Industry 4.0 – Current Scenario in Indian Manufacturing Industry

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Abstract - *Industry 4.0 is now the future of manufacturing and service base industry. This paper includes the survey of capability of industry 4.0 for Maharashtra industries. Industry 4.0 is not an ordinary industry its more about smart industries which uses Iot things for production and servicing to get optimum accuracy .it is the fourth revolution of industry. The data have analyzed all the surveyed data and described every aspects related to comparison obtained from industry 4.0. This paper has presented a data which provides a brief review about the present plight of all kinds of industries starting from small scale to large scale industry. It also makes sure that all the industries are well aware about the concept of industry 4.0. From this can also look at different methodology and alternatives adopted to implement the necessary parameters to meet the requirement of industry 4.0. Industry 4.0 is all about innovation and connectivity. This evolution will make remarkable growth in the production process and meeting all the needs of customer with at most efficiency. The survey has conducted and this survey gives a broad idea about the different areas such as machinery, automations, cloud computing services, advanced digitalization and many more on which industries needs to keep a track of in order to be part of this revolution.*

***Key Words*: Industry4.0, innovation, integration, survey, digitation (automation, iot, software), value chain (vertical and horizontal), customer review and satisfaction, connectivity.**

1. INTRODUCTION

A revolution has been seen as the most important parameter when it is considered to human evolution. We have seen a major transformation from Stone Age period to this advanced computerized period in terms of industrial revolutions. Our first industrial revolution known as industry 1.0 was adopted around 18- 19 century. This brought change in production technology as steam engine was evolved. This led to massive increase of 30 percent in iron production. Another industrial revolution was marked during 19 century known as industry 2.0 which embraces the mass production assembly lines with electricity. This ultimately led to 8 percent increase in the mass production of car.

Corresponding decade saw a huge increment by industry 3.0 which brought in picture the first programmable logic controller. This revolution widely used partially automated systems which used electronics and it. This is considered to be a leading step toward the introduction of automation and different Softwares. The current revolution which is on its verge to bring all the necessities at a door step is industry4.0. Industry 4.0 is all about connectivity. It allows existing industries to change their traditional ways in responding to meet the need of customer. It is a fusion of production with information and communication technology. It focuses on how smartly the product can be made and different processes can be developed to bring so as to increase efficiency of production. It believes in key concept of integration. Integration here means moving towards large scale and proactive integration across their enterprise and among their customer supply base and product to ensure they are well aware about opportunities industry 4.0 offers. The main motto of this revolution is "Think big and be bold enough" to execute ideas. With this fast growing technology if one wants to go hand in hand then they must always plan ahead. Another feature is understanding that the changes are radical and most importantly being bold to predict where the product will be in future as compared to present condition.

 The survey was conducted in approximately hundred plus industries to obtained data which provides enough information about the parameters to work on in order to bring out these changes. It is very important that the industries should know what exactly this term means and what it stands for. Different strategies and progress indicators industries are planning to work on. This survey also leads to compare different elements which industry sometimes doesn't pay much attention but then it leads to major failure. At present there are many setback on the way of industry 4.0 such as lack of skill ,advanced technology , methodology which can be rectify by giving proper training.

The digitization of factories makes it possible to create a digital model of the factory. The aim is that work piece guides itself autonomously by using modified automated system such as sensors, iot, digital monitoring. The degree of digitization varies according to value chain. Vertical value chain is from product development to production whereas horizontal value chain is from customer order over suppliers. It is necessary to analyze customer data to increase customer insights. Keeping track of product development and storing the data at a proper location systematically is what a industry 4.0 also focuses. This

revolution is about innovating different automated system and adopts different methodology to bring the positive outcome.

2. METHODOLOGY

The process was divided in Three Steeps.

1. Idea
2. Contact
3. Collecting Data.

The main purpose of Research paper to provide to the Specific data to the industries about Industries 4.0, So that they can know if these industries are ready for industry 4.0. Most of the industries are ready to invest in these Industries. It will also benefit to increase their production.

