

# A NEW LOOK OF ARTIFICIAL INTELLIGENCE: IT IS A STRATEGIC NECESSARY FOR VILLAGE INDUSTRIES IN THE CONTEXT OF SURVIVAL AND GROWTH. AN EMPIRICAL STUDY

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**Abstract-** The study intends to explore the adoption of Artificial Intelligence (AI) technologies in the context of the survival and expansion of rural village industries, which are essentially referred to as the un-organized sectors of the economy and consists of tiny, cottage and very small industries. According to a recent report, the sectors rank lower when it comes to contract work in rural areas due to outdated and obsolete technology which still exists in these sectors. The sector does not have wide consumer preferences and they are limited to selling commodities at low prices. As a result, these industries provide extremely low wages, which contributes to the growing migration of people from West Bengal's rural districts to urban centers—basically, to developed metropolises or other states—in quest of better opportunities. In this perspective, the use of AI in the village industries may be seen as the sectors' main strategic growth path. In fact, there is a dearth of academic materials on the adoption of AI in village industries. When Artificial Intelligence in business is a topic of attention worldwide today, West Bengal villages continue have serious concern about it. The study basically aims to answer the research questions, “What are the major barriers of AI adoption in the village industries in the landscape of West Bengal region.”

Collection of primary data was done from 40 respondents, comprising with owners, managers and employees, operating in different village industries in West Bengal. The Mix qualitative questionnaire was used as survey instruments. The survey results showed that a significant portion of the owners who responded expressed little interest in using AI in their respective business at this time, primarily because of the high adoption costs along with hesitations of implementing it. Surprisingly, though, they also employ AI in other contexts for example, sending messages to friends via facebook or What's app, watching movies in You Tube, booking commodities at Flipkart, Amazon through their smart phones. The study due to constraint of time and sizes of samples, the authors had to concentrate only within the West Bengal region. Therefore, the generalization of the result should be done with care. This study also indicates some useful suggestions and recommendations for further research.

**Key words:** Artificial Intelligence, village industries, growing migration, huge costs, Hesitations, smart phones.

## INTRODUCTION

A recent LinkedIn report highlighted that 90% of small industries in India are using Artificial Intelligence techniques to stay resilient in the face of uncertainty and challenges. Today's dynamic technology and business landscape means every developers irrespective of their business volumes and sizes needs to be an Artificial intelligence developer” says Jorgen Muller, CEO and member of the Executive Board of SAP.SE in one hand. On the other hand, Institute of Corporate productivity (2012) pointed out that most organization in the globe are still unprepared to handle the ocean of data, which will be provided by the AI based big data. In fact, the ocean of data cannot be able to speak for itself. It is true that the importance of AI related knowledge and information for economic prosperity has been widely acknowledge around the globe( Cooke,P, Leydesdroff-Regional development in the knowledge based economy-2006). The 20th century's economic patterns highlight the benefits AI can offer to all types of firms, including micro, small, large, and micro enterprises. From this angle, artificial intelligence (AI) has been more popular because of its enormous potential to bring about changes, which has been fueled by the introduction of new applications and technology, particularly in the area of computer processing power. Applications like computer vision, speech recognition, natural language processing, machine learning, and deep learning are just a few of the emerging technologies that could significantly benefit village industries.

Today, in business periphery, certain section admits AI is a new technology with a great disruptive potential (Dave Port-2018). Simultaneously, these technologies can lead to dramatic cost savings, efficiency gains, and errorless proposition and help to take rational decision making. And in true sense, some refers AI as the greatest economy opportunity of our life time (IBM-2020). As noted by Loebbecks & Picot (2015), rural village industries continue to face challenges in competing with their digital DNA – ready counterparts. On the other hand, these technologies offer the potential to completely transform industries (Canhoto and Clear-2020).

In any case, Brynjolfesson and McAfee (2017) state that AI as the most important general purpose technology of our time. Andrew Ng, former professor and founder of Google brain, quote that “AI is the new electricity” (Ng-2017). In fact, Engstrom and Stimling (2020) argue that, knowing its benefits, many individuals have become users of Machine learning and deep learning without knowing it properly. In their 2020, “State of Art” report management consultant McKinsey (2020) highlights that 50% of companies globally have adopted AI solutions in at least one business function.

In this perspective, IBM (2020) asserts that the adoption of AI in rural industries is noticeably lower, compared to small scale Industries. Village industries are distinguished by their primary focus on owner-manager concepts (OMEs) and their under developed capabilities in key business areas, growth aversion, incompetence of OMEs functioning, and often inadequate business support services. There is virtually little application or implementation of AI in the village industries, which are a subset of the micro-based industries. IBM further demonstrates the notable distinction in AI adoption between large and Micro levels. In fact, McKinsey (2019) shows that so-called the first – movers and fast –followers of AI are more profitable than the industries average. Therefore, it may be said that village industries, which are a vibrant surceases of employment in rural areas, ought to step up their efforts to implement these emerging technologies in light of their impending advancement, particularly the areas of sales and marketing , where they have long struggled. Apart from this, a few more issues like inadequate funding provision, inadequate networking, outdated technologies, insufficient electricity, and above all lack of experiences with marketing strategies are the major roadblocks to this sector’s expansion. The study also explored the well known but disconcerting truth that the owners, managers and workforces are having lack of trust on AI and preciously prefer to run their respective unit by using their traditional process, even if that means of incurring an enormous loss.

Consequently, it is now crucial that decision-makers start considering how village industries will grow. Village industries have a big influence on a lot of things these days, including economic development. As more individuals migrate from rural to urban regions in quest of greater economic opportunities and due to the challenges associated with running their own units, following which the growth problem becomes more aggravating in this sectors. Thus, the contemporary economic world and a deep comprehension of artificial intelligence (AI) technology—including its applications and justifications—are required to promote creativity and creation within village enterprises. To do this, the sectors of village industries need to be clearly defined. Business owners and managers of the entire village industry should be more aware of the benefits of using AI technology in promotional marketing techniques. Furthermore, gaining market share, distributing goods more effectively, and raising brand awareness can all give this sectors a competitive edge

### **PROBLEM AND RESEARCH AIM**

In artificial intelligence topics, which are no more a buzz word today, there are recently few adoption studies available. For example, Chen.et.al . (2012) states that, Chinese telecom industries got success after adopting AI tools in their industries. In a statement, Lorica and Nathan (2019) indicates that AI adoption in multiple industries. Cubrick (2020) also conducts a systematic research on currently, Hansen and Bogh (2012) conducted a review of literature on AI in the context of Micro Industries. They concluded that academic literature focusing on the AI adoption in rural based industries was not available. In this scenario, addressing the gap, we aim to further research the essential barriers that these sectors face in the context of AI adoption technologies. Thus, we arrive at the following research question for this thesis, “What are the main barriers of AI adoption in rural based enterprises.

### **DELIMITATIONS**

We conducted our interviews only with rural businesses. We distinguish between basic AI technologies, which are employed in average small-scale and micro companies, and sophisticated, advanced AI technologies, which are said to be used in large industries. To the best of our knowledge, artificial general intelligence (AGI) is only the tip of the iceberg due to the extremely powerful, sophisticated, and advanced AI technologies. There is now very little discernible AI acceptance in larger businesses, mostly in the early stages of introduction. The majority of the field is still concealed. However, the adoption of AI in typical businesses refers to better computer systems that solely carry out jobs that have historically been performed by people (Elements of AI-2020). Thus, in regards to the adoption of AI proves existing AI processes, and the second one using AI technologies to bring additional and alternative proposition. Considering the two approaches we decided to exclude the second approach from our discussion and

choose the first one AI adoption to those cases-here grassroots level village industries, where it is applicable to improve existing business processes in order to bring success.

## THESIS OUTLINE

First, we provided background knowledge or broad information on AI adoption technology and discussed the content of AI and the adoption challenges it faces in rural businesses. We used semi-structured interviews to gather qualitative primary data from 40 respondents, including owners, managers, executives, and employees, in order to address the research question. We also attempted to analyze the key obstacles to AI adoption in rural-based enterprises. (Since the majority of these companies operate based on the ideas of their owners and staff). We highlight research findings from interviews together with literature findings on adoption hurdles for AI while debating the subjects. We conclude that, considering AI's promise, more research is required in this particular scenario.

