	Ho rejected and H1 accepted.
7.Big data analytics for carrying out sentiment analysis.	19.62	1.04E-05	Ho rejected and H1 accepted.
8.Cloud technologies for disaster management.	5.22	0.0223	Ho rejected and H1 accepted.
9.Third party cloud data centers for storing startup data.	10.80	0.0010	Ho rejected and H1 accepted.
10.Payment gateways, e-commerce to carry out secured transactions.	34.32	4.67E-09	Ho rejected and H1 accepted.

Graphical results of Hypothesis1 to 10.

Hypothesis 1

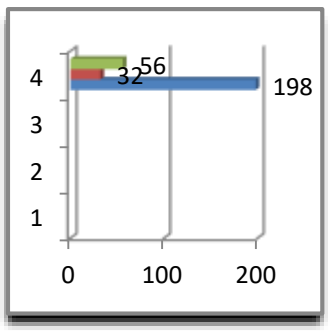


Figure 1

Hypothesis 2

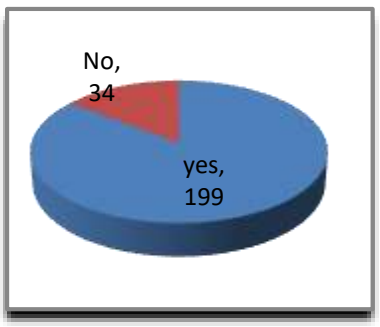


Figure 2

Hypothesis 3

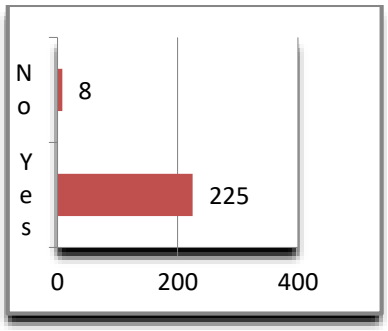
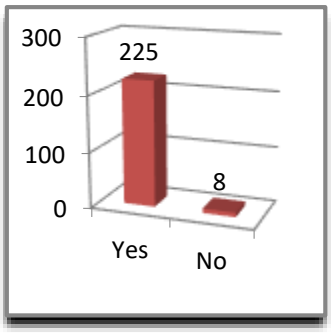
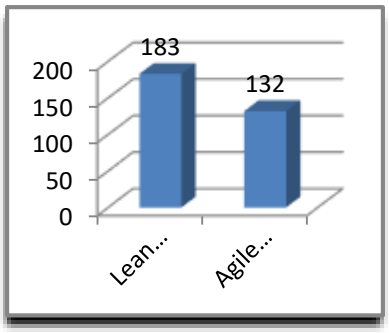


Figure 3

Hypothesis 4 Hypothesis 5 Hypothesis 6





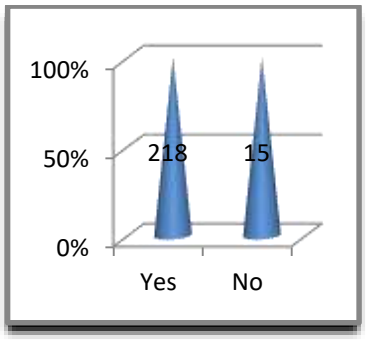
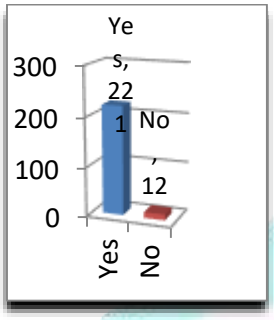
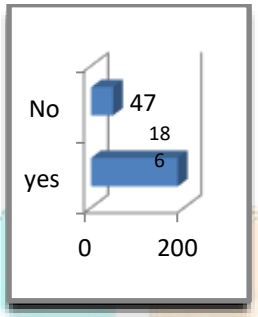
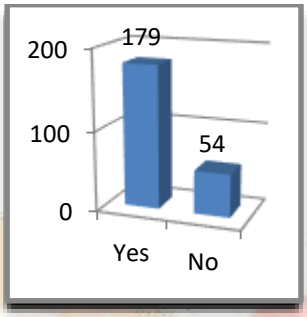