Questionnaires were formed in the form of Google form, also provide link of questionaries' to the industries so that they can directly give the answers without meeting us and if they have any problem, they can contact and able to get so many contacts of all industries. Now the last part is to collect the data from specific person for eg COO, CEO Manager or Director or HR because these people know the upcoming plan of their company and projects.

Most of the contact and data we get form Industrial Exhibition. The questionnaire is in the form of yes and no and some of them in the form of the data. Collection was further remaining data from industrial exhibition in pune. The data is in the form of graphs bar graphs and pie chart.

It is very easy to understand hence to choose this data and arranged them in statistical form for easy view and under this form.
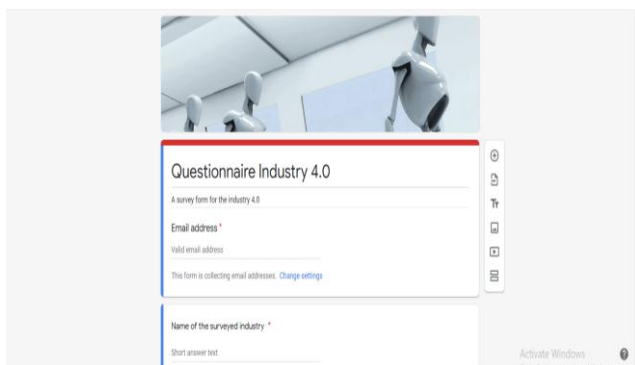
Fig.1: Google questioner Form

3. ANALYSIS OF DATA

The data analysis is carried out and the following were the results obtained:

Que1. Have you heard the term industry 4.0?
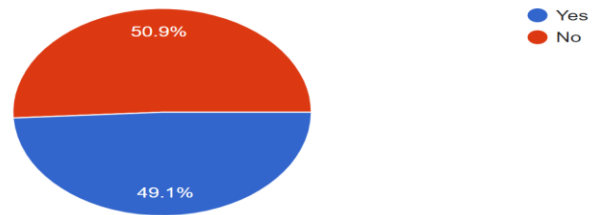
Fig.2

Que2. Strategy for the implementation status of your Industry 4.0 strategy?
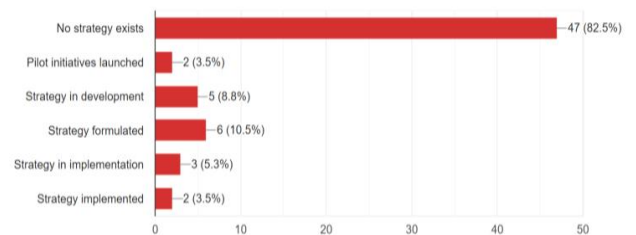

Fig.3

Que3. In which parts of your company have you invested in the implementation of Industry 4.0 in the past two years, and what are your plans for the future?
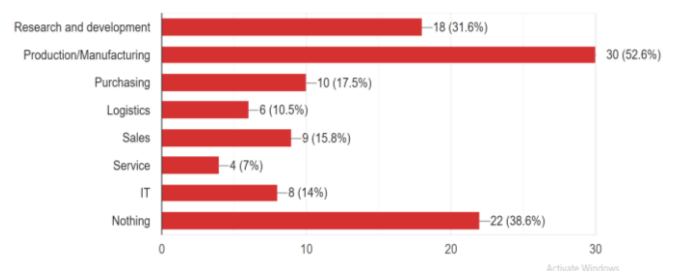

Fig.4

Que4. What is the level of contribution of Industry 4.0 that your organization need in order to increase the competitiveness, overall value creation of your products & service?
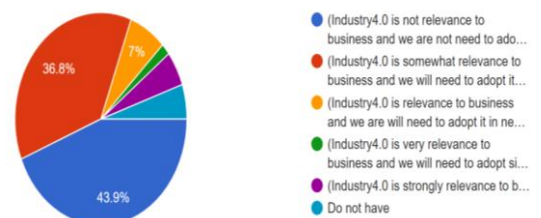

Fig.5

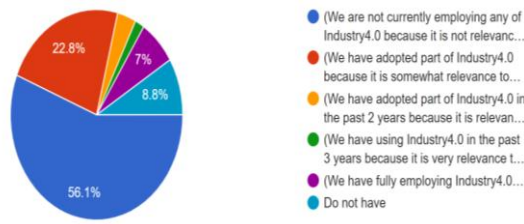**Que5. What is the actual level of Industry 4.0 that your organization is currently employing?**

