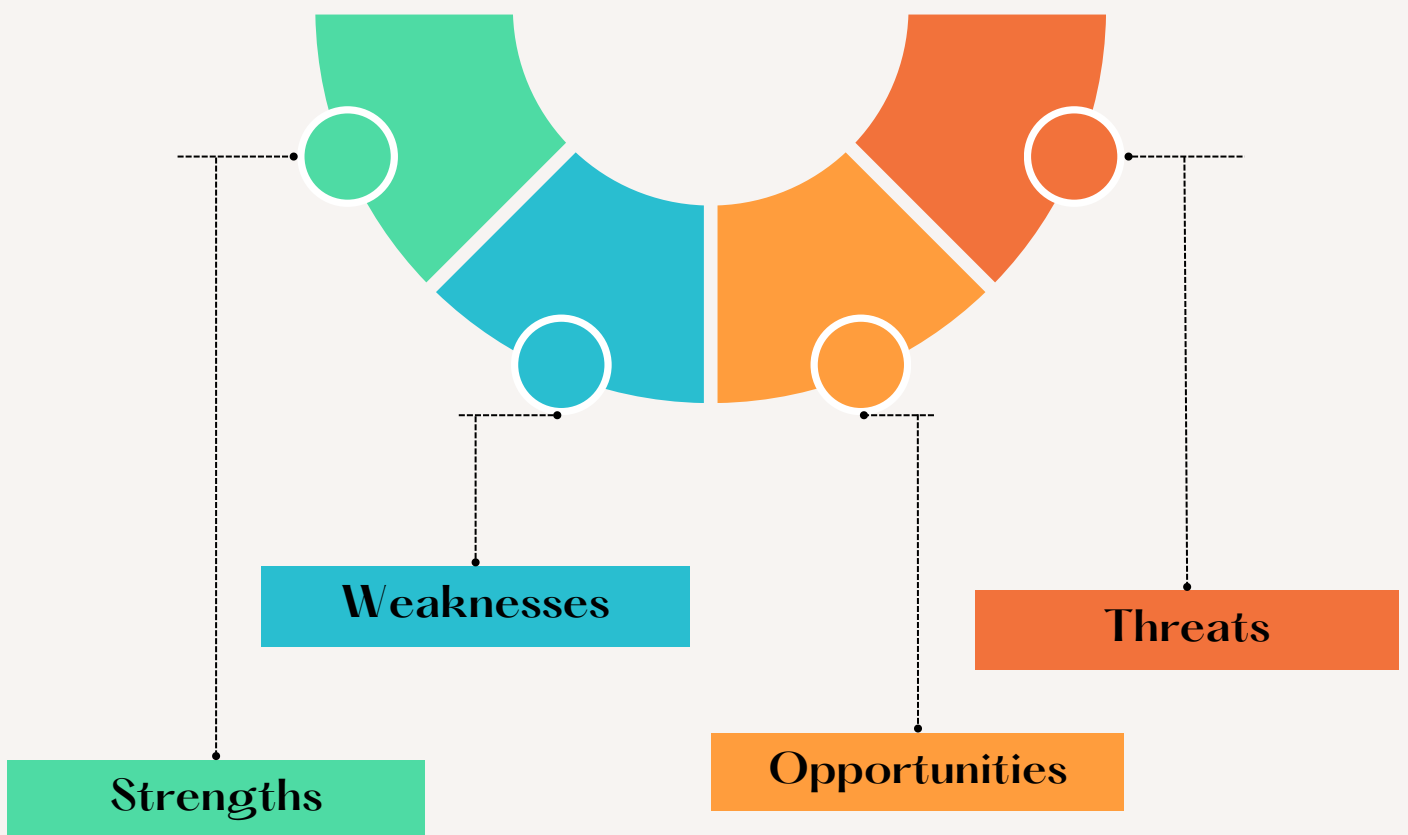


Interdisciplinary Studies:

Converging Research for Growth and Development



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Interdisciplinary Studies: Converging Research for Growth and Development

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PREFACE

Growth and development of any region or country is based on the support and investment that are provided to multitude areas of researches which then incorporates the skill and perspectives so developed in an interdisciplinary way to resolve precarious problems related to the growth and development. Interdisciplinary research can be comprehended as the linking of diverse disciplinary fields where application of evolved knowledge and research of different subject areas are put together to analyze and resolve one complex problem. This approach is benefited from the different theories using multiple models.

