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ASHAA KIRANN GROUP OF INSTITUTIONS (IIMS, BSMT & BIMS)

(Approved by AICTE, New Delhi, ONMRC, Odisha and

Affiliated to Utkal University, Higher Education Dept., DMET, Odisha).

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About the Journal

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From The Editor-in-Chief's Desk

Greetings from A.K.G.I…..

It gives me immense pleasure to bring out the **JOURNAL OF AKGI RESEARCH REVIEW (AKGIRR),** our scholarly journal referred Bi- annual/ Semiannual (Twice a year - April and October) journal of **Ashaa Kirann Group of Institutions** (AKGI), Bhubaneswar, a top notch promising premier professional, Information Technology, Technical and Health Science in the country. The issues so far have been incited by the multidisciplinary communities & the corporate leaders. Our endeavor to disseminate the novel dimensions of emerging thinking & research in the field of Academics.

The Academics landscape is progressively changing, so as the thinking as well as practice. Considering this view, the current issue projects some articles chew over the same domain. This is zeroing on different facets of multidisciplinary innovative thoughts pertaining to different countries, diverse areas & emerging practices in Global arena. Given the context, the articles presented in this volume will have consequential applied value for the readers.

I look forward to the continued co-operation in terms of contributing articles perennially.

Reader's feedback is always welcome!

Wish you a value-laden retrospection!!!

Dr. Bhimasen Swain.
Editor-in-Chief, AKGIRR

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ADOPTION OF DIGITAL MARKETING PRACTICES IN MICRO SMALL MEDIUM ENTERPRISES FOR INCLUSIVE GROWTH

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ABSTRACT

India's Micro, Small, and Medium Enterprises (MSMEs) base is the biggest on the planet after China. According to the official appraisals, there are about 63.05 million miniaturized scale businesses, 0.33 million little, and around 5,000 medium undertakings in the nation. The Micro, Small and Medium Enterprises (MSME) part is a profoundly lively and dynamic segment of the Indian economy. It contributes in the financial and social advancement of the nation. MSMEs are encouraging enterprise and creating biggest work openings at relatively lower capital expense, next just to farming. Presently, MSMEs are worked in practically all significant segments in the Indian business, for example, Food Processing, Textiles and articles of clothing, Agricultural data sources, Leather and cowhide merchandise, Sports merchandise, Plastic items, Electro-restorative gear, Computer Software and so on. SMEs assume a crucial job in Indian Economy with their commitment in modern yield, fares, business and creation for Indian and worldwide market. This paper centers on existing advertising media for SMEs in administrations division and searches for extent of internet promoting. With the range of time online media has gain significance in showcasing and it very well may be a perfect mechanism for SMEs accomplishment in promoting. Online media permits securing, sustaining and gathering prompts draw in with them dependent on referrals and proposals. Specialists have likewise indicated that web based showcasing is savvy and aides in widen and oversee client database for SMEs. As Digital Marketing gives colossal advantages to the business, MSMEs is likewise the territory which can get or benefit this stage for offering pace to their advancement. The following are the two motives for doing research in this area. First one is Digital Marketing is a fruitful idea for huge brands in India, what is the impact on neighborhood and little brands in little urban communities? And the second one is what devices and parts ought to be utilized by these nearby and little brands to completely abuse the Digital Marketing?

Keywords: Msmes, Digital Marketing Practices, Business, Online Media, Smes Marketing.

I. INTRODUCTION

This paper explores web based promotional possibilities of SMES of administrations area in India. Investigates uncover that there are not many examinations on web based showcasing of SMEs searching for point of view to make a passage in worldwide commercial center. Advertising of business and endeavor has made some amazing progress from the time of generation to period of relationship promoting. Along these lines web based advertising of

SMEs is significant for examine as they are significant wellspring of work, development and economy. Financial advancement of a country really relies on the industrialization with the assistance of satisfactory assets, advances and responsive government strategies. For a creating economy like India, in the late twentieth century with disclosure of web, ventures saw an extreme change in business tasks and promoting by going past value-based advertising and towards relationship showcasing Micro, Small and Medium Enterprises (MSMEs) are one of the most lively, dynamic and delicate parts in Indian economy. The MSMEs are viewed as motor of development everywhere throughout the world. The essentialness of the part is ascribed to its ability of work age, low capital and innovation necessity, utilization of conventional or acquired aptitude, preparation of nearby assets and exportability of items. This division was experiencing an exceptionally ensured territory during the pre-progression period. The primary goal of that security was to protect the Small Scale Industries (SSIs) from showcase rivalry by forcing a few limitations. Be that as it may, with the rise of globalization in Indian economy since 1991, the circumstance changed drastically. Indian market was opened up for outside speculators by decreasing different exchange limitations to advance unhindered commerce all through the world. The MSMEs are one of the significant constituent of our economy and contributes altogether to nearly 7% of the assembling GDP and 31% of the administrations GDP. They produce around 120 million livelihoods and add to around 46% of the general fares from India. MSMEs have an extraordinary job being developed of country India. By producing enormous number of business MSMEs assists with limiting rustic neediness. In rustic region MSME assists with lessening provincial country lopsided characteristics and over reliance of agribusiness. MSMEs have demonstrated as extraordinary instruments being developed of in reverse class individuals and ladies strengthening. MSMEs in India assumes a basic job in the financial improvement of the country through commitment to the assembling yield, expanding remote trade income, arrangement of business openings, sends out, and advancing adjusted monetary advancement. India has around 36 million MSMEs giving around 80 million work openings, adding to about 8% of the (GDP) and about 33% of all out assembling yield (Ministry of Micro, Small and Medium Enterprises, 2018). Indian MSMEs are seeing an amazingly powerful and multi-faceted business situation. The inexorably unpredictable cost structures and a stubborn journey of conveying high consumer loyalty are requiring the selection of ICT (Information Communication Technology) devices including the reception of web promoting and web based business to support in the present situation where rivalry is progressively getting worldwide, particularly because of the flood of imports from neighboring China.

The focal point of this examination is on the ID of the key determinants which influence the selection of web showcasing channels for the MSMEs. The examination additionally recognizes the unmistakable advertising channels conveyed by these organizations in the Indian situation. The significant issues with the progress to the web advertising channels were from that point explored to create a comprehension about the computerized provokes relevant to the Indian MSMEs. The following table explains the major industries share in MSME.

Table-1: Share of major industries in MSME

Sl. No.	Industry	Percentage of share
1	Retail trade & repair of personal and household	39.85%
2	Wearing Apparel and dressing	8.75%
3	Food products & beverages	6.94%
4	Hotels & restaurants	3.64%
5	Furniture manufacturing	3.21%
6	Sale, Maintenance & retail of Automotive	3.57%
7	Other service	6.20%
8	Other business activities	3.77%
9	Manufacture of Textiles	2.33%
10	Manufacture of fabricated metal products	2.33%
11	Others	19.40%

*Source: Annual Report MSME-2018

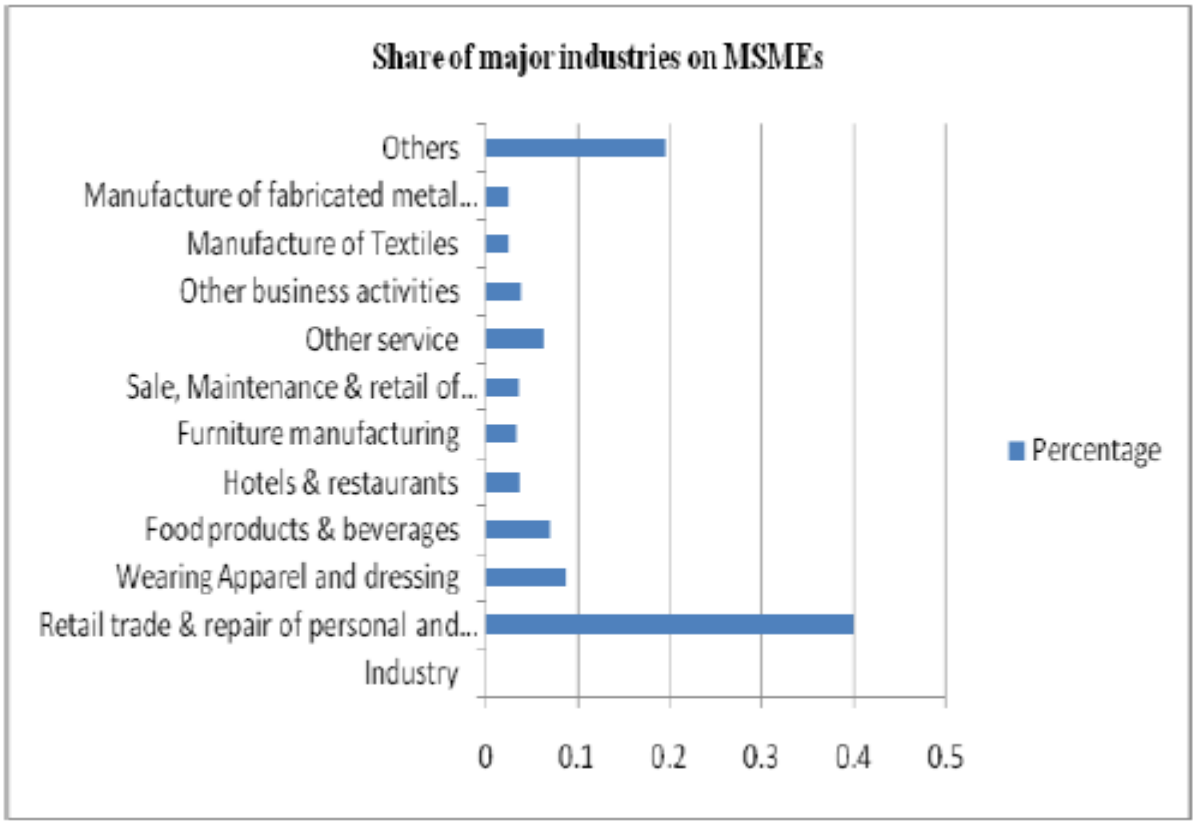

Figure-1: Graphical Presentation of Share of major industries in MSME

II. LITERATURE REVIEW

ICT helps in effective usage of an arranged and focused on advancement which can help the development of the venture and holds clients for the future result. Nikolopoulos and Dana(2017): The selection of ICT channels, particularly web advertising, by MSMEs is regularly damaged by a few components identified with the absence of essential assets, absence of mindfulness or information, or money related limitations. Mbuyisa and Leonard (2017): Much of the time, it supplements with other customary correspondence modes to build up a satisfactory multi-channel showcasing procedure. The key for organization of a showcasing blend for a venture is to create mindfulness among target clients, improving client information about the item or administration, fabricating the brand value and friends picture to pick up client steadfastness. Subrahmanya Bala (2011): has examined the effect of globalization on the fares possibilities of the little scale undertakings. The examination uncovers that portion of SSI send out in absolute fare has expanded in security period yet stay pretty much stagnated during the progression time frame. Be that as it may, the connection co-effective in progression period is higher than that of assurance period recommending that the connection between the absolute fare and SSI trade has gotten more grounded in advancement period. Bhavani T.A. (2010): features the issue of business age example of Small scale ventures. The investigation uncovers that, work age by the SSIs might be high in quantitative term yet extremely low in quality. Mechanical up degree may lessen that issue and can produce quality business and aptitude. Rathod, C. B. (2007): broke down the significance of little scale industry and its commitment in world economy. The examination additionally find that, SSI division in India has been displaying a striking fare execution and fare had grown up to twofold digit from the most recent ten years. Wymer and Regan (2005): The drivers for ICT utilization and appropriation among the MSMEs can be comprehensively be delegated: business-related elements coming about because of outer challenge, authoritative capacities and expertise and budgetary adequacy of the firm; and innovation related variables which incorporates the IT foundation. Reid (2003): The reception of promoting blend assumes an essential job to create and keep up cozy associations with clients and partners. It assists with recognizing the requirements of clients, in this manner helping ventures to grow better client esteemed items and administrations. It additionally stretches out to the development of the interior assets of the association, in this manner improving its presentation as far as authoritative foundation improvement, key arranging and recognizable proof of target markets and intuitiveness with the clients.

Scupola (2003): The arrangement of the ICT devices and applications in the business procedures would help improve the intensity of MSMEs in national and global markets. This requires the recognizable proof of the objective client groups, advancement of aptitudes in the ICT devices, building up the e-preparation foundation and the customization of ICT applications and arrangements according to the necessities of individual MSMEs.

Shin (2001): Web promoting is developing as a promising device for client centered advertising endeavors to gain, keep up and develop associations with clients and different

partners.

Low (2000): Having an effective promoting blend, including embracing of web showcasing and web based business accompanies a few related advantages to MSMEs, not many of which are: presentation of items or administrations in the worldwide market, distinguishing proof and comprehension of worldwide gauges, web based business stage for items and administrations, cost and item customization to target potential clients and gaining the center abilities and aptitudes required in worldwide market situating.

Manickavel, S (1997): He has contemplated the nearness of any sexual orientation biasness with respect to assessment of credit demands, assent of advance to new business by the business banks. The investigation uncovers that both male and female business visionaries face trouble in getting credit from banks. The issue is, be that as it may, increasingly unmistakable for the female business people. Sandesara (1993): contemplated the exhibition of Small scale enterprises (SSI) creating saved things. The examination look at the presentation of SSI firms creating held class things with that of delivering non-saved things.

III. METHODOLOGY

The methodology utilized in the investigation is graphic and explanatory in nature and depends on optional data sources gathered from different research papers, notoriety diaries and magazines, library, yearly reports of the Ministry of MSMEs, different registration report led by the Ministry of MSMEs, and other related sites to this issue. The crucial questions in our examination were spun around:

(1) What are the different kinds of promoting apparatuses utilized by MSMEs in India?

(2) What variables are answerable for assistance of web advertising and online business among Indian MSMEs?

(3) What are the significant hindrances or difficulties looked by Indian MSMEs in the reception of web showcasing and web based business channels.

We embraced an expressive research strategy to address the above research inquiries through a cross-sectional investigation of MSMEs as for ICT. It is focused on the distinguishing proof and portrayal of the current situation with the Indian MSMEs in the web and web based business area. To waitlist firms for our examination, we experienced the databases gave by the Indian Chamber of Commerce just as MSME Development Institutes of different Tier I and Tier II urban communities in India. In the principal phase of the examination, we attempted a progression of extensive, face-to-face, semi-organized meetings with MSME administrators/proprietors to more readily conceptualize the issue. The meetings depended on the premises of catching the different components that impact the appropriation of web showcasing and internet business by MSMEs. Accommodation testing was done at this stage dependent on the essential member qualities and dependent on the member's ability to participate the meetings were recorded and later translated to recognize designs among the reactions of the members. In light of the reactions from interviews, an overview poll was structured and managed among the proprietors of over a hundred MSMEs working in India. These inquiries were principally identified with the sorts of the promoting blend utilized by the entrepreneurs, the aptitudes required for embracing web showcasing and web based business and the various provokes identified with the appropriation of those channels.

Following are the significant discoveries from the study managed among hundred and five MSME proprietors.

IV. RESULTS

A. Promotional tools used by MSMEs

Table-2: Promotional tools used by MSMEs

Promotional Tools	Respondents (105)	Percentage (%)
Advertising	31	29.52%
Discount Sale	28	26.67%
Pamphlet	23	21.90%
Retailing	23	21.90%

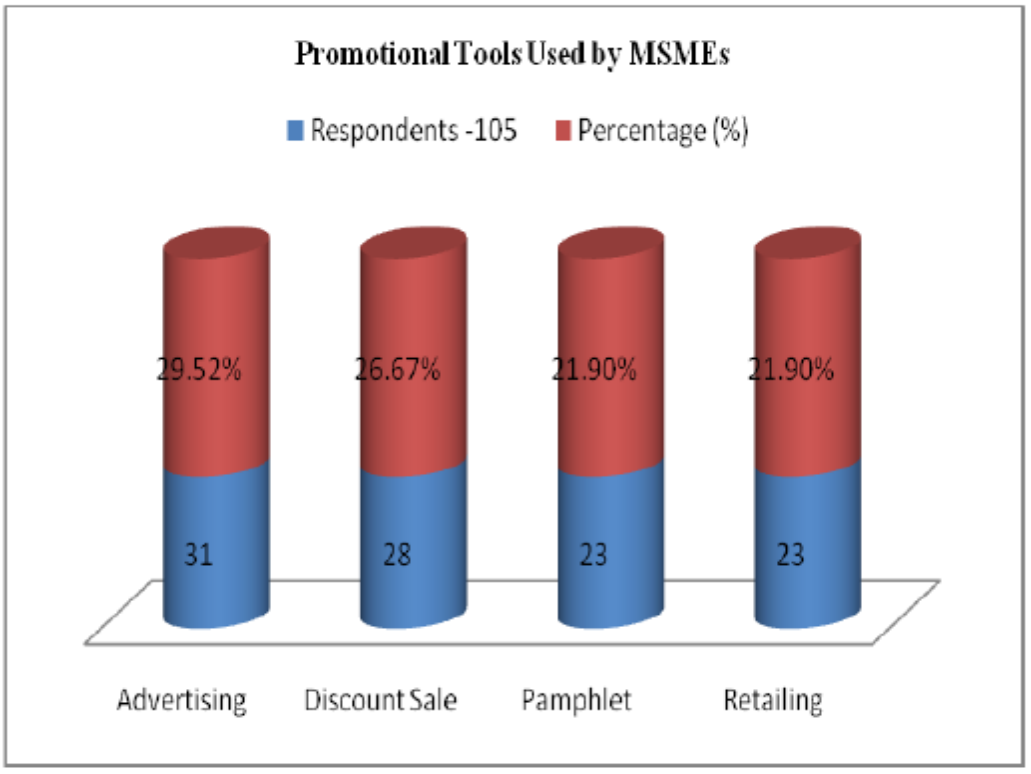

Figure-2: Promotional tools used by MSMEs

Interpretation: Table-2 introduces the predominant showcasing devices utilized by MSMEs to upgrade their fame and development. The discoveries in Table 1 demonstrate that promoting is favored by 31 respondents (29.52 percent), while rebate deals are supported by 28 (26.67 percent). Handout and individual retail establish the rest of the segments with 21.9 percent each. The Indian MSMEs are likewise seen as depending on more than one method of advancement at a solitary purpose of time. Endeavors have been made right now catch the most pertinent instrument regarding every one of the reviewed firm. There are additionally varieties in the propriety of the favored methods for advancement over the various purposes of time in a year.

B. Deficiencies related to skills and knowledge in the usage of digital marketing and electronic commerce

Table-3: Deficiencies related to skills and knowledge in the usage of digital marketing and electronic commerce

Knowledge	Respondents (105)	Percentage (%)
Lack of awareness	41	39.05 %
Not required	34	32.38 %
Lack of skills and experience	30	28.57 %

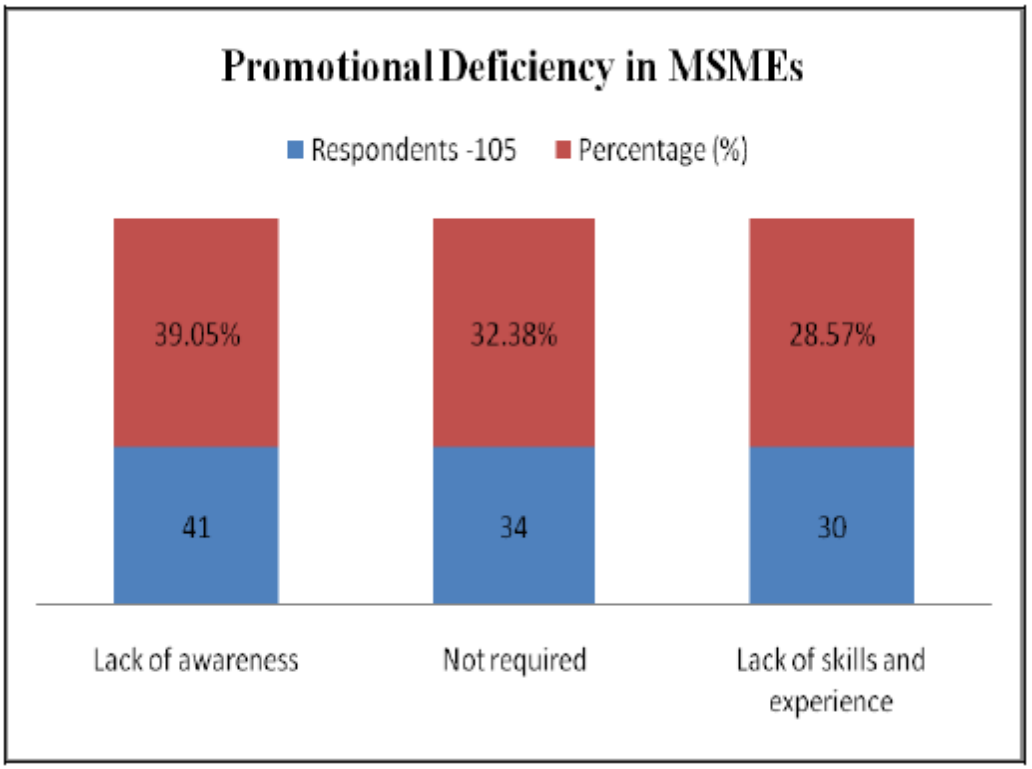

Figure-3: Deficiencies related to skills and knowledge in the usage of digital marketing and electronic commerce.

Interpretation: Table 3 displays the insufficiencies looked by MSMEs on the aptitudes and information required to receive web promoting and online business. Absence of mindfulness was shown by 41 (39.05 percent) respondents as the most noteworthy issue. This is trailed by the conviction that these channels are not required (32.38 percent) and afterward absence of abilities and experience (28.57 percent). There are additionally some minor variables, for example, semantic imperatives, inclinations towards innovation, and so forth. One significant perspective that rises up out of these discoveries is the requirement for commitment programs for the MSMEs. This commitment could be filled in as an engaged gathering to measure the significance of the web showcasing and web based business for the independent ventures in the light of the developing worldwide challenge. C. Practical hurdles in implementing Internet Marketing and E-Commerce practices

Table-4: Practical hurdles in implementing Internet Marketing and E-Commerce practices

Factors	Respondents(105)	Percentage of Respondents
Market Competition	37	35.24%
Financial/Capital	26	24.76%
Macroeconomic Factors	34	32.38%
Infrastructure	8	7.62%

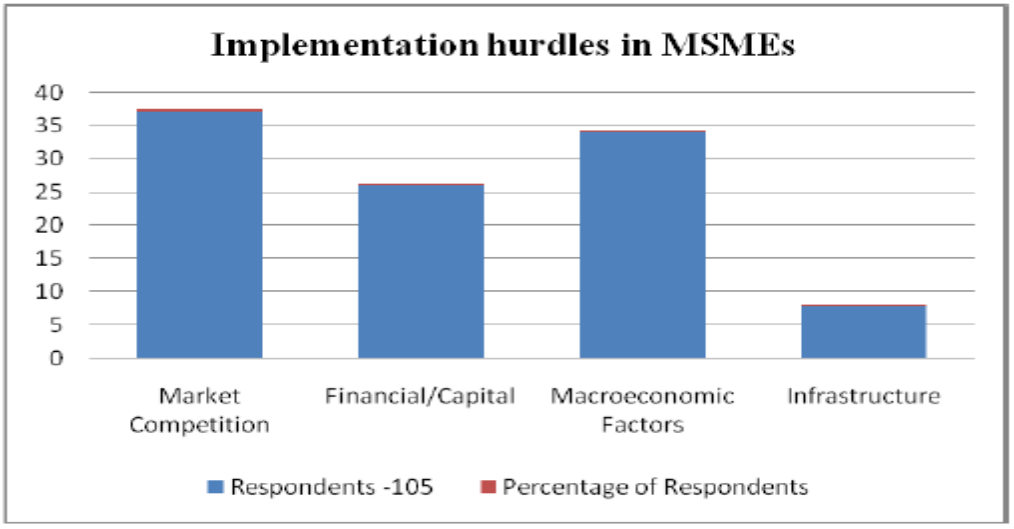

Figure-4: Practical hurdles in implementing Internet Marketing and E-Commerce practices

Interpretation: Table-4 mirrors the significant difficulties looked by MSMEs on the utilization of web advertising and web based business. 37 respondents (35.24 percent) felt the risk of market rivalry as the major testing factor that influences the utilization of web advertising and online business by MSMEs. The following most significant factor was macroeconomic issues demonstrated by 34 respondents (32.38 percent), trailed by budgetary (24.76 percent) and framework (7.62 percent) issues. The MSMEs are frequently occupied with fruition with their nearby partners. This goes about as an obstruction for them to concentrate on extending their client base through web and internet business channels. The market rivalry is likewise connected with fake items as a subordinate factor. The accessibility of less expensive results of standard or crummy quality may dishearten clients from purchasing certified items. The MSMEs in India are frequently confronted with the issue of the accessibility of accounts. These money related holes emerge because of the absence of insurances for the getting bank advances, together with significant expense related with different methods for deliberate credit. The significant subsidizing for undertaking a development or advancement exercises is frequently gotten through chaotic wellsprings of capital, which can seriously influence the long haul productivity of the Indian MSMEs.

V. DISCUSSIONS

A few qualities of Indian MSMEs warrant consideration if we somehow happened to

value the difficulties they looked in the selection of web promoting and web based business channels. Initially, the auxiliary qualities of the MSMEs assume a significant job in the presence of a correspondence technique. MSMEs are little by their inclination, with most of them being possessed by people or families. They are dependent upon inward just as outer limitations with respect to their improvement and development. Inner issues incorporate absence of skillful work force, constrained accessibility of capital, absence of innovative intensity to embrace ICTs, and so forth. Outside elements incorporate market powers, for example, request changes, macroeconomic and political elements, send out issues, and so forth. Our examination uncovered that lion's share of the Indian MSME proprietors are not persuaded about the requirement for web advertising and internet business for their organizations. Comparable outcomes have been seen in other developing economies too. This could be extensively credited to an absence of mindfulness about the potential advantages, absence of assets, the nearness of outside elements or a blend of these variables. There is likewise no all encompassing correspondence program for firms in the majority of the cases and little exertion is placed into actualizing the equivalent. This features the constrained achievement of the MSMEs in valuing the essentialness of the ICTs to positively affect their clients. The utilization of ICTs in this manner depends on destinations and enthusiasm of explicit associations, especially that of the administration/proprietors. The second trademark among the respondents rises as far as essential drivers identified with the appropriation of web advertising as a way to mark relationship the executives.

These drivers are basically identified with the achievement of high client connection level through inputs, accomplishing vital consistency over the different useful levels and improvement of cross-utilitarian capabilities. MSMEs frequently like to gather their interests in correspondence to just a solitary sort of correspondence, as they send explicit correspondence modes in quest for accomplishing higher deceivability in the engaged commercial center to improve relational connections. Correspondences in such cases are regularly specialized and are connected to the conduct of its rivals. The third trademark is about their interior structure and correspondence forms. MSMEs conveying different correspondence modes regularly have issues identified with formalization of choices. This is identified with an absence of between utilitarian contribution, mindfulness, monetary and budgetary imperatives, and so on. In this way, the organizations regularly characterize their spending limit as for the chose correspondence action to be received. MSMEs with huge productivity and incomes frequently lean toward various methods of correspondence. At the end of the day, the appropriation of serious correspondence procedure could be credited to higher incomes and inward elements.

VI. CONCLUSION

Utilization of web advertising/digital marketing and internet business could fill in as a key empowering agent to increase an upper hand as far as separation through an improved item and administration conveyance, or a brought down expense. It can assume a basic job to help reshape the plans of action of MSMEs by improving their serious elements. By and by, the low interest from Indian MSMEs for web advertising and online business has restricted the contributions of items and administrations custom fitted to suit the requirements of individual MSMEs in the market. This is owing to an absence of dynamism between the

organizations offering web promoting administrations and MSMEs in the Indian situation. There is a hole sought after and supply which restricts the MSMEs to embrace web advertising and internet business channels. Subsequently, we propose that the administration and the business should cooperate to encourage the spread of ICT mindfulness and related ability improvement in the MSME area. This examination subsequently bears suggestions for policymakers. By sensibly utilizing components and impetuses accessible available to them, policymakers should cooperate with MSMEs to reduce a portion of the significant difficulties looked by MSMEs in the selection of web showcasing and online business. This would not simply help in the household organizations of MSMEs, yet in addition in their worldwide effort, both contributing toward bigger financial possibilities of the economy. This examination additionally gives a way to professionals and MSME proprietors to look at their authoritative practices with other little and mediumsized firms. The difficulties in the selection of web promoting and internet business should be appropriately evaluated in the light of particular authoritative culture and structure. Among others, the nonattendance of satisfactory aptitudes and expertise was distinguished as one of the key difficulties for MSMEs in their reception of web showcasing and online business for their organizations. Thus, we propose that supervisors/proprietors of MSMEs ought to put satisfactorily in ability improvement/securing to effectively accomplish commercialization and showcasing of their ventures over web and computerized channels. Being among the novel examinations on the difficulties looked by Indian MSMEs in embracing web showcasing and web based business, this investigation sets an establishment for future analysts to dig into more profound inquiries. We additionally propose comparable examinations to be reproduced in various settings to differentiate and relate what all difficulties looked by Indian MSMEs are widespread as well as novel to the bigger institutional setting. One of the confinements of the investigation is the moderately little example size of respondents in the examination that can restrain sum up of the discoveries. Be that as it may, as we've followed a two-advance procedure, for example an underlying round of subjective meetings was trailed by a review study; we accomplished a type of triangulation inside the investigation itself. We prescribe future researchers to explore comparative inquiries with a bigger dataset.

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DIGITAL TRANSFORMATION IN BANKING INDUSTRY: AN EMPRICAL STUDY

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ABSTRACT:
The rapid growth of information technology has taken a special place in the financial sector, epically the banking sector. The digital banking as added further value for make delivery their services faster to their customers. Through digital banking, the bank wants to introduce the core concept of Information Technology enabled services (ITES). Now, the internet is the most preferred medium which connects banks with their customers. Due to technological advancements in India, internet availability and internet usage are increasing largely. The internet medium is rapidly changing the traditional face to face banking to online banking. To study the quality of the bank, it is necessary to study the e-service quality of banks. This paper deals with the customer's awareness of online banking. The E-Banking services are executed only upon the customer, and these-banking services would fully integrate with the core banking solution that is already in usage. The major idea is to provide a series of services to the customer through the internet and make the customer feel flexible instead of visiting the bank every time.

KEYWORDS: digital banking, banking customers, digital services

INTRODUCTION:

Digitalization starts a new era in the banking sector in which it creates vibes for the entire environment. Through digitalization, it makes bankers as well as customer extravagant in their approach and their services. The implementation of digital marketing into banking has added new value to traditional marketing. Marketer tries to save time and efforts by offers. In today's scenario, the consumer has scrubbed digital marketing into spaces that create value for banking customers. It helps the consumer to be united with the product, price, place, promotion, people, process and physical evidence in a unified way. This is a saying where the market creates value but now through digital marketing creates delighters for the banking customer.

Marketing is all about creating value for the customer. To create that value to the customers, marketer tries to links customers through different electronically using interactive technologies like emails, websites, online forums, and newsgroups, etc. Today customers can find information about products, places, and activities by image, voice and gesture and other participate transactions. With the help of new opportunities via devices that augment into reality. So, companies need to understand and use such types of digital channels to engage customers. But ultimately decisions taken by the customers based on their experience journey with the banks.

Digitalization is a central importance to data processing, storage, and transmission because it allows information of all kinds in all formats to be carried with the same efficiency and also intermingle. This is why it is a favored way of preserving information for many organizations

around the world especially in the banking sector. Digital banking is the move to online banking where banking services are delivered over the internet. The advantages for banks and customers are providing more convenient and faster banking services. The shift from traditional to digital banking has been gradual and should be rather described in degrees of service digitization than through a categorization into yes and no. It involves high levels of process automation and web-based services and may include APIs enabling cross-institutional service composition to deliver banking products and provide transactions. It provides the ability for users to access financial data through desktop, mobile and ATM services.

DIGITAL BANKING TRENDS IN INDIA:

Digital India in the banking sector has grown sharply in recent times. Some trends in digital banking in India are: Increase in Customers: The government's encouragement to use electronic wallets has contributed much¬ to people adopting the use of technology in financial transactions. There is a rapid increase in the use of credit/debit cards as well as electronic wallets and the trend will continue. Chatbots: Several banks have already employed chatbots in their customer care operations. There is¬ steady increase in the number of chatbots employed as well as improvements in their speed of response, quality of interaction and the quality of services rendered. Merge Physical and Digital Process: Many banks today offer a mixed physical and digital process to their¬ customers. The customers could walk into the bank and then use devices there to carry out their transactions. In the Indian context, we will certainly see a steady increase in this kind of service, especially in rural areas. Mobile Technology: The proliferation of mobile phones and the easy and cheap availability of internet¬ have meant that the banking sector had to provide digital services via mobile phones. Many banks have developed apps to help customers handle banking transactions on their mobile phones. This trend will only continue. End to End Digital Banking in India: Some customers are already using devices to handle their¬ banking tasks. Banks have come to realize that digitization is the only way forward. Hence several banks have already started on the path of end to end digitization in their effort to provide all kinds of services over the internet resulting in paperless transactions. The Indian government is aggressively promoting digital transactions. The launch of United Payments Interface (UPI) and Bharat Interface for Money (BHIM) by National Payments Corporation of India (NPCI) are significant steps for innovation in the payment systems domain. UPI is a mobile interface where people can make instant funds transfer between accounts in different banks based on virtual address without mentioning the bank account. Today banks aim to provide fast, accurate and quality banking experience to their customers. Now a day the topmost agenda for all the banks in India is digitalization. As part of encouraging cashless transactions and transforming India into a cashless society, various modes of digital payments are available.

Debit/Credit Card: Suitable for online/offline merchant sale. Transaction limit set by the card issuer. Card¬ number details required.

RTGS/NEFT: Suitable for high-value online transactions. Transaction limits minimum 2 Lakh, no upper¬ limit. Account number, password, beneficiary registration, IFSC code are required.

Immediate Payment Service (IMPS): Suitable for instant transfer. Transaction limits up to 2 Lakh per¬ day. Account number, password, beneficiary registration, IFSC code are required.
Unified Payment Interface (UPI): Suitable for instant transfer. Transaction limits up to 1 Lakh. Virtual¬ payment ID (VPA) of the recipient is required. Unstructured Supplementary Service Data (USSD): Suitable for feature phones without internet¬ connectivity. Aadhar number, IFSC or code allotted by banks on registration is required.
E-Wallet: Suitable for small-ticket transactions. Transaction limits 20,000 per month (1 Lakh for KYC¬ compliant wallet holders. Login ID is required.