Fig.6

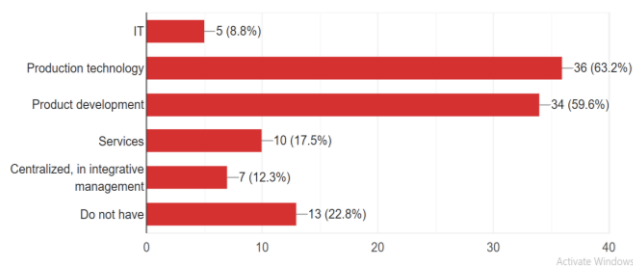**Qu6. In which areas does your company need to have to attain Industry 4.0?**

Fig.7

Que7. Are you making efforts to acquire the skills that are lacking? Through special training seminars, knowledge transfer systems, coaching, etc.
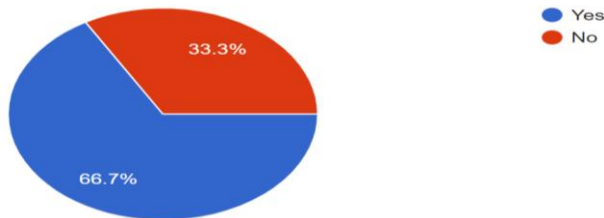

Fig.8

Que8. How would you evaluate your equipment infrastructure when it comes to the following functionalities?
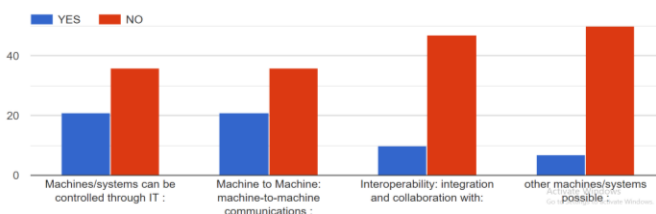

Fig.9

Que9. How would you evaluate the adaptability of your equipment infrastructure when it comes to the following functionalities?
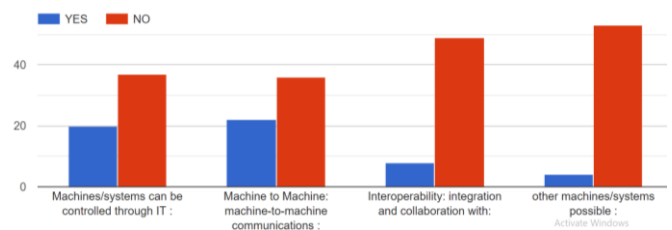
Fig.10

Que10. The digitization of factories makes it possible to create a digital model of the factory. Are you already collecting machine and process data during production?
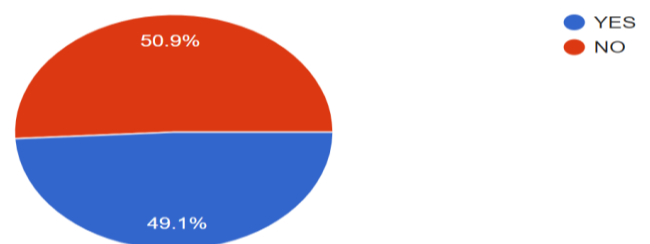
Fig.11

Que11. The vision of Industry 4.0 is a work piece that guides itself autonomously through production. Does your company already have use cases in which the work piece guides itself autonomously through production?
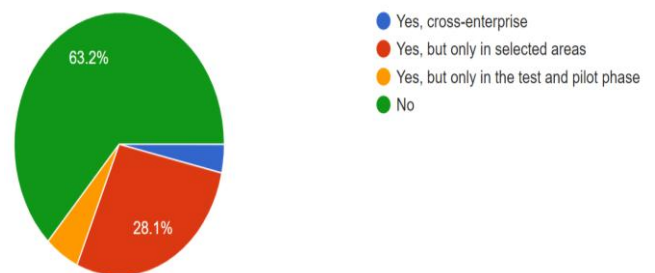