This book presents readers with many such studies searching for solutions which cannot be understood from just one perspective but, would rather require multiple viewpoints. We have meticulously chosen topics from diverse field ranging from medical background to big data analytics covering intermediary topics where computer assisted technology is used for resolving medical issues. We hope this book would provide an informative experience to readers.

ACKNOWLEDGEMENT

This edited book on “**Interdisciplinary Studies: Converging Research for Growth and Development**” is an attempt to gather recent researches and present them to the readers who can gain insights into how interdisciplinary researches are making the way for various different fields to come together and solve complicated research problems. We would like to extend our deep gratitude to various researchers who work hard to perform the task and present their findings in the form of research articles. . We would like to express our gratitude from the core bottom of our hearts to Empyreal Publishing House for their strong support during the entire publication process. We are thankful to the Almighty that our book came into existence. We are also Grateful to our immediate family members for being supportive throughout the Publication process and also for bearing with us as we were not able to give them enough time during this entire process of the Publication.

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Dr. Manisha Vikrant Jagtap has an extensive blend of industry and academic experience, with a total of 24 years of experience. Her education qualifications include a Master of Commerce in Cost & Works Accountancy, a Master of Business Studies in Marketing Management, and a Ph.D. in Marketing.

Her teaching interests include Marketing, Digital Marketing, Start-up and New Venture Management, Consumer Behaviour, Brand Management, Service Marketing, and Sales & Distribution Management. Dr. Jagtap is an avid reader and regularly contributes to national and international journals.

In her academic career, Dr. Manisha has spent a decade handling various academic activities, events, conferences, seminars, workshops, and overall coordination of the MBA program. She has conducted numerous workshops on topics such as Rural Entrepreneurship Development, Preparing Business Plans, Personality Development Programs, and Communication Skills, for both undergraduate and postgraduate students across India. She has also conducted various Faculty Development Programs on Case Discussion Methodology for management faculties across India.

Currently, Dr. Manisha holds the position of Associate Professor and Head of the Department at Dnyansagar Institute of Management & Research, affiliated with Savitribai Phule Pune University. With her rich industry and academic experience and teaching interests, Dr. Manisha Jagtap strives to provide a holistic learning experience to her students and inspire them to achieve their full potential.

Her axiom of life is – make the best of whatever you have. Appreciate the positives and live life to the fullest!

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**LEARNING ANALYTICS AND ITS INFLUENCE ON MALAYSIAN HIGHER
EDUCATION INSTITUTIONS: A COMPREHENSIVE MULTI GROUP
ANALYSIS MODEL USING AMOS FOR STUDENT RETENTION,
ATTAINMENT, AND EMPLOYABILITY**

Prof Dr Kosga Yagapparaj

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ABSTRACT

Learning analytics is moderately new in research models, evaluation, and business intelligence. The critical analysis of the literature explains that learning analytics has gained significant attention in education as an influence of more and better data. This paper highlighted the integration of the status of Learning Analytics (LA) usage in Malaysian HEIs and the proposed framework involving Student Retention, Attainment, and Employability fit with the data collected from Malaysian HEIs. It gives a comprehensive background for increasing understanding of the positive aspects of implementing the learning analytics framework (LA) in higher educational institutions in Malaysia. It gives a qualitative analysis overviewed the critical objectives of adopting the proposed model of LA in generic educational strategic planning by Malaysian HEIs. Mixed methods convergent parallel design was used for this research. The results have highlighted some significant directions of LA and academic analytics in driving. This study uses the Comprehensive Multi Group Analysis Model and AMOS techniques to determine how the proposed framework will identify Student Retention, Attainment, and Employability for achieving student retention and enhancing employability.