REVIEW OF LITERATURE:

Rajesh Kumar Srivastava (2022) - In his research paper "Customer's perception on the usage of internet banking".This paper presents Internet banking is still in the formative year's stage in the world. Many studies focused on the usage of internet banking but many factors on non-usage were overlooked. This research was carried out to validate the conceptual model of internet banking. The causes were identified and researched by correcting the causative factors so that internet banking can be based on more people. This will help the banking operations to be more cost-effective. The research is focused on what are the customer's perceptions about internet banking and what are the drivers that drive consumers.
Pooja Malhotra &Balwinder SINGH (2020) - In their research paper "The Impact of Internet Banking on Bank Performance and Risk: The Indian Experience". The paper describes the current state of Internet banking in India and discusses its implications for the Indian banking industry. Particularly, it seeks to examine the impact of Internet banking on banks' performance and risk. Using information drawn from the survey of 85 scheduled commercial bank's websites, during June 2007, the results show that nearly 57 percent of the Indian commercial banks are providing transactional Internet banking services. The univariate analysis indicates that Internet banks are larger banks and have efficiency ratios and profitability as compared to non-Internet banks. Internet banks rely more heavily on core deposits for funding than non-Internet banks do. However, the multiple regression results reveal that the profitability and offering of Internet banking do not have any significant association, on the other hand, Internet banking has a significant and negative association with the risk profile of the banks.
Ankit Kesharwani&GajulapallyRadhakrishna (2013) - In their research paper "Drivers and Inhibitors of Internet Banking Adoption in India". This paper research on different banks condition that on e-banking services, to transform their profits. Since internet banking in India is still in its embryonic stage, it is essential for e-banking institutions to enhance reception and usage of the internet as a banking channel by their customers. This paper has reviewed the most seminal studies in the area of diffusion of innovation and attempts to do experimental research that looked into the factors that drive and inhibit internet banking usage in India. An investigative factor analysis followed by a positive factor analysis has been applied on 362 internet banking users. Findings resulted in seven factors – perceived benefit, hacking and fraud risk, performance risk, computer self-efficacy, technology intricacy, social influence, and pricing concerns. The results suggest that acceptance and usage of internet banking

services can turn into a fundamental concern for future research, as the drivers overcoming the inhibitors over time at an influencing rate. Moreover, this study also compares the findings with extant diffusion of innovation literature and identified several additional factors that can affect internet banking adoption in India.

Shaza W. Ezzi (April 2014) - In their research paper titled "A Theoretical Model for Internet Banking: Beyond Perceived Usefulness and Ease of Use" tried to inquired different types of electronic banking like ATM's, telephone banking, and electronic funds transfer, Internet banking like has evolved from consumers' needs to have superior access to banking services clear of most banks teller-staffed, normal operating hours. Additionally, Internet banking has grown swiftly from the recent and the span increases in ecommerce. Internet banking (IB) continues to govern the landscape of electronic banking as consumers continue to use IB to complete schedule banking transactions in addition to conducting on-line sales and purchasing. This study presents a theoretical model considered to help researchers and practitioners better understand the acceptance and adoption of Internet Banking. The proposed model maybe particularly useful in developing nations where consumers are loath to use Internet Banking even when the services are available. However, a review of several studies that have investigated consumers' acceptance of Internet banking services from a multiplicity of perspectives have not reached a clear consensus of the factors that contribute to overall consumer acceptance and adoption. The paper concludes with discussions of the managerial implications and avenues for future research.

KartikeyaBolar (2021)- In their research paper "End-user Acceptance of Technology Interface In Transaction Based Environment "This paper presents Creators and investors of technology need information about the customers' assessment of their technology interface based on the features and various quality dimensions to make strategic decisions in improving technology interfaces and compete on various quality dimensions. The research study identifies the technology interface dimensions as perceived by the end-users in a transaction based environment (viz. Internet banking) in India, using exploratory factor analysis. The influence of these dimensions on the utility of technology interface and hence the usage is examined by Structural Equation Modeling. The moderating role of user demographics and technology comfort is also tested. Managerial implications are discussed.

OBJECTIVE OF THE STUDY:

1. To analyze awareness among customers using digital banking services.
2. To know about the Net Banking service provided by Banks.
3. To know the cause why customers are using or not using digital banking service.

DATA ANALYSIS AND INTERPRETATION:

DEMOGRAPHIC PROFILE OF THE RESPONDENTS

DEMOGRAPHICS	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
1.GENDER:		
Male	94	47%
Female	106	53%

TOTAL	200	100%
2.AGE:		
18-28 Years	53	26.5%
28-38 Years	90	45%
38-48 Years	51	25.5%
Above 48 Years	06	3%
TOTAL	200	100%
3.EMPLOYMENT:		
Student	24	12%
Business	80	40%
Professional	09	4.5%
Service	82	41%
Other	05	2.5%
TOTAL	200	100%
4.ANNUAL INCOME:		
Upto 1,00,000	40	20%
1,00,000-3,00,000	83	41.5%
3,00,000-5,00,000	66	33%
Above 5,00,000	11	5.5%
TOTAL	200	100%
5.EDUCATION:		
Illiterate	0	0%
High School	59	29.5%
Intermediate	25	12.5%
Graduate	86	43%
Post Graduate	30	15%
TOTAL	200	100%

ANALYSIS AND INTERPRETATION-

From the data collected it was found majority of respondents that is 53% of them are females. About 26.5% of the customers belonged to the age of 18-28 years. It was found that majority of customers belonged to service class followed by business class. It was found that majority of the respondents fell between the income group of 1,00,000-3,00,000 followed by income group between 3,00,000-5,00,000.It was found that the majority of respondents were graduates.Thus it can be concluded that the majority of the respondents were knowledgeable .

Table 2 . Use digital banking over traditional banking methods:

OPTIONS	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
YES	125	62.5%
NO	75	37.5%
TOTAL	200	100%

It is found that 62.5% of respondents prefer internet banking over traditional banking methods.Thus it can be concluded that more than 50% of people like to use net banking services provided by bank.

Table 3 For how many years you are using digital banking?

OPTIONS	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
Less than 1 year	45	20%
1-5 years	106	53%
5-10 years	45	25%
10-15 years	3	1.5%
Above 15 years	1	0.5%
TOTAL	200	100%

From the data collected, it is found that about 53% of people are using digital banking from 1-5 years followed by people who are using net banking from 5-10 years.

Table 4 Which category of the banks do you consider as most digitally advanced?

OPTIONS	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
Public sector banks	87	43.5%
Private sector banks	113	56.5%
TOTAL	200	100%

Table 5 Which factor promotes you to use digitalization in banking?

OPTIONS	PERCENTAGE OF RESPONDENTS WHO USE	PERCENTAGE OF RESPONDENTS WHO DO NOT USE
Reduced time of transactions	86%	14%
Cost Effectiveness	80%	20%
Door Step Banking	80%	20%
Technology savvy	53%	47%

According to the data collected, it is found that 47% of customers believe that technology savvy is one of the most crucial factor which promotes the customers to use the new techniques of banking followed by cost effectiveness, door step banking and reduced time of transactions.

Table 6 Which digital payment services do you use?

OPTIONS	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS WHO USE
Connected to the Internet at home or work to do their financial transactions	15	7.3%
Uses E – mail	30	14.45%
ATM / Debit card service	36	18.1%
UPI/BHIM	33	15.8%
Online banking services	24	12.9%
E – payments	34	17.2%
Electronic Fund Transfer (EFTs)/NEFT/RTGS	28	14.15%

From the data collected, it is found that 18.1% of the respondents use ATM/Debit card service followed by E-payments, Credit card service and so on.

TABLE 7: Satisfaction on Technology usage.

OPTIONS	EXTREMELY DISSATISFIED	DISSATISFIED	NEUTRAL	SATISFIED	EXTREMELY SATISFIED
ATMs are conveniently located.	0%	0.5%	2.5 %	64.5%	32.5%
Accounts information and balance enquiry.	0.5%	1%	4%	68.5%	26%
Account to account transfer.	0.5%	4.5%	6.5 %	47.5%	41%
Transaction status	1.5%	4.5%	7.5 %	37%	49.5%
Statement Request	1.5%	5%	8.5 %	49%	36%
SMS alerts about specific information to the bank services / new products.	2.5%	3.5%	6%	56.5%	31.5%
The charges that the bank collects from you are reasonable when compared to other banks.	2.5%	5.5%	7.5 %	50.5%	34%

ANALYSIS AND INTERPRETATION-

According to data collected, it is found that 64.5% of respondents are satisfied that ATMs are

conveniently located.68.5% are satisfied after knowing their accounts information and balance inquiry .47.5% are satisfied on account to account transfer.49.5% people are extremely satisfied with their transaction status.49% people are satisfied with statement request.56.5% are satisfied with SMS alerts about specific information to the bank services / new products.50.5% of people are satisfied with the charges that the bank collects from you are reasonable when compared to other banks.

Table -8 What online banking operations do you use the most?

OPTIONS	VISITING BRANCH	PHONE BANKING	ONLINE BANKING	OTHER
Pay Bills	8.5%	5.5%	84.5%	1.5%
Consult balance/bank statements	5.5%	24%	69%	1.5%
Print bank slip or statement	28.5%	28%	42%	1.5%
Open an account	95.5%	1.5%	1.5%	1.5%
Bank transfer	12.5%	20.5%	64.5%	2.5%
Investments/Savings	16%	26.5%	53.5%	4%
Shopping	16%	22.5%	58.5%	3%
Insurance	85%	8.5%	3%	3.5%
Loans and Mortgages	23%	32.5%	40.5%	4%
Contact your bank advisor	70%	10%	10%	10%

ANALYSIS AND INTERPRETATION

According to the research, 84.5% of people pay bills online,69% people consult balance and bank statements using online banking,42% people print bank statement,95.5% people open an account by visiting branch,64.5% people use online banking for bank transfer,53.5% use online banking for investments and savings,58.5% people do shopping using online shopping,85% do insurance by visiting branch,40.5% people take loans and mortgages using online banking,70% people visit branch to contact the bank advisor.

Table 9 Problems of digital - technology usage

OPTIONS	OFTEN	RARELY	NEVER
Bank server down	9%	10.5%	80.5%
Network problem	5.5%	41.5%	53%
Internet banking can be tampered with by others.	20%	46%	34%
Lack of security in transactions.	9%	67%	24%
Too many steps in processing	13.5%	25.5%	61%

transaction.			

ANALYSIS AND INTERPRETATION

According to the research, 80.5% respondents think that ATMs never go out of cash. 53% of respondents think that they do not have to wait in long queues. 46% of respondents think that rarely internet banking can be tampered with by others.67% of respondents think that rarely there is a lack of security in transactions.61% of respondents think that they do not have to follow too many steps in processing transactions.

Table 10 Rank(1 2 3 4 5 6 7) to the following reasons due to which digital banking is not properly used.

Test Statisticsa

N	200
Chi-Square	229.126
Df	6
Asymp. Sig.	.000

a. Friedman Test

Ranks

	Mean Rank
Banking web pages are confusing.	4.33
	5
The use of a computer or the internet is difficult.	4.66
	6
Neither friends nor relatives use the internet.	3.72
	3
Digital banking facility is not secured	3.10
	2
Digital banking is expensive	5.54
	7
Digital banking offers no receipts on payments.	2.79
	1
Digital banking is not reliable.	3.88
	4

ANALYSIS AND INTERPRETATION

Scores are significantly different on The Friedman two way Anova test since Sig. value is less than the level of significance-0.05. The digital banking offers no receipts on payments was ranked 1 that is the most important reason while it is more expensive than going to a branch was given the last rank that is 7.

It can be concluded that the majority of the respondents regarded that the most important reason for which digital banking is not being used popularly was that it does not offer receipts on payments.

The findings of the study were as follows-
The majority of the respondents have availed of the digital banking service.
The majority of the respondents regarded that the most important reason for which net banking service is not being popularly used was that it does not offer.
The majority of the respondents felt that the net banking service was better than traditional banking.

CONCLUSION:

It can be concluded that 84.5% of people preferred online banking for their paying bills. Still, customers do not know about the offers and information on online banking because they are not techno-savvy. Due to emerging new technology has been changing the attire of the banking sector. The brick and mortar banking is slowly giving place to click on mouse banking. Technology is aiding globalization and integration of financial markets across the globe. Customer's expectations for new products and alternatives delivery channels have been rising. In the present scenario, people can check their bank account details, pay their bills online, transfer money to other accounts and all these can be done very comfortably at any time, any place and anywhere. For this, the only requirement is an internet connection. So, banks should focus on customer awareness programs to educate about online facilities provided by the banks.

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THE SALUTARY ROLE OF THE H.R.D IN THE CONTEXT OF TALENT MANAGEMENT IN BANKING SECTOR: "A CASE STUDY OF PUBLIC SECTOR AND PRIVATE SECTOR BANKS IN ODISHA.

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ABSTRACT

Human resource is the most crucial asset for an organization. Human resource development is a framework for the expansion of human capital within an organization through the development of both the organization and the individuals in order to achieve performance improvement. Human resource is the most important and vital factor for economic development and it can be said that humans are the agents of the development. The successful performance of an organization is largely depending upon the quality of its human resources. The quality of organization's human resources depends upon the extent of knowledge received through training and education and their motivational level. Thus, it is very much clear that competent employees are the greatest assets of any organization. Every organization should provide right type of climate which shall help the employees to give full contribution to their potentials, in order to achieve the goals of the organization and thereby ensuring optimization of human resources.

Talent management has been described as having the right people with the right skills in the right jobs at the right time. At the same time the organization should know that they have to hire talented staff and encourage them to remain in the organization, thus it is perceived critically important that talents must be managed properly in order to achieve the best results. The present topic is a case study of public sector and private sector banks in Odisha, where the role of HRD in Private sector Banks is better than the public sector Banks to retain the talents in the organization.

KEY WORDS: -Talents, Optimization, Management, Knowledge, Performance.

INTRODUCTION

The quality of organization's human resources depends upon the extent of knowledge received through training and education and their motivational level. The Nationalized Banks has a strong digital proposition across the spectrum – with ATMs. Call Centre, Internet Banking, Mobile Banking and Tibullus Banking Channels. These digital challenges presently accounting for 60% of overall transaction, is the best in Public Sector Banks. Further the Bank aims to scale-up transaction through digital channels to 75% over the next couple of years. In spite of good talent management in the Nationalized Banks the complaints also rise from year to year such as SBI and its associates having 1022 nos. of complaints which has redressed.

Technology particularly the advances in Information Technology has indeed been driver of financial innovations over last few decades. The latest initiations taken to make ease and reduce

the current transaction in banking systems as 'Aadhaar Pay' which is started with the Chairmanship of N. Chandrababu Naidu, the former Chief Minister of Andhra Pradesh. The private banks HDFC also implementing intelligent robotic Assistant to provide 9 to 10 banking services.

The number of mobile banking users globally is forecast to double to 1.8 billion, over 25% of the world's population, in the next four years as per a global survey. Mobile banking is on an upsurge in India and the number if likely to grow twice in the next four years since customers are rapidly switching to mobile banking.

Modern Banking in India is about 250 years old, but the concept of banking in India can be traced back to as far as 2000 BCE from Mauryan period to Mughal Era. All the major instruments of Banking were present in one form or the other.

The real challenges of this sector in 'Indian Banking' are to transform into global corporations without losing the positive values ad culture that they have developed. As most part of the jobs in the banking sector is monotonous or repetitive and routine. The HR department has to empower, engage and energies employees to create efficiency and effectiveness through motivation. Organizational structures, systems and procedures are facilitators for organizational growth, for which there is a need to focus on these aspects by the industry. The emergence of a core and peripheral workforce in many banks has presented new challenges for human resource managers of public & private sector banks are fast because of multi ethnicity.

OBJECTIVE

The present work is carried out with the following objectives:

1. To study the type of human resource development climate prevailing in selected public sector and private sector banks.
2. To study the implementation of core human resource functions like recruitment, selection, promotion, transfer, performance appraisal system, training and development, compensation and benefit in Indian banks.

RESEARCH DESIGN AND METHODOLOGY

For the purpose of the study, the researcher selected the banks on the basis of judgmental sampling and respondents on the basis of probability random sampling.

Phase-I: Extensive primary data shall be collected from both types of banks and their customers through a structured questionnaire and secondary data shall be collected from books, journals, proceedings of seminars and annual reports of banks.

Phase-II: Literature will be made to understand the theoretical background and identify the major characteristics of effective human resource practices in talent management after advanced technology also identifying the major player and their role played in the administration of the practice of the banks in Odisha.

Phase-III: Based on the results of Phase-I & Phase-II, hypothesis would be formulated regarding the challenges that the administration of banks in Odisha are facing and hypothesis testing would be designed. This would include sampling plan, questionnaire design, and analysis.

HYPOTHESIS OF THE STUDY

NH-1: There is no significant difference between the reasons for continuation of a job in a private sector and that of the public sector banks.
NH-2: Remuneration is the key criterion for ensuing whole hearted support.
NH-3: Both public and private sector bank employees perceive their job in the same manner.

SAMPLE SIZE

The sample size of the present study was 627 numbers, but 512 respondents consented their information i.e., 362 from public sector banks and 150 from private sector banks.

STATISTICAL TOOLS USED FOR THE ANALYSIS

The whole study was made with the help of various statistical tools such as ANOVA, Chi-square Test, Pearson's Coefficient Correlation, Kendall's Coefficient Correlations, and Pie Chart etc.

LIMITATIONS OF THE STUDY

Though there are many benefits of new technology in H.R Practices of talent management in banks, it is not free from limitations.

- The inbuilt deficiencies of the primary data will be more or less manifested in the subsequent analysis.
- The respondent's sample for conducting the study is by large done arbitrarily and restricted to limited numbers due to constraint of time.
- The secondary data collected from various publications also suffers from all the natural limitations associated with it.

EMPIRICAL ANALYSIS & RESEARCH METHODOLOGY

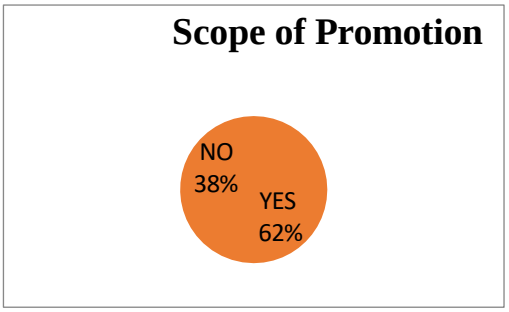
SCOPE OF PROMOTION

Table-1
PUBLIC SECTOR BANKS
Scope of Promotion

Response	Respondents	Percentage
Yes	225	62%
No	137	38%
Total	362	100%

Analysis: Out of 362 respondents of the public sector banks, 62 percentage shown positive response where as 38 percentage shown negative response. This is further reflected in the graph number 1.

Graph No 1



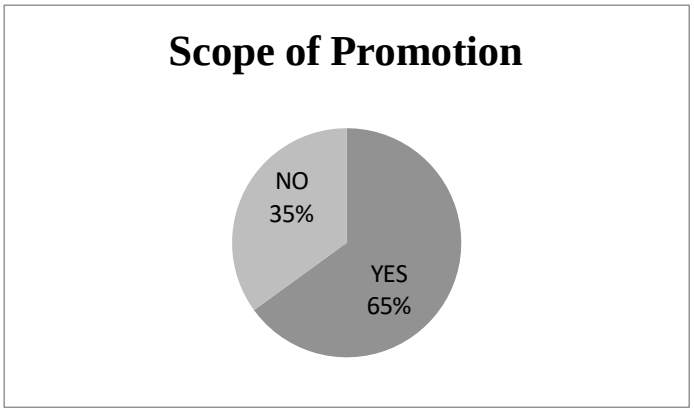
As cash or chit of appreciation motivates the workers, therefore promotion is a tool to motivate the talented workers for fulfillment of their monetary and non-monetary benefits, therefore on the basis of perfect performance management system, employees' promotional steps should be initiated in private sector banks so as to retain the talents for long period in the organization. Table 5.2 reveals that the various responses collected are shown below:

Table-2
PRIVATE SECTOR BANKS
Scope of Promotion

Response	Respondents	Percentage
Yes	98	65%
No	62	35%
Total	150	100%

Analysis: Out of 150 respondents in the private sector banks, 65 percentage shown positive response where as 35 percentage shown negative response. This is further reflected in the graph number 2.

Graph Number 2



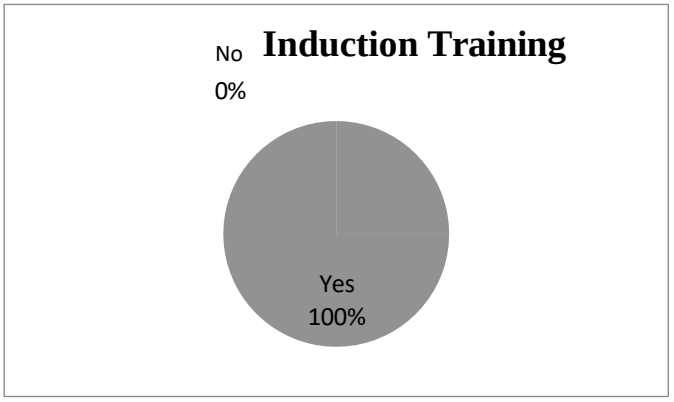
INDUCTION TRAINING

Table-3
PUBLIC SECTOR BANKS
Induction Training

Response	Respondents	Percentage
Yes	362	100%
No	0	0%
Total	362	100%

Analysis: Out of 362 respondents of the public sector banks, 100 percentage shown positive response whereas null percentage shown negative response towards the induction training system. This is further reflected in the graph number 3.

Graph Number 3



As the probability of job rotation is more frequent in private sector banks, therefore it needs extensive induction training to the newly joined employees of the organization so as to acquaint them with different functionaries and its executants within the organization for taking assistance at the time of their need. Table 4 reflects the opinion of the respondents in private sector banks.

Table-4
PRIVATE SECTOR BANKS
Induction Training

Response	Respondents	Percentage
Yes	150	100%
No	0	0%
Total	150	100%

Analysis: From the 150 respondents of the private sector banks, 100 percentage shown positive response whereas null percentage shown negative response towards the induction training system. This is further reflected in the graph number 4.

Graph Number 4

RECRUITMENT

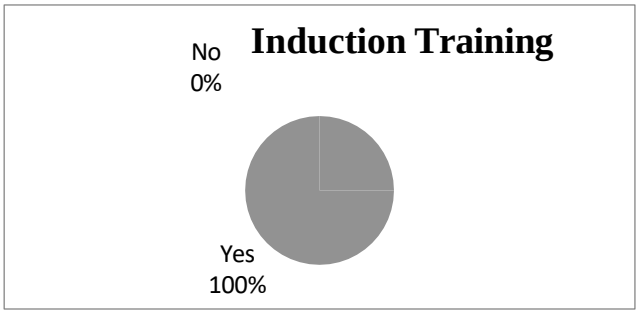
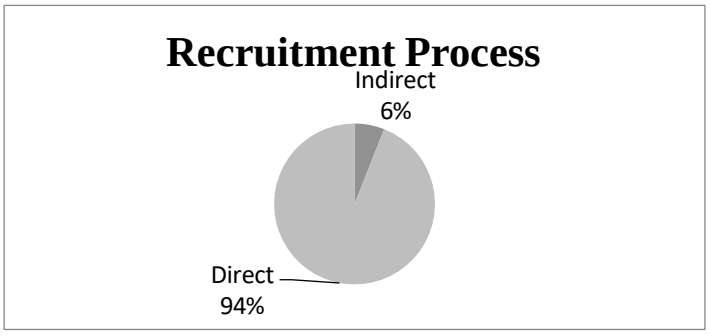


Table-5
PUBLIC SECTOR BANKS
Recruitment Process

Mode of Recruitment	Respondents	Percentage
Indirect	20	6%
Direct	342	94%
Total	362	100%

Analysis: From the 362 respondents of the public sector banks, 6 percentage are indirect workers and 94 percentage are recruited directly by the banking recruitment process. This is further reflected in the graph number 5.

Graph Number 5



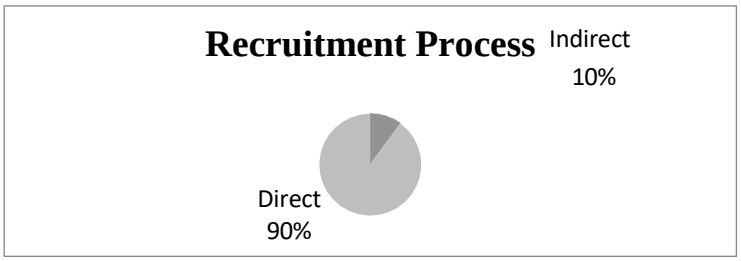
Similarly, the recruitment process in private sector banks follows the similar procedures as like the public sector banks. Table 6 reveals the recruitment process of private sector banks.

Table-6
PRIVATE SECTOR BANKS
Recruitment Process

Mode of Recruitment	Respondents	Percentage
Indirect	15	10%
Direct	135	90%
Total	150	100%

Analysis: From the 150 respondents of the private sector banks, 10 percentage are indirect workers and 90 percentage are recruited directly by the banking recruitment process. This is further reflected in the graph number 6.

Graph Number 6



DECISION OF CONTINUING:

Table-7
PUBLIC SECTOR BANKS
Decision of Continuity

Response	Respondents	Percentage
Yes	330	91%
No	32	9%
Total	362	100%

Analysis: Out of the 362 respondents in the public sector banks, 91 percentage given positive response because of job security and 9 percentage have given negative response of the decision of continuing the job because in the recruitment process some of the people of professional/technical qualifications enter into the job and after getting a better placement willing to leave the job. This is further reflected in the graph number 7.

Graph No.-7

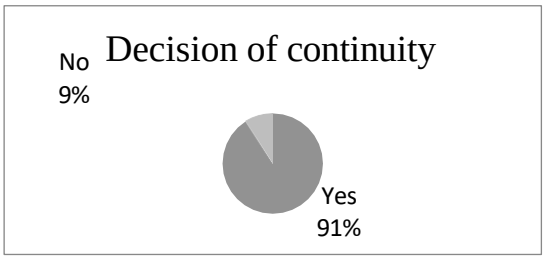


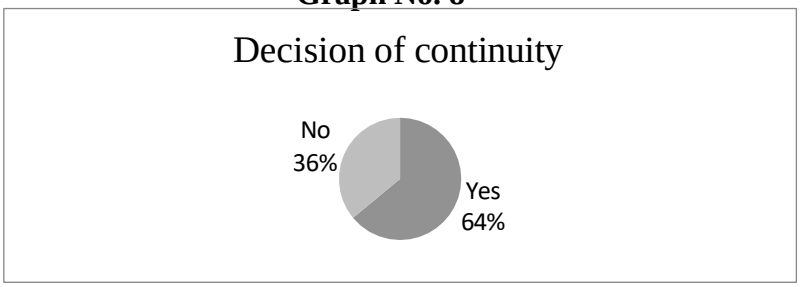
Table 8 reveals the opinion of the respondents in positive and negative way in private sector banking.

Table-8
PRIVATE SECTOR BANKS
Decision of Continuity

Response	Respondents	Percentage
Yes	96	64%
No	54	36%
Total	150	100%

Analysis: Out of the 150 respondents in the private sector banks, 64 percentage given positive response because they have the zeal and courage to work under pressure and get pleasure to accept the new challenges so as to prove their credibility before the management and 36 percentage have given negative response of the decision of continuing the job because of uncertainty in job security, high stress, meeting the competitive target fixed by the management. These people want to shift because they possess professional/technical knowledge which may enable them to join in public sector jobs in their future career path. This is further reflected in the graph number 8.

Graph No. 8



CONSULTATION FOR SHIFTING

The impact of friends, peers, spouse and experts plays a vital role at the time of career decision. Studies have shown that opinion, advice and value of friends, peers, spouse, and experts also act as a determining factor while decision is taken for shifting the job. In cases, spouses also exercise his/ her influence at the time of taking the decision of shifting, accordingly respondents were asked to express about the influence exerted by friends, peers, spouse and experts, if any, in their job shifting process. Table 9 reveals the opinion of the respondents in positive and negative way.

Table-9

PUBLIC SECTOR BANKS

Consultation for shifting

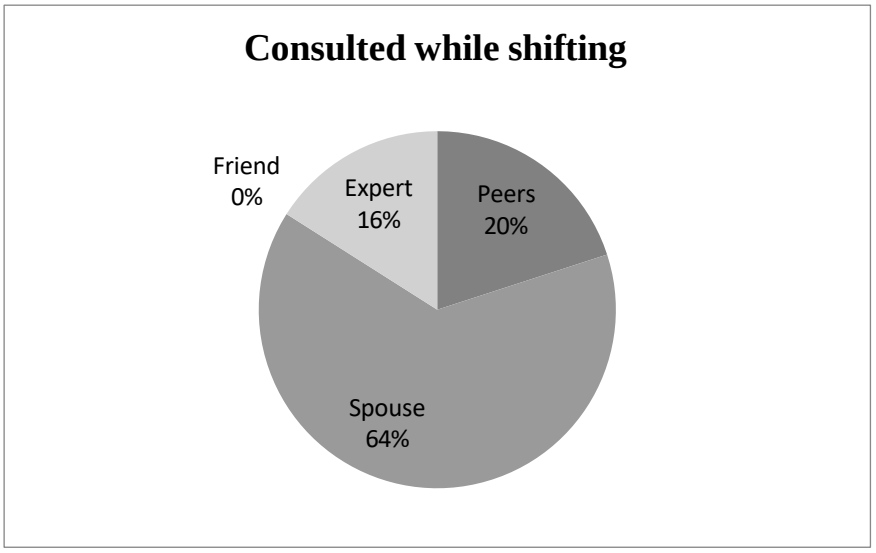
Decisional source	Response	Percentage
Peers	74	20%
Spouse	230	64%
Friend	0	0%
Expert	58	16%
Total	362	100

Chi square value 218.04, d.f.=3, 5% level of significance, table value is 7.82.

Analysis: Out of the 362 respondents in the public sector banks, 20% consulted their peers, 64 percent consulted their spouse, non-consulted their friends and 16% consulted experts at the time of shifting of job from one bank to another bank. Spouses dominate the decision-making process of shifting the job because they are the life partner of the member. This is further reflected in the graph number 9.

Table value of Chi Square with d.f. = 3 at 5 percentage level of significance is 7.815 and the calculated value is 218.04, which reflects that there is no relationship among different influencing group who have exercised their power on shifting of job of the respondents. Only the spouse is playing the major influencing parameter in the above table.

Graph No. 9



Similarly, irrespective of experience and educational value, sometimes employees are in confusion when it comes to their career decision making process which needs extensive consultation with others to reach at a productive decision. Table 10 reveals the consultation of respondents with others.

Table-10
PRIVATE SECTOR BANKS
Consultation for shifting

Decisional source	Response	Percentage
Peers	30	20%
Spouse	83	55%
Friend	19	13%
Expert	18	12%
Total	150	100

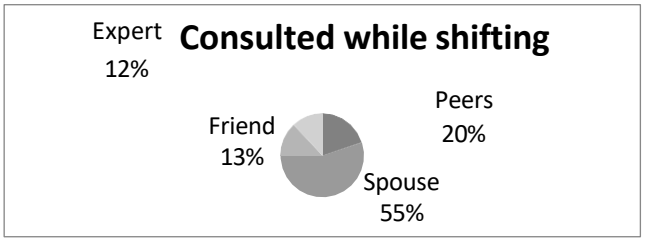
Chi squire value 56.71, d. f.=3, 5% level of significance, table value is 7.82.

Analysis: Out of the 150 respondents in the private sector banks, 20 percent consulted their peers, 55 percent consulted their spouse, 13 percent are consulted their friends and 12 percent their consulted with experts at the time of shifting of job from one organization to another organization.

Table value of Chi Square with d.f.=3 at 5 percentage level of significance is 7.82 and the calculated value is 56.71, which reflects that there is no relationship among different influencing group who have exercised their power on shifting of job of the respondents. Only the spouse is playing the major influencing parameter in the above table. This is further

reflected in the graph number 10.

Graph No. 10



FINAL DECISION

When respondents are enquired about the ultimate decision taken by whom for shifting the job, majority of the respondents are on the opinion that they have taken the decision at their end. In this case, the spouse occupied the second position. For an employed person, his/her decision is final because he/she shoulder the risk for failure in decision taking steps. Table number 11 reveals the consultation at the final decision.

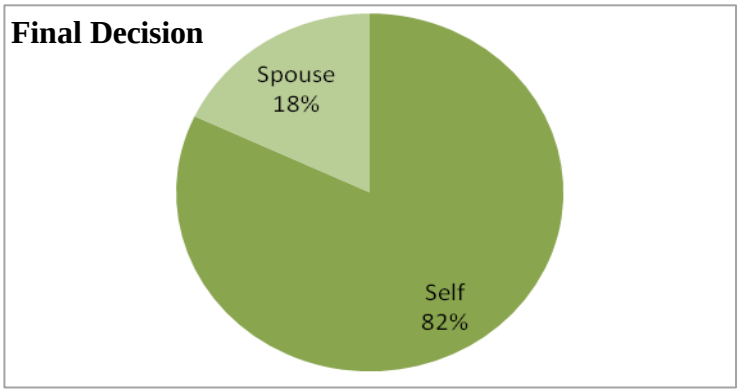
Table-11
PUBLIC SECTOR BANKS
Final Decision

Decision Maker	Response	Percentage
Self	298	82%
Spouse	64	18%
Total	362	100%

Chi squire value 151.26, d.f.=1, 5% level of significance, table value is 3.48.

Analysis: Out of the 362 respondents in the public sector banks, 82 percent of the respondents are self-confident at the time of taking final decision and 18 percent of the respondents are consulting with spouse at the time of final decision. Table value of Chi Square with d.f.=1 at 5 percentage level of significance is 3.48 and the calculated value is 151.26, which reflects that always the employed person takes active part in the final decision processes in continuing or shifting the job. This is further reflected in the graph number 11.

Graph Number 11



Similarly, at the time of final decision in the shifting of the job, some are firm about their own decision and confidence and some are consulting with their spouse at the time of taking decision. Table number 5.12 reveals the consultation at the final decision.

Table-12
PRIVATE SECTOR BANKS
Final Decision

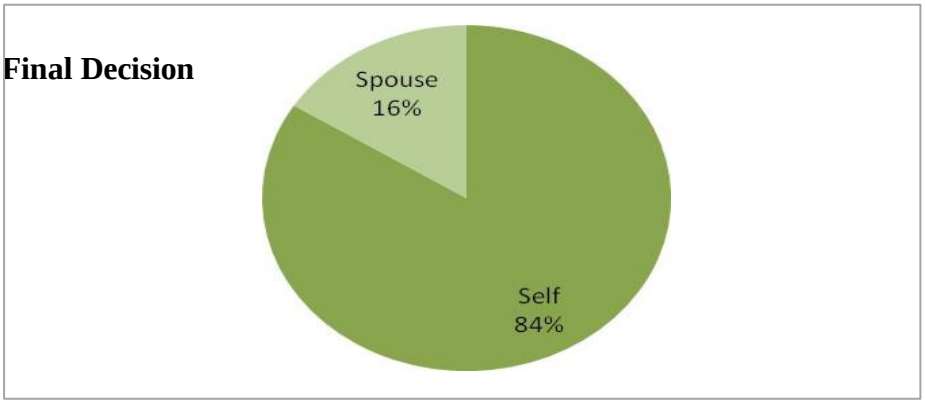
Decision Maker	Response	Percentage
Self	126	84%
Spouse	24	16%
Total	150	100

Chi squire value 69.36, d.f.=1, 5% level of significance, table value is 3.48.