Fig.12

Que12. Does your company have production processes that respond autonomously/automatically in real time to changes in production conditions?
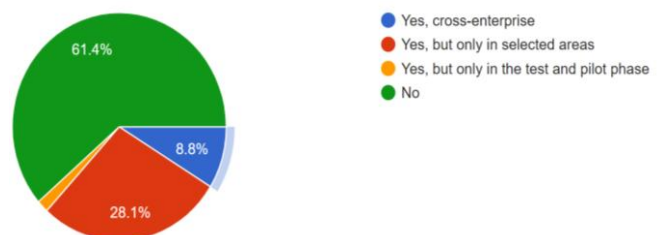

Fig.13

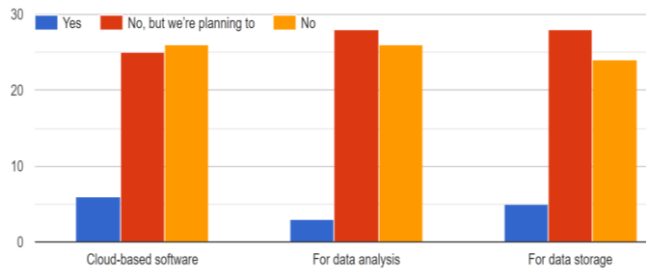**Que13. Are you already using cloud services?**

Fig.14

Que14. How would you rate the degree of the digitization of your vertical value chain (from product development to production)?
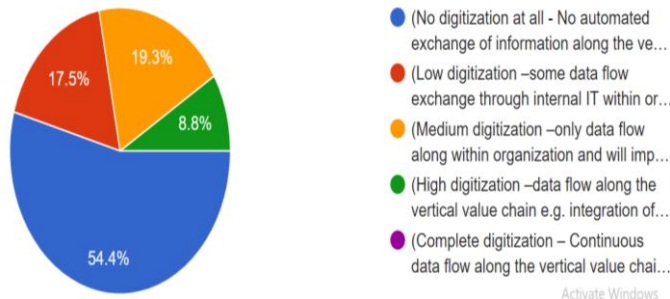

Fig.15

Que15. To which degree do you have an end-to-end IT enabled planning and steering process from sales forecasting, over production to warehouse planning and logistics?
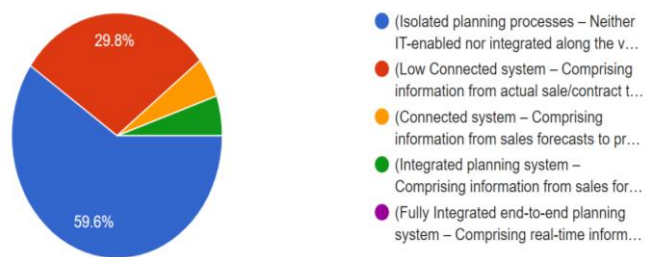

Fig.16

Que16. How advanced is the digitization of your production equipment (sensors, IoT connection; digital monitoring, control, optimization & automation)?
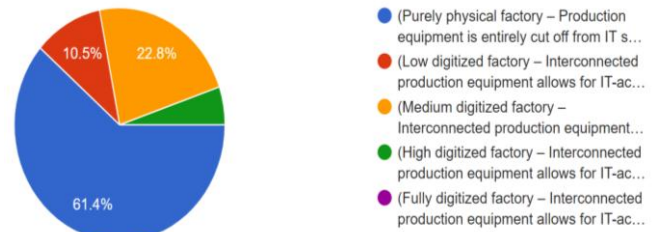

Fig.17

Que17. How would you rate the degree of digitization of your horizontal value chain from customer order over supplier, production and logistic to service)?
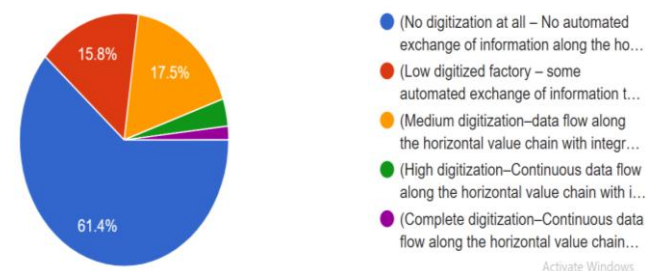