Figure 4 Figure 5 Figure 6

Hypothesis 7 Hypothesis 8 Hypothesis 9 Hypothesis 10







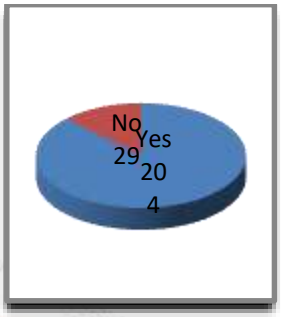


Figure 7 Figure 8 Figure 9 Figure10

V. RESEARCH OUTCOMES

The research study is related to find the various ways and means by which ICT can be used for entrepreneurship incubation/ startup projects. As per the objectives of the study the implications of ICT based technologies were studied and evaluated by means of case study analysis of more than 150 startups and taking feedback from the stake holders like startup owners, budding entrepreneurs, managers and the engineers working in the startups. The entire stated hypotheses have been tested with the help of data collected by the survey questionnaire and the personal interviews of the persons indulged in the startups. All the stated hypotheses are related to one or the other key indicator. The outcome of the study is as follows:

- **ICT to establish the requirement gap or gap analysis**

The new entrepreneur should asses the difference in performance between a business information system to determine whether business requirements are being met and what steps should be taken to ensure they are met successfully. Before starting a new venture, it is very important that the entrepreneur should establish the requirement gap between what is available and what is possible. He should carry out market survey to test the product or process, thorough analysis of the similar products available in the market should be done. The entrepreneur should conduct customer survey and get the necessary feedback from the customers, he can use the ICT based business analytics tools to do the same. It is observed that 81% startups use ICT based business analysis tools to do the gap analysis. 88% new entrepreneurs have used ICT based tools to carry out market survey to test the product or process. 79.2% entrepreneurs have used ICT based tools to enable new environment as well as generation of new markets.

- **ICT for profiling market before startups venture out**

Market profiling explores trends and forecasts of the target organization. It is used to do the analysis of specific market to determine the value, characteristics, key players, drivers, inhibitors and most importantly size of the market. It gives snapshot of a market which will be useful for business planning and investment. The new entrepreneur should use ICT based data mining tools in profiling market before he ventures, out. As shown in figure 1 it is observed that 93.5% startups have used data mining tools for profiling market. 91.7% startups have

used ICT based modeling and simulation tools for projecting the future of their startups. 84.9% startups have used business analysis/ business intelligent systems for forecasting market behavior.

❖ **ICT can be used for cutting cost of startups.**

Starting a new venture is a herculean task. Not only you need seed money but you require office space, equipment purchases, buying inventory, advertising cost, utility costs, software, motivated and highly dedicated team members. For a startup which has limited resource cutting the unwanted task is of utmost importance. If the entrepreneur doesn't have an idea of his startup costs, then he will not know how much funding he will need or how quickly to scale. The entrepreneur will not really know where the startup is going and the startup could fail before it even hit the breakeven point. It is observed that 86.6% startups have used open source technology for cutting down cost of software licensing of proprietary items. To reduce the advertising cost 85.5% startups are using social media for doing advertisement of their products. 76.3% startups have agreed that they use social media to identify and procure human capital.

❖ **ICT for technology absorption or rejection of products and processes.**

Startup should do acquisition, development, assimilation and utilization of technological knowledge for their growth. Technology acquisition may help the startup for meeting market specific needs as well as getting availability of supporting infrastructure, improvement in efficiencies and increasing revenues. ICT based systems such as ERP, SCM, CRM are used by startups to build better products and better design making. Startups should use the technology for absorption or rejection of product and processes. It is observed that 81% startups have used soft computing/ artificial intelligence techniques for technology absorption or rejection of ICT products and processes. 83.2% startups have agreed that they acquire big data analytics for carrying out sentimental analysis to understand the market and cultures of various geographies.

❖ **ICT for business model design and innovation in business model**

Business model design is a way of defining its business logic at the strategic level. It is a narrative of how the startup business works. Business model describes the type of organization, it also helps in deciding strategies and capabilities in order to face upcoming changes. By the analysis of business model one can know how the venture is going to make money and its position in the supply chain. It is the method of doing business by which the startup can sustain itself. At the strategic level business model design and innovation defines its business logic. 83.6% have used ICT tools for business model design and innovation of business model. 77.2% startups have agreed to use ICT based tools/systems for monitoring business productivity and employee progress.

❖ **ICT can be used for evaluating the project risk and mitigating the risk.**

Investing in startup is very risky as it is an early stage companies with little revenues, no profitability and higher mortality rates. Assessment of possible risk and expected return on the startup can be evaluated by analyzing the business model. It is observed that 84.9% startups use risk analysis methods for evaluating the risk involved in their project and processes. To avoid the risk of loss of data from any hazardous situation 79.8% startups have agreed that they are keeping their valuable data in third party cloud data centers.