Analysis: Out of the 150 respondents in the private sector banks, 84 percent of the respondents are self-confident at the time of taking final decision and 16 percent of the respondents are consulting with spouse at the time of final decision.

Table value of Chi-Square with d.f.=1 at 5 percentage level of significance is 3.48 and the calculated value is 69.36, which reflects that always the employed person takes active part in the final decision processes in continuing or shifting the job. This is further reflected in the graph number 12.

Graph Number 12



CAREER ADVANCEMENT

Table-13
PUBLIC SECTOR BANKS
Career Advances

Response	Respondent	Percentage
Yes	362	100%
No	0	0
Total	362	100

Analysis: Out of 362 respondents from public sector banks 100 percent are given positive response towards their career advancement. It indicates the human resource management

department providing salutary role for nourishing the employees properly. The details are shown in the graph number 13.

Graph Number 13

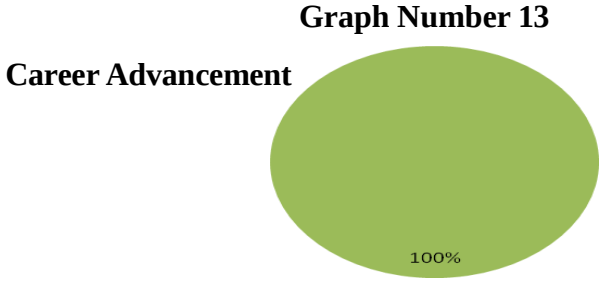


Table-14

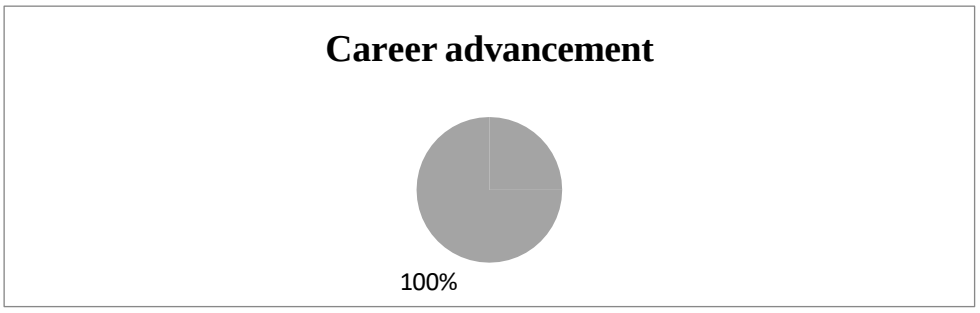
PRIVATE SECTOR BANKS

Career Advances

Response	Respondent	Percentage
Yes	150	100%
No	0	0%
Total	150	100

Analysis: Out of 150 respondents from private sector banks, 100 percent are given positive response towards their career advancement. The details are shown in the graph number 14.

Graph Number 14



NEW TECHNOLOGY

Table-15

PUBLIC SECTOR BANKS

New Technology

Use of Technology	Respondent	Percentage
Threat	68	19%
Well being	294	81%
Total	362	100

Chi squire value 141.09, d. f.=1, 5% level of significance, table value is 3.48.

Analysis: Out of 362 respondents, 19 percent responded, the use of new technology in the banking sector is a threat and 81 percent are favoring towards the wellbeing. Table value of Chi Square with d.f.=1 at 5 percentage level of significance is 3.48 and the calculated value is 141.09, which reflects that always the employees welcome the new technology which provide support to increase their efficiency. The details are shown in the graph number 15.

Graph No.15

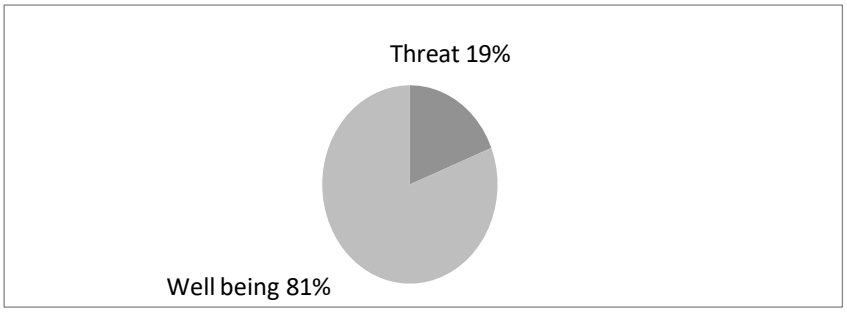


Table No.-16
PRIVATE SECTOR BANKS
New Technology

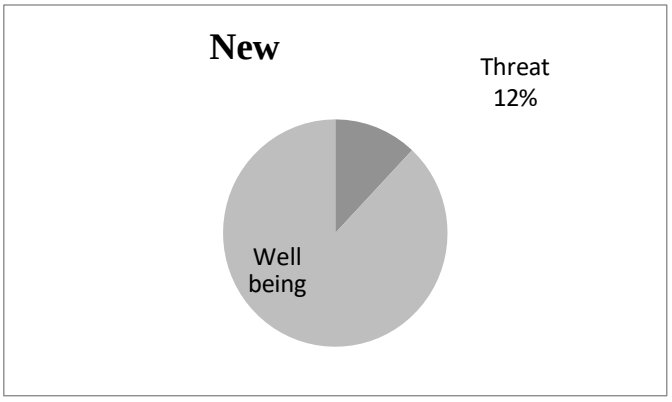
Use of Technology	Respondent	Percentage
Threat	18	12%
Well being	132	88%
Total	150	100

Chi squire value 86.64, d.f.=1, 5% level of significance, table value is 3.48.

Analysis: Out of 150 respondents, 12 percent were in favor of threat of new technology and 88 percent favored as the wellbeing.

Table value of Chi Square with df.=1 at 5 percentage level of significance is 3.48 and the calculated value is 86.64, which reflects that always the employees welcome the new technology which provide support to increase their efficiency. The details are shown in the graph number 16.

Graph No. 16



STEPS TAKEN TO GAIN THE WHOLE HEARTED SUPPORT

Table-17

PUBLIC SECTOR BANKS

Whole Hearted Support

Motivating Factors	Respondent	Percentage
Benefit to Organization	0	0
Facilitate in Career building	40	11%
Training	20	6%
Higher Remuneration	302	83%
Total	362	100%

Chi squire value 118.68, d. f.=3, 5% level of significance, table value is 7.82.

Analysis: Out of the 362 respondents of public sector banks, none are worried for the benefit of organization, 11 percent are dreaming for facilitating of career building, 6 percent are interested for attainment of training programme and 83 percent are ready to give their full support with exchange of higher remuneration.

Table value of Chi Square with d. f.=3 at 5 percentage level of significance is 7.82 and the calculated value is 118.68, which reflects that there is no relationship among the variables. Monetary benefit i.e., remuneration is the single measure parameter which influence the employee to give his whole hearted support for the organizational benefit. The details are shown in the graph number 17.

Graph Number 17

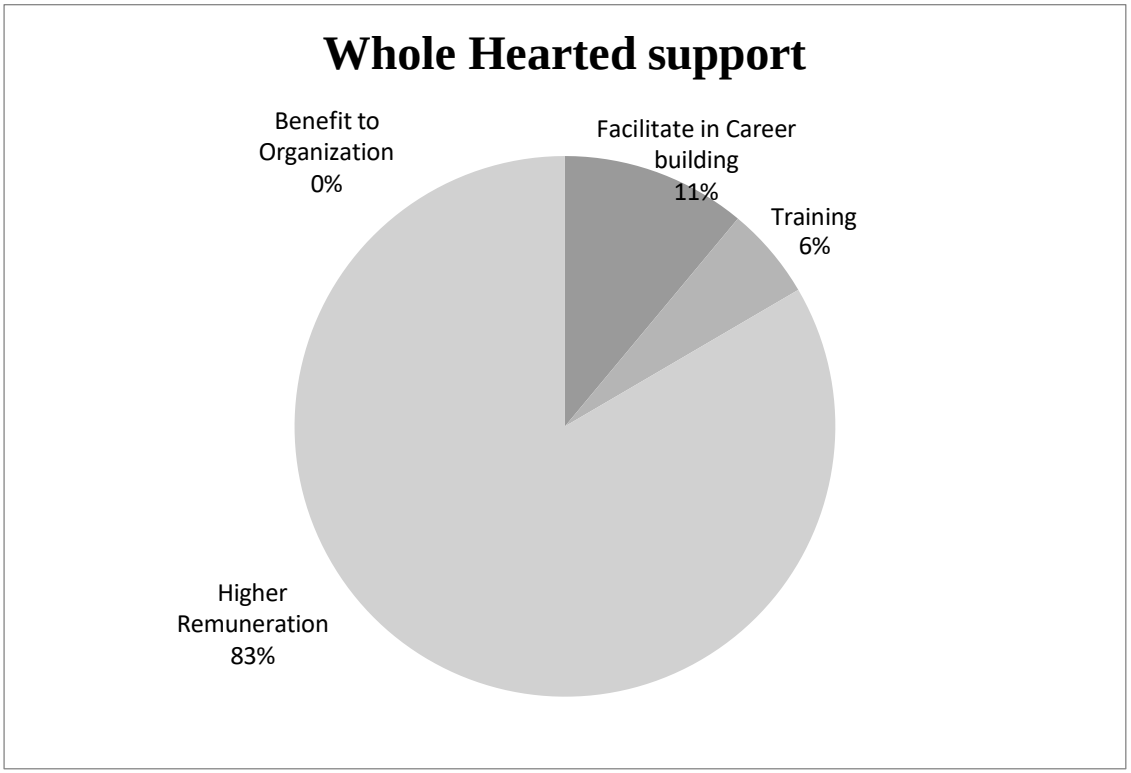


Table-18

PRIVATE SECTOR BANKS

Whole Hearted Support

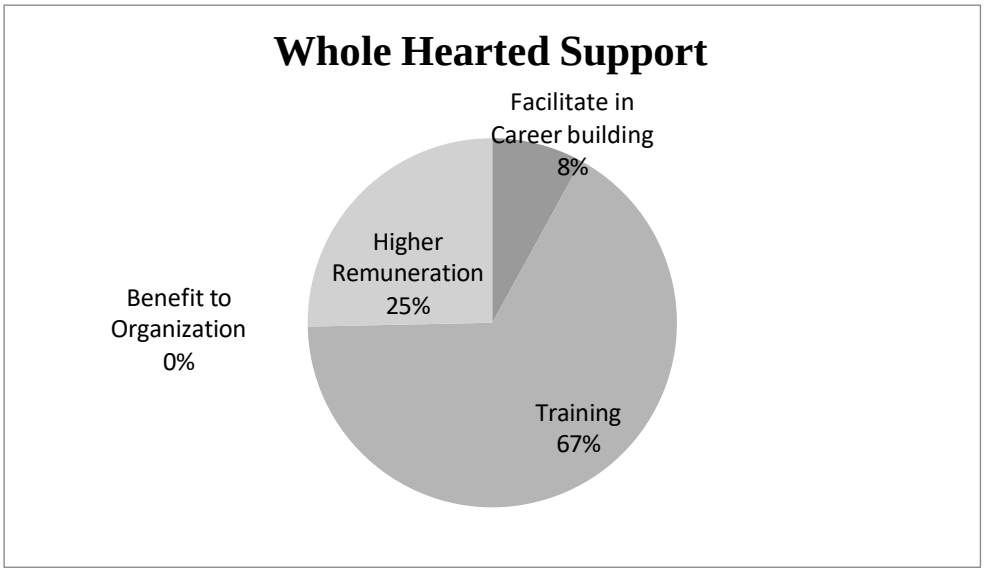
Motivating Factors	Respondent	Percentage
Benefit to Organization	0	0%
Facilitate in Career building	12	8%
Training	100	67%
Higher Remuneration	38	25%
Total	**150**	**100**

Chi squire value 54.84, d.f.=3, 5 percent level of significance, table value is 7.82.

Analysis: Out of the 150 respondents of the private sector banks, none are worried for the benefit of organization, 8 percent are dreaming for facilitate in career building, 67 percent are interested for attainment of training programme and 25 percent are ready to give their full support with exchange of higher remuneration. Private sector banks introduce higher technology at their work place. The employees depend upon the human resource management to provide them proper training to upgrade their knowledge, for their competencies to retain themselves in the present job without the fear of losing the job for low performance appraisal. Training is also helping the organization to equipped the man power with the latest technology i.e., reduce the cost and increase the revenue of the organization.

Table value of Chi-Square with d.f.=3 at 5 percentage level of significance is 7.82 and the calculated value is 54.84, which reflects that there is no relationship among the variables. Training is the single measure parameter which influence the employee to give their whole hearted support for the benefit of the organization. The details are shown in the graph number 18.

Graph Number 18



YEARS REQUIRED FOR PROMOTION

Table-19

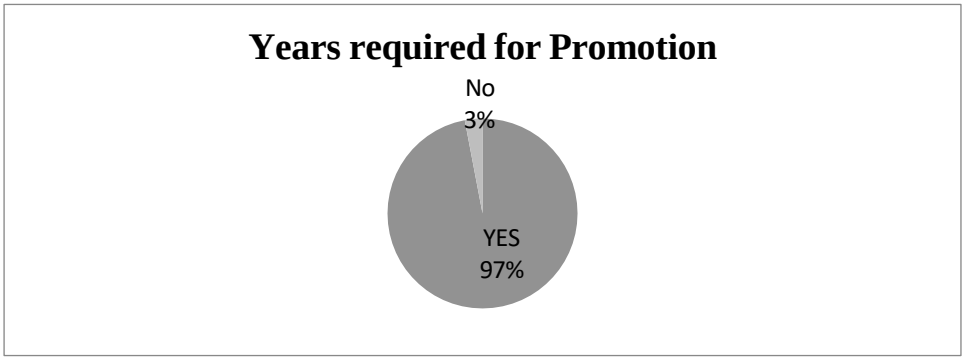
PUBLIC SECTOR BANKS

Years required for Promotion

Duration	Respondent	Percentage
3 years	350	97%
5 years	12	3%
Total	362	100

Analysis: Out of 362 respondents, 97 percent are much interested to get their promotion within the time frame of 3 years and 3 percent of employees are expecting their promotion within 5 years. The details are shown in graph number 19.

Graph Number 19



In private sector banks, employees are showing high efficiencies and expecting their early promotion. Table number 20 reveals about the duration of the promotion.

Table-20

PRIVATE SECTOR BANKS

Years required for Promotion

Duration	Respondent	Percentage
3 years	100	67%
5 years	50	33%
Total	150	100

Analysis: Out of 150 respondents, 67% are expecting the promotion within 3 years whereas 33% of employees are expecting their promotion within 5 years. The details are shown in graph number 20.

Graph Number 20.

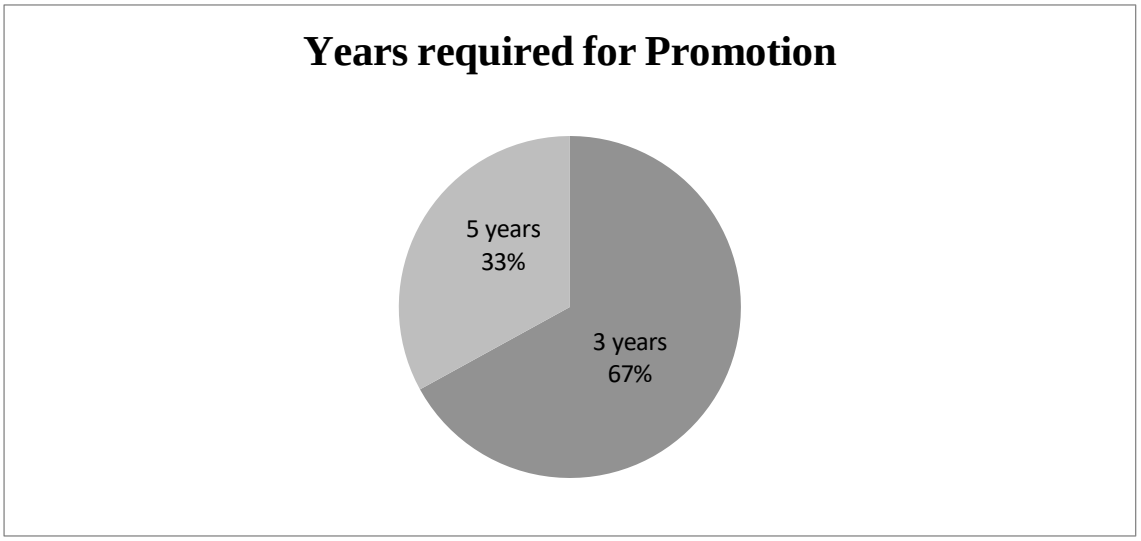


Table-21

JOB PERCEPTION OF PUBLIC AND PRIVATE SECTOR BANKS

Job perception: Combined table for Public and Private Sector Banks

Banks	Highly Satisfactory		Satisfactory		Moderate		Unsatisfactory		Highly unsatisfactory		Total	Percentage
	Total	%	Total	%	Total	%	Total	%	Total	%		
Public	282	78%	50	14%	30	8%	0	0%	0	0%	362	100%
Private	110	73%	12	8%	28	19%	0	0%	0	0%	150	100%

Analysis:

Out of the total 362 respondents from the public sector banks, 78 percent are highly satisfactory, 14 percent as satisfactory,8 percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 150 respondents in private sector banks, 73 percent are highly satisfactory, 8 percent as satisfactory, 19 percent are moderate and null percentage are unsatisfactory and highly unsatisfactory.

Table-22
JOB PERCEPTION OF PUBLIC SECTOR BANKS
Age-wise

Age	**Highly Satisfactory**		**Satisfactory**		**Moderate**		**Unsatisfactory**		**Highly unsatisfactory**		**Total**	**Percentage**
	Total	%	Total	%	Total	%	Total	%	Total	%		
Below-25 years	83	75	10	9	18	16	0	0	0	0	111	100%
26-30 years	97	75	20	16	12	9	0	0	0	0	129	100%
31-35 years	40	58	12	23	0	0	0	0	0	0	52	100%
Above 35 years	62	67	8	11	0	0	0	0	0	0	70	100%

Analysis:

Out of the total 111 respondents under the income group below 25 years, 75 percent are highly satisfactory, 9 percent as satisfactory,16 percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 129 respondents under the income group between 26-30 years, 75 percent are highly satisfactory, 16 percent as satisfactory,9 percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 52 respondents under the income group between 31-35 years, 58 percent are highly satisfactory, 23 percent as satisfactory, null percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 70 respondents under the age group above 35 years, 67 percent are highly satisfactory, 11 percent as satisfactory, null percent are moderate and null percentage are unsatisfactory and highly unsatisfactory.

Table-23
JOB PERCEPTION OF PUBLIC SECTOR BANKS
Income-wise

Income (`)	**Highly Satisfactory**		**Satisfactory**		**Moderate**		**Unsatisfactory**		**Highly unsatisfactory**		**Total**	**Perce-ntage**
	Total	%	Total	%	Total	%	Total	%	Total	%		
Less than 20,000	80	66	22	18	20	16	0	0	0	0	122	100%
20,001-30,000	95	84	8	7	10	9	0	0	0	0	113	100%
30,001-40,000	30	77	9	23	0	0	0	0	0	0	39	100%
Above 40,000	77	88	11	11	0	0	0	0	0	0	88	100%

Analysis:

Out of the total 122 respondents under the income group of less than `20,000, 66 percent are highly satisfactory, 18 percent as satisfactory,16 percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 113 respondents under the income group of `20,001-`30,000, 84 percent are highly satisfactory, 7 percent as satisfactory, 9 percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 39 respondents under the income group of `30,001-`40,000, 77 percent are highly satisfactory, 23 percent as satisfactory, null percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 88 respondents under the income group of above `40,000, 88 percent are highly satisfactory, 11 percent as satisfactory, null percent are moderate and null percentage are unsatisfactory and highly unsatisfactory.

Table-24

JOB PERCEPTION OF PUBLIC SECTOR BANKS

Education-wise

Education	**Highly Satisfactory**		**Satisfactory**		**Moderate**		**Unsatisfact-ory**		**Highly unsatisfacto-ry**		**Total**	**Perce-ntage**
	Total	%	Total	%	Total	%	Total	%	Total	%		
Graduate	80	85	14	15	0	0	0	0	0	0	94	100%
Post Graduate	69	70	21	21	9	9	0	0	0	0	99	100%
Professional	103	84	8	7	12	10	0	0	0	0	123	100%
Technical	30	65	7	15	9	20	0	0	0	0	46	100%

Analysis:

Out of the total 94 respondents under the graduate group, 85 percent are highly satisfactory, 15 percent as satisfactory, null percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 99 respondents under the post graduate group, 70 percent are highly satisfactory, 21 percent as satisfactory, 9 percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 123 respondents under the professional group, 84 percent are highly satisfactory, 7 percent as satisfactory, 10 percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 46 respondents under the technical group, 65 percent are highly satisfactory, 15 percent as satisfactory, 20 percent are moderate and 6 percent are unsatisfactory and null percent in highly unsatisfactory.

Table-25
JOB PERCEPTION OF PRIVATE SECTOR BANKS
Age-wise

Age	**Highly Satisfactory**		**Satisfactory**		**Moderate**		**Unsatisfactory**		**Highly unsatisfactory**		**Total**	**Percentage**
	Total	%	Total	%	Total	%	Total	%	Total	%		
Below -25 years	17	44	0	0	22	56	0	0	0	0	39	100%
26-30 years	47	100	0	0	0	0	0	0	0	0	47	100%
31-35 years	25	71	4	11	6	17	0	0	0	0	35	100%
Above 36 years	21	72	8	28	0	0	0	0	0	0	29	100%

Analysis:

Out of the total 39 respondents under the income group below 25 years, 44 percent are highly satisfactory, null percent as satisfactory,56 percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 47 respondents under the income group between 26-30 years, 100 percent are highly satisfactory, null percent as satisfactory, null percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 35 respondents under the income group between 31-35 years, 71percent are highly satisfactory, 11 percent as satisfactory, 17 percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 29 respondents under the age group above 35 years, 72 percent are highly satisfactory, 28 percent as satisfactory, null percent are moderate and null percentage are unsatisfactory and highly unsatisfactory.

Table-26
JOB PERCEPTION OF PRIVATE SECTOR BANKS
Income-wise

Income (`)	Highly satisfactory		Satisfactory		Moderate		Unsatisfactory		Highly unsatisfactory		Grand Total	Total Percentage
	Total	%	Total	%	Total	%	Total	%	Total	%		
Less than 20,000	22	58	5	13	11	29	0	0	0	0	38	100%
20,001-30,000	53	100	0	0	0	0	0	0	0	0	53	100%
30,001-40,000	32	64	7	14	11	22	0	0	0	0	50	100%
Above 40,000	3	33	0	0	6	67	0	0	0	0	9	100%

Analysis:

Out of the total 38 respondents under the income group of less than `20,000, 58 percent are highly satisfactory, 13 percent as satisfactory,29 percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 53 respondents under the income group of `20,001-`30,000, 100 percent are highly satisfactory, null percent as satisfactory, null percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 50 respondents under the income group of `30,001-`40,000, 64 percent are highly satisfactory, 14 percent as satisfactory, 22 percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 9 respondents under the income group of above `40,000, 33 percent are highly satisfactory, null percent as satisfactory, 67 percent are moderate and null percentage are unsatisfactory and highly unsatisfactory.

Table-27

JOB PERCEPTION OF PRIVATE SECTOR BANKS

Education-wise

Education	Highly Satisfactory		Satisfactory		Moderate		Unsatisfactory		Highly unsatisfactory		Total	Percentage
	Total	%	Total	%	Total	%	Total	%	Total	%		
Graduate	0	0	0	0	0	0	0	0	0	0	0	100%
Post Graduate	24	71	10	29	0	0	0	0	0	0	34	100%
Professional	76	78	2	2	19	20	0	0	0	0	97	100%
Technical	10	53	0	0	9	47	0	0	0	0	19	100%

Null percent of the graduate group have not shown any interest to attain the questionnaire. Out of the total 34 respondents under the post graduate group, 71 percent are highly satisfactory, 29 percent as satisfactory, null percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 97 respondents under the professional group, 78 percent are highly satisfactory, 2 percent as satisfactory, 20 percent are moderate and null percentage are unsatisfactory and highly unsatisfactory. Out of the total 19 respondents under the technical group, 53 percent are highly satisfactory, null percent as satisfactory, 47 percent are moderate and null percent are unsatisfactory and null percent in highly unsatisfactory.

Causes of Shifting (Age, Education & Income)

Cause of shifting the Job in ranking order
(Age-wise) in Public Sector Banks
Table No. 28

Cause of shifting the Job in ranking order (Age-wise) in Public Sector Banks

Age	Rank-1	Rank-2	Rank-3	Rank-4	Rank-5	Rank-6	Rank-7	Total
Below 25	9	12	14	16	18	20	22	111
26 yrs-30 yrs	12	16	16	18	20	22	25	129
31 yrs-35 yrs	6	7	6	8	10	7	8	52
36 yrs above	4	7	12	14	11	13	9	70
Total	31	42	48	56	59	62	64	362

Now by Kendall's' coefficient we could estimate the relationship and test whether the different respondents are in agreement or not, as given below.

H_0: The respondents have disagreement in ranking, the causes of shifting the job.

H_1: The respondents have agreement in ranking the causes of shifting the job.

Test Statistic

W = $\frac{12\sum R^2 - 3[k(n+1)]^2}{(n+1)}$, W approximately follows χ^2 distribution with (n-1) degrees of freedom.

R = rank sum, n =no. of attributes ranked =4, k =ranks = 7

Tabulated value 3 d.f and k = 4 is 7.815

Kendall's coefficient of concordance = $W = \frac{S}{\frac{1}{12}k^2\left(n^3 - n\right)}$ = 6.193,

Cal. W < Tab. W, H_0 is accepted and H_1 is rejected.

Interpretation:

The calculated value of Kendall's coefficient signifies that, there is a disagreement among the respondents in ranking the causes of shifting the job in public sector banks.

Cause of shifting the Job in ranking order
(Age-wise) in Private Sector Banks
Table No. 29

Cause of shifting the Job in ranking order (Age-wise) in Private Sector Banks

Age	Rank-1	Rank-2	Rank-3	Rank-4	Rank-5	Rank-6	Rank-7	Total
Below 25	3	6	4	9	7	4	6	39
26 yrs-30 yrs	4	7	6	7	8	9	6	47
31 yrs-35 yrs	2	5	4	5	6	7	6	35
36 yrs above	2	3	5	6	5	4	4	29
Total	11	21	19	27	26	24	22	150

Now by Kendall's' coefficient we could estimate the relationship and test whether the different respondents are in agreement or not, as given below.

H_0: The respondents have disagreement in ranking, the causes of shifting the job.

H_1: The respondents have agreement in ranking the causes of shifting the job.

Test Statistic

W = $\frac{12\sum R^2 - 3[k(n+1)]^2}{(n+1)}$, W approximately follows χ^2 distribution with (n-1) degrees of freedom.

R = rank sum, n =no. of attributes ranked =4, k =ranks = 7

Tabulated value 3 d.f and k = 4 is 7.815

Kendall's coefficient of concordance = $W = \frac{S}{\frac{1}{12}k^2\left(n^3 - n\right)}$ = 11.21,

Cal. W >Tab. W, H_0 is rejected and H_1 is accepted.

Interpretation:

The calculated value of Kendall's coefficient signifies that, there is an agreement among the respondents in ranking the respondents in ranking the causes of shifting the job in private sector banks.

Causes of shifting the Job in ranking order (Income-wise)
Public Sector Banks
Table No. 30

Income	Rank-1	Rank-2	Rank-3	Rank-4	Rank-5	Rank-6	Rank-7	Total
Less than 20000	14	15	17	18	18	18	22	122
20001-30000	13	13	11	14	15	20	27	113
30001-40000	4	7	5	6	5	6	6	39
Above 40001	9	10	13	15	15	14	12	88
Total	40	45	46	53	53	58	67	362

Now by Kendall's' coefficient we could estimate the relationship and test whether the different respondents are in agreement or not, as given below.

H_0: The respondents have disagreement in ranking, the causes of shifting the job.

H_1: The respondents have agreement in ranking the causes of shifting the job.

Test Statistic

W = $\frac{12\sum R^2 - 3[k(n+1)]^2}{(n+1)}$, W approximately follows χ^2 distribution with (n-1) degrees of freedom.

R = rank sum, n =no. of attributes ranked =4, k =ranks = 7

Tabulated value 3 d.f and k = 4 is 7.815

Kendall's coefficient of concordance = $W = \frac{S}{\frac{1}{12}k^2\left(n^3 - n\right)}$ = 8.91,

Cal. W > Tab. W, H_0 is rejected and H_1 is accepted.

Interpretation:

The calculated value of Kendall's coefficient signifies that, there is an agreement among the respondents in ranking system the causes of shifting the job in public sector banks.

Causes of shifting the Job in ranking order (Income-Wise)
in Private Sector Banks
Table No. 31

Income	Rank-1	Rank-2	Rank-3	Rank-4	Rank-5	Rank-6	Rank-7	Total
Less than 20000	4	7	4	6	5	6	6	38
20001-30000	6	7	6	8	10	7	9	53
30001-40000	8	7	8	6	6	9	6	50
Above 40001	2	2	1	1	1	1	1	9
Total	20	23	19	21	22	23	22	150

Now by Kendall's' coefficient we could estimate the relationship and test whether the different respondents are in agreement or not, as given below.

H_0: The respondents have disagreement in ranking, the causes of shifting the job.

H_1: The respondents have agreement in ranking the causes of shifting the job.

Test Statistic

W = $\frac{12\sum R^2 - 3[k(n+1)]^2}{(n+1)}$, W approximately follows χ^2 distribution with (n-1) degrees of freedom.

R = rank sum, n =no. of attributes ranked =4, k =ranks = 7

Tabulated value 3 d.f and k = 4 is 7.815

Kendall's coefficient of concordance = $W = \frac{S}{\frac{1}{12}k^2\left(n^3 - n\right)}$ = 14.51,

Cal. W >Tab. W, H_0 is rejected and H_1 is accepted.

Interpretation:

The calculated value of Kendall's coefficient signifies that, there is an agreement among the respondents in ranking the causes of shifting the job in private sector banks.

Causes of shifting the Job in ranking order (Education-wise)
in Public Sector Banks
Table No. 32

Education	Rank-1	Rank-2	Rank-3	Rank-4	Rank-5	Rank-6	Rank-7	Total
Graduate	9	10	12	16	14	17	16	94
Post Graduate	10	9	16	12	15	19	18	99
Professional	14	16	17	18	18	18	22	123
Technical	4	6	6	7	8	6	9	46
Total	37	41	51	53	55	60	65	362

Now by Kendall's' coefficient we could estimate the relationship and test whether the different respondents are in agreement or not, as given below.

H_0: The respondents have disagreement in ranking, the causes of shifting the job.

H_1: The respondents have agreement in ranking the causes of shifting the job.

Test Statistic

W = $\frac{12\sum R^2 - 3[k(n+1)]^2}{(n+1)}$, W approximately follows χ^2 distribution with (n-1) degrees of freedom.

R = rank sum, n =no. of attributes ranked =4, k =ranks = 7

Tabulated value 3 d.f and k = 4 is 7.815

Kendall's coefficient of concordance = $W = \frac{S}{\frac{1}{12}k^2\left(n^3 - n\right)}$ = 3.562,

Cal. W < Tab. W, H_0 is accepted and H_1 is rejected.

Interpretation:

The calculated value of Kendall's coefficient signifies that, there is a disagreement among the respondents in ranking the causes of shifting the job in public sector banks.

Causes of shifting the Job in ranking order (Education-wise)

in Public Sector Banks

Table No. 33

Education	Rank-1	Rank-2	Rank-3	Rank-4	Rank-5	Rank-6	Rank-7	Total
Graduate	0	0	0	0	0	0	0	0
Post Graduate	2	5	4	4	6	7	6	34
Professional	11	10	12	15	14	19	16	97
Technical	2	3	2	3	4	1	4	19
Total	15	18	18	22	24	27	26	150

Now by Kendall's' coefficient we could estimate the relationship and test whether the different respondents are in agreement or not, as given below.

H_0: The respondents have disagreement in ranking, the causes of shifting the job.

H_1: The respondents have agreement in ranking the causes of shifting the job.

Test Statistic

W = $\frac{12\sum R^2 - 3[k(n+1)]^2}{(n+1)}$, W approximately follows χ^2 distribution with (n-1) degrees of freedom.

R = rank sum, n =no. of attributes ranked =4, k =ranks = 7

Tabulated value 3 d.f and k = 4 is 7.815

Kendall's coefficient of concordance = $W = \frac{S}{\frac{1}{12}k^2\left(n^3 - n\right)}$ = 15.112,

Cal. W > Tab. W, H_0 is rejected and H_1 is accepted.

Interpretation:

The calculated value of Kendall's coefficient signifies that, there is an agreement among the respondents in ranking the causes of shifting the job in private sector banks.

$S^2 = [\sum(X_1 - \overline{X_1})^2 + \sum(X_2 - \overline{X_2})^2] / [n_1+n_2-2] = 32.5$

t = 25.35, which is greater than the Table Value of $t = t_{0.05} = 1.96$

So, H_0 is rejected and H_1 is accepted.

Hence we can conclude that there exist differences between the reasons for continuation of a job in a private sector and that of the public sector banks.

2. There are no significant differences amongst the reasons of job shifting for employees. One way ANOVA has been performed to analyze the differences amongst the reasons of job shifting for employees.

Reasons of job shifting for employees

	Sum of Squares	d.f.	Mean Square	F
Between Groups	2515.500	2	1257.75	15.881
Within Groups	712.750	9	79.194	
Total	3228.25	11		

Null hypothesis H_0: There is no significant difference of reasons shifting the jobs for the employees.

Alternative hypothesis H_1: There is a significant difference of reasons shifting the jobs for the employees.

Tab. Val of $F_{(0.05)}$ at (2, 9) d.f is 4.26

As, $F_{cal} > F_{tab,}$ H_0 is rejected and H_1 is accepted.

Interpretation: There exists significant difference of reasons of shifting the jobs for the employees.

3. Remuneration is the key criterion for ensuring whole hearted support to the organization.

Correlations

		Remuneration	Support to the organization
Remuneration	Pearson Correlation	1	0.878
	N	10	10
Support to the organization	Pearson Correlation	0.878	1
	N	10	10

** Correlation is significant at the 0.01 level (2-tailed).

There is a fairly good correlation between the variables. Therefore it is concluded that Remuneration is the key criterion for ensuring whole hearted support to the organization.