Fig.18

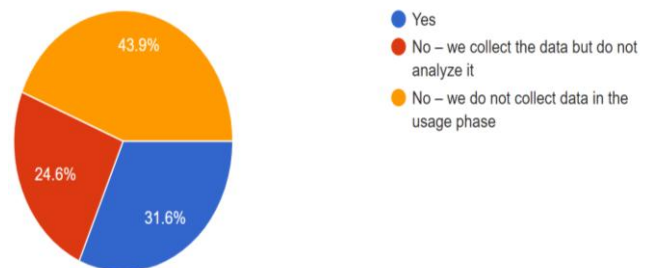**Que18. Do you analyze the data you collect from the usage phase?**

Fig.19

Que19. How far do you integrate multiple channels (website, blogs, forums, social media platforms etc.) into your customer interactions for communicating news, receiving feedback, managing claims etc.?
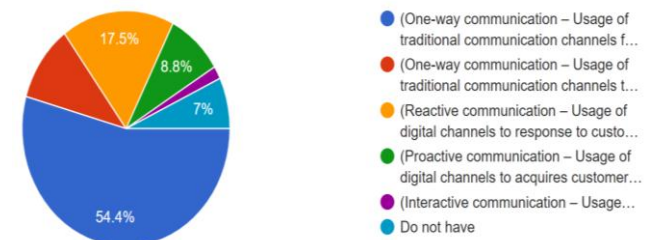

Fig.20

Que20. How advanced is the digital enablement of your sales force (mobile devices, access to all relevant system anywhere and anytime, full sales process possible at client site)?
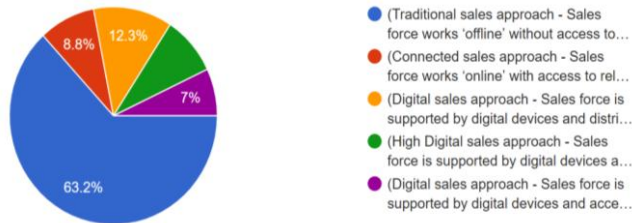

Legend:
- (Traditional sales approach - Sales force works 'offline' without access to...
- (Connected sales approach - Sales force works 'online' with access to rel...
- (Digital sales approach - Sales force is supported by digital devices and distri...
- (High Digital sales approach - Sales force is supported by digital devices a...
- (Digital sales approach - Sales force is supported by digital devices and acce...

Fig.21

Que21. To which extent do you analyze customer data to increase customer insight (e. personalized offers to customers based on their personal situation, preferences, location, credit score; consideration of usage data for design & engineering etc.)?
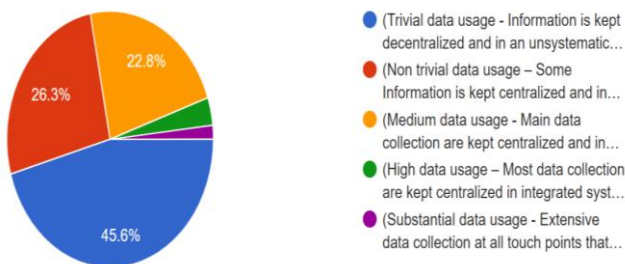

Legend:
- (Trivial data usage - Information is kept decentralized and in an unsystematic...
- (Non trivial data usage – Some Information is kept centralized and in...
- (Medium data usage - Main data collection are kept centralized and in...
- (High data usage – Most data collection are kept centralized in integrated syst...
- (Substantial data usage - Extensive data collection at all touch points that...