## THEORITICAL BACKGROUND

The characteristics of village industries face various challenges which can impede economic development and which neither are nor frequently encountered in urban settings. Which is highlighted is that village areas tend to be characterized by low population densities, economic dependence on natural resources and far from only agricultural products, and operating in localities isolated by distance and time. (Deavies-1992). This is especially true for the development of the new products, in which village industries encounter specific problems when compared to large industries. Say for Example of –NEERA. NEERA was a health drink, tapped from coconut trees was a contribution of Kerala's village industries, to the all natural beverage market. The NEERA product got tremendous responses from the beverage market. The average NEERA production was increased from few litters to 600 liters per month. The village set up industries was selling the Non-alcoholic, mineral rich and nutritious health drink in PET pack through over two dozen outlet in the regions. But the good days was not last long. The lack of experiences in running business, was a major factors of falling of NEERA, due to failing of proper marketing strategy,, sales and marketing research, outdated technical knowhow. The downfall of the projects has been attributed to few key factors, they are as follows:

- The failure of knowledge, skills and abilities. Which would have been developed through ML and deep learning applications of AI
- Failure of taking rational decisions, which might have taken through AI application
- And finally not getting proper AI skilled employees or advisers for developing the marketing areas and future sales predictions.

In fact the village industries have definitely heard the buzz of AI. It is found that all most all village industries are falling behind failing to adopt AI (K.Taylor and Hernbury-2018) even with their considerable economic backup. Many researchers considers that digital transformation –basically, Artificial Intelligence adoption as the solutions of the barriers that village industries face (Treandor,et.al.2019). In fact Bowman -2016, has correctly pointed out that village industries have been suffering for years with the difficulties empowered by big industries respectively.

At a time, the cost benefits and importance of AI in village industries need to be clearly understood and be courage as this will be an important promotional tools for strengthen the industries. In this perspective, it is seen that many village industries are still not properly comprehending or using the emerging technology in promoting their business.

What is AI all about?

AI promises to re-shape industries, jobs, economics and our daily lives-said McKinsey-2019, In this context, understanding what AI means is challenging as there is a lack of a unified definition to ground empirical studies on. This has led to a fundamental problems of understanding AI (Wirtz et.al,-2019).

However, AI definition in 2024 has categorically mentioned as the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings.. AI is also defined as:

- An intelligent entity created by human
- Capable of performing tasks intelligently without being explicitly instructed
- Capable of thinking and acting rationally and humanity

In accordance of the researchers, AI is a set of algorithms that can produce results without having to be explicitly instructed to do so. The intelligence demonstrated by machines is known as Artificificial Intelligence.

What are village industries today?

To put it simply, village industries are those in the isolated village sectors that, in spite of obstacles, innovate (creating creative goods) with the goal of turning those inventions into commercial commodities.

The fundamental cause of the issue is unbalanced growth, which occurs when development occurs in one area at the expense of other areas. With concurrently present underdevelopment-related issues. According to this report, there has been a significant migration of rural residents into cities due to underemployment and unemployment in the rural

areas. Right now, we need to establish an environment that reduces the migration of people from rural to urban regions. Therefore, industry development through the application of AI entails:

- 1) Provided employment opportunities-Village industries as such is mainly labor intensive and certainly provides a clear solutions to the growing problems of unemployment
- 2) Check on migration of rural youth-Village industries can fill the lacuna and big gap and also disparities in income for rural and urban people. It can develop infrastructure facilities and therefore, minimize the trend of people migration to semi urban areas in search of jobs
- 3) Promotion of artistic activities in the rural part of west Bengal-The age old rich heritage of rural Bengal is preserved by promoting and protecting handicrafts and arts through AI applications.
- 4) Awaken the rural youth-Village oriented youth can awaken and find out some other avenues and adopt the AI technologies as a career option
- 5) There is no denying the fact these overall improvements may bring a sustainable growth of the sectors and will help to change the standard of living of the rural population.

Harness the power: How can AI help village industries?

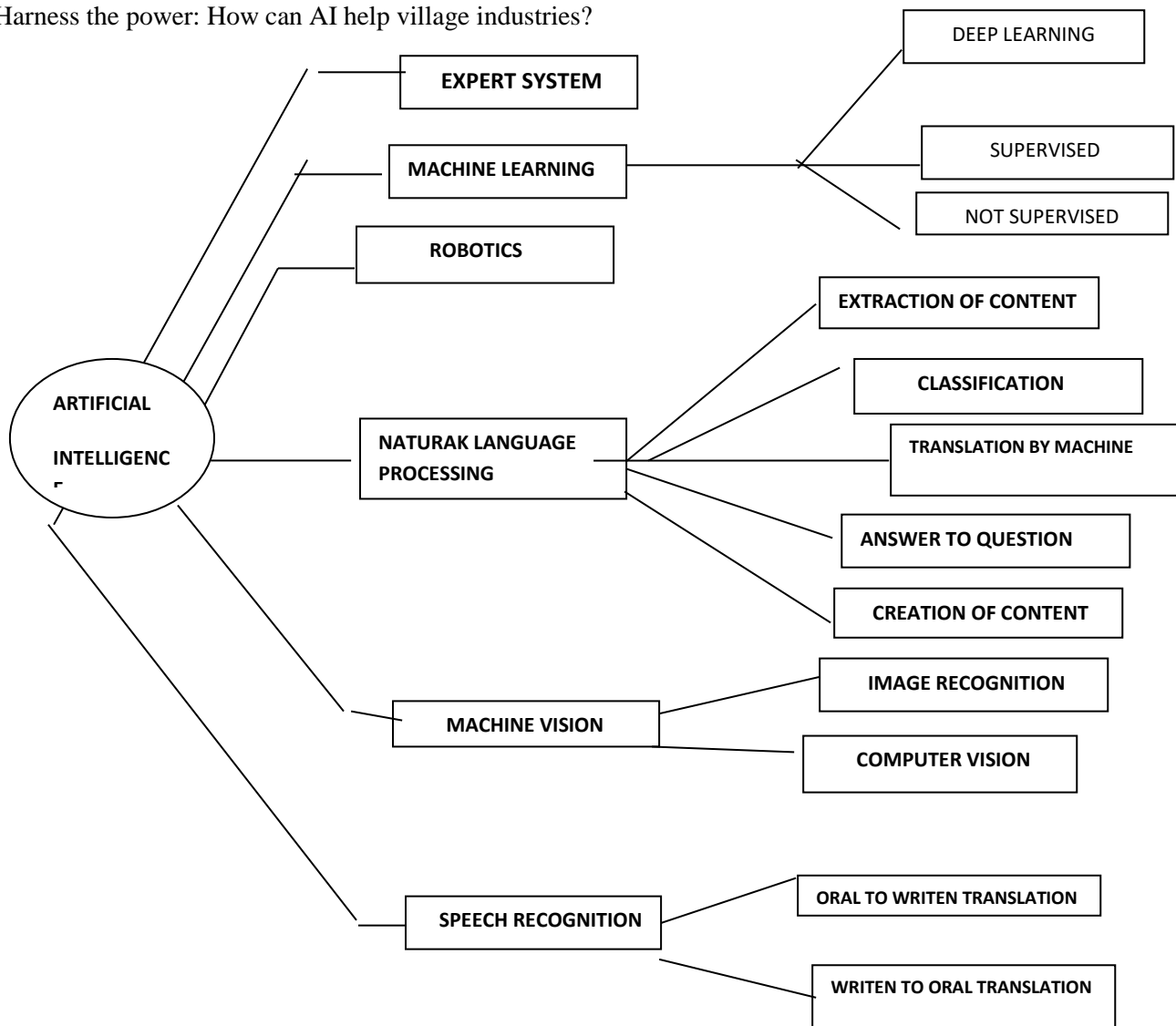


FIGURE -1: AI FUNCTIONS (DEJOUX, LEON, 2018, P.188)

To understand how AI actually work for grass root level village industries, one need to deep drive into the various sub-domains of AI and understand how there domains could applied to the various fields of the village industries. Figure -1 depicts the summary of AI and its domains.

- ML (Machine learning)-ML teaches a machine how to make inferences and decisions based on past experiences. This automation to reach conclusions by evaluating data saves human time for the organization and helps



them to make better decisions. Machine learning , which is” the ability of computer to automatically refine its methods and improve its results as it gets more data” (Brynjolfsson & McAfee, 2014 P-91),

- Deep learning –Deep learning is a machine learning technique. It teaches a machine to process inputs through layers in order to classify, infer and predict to outcome. DL is an efficient AI technique, and it is the driver behind numerous recent AI advancements. Since it allows algorithms to train themselves to complete tasks that resemble intelligence (LeCun et, al, 2015). This technique can process a broader range of data resources and produce more accurate results than traditional machine learning approach. Some of the DL applications which can help to accelerate the rural based small enterprises functions little bit faster are as follows.