Keywords: Learning, analytics, Malaysian HEI's, AMOS, students, retention

I - INTRODUCTION

According to Yassin et al. 2020, the current wave of globalization is accelerating the trend toward internationalization of higher education in many HEIs worldwide, including those in Malaysia; Managing intercultural diversity and overcoming intercultural learning obstacles that impact international students' learning outcomes and

learning sustainability are, however, international higher education institutions' primary challenges. Consequently, the proposed measurement model was used to investigate intercultural learning challenges that impact the learning sustainability of international students. A survey was used to collect information from 273 international students enrolled in Malaysian higher education institutions. Variance-based structural equation modeling, or PLS-SEM, was used to analyze the data. The findings demonstrated that students' learning sustainability was unaffected by intercultural obstacles. However, difficulties with language, academics, and research were found to hinder international students' learning sustainability significantly (Ngo & Chase, 2021). Even though international students may be able to overcome such obstacles over time, the study concluded that intercultural learning barriers are considered to be intercultural learning challenges, which negatively impact international students' learning sustainability. The study also found that various factors, including students' language and learning abilities, educational systems at higher education institutions, and lecturers, contribute to international students' education sustainability. Higher education institutions must develop a clear framework that incorporates these elements to make learning more sustainable for international students, according to the study's findings.

The features of electronic learning in the Education 4.0 environment are discussed in this paper (Education 4.0). The Malaysian government encourages HEIs to incorporate technologies to prepare students for the future. In addition, students need to develop skills to be additional flexible to differences in the environment. Learning Management Systems (LMS) are currently used by higher education institutions and lack interactive features and personalized learning (Alqahtani & Rajkhan, 2020). As a result, the goal of this article was to look at the existing research on e-learning practices in Education 4.0 and suggest e-learning features that would work well in an Education 4.0 environment guided by the Reporting Items for Systematic Studies and Meta-Analyses review method, a Scopus 24-related systematic review. Self-regulation, personal perspective, experiential learning, social learning, learning community, creating and sharing knowledge, and structure and layout are the seven e-learning features based on the constructivism principle that can be used to upgrade and redesign LMSs (Mansor et al., 2020).

Guseva et al. (2022) studied a performance dataset of 93 Russian universities presented in this article. The data was gathered from 2015 to 2018 and evaluated using 24 indicators. These data came from sources like the Web of Science (with its citation-based research analytics tool InCites) and Scopus (with its citation-based research analytics tool SciVal) databases, as well as information from international ranking agencies like QS, THE, and ARWU. Russian Federation has published materials to monitor the effectiveness of higher education institutions. The dataset includes evaluations of university performance based on the most critical indicators utilized in socio-economic studies of comparative analysis of the development levels of the higher education system in various nations (Campbell, 2021). international financial and economic performance, international public recognition (universities' positions in leading international rankings), and educational and scientific research. The following are the groups of evaluated universities: Participants in the Russian Academic Excellence Project (Project 5-100) include Flagship Universities (FIU), National Research Universities (NRU), and Federal Universities (FU). The Displaced Ideal Method and the calculation of median values are used to analyze the indicators for the comparative analysis, which are grouped by activity type. Researchers, university administrators, specialists in the higher education system, and others may find the helpful dataset. Data mining techniques, machine learning, and pattern analysis can be used to process data to create intellectual structures that can be used for university performance evaluation in various educational systems. Based on the data presented, we can assert that providing specialized assistance to leading Russian universities has a strong influence on the development of Russian higher education, expanding the country's presence in the international academic community. The leading national research universities that participated in Project 5-100 had the most significant impact on making Russian education more globally competitive.