Fig.22

Que22. Does your company use any software for production planning?
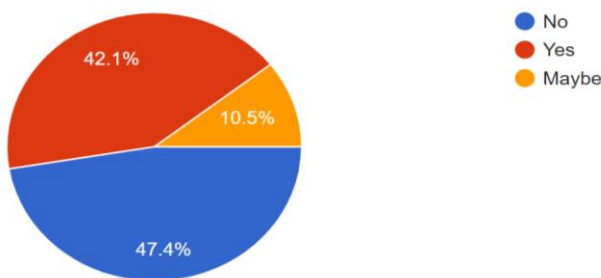

Legend: No, Yes, Maybe

Fig.23

Que23. Is there any automated system with your enterprise to manage the inventory?
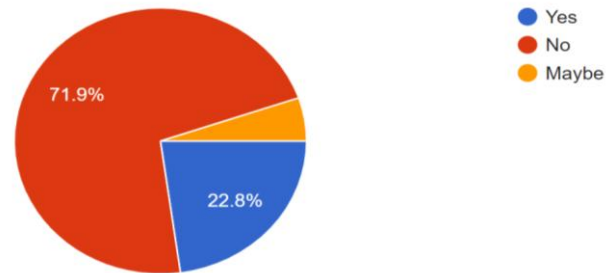
Fig.31

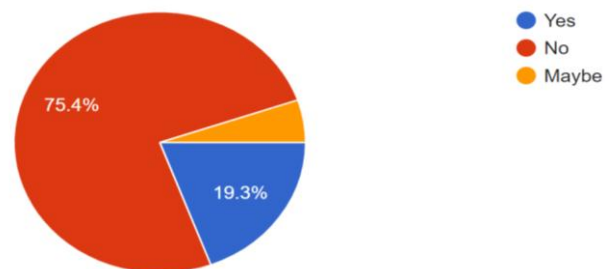**Que31. Do you have any cloud platform for data storage and retrival?**

Legend: Yes, No, Maybe

Fig.24

Que24. Do you use any big data analytics for management action plan?

Legend: Yes, No, Maybe
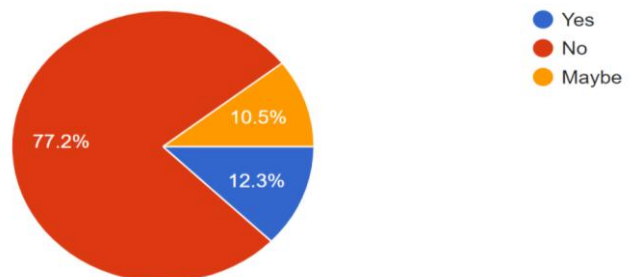
Fig.25

Que25. Do you any specialized robots for line balancing?

Legend: Yes, No, Maybe
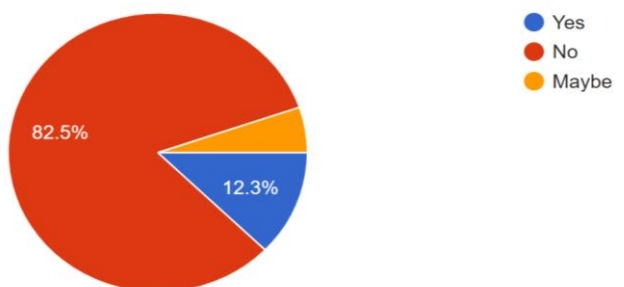
Fig.26

Que26. Do you use any IoT service for factory management and control?

Fig.27

Que27. Do you use machine learning techniques for demand prediction?

Fig.28

Que28. Do you use any special type of automated robots for inspection (quality check) of your product?

Fig.29

Que29. Do you use any effective waste management technique?

Fig.30
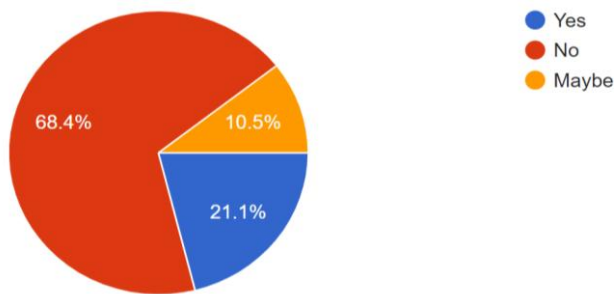
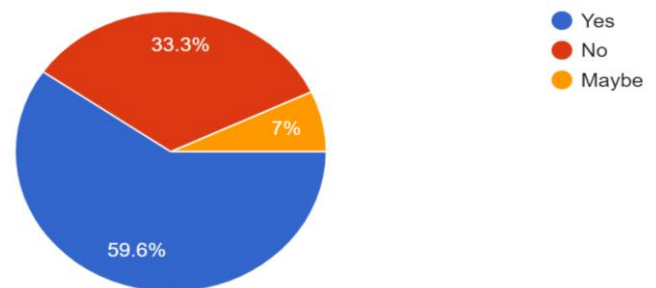**Que30. Do you use 3-d printing or additive type of manufacturing systems in your plant?**