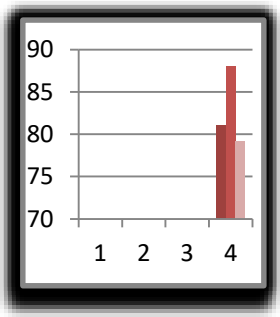
❖ **ICT can be leveraged to make business process more efficient and productive.**

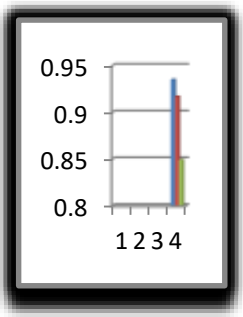
It has been found that, most of the technology-based startups are using ICT based services to improve the efficiency of their business process. It is observed that 74.2% startups are using ICT based services for leveraging collaborative capabilities.74.7% of startups use ICT for continuous standard setting and innovation of the business model. Almost 77.2% startups use ICT to monitor productivity and progress of their employees. But, still there are few key areas where ICT is still to be used more effectively. For example, it is observed that only 55.3% startups are using ICT for enhancing the productivity and effectiveness of activities and functions, analyze performance and to improve qualification and specialization of human resources.

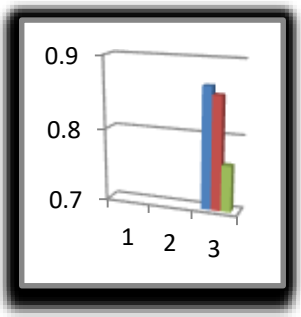
❖ **ICT can be used for elimination of non-value adding procedures and processes.**

To improve the efficiency of the project and processes it is very important to eliminate the non-value adding procedures and processes. It has been found that, 78.5% startups are using lean management methodologies and 56.7% are using agile management methodologies for elimination of non-value adding procedures and processes.

Outcome 1 Outcome 2 Outcome 3 Outcome 4







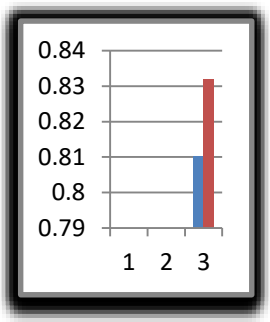
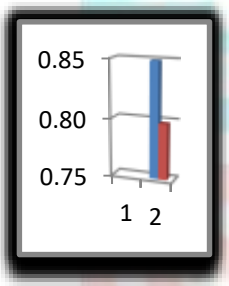
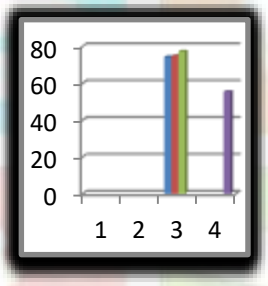
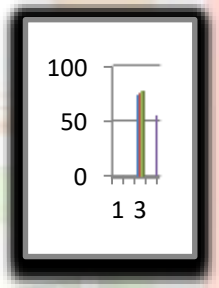


Figure 11 Figure 12 Figure 13 Figure 14

Outcome 5 Outcome 6 Outcome 7 Outcome 8







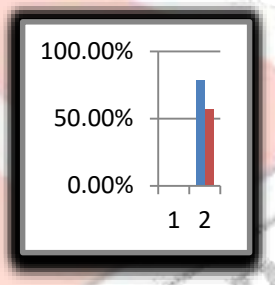


Figure 15 Figure 16 Figure 17 Figure 18

VI. Conclusion

ICT can be used in creation of new models for turning inputs into products and /or services. Startups are using ICT to overcome geographic boundaries, creating a more efficient global market place. ICT plays the important role right from the development stage to the full growth of a startup. ICT based tools are used by startups for doing gap analysis, profiling markets, business model innovation, leveraging collaborative capabilities. Startups use ICT based tools to monitor business productivity and employee progress. It is also used to enable new environment as well as generation of new markets. The ICT tools are used for elimination of non-value adding procedures and processes, for doing sentimental analysis to understand the market and cultures of various geographies.

Tier-1 cities like Bengaluru, Delhi NCR and Mumbai form the lion share of the startup base. B2B startups gain prominence. The key focus of most of the startups is on AI, IOT and analytics. To boost the startup system the government of India has launched lot of schemes like, “Make in India”, “Standup India”, “Digital India”, “SETU” and “MUDRA” scheme. Still it is observed that the startup mortality is a key problem with majority startups dying within 1.6–1.9 years of inception. There is a need to have programs to foster entrepreneurship and build entrepreneurial capabilities as scale to strengthen support system for startups. It is the responsibility of the government to see to it that the startups get benefited from their various schemes.

VII. Acknowledgment

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