SUGGESTIONS:

The talent management scenario in the banking sector becoming increasingly competitive and customer oriented so identification and management of talented personals is becomes the biggest challenge. Talent management initiatives are well developed in private sector banks as compared to public sector banks in terms of rewards, remuneration and selection procedures. Public sector banks compensates in terms of job stability due to life time employment with post employment pension.

With the financial reforms during early 1990s, followed by implementation of high-end technologies by the public sector banks during the last decade, the talent management in these banks has become a very challenging issue. The process of talent management, which is in practice, in the public sector banks may be discussed in the following steps.

CONCLUSION:

Public Sector Banks are ahead of the Private Sector Banks. Themain reasons are the trust andreliability factor (DICGC assuranceon deposits) and the location of the branch (Financial Inclusion policy of Reserve Bank of India). According to the Hudson report, 2008, the critical HR challenges are hiring right staff, retaining talented staffs, staff development, salary inflation, external threats, etc. Other challenges are changing working conditions, re-skilling, compensation etc. Gone are those days when an employee in a public sector bank was retiring from the same bank after serving the bank for 30-40 years. With enough options for career, today an employee leaves a particular public sector bank just because some other bank offers him or her posting near his/ her home town or a private bank offers a better pay package. Some employees even after putting their service for 15-20 years in a public sector bank may switch to academic profession or joining to a consulting firm for better opportunities. Statistics reveal that the attrition rate in public sector banks in recent years is quite alarming.

When we consider the cause of shifting of job according to the age wise, the respondents of private sector banks shows the agreement but there is a disagreement of opinion of respondents on public sector banks. When we take income wise in account, both the respondents of public sector and private sector banks agree in the same manner for the causes of shifting of job. When we consider education wise then in public sector banks, the respondents showed their disagreement where as in private sector banks the respondents shown their agreement.

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A CONCEPTUAL FRAMEWORK ON GREEN HRM: AN EMERGING TREND IN HR PRACTICES AND CHANGES NEEDED IN EMPLOYMENT RELATIONSHIPS.

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Abstract

The COVID-19 pandemic has changed the way we operate at work. This paper target underlying strategies for improving environmental sustainability, creating awareness among human resource managers and employees about Green Human Resource Management (GHRM), the green movement, and therefore the use of natural resources to assist organizations foster sustainable development, up-gradation and safeguard the health and safety of stakeholders. During the COVID-19 pandemic, employers are putting greater efforts towards achieving the amount of employee's health and giving all-round protection. Green HRM encompasses all activities aimed toward helping a corporation do its curriculum for environment management to cut back its carbon footprint in areas which concerns outsourcing, on-boarding and absorption of human resources, their induction, performance appraisal & management, training and development, compensation management system with paperless work. this is often only possible by the proactive implementation of green HRM within the organization. These practices would lead to improving employee attitudes and behaviors at work place within the organization. This paper diagnosis GHRM practices in organizations supported the much recent published relevant information. The study found the importance of GHRM creations, practices, strategies, and process of facing difficulties within the business and other organizations. The study uses strategies to gather, observe, and dissipate contemporary facts of green human resource management. This is to make the workers attentive to the intricacies of environment management.

Key words: Human Resource Management, Green HRM, Environment sustainability, Organization, Corporate Image.

1. Introduction

In today's world of depleting natural capital, the "green way" of doing business is poised to become the subsequent competitive advantage. Companies have begun to acknowledge the importance of going green as a part of their innovation strategy.

In recent times the importance of Environmental issues and Sustainable development has increased both in the developed and developing nations. Growing concern for global environment and therefore the development of international standards for Environmental Management has created a requirement for businesses to adopt 'green practices'. With these concerns organizations today became more conscious about the growing importance of the combination of Environmental Management and Human Resource Management i.e. 'Green HRM' Practices. Green HRM is that the use of HRM policies to push the sustainable use of resources within business organizations and more generally, promotes the reason for environmental sustainability. It involves human resource initiatives to endorse sustainable practices and increase employee awareness and commitments on the problems of

sustainability. Green HR could be a field of HR, extends its role in promoting and achieving sustainable goals within a company. It uses the HRM policies to make a comprehensive system of preserving natural resources by creating employee awareness.
Green HRM practices play an important role during a forward-thinking business that develops other ways to save lots of cost without compromising on their talent & essential resources. It ranges from the promotion of saving energy to the usage of ethical practices. Its initiatives align various HR processes like staffing, performance management, training, and development with sustainable business.

1.1 Concept

Twenty-first century has been showing heightened interest within the environmental concerns all round the globe regardless of related fields be it politics, public, or business. The recent interest in environmentalism globally has arisen from specific treaties to combat global climate change. as a result of the harmful consequences of business pollution and waste materials, including toxic chemicals, governments and NGOs around the globe promoted regulations and policies with effect of slowing down and to some extent even reverse the destruction of natural resources and its negative effect on the mankind and therefore the society as a full.

Human Resource Management (HRM) is a vital faction of management that deals with human resources. The full context of HRM is currently being considered within the light of sustainability. Human Resource Management (HRM) is engaged in managing the environment within a corporation. Mampra (2013) defines Green HRM because the use of HRM policies to encourage the sustainable use of resources within business enterprises and promote the reason for environmentalism which further boosts up employee morale and satisfaction.
Green initiatives within HRM form a part of wider programs of corporate social responsibility. Green HR essentially consists of two major elements namely environment-friendly HR practices and therefore the preservation of data capital (Mandip, 2012). Within a company, human resource and their systems are the fundamental foundation of any business, be it financial business or sustainable business. They're those answerable for planning and executing those eco-friendly policies to form a green atmosphere. Without facilitating the human resource and implementing sustainable policies, going green would be a tough nut to crack.
Green HR consists of two essential elements: Environmentally-friendly HR practices and therefore the preservation of information capital. It entails undertaking environment friendly initiatives leading to greater efficiency, lower costs, and better employee engagement and retention which successively help organization to cut back carbon footprints.

HR policies target collective and individual capabilities to bring about green behaviour. Such policies are aimed at developing an environmental corporate culture. Green HRM focuses on employees' environmental behavior within the company, which successively, may well be carried on to consumption pattern in their private life (Muster and Schrader 2011). Researchers within the area of Green Management initiatives argued that Environmental Management System (EMS) can only be effectively implemented if the businesses have the proper people with the correct skills and competencies (Daily and Huang 2001). Because

the implementation of those initiatives requires a high level of technical and management skills among employees (Callen Bach et. al., 1993) therefore Green HR initiatives involve the implementation of recruitment and selection practices, compensation and performance-based appraisal systems, and also the training programmes aimed toward increasing the employees' environmental awareness.

In the environmental literature, the concept of Green management for sustainable development has various definitions; all of which generally, seek to clarify the necessity for balance between industrial growth for wealth creation and safeguarding the natural environment so that the future generations may thrive (DailyandHuang,2001).Though organizations now a days have been acting on product innovation for environmental sustainability yet the problem of how a private organization or entire society achieves sustainability from the green management movement remains debatable and unclear. Therefore, this research study attempts to detail a process model of the HR practices involved in green HRM on the premise of obtainable literature.

The Covid-19 pandemic has forcibly induced changes within the way company employee's work, promoting virtual-working and greater work day flexibility. But these changes have also challenged traditional conceptions of the use relationship. It's tougher to watch the activities of employees who are functioning at a distance; it's harder for supervisors to produce feedback and direction to employees who are teleworking, and it's more awkward for workers to interact with other employees remotely (Carillo et al., 2020).

1.2. How to Make Green HRM Work for You

According to Jabbour and Santos (2008), HRM will help businesses with environmental management if they: A Hire and choose those who are environmentally conscious; b. Train and develop those that are environmentally conscious; c Train and develop those who are use environmental standards to coach and assess employees' performance; d Incorporate remunerated and non-remunerated methods of rewarding individual and collective environmental performance; e Encourage ongoing environmental management education; f Treat environmental issues as organizational values; and g Encourage team collaboration to deal with environmental issues and aim for continuous development of environmental management activities. Kitazawa and Sarkis found that an eternal reduction in pollution is significantly linked to the empowerment and involvement of employees who are trained in environmental management activities and reward programmes, like profit-sharing, which will increase employee participation in businesses, supported a study of three companies. Furthermore, team-based approaches, capability enhancements, transparent communication, and management support for quality improvement in operational activities for pollution reduction are found to be critical. Perron, Cote, and Duffy (2006) emphasize monitoring employee performance after being educated on environmental issues to test employee performance progress on environmental management, supported research involving employees from two separate organizations. Environmental training and communication, organisational learning, and also the success of environmental management programmes are all essential, in keeping with other researchers. GHRM, per Dutta, is directly to blame for developing a green

workforce that recognizes, values, and implements green policies. During the HRM phase of recruiting, hiring, and training, still as compensating, improving, and advancing the firm's human resources, an organization may retain its green objectives. Implementing stringent employee recruitment and selection, a performance-based assessment framework, and training programmes targeted at green management initiatives are all critical to promoting environmental innovation. Developing a reputation as a green employer will facilitate your recruit new employees. in step with Phillips, 8% of UK businesses honour green behaviour with a range of awards and/or financial rewards. Employers with environmental responsibility may use their green responsibilities to draw talent that suits and contributes to the organization's environmental goals. The efficacy of executive compensation policies is linked to greater pollution control performance in US companies operating in high-polluting industries, in keeping with Baron and Gomez Mejia. Recognition services, like those run daily, are another common component of corporate environmental initiatives.

1.3. Objectives

The main purpose of this study is to:

• Provide with a basic understanding of green HRM to the readers,
• Highlight different significant works on green HRM by other workers, and
• Elaborate on various green practices that may be incorporated for building a Green workplace.
• Attempts to suggest some green initiatives for HR.

1.4. Methodology

The study is based upon the secondary data. For this extant literature associated with the subject from different databases, websites and other available sources were collected. A scientific review of collected literature was exhausted detail.

1.5. What is Green HRM?

The term Green HRM has become the thrill word within the business field at this time and its significance is increasing manifold with the passage of your time. This term has also its secured position as a hot topic in recent research works since the attention on environmental management and sustainable development has been increasingly raising day by day all around the globe. Today the subject Green HRM not only includes awareness toward environmental affairs, but also stands for the social similarly as economical well-being of both the organization and also the employees within a broader prospect.

1.6. Needs for GHRM

Last 20 years of this century have witnessed a unanimous consensus for the necessity of a practical environmental management drive everywhere the globe. This effort was undertaken since the damaging effects of various pollutants among which the economic wastes being the most important culprit that has been deteriorating and depleting our natural resources in no

time has been evident. The "Magna Carta" on Human Environment was declared within the first United Nation's (International) Conference on Human Environment held in June 1972 in Stockholm declared that to defend and improve the human environment for present and future generation became an essential goal for mankind.

1.7. Literature review

The extant literature within the HR field on the subject of sustainability suggests that more and more HR executives are keen to modulate their corporation per se to become exclusive environmental champions. an excellent extent of inquiry highlights the impact of environment management practices on performance of the organization using different parameters (Iraldo, Testa, & Frey, 2009; Yang, Lin, Chan, &Sheu, 2010). Literature has given importance to adoption of environmental practices as a key objective of organizational functioning making it important to spot with the support of human resource management practices. (Cherian & Jacob, 2012, p. 25). Haden, Oyler, and Humphrey (2009) comprehend that the combination of environmental objectives and methods together with the strategic development goals of a corporation ends up in an efficient environment management system. Daily and Huang (2001) proposed that organizations essentially must balance the commercial growth similarly as preservation of the environment because it's been confirmed that by endorsing green practices, the businesses may profit over before (Murari& Bhandari, 2011).

1.8. GHRM functions future direction

GHRM could be a manifesto which helps to make green workforce that may understand and appreciate green culture in a company. Such green initiative can maintain its green objectives all throughout the HRM process of recruiting, hiring and training, compensating, developing, and advancing the firm's human capital (Dutta, 2012). The Human Resource Department of a corporation is capable of playing a major role within the creation of sustainability culture within the corporate (Harmon et al., 2010).

2. Aspects of Green HRM from a Strategic Perspective

HR is critical in ensuring that the organization's environmental responsibilities are incorporated into the company mission statement. The HR managers' job is to lift awareness about Green HRM, the Green movement, and therefore the use of natural resources within the workplace, assisting the corporate in maintaining a healthy environment and preserving natural resources for future generations. A green job is one that involves working directly with environmental policies, information, materials, and technology and wishes specific knowledge, expertise, training, or experience in these fields.

Green HRM focuses on employee environmental attitudes within the workplace, which workers can then replicate in their personal lives.

The following are samples of green HR policies:

• Human resource sourcing and procurement.
• Green hiring and selection.
• Orientation; Learning and Growth.
• Management of green results.
• Compensation and reward management that's environmentally friendly.

2.1. Human resource sourcing and procurement:

Green goals should be included within the management verbal description so higher-level executives are well-versed for green initiatives. Environmental awareness should be included within the organization's competency model as a prerequisite for workers. Recruitment and selection practices that are environmentally friendly Green hiring may be a system that emphasizes the importance of the community as a serious component of the corporate. Additionally, the hires are excited and, to a point, obsessed on working for a "green" organization that's environmentally friendly. Companies will easily induct practitioners who are knowledgeable of sustainable processes and are already aware of basics like recycling, conservation, and creating a more rational environment by recruiting applicants with a green bent of mind. In their research on the effect of a company's environmental standards on employee recruitment, Grolleau et al. (2012) discovered that a company's environmental commitment contributes to its profile. In their initial study, they found that professionals were more worried with a company's environmental policy. Companies may use their websites to ask people to use for open positions. To attenuate waste of printed papers, a resume is submitted online. Web portals may be used for on boarding documents like bid letters, certificates, and testimonials about skills and experiences, furthermore as acceptance letters from selected applicants. Companies that are environmentally conscious attract more skilled and motivated employees. Some job seekers tend to forego a better salary so as to figure for environmentally conscious organizations. Some job descriptions for advertised positions, additionally as other company details, are often posted on the company's website, which aids within the orientation of recent employees. Several environmental considerations may be listed within the verbal description another time. The duty description should include a piece on environmental issues. Environmental reporting functions, health and safety assignments, and dangerous elements/probable radiations for workers are all included during this sort of description, which is then matched to worker characteristics supported environmental competencies. Green consciousness is also used as a preferential criterion when hiring workers. Employers hunt for workers that are environmentally conscious.

Green recruiting could be a system where the main focus is given on importance of the environment and making it a serious element within the organization. Complementing this, the recruits also are enthusiastic, and to some extent, hooked in to working for an environment friendly "green" company. Recruiting candidates with green bend of mind make it easy for firms to induct professionals who are aware with sustainable processes and are already conversant in basics like recycling, conservation, and creating a more logical world.

2.2. Orientation:

The employee induction programme should be designed in such the way that new hires are introduced to a green-conscious community. Within the orientation programme, employers should emphasize their concern for green concerns like employee health, protection, and green working conditions.

2.3. Growth and Green training and development

Training and development could be a practice that focuses on development of employees' skills, knowledge, and attitudes, prevent deterioration of EM-related knowledge, skills, and attitudes Green training and development educate employees about the worth of EM, train them in working methods that conserve energy, reduce waste, diffuse environmental awareness within the organization, and supply opportunity to interact employees in environmental problem-solving. Green T&D activities make employees attentive to different aspects and value of environment management. It helps them to embrace different methods of conservation including waste management within a corporation. Training and growth may be a process that focuses on improving workers' abilities, expertise, and attitudes so as to avoid the loss of EM-related knowledge, skills, and attitudes (Zoogah, 2011, p. 17). Employees are made awake to various aspects and therefore the importance of environmental sustainability through green T&D activities. It enables them to adopt various recycling practices, like waste management within a company. It also improves an employee's ability to house a spread of environmental concerns. in a very survey of managers on best management practises, Ramus (2002) found that environmental training and education, additionally as creating a positive environmental culture for workers where they want, they're a component of environmental outcomes, are the foremost critical HRM processes for achieving environmental goals. Employees may enjoy learning, training, and growth policies like programmes, seminars, and sessions that help them improve and acquire expertise in environmental management, green skills, and attitudes. Job rotation within the green assignment should become an integral aspect of the career growth strategy for potential talented green managers. The content of coaching should be determined so as to enhance employee competencies and skills in green management. Environmental management training may make extensive use of online and web-based training courses, further as interactive media. Health, energy conservation, waste management, and recycling are all environmental concerns which will be addressed by green training. Training managers can rely more on the web course material and case studies instead of on printed handouts, thereby further reducing the utilization of paper.

2.4. Green performance management:

Performance management (PM) is that the method of encouraging workers to enhance their technical skills so as to assist the corporate accomplishes its goals and objectives more effectively. For every risk area in environmental awareness and guidance will help to successfully launch a green PM framework. Green initiatives must be communicated in the

slightest degree levels of the organization. Green goals and responsibilities are also set by managers and employees.

Performance management (PM) is that the process by which employees are prompted to boost their professional skills that help to attain the organizational goals and objectives in a very better way. The popularity of the company strategy culminates into the PM. With the EM affecting global business strategy, PM is additionally being influenced by the green wave in an exceedingly possible positive manner. Green performance management consists of issues associated with environmental concerns and policies of the corporate. Today some firms house the difficulty of PM by installing corporate-wide environmental performance standards, and Green information systems/audits to realize useful data on environmental performance (Marcus & Fremeth, 2009).

The PM is that the culmination of the appreciation of the business strategy. With the EM influencing global business strategy, the green wave is probably going to own a positive impact on PM. Green performance management is worried with the company's environmental concerns and policies. It also focuses on the applying of environmental obligations. In their research, Epstein and Roy (1997) found that when HR managers incorporate environmental performance into PM systems, they protect environmental management from damage. The goal of the performance management (PM) system in green management is to live ecological performance standards across the organization's departments and acquire useful information on managers' green performance. The PM system should include green performance indicators. The event of performance metrics for every risk area in environmental awareness and guidance will help to successfully launch a green PM framework. Green initiatives must be communicated in the slightest degree levels of the organization. Green goals and responsibilities could also be set by managers and employees.

2.5. Green compensation and rewards management:

Rewards and compensation are the most important HRM processes through which employees are rewarded for his or her performance. These HR practices are the foremost powerful method which links together an individual’s interest to it of the organizations. We also assert that incentives and rewards can influence employees’ attention to the utmost at work and motivate them to exert maximum effort on their part to attain organizational goals.

Rewards and compensation could also be thought of as possible mechanisms for promoting sustainable programmes in organisations within the sense of Green HRM. Modern companies are designing incentive programmes to push eco-friendly activities undertaken by their workers, in line with a strategic approach to reward and management. Employees' compensation packages should be adjusted to reward the training and achievement of green skills. Monthly managerial incentives and monetary, nonmonetary, and recognition-related environmental compensation programmes could also be offered supported performance outcomes in environmental balance. The first considerations for executive compensation as an

award for green activities are carbon emission standards and renewable energy sources. Employees who achieve green objectives are compensated.

2.6. Green Employee relations:

Employee relations are that aspect of HRM which is anxious with establishing amicable employer–employee relationship. The connection facilitates motivation and morale of the workers further as, increases the productivity. Other benefits of employee involvement are improvement in employee and organizational health and safety, similarly as development of eco-friendly staff. We propose that keeping the policies in situ, long-term trust among the management and employees are built which can provide a chance to the workers to precise their personal ideas at workplace and help to form climate conducive to green management practices and systems.

Employee relations are the part of human resources management that deals with establishing a positive employer–employee relationship. Employee motivation and morale are improved as results of the partnership, as is efficiency. Employee relations are essentially practices that include employee engagement and empowerment. It also aids within the prevention and backbone of workplace issues that might have a control on the duty. Positive employee relations are, in reality, an intangible and long-lasting asset furthermore as a source of competitive advantage for any business. Employee involvement in green initiatives improves green management by aligning employees' priorities, skills, motivations, and perceptions with green management policies and systems. Employee involvement in EM has been identified to boost EM systems like resource efficiency (Florida & Davison, 2001); waste reduction and occupational emissions reduction (Florida & Davison, 2001). Individual empowerment, in keeping with several researchers, features a positive impact on efficiency and success, moreover as facilitating self-control, individual thought, and problem-solving skills (Renwick, 2008; Wee &Quazi, 2005). Employee interactions should be broadened by instituting a suggestion scheme within the corporate, within which every employee, from the highest to the underside, is given the chance to participate. This practice would aid in raising awareness of environmental issues, furthermore as generating new ideas for environmentally sustainable practices from various sources.

3. Green initiatives for HR

Organizations across the planet are incorporating and dealing toward implementing GHRM practices to achieve competitive advantages among the company world. Complete adoption and integration of GHRM in business isn't impossible but requires a changed approach toward the present HR practices on a part of both the management also as employees simultaneously. There are numerous issues associated with GHRM that's to be taken into consideration by HR department before implementing green initiatives and, all of them may be not contained within one document. due to the space limit the subsequent section of the paper briefly focus upon a number of the most important green initiatives for HR departments.

3.1. Buildings that's environmentally friendly:

Organizations everywhere in the planet are increasingly choosing green buildings as their workplaces and offices over conventional offices. Green buildings meet some criteria for reducing the exploitation of natural resources utilized in their construction, making the phenomenon very trend-setting. Green buildings even have several additional features associated with green practices including energy conservation, renewable energy, and storm water management. In recent years, there has been a rapid increase within the adoption of green buildings by businesses. The importance of green buildings in managing environmental issues has become increasingly apparent within the business world. Due to their low cost of construction and engineering, green buildings also function a forum for financial savings for businesses. Business behemoths like Ford and PepsiCo are committed to sustainability and have incorporated green building design concepts into their structures.

3.2. Paperless office

Most of the office is managed on paper but, with introduction of IT, the consumption of paper has been reduced. Today E-business and learning have changed the methods and procedures at offices converting them into paperless offices. Paperless office could be a work place where the employment of paper is either restricted or eliminated by converting important official documents and other papers into automated workflows. Finally, we assert that by reducing the employment of paper, we will directly conserve natural resources, prevent pollution, and reduce wastage of water and energy.

3.3. Power conservation:

Energy conservation within the workplace has the potential to own a major environmental effect. Offices round the world have adopted many energy saving programmes to cut back their environmental effects so as to produce simpler and environmentally sustainable services. Organizations are now encouraging the widespread use of energy star-rated light bulbs and fixtures, which use a minimum of two-thirds, less energy than standard bulbs and fixtures.

Conservation of energy within the office has the potential for a good environmental impact. In an endeavor to produce more efficient and eco-friendly services, offices round the world have implemented several energy conservation initiatives to cut back the environmental impact. The HR department at the United Kingdom arm of Sky has started a campaign where the staff are asked to show off PCs, TVs, and lights when leaving, to use 100% renewable energy, and introduced solar lighting (Davies & Smith, 2007), Whereas the HR department of other British organizations is emphasizing upon their travel policy which promotes car sharing and therefore the increased use of conveyance (Simms, 2007). additionally, HR systems like e-HR are seen to be able to help management and employees track their own carbon emissions (Beechinor, 2007). Organizations also are promoting the extensive use of energy star-rated light bulbs and fixtures which undoubtedly consumes a minimum of two-thirds less energy than regular ones.

3.4. Waste disposal and recycling:

Recycling is that the process of converting discarded materials (waste) into fresh and usable products. Recycling is that the methodology of processing exhausted materials (waste) into new and useful products. Recycling reduces the utilization of raw materials that will are otherwise wont to produce new products. Consequently, this practice saves energy and reduces the number of wastes that's thrown into the dustbins, thereby making the environment cleaner and therefore the air fresher. As an element of their green initiatives, several organizations are implementing recycling program to extend the number of recycled products and reduce the number of wastes. Recycling helps to avoid wasting raw materials that might preferably be wont to create new goods. As a result, this method saves electricity and reduces the number of wastes dumped into landfills, leading to a safer atmosphere and cleaner air. Several organizations are introducing recycling programmes as a part of their sustainability initiatives to extend the quantity of recycled materials and reduce waste. Resource experts are tasked with developing company recycling systems and tracking workplace thermostats since the businesses adopted the thought of saving money while still concentrating on the environment and sustainability. Many HR practitioners concluded as a result of this process that green initiatives were a crucial a part of overall corporate social responsibility. To avoid wasting the world, the entire business world is reciting the old motto of the three R Reduce, Reuse, and Recycle.

4. Aspect of Green HRM

HR plays a significant role in making the environmental responsibility of the organization as a component of the company mission statement. The responsibility of the HR managers is to make awareness about the Green HRM, the Green movement, and therefore the utilization of natural resources, helping the company to take care of the right environment and retain natural resources for future generations among young and dealing people.

5. HRM Practices

1. Encouraging workers to search out ways to scale back the employment of environmentally harmful chemicals in their goods through training and rewards.

2. Assisting workers in locating ways to recycle materials which will be wont to build playgrounds for kids that don't have access to safe places to play.

3. The HRM structure of a company should represent wealth, growth, and well-being, resulting in the long-term health and sustainability of both internal (employees) and external (communities).

4. Emphasizing long-term job stability helps workers, their families, and their neighborhoods escape disruption.

5. The employment of company job sites for recruiting, likewise because the tradition of phone, internet, and video interviews, which may reduce the candidate's travel requirements while also reducing paperwork.

6. Businesses can give green incentives to workers by arranging for a nature friendly workplace and lifestyle benefits like carbon credit equalizers, free bicycles, and so on.

7. Talented, professional, and seasoned workers are increasingly concerned about the environment, and that they seek self-actualization so as to stay committed to their employment. By adhering to green values and practices, green HR can foster this commitment.

8. Within the areas of recruiting, training and advancement, and performance assessment, green actions may be accomplished with the smallest amount of paper and written materials.

9. By minimizing the employment of printed products, increasing recycling, using ecofriendly grocery and lunch bags, and banning the utilization of drinking water and plastic within the workplace, a corporation can create a green business climate.

10. Within the office, fluorescent light bulbs and other energy-saving green technologies is also used.

11. Companies may encourage workers to boost their travel and commuting habits by minimizing official car trips, using public transportation for business travel, carpooling, offering interest-free loans for motorcar purchases, and inspiring employees to bike or walk to figure.

12. Whenever possible, conduct business meetings and conferences through the net, telephone, or video conferencing to save lots of time and money.

13. Workers, their families, and also the general public should participate in wellness programmes that emphasize workout, good nutrition, and a balanced lifestyle. Environmental sustainability should be included within the company's mission statement as a component of their corporate responsibility as a good green goal.

14. Encourage the worker to avoid wasting electricity by turning off lights, monitors, and printers during work hours and on weekends. 16. Encourage staff to show off computers and printers after they are going to be out for an extended period of your time.

6. Advantages of Green HRM

The following are a number of the benefits of GHRM as defined by experts:
1. Assisting businesses in reducing expenses without sacrificing talent.

2. Being green and developing a brand-new friendly world provide massive growth opportunities for businesses, furthermore as huge operational savings by lowering their carbon footprint.

3. It contributes to increased employee work satisfaction and loyalty, which results in increased productivity and long-term viability.

4. Foster a community of caring for one's coworkers' well-being and health.

5. A rise within the employee's retention rate.

6. An improved public profile. When an organization implements a green programme within the workplace, the incident is often accustomed generate positive publicity. Organizations may use press releases to advertise their environmental contributions to the media so as to achieve the eye of potential buyers and generate new revenue.

7. Work to spice up employee morale.

8. The company's environmental impact is reduced.

9. Improved average efficiency and increased competition.

10. Substantial reduction in utility costs. And little businesses can save cash on utilities by implementing energy-efficient and waste-reduction technologies.

11. Tax breaks and rebates. Governments, local municipalities, water system authorities, and electric utilities all provide tax incentives and rebates, making it easier to travel green.

12. Expanded market possibilities only companies that meet clear green criteria are allowed to bid on contracts with certain government agencies, commercial businesses, and charitable organizations. Some businesses often require their buying departments to only purchase green groceries or to use products and services from companies that meet certain environmental criteria.

13. Lessening the impact on the climate. Encourage workers to seek out ways to scale back the employment of environmentally harmful products by training and compensation.

14. Consumers today, especially the foremost educated and affluent, hunt down businesses that adhere to environmental regulations. Organizations that pursue environmentally sustainable human resource practices will profit greatly.

15. This could aid within the development of greener goods and also the reduction of waste. Consumer satisfaction is often improved indirectly by promoting such principles.

7. **HRM Practices in Companies**

Businesses are under heightened economic, regulatory, and societal pressures in today's global business world. Additionally, there's demand for environmental protection, which necessitates the implementation of policies to cut back the environmental impacts of the products and services provided. Going green, consistent with Clem (2008), represents a social consciousness about sustaining and maintaining the Earth's natural resources for the sake of civilization. The marketplace for food is increasing as consumers become more tuned in to environmental issues. This increased sensitivity to and understanding of environmental issues puts some demands on business functions to become more environmentally friendly. Smith (2003) and Friend (2009) describe 'green businesses' as businesses and activities that are perceived as environmentally sustainable, like the utilization of organic and natural resources to make factories, stricter pollution controls, and environmentally friendly material sourcing. in keeping with Gilbert (2007), a green business operation is any activity that has either a coffee negative ecological effect or directly benefits the natural environment in any way. A green company, per Morebusiness.com (2009), uses fewer natural resources to finish tasks and uses sustainable methods and materials, like recycling (paper, plastic, appliances, glass, and aluminum) and utilizing sustainable goods (recycled, plant-based or organically grown). With environmental issues at the forefront of all business decisions, HR's position is about to vary dramatically, and Green HR is anticipated to dominate the longer term of all businesses, large and little. In fact, some researchers have attempted to classify the literature on the idea of entry-to-exit processes in HRM (from recruitment to exit), revealing the role that HR processes play in translating Green HR policy into practice, given the growing need for the combination of environmental management into Human Resource Management (HRM) – Green HRM – research practice. Green HR could be a technique that focuses on lowering each employee's carbon footprint and retaining talent. the traditional CSR definition is combined with a longer-term renewable approach to business practices during this term. Electronic filing, carsharing, job-sharing, teleconferencing and virtual interviews, recycling, telecommuting, and online training are samples of environmentally friendly HR programmes that lead to greater efficiencies, lower costs, and better employee engagement and, as a result, help companies reduce employee carbon footprints.

• **IBM:** Over the last ten years, IBM has undergone a dramatic and well-publicized transition, transforming itself from a robust multinational corporation to a globally integrated corporation. Such businesses combine development and value distribution round the globe by locating business functions where they're most cost-effective and qualified. IBM's human resources (HR) department analyzed its own operations and procedures to remain in keeping with this approach and serve other business needs, distinguishing key HR responsibilities like policy creation and internal business consulting from noncore back-office administrative tasks. "We were wasting lots of your time on processing and logistical aspects, running technology, and plenty of other foundational items that weren't contributing anything to the underside line. IBM recognizes the necessity to draw on talent globally, with quite 170 countries and 62 percent of our company services located there. HR has moved to a globally oriented, process-driven model to accomplish this. IBM's five building blocks provide you with the

resources you wish to save lots of money and develop your company. They've learned that going green has a control on both the wallet and also the environment. Reduce maintenance costs 40-50 percent energy savings $1.3 million a year Positive environmental effect 1,300 fewer vehicles or 3.5 million pounds of coal saved Diagnose Get the facts to grasp the energy usage and potential for change Develop Plan, build, and upgrade to energy efficient data centers Cool Virtualize Implement etc. IBM's Big Green Use initiative has pioneered creative cooling technologies and takes a holistic Green IT approach.

• **ONGC:** within the 'Mining, rock oil Production' group of Fortune's Most Admired List 2012, ONGC is that the only Indian energy major. Supported sales (US$ 26.3 billion), profits (US$ 5 billion), assets (US$ 51 billion), and capitalization (US$ 46.6 billion), it's ranked 171st in Forbes Global 2000 list of the world's largest companies for 2012. Transparency International has ranked ONGC 39th among the world's 105 largest listed companies in terms of 'transparency in corporate reporting,' making it India's most transparent business. Landscaping, garden design, and area greening projects have begun on the Jolly grant Airport campus in Dehradun. ONGC encompasses a range of green HRM initiatives. Another is that the Vadodara Movement, which is operated by Indian Express.

GAIL (Gas Authority of India Limited) is one in every of India's premier Navratna Public Sector Undertakings, having consistently retained its Navratna status since 1997. The business is using the simplest Human Resource Management techniques that are widely used and practiced in top-tier multinational companies. TEAM GAIL, the name given to GAIL India Limited's staff, is to blame for the company's growth. it's an oversized growth opportunity within the coming years because it expands its base in India so as to extend the utilization of green energy. It's been ready to significantly reduce the country's environmental emissions. The preservation of the Taj Mahal from pollution, additionally as reformative measures in capital of India, Surat, Mumbai, and a bunch of other towns, live samples of its excellence. It's one in all the safest public-sector organizations, with no recorded cases of business hazard or injuries in any of its facilities for several years. It's thanks to the human resources' high degree of dedication to figure. It donates 2% of its Profit after Tax (PAT) to charitable organizations. It's an enormous support to lakhs of India's poor and vulnerable people. In keeping with Hewitt International, an internationally recognized survey firm, it's ranked jointly of the most effective employers within the country. The corporation is one amongst the world's biggest corporate citizens. For several years, the simplest management systems are in use. It's a really honest and open business. It's a really high degree of customer satisfaction. Due to its strong Human Resource Management practices, its workers are among the very best paying and most happy.

• **Wal-Mart:** Wal-Mart's big-picture strategic aim of being powered entirely by renewable energy, producing zero waste, and selling goods that benefit consumers and therefore the environment is attracting lots of attention. Much has been written about its plans to green its supply chain and improve organic product scores so as to realize a 20 million weight unit reduction in greenhouse emission emissions. Via a volunteer associate sustainability initiative, Wal-Mart is enlisting the assistance of its a lot of associates spread across four continents to assist transform its declared initiatives into reality. Wal-Mart

employees everywhere the globe is focused on their health, their communities, and also the environment. Wal-Mart also contains a policy of recognizing employees and their accomplishments on a daily basis. Wal-Mart has been effective within the green sales, earnings, and environmental improvements by encouraging collective management/associate thinking.