- Natural language processing- NLP is a science of reading, understanding and interpreting a language by a machine. Once a machine understands what the users intends to communicate , it responds accordingly. Natural Language Processing , designed to understand and analyze language as used by humans and at the same time considered to be the base for the Speech Recognition AI, and finally Machine Vision which is algorithmic inspection and analysis of image ( Jarrahi, 2018, P-2).

- Computer vision-computer vision algorithms try to understand an image by breaking down an image and studying different parts of objects

- Speech recognition- it is a capability which enables a program to process human speech into written format

### **Studies of uses AI application in sales promotion**

Uncertainty in sales is an area where the small and village industries have been facing an acute problems for years. (Lensing, Vanstean and Starcken-2015). Recent advances in Machine learning , a class of Artificial Intelligence techniques , can be used to help reducing uncertainty in sales. In fact, village oriented industries owners still rely on their intuition for most decisions ((Culkin and Smith, 2000). At present, to cope with the situation basically for competition and question of survival a certain sections of village industries have been focusing on healthy and organic food products with ingredients from local natural sources or from local suppliers ((Dagevos-2016). In this perspective of transformation, village oriented small industries can now access cost effective and widely available information technologies such as techniques based on AI can bring competitive advantage to those units(Burns-2016)

### **Studies of uses AI tools in marketing in village industries**

It is known chapter to everyone AI has the potentiality in marketing. It aids enormous data services , improving software data management capabilities and designing intricate and advanced algorithms. The application of the technology is highly dependent on the nature of the website and the types of business. Marketers of village industries today, can now focus more on customers and meet their needs in real time. By using AI , they can quickly determine what content to target customers and which channel to employ at what moment. Ai tools also can also be used to analyze the performance of competitors and reveal their customer expectations. For the Study, relevant articles on AI in marketing are mostly identified from Scopus, Google scholars, research gate, news papers and other platforms. Then the study was developed the role of AI in marketing, and how it is useful for the remote village industries.( Table -1 categorically explained) . Having said so, it is known to all while, AI has the potential to provide large incremental value to a wide range of sectors, AI adoption till date has been driven primarily from a commercial perspective.

So considering two studies we may draw a line, if a the AI tools or technologies are adopted in village industries it can give an enormous dividend and give competitive advantages in the market share. The authors finding the advantages of bare minimum AI application at the grass root levels are as follows:

- ❖ Helps in doing respective tasks
  - ❖ It gives digital assistance
  - ❖ Reduce the human error at the time of working
  - ❖ Improve the total security system
  - ❖ Build up an effective communication with the customers
  - ❖ It can enhance all products and services effectively by improving experiences for end users and delivering better product recommendations and
  - ❖ In the context of data analysis, AI do it mast faster and more accurate than human and interpret best decisions
- Therefore, simply put, AI helps in rural based small industries to make better decisions, enhancing product and business process at a much faster.

Table -2 presents the review of seven key AI technologies (as per Davenport-2018). Each technology and its applications explained as:

Seven Key technologies (Devanport-2018)

Table 2:

Technology	Brief description	Example applications
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1) Statistical machine learning (ML)	Automate the process of training and fitting models to data	Highly effective marketing tools, and can analysis big data
2) Neural net works(NN)	Uses artificial “Neurons” to weight inputs and relate them to outputs.	Identify credit trend , furthermore prediction of future trend and environment
3) Deep learning	Neural Networks with many layers of variables or features	Image and voice recognition. Extracting meaning from text
4) Natural language processing (NLP)	Analyze and understand human speech and text	Speech recognition. Chatbot, intelligent agents,
5) Rule based Expert system	A set of logical rules derived from human experts	Insurance understanding , credit approval
6) Physical robots(robotics)	Automates a physical activities	Factory and warehouse tasks
7) Robotics Process Automation (RPA)	Automates structured digital tasks and interfaces with systems	Credit card replacement, validating online credentials

These are some of the major advancements and benefits which village industries can avail, if they adopt bare minimum AI tools for the betterment of their business. Such as in terms of uncertainty in marketing and sales, Ai possibly cannot make correct and accurate business decisions based on a rational way, but in the case of complexity it can perform well. Therefore, as far as almost meaningful business decisions-making the most effective methods is a collaboration between owners, managers, workforces with and AI.

What are the basic challenges of AI adoption in village industries? As per literature review

As Chen,et,al, 2021, suggest, despite the considerable existing literature regarding AI adoption, only a very few numbers of studies investigate AI adoption particularly at small and large industries . Similarly, Cubric’s (2020) said only systematic review found just 30 studies related to AI adoption in the business and management field. However, the current hype of AI (Leufer-2020) and its future economic benefits for organizations have raised the interest in understanding how to adopt it. Survey from McKinsey-2019, and Lorica and Nathan 92019) provide an overview of the critical challenges that organizations from grass root level face in its technology adoption. In their survey, McKinsay-2019, explained not lack of an AI strategy as the most significant challenges for adopting AI technologies. On the other hand Lorica and Nathan (2019) results suggest the lack of leaders’ ownership as the most challenging. On the other hand the lack of skilled and talented employees is a common challenge related to high demand in the market. Moreover, Cubic’s (2020) study suggest of AI adoption in business and management identified similar barriers, including economics, financial and technical aspects and preciously social barriers. Therefore, building trust worthy AI solutions, especially in the village industries need to be considered a number of dimensions, including sales, marketing, and access to the internet network aspects. Though it is said the AI is a game changer and potential principles, accepted globally, but have been limited at the grass root levels implications. In this report we highlighted a report on few qualitative small enterprises a sub set of Micro industries in rural parts of West Bengal, consultations to establish their understanding of both AI benefits and its implications and to identify key barriers face all those industries in their adoption of ethical AI Approaches. We then use independent interviews to find out their perception regarding AI adoption.

In fact, Artificial intelligence bears great potential for the most of the companies across globe, and in true sense massively change the way we will work in future. In spite of the statement, this study explores that AI not wide spread within the rural based village industries in the West Bengal region, following which they are facing enormous challenges in their day to day business activities. Even it is also seen many small unites face many unrollable problems as per as there growth is concerned. The findings make it clear at most of the barriers of adopting AI in their respective business comes from top level of the rural based enterprises. Apart from the conception of AI, there are few primary reasons which basically prevent them to adopt AI in their business.

Using the McKinsey 2019 structure, our surveys provides a picture of critical challenges that rural based enterprises face in the context of AI adoption in their respective business.

Table 3:

BARIERS	PERCENTAGES (40 RESPONDENTS)
1, LACK OF KNOWING WHAT IS AI AND ITS APPLICATION IN DETAILS	47%
2.LACK OF SKILLED OR TALENTED EMPLOYEES OR TALENT ACQUISITION	42%
3. LACK OF LEADERSHIPS (OWNERS, MANAGERS, EXECUTIVES, EMPLOYEES)	32%

4. LACK OF TECHNOLOGICAL INFRASTRUCTURE (INTERNET CONNECTIVITY)	45%
5. LACK OF AVAILABILITY OF REQUISITE DATA	24%
6. LACK OF FINANCIAL BACKUP OR RESOURCES	50%

### **Major objectives of the study**

Most of the owners, managers and workforces of village industries have mixed views of how AI technologies influence their business activities. The purpose of the study is to identify a potential knowledge gap of the existing workforce in these sectors and try to bring new insights –how the tools can help the growth and success of these sectors.