According to Muljana & Luo (2019), analyzing the gap between online learning's popularity and the completion rate is the subject of this systematic review of the relevant literature. This study's scope of the review includes determining how to improve retention rates and whether the low completion rates in online learning environments are due to any underlying factors. Student retention paces are remarkably

lower than those in the traditional setting, despite the growing popularity of online education and the steady increase in online students. Numerous institutions are still looking for solutions to this problem, despite the numerous studies. Forty studies from 2010 to 2018 were the subject of a comprehensive literature review. The selection of eligible articles was guided by criteria that included topic relevance (under the research questions), empirical studies, and publication time frame. Additional steps were taken through extensive database searches, abstract screening, full-text analysis, and synthesis. This analysis counts to the growing research on strategies for retaining students in online learning environments in higher education (Pinchbeck & Heaney, 2022). The level of difficulty of the programs, the promotion of a sense of belonging, the facilitation of learning, the course design, the behavioral characteristics of students, demographic variables, and other personal variables are revealed. Early interventions, ongoing student support, efficient communication, assistance for online course instructors, high-quality instructional feedback and strategies, guidance for fostering positive behavioral attributes, and association among stakeholders to sustain online students are the identified strategies for improving student retention. Recommendations for Practitioners Given the interconnected nature of the open systems of online learning, we recommend that multiple stakeholders work together to address retention issues in online learning. Recommendations for Researchers Established on the conclusions of this study, the researcher suggests that other researchers focus on each influential factor and recommendation related to student retention in online learning environments. The findings will add to the knowledge of student retention in online learning settings. The effectiveness of student support and faculty support programs, as well as methods for encouraging struggling students to adopt effective strategies that have the potential to engender positive learning behaviors, may all be the subject of future research into data mining and analytics.

Kelly et al. (2017) examined higher education institutions; this study aims to demonstrate the value of combining event and variable-centered approaches for extensive data analysis. The case study method is used to demonstrate the methodology for this analysis using a substantial university-wide data set. It uses process modeling to investigate further empirical findings regarding relationships between student behavior

in a learning management system (LMS) and students' learning outcomes. Using big data from an LMS and the central university database of student results and demographics, the paper describes a two-year study at a Chilean university. Descriptive statistics for various years provide a comprehensive picture of how students use the LMS. In order to provide a more profound comprehension of these findings, process mining is described as an event-centered strategy (du Plessis, 2020). According to the study's findings, instructors do not significantly impact how students use an LMS. It shows that higher-performing students use an LMS differently than lower-performing students, confirming previous research. It demonstrates the value of combining learning analytics methods focusing on events and variables. The study is constrained by its two-year duration, institutional context, and exploratory approach to case study development. The paper can help institutions create a method for using event-centered approaches with big data from an LMS. The paper is significant in duplicating and broadening late examinations by utilizing occasion-focused ways to deal with the investigation of learning information. Using a university-wide data set and a novel setting (Latin America), the present study explains how and why the methodology should inform institutional approaches.

Gosch et al. (2021) researched the need for practical guidelines to support the development of Learning Analytics (LA) is growing as it moves from a research field to an implemented fact of the learner's experience in higher education. LA Policies create frameworks to direct the way by bringing together various perspectives, such as the ethical and legal dimensions (Knobbout & Van der Stappen, 2020). Consenting to the LA tool is the first time students interact with LA. Using a legal framework (GDPR) and an ethical framework (TRUESSEC), the researcher questions whether genuine consent is possible in higher education. Based on this premise, Researcher then demonstrates how learning as a service rather than an intervention can recognize the learner's autonomy. It could point to a shift in thinking about the learner as an empowered requester. Finally, researcher demonstrates how this could be incorporated into the GDPR by recognizing the requirement that educational institutions simultaneously utilize student data. The development of our own LA policy will be influenced by these factors in the future: a list of LA criteria.

Sujatha & Uma Maheswari (2021) explained that big data and information technology are two buzzwords that have recently affected education and other industries. The academic data mining and learning analytics research domain is still in their infancy. In an economy still in its infancy, such as India's, incorporating analytics into education is essential. The time has come for educational establishments to use machine-learning tools to improve the teaching-learning experience (Hasan Sapci & Aylin Sapci, 2020). This study's goal is a system of preventive feedback for faculty and students, which employs learning analytics techniques using data from postgraduate management program students. The first section determined the academic status of foundation courses in the first semester using logistic regression. The validity of six models was evaluated with the help of "specificity" scores. The stepwise regression model was used to predict the student's capstone course grade in the second part of the study. The findings demonstrated that scores on the tenth and higher secondary board examinations no longer matter as the student progresses through courses in the second semester. The outcomes of the second semester are greatly influenced by how well students do in their first-semester classes. The standards originated in this study could be used to improve student performance and the effectiveness of student-faculty engagement.