• **ITC**: It could be a leading private sector company in India with a deep commitment to the triple bottom line. It's been a forerunner in implementing environmentally friendly processes, well before regulations, setting industry standards. With a diversified presence in cigarettes, hotels, paper boards and specialty papers, packaging, agribusiness, processed goods, and a spread of other services, it's a capitalization of over US $ 22 billion and a turnover of over US $ 5 billion. Premium Business Paper is one among ITC Ltd.'s sustainable initiatives at ITC Green Products. For the primary time in India, ITC has introduced Paper Kraft Premium Business Paper, an environmentally friendly multipurpose paper for office and residential use, employing a new technology called 'Ozone Treated Elemental Chlorine Free Technology,' which replaces Elemental Chlorine, which was previously employed in the bleaching process during paper manufacturing. As a responsible corporate citizen, ITC engages in an exceedingly type of activities that benefit society, including environmental, health, and safety (EHS) programmes, outreach to the general public, preservation of national heritage, and support for sustainable growth. It's dedicated to environmental protection within the areas where it works. The HR role of their department makes major contribution to the company's green management practices. A good, clean, and green work environment is extremely important to the corporate. ITC is devoted to providing healthy physical working conditions also as encouraging high hygiene and housekeeping standards. The corporate considers commitment to sustainable development to be a critical component of responsible corporate citizenship and so gives it top priority. As a result, the corporate is devoted to Best Practices in environmental matters resulting from its business operations, and every business is anticipated to completely demonstrate this dedication.

HCL Technologies-

HCL Technologies Limited is an Indian global IT services company. It offers services including Software Consulting, Enterprise Transformation, Remote Infrastructure Management, Engineering and R&D services, and Business Process Outsourcing. HCL has offices in 31 countries to supply services across industry verticals, including aerospace & defense, energy & utilities, independent software vendors, manufacturing, professional services, servers & storage, automotive, financial services, industrial manufacturing, media & entertainment, retail & consumer, telecom, consumer electronics, government, life sciences & healthcare, medical devices, semiconductors, and travel, transportation &logistics. In the year 2013 HCL won the Asia-Pacific Enterprise Leadership Award (APELA). This award recognizes and honors the achievements of companies within the areas of sustainable development and company responsibility. HCL runs a multi-layered corporate program "Go Green" to drive its sustainability initiatives. it's green processes across facilities & within the areas of travel, IT and events. The company commits to compliance with ISO14001 standards. It runs campaigns to initiate individual action to wards environmental issues. HCL views Green initiatives

enterprise wide and understands that Green goals can be set at a corporation strategy level so top down approach may be adopted for its implementation, which might create green business processes and Green workplace for employees. Recently HCL has been honored with the 'Global Sustainability Leadership Awards 2014' under the category 'Best Community Action' at the globe CSR Congress. The award recognizes Best Practices & Outstanding Individuals engaged in Corporate & Social Responsibility.

Conclusion:

Green Human Resources Management is targeted on the green movement, which is anxious with environmental conservation and therefore the preservation of the world Earth from potential disasters. As a result, protecting and improving the human environment for current and future generations has become a critical task for humanity. In reality, not only in these firms, but increasingly in other businesses furthermore, Green HRM is poised to play a big role within the industry by incorporating it into management theory, HR policies and practices, employee training, and also the implementation of environmental laws. It'll also raise awareness among workers and community members about the way to use natural resources more efficiently and promote the employment of environmentally friendly goods. Green HRM is the buzzword of the long run. The GHRM activities mentioned during this section can help the organization improve both its environmental and financial performance. GHRM practices reviews like this also are likely to enhance employee health within the workplace, not least by enhancing the working climate and meeting the wants of an increasingly environmentally conscious workforce. To summarize, we assume that GHRM has the power to extend employee well-being likewise as organizational success. Green HR aids in process improvement and price reduction by reducing and removing environmental waste and refurbishing HR materials, equipment, and procedures.

Though the green movement and Green HR are still within the stages of infancy, growing awareness within organizations of the importance of green issues have compelled them to embrace environment-friendly HR practices with a selected specialise in waste management, recycling, reducing the carbon footprint, and using and producing green products. The future of Green HRM appears promising for all the stakeholders of HRM, be it the employers, employees, practitioners, or academicians. Studies that observe the general impact of GHRM systems instead of individual practices would be particularly helpful during this respect. Such studies can help organizations to cut back degradation of the environment become healthier both physically and financially and, make the globe a cleaner and safer place to measure. On the concluding note, we might prefer to add that HR is that the major role player in implementing GHRM practices and policies. but this, they need a vital role to play in recruitment of recent employees who are more established toward green business practices thus, indirectly saving the planet. Last, but not the smallest amount, HR has significant opportunity to contribute to the organization's green movement and plays important role in enthusing, facilitating, and motivating employees for absorbing green practices for greener business.

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IMPLEMENTATION OF AN ERP SYSTEM: A CASE STUDY OF A FULL-SCOPE SAP PROJECT

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Introduction

Although the research literature on Enterprise Resource Planning (ERP) systems is prolific, and covers all stages of the system lifecycle [Eden et al., 2014], detailed analysis of the implementation process is lim tied. Furthermore, misconceptions regarding this topic appear in the literature. The purpose of this study is to analyze the implementation of an ERP system in order to determine what activities were performed in eachof the project phases, what effort was involved for each activity and howlong they lasted. The paper is structured as follows. A literature review is presented, which was performed to determine current understanding of the ERP implementation process. The results of a case study of an SAP im plementation project are then presented. Analysis of the documentation was used as the primary research method. Based on an analysis of the activity reports produced by the consultants during the project, the activitiesand resulting outcomes were identified for each of the project phases. Theduration and effort of the consultants that was needed to accomplish eachof the project phases were then identified.

Keywords: ERP, Methodology, Configuration, Customisation

1. ERP implementation – literature review

The implementation (project) phase of an ERP system lifecycle beginsafter the system and the implementing partner have been chosen, and ends after the system "go-live" [Lech, 2013]. It involves all of the activitiesnecessary to make the selected system operational in a given organization. Although the implementation phase is the most researched topic in the ERP system lifecycle, papers detailing the implementation and the activities performed during the implementation are scarce [Eden et al., 2014]. The studies that have presented the implementation phases in a comprehensive way are presented in table 1.

Table 1. ERP system implementation phases

(1) Ahituv et al. [2002]	(2) Bajwa et al. [2004]	(3) Esteves et al. [2003]
Design: Definition of scope Establishing implementation teams and timetables Training of the implementation teams	Preparation: Definition of scope Establishment of implementation teams and timetables Training of implementation teams	Project Preparation: Definition of project objectives and scope Preparation of project plan Definition of project team

Initial implementation of the system	Initial prototyping Determination of implementation approach	
Implementation: Gap analysis Business process reengineering Identification of complementary solutions Construction of prototype Data conversion Definition of work procedures Full implementation ofthe system Training of users Acceptance tests	Implementation: Detailed gap analysis Business process reengineering Identification of complementary solutions Construction of prototype Data conversion Clarity of work procedures Full implementationUser training Acceptance tests	Business Blueprint: Detailed documentationof the organizational structure and business processes Scope adjustment Realization: System configuration Final preparation: Testing User training Cut over activities
Operation: Establishing of support centres Performance of changesand enhancements Upgrading the system System audit System termination	Operation: System use Maintenance Business integration	Go-live and support: Move from pre-production to production environment Support organization set up for end-users System performance improvement

Disregarding the differences in the naming of the phases, which is ofminor importance, the activities presented in table 1 are quite similar, al-though there are some major differences.

1. Papers 1 and 2 mention the training of the teams and the proto- typing/initial system implementation in the preparation phase of the project, while Paper 3 does not.
2. Papers 1 and 2 suggest the realization phase starts from gap analysis and business process reengineering, which is then followed by the identification of complementary solutions and construction of the prototype. In this phase, Paper 3 presents detailed documentation of the organizational structure and business processes, followed by the system configuration.

It is noteworthy that in Paper 3, configuration is the only activity mentionedin the realization phase. Papers 1 and 2 do not mention how the system istailored to the needs of the adopting organization.

Further analysis of ERP-related papers indicates that there is no clearview on what is carried out during the realization phase of the project. Some of the authors reduce the realization process to the installation of the software [Al-Mashari, Al-Mudimigh, 2003; Amoako-Gyampah, 2004; Beheshti, Beheshti, 2010; Vilpola, 2008]. Another group of authors makea distinction between the installation of the so-called "vanilla" system and system customization, during which the system is altered to fit the organizational processes of the organization [Grossman, Walsh; 2004; Ko, 2010; Helo et al., 2008; Somers, Nelson, 2004]. Chan and Rosemann [2001] as well as Wang et al. [2007], state that the implementation process mainly consists of the system configuration, blended with the organizational change. Hislop [2002] differentiates between configuration and customization as the two ways of adjusting the system to the specificity of the adopting organization, where configuration is the setting up the system parameters, and customization is the changing of the existing code.

In this study, the approach presented by Hislop [2002] was applied, as it fits the reality experienced by the author in more than twenty implementation projects. To adjust the system to the specificity of an adopting organization, one can choose between (or combine): configuration – i.e., setting the system parameters to determine the way the system operates by choosing from the existing options; customization – i.e., changing the existing code of the system to alter its operation or developing a new code to extend or change the functionality of the system.

The implementation of an ERP system using only configurationmeets the definition of a "vanilla" implementation. However, a "vanilla"implementation should not be considered as a simple system installation, because the biggest ERP systems include thousands of configurations ta- bles [Brehm et al., 2001; Campagnolo, 2013; Light, Wagner, 2006] offering a "myriad of business processes to choose from" [Light, Wagner, 2006]. Therefore, planning and executing the configuration of a large system re-quires significant time and effort.

The aim of this study is to analyze the implementation of a big ERP system, namely SAP ERP, to determine what activities were performed during the project and with what effort. The remainder of this paper presents the results of the case study.

2. Research approach

The following research questions were posed in this study:

1. What activities are performed during the ERP implementation project?
2. How long does a project phase last?
3. How much effort do these activities involve?

Case study was selected as the research method, with the analysis ofdocumentation being the main data collection approach. The unit of analysis was a full-scope SAP ERP project in a medium-sized production company, employing 200 employees. The reasons for the implementation ofa new ERP system were the inefficiency of the legacy system. As the company grew, the complexity of the business processes increased, and so didthe need for complex planning and information. The legacy system couldnot cope with these increasing

requirements, which resulted in the decision to implement a new system.

The project duration was sixteen months and the implementation covered all major areas of the adopting enterprise's operations: purchasing, stock management, production planning and execution, sales and distribution, and accounting. The project was executed in a client – consultant mode: the adopting organization hired a professional consulting firmto execute the implementation project. While the client's staff participatedactively in all phases of the project, formulating the requirements, super- vising the implementation work and testing the system, most of the implementation was done by the employees of the consulting enterprise. These individuals, both consultants and programmers, reported their work on a weekly basis in a form of *Activity Reports* (AR-s) which contained short descriptions of what had been done, together with the effortexpended (in man-days, where half a day was the minimum unit of evidence). These ARs of the consultants and programmers were the source ofdata for this study. In total, 250 entries were identified, relating to 724 man-days of consulting work (as many activities lasted longer than one day).

3. ERP implementation – case study results

The results are broken down by the project phase, according to the ASAP methodology project split.

3.1. Project preparation

In the project preparation phase, the work was done mostly by the project manager of the consulting enterprise, with some input from the project manager of the adopting organization. The aim of this phase was to prepare the project's environment from formal and organizational perspectives so that the work in the subsequent phases would be performedin a structured way. The main product of this phase was the Project Charter document:

1. Project plan:
   - the project scope and the budget (repeated from the contract),
   - the project phases and their descriptions,
   - a definition of products for each project phase,
   - a definition of project milestones,
   - a detailed project schedule (based on the general schedule from thecontract).
2. Definition of the project organizational structure:
   - a definition of project roles and responsibilities,
   - the assignment of project participants to their respective roles.
3. Project procedures:
   - communication, i.e., communication means, frequency, and communication paths,
   - documentation, i.e., project repository and document templates,

risk management, i.e., identification, reporting, mitigation, and escalation of risks,

- change management, i.e., identification, reporting, approval, and escalation of change,
- management of open items, i.e., identification, reporting, management, and escalation

of open items,
- status reporting, i.e., frequency, logistics (physical meeting or tele-conference), and reporting document templates of status reports.

Compared to the lists of activities derived from the literature and presented in table 1, the following differences are noteworthy:

1. Project scope, budget, and schedule were not defined in the project preparation phase. This was done during the phase of selection of the im-plementation partner, which was the part of the pre-project activities.
2. There was no initial implementation of the system in the project preparation phase.

These differences are not only true only for the project in this study, but also for all of the 20+ projects in which the author took part.

The project preparation phase lasted for one month and involved twelve days of consulting by the project manager, which constituted 1,66% of the total workload.

According to ASAP methodology, in the project preparation phase the system is also installed. However, in the project being analyzed in thisstudy, the system environment was already in place, so no installation was needed. An SAP system landscape usually consists of three systems:

- a development system, which is used for system configuration andcustomization during the project;
- a quality assurance/test system – used for testing;
- a production system – used for daily operations.

Finally, a development system should be available at the end of the projectpreparation phase.

A sandbox is often installed to be used for prototyping during the project. The sandbox is usually a part of the development system (separate "client", i.e. logical subsystem in the development system). The Project Preparation phase ended with a project kick-off meeting, during which the teams met together and were briefed regarding the project's goals, deliverables, scope, and schedule.

3.2. Business Blueprint

In the Business Blueprint phase, the consultants gathered detailed knowledge regarding the business processes and information requirements of the adopting organization. The main sources of information were

workshops with the process owners and key-users from the adopting organization. An additional source of information was an analysis of the existing documentation (documentation of the systems, reports, and print- outs currently used). As a result of this phase, Business Blueprint documents were produced for each of the functional areas. These documents contained the "translation" of the adopting company's requirements into SAP language. They described the way in which the companystructure would be reflected in SAP, the structure of the master data. Theyalso included a brief description of the business processes, followed bya detailed description of how these processes would be executed in SAP,using the standard functionality i.e., how the system would be configured. This was the basis for the actual system configuration in the subsequent project phases. The Business Blueprint documents

also containeda high-level description of the system customizations: enhancements, interfaces with other systems, non-standard reports, and printouts (forms) –RICEF in SAP nomenclature (Reports, Interfaces, Conversions, Enhancements, and Forms).

The Business Blueprint phase lasted for four months and involveda total of 145,5 days of consultants' work, which constituted 20,10% of thetotal workload. Of these 145,5 days, workshops with the process owners and key-users involved 92,5 days (12,77% of the total workload), preparation of the Business Blueprint documents involved 43,5 days of work (6,01% of the total effort) and 9,5 days (1,31% of effort) were used for project management activities.

3.3. Realisation

During the Realization phase, the system was actually configured ac-cording to the design included in the Business Blueprint. The technical de-sign for the customization work was also prepared, and the customizationwas executed. The realization phase lasted for three months (although some customization work was developed at a later stage – some work continued for the next three months) and involved 204 days of work from consultants and programmers, which constituted 28,18% of the totalworkload.

The split of the workload was the following:

- configuration – 50,5 days (6,98% of total workload),
- customization – 130 days (17,96% of total workload),
- requirements analysis and preparation of the technical blueprints – 56,5 days,
- coding – 75,5 days,
- data migration – 18,5 days (2,56% of total workload),
- project management – 5 days (0,69% of total workload) days.

Configuration is the primary method of adjusting the SAP system tothe requirements of an adopting organization. All SAP configuration transactions (a transaction is an executable program in SAP) are collectedin a separate menu – the IMG (implementation guide). The IMG is in- tended to guide the users through the implementation process ona top-down basis: from general settings, affecting all companies and all functional areas, to the detailed ones, specific for a given functional area ofthe company (or part of the company). However, SAP offers so many con-figuration options, which interdepend or contradict each other, that even with the use of the IMG, the configuration of the system requires a lot of specific knowledge and experience, and therefore, this is usually carried out by professional consultants. The configuration starts with the settingup the company structure. Each of the functional areas in SAP has its ownelements of company structure, which have to be defined and connectedto each other. The master data types are then defined, together with theirsteering parameters and their field statuses. This is followed by the config-uration of the transactions, which reflect the business processes in the sy-stem. The field statuses for each screen can also be adjusted.

The customization items were also defined and programmed duringthe realization phase. As in the Business Blueprint these items were only identified. The first step was to detail the requirements and prepare the technical design documents (technical blueprint) for each

element that re- quired programming. Then the actual programming was executed. The majority of the customization work involved creation of interfaces be- tween the ERP system and the Manufacture Execution System, the Sales Force Automation System and the Business Intelligence platform, as well as development of reports and forms (printouts). Minor extensions of the standard functionality were also developed in the logistics area. No modifications of the standard code were made.

Data migration templates and programmes were also prepared in this phase. The data migration templates mapped the master data from legacy systems to the SAP system. They were prepared as Excel files, whichwere later filled with real data from the legacy systems. Data migration programmes allowed for the automatic input of the data from the Excel files to SAP.

3.4. Testing

Testing is not a standalone phase in ASAP methodology. However, in this project, testing was started at the end of the realization phase and,for some developments, continued during the final preparation phase. Therefore, for clarity of the analysis, activities related to system testing were shown separately. The tests were carried out in three phases:

- unit testing was done by consultants alone, in each of the functional areas (modules) separately;
- modular tests were done by the key-users with the assistance of the consultants for each of the functional areas (modules) separately;
- integration tests were done by the key-users with the assistance of theconsultants and the whole business process was tested, involving multiple functional areas (modules). Integration tests were also considered to be user acceptance tests (UAT), no separate UAT sessions wereperformed.

Modular and integration tests were carried out with the use of test scenarios, prepared by the key-users. They included standard and no- n-standard situations, as well as negative scenarios (erroneous transactions and their corrections). Unit tests, done solely by the consultants, were not carried out using the formal test scenarios.

Testing involved 142,5 man-days of work from the consultants and programmers, which constituted 19,68% of the total workload. The general testing activities lasted for three months but as some of the customization work related to the development of interfaces and printouts was late, and the tests of these items continued for the next two months, in parallel with the final preparation activities, and were finished right before the productive start of the system.

3.5. Final preparation

During the final preparation phase, all of the configuration andcustomization was moved to the production system, which was then fi- ne-tuned to be ready for the “go-live”. Data migration was performed forthe master data, opening balances and open items and end-users were trained to use the system. User authorization profiles were also created and users were

assigned to them so that each user had access only to the system functions he/she was authorized to execute.

All these activities were performed according to the Productive StartPlan, which was developed at the beginning of the phase. This documentstated a sequence of actions, both in the legacy systems and in the new system, which ensured a smooth transition to the new IT environment. In particular, the Productive Start Plan specified the exact dates of freezing the legacy systems so that closing balances and open items from these systems were transferred to the new system via the data migration templatesand programs. It also specified how the delta of the data is treated: as themigration takes time (data from legacy system have to be moved to the data migration templates, checked for consistency, then migration has tobe done to the new system). There is usually a time lag between the freezing of the legacy system and the start of the new system. During that time,new data cannot be stored in an old system or in a new one. The solution isto either collect source documents during that period and input the data into the new system manually, or to create temporary tools to evidence that data and then input in to the new system using the migration mechanisms. This phase lasted for two months and involved 64 days of consul-ting work, which constituted 8,84% of the total workload.

1.1. "Go-live" and support

After the system "go-live", it began to be used for daily operations. However, as the system is complicated to operate, the users required helpfrom the consultants during the first three months. During this time, someminor errors were also identified and corrected. The support phase in- volved 156 man-days of work from the consultants and programmers, which constituted 21,54% of the total workload. After three months, the project was completed and the system was subject to the routine supportagreement.

2. ERP implementation process – research summary

The summary of the results, presenting the phases, the activities and the products, constituting a complete ERP implementation process, is presented in table 2.

Table 2. ERP implementation process

Phase	Activities	Products	Duration	Effort
Project preparation	Definition of: Project plan, Project organization Project procedures System installation Kick-off	Project Charter System environment ready to start the project	1 month	12 days 1,66%

Phase	Activities	Products	Duration	Effort
Testing	Unit tests Modular tests Integration/user acceptance tests	System accepted by the adopting organization	3 months	142,5 days 19,68%
Final preparation	Preparation of the Productive Start Plan Transport of the configuration and customization to the productive environment Fine-tuning of the productive system Data migration End-user training Preparation of user authorization profiles	System ready for "go-live"	2 months	64 days 8,84%
Go-live and support	System launch Support of the users Correction of errors	System in normal operation Users familiar with the system Errors corrected	3 months	156 days 21,54%
Business Blueprint	Analytical workshops, definition of: enterprise structure, master data, business processes, Identification of RICEF Preparation of Business Blueprint documents (system design)	Business Blueprint, including: enterprise structure, master data structure, configuration design for businessprocesses, list of RICEF with high-leveldescription	4 months	145,5 days 20,10%
Realization	Configuration of the system according to the design from the Business Blueprint Detailed requirements analysis and preparation of technical blueprints for customization items (reports, printouts, interfaces, enhancements) Preparation of data migration templates and programs	System configured according to the design from Business Blueprint Customization items programmed Data migration templates and programs	3 months	204 days 28,18%

Source: Own elaboration.

The activities performed during the project are in line with the implementation methodology presented in Esteves et al. [2003]. The major differences are the following:

1. Project objectives and scope were not defined during the Project Preparation phase. Instead, they were defined before the project start, andincluded in the contract between the adopting organization and consulting partner.
2. Business Blueprint was not only the documentation of the organizational structure and business processes. A design of how these wouldbe reflected in the system with the use of configuration and customization was also produced.
3. In the Realization phase, the system was not only configured, but also customized.

These differences can be seen, not only in this project, but also in the manyother projects in which the author took part. The current study also presented the activities in more detail. The testing is actually not the separateproject phase, and in this study, it was only shown separately because it involved significant effort.

The similarity of the project methodology applied in the study of thisproject with the one presented in Esteves et al. [2003] does not necessarilymean that the other approaches presented in the literature review are not correct. They may reflect different approaches to implementation. How- ever, the results presented above correspond to the experiences from other 20+ projects in which the author took part.

The results from one project cannot obviously be generalized with regards to time and effort needed to accomplish a project. However, the phases, the activities and the products presented in this research, as well as the division of implementation work between configuration and customization are common also to other projects.

Conclusion

The study presented in this paper analyzed the activities, products, and effort needed to perform a full-scope ERP project. As a result, a list ofthe activities performed in each project phase and the resulting productswas developed. This list is more comprehensive than those developed in previous research studies. Although the current study analyzed one implementation project, the list of activities corresponds to the experience gained in other projects in which the author took part. Therefore, the resulting implementation process can be treated as universal to some extent(although not the only possibility, of course). A clear distinction was alsomade between the system configuration and customization. Configuration was defined as setting the parameters of the system, and customization referred to changing or adding a new code to the system. Both methods of adjusting the system to the needs of an adopting organizationwere used in this project. The analysis of effort showed that the effort needed for configuration should not be underestimated. Even if the project were a “vanilla implementation”, i.e., not involving any customization, this would still require significant time and effort. The project du-ration and effort are specific to the project that was analyzed and may differ significantly in other projects. This data should, by no means, be generalized or extrapolated to other projects.

The main limitation of the study is that it was based on one case study. Therefore, the duration and workload for each of the activities may differ in other cases. The list of activities performed in each of the project phases, as well as products of these activities may also differ from case tocase (e.g. if agile methodology is implemented), however the results presented in

this paper offer a working, detailed and full-scope methodology,which was tested in practice. It may be used as a reference for practitionersaiming at implementing an ERP system. It may also be used for researchers as a reference while examining ERP implementation projects in detail. The results also shed light on the notion of the "vanilla" system, present inthe IT literature. For big ERP systems, like SAP ERP, no such thing as vanilla system exists – i.e. after installation the system is not ready to use. Animplementation project is always needed before the system can be used, even if it only involves configuration of the system, without any programming work (i.e. customization). Therefore, when performing studies on ERP implementations, one should indicate if the study involves small, ready-to-use systems, offered on a take-it-or-leave-it basis, or big ERP suites.

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Implementation of an ERP system: a case study of a full-scope SAP project (Summary)

The paper presents the process of implementation of an ERP system basingon a single case study, with analysis of documentation being the main data collection approach. Activities and resulting products were presented for each of the project phases. Duration and effort needed to accomplish each phase were also identified. The result of the study is presentation of a real-life ERP system implementation methodology, verified during the full-scope implementation project. The paper may be of interest to researchers, who want to study any aspect of theERP implementation as well as practitioners not familiar with ERP methodology, for example individuals aiming at entering the consulting industry or implementing ERP in their organizations.

CARBON FOOT PRINTING IN AGRICULTURE: A REVIEW OF METHODS, IMPACT AND FUTURE DIRECTIONS

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ABSTRACT

This paper reviews carbon foot printing methods in agriculture, emphasizing their importance in addressing global greenhouse gas (GHG) emissions amid rising food demands. The introduction outlines agriculture's substantial contribution to GHG emissions and highlights China's progress toward low-carbon agriculture. The review then delves into carbon footprint definitions and methods, comparing Life Cycle Assessment (LCA) and Input-Output Analysis (IOA) for their strengths, weaknesses, and applicability across micro and macro levels. Impacts of agricultural carbon foot printing include increased awareness, resource efficiency, market competitiveness, regulatory compliance, and potential revenue from carbon markets. However, challenges persist due to high costs, data variability, inconsistent methodologies, and limited carbon market access. Future directions call for refined measurement methodologies, enhanced data collection, affordable technology, supportive policies, and farmer training, aiming to bolster sustainable agricultural practices and achieve climate mitigation goals.

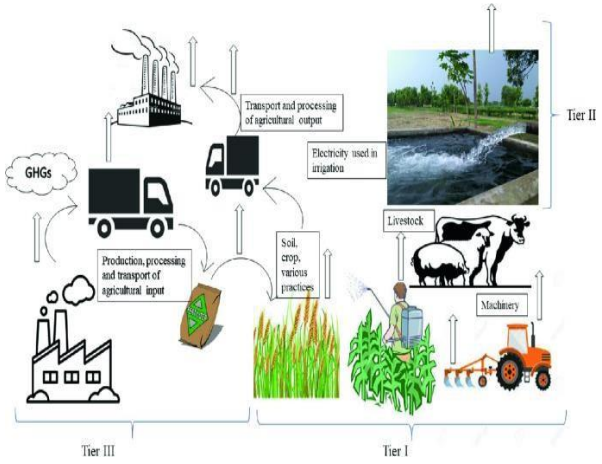
KEY WORDS: Carbon foot printing in agriculture, Greenhouse gas emission, Life Cycle Assessment (LCA), Input-Output Analysis (IOA), Climate change mitigation, Sustainable Agriculture Practices

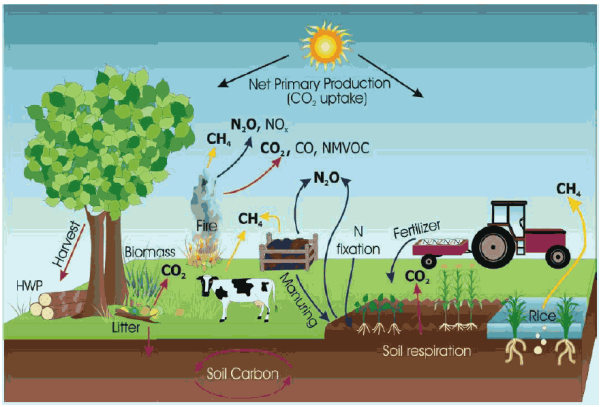
INTRODUCTION

According to the World Population Prospects 2022, the global population surpassed 8 billion in 2022 [1] and is projected to likely exceed 10 billion by 2060 [2]. This rapid population growth is driving increased demand for income and food, presenting a major challenge for governments worldwide [3,4]. Advances in agricultural productivity have tripled global output, effectively averting food shortages [5]. However, these gains in agricultural productivity and modernization have come at a cost, leading to higher energy and water use and increased greenhouse gas emissions, particularly carbon dioxide [6].

At the COP_{26} Climate Summit, it was reported that emissions from agriculture and food production have risen by 17 percent over the past 30 years, with the sector contributing 17 billion tons of carbon dioxide in 2019, 31 percent of global emissions [7]. By 2050, agriculture could become a major source of emissions such as CO_2, N_2O, and CH_4 [8]. Following the UN Climate Change Conference in Paris, most government climate action plans have emphasized agriculture as a priority, with strong commitments to reducing greenhouse gas emissions and conserving energy and water in the agricultural sector [9,10,11].

As a major agricultural nation, China achieved consistent growth in grain output for 12 consecutive years from 2004 to 2015, driven by progressive agricultural pol icy changes at various developmental stages [12]. Currently, traditional agricultural methods in China are responsible for 17% of the country's greenhouse gas emissions and represent approximately 12% of global agricultural emissions [13,14]. In response, China is transitioning from high-carbon, less efficient traditional practices to low-carbon, highly efficient modern agriculture [15]. Developing solutions to boost agricultural production while addressing environmental challenges has become an urgent priority. This shift is essential to meeting food demands for a growing population and supporting sustainable development goals within the agricultural sector.





Agriculture is a major contributor to global greenhouse gas (GHG) emissions, accounting for approximately 10–12% of total emissions in 2005. By 2009, this figure had risen to 13.5% (with CO_2 contributing 25%, CH_4 50%, and N_2O 70%), making it the second largest emissions source, and further increased to 18% by 2011[16]. The carbon footprint of agricultural innovations has significant scientific and public relevance due to GHG emissions resulting from various management practices, including tillage, inorganic fertilization, harvesting [17], pesticide use, manuring, waste management, composting, biochar application, and crop photosynthesis capacity. To address these environmental challenges, sustainable agricultural practices must be explored and implemented.

Mitigating greenhouse gas emissions and thus combating climate change could be achieved by managing agricultural practices through the assessment of agriculture's carbon footprint (CF). Recent experiments have explored agricultural CF under various management strategies, including tillage, crop rotation systems [18], and nitrogen fertilizer application rates [19]. However, there is still limited information on how crop production CF responds to integrated technologies that combine different agricultural strategies.

Agricultural practices require substantial energy due to machinery and processing demands. Enhancing energy efficiency and reducing the carbon footprint associated with crop production are, therefore, crucial goals. Given that greenhouse gas (GHG) emissions stem largely from soils through biological processes sensitive to soil properties [20], there is increasing focus on boosting production efficiency while minimizing carbon footprints. Numerous studies highlight the role of soil in reducing conventional energy use, facilitating clean energy, and advancing low-carbon agriculture. To achieve these goals, GHG emissions must be reduced in tandem with efforts to maintain or improve soil health and quality. Understanding the complex and dynamic soil system, including the direct and indirect components contributing to GHG emissions in agriculture, is essential for addressing climate change. Improved insights into climate change effects on soil organic carbon (SOC) are also necessary, especially concerning the balance of soil carbon inputs and losses expected under changing climate conditions.

The inconsistent definition of carbon foot printing:

For the past 30 years, footprint accounting has been a key method for assessing sustainable development in countries and regions, especially in relation to human life. Scholars initially introduced the concept of the "ecological footprint" to evaluate how much a region utilizes its ecological resources and the services those resources provide [21]. Over time, they developed a mathematical model to assess the carrying capacity of natural ecosystems, evolving the ecological footprint from a simple linear idea into a more comprehensive, two-dimensional model [22]. Following the introduction of the ecological footprint concept in 1992, attention turned to thewy "carbon footprint" in 2007, which stemmed from this foundational idea.

Some literature has used carbon footprint accounting exclusively to measure carbon emissions. The earliest concept of the carbon footprint was introduced to quantify both direct and indirect greenhouse gas emissions associated with a product or service throughout its life cycle [23]. However, there is no consensus on whether the definition of a carbon footprint should be limited solely to carbon emissions.

For example, some researchers believe that the concept of the carbon footprint originated from the ecological footprint theory and define it as the total amount of CO2 generated from daily activities, encompassing both direct and indirect carbon emissions [24,25]. Others, however, argue that the carbon footprint should include more than just "carbon" emissions and should account for other pollutants, such as Nitrogen oxides (NOx) and Sulphur dioxide (SO2), as well as factors like land use and surface reflectance, which also influence climate change [26]. Additionally, some scholars contend that the carbon footprint was initially conceived as a climate change impact assessment metric within the Life Cycle Assessment (LCA) framework, rather than deriving from the ecological footprint theory [27,28].

Despite varying definitions and research perspectives on the carbon footprint, scholars agree on essential aspects, such as accounting for CO2 emissions throughout the entire life cycle or production process. Based on this consensus, we believe that the carbon footprint should encompass all greenhouse gas emissions over a product's full life cycle or an activity's entire process, capturing all emission sources. The boundary of carbon footprint in the agriculture sector is the agricultural production system functions as an ecosystem capable of both emitting and absorbing carbon. Consequently, two primary carbon footprint concepts

emerged early on in the agricultural sector: one focused solely on carbon emissions, and the other considered net emissions [29,30]. While most scholars have concentrated on carbon emissions in agricultural production, the carbon sequestration capacity of agricultural ecosystems deserves attention due to agriculture's dual role as both a carbon source and sink. For example, research has shown that carbon sequestration in agricultural soils can offset some emissions and may even result in a negative carbon footprint [31,32]. Scholars have investigated carbon uptake through both crop photosynthesis and soil dynamics [33].

OBJECTIVE

The objective of this paper is to examine the methods, impacts, and future directions for carbon foot printing in agriculture. It aims to analyze the carbon footprint associated with various agricultural activities, evaluate existing measurement techniques, identify challenges and limitations, and propose potential advancements and strategies to mitigate greenhouse gas emissions in the agricultural sector.

METHODS FOR MEASURING CARBON FOOTPRINTING IN AGRICULTURE

The study of carbon footprints has gained prominence since it was first proposed, becoming a primary focus among environmental footprint studies. Currently, carbon footprint research is analyzed from various angles. Key accounting methods include Life Cycle Assessment (LCA) and Input-Output Analysis (IOA), each offering unique perspectives and focal points. This section summarizes existing literature on the agriculture sector from a methodological standpoint.

This section employs SWOT analysis to examine and synthesize previous evaluations of the two methods. Originally developed for corporate management, SWOT analysis has been continuously refined for application across various fields. It assesses four dimensions—strengths, weaknesses, opportunities, and threats—providing insight into each method's internal advantages and limitations, as well as the external opportunities and risks associated with them.

Several scholars have analyzed carbon footprints at a macro level, frequently using Input-Output Analysis (IOA) as the primary method for such assessments. IOA is widely employed to evaluate the carbon footprint across multiple regions or sectors. For instance, studies focusing on international trade reveal that China's embedded carbon emissions have risen due to trade activities [16, 36–38]. Similarly, research into the transportation sector has aimed to guide sustainable development by analyzing its carbon footprint within specific regions [39–41]. While macro-level studies are less common in agriculture, they have nonetheless highlighted the trends and flow characteristics of carbon footprints in this sector [16].

Some scholars have analyzed the carbon footprint of products at a micro level by applying the Life Cycle Assessment (LCA) method. In the agriculture sector, much of this research has concentrated on examining various planting patterns and fertilization techniques for specific crops [42,43]. Studies have also calculated the carbon footprint of major crops to optimize crop varieties and improve farming practices and techniques [44,45].

Carbon footprint based on life cycle assessment:

The Life Cycle Assessment (LCA) is a "bottom-up" analysis method that evaluates the entire lifecycle of a product or process, from the extraction of raw materials, through production and processing, storage and transportation, usage, and finally, disposal [46].