Basically, the under mentioned bullet points are the primary objectives of the study:

- To analysis the major barriers of Artificial Intelligence adoption in the rural based village industries
- To know what could be the major benefits if AI is implemented in the rural set up
- To study the various nature of the barriers and the perceptions of the owners, managers and workforces on AI adoption
- To suggest some remedial measures to clear the doubts of the employees in connection of AI Technology and its adoption
- AI effects on the village industries as far as its survival and growth is concerned
- To find out some psychological problems of the existing workforces in adopting the AI tools in their respective business
- Finally, why the AI is a strategic necessary for the development of village industries

### **LITERATURE REVIEW**

- 1) SNOW.C.C-FJELDSTAD –(2017)-Designing the digital organization, Journal of organization Design 6(7), p.p. 1-13-“In a continuously changing uncertain and complex business environment new emerging digital technology –AI-are reconstructing the landscape of the economy, organization culture , charecteristics and the way we interacts with organization.”
- 2) WEILL AND WOERNER’S –“WHAT YOUR DEGITAL BUSINESS MODEL-1-3-“Digital transformation is not about technology-it’s about change, aiming to achieve high performance and competitive advantage
- 3) JARRHI-(2018), p-1, “AI is considered as a machine being able to emulate cognitive human tasks”
- 4) DUW HURST AND WILLMOTT –(2012)-“AI adoption, supported by cheap and available connectivity-How technology is changing work and organization”
- 5) FIEDLER AND GRACIA –(1987)- New approach to effective Leadership: Cognitive resources-“Cognitive ability or intelligence has traditionally been considered as an important elements for successful managerial leadership functioning. There is seldom a lack of studies supporting this view point. Infact, the relationship between intelligence and managerial leadership can be regarded by some researchers as “Common Sense”
- 6) HUANG el.at.-(2019)-“An unprecedented trend on increasing focus on human –focused tasks in the workplace, due to fact that AI adaption are doing very well in mechanical intelligence and thinking intelligence, but not in the feeling intelligence which requires the capabilities in recognizing emulating and responding to human emotions in an appropriate way”
- 7) MARE ANDREESSEN- (2011)-In his article “Why software is eating the world”-explains, that six decades into the computer resolutions, four decades since the inventor of the microprocessor, and two decades into the use of the modern internet, all of the technology required to transform industries through software, finally works, and can be widely delivered at global scale-and is also affordable for many”
- 8) PALANIVELU-(2020)-Lastly, one thing we must be sure that AI does not make the situation worse. The promise of “AI for all” must be that everyone will have accesses to the products of technological revolution, is currently taking place and will be able to benefit from them, particularly in terms of innovation and knowledge”
- 9) ADAMS et.al. (2013) – systematic reviews : Work needs to be done –Journal of evidence –Based medicine-6(4)-“The potential of AI to augment and partly automate research has separated vivid debates-in many disciplines including management.”
- 10) DAPP AND SLOMKA-(2015)-SLOMKA transactives in depth-The impact of their study seen “an increasing AI adoption , and is to reduce barriers to accessing technological tools-eg, planning, decision making, automation, which was only accessible to big industries.”

- 11) Smith.et.al.-(2018) Financial constraints-rural based small and cottage enterprises face challenges due to limited financial resources for implementing AI technologies
- 12) Jones and Broun-(2019)-Lack of expertise-the acute shortages of skilled professional and technical expertise is identified as a barrier to AI adoption in rural based small and cottage enterprises

## RESEARCH METHODOLOGY

A combination of primary and secondary data was used in this study paper. Secondary data was extracted through journals, publications through net search especially from net search. Primary data was gathered through survey undertaken through a questionnaire which is attached in the Appendix section of the study paper. The questionnaire was distributed among owners and managers, workforce working in select village industries the sampling strategy followed was convenience Sampling. Feedback was collected mostly online though in some cases telephonic interview was conducted. The number of respondents was 40.

### Study of AI adoption in village industries so far in the context of West Bengal region

Nowadays, practically all private companies are aware that making effective use of data can help them accomplish their objectives more quickly. With the advancement of modern technology, a large portion of the labor involved in placing the right person in the right position can now be automated. Both structured and unstructured data can be used to learn more about the competencies of the workforce that is currently available, and social networking site information can be used to identify potential candidates. In this sense, it assists the organization in streamlining its operations, saving money and time. In order to support our findings and have a deeper understanding, we looked at the perspectives of a few medium-sized rural businesses. From what we could tell, these businesses have been employing AI for a considerable amount of time.

We have gone through the views of few medium rural based industries for strengthen our observations, views more better, and can say that they have been using AI for quite a while to analyze and interpret data in a far better way and thereby, take much better decision than existing village industries in West Bengal region. As per literature reviews we have come to a conclusion that there are few advantages that village based small, tiny and cottage industries can avail while using AI in their respective businesses. They are as follows:

- Using AI tools can accelerate of manufacturing initiations of rural industries
- Using AI can help to empower the indigenous products as well as units up to the international forum from the field of farmers-produces
- It helps to enhance the marketing connectivity to a great extent
- Improvement of wider distribution of customer services, and thus, improvement of business transactions
- Adopting AI helps to reduce the overhead costs of the unites
- AI adoption helps the village based units of optimum utilization of resources.

Furthermore, our survey also suggested few bare minimum AI technologies or applications, which may help the organization a lot and for adopting of AI takes a nominal costs. Even using their smart phones. They are as follows.

(Prepared by Authors)

- 1) Access to social media directly.
- 2) Content creation(writing image)-using mobile phone app
- 3) E-mail marketing with massive campaign
- 4) Website personalization.
- 5) Analyze customer data and perform predictive analysis

During interview the interactions with participants with us has also strengthen our views and observation by saying that also they are using smart phones but they don't have minimum ideas of AI technologies and its potentiality in the context of the survive and growth of the businesses.

Though our perceptions that AI adoption in village industries is still a blooming field with great future prospects, if it is correctly and carefully implemented in the grass root levels units. AI of village industries is extremely important for the development and competitive ness of rural business. (Gutha M. Empowerment and entrepreneurship of rural women-2015, 3(7), 1-5

Annual status of Education report (ASER) 2023, that was released recently, confirms that the story of widening access to Smartphone's across the country continues. The results unearth that, a major section of people irrespective of their academic base, even academic qualifications were reported knowing how to use smartphones. What does that access mean in terms of learning or applying? Without knowing AI, it has the ability to browse for huge information regardless whether they know the configuration of the phone or simply access to it. It is now open chapter to the researchers that without being taught the AI technology, huge numbers of population even village level population today are using Smartphones.

It is a common philosophy, once technology, especially emerging technology, is in the hands of motivated lay man users without constraints, they learn to use it. Hopefully this theory will work to the village people who are basically



uneducated and less knowledgeable for the AI adoption in their respective village industries. Therefore, one Smartphone may serve the purpose effectively.