Safsouf et al. (2021) analyzed many nations that have embraced virtual education as an alternative to traditional classroom instruction since the COVID-19 pandemic began. As a result, more people know how important it is to improve and evaluate the learning process by analyzing student learning data. This article introduces TaBAT, a new tool designed to work with various LMSs in the form of online dashboards that allow teachers to monitor their student's progress and students to visualize their learning process simultaneously. The e-LSAM (eLearning Success Assessment Model) model for assessing online learners' success was proposed and statistically validated in our previous research on factors influencing online learners' success. The design of TaBAT is based on these results. This article discusses two studies. The first one looks at a group of students from two classes (each with two groups) at a higher education institution in Morocco who took blended learning courses on the Moodle platform. One of the two groups had access to the experiment for each class to use the TaBAT tool to analyze the learning traces (the exposed group), while the control group did not have

access to the dashboard. The second study aimed to determine how the TaBAT tool affected the two exposed groups. This article presents a new analysis tool, tests it, evaluates its impact on self-regulation and prediction of academic success, and finally examines how these students rate it. Based on our theoretical model e-LSAM, the success algorithm's effectiveness is demonstrated by the TaBAT results. The outcomes also demonstrate that this tool effectively improved the performance of the exposed students in both groups. The participants' overall evaluations supported these findings (Namoun & Alshanqiti, 2021). **Impact on Society** The article suggests a tool that would make it easier for educational institutions to monitor and control how students learn. The tool gives students visualizations to encourage self-reflection, improve their performance, and help them succeed academically. Teachers can use the information to study and respond to it in the classroom. In order to ensure the results of this article and simultaneously boost students' self-regulation and academic success, future research should expand the application of the TaBAT tool to include both private and public settings.

Jones (2017) says that learning analytics is a technology that uses predictive measures and paternalistic nudging methods. These methods may restrict student autonomy, in opposition to student interests and preferences, and may not always provide benefits; some students may suffer harm. The paper discusses three instances of paternalism in learning analytics technologies and argues that liberal education-centered higher education institutions are particularly troubled by paternalism. As a means of guarding against threats to the academic freedom of students, three general recommendations are made to encourage student autonomy and choice-making.

LITERATURE REVIEW

Status of learning analytics

Although learning analytics are becoming increasingly popular in higher education, very little research has been done on its development in Asia. This study reports concentrate on improving learning examination in advanced education in Asia. Eight senior academics or managers from various Asian tertiary institutions participated in semi-structured interviews. The participants were asked about their institutions' stance

on learning analytics, their progress in implementing it, the factors that contributed to its successful implementation, and any obstacles they faced. The findings indicated that the primary goals of the institutions that had implemented learning analytics were to improve student retention, pedagogy, and students' learning experience. The support of senior management and consideration of students' perspectives in decision-making is necessary for its successful implementation. Teachers' and students' concerns about the increased workload and data privacy, and technical issues with data collection, processing, and analysis presented challenges for the participants' institutions. In conclusion, although learning analytics have only recently gained popularity in Asia, they are currently being implemented. Learning analytics practices and research directions are also discussed (Li et al., 2018).