Life Cycle Assessment (LCA) comprises four main stages: defining objectives and scope, compiling the life cycle inventory, assessing life cycle impacts, and interpreting results [47]. In the first phase, objective and scope definition, it's essential to outline the materials, processes, and boundaries for the entire activity. Next, during the life cycle inventory stage, criteria for calculating the carbon footprint must be established, and both direct and indirect carbon emissions identified. The third phase involves converting various greenhouse gases into CO2 equivalents to standardize the impact measurement. Finally, in the interpretation phase, the calculated carbon footprint results are verified to ensure scientific accuracy, supporting the development of informed recommendations. Figure 1, below, uses the agricultural sector to illustrate this process.

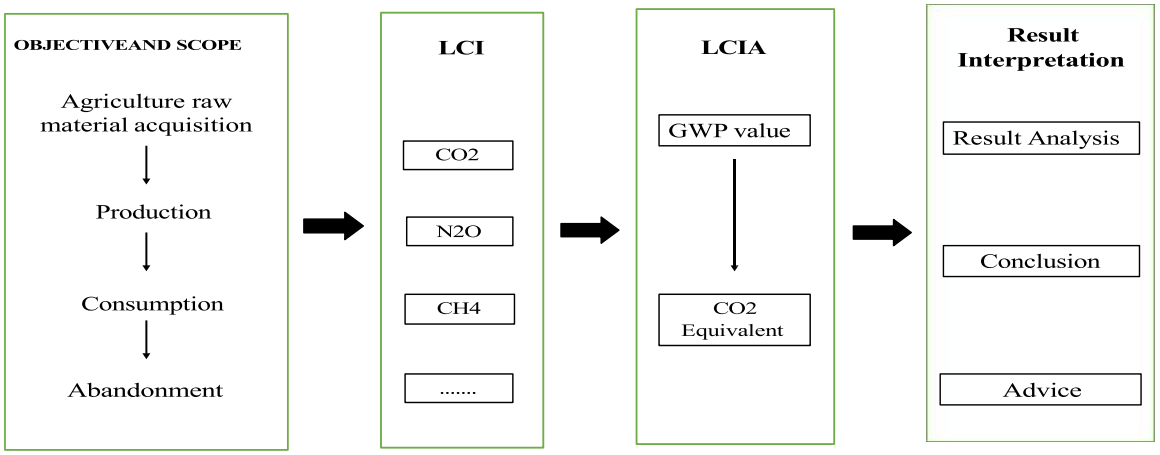


Figure 1. Procedure of carbon footprint measuring based on LCA; 1. LCI includes life cycle material input and corresponding greenhouse gas output. 2. LCIA converts gases with different greenhouse effects into emissions equivalent to the greenhouse effect of CO_2.

The Life Cycle Assessment (LCA) method allows for a comprehensive measurement of carbon footprints by accounting for both direct and indirect emissions. This makes it particularly useful for evaluating the carbon impact of small-scale or microscopic objects [48,49]. However, some researchers have advocated for using Input-Output Analysis (IOA) to examine carbon footprint flows and regional differences within the agriculture sector. This approach is seen as a solution to the challenges in obtaining macro-level data and the high financial and labor costs associated with collecting detailed data on individual products for LCA [50]. Figure 2 presents a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) of the LCA method, drawing on findings from the literature [49,51]. Among its strengths, LCA, especially when based on process analysis, provides a precise and reliable means of calculating the carbon footprint of specific products. This capability enables

governments and companies to identify more sustainable ways to achieve carbon reductions. Nonetheless, the use of LCA is limited by the complexity of system boundaries and the difficulty of obtaining macro-level data.

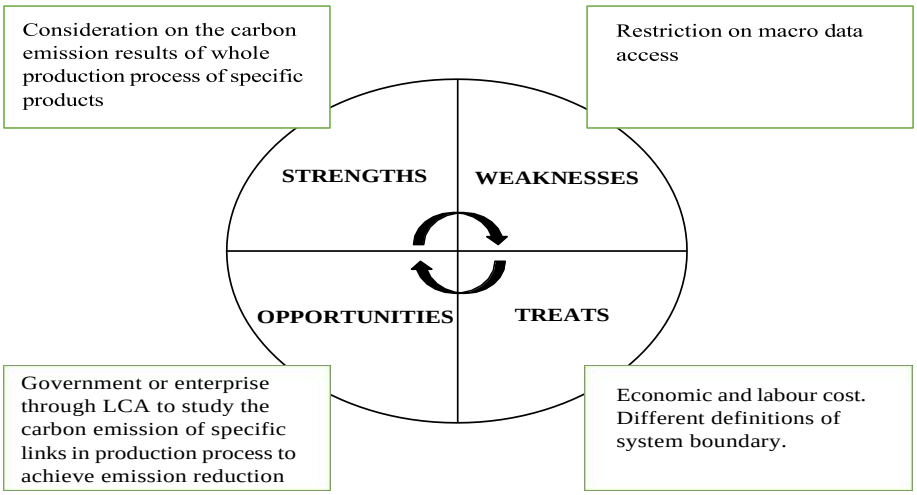


Figure 2. SWOT Analysis of carbon footprint measuring based on LCA.

Carbon footprint based on input-output analysis:

Most studies on footprint measurement employ Input-Output Analysis (IOA), a "top-down" approach that captures the relationships among initial input, intermediate input, total input, intermediate output, final output, and total output across various sectors. IOA methodologies include the Single-Regional Input-Output (SRIO) and Multi-Regional Input-Output (MRIO) models [52-54]. Figure 3 presents a SWOT analysis of IOA, examining its strengths, weaknesses, opportunities, and threats. While the input-output method effectively accounts for the hidden carbon flows between regions and sectors, it lacks the precision to measure carbon emissions at a product-specific, micro level [55-58].

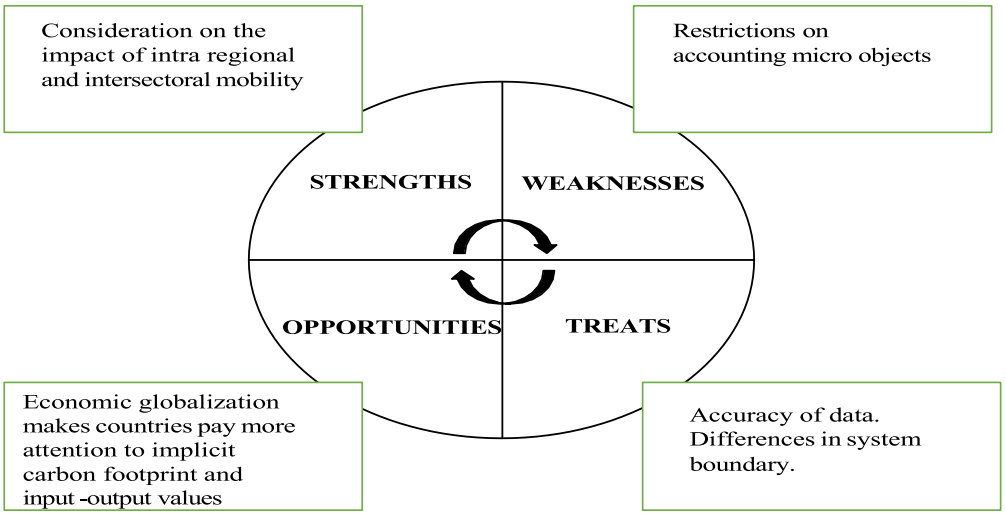


Figure 3. SWOT Analysis of carbon footprint measuring based on IOA.

Single-regional input-output

The SRIO (Single-Region Input-Output) model is an early approach for studying the carbon footprint associated with a country or region's final consumption, using an input-output table to assess greenhouse gas emissions and other environmental impacts linked to final demand. Compared to the traditional input-output model, the SRIO model streamlines data requirements, making calculations more convenient. However, the SRIO model assumes there are no technological differences across regions, overlooking how variations in technology between countries impact carbon footprints. This assumption conflicts with the realities of globalization and international trade [49]. Consequently, the SRIO model does not fully capture greenhouse gas emissions from imported intermediate goods and final consumption in certain countries, which reduces the scientific accuracy and rigor of such studies [55].

Multi-regional input-output method

The MRIO (Multi-Region Input-Output) model was developed in response to economic globalization, addressing the SRIO model's limitation of assuming uniform production technology across regions. Building on the SRIO framework, the MRIO model incorporates country-specific input-output structures and accounts for carbon and atmospheric pollutant emissions based on each country's unique characteristics. By addressing technological differences and processing trade, the MRIO model improves calculation accuracy [59-62]. Consequently, the MRIO model has become the most widely adopted and effective input-output analysis model for studying the "footprint family," [55] making it a critical tool for agricultural carbon footprint accounting [49]. This section introduces the fundamentals of the multi-region input-output model.

Compared to the single-region input-output model, the multi-regional input-output (MRIO) model links multiple sectors across different regions. It comprehensively accounts for the effects of inter-regional mobility, enabling a broader analysis of a region's carbon footprint within a wider, interconnected context.

Some researchers have expanded traditional input-output analysis (IOA) by applying environmentally extended input-output analysis (EE-IOA) to explore links between product production, consumption, and environmental impacts. EE-IOA builds on the conventional static, value-based input-output table, integrating additional data like energy, resources, and emissions. This approach uncovers both the direct costs faced by producers and estimates of indirect costs, such as greenhouse gas emissions that lead to rising temperatures, air pollution, and water contamination. For example, many scholars have used EE-IOA to analyze the interactions between environmental and economic systems [63,64].

IMPACTS OF CARBON FOOTPRINTING IN AGRICULTURE

Carbon foot printing in agriculture refers to measuring and analyzing greenhouse gas (GHG) emissions associated with agricultural activities, including crop and livestock production, soil management, and energy use. Understanding and managing these emissions is essential, as agriculture is a significant contributor to global GHG emissions, primarily through methane, nitrous oxide, and carbon dioxide.

Increased Awareness and Accountability: Carbon foot printing provides detailed insights into the environmental impacts of farming practices, making farmers and stakeholders more aware of the emissions generated by each aspect of production. This awareness encourages sustainable practices and often leads to more accountability.

Reduction in Greenhouse Gas Emissions: By identifying high-emission areas, farmers can implement targeted practices to reduce their carbon footprint, such as optimizing fertilizer use, employing no-till farming, or improving livestock diets to reduce methane emissions.

Improved Resource Efficiency: Carbon foot printing helps in identifying inefficiencies in water, energy, and resource use. More efficient practices-like precision agriculture or the adoption of renewable energy sources can lead to reduced emissions and cost savings.

Market Competitiveness and Brand Value: With growing consumer demand for sustainable products, producers with lower carbon footprints can differentiate themselves, enhance their market competitiveness, and appeal to eco-conscious consumers. This can increase brand value and open access to green markets.

Policy and Regulatory Compliance: Many regions are implementing stricter environmental regulations. By proactively managing their carbon footprint, agricultural operations can ensure compliance with policies and prepare for future regulations aimed at reducing GHG emissions in agriculture.

Access to Carbon Markets and Financial Incentives: Reducing emissions through sustainable practices can allow farmers to participate in carbon markets, selling carbon credits as an additional revenue stream. Governments and organizations may also offer financial incentives for low-emission practices, further supporting farm incomes.

Enhanced Soil Health and Biodiversity: Practices aimed at reducing carbon emissions—such as cover cropping, crop rotation, and reduced tillage can improve soil health and biodiversity. Healthier soils increase carbon sequestration, which not only mitigates climate impact but also enhances soil productivity and resilience.

Contribution to Climate Change Mitigation: By actively reducing emissions and increasing carbon sequestration, agriculture can play a vital role in global climate mitigation efforts. Scaling these practices contributes to achieving national and international climate targets, such as those under the Paris Agreement.

CHALLENGES AND LIMITATIONS OF CARBON FOOTPRINTING IN AGRICULTURE

High Cost of Measurement and Monitoring: Accurately measuring and tracking emissions from diverse agricultural activities can be costly, often requiring specialized equipment and expertise. This may be prohibitive for smaller-scale farms or those in regions with limited resources.

Variability in Emissions: Agricultural emissions vary significantly based on crop type, climate, soil composition, and farming practices, making it difficult to establish standardized measures.

This variability challenges the consistency and comparability of carbon footprint assessments across regions.

Inconsistent Definitions and Methodologies: There is no universally accepted definition of a carbon footprint in agriculture. Some definitions focus solely on carbon emissions, while others encompass broader greenhouse gas emissions, land use, and other environmental impacts. This inconsistency complicates the measurement and comparison of carbon footprints across studies.

Complex System Boundaries: Determining the boundaries for carbon footprint assessments in agriculture can be challenging. For instance, emissions from inputs like fertilizers and pesticides, as well as indirect emissions, are often debated in terms of inclusion, complicating the overall analysis.

Data Accessibility and Quality: Access to high-quality, region-specific data is limited, especially for developing regions. This lack of reliable data makes accurate carbon footprint calculations difficult and reduces the effectiveness of footprint reduction strategies.

Limitations in Methodologies: Life Cycle Assessment (LCA) and Input-Output Analysis (IOA), the two primary methods used in foot printing, each have their limitations. LCA is resource-intensive and better suited for micro-level analysis, while IOA lacks the precision needed for specific products but captures broader sectoral impacts. Balancing these methodologies is a challenge.

Limited Access to Carbon Markets: Many farmers, especially small-scale ones, struggle to access carbon markets where they could sell carbon credits, limiting their incentives for reducing emissions. This barrier reduces the overall impact of carbon foot printing efforts on climate mitigation.

Technological and Knowledge Barriers: Adoption of low-carbon technologies and sustainable practices requires knowledge and training, which may not be readily accessible to all farmers. This lack of awareness or expertise limits the potential for widespread reduction in carbon footprints.

Addressing these challenges would require advances in affordable technology, consistent definitions and standards, accessible data, and supportive policies that ensure carbon foot printing benefits are available to all farmers.

FUTURE DIRECTIONS FOR CARBON FOOTPRINTING IN AGRICULTURE:

Enhancing Measurement and Methodologies: The document highlights the need for consistent definitions and improved methodologies, such as refining Life Cycle Assessment (LCA) and Input-Output Analysis (IOA). This includes developing universally accepted standards for agricultural carbon footprint assessments.

Expanding Data Collection: Addressing the limitations in data accessibility, particularly in developing regions, is crucial. Improved data collection could lead to more accurate carbon footprint calculations, allowing for region-specific strategies to reduce emissions.

Technological Innovations: Adoption of affordable and accessible low-carbon technologies is needed, especially for small-scale farmers. This could involve advancing precision agriculture and renewable energy integration to reduce emissions.

Policy Development and Incentives: The document emphasizes the importance of supportive policies to encourage sustainable practices. This may include financial incentives, access to carbon markets, and compliance with environmental regulations to boost farmers' engagement in carbon reduction.

Farmer Education and Training: Providing education and resources on low-carbon practices and technologies will be essential for widespread adoption and the success of mitigation efforts.

Focus on Soil Health and Biodiversity: Future research and practice could emphasize the role of soil health and biodiversity in carbon sequestration, potentially offsetting emissions through sustainable practices like cover cropping and crop rotation.

These directions could collectively contribute to achieving climate targets while supporting sustainable agriculture and environmental health.

CONCLUSION

The document emphasizes that agriculture is a significant contributor to global greenhouse gas (GHG) emissions, primarily due to practices that release methane, nitrous oxide, and carbon dioxide. It underscores the importance of carbon footprint measurement in agriculture for climate change mitigation, enhancing sustainability, and meeting increasing food demands.

The document examines two main carbon footprint assessment methods: Life Cycle Assessment (LCA) and Input-Output Analysis (IOA). Each method has unique strengths and limitations, with LCA offering detailed product-level insights and IOA providing a broader regional and sectoral view. Challenges include high costs of monitoring, data variability, and inconsistent definitions, which complicate accurate assessment and comparison across regions.

The review concludes by recommending future directions, such as developing consistent definitions and methodologies, expanding data collection, supporting technology adoption, and encouraging policies and incentives. Enhanced measurement practices, farmer education, and an emphasis on soil health and biodiversity are suggested as ways to reduce emissions and improve sustainable practices in agriculture.

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ARTIFICIAL INTELLIGENCE IN NATIONAL EDUCATION POLICY – 2020: NEEDS AND CHALLENGES

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Abstract

The National Education Policy 2020 (NEP 2020) in India highlights the transformative prospective of Artificial Intelligence (AI) to bring up to date and enhance the country's education system. By integrating AI-driven tools and methodologies, NEP 2020 aims to support personalized learning, bridge linguistic and geographic divides, and promote panoramic in education. AI can adapt learning content to individual needs, enabling tailored educational experiences and real-time feedback for students. Additionally, AI's capacity for data analysis aids in evidence-based policymaking and curriculum refinement, ensuring that education aligns with evolving industry demands. AI also addresses the teacher workload by automating routine tasks, allowing educators to focus on mentorship and student engagement. By equipping students with digital literacy and AI skills, NEP 2020 prepares them for a technology-driven future. This paper explores the role of AI as envisioned in NEP 2020, examining how it fosters unbiased, accessible, and skill-oriented education to support India's socioeconomic development in the 21st century.

Keywords: Transformative, Foster, AI, Education, India, Skills, Artificial Intelligence, NEP-2020

Objectives of the Study: The objectives of this paper are as follows:

1. The call for of AI in Education.
2. AI from the angle of NEP 2020.
3. The different challenges of AI in Education

1) The call for AI in Education

The integration of Artificial Intelligence (AI) in education is emerging as a necessary evolution in response to the rapid changes in technology, economy, and societal expectations. AI offers solutions to many of the challenges that traditional educational systems face, including accessibility, personalization, efficiency, and scalability. Here's an in-depth look at the key reasons why AI is increasingly needed in education:

1.1. Personalized Learning for Diverse Learners

- **Adaptive Learning Paths**: Students have varied learning styles, paces, and capabilities. AI allows the creation of adaptive learning environments where educational content can be tailored to individual needs, helping students learn in a way that works best for them. For example, AI-driven platforms can adjust lesson difficulty based on a student's comprehension, offering support where needed.

- **Real-Time Feedback**: AI systems can analyze student performance in real-time and provide instant feedback, helping students correct mistakes on the spot and promoting better understanding and retention of concepts.

1.2. Addressing Teacher Shortages and Enhancing Teacher Roles

- **Automating Administrative Tasks**: Teachers often spend a significant portion of their time on administrative tasks like grading, lesson planning, and managing classroom activities. AI can automate many of these tasks, allowing teachers to focus more on student engagement and individual support.
- **Supporting Understaffed Classrooms**: In regions with a shortage of qualified teachers, AI can fill the gap by providing structured, high-quality educational resources that guide students and maintain consistent learning standards.

1.3. Improving Access and Inclusivity in Education

- **Language Processing and Translation Tools**: In multilingual countries like India, language diversity can create barriers to quality education. AI-powered translation tools can break down these language barriers, making educational resources accessible to students in their native languages.
- **Assistive Technologies for Students with Disabilities**: AI can support students with physical, learning, or cognitive disabilities. For instance, voice recognition, text-to-speech, and other assistive technologies can make learning more accessible, enabling these students to fully participate in educational activities.

1.4. Scalability and Efficiency for Large-Scale Education Systems

- **Automating Routine Tasks**: From automated grading of tests and assignments to handling repetitive administrative tasks, AI improves the efficiency of educational systems. This is particularly beneficial in large educational systems where managing routine processes manually can be time-consuming and resource-intensive.
- **Handling Large-Scale Data**: AI can analyze large datasets to generate insights into student performance trends, school efficacy, and curriculum impact. These insights help educators and policymakers make informed decisions to improve educational standards.

1.5. Enhancing Student Engagement and Motivation

- **Interactive Learning Experiences**: AI can make learning more engaging and interactive through technologies like augmented reality (AR), virtual reality (VR), and AI-driven simulations. These technologies enable students to explore complex subjects in a hands-on, immersive way that enhances motivation and interest.
- **Gamification of Learning**: AI can introduce game-like elements to make learning enjoyable. Gamification keeps students motivated by rewarding progress, allowing them to take on challenges, and enabling a sense of achievement.

1.6. Career Guidance and Skill Development

- **Guiding Career Paths with AI**: AI tools can analyze students' skills, interests, and academic performance to offer guidance on suitable career paths. This is particularly valuable as students navigate an evolving job market with emerging fields like data science, digital marketing, and robotics.
- **Supporting Lifelong Learning**: In today's job market, skills require frequent updates. AI can power lifelong learning platforms that adapt to changing industry requirements, suggest relevant courses, and provide ongoing skill development tailored to individual needs.

1.7. Data-Driven Insights for Improved Learning Outcomes

- **Individualized Performance Analysis**: AI can track individual student performance over time, offering insights into strengths, weaknesses, and learning progress. This data can help educators tailor their approach to support each student more effectively.
- **Institutional Insights**: On a larger scale, AI can offer insights to institutions by identifying trends, challenges, and areas for improvement within their programs. For example, AI analysis can reveal areas where students commonly struggle, allowing schools to refine curricula and teaching methods.

1.8. Fostering Critical Thinking and Problem-Solving Skills

- **Encouraging Analytical Skills**: AI-driven tools can promote critical thinking by providing students with complex, real-world scenarios to analyze and solve. For instance, AI simulations in STEM subjects can help students understand and experiment with scientific and engineering principles in a virtual, hands-on environment.
- **Facilitating Collaborative Learning**: AI can create virtual collaborative spaces where students work together, share ideas, and solve problems. These platforms encourage communication, teamwork, and creativity, which are essential 21st-century skills.

1.9. Preparing Students for an AI-Driven Future

- **Building Digital Literacy and AI Competency**: AI is transforming nearly every industry. Introducing students to AI concepts early on equips them with knowledge and skills that are becoming essential in the workforce. Familiarity with AI tools, coding, and data analysis will help students succeed in a technology-driven economy.
- **Enabling Ethical Awareness**: By incorporating AI in education, schools can also teach students about the ethical considerations of AI, including privacy, bias, and the responsible use of technology, preparing them to contribute responsibly to society.

1.10. Supporting Policy and Decision-Making with AI Insights

- **Evidence-Based Policy Making**: AI can provide data-driven insights for policymakers, allowing them to craft education policies based on objective, real-world data. This can

improve educational standards, identify effective teaching methodologies, and assess resource allocation.

- **Predictive Analytics**: AI can use historical data to forecast future educational trends, helping institutions plan for emerging needs, such as preparing curricula for in-demand skills or anticipating student enrollment changes.

2) AI from the angle of NEP 2020

The National Education Policy 2020 (NEP 2020) in India lays out a transformative vision to modernize the country's education system, and a significant component of this vision involves leveraging Artificial Intelligence (AI). NEP 2020 emphasizes AI as a tool for achieving accessible, personalized, and skill-oriented education across India. The policy aims to realize the aspirations of a 21st century **Atmanirbhar Bharat** (self-reliant India) and to make India a vibrant knowledge hub through equity, inclusion, and excellence in education. Here's an in-depth look at AI in NEP 2020 and how it aligns with the policy's goals:

2.1. Promoting Personalized and Adaptive Learning

NEP 2020 seeks to address the needs of diverse learners by promoting customized learning experiences. AI-powered tools can facilitate this by adapting content, assessments, and feedback to individual student preferences and learning paces. AI's role here is to:

- **Tailor Educational Content**: AI can modify lesson plans and learning materials based on a student's strengths and weaknesses. This personalized approach encourages self-paced learning, helping students grasp concepts more effectively.
- **Provide Real-Time Feedback**: AI-based systems offer immediate feedback on assignments and tests, helping students understand and correct mistakes on the spot, thus improving learning outcomes.

By enabling adaptive learning, AI supports NEP's goal of student-centered learning, ensuring that each student's unique needs are addressed.

2.2. Bridging the Language Divide with AI-Based Translation

India's linguistic diversity presents challenges in providing standardized education. NEP 2020 places emphasis on offering multilingual education, particularly in early learning stages. AI can assist in overcoming language barriers through:

- **Real-Time Language Translation**: AI-driven natural language processing (NLP) can translate educational content across various Indian languages, making it accessible to students who may otherwise struggle with content in non-native languages.
- **Speech-to-Text and Text-to-Speech Tools**: AI can convert spoken language to text and vice versa, supporting students who are more comfortable with verbal learning or who may have literacy challenges.

Through these language-based AI tools, NEP 2020's vision of providing equitable, multilingual education becomes more achievable, making quality education accessible to students from diverse linguistic backgrounds.

2.3. Enhanced Skill Development and Vocational Training

NEP 2020 emphasizes developing practical, vocational, and technical skills among students to make them industry-ready. AI tools can drive this skill-focused approach by:

- **Identifying Strengths and Suggesting Career Paths**: AI systems can analyze student performance and suggest career options based on their skills, interests, and strengths, helping students make informed decisions about their future.
- **Facilitating Hands-On Learning**: AI-powered simulations and virtual labs can provide experiential learning opportunities, allowing students to practice skills in a safe, virtual environment—especially valuable in areas like coding, engineering, and medical sciences.

By supporting skill-oriented learning, AI helps align NEP 2020's goals with the demands of a modern workforce, preparing students for emerging careers.

2.4. Supporting Teachers through AI-Based Tools

NEP 2020 highlights the critical role of teachers in shaping the learning experience, and AI can empower teachers by:

- **Automating Routine Administrative Tasks**: Grading, record-keeping, and lesson planning are time-consuming. AI can automate these tasks, allowing teachers to focus more on personalized mentoring and interactive teaching.
- **Professional Development and Training**: AI-driven analytics can identify areas where teachers might need additional support or training, enabling targeted professional development programs.
- **Classroom Management**: AI can analyze classroom data to identify student engagement levels, helping teachers adjust their approach based on real-time insights.

By assisting teachers with non-instructional tasks, AI enables educators to focus on fostering critical thinking, creativity, and holistic learning, as envisioned by NEP 2020.

2.5. Equity and Inclusivity through Assistive Technologies

NEP 2020 envisions an inclusive education system that caters to students of all abilities. AI-powered assistive technologies can support students with physical, cognitive, and learning disabilities by:

- **Providing Accessible Learning Materials**: Tools like screen readers, voice recognition, and text-to-speech can make educational content accessible to visually and hearing-impaired students.
- **Customized Learning Plans**: AI can assess the needs of students with disabilities and suggest modifications to standard curricula, ensuring these students receive an equitable learning experience.

With AI-driven assistive technology, NEP 2020's goal of inclusivity becomes more practical, making education accessible to students of diverse abilities and backgrounds.

2.6. Data-Driven Insights for Policy-Making and Curriculum Development

AI offers the capability to analyze vast amounts of educational data, providing insights for curriculum improvement and policy adjustments:

- **Analyzing Student Performance Trends**: AI can detect patterns in student performance across regions and demographics, enabling policymakers to address systemic issues and adapt curricula to meet student needs.
- **Personalized Curriculum Recommendations**: AI can assess the relevance and impact of existing curricula, helping educators refine and update content to stay aligned with industry demands and future workforce needs.

With AI's analytical power, NEP 2020 can benefit from evidence-based decisions, making educational reforms more responsive to real-world data and trends.

2.7. Focus on Lifelong Learning and Continuous Skill Development

In line with NEP 2020's emphasis on lifelong learning, AI can provide platforms that support continuous learning beyond formal education:

- **AI-Powered Learning Platforms**: AI can power platforms that recommend learning paths based on user progress, job market trends, and individual goals, encouraging students to continue skill development throughout their lives.
- **Skill Gap Analysis**: AI can analyze market data to identify emerging skill requirements, recommending relevant courses to help students stay competitive in the job market.

AI's ability to promote lifelong learning aligns with NEP 2020's vision of preparing individuals for evolving career landscapes, fostering a culture of continuous upskilling.

2.8. Building Digital Literacy and AI Awareness from an Early Age

NEP 2020 envisions integrating digital literacy into school curriculums to prepare students for a technology-driven future. AI can help achieve this by:

- **AI-Enhanced Learning Modules**: Schools can use AI-based programs to teach foundational AI concepts, programming, and digital literacy, helping students understand AI's applications and limitations.
- **Ethics and Responsible AI Education**: AI can support learning modules on ethics in technology, helping students consider the broader social implications of AI and develop a sense of responsibility in using technology.

By introducing AI and digital literacy early on, NEP 2020 can help students develop critical skills, preparing them for careers in AI and other technology sectors.

2.9. Career Guidance and Counseling with AI

As NEP 2020 emphasizes the need for career counseling, AI can play a critical role in:

- **Personalized Career Recommendations**: AI tools can evaluate a student's interests, skills, and performance to offer tailored career advice, enabling students to explore options suited to their strengths.
- **Skill-Based Aptitude Tests**: AI-driven aptitude assessments can help identify students' interests and skills, guiding them toward academic paths or vocational courses aligned with industry demands.

With AI-driven career guidance, NEP 2020 can create an education system that is more aligned with future job requirements, helping students make informed career choices.

2.10. Support for Monitoring and Evaluation

AI can help educational institutions and policymakers monitor and evaluate the effectiveness of NEP 2020 reforms by:

- **Tracking Policy Impact**: AI can analyze trends in student achievement, dropout rates, and educational outcomes to assess NEP 2020's impact and inform future policy adjustments.
- **Enabling Real-Time Feedback**: By using AI for continuous assessment, policymakers can receive regular updates on progress toward NEP goals, making it easier to make data-driven improvements.

3) Different challenges of AI in Education

Integrating Artificial Intelligence (AI) in education offers significant benefits, but it also presents unique challenges that need to be addressed for effective implementation. Here's a look at some of the most pressing challenges associated with AI in education:

3.1. Infrastructure Limitations

- **Digital Divide**: In many regions, especially rural and economically disadvantaged areas, access to high-speed internet, reliable power, and advanced devices is limited. Without this infrastructure, AI tools are difficult to deploy on a large scale.
- **Cost of Technology**: High-quality AI systems require advanced hardware, software, and technical support, which can be cost-prohibitive for many educational institutions, especially those operating on limited budgets.

3.2. Data Privacy and Security Concerns

- **Personal Data Collection**: AI systems in education rely heavily on data from students, which raises significant concerns regarding privacy and data security. Personal data, learning preferences, and performance metrics need to be handled carefully to prevent misuse.
- **Regulatory Compliance**: Education institutions must comply with data protection laws, such as GDPR or COPPA (in the United States), to ensure student information is securely handled. This can be a complex task, especially for schools with limited resources or technical expertise.

3.3. Bias in AI Algorithms

- **Algorithmic Bias**: AI systems are often trained on existing datasets, which may inadvertently contain biases. This can lead to discriminatory practices where AI tools may favor certain groups or reinforce existing disparities in education.
- **Lack of Diversity in Training Data**: If training data does not reflect the diversity of student populations, AI models may underperform for certain demographics, such as students from different cultural or socioeconomic backgrounds.

3.4. Teacher Training and AI Literacy

- **Lack of AI Skills Among Educators**: Many teachers may not be familiar with AI tools and may feel unprepared to use them effectively in the classroom. Training teachers in AI fundamentals and tool usage is essential for successful implementation.
- **Resistance to Change**: Educators may be resistant to adopting new technologies due to lack of familiarity or fear that AI might replace traditional teaching roles, reducing the personal interaction central to education.

3.5. Ethical Concerns

- **Student Monitoring and Surveillance**: AI systems often track student behaviors, learning habits, and progress. There’s a fine line between using this data to improve learning outcomes and crossing into invasive monitoring, which can raise ethical concerns.
- **Autonomy and Control**: Over-reliance on AI could reduce the role of teachers, diminishing their control over the educational process. Ensuring that AI assists rather than replaces teachers is crucial to maintain human agency in education.

3.6. Quality and Accuracy of AI Content

- **Dependence on Quality Content**: AI-driven educational tools need high-quality, accurate content to function effectively. Inaccurate or biased content fed into AI systems can lead to incorrect or suboptimal learning outcomes.
- **Limitations in Creativity and Critical Thinking**: While AI excels at repetitive tasks and adaptive learning, it may struggle to encourage creativity, critical thinking, and complex problem-solving—skills essential for students in the 21st century.

3.7. Implementation Costs and Sustainability

- **High Upfront Costs**: Developing, deploying, and maintaining AI systems can be costly. Many educational institutions may struggle to cover the initial costs associated with adopting AI technologies.
- **Long-Term Maintenance**: AI systems require regular updates, data management, and maintenance to remain effective and relevant. Schools and universities may not have the resources or expertise needed for ongoing support.

3.8. Access and Equity Issues

- **Inequality in Access to AI Tools**: Not all students have equal access to AI-powered learning tools, which could widen the achievement gap between different socioeconomic groups.
- **Language and Cultural Barriers**: AI models are often built with dominant languages and cultures in mind. Ensuring that these tools are inclusive and accessible to students who speak different languages or have unique cultural needs is critical.

3.9. Measuring AI Effectiveness in Education

- **Lack of Standardized Metrics**: Assessing the true impact of AI on educational outcomes is challenging due to a lack of standardized evaluation metrics.
- **Difficulty in Assessing Holistic Skills**: AI can measure academic performance and engagement, but it may struggle to evaluate social, emotional, and other soft skills crucial for student development.

3.10. Legal and Policy Challenges

- **Evolving Legal Frameworks**: AI in education is a relatively new field, and existing laws may not be sufficient to address its complexities, leading to potential legal challenges.
- **Institutional Readiness**: Schools and universities must develop policies that address AI's role and limitations, which requires coordination with policymakers, educators, and tech experts.

Conclusion

AI is essential in education today as it addresses several critical issues, from providing personalized learning and enhancing massiveness to enabling data-driven decision-making and fostering skill development for the future.

With continued investment in AI and a focus on teacher training, privacy, and impartial access, AI in education can help close gaps and transform learning experiences for millions of students globally.

By integrating AI thoughtfully and ethically, educational systems can create more adaptive, efficient, and comprehensive learning environments that prepare students for an increasingly technology-oriented world.

AI's integration into NEP 2020 holds transformative potential to modernize India's education system by promoting personalized learning, universal, skill development, and continuous education.

Through AI, NEP 2020 has the potential to reshape India's education landscape, preparing students for a world driven by innovation, creativity, and technology.

By strategically addressing AI's implementation challenges, such as infrastructure, teacher training, and data privacy, NEP 2020 can leverage AI to create a more accessible, unbiased, and future-ready educational ecosystem.

By developing robust data protection policies, investing in digital infrastructure, and focusing on teacher training and valuation, educational institutions can better take advantage of AI to improve learning outcomes while maintaining ethical standards.

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ROLE OF CROSS-CULTURAL MANAGEMENT IN HRM: A COMPARATIVEANALYSIS OF PRACTICE IN INDIAN AND CHINESE COMPANIES

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ABSTRACT

This paper analyses the increasing importance of cross-cultural management in the field of HRM and that too in this era of globalization. In the current scenario, cross cultural management is emerging as an important area of interest for HR professionals as a number of organizations are diversifying their business operations globally. Through this paper I have tried to do a comparative study of HRM practices in two different MNCs, one which is an Indian MNC and another one, a Chinese MNC. The focus is mainly on the need of eliminating cross cultural barriers from business and thus helping out HR professionals in crafting better HR strategies and plans to run organizations in more effective manner. The recruitment processes, training and development, compensation and reward processes in various organization is mainly dependent on the culture prevailing in that country in which the organization is working. All these areas need to be integrated using technology as an enabler. The political scenario, the art and culture, the individual behaviorism, the religious views, all have a larger influence in shaping the culture of an organization.