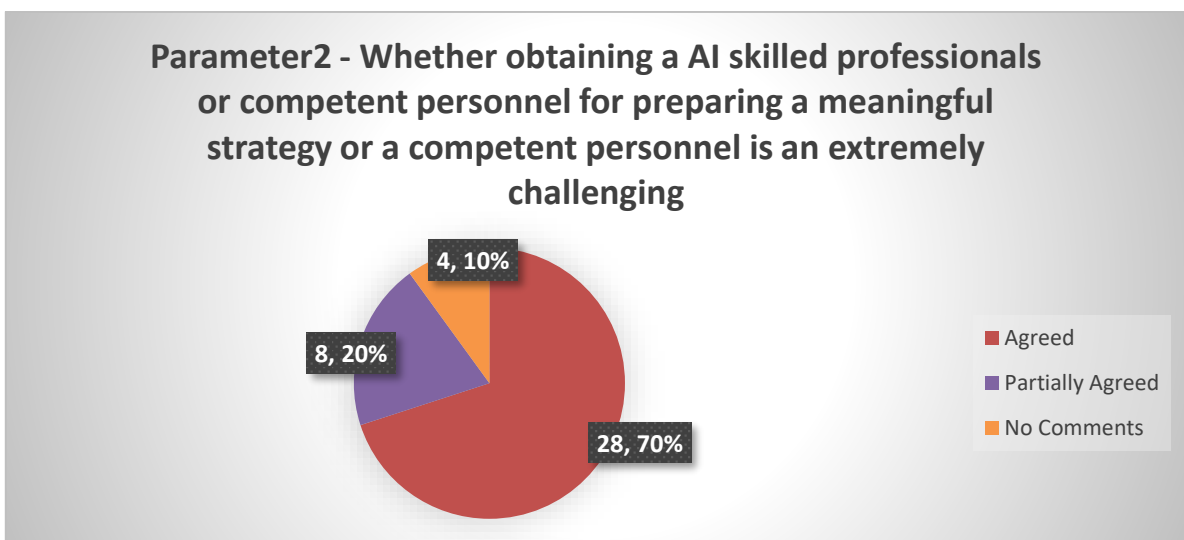
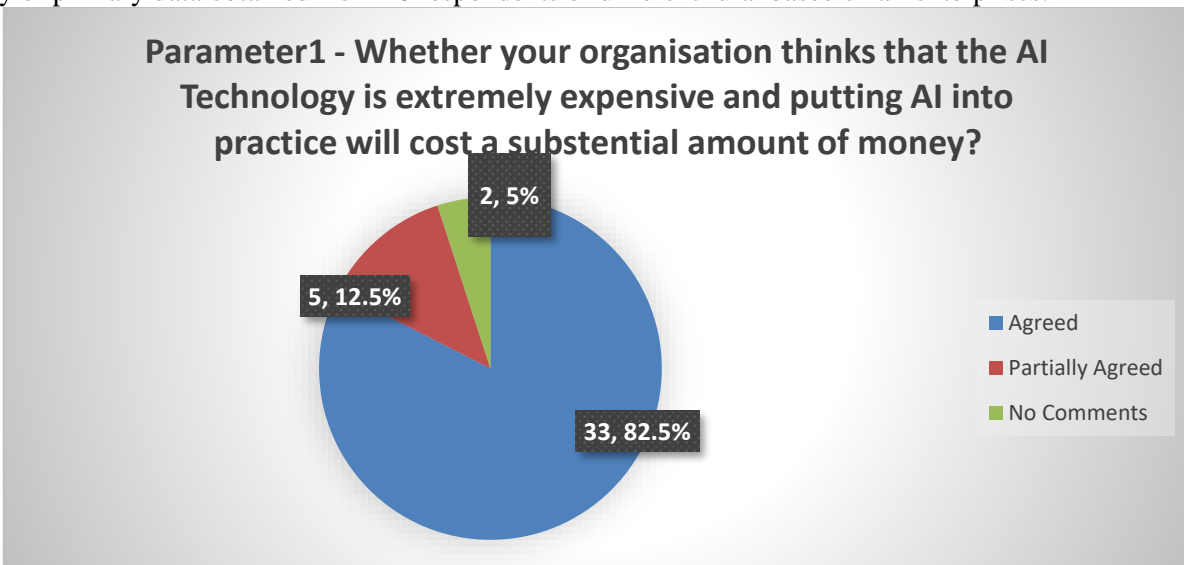
In this context, a silver lining is Hewlett-Packard, which is popularly known as HP, the major manufacturer of PC is going to redesign their PC attached with the application of AI (in-built). According to the company's MD and VP Ipsita Dasgupta, the redesigned PC will be enabled to run Large Language Models (LLMs) locally-eliminating the need to upload private data to a cloud-based processor, minimizing processing latency, and decreasing the cost of AI process, simplifying tasks and enhancing usability for various aspects of life and work. So implementing this PC will help the village industries a lot as far as their growth is concerned.

However, the slow uptake of data science in the village level units is mostly due to the fact that using big data requires a shift in the processes used earlier, along with a shift in culture. This appears to be hard for the village level small, tiny and cottage industries, especially, because they are hardly ready to come out from their long established norms. So a visionary outlook is required in these units before adopting AI in their business.

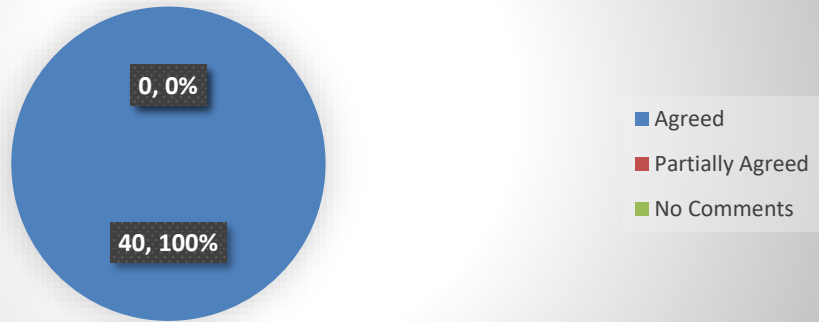
### RESULTS

The following are the results obtained from our survey:

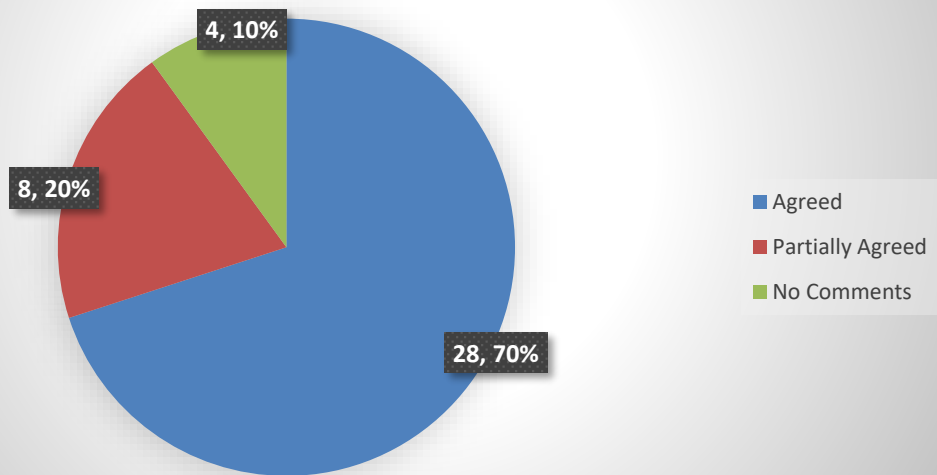
Summary of primary data obtained from 40 respondents of different rural based small enterprises:



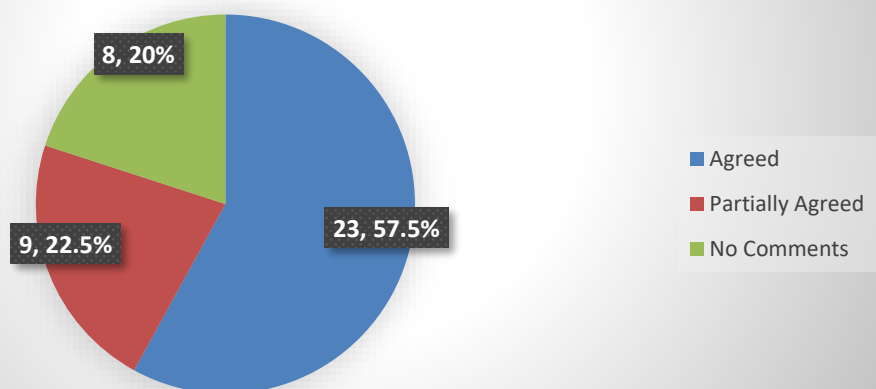
**Parameter 3 - Whether the existing infrastructure are enough or for daily and repetative tasks at hand?**



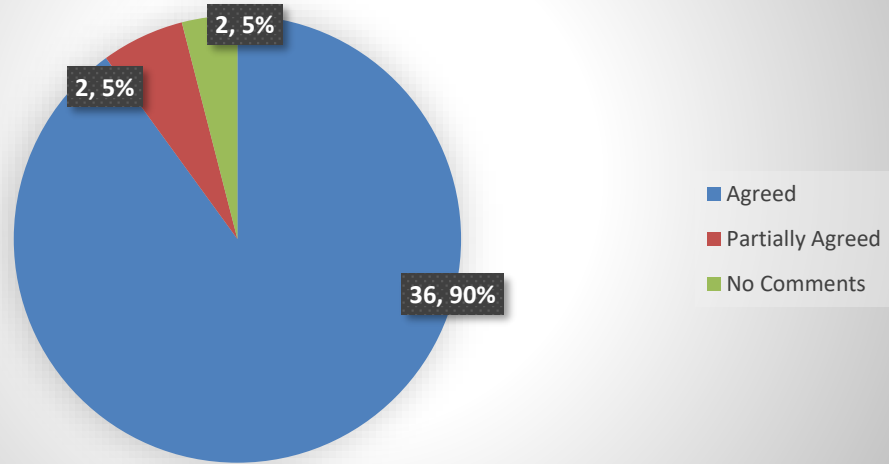
**Parameter4 Whether your organization are well aware of the emerging technology AI- and its unthinkable potentiality?**