Fig.31
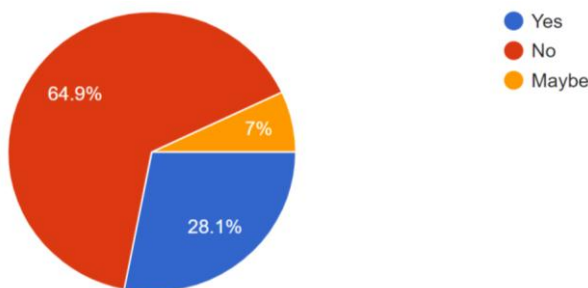
Que31. Do you use digital marketing systems?

Fig.32
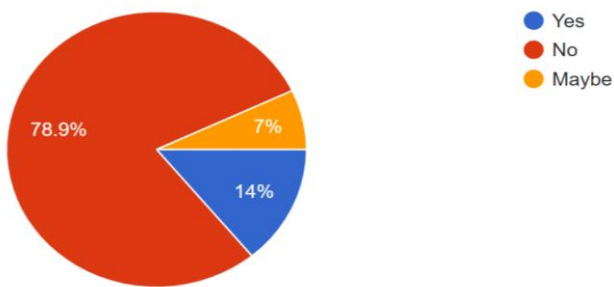
Que32. Do you have any security for your data exchange process?

Fig.33
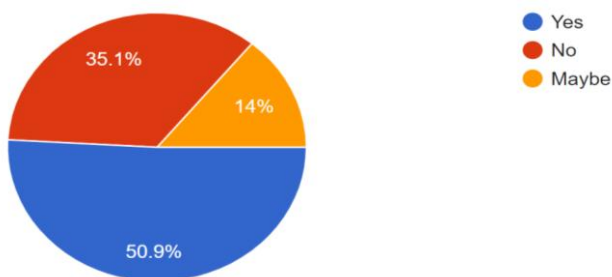
4. CONCLUSIONS

Industry today is going through the transition into the next industrial generation. The world is going into the next industrial generation i.e. is INDUSTRY 4.0. But the fact remains that industry across the globe are not moving at the similar pace. India especially its SME's are lagging behind in this context. Our extensive surveys and analysis into the preparedness of the industries both SME's and MNC's gives some insight into the problems faced by the industries in India to implement INDUSTRY 4.0.

SME's show higher resistance in the implementation of the new technologies. Some main reasons for not buying the infrastructure requisite for INDUSTRY 4.0 are lack of capital, lesser volumes of production making buying newer technologies unprofitable, process based manufacturing making investing in certain technologies redundant when new products are to be manufactured, less amount of inventory, lesser need of logistical support, data analysis is not requisite, decision making is not streamlined and lack of governmental incentives to invest in INDUSTRY 4.0 infrastructure.

MNC's though while willing to implement INDUSTRY 4.0 standards face different problems. Management has lesser affiliation towards technologies that yield lesser profits, investment in teaching the front line workforce on using the resources, unnecessary investment in infrastructure required for data storage and analysis, resistance from workers stating traditional ways have yielded profit and fear of unemployment from workers side. Though, some companies have started using INDUSTRY 4.0 techniques in logistics control and management and cloud storage for better data handling.

The problems stated above for both SME's and MNC's needs to be mitigated for improving the quality and quantity of production, to increase the profitability of the organization and for better management of human resources. Furthermore extensive research needs to be done in this zone to get the details of the problems faced by individual organizations. Further classifying the group of organizations based on their needs and production type and then finding the solutions to the problems is needed. Faster implementation of better technologies will help the industries meet the increasing needs and also compete with their better off foreign counterparts.

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