KEYWORDS: Culture, Organizations, Recruitment, Learning and Development, Cross Cultural Management.

INTRODUCTION

The practices conducted in human resource management department throughout various organizations in the world largely depend on the culture and traditions of that country. It is evident from earlier studies that culture has a great role in shaping individual's behavior and this behavior has to do a lot with the workplace attitude of an employee. The world is moving towards an era where countries are going to depend on each other for flourishment. At this juncture, organizations, particularly MNCs are going to depend on various other countries for the supply of raw materials, natural resources, equipments, workforce (skilled labors) and technology. Organizations need people who are best in the breed to map the competency levels and for this purpose they are ready to recruit from any part of the world. This is the time when cross cultural management gives a boost to HRM. Moreover, the increasing internationalization, and globalization, of business makes it more difficult than ever to understand how to establish HRM procedures which can deal with considerable cultural, national differences and establish a common HRM practice. This paper addresses this issue of cross-cultural management through reviewing the results of a comparative survey of HRM practices in an Indian and Chinese company matched as far as possible by size and popularity. After explaining the methodology and providing some background information about the context of Chinese and Indian business, the paper describes the current usage of cross-cultural management in HRM practices in these two countries with the examples taken from the industry.

METHODOLOGY

This research is based on my study on various previous papers presented by researchers in this field (Mark- Easterby Smith, Danusia Malina and Lu yuan). I had studied the cultural background in China and in India before writing this paper. There is a lack of direct comparisons because of some barriers which is a major weakness in this paper and this weakness was a part of the major earlier studies on human resource management. The reason for choosing a comparison between India and China was that there are marked comparative similarities and differences between these two countries. In China, there is a stronger emphasis on relationships, group orientation, and respect for age and hierarchy which can be seen in India also. In India, the division of work is somewhat based on gender and the major trading partners of India are the United States, the United Kingdom, Russia and Germany. Political animosities have long ensured that trade with neighboring South Asian countries remains minimal, although there is now considerable transborder trade with Nepal, Sri Lanka, Bangladesh, and Bhutan. In China, initially under communism, wages were predetermined and did not reward productivity. That system was modified in 1978 and again in 1986 to allow for wage increases and firings in relation to productivity. Under Deng Xiaoping's leadership, people were encouraged to develop their entrepreneurial skills as shopkeepers and taxi drivers and in other small business ventures which boosted the country's economic growth. We should also take this into account that India got liberalization in 1991, whereas in China, the market economy have been set in train since 1979. These differences would therefore suggest that elements of HRM would be quite different in China compared to that inIndia. The companies chosen for investigation were also located in different industries and the variation was relatively high.

Thus, HUAWEI is a Chinese mobile company and TATA MOTORS is an Indian automobile company. This analysis would further help researchers to understand how things work in Chinese organizations and also the Chinese and Indian organizations. The data was obtained from various previous studies and research papers, from relevant net sources and documents and based on previously prepared questionnaires. A summary for each company was taken from their official websites and previously conducted studies of various researches on these companies. Culture of any particular country is very difficult to define and I have tried not to equate the cultural differences of any country with national differences.

BACKGROUND OF HRM IN CHINA

Chinese mainly focus on Training and Development Systems when considering HRM. This is because, since the advent of economic reforms in 1979, training and development were seen nationally as a key to the country's development in China. Hence provision was organized nationally through compulsory training courses for all top managers, the establishment of a national network of Cadre Training Institutes and the development of postgraduate courses in management within most of the country's leading universities (Mark Easterby- Smith, Danusia Malina, Lu-Yuan; 1995 Academic researchers have already been carried out in limited amount, on other aspects of HRM in Chinese companies. Some of the

notable studies include the work of Warner (1986, 1993), Takahara (1992) and Child (1994) on remuneration; Osigweh and Huo (1993) on relationships between employers and employees; and the broad overview of HRM and management in China provided by Laaksonen (1988). China formed industrial ministries and bureaus for the supervision of all its public enterprises which keeps a tight grip on internal decisions in relation to both business and human resource matters at present. The Ministry of Labor and Personnel (MoLP) produces regulations to govern human resource procedures for both workers (labor) and personnel (cadres).

In addition, there is a dual power structure within every Chinese Organization consisting of executive management and the party. Each has its own internal structure – for example, the Party has a separate organization department which parallels the function of the personnel department. Each also has an independent reporting relationship to superior authorities outside the organization. Although the executive system has formal responsibility for decision making, the Party's influence has been somewhat reinforced since June 1989. Promotion criteria in China include: - Loyalty to party - Good quality of relationships - Hard worker - Good 'moral' practices.

BACKGROUND OF HRM IN INDIA

In the contemporary world, we can clearly say that Indian management is still influenced by the residual traces of the wisdom that is generated from ancient management practices. Feelings and emotions associated with caste affairs influenced managers in areas like recruitment, promotion and work allocation which at many times created problems in workplace (Chaterjee, S. R. 2007). Indian institutions and organizations separated lower castes and tribal communities by separating them with a new identity called 'scheduled castes and scheduled tribes'. 'Reservation', is the new name given by the Indian politics to this practice, which is a strict quota system to achieve equity of castes. The central government has decreed 15 per cent of recruitment to be reserved for scheduled castes, and a further seven and half per cent for scheduled tribes along with a further 27 per cent which has been decreed for other backward castes. However, recent studies prove that the liberalization of markets and global linkages have created transformation of attitudes towards human resource (HR) policies and practices (Chatterjee, S. R. 2007).

In a recent survey of Indian CEO's, it was suggested that Indian managerial leaders were now less dependent on their personal charisma, but they emphasized logical and step by step implementation processes while taking decisions regarding the growth of organization Demographic uniqueness is one of the noteworthy features of Indian workplace. The retirement is between 55 to 58 years of age in most public sector organizations in India, which indicates that Indian workplaces are largely dominated by youths. This further indicates that there will be large workforce in India in the near future who requires job to showcase their talent.

CROSS-CULTURAL TRAINING IN CHINA

Even if there is a limited literature that addresses the issues of cross-cultural training in China, we can see that a number of researchers have attempted to categories the content of

cross-cultural training programmes (Tung, 1981; Early, 1987; Mendenhall and Oddou, 1985). With regards to training programmes, these researchers identified five key issues which are asfollows: area studies, cultural assimilation, language preparation, sensitivity training, and field experience. For example, area studies include useful geographical and demographic business information; cultural assimilation involves an introduction to business theories and cultural practices; language preparation considers the wider aspects of business language and communication; sensitivity training illustrates interpersonal skills, e.g. in the interaction between employees and customers; and field experience tests theories and practices in the work place and supported by study visits to overseas sites on a regular basis with a view to improving overall managerial performance. These practices identified by these researches are nowadays used as a great practice by HR practitioners all over world to improve managerial skills. There is another model called Brislin's (1979) model which classifies cross-cultural training methods into three types: cognitive (the learning of information and skills from lecture-type non-participatory lessons), affective (the learning of cultural insights through techniques that raise affective responses including culture assimilator training, role-play, and case study), and behavioral/Experiential (programmes involving sensitivity training, field experience, simulations).

TATA GROUP AND HRM PRACTICES

It was Jamsetji Nusserwanji Tata, who in 1868 took the initiative or who has laid down the foundation for what later on became the TATA GROUP. In 1991, Ratan Tata took over as the Chairman of Tata group and then designed Tata group into a fast-changing business environment where old rules did not apply and new realities were taking hold. According to a source in Tata, “The key in all this growth, which everybody is talking of today, was not the money. It was the management. Led by its chairman, the group has a large and highly competent team of managers in every business, with rapidly growing experience of international operations. This talent was nurtured over the decades, and has now been given a new impetus by the internal revitalization. This was the flab that has become muscle.”

LEARNING AND DEVELOPMENT IN TATA

The TATA group's commitment to its people has resulted in the establishment of institutions such as Tata Management Training Centre and the programmes such as TAS. TAS is an entry level induction programme which provides young managers multiple opportunities for professional growth and makes them a part of talent pool that could be tapped by companies across the TATA organization.

TATA AFFIRMATIVE ACTION PROGRAMME

This programme commits TATA companies to exercising positive discrimination in employing personal from historically disadvantaged communities. This show cases the TATAs interest in developing individuals across cultures. They took an affirmative action aligned with Confederation of Indian Industry, to focus on four areas of development: employment, employability, entrepreneurship and education, i.e., the four E's. TATA companies adhere to the principle of equal opportunity, whether in recruitment or career advancement within the organization

CULTURAL TRENDS IN TATA

In Tata, they follow a great cultural trend. They diversify in their employee recruitment and they have their own organizational culture. TCS is one of the world's largest women employers and because of this reason they have so many women friendly initiatives and policies. Nicole Hall, operations project manager, Tata Global Beverages, shares her thoughts about working at Tata and why she enjoys her job. She tells that, “What is special about working for Tata Global Beverages are the opportunities on a global scale. We have such a vast portfolio of companies that there is unlimited scope to learn, to travel to different regions and understand different cultures and business practices”. To expand its footprint globally Tata launched programs such as LEAD and other group wide initiatives which reaffirm their commitment to diversify and inclusion. They even have an initiative called 'Diversify and Inclusion(D&I) culture' across Tata companies which enables employees to achieve their full potential without being discriminated on the basis of factors such as religion, country, age, gender, ethnicity, race and physical and mental ability. The D&I strategy of the group has been further strengthened with the launch of Tata LEAD. Launched in March 2014, the initiative is steered by the Group Diversity Council (GDC), which comprises representatives from group companies and provides strategic direction to the programme. A multi-prolonged approach is adopted for the implementation of Tata LEAD.

The Tata group's global footprint spans more than 100 countries in six continents which shows their steps towards working across cultures. From the day of their inception, they have been thinking international in terms of their approach. A very striking coincidence that can be highlighted here is that the founder of Tata, Jamsetji Tata, began his business career in international trade in China and England. I am here enforcing the word 'China', to show that even Tata has a close connection with the working conditions in China. The businesses that TATA group established in India measured up to international standards and used world-class technology. Tata Exports (now Tata International) was set up in 1962 and currently Tata companies export their products and services to over 150 countries which shows their active participation across geographic boundaries.

At times, TATA group has even hired a Human Resource (HR) consulting firm to restructure the remuneration paid to its employees across group companies. This is all about Tata group which I want to show through this paper that why I took the comparisons between this traditional business group in India and the Chinese firm.

RESULTS AND CONCLUSION

Globalization is the major driving factor which forces companies to hire from all parts of the world. Studies shows that mergers and acquisition are the reason why companies started needing a global workforce. This shows that we need further studies and researches to tackle this problem of cross-cultural trends prevailing in organizations to diversify our workforce to meet the global needs and HR. The conclusions that I have derived out of my study regarding the cross-cultural management in these two organizations is discussed here. In India, we should eliminate the practice of believing in our set norms, values, and customs from HR practices. We should consider the fact that in India, we adhere to an Individualistic

concept while Chinese believe in collectivistic model of working. India which has demographic uniqueness and China which has the widest land population should extend their hands to the world so that companies from global level could scramble a slice of both the markets. Before diversifying their workforce, companies must study the business etiquette and ethics prevailing in that particular country, so that they can successfully manage their employees. While working is a global perspective, comprises need to eliminate the differences, be it in wages or in opportunities.

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MICROBE-MEDIATED BIOSYNTHESIS OF NANOPARTICLES: APPLICATIONS AND FUTURE PROSPECTS

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ABSTRACT

Nanotechnology is the science of nano-sized particles/structures (~100 nm) having a high surface-to-volume ratio that can modulate the physical, chemical and biological properties of the chemical compositions. In last few decades, nanoscience has attracted the attention of the scientific community worldwide due to its potential uses in the pharmacy, medical diagnostics and disease treatment, energy, electronics, agriculture, chemical and space industries. The properties of nanoparticles (NPs) are size and shape dependent. These characteristic features of nanoparticles can be explored for various other applications such as computer transistors, chemical sensors, electrometers, memory schemes, reusable catalysts, biosensing, antimicrobial activity, nanocomposites, medical imaging, tumor detection and drug delivery. Therefore, synthesizing nanoparticles of desired size, structure, monodispersity and morphology is crucial for the aforementioned applications. Recent advancements in nanotechnology aim at the synthesis of nanoparticles/materials using reliable, innoxious and novel ecofriendly techniques. In contrast to the traditional methods, the biosynthesis of nanoparticles of a desired nature and structure using the microbial machinery is not only quicker and safer but more environmentally friendly. Various microbes, including bacteria, actinobacteria, fungi, yeast, microalgae and viruses, have recently been explored for the synthesis of metal, metal oxide and other important NPs through intracellular and extracellular processes. Some bacteria and microalgae possess specific potential to fabricate distinctive nanomaterials such as exopolysaccharides, nanocellulose, nanoplates and nanowires. The present review provides explicit information on different strategies for the synthesis of nanoparticles using microbial cells; their applications in bioremediation, agriculture, medicine and diagnostics; and their future prospects.

Key words: Nanotechnology, nanoparticles, microorganisms, bioremediation, pharmaceutical application, biocompatibility

INTRODUCTION

Nanotechnology is an emerging branch of science which deals to with excising the structure of matter between 1 and 100 nanometers on the atomic, molecular and supramolecular level for the development of desired properties and functions and for diverse applications. In the last few decades, nanoscience has attracted the attention of the scientific community worldwide for the sustainable production of various nanoparticles (NPs), using innovative techniques, which finds applications in the pharmacy, medical diagnostics and disease treatment, energy, electronics, agriculture, chemical and space industries [1, 2, 3].

NP synthesis using biological systems is rapid, feasible and ecofriendly. Moreover, the toxicity and size characteristics of the NPs can be controlled. Synthesis of NPs using bacteria, actinobacteria, fungi, yeast, microalgae and viruses has been explored by many researchers for the production of desired NPs [4, 5].

It is interesting to note that the metabolic pathway of microbial machinery can also be altered through genetic engineering for the fabrication of NPs with specific physical, chemical and biological properties [6]. The application of microorganisms for the synthesis of NPs is unique but also has scope for improvement. The recent outbreak of COVID-19 has introduced a huge challenge to the field of medicine. Nanotechnology has the immense potential to strategically find solutions and to cope with such pandemic situations, as the NPs can be deployed for diagnosis and treatment of the COVID-19 disease [7].

The current review article is focused on the microbial-mediated synthesis of various nanoparticles and their applications in multiple sectors, with a particular focus on the biomedical and pharmaceutical industry.

SYNTHESIS OF NANOPARTICLES BY MICROBIAL STRAINS

There are three primary approaches to the synthesis of nanoparticles, namely physical, chemical, and biological. While physical and chemical methods have successfully generated nanoparticles of high purity and desired size, these processes are typically costly and require toxic chemicals. The chemical synthesis process may lead to the existence of certain toxic chemical species becoming adsorbed on the surface of nanoparticles, which may lead to detrimental effects in medical applications; these nanoparticles may also have direct interaction with the human body, where the related toxicity becomes important. Thus, one of nanotechnology's primary objectives is to establish an eco-friendly production process that can provide low toxicity nanoparticles. The biological synthesis of nanoparticles includes a vast range of species in nature, such as viruses, bacteria, fungi, algae, plants (using their enzymes, proteins, DNA, lipids, and carbohydrates, etc.). Bacteria that reduce metals are found environmental-friendly catalysts for bioremediation as well as materials synthesis. In fact, microbes may help in the synthesis of diverse metal oxides through respiration processes [8]. Electrons can be moved from reduced organic to oxidized inorganic compounds through microbial dissimilatory anaerobic respiration, thus promoting the formation of crystal/nanoparticles along with bioremediation processes. It is well-documented that the genus Shewanella are able to do the oxidation of organic acids as electron donors and reduction of inorganic metals as electron acceptors [9]. Further, the mechanism for detoxifying the immediate cell environment has been developed by microorganisms such as bacteria by reducing toxic metal species into metal nanoparticles [10].

Microbes, which are regarded as potent eco-friendly green nano factories, have the potential to control the size and shape of biological nanoparticles. Even though plant-extract based nanoparticle synthesis is a well-known biological nano synthesis platform, nanoparticles

synthesized this way may become polydisperse in nature due to the presence of phytochemicals as well as have difference in yield due to seasonal variations [11, 12, 13, 14].

Nanoparticle Synthesis by Bacteria

Production of reduced metal ions by microbes arises from their remarkable ability to adapt themselves to conditions of environmental stress (Kulkarni et al., 2015). Therefore, supernatants of various bacteria such as Pseudomonas proteolytic, Pseudomonas meridiana, Pseudomonas Antarctica, Arthrobacter gangotriensis, and Arthrobacter kerguelensis act as microbial cell factories finding applications as reducing agents in the synthesis of silver nanoparticles [15, 16]. Silver nanoparticles (AgNPs) synthesized by using Bacillus brevis have recently demonstrated remarkable antimicrobial properties against Staphylococcus aureus and Salmonella typhi multidrug-resistant strains [17]. Pseudomonas stutzeri is another bacterial strain which has been found to accumulate AgNPs through an intracellular mechanism [18]. In Bacillus sp., silver nanoparticles have also been synthesized in intracellular periplasmic space [19]. The organisms that reside in gold mines would be more able to resist soluble gold toxicity and efficiently produce gold nanoparticles [20]. When Acinetobacter sp. SW30 was incubated with different concentrations of gold chloride and different cell density, it showed enormous variation in the colour of gold nanoparticles (AuNP) containing colloidal solution, suggesting variation in size and shape.

Nanoparticle Synthesis by Fungi

Kumar and their groups formed in vitro silver nanoparticles (10–25 nm) stabilized in the presence of reduced cofactor nicotinamide adenine dinucleotide phosphate (NADPH) by a capping peptide using the nitrate reductase enzyme isolated from Fusarium oxysporum, along with phytochelatinin, and 4-hydroxyquinoline [21]. Another study indicated that the synthesis of monodispersed AgNPs of 9.4 nm size was mediated by Rhizopus stolonifera extracts, although condition optimization resulted in AgNPs of 2.86 nm [22]. The extracellular synthesis of AgNPs utilizing Candida glabrata suggested strong antimicrobial activity [23]. ZnO nanoparticles mediated by Aspergillus niger indicated excellent antibacterial potential, while the Bismarck brown dye was also degraded by up to 90% [24]. Cobalt oxide nanoparticles have recently been fabricated using Aspergillus nidulans [25].

Nanoparticle Synthesis by Algae

The use of algae for the biosynthesis of nanoparticles is also increasingly becoming common. In order to synthesize ZnO nanoparticles, Sargassum muticum was used and was reported to decrease angiogenesis in HepG2 cells in addition to apoptotic effects [26]. In the biosynthesis of AuNPs, *Sargassum crassifolium*, a macroalgae along with sea grass, has been utilized. Interestingly in this study, a blue shift in the UV absorption spectra was observed after increasing the concentration of *S. crassifolium*, which was attributed to a decreased size of the

nanoparticles due to increased nucleation centers in the reductant [27]. Using Sargassum ilicifolium, aluminum oxide nanoparticles with ∼20 nm size were produced [28].

CONCLUSION AND FUTURE PROSPECTS

Nanoparticles synthesized by microbes prove promising for several biomedical and therapeutic applications due to their controlled biocompatible dimensions and unique properties. Methods of biosynthesis are also beneficial since nanoparticles are often coated with a lipid layer/biomolecule that gives physiological solubility and stability, which is essential for biomedical applications and is the bottleneck of other synthetic methods. However, biogenic nanoparticles pose a few challenges which need to be addressed for large scale applications. For the synthesis of highly stable and well characterized NPs, biological protocols may be used when critical aspects such as organism types, inheritable and genetic properties of organisms, optimal conditions for cell growth and enzyme activity, optimal reaction conditions, and biocatalyst state selection have been considered. Additionally, most biomedical studies with microbial nanoparticles have been accomplished in-vitro and large-scale clinical trials and safety tests are of utmost importance to realize their effects in-vivo. Thus, with further in-depth studies, it is hoped that microbial nanoparticles will hold immense potential in medicine and healthcare.

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TREND AND FORECASTING OF TOTAL EXPORT OF DIFFERENT MARINE PRODUCTS FROM INDIA

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Abstract
The purpose of the paper is to explore trend and forecasting of total export of different marine products from India. In the paper we have described about both inland marine production of India and about the fishery items which have a significant impact on the total production and which have not. The results show that by the method of Spencer we have predicted the annual marine products export for the year 2025-26.

Keyword: - Significant, Impact, Prediction, Trend, Forecasting and Production.

Introduction

India is the third-largest fish and aquaculture-producing country. It accounts for 7.96% of the total global fish production. The industry employs more than 28 million people in India.

Marine products industry alone has a share of at least 6 per cent in world exports in which India is the fourth largest exporting country after China, Peru and Japan (Das et al., 2016). In fact, out of 7.85 million tonnes (mt.) of overall fish production of India, roughly 43 per cent (3.32 mt.) is contributed by the marine sector though it turns out to be less than half to that of India's major competitors in fish trade (MPEDA, 2017). Marine products exports play a pivotal role in Indian economy in terms of employment and income generation besides valuable foreign exchange earnings. They have created a huge demand in international trade and are acclaimed to be one of the fastest moving commodities in the world food market.

India as a country comfortably boasts of 8,129 kilometers which is 5,051 mi of marine coastline, 3,827 fishing villages as well as 1,914 traditional fish landing centers. Speaking of fresh water resources, India has 195,210 kilometers which is 121,300 mi of rivers and canals. The country also boasts of 2.9 million hectares of minor and major reservoirs, about 0.8 million hectares of flood plain wetlands and water bodies as well as 2.4 million hectares of ponds and lakes. As at 2010, India's marine and freshwater resources offered a combined sustainable catch fishing potential of more than 4 million metric tonnes of fish. What's more? India's water and natural resources have a tenfold potential for growth in aquaculture (farm fishing) judging by the harvest levels of 2010, 3.9 million metric tonnes of fish, if India would choose to adopt the knowledge of fishing, regulatory reforms as well as sustainability policies**.**

India mainly has eight major fish-producing states: Andhra Pradesh, Gujarat, Karnataka, Kerala,

Maharashtra, Odisha, Tamil Nadu and West Bengal. Andhra Pradesh is the largest producer of marine products with 2019- 20 production at 4.2 million MT. The share of Gujarat, Karnataka, Odisha and Maharashtra during the same period was 6%, 4.5%, 5.8% and 4%, respectively.

The Food and Agriculture Organization (FAO) of the United Nations reports that the production of fish has multiplied by more than 10 since the year 1947 and has doubled between the years 1990 and 2010.

EXPORT TREND

India is among the top 5 fish exporting countries in the world. About 17% of India's agricultural exports are fish and fish products. In 2021-22, the country exported marine products of quantity 1.36 million MT. The value of exports for the same year was US$ 7.76 billion. This is an increase of about 30% over previous year. This is a great achievement considering the challenges posed by the Covid-19 pandemic and other difficulties related to logistics.

India mainly exports frozen shrimps, fish, cuttlefish, squids, dried items, live and chilled items. Out of these, frozen shrimp is the largest exported marine product contributing to more than 53% of the total quantity and about 75.11% of the total export US$ value.

In 2021-22, the frozen fish, cuttlefish and squid contributed 6.08%, 3.61% and 4.94% of the total marine products export value, respectively. The same contributed to 16.55%, 4.31% and 5.53% of the total quantity exported in the same year.

Marine exports from India are expected to reach US$ 14 billion by 2025. The Marine Products Export Development Authority (MPEDA) has already proposed a roadmap to achieve this target, which constitutes necessary steps to enhance production and promote seafood.

MAJOR EXPORT MARKETS

India exports fish and fish products primarily to the following regions - USA, China, EU, South East Asia, Japan and Middle East.

In 2021-22, with an import of US$ 3,371.66 million and a share of 37.56% in terms of dollar value, the USA remained the largest importer of Indian seafood both in terms of value and volume. Exports to the US increased in terms of volume by 27.63%, rupee value by 36.76%, and dollar revenue by 37.56%. The main product shipped to the USA was frozen shrimp.

With an import of 2,66,989 MT worth US$ 1,175.05 million, or 19.50% in terms of quantity and 15.14% in terms of dollars, China became the second-largest seafood export market from India in terms of volume. Exports to China increased in volume by 22.28%, rupee value by 31.09%, and dollar value by 25.12%.

The EU remained India's third-largest export market for seafood, with frozen shrimp continuing

to grow in both quantity and value, respectively, by 29.11% and 37.09%.

GOVERNMENT INITIATIVES

a) Pradhan Mantri Matsya Sampada Yojana (PMMSY)

The Central Government's share in PMMSY is Rs. 9,407 crores (US$ 1.12 billion), the State's share is Rs. 4,880 crores (US$ 617 million), and the beneficiaries' share is Rs. 5,763 crores (US$ 729 million). The objective of the scheme is to increase the fish production to 22 million MT by 2024-25, enhance aquaculture productivity to 5 tonnes per hectare and increase the GVA contribution of the fisheries sector to 9% by 2024-25.

b) Fisheries and Aquaculture Infrastructure Development Fund (FIDF)

In 2018-19, the Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying formed a fund called the Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying (FIDF) to meet the infrastructure requirement of the fisheries sector. The total fund size is Rs. 7,522.48 crores (US$ 951 million). The objective of the fund is to provide concessional finance to eligible entities like State Governments/Union Territories and State entities for developing the identified fisheries infrastructure through loaning entities namely - National Cooperatives Development Corporation (NCDC), National Bank for Agriculture and Rural Development (NABARD), and all scheduled banks.

GOVERNING BODY

The Marine Products Export Development Authority (MPEDA)

The MPEDA was formed in 1972 for the development of the seafood industry in India and to realize its full export potential. The focus of MPEDA is on market promotion, capturing fisheries, research and development, quality control, infrastructure processing and value addition. The authority also advises the central government for setting new standards for fishing vessels, storage premises, processing plants and conveyances. Department of Fisheries (DoF) The DoF was formed in 2019 by dividing the fisheries division from the now known as the Department of Animal Husbandry, Dairying and Fisheries. The department's roles are developing the fish industry, promoting fisheries and the welfare of fishermen, statistics, regulations, and carrying out surveys.

Types of Marine Products

Mainly, there are two types of Fisheries exist in India, one is Inland and the second one is Marine. Irrespective of that there are also different kinds of fisheries exist like culture fishery, capture fishery, aquaculture and pisciculture etc.

INLAND FISHERY AND MARINE FISHERY

Inland Fishery	**Marine Fishery**
Inland fishery is the rearing of fish in freshwaters like canals, ponds, reservoirs, and rivers.	The marine fishery is the rearing of fish in seawater or saltwater.
A large number of fishes are cultured for human consumption in tanks or ponds like fish farms or blue revolution.	In marine fishery, a large number of fishes are caught by using synthetic fiber nets, mechanized fishing, etc.
These fishes are freshwater commercial fishing operations.	These fishes can be products reaching world markets.
Examples of the inland fishery are Rohus, Grass Craos, Callas, Mrigals, etc.	Examples of the marine fishery are catfish, mollusks, mackerel, sardines, tunas, crustaceans, etc.

CULTURE FISHERY AND CAPTURE FISHERY

Culture fishery	**Capture fishery**
Culture fishery is a method of raising fish in ponds and tanks.	Capture fishery is a method of catching fish without raising them.
They are grown in fresh or pure water and are divided by the food they consume into top feeders, middle feeders, and bottom feeders.	They come from natural resources like seas. So they are basically from saltwater
Examples of culture fishery are rohu, carps, and mirgils, etc.	Examples of capture fisheries are oysters, bhetki, etc.

AQUACULTURE AND PISCICULTURE

Aquaculture	**Pisciculture**
This involves culture, management, and rearing of fish and other aquatic organisms	This involves only the culture, management, and rearing of fish.
Examples are crustaceans, finfish, mollusks, and aquatic plants.	Examples are tilapia, salmon, carp, catfish, European seabass, and cod.

But India mainly exports frozen shrimps, fish, cuttlefish, squids, dried items, live and chilled items. Out of these, frozen shrimp is the largest exported marine product contributing to more than 53% of the total quantity and about 75.11% of the total export US$ value.

History of Export of Marine Product from India

Fishing is a very prominent industry in the coastal states of India with more than 14 million Indians earning a living from fishing. The practice of fishing dates back to very many centuries ago before modern methods and practices were birthed and fishing became a major recognized addition to the Indian economy. For many centuries, the country of India has had a cultural practice of fishing in small ponds. Without the mechanized and modern systems which are prominent today, fishing has stayed a tradition in India with many people engaging in this for personal use. With the passing of time and the coming of the nineteenth century, commendable improvements had been made in productivity with breeding carps in tanks and with controlled systems. Frozen fish, the third largest export item, fetched Rs 3471.91 crore (USD 471.45 million), accounting for 16.55 per cent in quantity and 6.08 per cent in dollar earnings. The export of frozen fish increased by 20.44% in quantity and 17.19 % in dollar value.

Export of frozen cuttlefish, pegged at 58,992 MT, showed a growth of 26.83 % in rupee value and 26.18 % in USD value, and earned Rs 2062.63 crore (280.08 USD millions).

Export of dried Items, pegged at 73,679 MT, showed a growth of 28.27 % in rupee value but declined 8.59 % in USD value, and earned Rs 1472.98 crore (143.46 USD millions).

Export of chilled items, which is considered as a promising sector, also increased by 23.08 % in quantity terms and 53.45 % in rupee terms but declined 1.87 per cent in USD terms.

Export of live Items, pegged at 7,032 MT, showed a growth of 60.57% in quantity, 47.43% in rupee value and 46.67% in USD terms.

In 2020-21, India's total marine and inland fish production stood at 14.73 million metric tonnes (MMT), which includes 11.25 MMT and 3.48 MMT from inland and marine sectors, respectively. Fisheries sector plays a crucial role in the national economy and is one of the key contributors to the country's foreign exchange earnings. In 2020-21, 66% of the Marine Fisheries and 51% of the Inland Fisheries potential were harnessed. The overall production of marine products in India has been growing consistently for the last ten years. Total fish production grew from 8.67 MMT in 2011-12 to 14.73 MMT in 2020-21.

With a very long-standing history of fishing which has conveniently become a culture in the country of India, fishing has remained an intricate part of the Indian culture and economy. Today, the practice of fishing has remained prominent with more and more people taking fishing as a full-time occupation and earning their living off from fishing.

Objective

The main objectives of this paper are

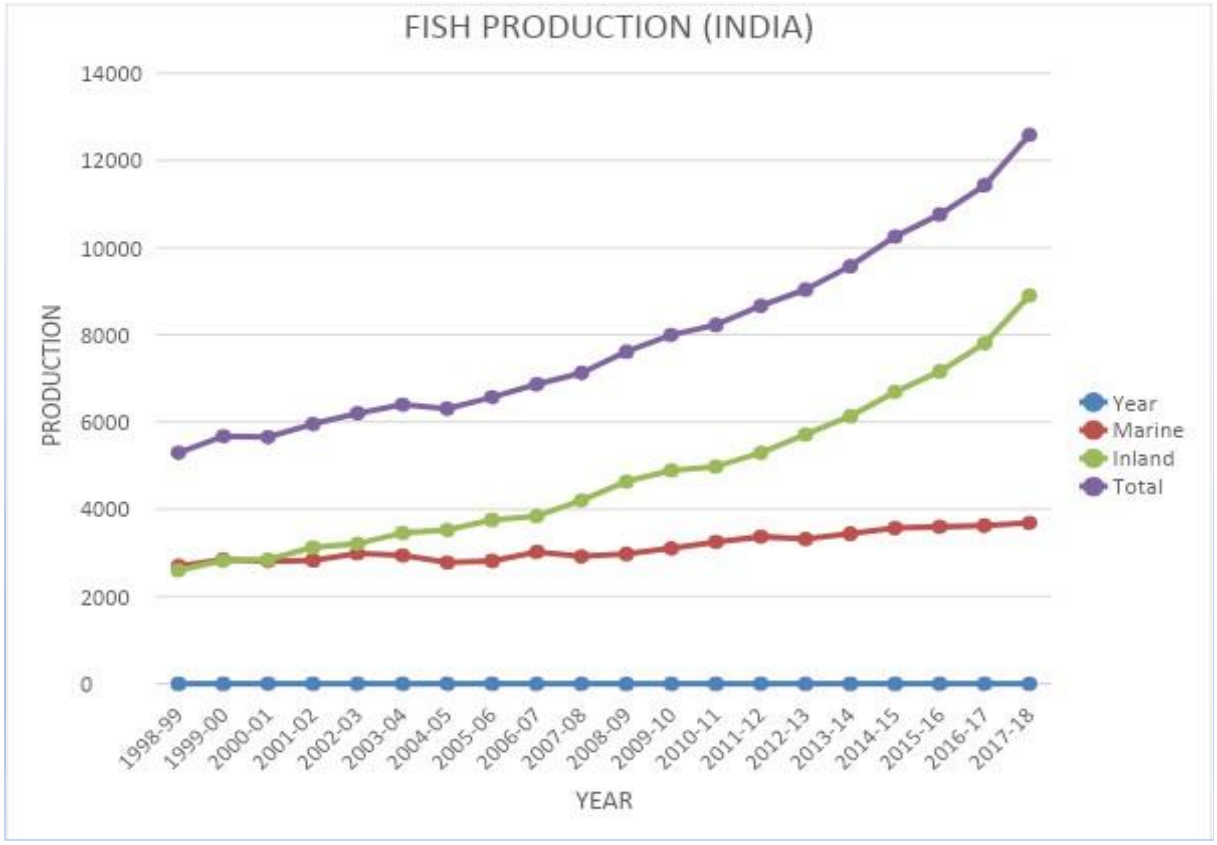
- To show the Trend of both Inland and Marine production of India.
- To find which kinds of fishery items have a significant impact on the total production and which items have not significant impact on the total production.
- To predict the annual marine export for the year 2024 by using the method of Spencer.