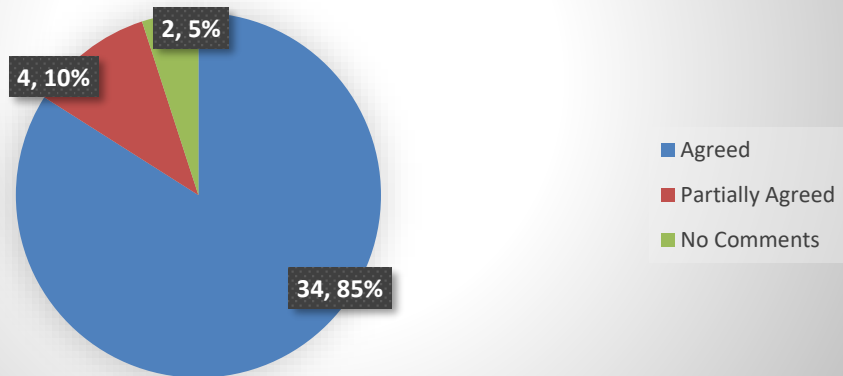
**Parameter 5 - Whether do you think, there is having a major technical challenge in implementing and incorporating the technology into present work flow?**



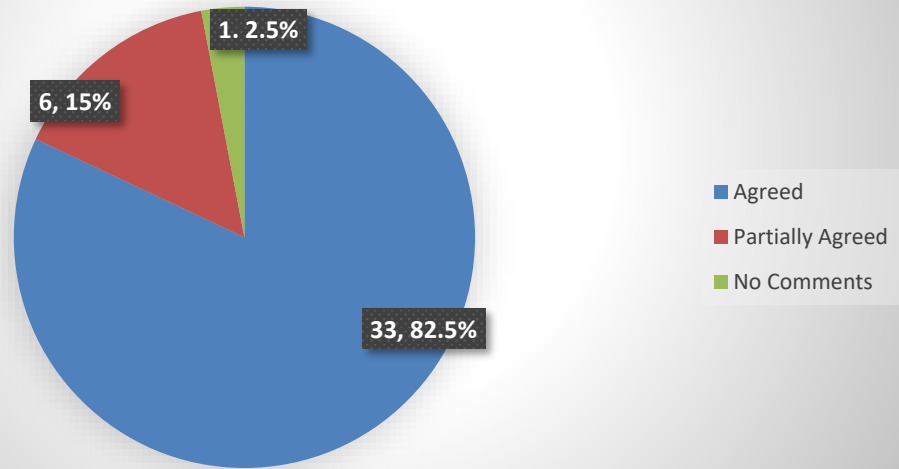
**Parameter6 - Whether do you have any serious concerns regarding your data security?**



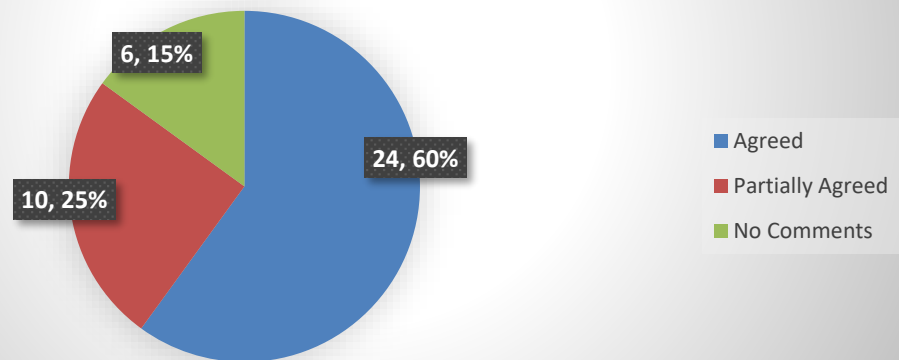
**Parameter 7 - Do you believe, typically, learning tasks of bare minimum AI tools are too long and very much time consuming due to lack of computer knowledge at the grass root level**



**Parameter 8 - Do you have any reservation or fearing of losing job, if AI is implemented at the lower level management**

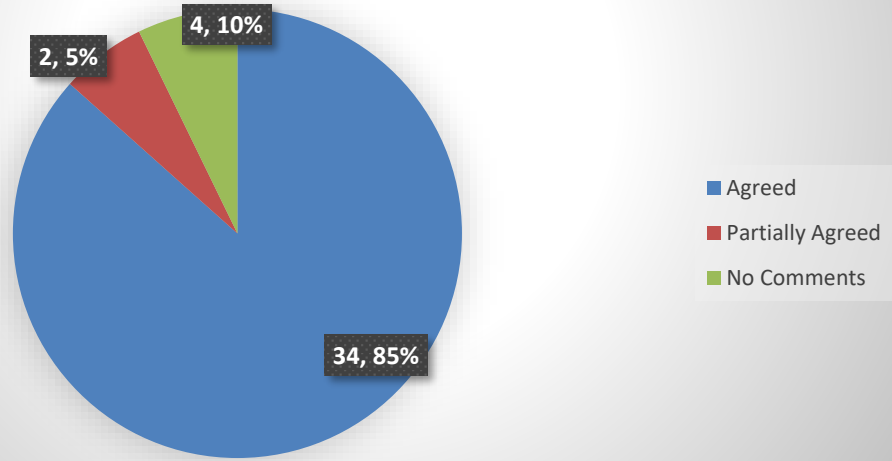


**Parameter9 - Do you consider that the AI technology is meant for large and medium scale industries not for micro or small and tiny enterprises at the grass root level**

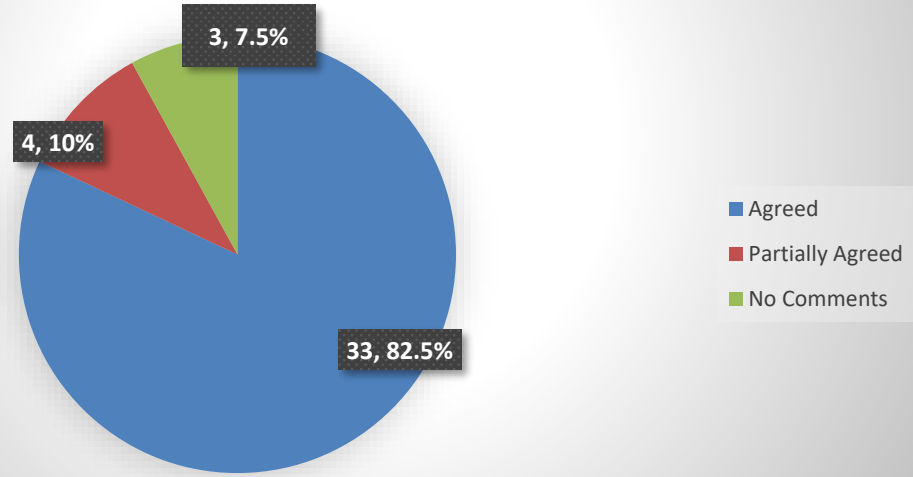




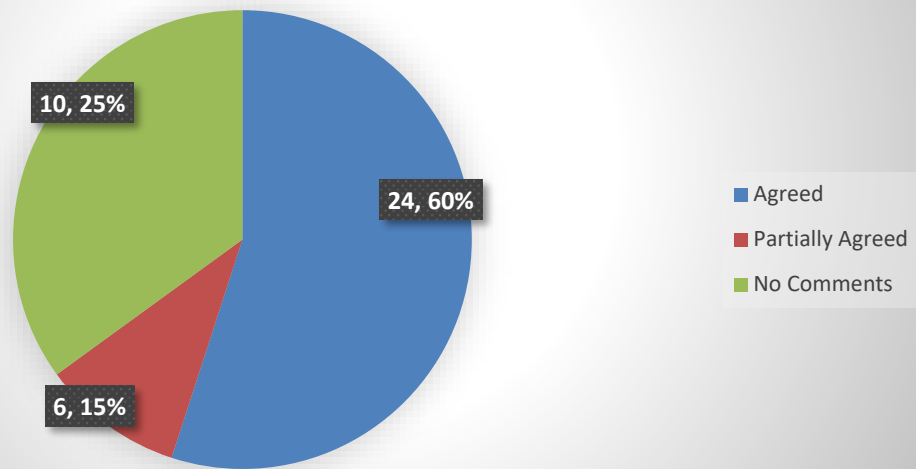
**Parameter 10 - Whether owner's managers, lack of experiences, expertise, knowledge and especially ideas on the basic of AI applications - is a big hendrane in implementing AI tools at the rural based small enterprises**



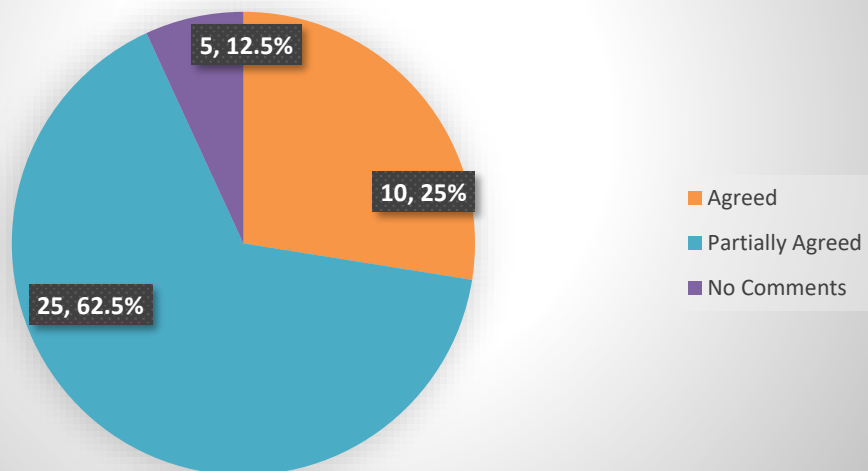
**Parameter 11 - Whether not getting necessary data for the enterprises, and insufficient infrastructure to access internet connectivity at the remote place is a challenge for AI adoption?**

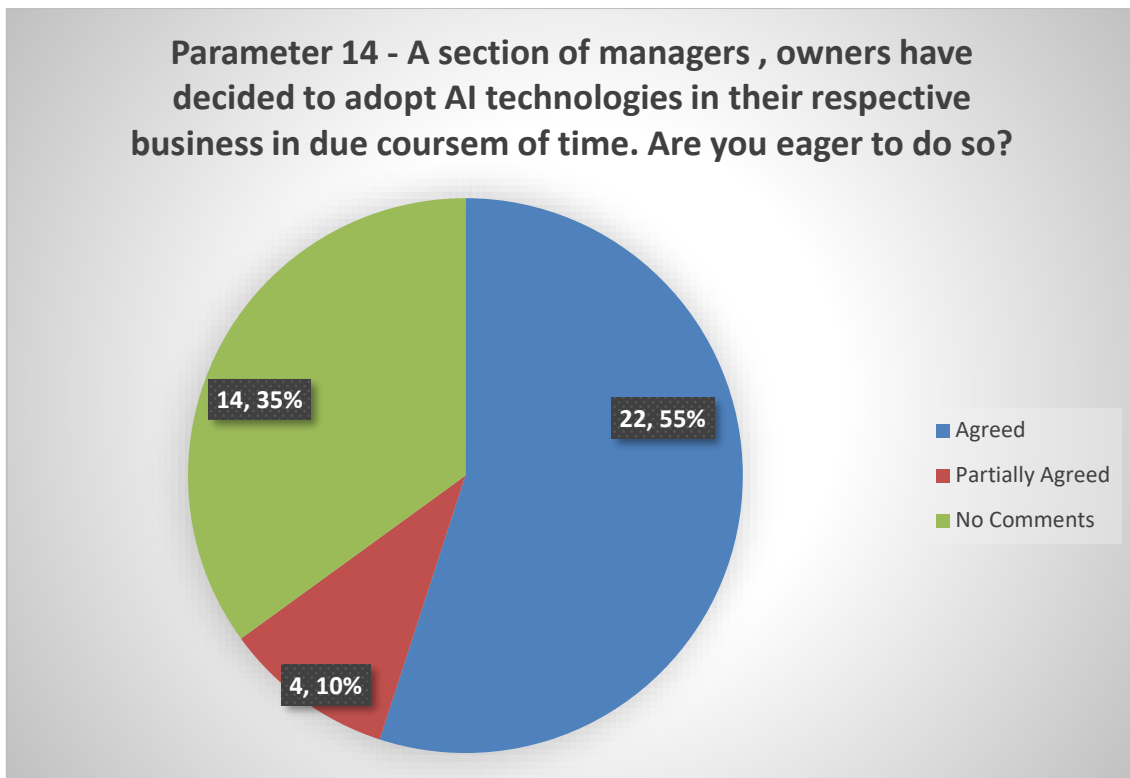


**Parameter 12 -Whether absence of funding resources or held for integrating AI technology in rural based small enterprises?**



**Parameter 13 - Business employing AI techniques in sales and marketing, similat to the Retail and Agriculture sectors are gaining ground in the context of success and growth?**





### **Interpretation and Discussion:**

Few questions have been linked to the percentage of owners, managers, and normal workforces who indicated how they felt about implementing AI technologies in their particular businesses in the analysis above. It is evident that the village industry sectors are still far from being ready to fully adopt AI technologies into their respective businesses. Furthermore, it is noted that neither of the key players possess even the barest understanding of the new technologies. The data also clarifies why the industry has embraced change more readily than in the past, choosing instead to wait and observe how AI technologies develop. The investigation goes on to show that participants still have a major lack of awareness of the fundamental advantages, benefits, and even intrinsic potential of AI technologies.

However, since very small sections of small scale industries are using AI tools in their business, so it is expected, village industries being the sub-set of small industries sooner or later will come forward to implement AI technologies in their business. In fact the sectors are basically a subjected to prolonged alienation from the main stream. So the need of the hour as far as perception is concerned , the workforce of the sectors has to be ready to incorporate a bare minimum AI Technologies, which is instantly possible , without incurring huge expenses, simply by using their smart phones and its relevant apps.

But during survey and interactions with the percipients, the authors have unearthed other aspects of the story. A fear psychology and hesitations is one and only logical reasons of adopting AI technology right now, even when the sectors is subjected to prolonged alienation and challenges compared to their counterpart small scale industries. The study also unearthed some pertinent questions on the basis of their live experiences, interactions and understanding about the trends of emerging technologies at the time of interview, that, there are basic three types of human judgment they posses which works more within themselves, and possibly these judgments create a strong barriers within them in terms of adopting AI technologies in their respective businesses. They are as follows:

- Emerging technology AI has the ability of generating new innovative ideas which could be considered as game changer due to its potentiality to operate beyond the usual reality. In true sense, AI can work perfectly well by using its potential abilities, but when it comes into action, the primary question referrers –exactly AI can really go beyond the existing frame of planning, rational decision making, or generating new ideas? AI is said to believe still persists at a nascent state, possibly tips of the ice berg, and there is no logical evidence so far at least in this sectors , that, AI can create anything without the help of human beings? So the answer is as far as implementing of AI is concerned , when human will be the driving force behind AI technologies, then what the necessary of using AI by spending a huge amount of money, when the sectors are considered to be financially challenged sectors?
- A huge amount of finance is associated with to provide training to the workforces, and also for purchasing necessary instruments or devices, for implementing the technology in their respective business. Therefore, an uncertainty, failure is always persisted in these investments, means an enormous amount of dividend lost. Does the introduction of AI is suitable for the sectors? Who will come forward to help them in that situation?

- Intuition, which could be considered as an ability to make decisions without using logic or rational thinking. According to their observation, how to pack a product, what would be the attractive advertisement for the product, which may attract customers in general, all these are needed different specializations. This is possibly a type of judgment that AI cannot perform exactly the specialized do. So why should they go for AI implementation, which has no adding advantages –by disturbing the existing one.
- Hesitations-Basically what are the types of hesitations about using AI, are as follows:

Out of 40 participants (N)

Table 4:

Sl. No	Frequency	Percentage	Descriptions
1.	29	72%	Hesitating to implement owing to fear psychology.
2	7	17.5%	Planning to implement bare minimum AI tools, but still need some time to watch and see the future progress of AI
3	4	10%	Have already started using AI tools such as making you tube video of their products and posted it in the social media, and planning to do more for promoting their products.

Out of 40 numbers -29 (72%) Approx participants hesitate to implement AI in their business, reasons of their hesitations and overall impacts of the hesitations on them.

Categorization based on the varieties oh hesitation about implementing of AI

- Reasons of hesitations to implement AI tools in their business
- Very much concerned about data security
- Highly expensive technology, which is impossible to afford( but using Smartphone not knowing AI technologies)
- As the workforce are almost illiterate especially on AI applications, so invariably it would take too much time to learn the subject, means a huge loss of productivity along with incensement of labor turnover and absenteeism. Getting semi skilled labor is very much low in remote village
- There is no such AI technologies have so far been built meant for rural sector industries only
- Nobody like our business are using the tools for their advancement, so we don't think that the technology will help our business a lot
- It would be an additional bothering if we implement it. Basically we don't have enough time in our hand to misuse. We don't think it is necessary for us

Findings of the study:

It was observed during survey lack of knowledge on AI associated with some traditional perceptions of human judgment comprising with serious reservations and hesitations (72%) of implementing AI in the respective industries had the highest ranked of barriers of AI adoption in the grass root levels. So It was concluded that lack of conceptions and perceptions of the participants following which a full of hesitations was the major barriers in the village oriented small, tiny and cottage industries in the West Bengal landscape. Furthermore, it is to be noted that Researchers and Economist maintains that a major obstacles to the economic growth of any sectors is a lack of educated owners, managers and work force.