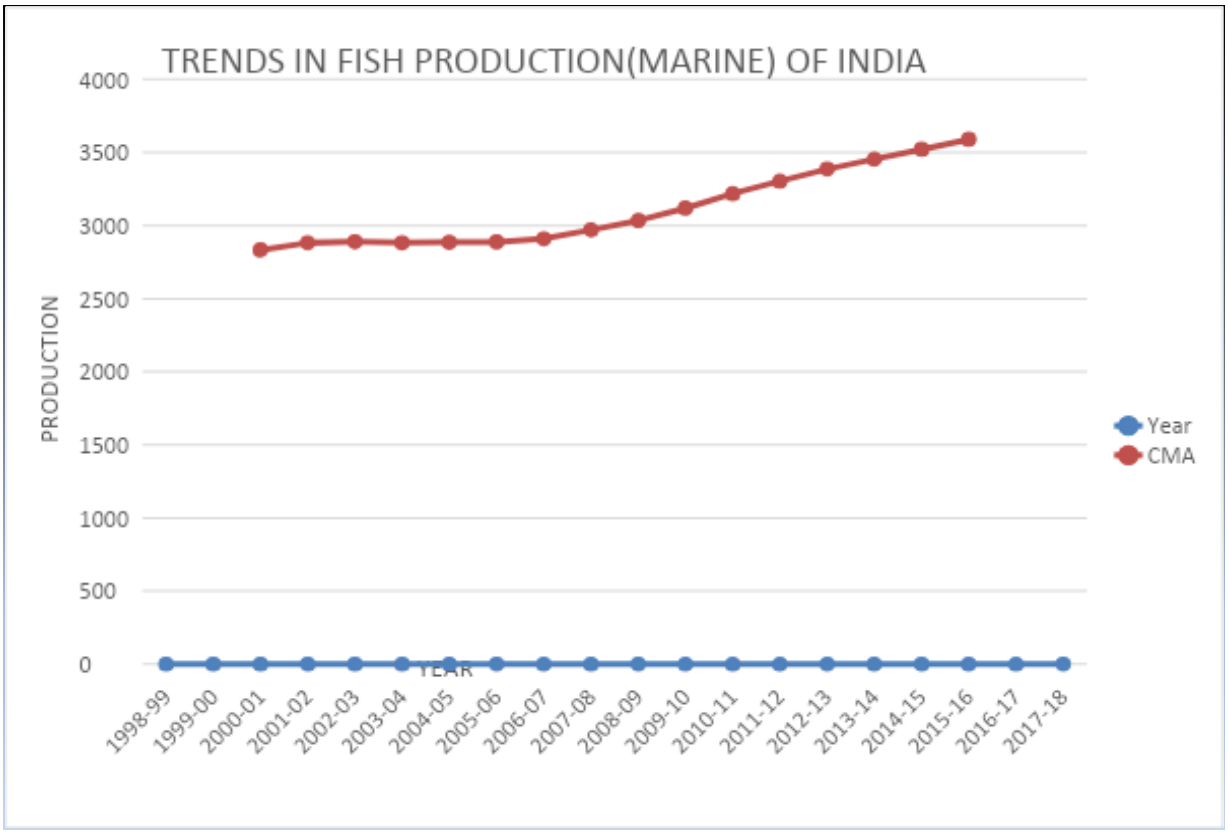
TREND LINE FITTING

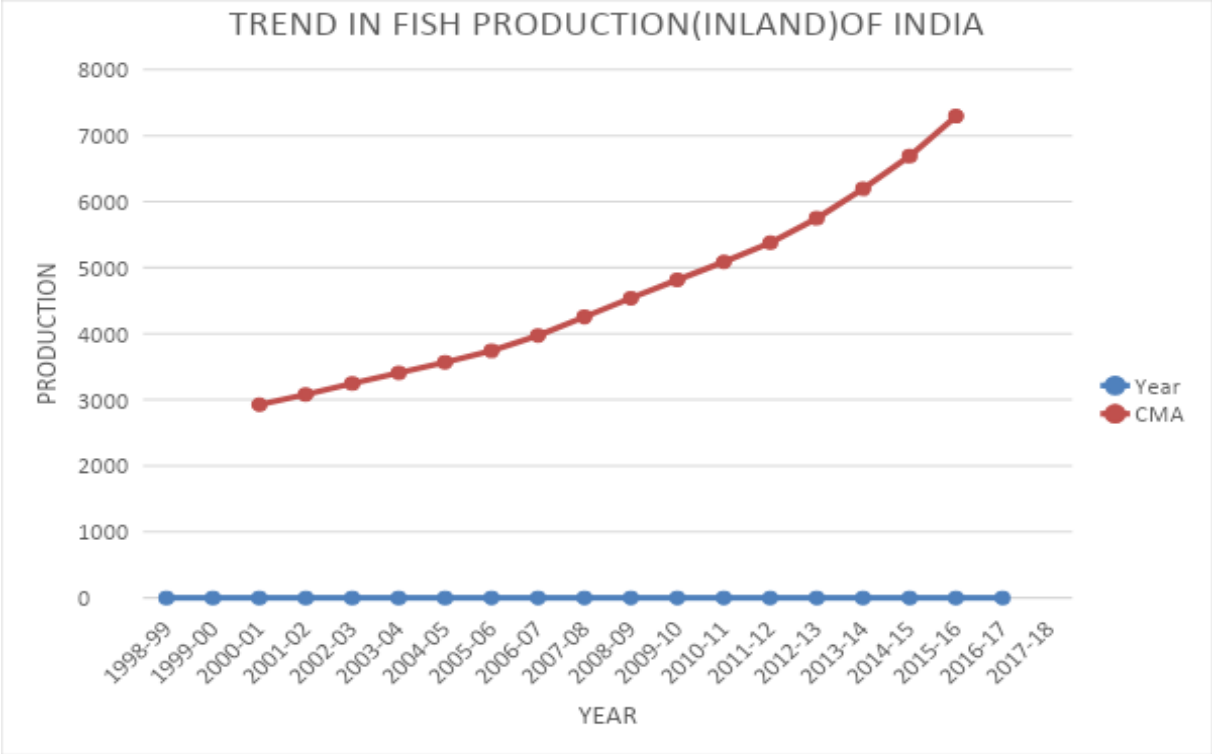
We have data of Marine, Inland and Total fish production of India and we have showed the trend of all these three individually.

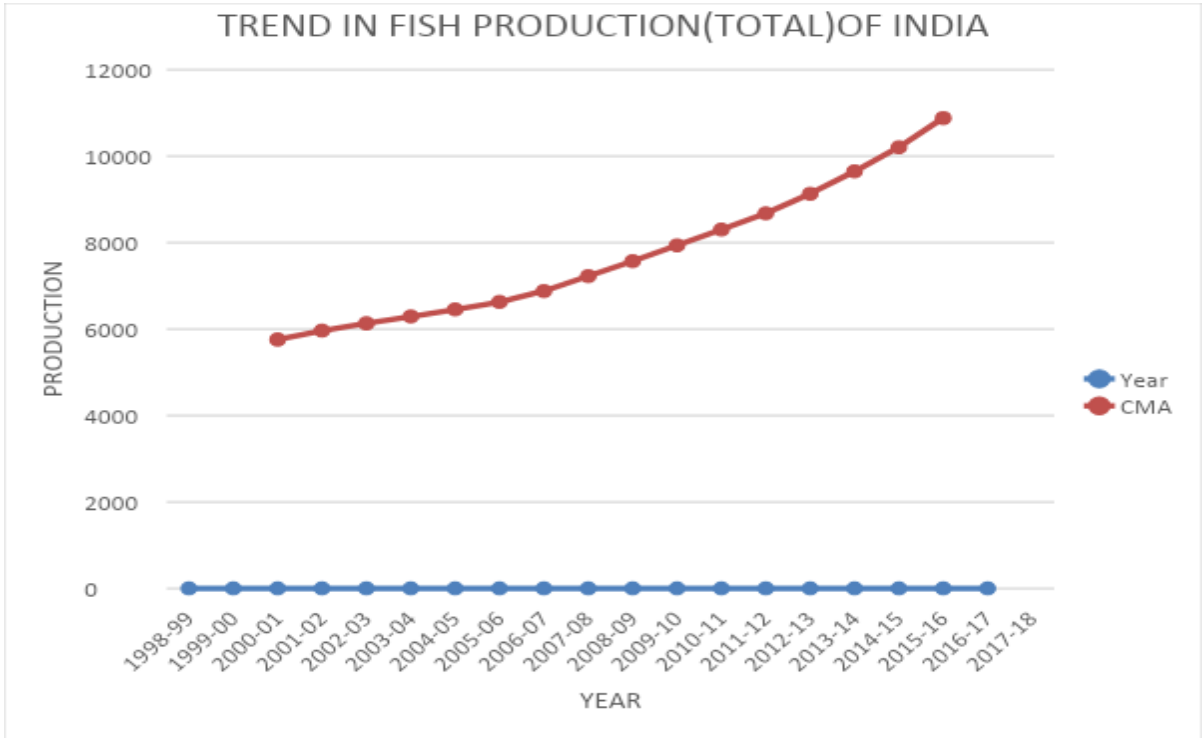
	Year	Marine	MA (4)	CMA	Inland	MA (4)	CMA	Total	MA (4)	CMA
1	1998-99	2696			2602			5298		
2	1999-00	2852			2823			5675		
3	2000-01	2811	2797.3	2834	2845	2849	2925	5656	5646.3	5759
4	2001-02	2830	2870.8	2881.9	3126	3001	3080.4	5956	5871.8	5962.3
5	2002-03	2990	2893	2889	3210	3159.8	3244.9	6200	6052.8	6133.9
6	2003-04	2941	2885	2883.3	3458	3330	3408.8	6399	6215	6292
7	2004-05	2779	2881.5	2885.8	3526	3487.5	3566.9	6305	6369	6452.6
8	2005-06	2816	2890	2887.4	3756	3646.3	3739.9	6572	6536.3	6627.3
9	2006-07	3024	2884.8	2909.6	3845	3833.5	3972.5	6869	6718.3	6882.1
10	2007-08	2920	2934.5	2970.5	4207	4111.5	4253.8	7127	7046	7224.3
11	2008-09	2978	3006.5	3034.8	4638	4396	4538	7616	7402.5	7572.8
12	2009-10	3104	3063	3119.5	4894	4680	4815.9	7998	7743	7935.4
13	2010-11	3250	3176	3218.9	4981	4951.8	5086.9	8231	8127.8	8305.8
14	2011-12	3372	3261.8	3304.1	5294	5222	5377.3	8666	8483.8	8681.4
15	2012-13	3321	3346.5	3386.4	5719	5532.5	5746.3	9040	8879	9132.6
16	2013-14	3443	3426.3	3454.8	6136	5960	6193.5	9579	9386.3	9648.3
17	2014-15	3569	3483.3	3521.3	6691	6427	6687.9	10260	9910.3	10209
18	2015-16	3600	3559.3	3589.9	7162	6948.8	7294.5	10762	10508	10884
19	2016-17	3625	3620.5		7806	7640.3		11431	11261	
20	2017-18	3688			8902			12590		

FISH PRODUCTION ('000TONNES) IN INDIA FOR THE PERIOD -1998-99 TO 2017-18


FISH PRODUCTION (INDIA)
14000
12000
10000
8000
6000
4000
2000
0
PRODUCTION
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
2017-18
YEAR
Year
Marine
Inland
Total


TRENDS IN FISH PRODUCTION(MARINE) OF INDIA
4000
3500
3000
2500
2000
1500
1000
500
0
PRODUCTION
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
2017-18
Year
CMA


TREND IN FISH PRODUCTION(INLAND)OF INDIA
PRODUCTION
8000
7000
6000
5000
4000
3000
2000
1000
0
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
2017-18
YEAR
Year
CMA


TREND IN FISH PRODUCTION(TOTAL)OF INDIA
PRODUCTION
12000
10000
8000
6000
4000
2000
0
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
2017-18
YEAR
Year
CMA

P-VALUE TABLE

ITEMS	P value	R Square	COV (%)
Fr. SHRIMP	**9.79E-08**	**0.8015**	**67.26612469**
Fr. Cuttlefish	**8.83E-06**	**0.6754**	**25.90853981**
Fr. Squid	**7.74E-09**	**0.8498**	**37.65904453**
Dried items	**1.51E-08**	**0.8383**	**73.67493868**
Live items	**1.62E-08**	**0.8371**	**54.72732074**
Chilled items	**0.0004207**	**0.508**	**71.78089567**
Others	**2.03E-13**	**0.9532**	**49.24563094**

If we will see the P-Value, then all the products have significant impact on total Export of Fish Items from India. And Fr. Squid has highest R^2 value hence it 84% explaining the dependent variable which is the total export from India. From the column of COV (Coefficient of Variation), we got that Fr. Cuttlefish has a very consistence export from 1999-2000 to 20017-18.

PREDICTION OF MARINE PRODUCTION OF INDIA

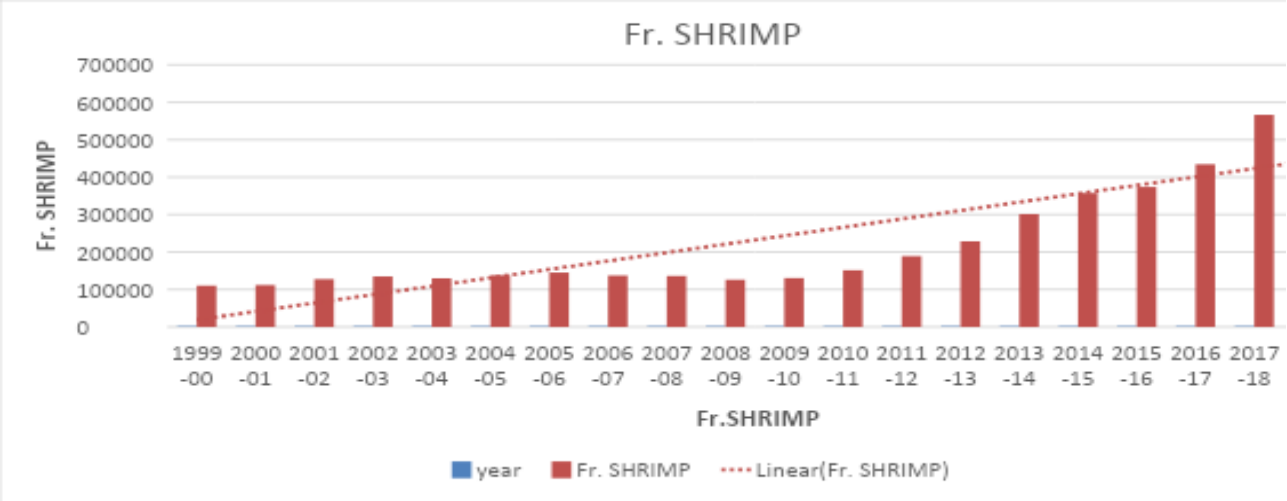
We have the data of different types of fisheries items export from India to different Countries from the year pf 1999-00 to 2017-18.

YEAR	Fr. SHRIMP	Fr. Cuttlefish	Fr. Squid	Dried items	Live items	Chilled items	Others	Total
1999-00	110275	32799	34918	6853	1678	3088	22116	343031
2000-01	111874	33677	37628	7532	1844	3820	31195	440473
2001-02	127709	30568	39790	8307	1628	3284	38209	424470
2002-03	134815	41381	37838	8178	2115	3350	43299	467297
2003-04	129768	39610	37832	12574	2341	3779	48090	412017
2004-05	138085	44239	48124	9692	2262	3988	55250	461329
2005-06	145180	49651	52352	14167	2568	5060	60841	512164
2006-07	137397	55701	47252	24293	2478	7200	67571	612641

2007-08	136223	45955	34172	22414	2498	6541	73698	541701
2008-09	126039	50750	57125	31688	3434	21453	73801	602835
2009-10	130553	63504	61445	47053	5492	28817	80592	678436
2010-11	151465	59159	87579	79059	5208	21118	97145	813091
2011-12	189125	54671	77373	53721	4199	21278	114538	862021
2012-13	228620	63296	75387	72953	4373	26868	112841	928215
2013-14	301435	68577	87437	67901	5080	19755	109212	983756
2014-15	357505	82353	69569	70544	5488	31404	124947	1051243
2015-16	373866	65596	81769	43320	5493	33150	113949	945892
2016-17	434486	63320	99348	61071	6703	31815	141442	1134948
2017-18	565980	69183	100845	88997	7034	19501	172512	1377244

SECOND DEGREE POLYNOMIAL FITTING FOR FORCASTING THE EXPORT

- **FORECASTING OF EXPORT OF Fr. SHRIMPS IN 2025-26**

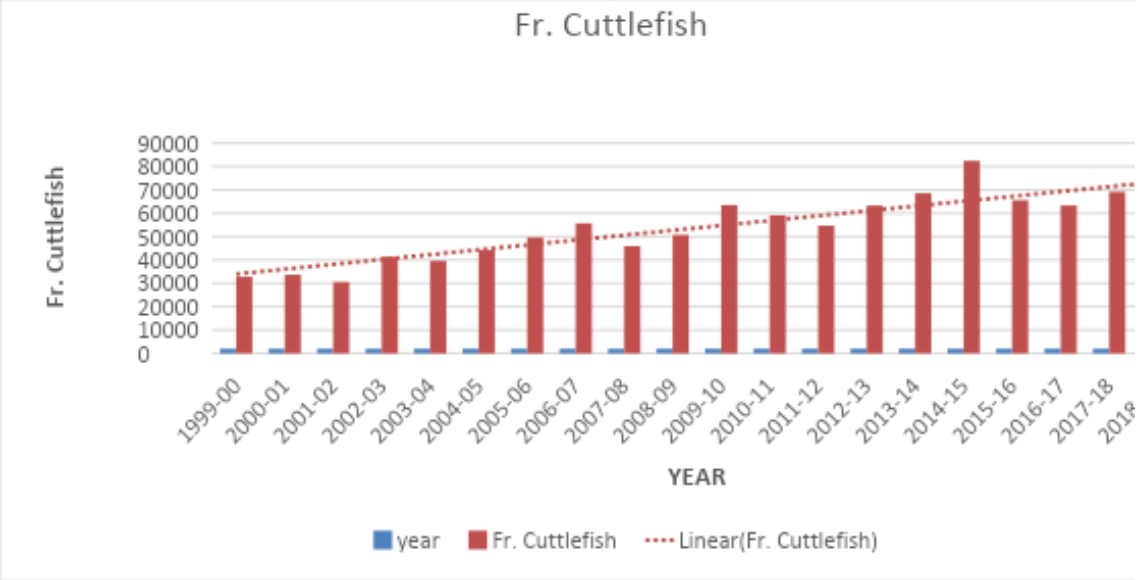


We got the Second-degree eq. for forecasting the Fr. SHRIMPS in 2025-26 as

$y = 2506.8x^2 - 30184x + 189429$

For the year 2025-26, the value of x is 26 and putting that value we get the estimated value of export of Fr. SHRIMPS in 2025-26 is **1099241.8.**

- **FORECASTING OF EXPORT OF CUTTLEFISH IN 2025-26**

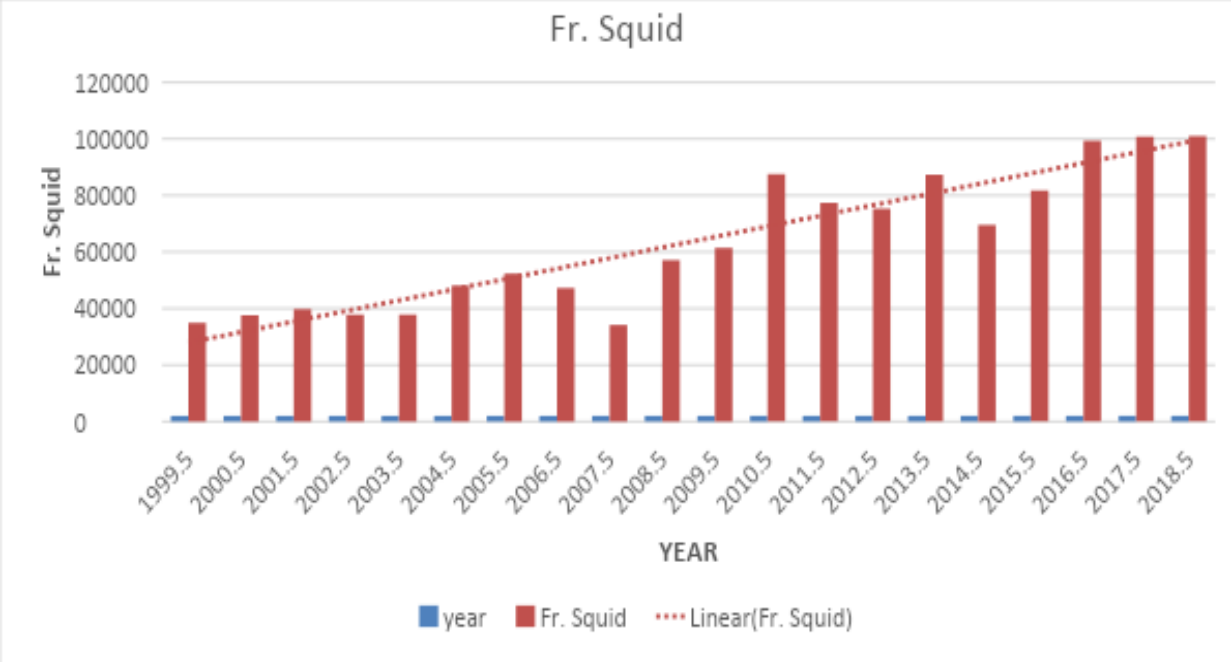


We got the Second-degree eq. for forecasting the Cuttlefish in 2025-26 as

$y = -101.28x^2 + 4203.9x + 24103$

For the year 2025-26, the value of x is 26 and putting that value we get the estimated value of export of Cuttlefish in 2025-26 is **64939.12**

- **FORECASTING OF EXPORT OF FR. SQUID IN 2025-26**

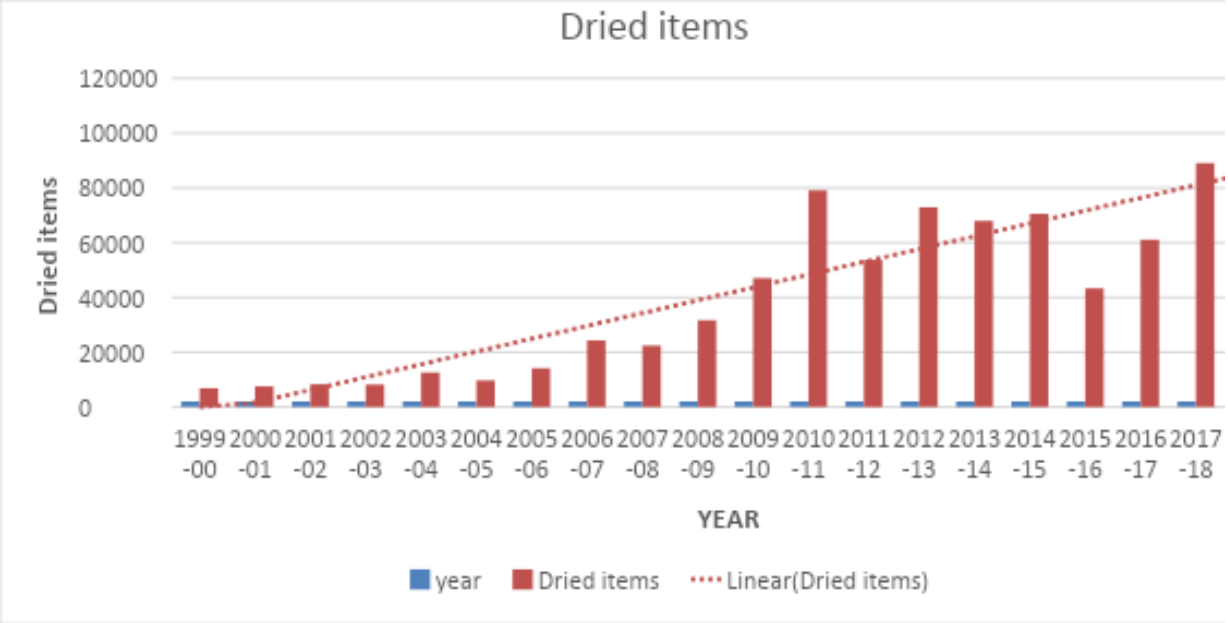


We got the Second-degree eq. for forecasting the Fr. Squid in 2025-26 as

$y = 91.774x^2 + 1814.1x + 31227$

For the year 2025-26, the value of x is 26 and putting that value we get the estimated value of export of Fr. Squid in 2025-26 is **140432.824.**

- **FORECASTING OF EXPORT OF DRIED ITEM IN 2025-26**

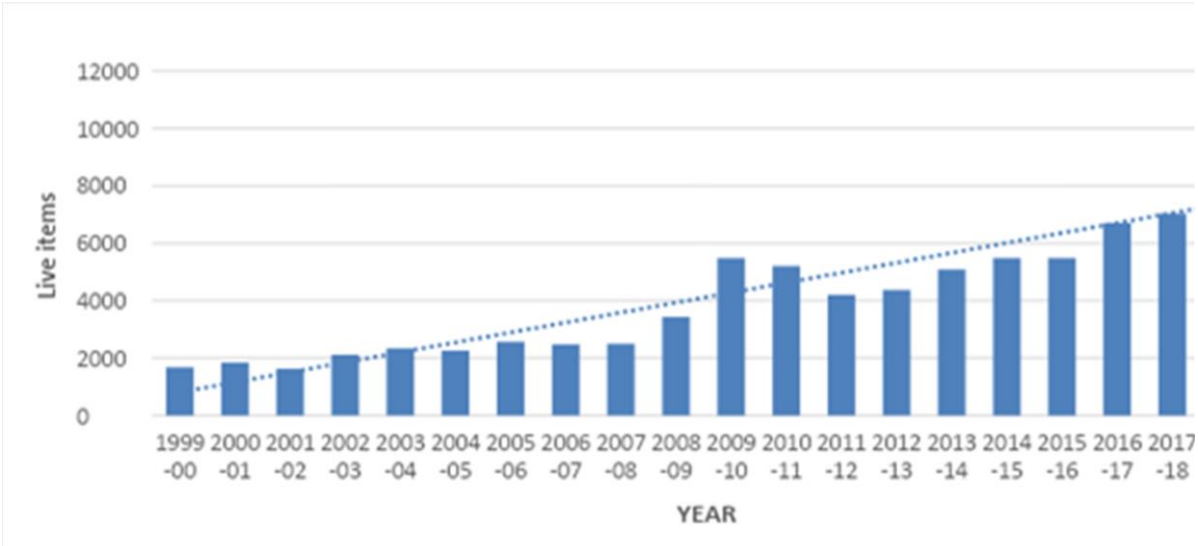


We got the Second-degree eq. for forecasting the Dried item in 2025-26 as

$y = 40.341x^2 + 3828.9x - 4711.4$

For the year 2025-26, the value of x is 26 and putting that value we get the estimated value of export of Dried item in 2025-26 is **122110.52.**

- **FORECASTING OF EXPORT OF LIVE ITEMS IN 2025-26**

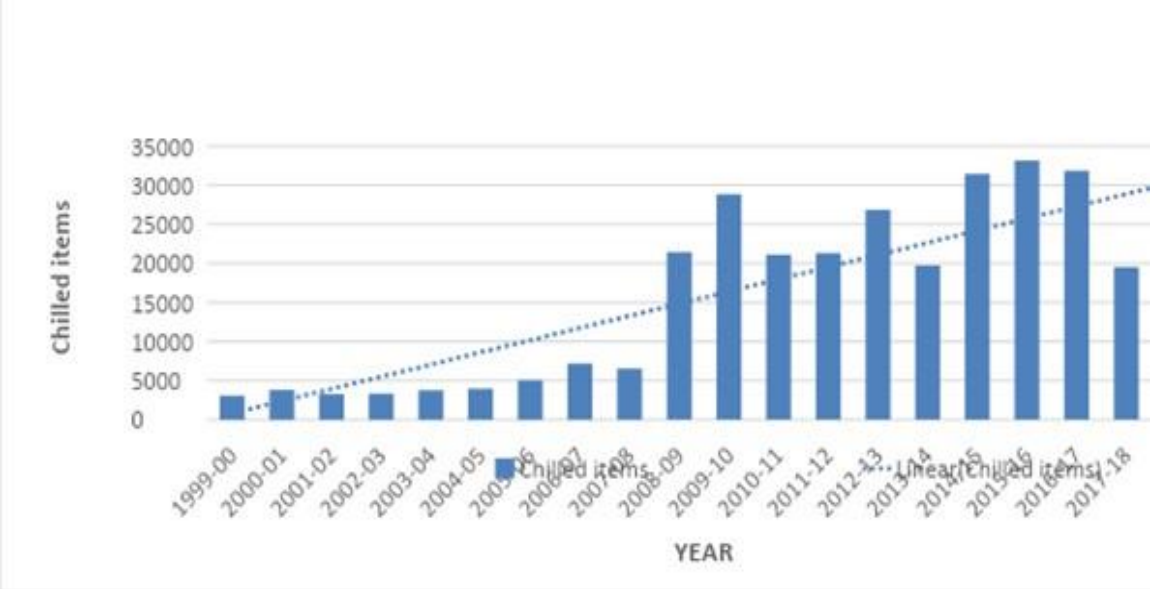


We got the Second-degree eq. for forecasting the Live items in 2025-26 as

$y = 17.302x^2 - 16.585x + 1796$

For the year 2025-26, the value of x is 26 and putting that value we get the estimated value of export of Live items in 2025-26 is **13060.942** ton.

- **FORECASTING OF EXPORT OF CHILLED ITEMS IN 2025-26**

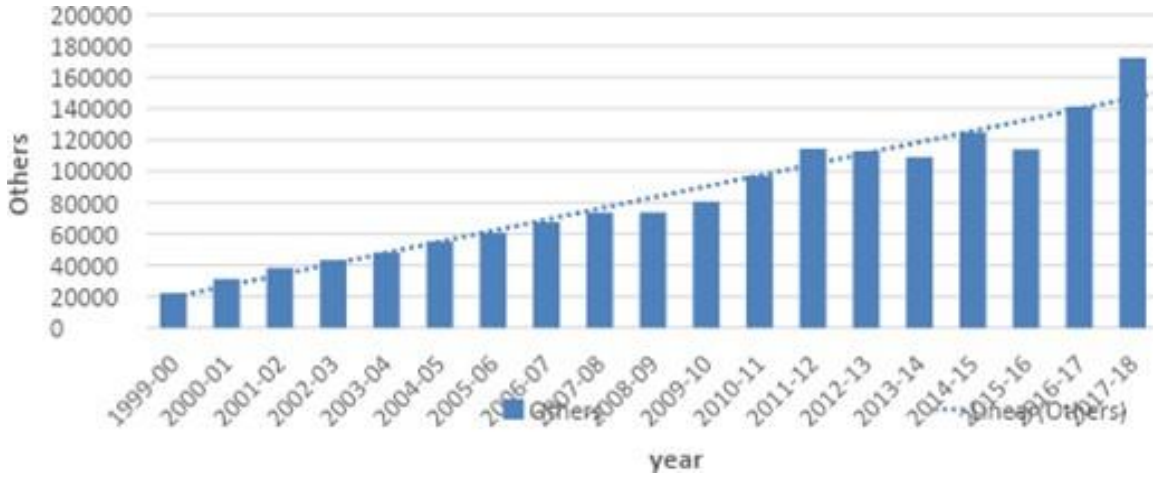


We got the Second-degree eq. for forecasting the Chilled items in 2025-26 as

$y = -66.52x^2 + 2953.4x - 5841.3$

For the year 2025-26, the value of x is 26 and putting that value, we get the estimated value of export of Chilled items in 2025-26 is **25979.6** ton.

- **FORECASTING OF EXPORT OF OTHER ITEMS IN 2025-26**

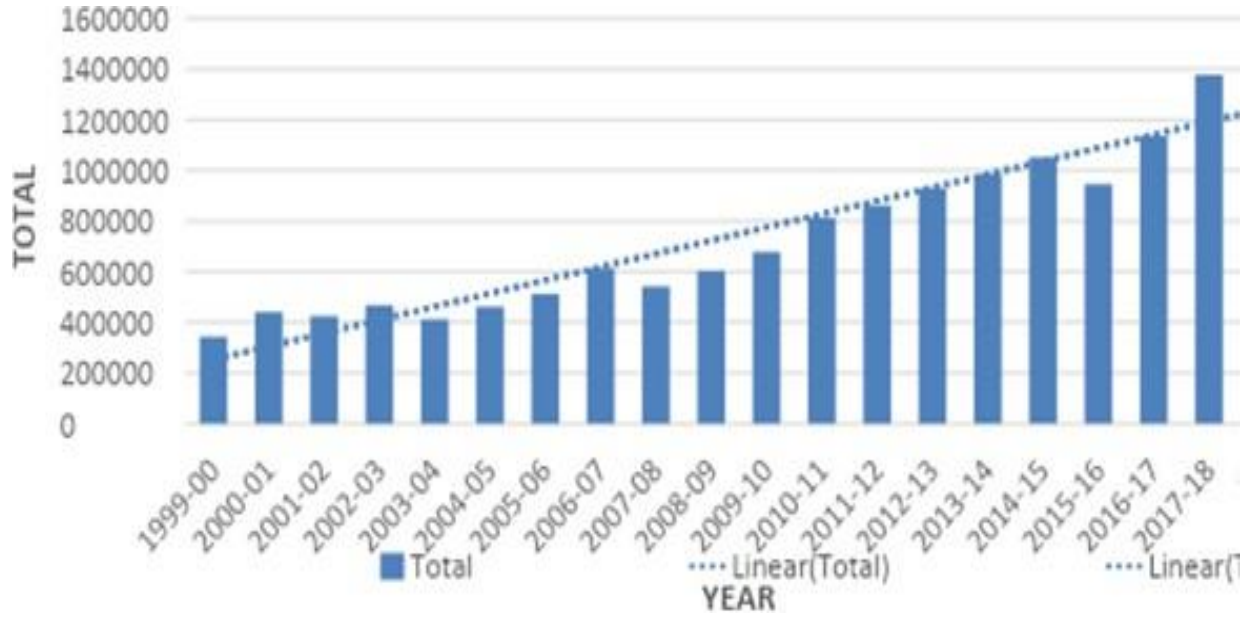


We got the Second-degree eq. for forecasting the export of others items in 2025-26 as

$y = 114.07x^2 + 4680x + 21327$

For the year 2025-26, the value of x is 26 and putting that value, we get the estimated value of export of s in 2025-26 is **220118** ton.

- **FORECASTING OF TOTAL EXPORT OF FISH ITEMS IN 2025-26**



We got the Second-degree eq. for forecasting the Total export in 2025-26 as

$y = 2328.8x^2 + 3371.1x + 379686$

For the year 2025-26, the value of x is 26 and putting that value, we get the estimated value of Total export in 2025-26 is **2041603** ton.

CONCLUSION:

From the results of the present study, it is evident that export growth in terms of quantity and value was low. However, no negative growth was experienced for any destination country in terms of quantity and value. For the last 20 years inland fisheries production is growing on low rate but marine fisheries production is not increasing significantly.

India is exporting many fisheries items but among them, Frozen Shrimps accumulates 69% from the total export but dried items and live items, child items togetherly accumulate less than 5% of the total fisheries export in India.

The study also showed that marine products export from India mainly focused to less desirable and least desirable destinations. India is exporting to South East Asia in a significant number but to Japan, China and Middle East in a low percentage.

Successful identification of stable markets and stabilization measures will help to enhance foreign exchange earnings and also would help to boost the economy of the country.

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