## SUGGESSTIONS

Therefore, the suggestions based on the findings of the study for the questions of survive and growth of village industries in the landscape of West Bengal region can be considered. Basically, an outdated technology, financial challenges and pessimistic perceptions on AI adoption was identified as the major problems of village industries. Therefore, the study suggests that local civic body-especially government sectors should reconstruct their efforts in the provision of infrastructural development, especially in the area of technology up gradation of village industries,



mainly easy access to internet , making the illiterate workforce accustomed with proper uses of smart phone and its advanced apps. Infact, to get it done, the sector requires a conceptual ideas on AI and its application.

At a time when ASER (Annual Status of Education Report) Rural, provides an inspiring insight that among Indian teenagers in rural parts, who cannot read a paragraph of text, over 30% can still browse the internet and close to 50% can find a video on You Tube. Its indicate that, anyone in the village level, if he or she, even less qualified, is given the opportunity to use a Smartphone, they will be able to enhance their business to a great extent.

### **CONCLUSION:**

Today almost every small, Micro and even village industries in the rural part of West Bengal are well aware that they can achieve their set goals more effectively through efficient use of data., when AI systems , which is no more a buzz word to the business sectors, are being geared up to provide exponential scale and predictions. Therefore, they need a much border governing approach than the traditional classic control, and testing driven approach. The algorithms can be updated for tiny, small, cottage industries, as the machine learn from its patterns in new data, though it is under the control of big players, need to be monitored carefully by subject matter( here village oriented small, tiny and cottage industries and its logical barriers.) experts to ensure the machine will interpret the change in business context correctly.

It is almost goes without saying , the reap of the benefits and advantages of AI technology will take a long time to develop, and fully implementation, as because, it is considered to be a nascent state right now.

Considering the statement-as noted by Loebbecks and Picot –(2015)-the rural village industries continue to face challenges in competing with their digital DNA-ready counterparts. Therefore, a late adopter of AI will go for all its necessary preparations for AI adoptions, but earlier adopter-4(10%) will have taken considerable market share. In short, winner may take all the late adopters may never catch up. As in case of NEERA.

The downfall of the unit attributed to the factors such as-Launching a product without proper marketing research (AI possibly can help in these areas), standardizations and so many other factors. But on the other hand KIRKLAND, a private label brand, owned by COSTCO, one of the biggest major in retail industries in USA, is a well known brand of coconut water without preservatives or any artificial ingredients, even any one can preserve it more than months compared to NEERA-which was highly susceptible to fermentation, transforming into toddy within hour of extraction. After packing its life was not extended only by no more than a week. Here lies the truth of AI.

Therefore, we may conclude-if a village oriented small industries wants to achieve its success they should start learning AI tools and technologies and make it a strategic path now, if they have not done it already-and hope, that's is not too late.

It is therefore, would be an absolutely inspiring work to see how, in the near future AI is accepted in the village industries sectors and helping the sectors towards growth, which possibly preciously gives the study a great hope.

### **Recommendation**

Based on research findings and conclusion, several recommendations can be made to enhance the support systems of AI adoption and digital literacy within the employees of village industries in West Bengal Landscape

The researchers recommend that continuous training and support initiatives for advanced AI adoption, employee's engagement research and development and infrastructure improvement to address connectivity challenges.

Both the authors have a specific understanding after the study that the most required skills which is crucial important for the village industries' workforce in the years to come.

- A constructive planning before launching the new product with strategic development fueling by intuitive thinking is required
- Improvement of basic leadership skills and qualities by acquiring knowledge and information
- A bare minimum technological conception and knowledge on digital technology and its useful usages
- Improving creative thinking and generate creative and innovative ideas for the existing products-basically social media campaign and making video clip for uploading in You Tube
- Improving the basic networking facilities by the government and assure to easy access to the internet at the right time.
- Training facilities need to be set up on AI to the grass root levels
- Enhancing of outsourcing resources on AI
- Control is required, if any shorts of deviation is found after implementing AI tools in the respective business by the subject experts.

Therefore, a bottom up approach to develop the unorganized sectors and its inclusion in the main stream policy is the need of the hour to build a sustainable productive path way out of Artificial Intelligence technology.

Appendix

## Questionnaire along with percentages

Sl no.	Parameter	Percentage
1	Whether your organization thinks that the AI Technology is extremely expensive and putting AI into practice will cost a substantial amount of money?	82.5
2	Whether obtaining a AI skilled professionals or competent personnel for preparing a meaningful strategy or a competent personnel is an extremely challenging	70
3	Whether the existing infrastructures are enough or for daily and repetitive tasks at hand?	100
4	Whether your organizations are well aware of the emerging technology AI- and its unthinkable potentiality?	70
5	Whether do you think, there is having a major technical challenge in implementing and incorporating the technology into present work flow?	58
6	Whether do you have any serious concerns regarding your data security?	90
7	Do you believe, typically, learning tasks of bare minimum AI tools are too long and very much time consuming due to lack of computer knowledge at the grass root level	85
8	Do you have any reservation or fearing of losing job, if AI is implemented at the lower level management	82.5
9	Do you consider that the AI technology is meant for large and medium scale industries not for micro or small and tiny enterprises at the grass root level	60
10	Whether owner's managers, lack of experiences, expertise, knowledge and especially ideas on the basic of AI applications - is a big hendrane in implementing AI tools at the rural based small enterprises	85
11	Whether not getting necessary data for the enterprises and insufficient infrastructure to access internet connectivity at the remote place is a challenge for AI adoption?	82.5

12	Whether absence of funding resources or held for integrating AI technology in rural based small enterprises?	60
13	Business employing AI techniques in sales and marketing, similar to the Retail and Agriculture sectors are gaining ground in the context of success and growth?	25
14	A section of managers, owners have decided to adopt AI technologies in their respective business in due course of time. Are you eager to do so?	55

## Calculation for the PIE-CHART

Sl no.	Parameter	Aggred Respondant (A)	Partially Aggred Respondant (B)	Not Aggred Respondant (C)	Percentage of A	Percentage of B	Percentage of C
1	Whether your organization thinks that the AI Technology is extremely expensive and putting AI into practice will cost a substantial amount of money?	33	5	2	82.5	12.5	5
2	Whether obtaining a AI skilled professionals or competent personnel for preparing a meaningful strategy or a competent personnel is an extremely challenging	28	8	4	70	20	10
3	Whether the existing infrastructures are enough or for daily and repetitive tasks at hand?	40	0	0	100	0	0
4	Whether your organizations are well aware of the emerging technology AI- and its unthinkable potentiality?	28	8	4	70	20	10

5	Whether do you think, there is having a major technical challenge in implementing and incorporating the technology into present work flow?	23.2	8.8	8	58	22	20
6	Whether do you have any serious concerns regarding your data security?	36	2.4	1.6	90	6	4
7	Do you believe, typically, learning tasks of bare minimum AI tools are too long and very much time consuming due to lack of computer knowledge at the grass root level	34	4	2	85	10	5
8	Do you have any reservation or fearing of losing job, if AI is implemented at the lower level management	33	6	1	82.5	15	2.5
9	Do you consider that the AI technology is meant for large and medium scale industries not for micro or small and tiny enterprises at the grass root level	24	10	6	60	25	15
10	Whether owner's managers, lack of experiences, expertise, knowledge and especially ideas on the basic of AI applications - is a big hindrance in implementing AI tools at the rural based small enterprises	34	2	4	85	5	10
11	Whether not getting necessary data for the enterprises and insufficient infrastructure to access internet connectivity at the remote place is a challenge for AI adoption?	33	4	3	82.5	10	7.5
12	Whether absence of funding resources or held for integrating AI technology in rural based small enterprises?	24	6	10	60	15	25
13	Business employing AI techniques in sales and marketing, similar to the Retail and Agriculture sectors are gaining ground in the context of success and growth?	10	25	5	25	62.5	12.5
14	A section of managers , owners have decided to adopt AI technologies in their respective business in due course of time. Are you eager to do so?	22	4	14	55	10	35

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