Learning analytics and motivational interventions

According to Herodotou et al. (2020) studied, Predictive Learning Analytics (PLAs) have the potential to identify students who are at risk of failing their studies; however, there is relatively little research demonstrating how PLAs can be effectively applied to higher education. This study aims to 1) determine whether and how PLAs can be used to design motivational interventions and 2) document the impact of those interventions on Open University UK student retention. The Student Probabilities Model (SPM), a predictive model, was used to predict a student's likelihood of finishing a course at the next milestone. The university Student Support Teams (SSTs) contacted undergraduate students (N=630) with a low likelihood of completing their studies and randomly assigned them to the control (n=312) and intervention (n=318) groups. The SSTs used various motivational methods, including phone calls, emails, and texts. The proposed intervention was effective in facilitating course completion based on the randomized control trial's statistically significant improved retention outcomes for the intervention group. Additionally, the scale-and-cost-effective administration of student support was enhanced by the intervention.

Academic Attainment

According to Nguyen et al. (2020), the attainment gap between white scholars and students of black and other minority ethnic backgrounds (BME) has existed for decades;

the possible reasons for these differences are highly contentious. Based on their digital footprints, researchers can now understand how students engage in learning activities in a naturalistic setting thanks to the development of learning analytics. This study examines the attainment gap by examining the differences in behavioral engagement between various ethnic groups. We confirmed the existing attainment gap by utilizing multilevel academic performance standards, demographics, and online fractions of 149,672 students enrolled in 401 modules through distance learning. BME learners lived between 19% and 79% less likely than white students to complete, pass, or earn an excellent grade after controlling for other demographics, module characteristics, and engagement. BME students spent 4-12% more time studying than white students for the same academic performance. Even after accounting for academic engagement, the achievement gap persisted, and our study further demonstrated the disparity between BME and white students.

Student Employability

According to Martín-García et al. (2020), Higher education institutions must make it possible for students to acquire abilities and skills that improve their employability and prepare them for work. This result from a sustainable higher education system focused on applied learning and teaching enhancement. By examining student interactions in a collaborative learning community, this study aims to contribute to that objective. In employment-focused blended studies, where enrollees have geographically dispersed undergraduates with various profiles, it evaluates the impact of visual tools on academic performance and student satisfaction. Students' interactions were tested in a model that encourages participation as users and creators of visual content, and a financial study learning community was established. Three surveys were carried out to evaluate the project's impact—pre-project, evaluation of classmates' visual exercises, and post-project—. We started by employing a univariate strategy that concentrated on the characteristics of the students, evaluations of the course and project, and the project's effects on academic performance and expectations. Second, a bivariate approach was used to see if respondents' mean scores were the same regardless of their characteristics and if any relationships existed between their evaluations and those characteristics. The outcomes demonstrated: 1) The preferences of students match those of employers; (2)

Students' perceptions of course procedures improve when they participate in novel initiatives; (3) Students' satisfaction and academic performance both benefit from the use of visual tools. By defining the factors that influence academic performance and student satisfaction, the study supports educational institutions' decision-making regarding courses and the overall curriculum.

III - RESEARCH GAP:

The literature review synthesis the view of the different research findings and identified the research gap, as most of the researcher studied about the learning analytics among higher education institutions and other factors separately, but none of the researchers have studied about the integrated influence of specific dimensions such as student retention, student attainment and student employability from higher educational institutions in Malaysia, In this specific study how learning analytics and its influence analyzed with Comprehensive Multi Group Analysis Model using AMOS to develop and evaluate if the proposed framework involving Student Retention, Attainment, and Employability fit with the data collected from Malaysian HEIs.

Conceptual framework123456

V - OBJECTIVES OF THE STUDY

Evaluating the rationale of the study and the gaps identified allowed in constructing the following objectives.

- 1) To investigate the status of Learning Analytics (LA) usage in Malaysian HEIs.
- 2) To identify potential relationships between LA usage in Malaysian HEIs and student retention.
- 3) To identify potential relationships between LA usage in Malaysian HEIs and student attainment.
- 4) To identify potential relationships between LA usage in Malaysian HEIs and student employability.
- 5) To develop and evaluate if the proposed framework involving Student Retention, Attainment, and Employability fit with the data collected from Malaysian HEIs.

VI - RESEARCH METHODOLOGY

A well-structured questionnaire was prepared for the specific study. The study methodology was Mixed methods convergent parallel design used for this research (Guetterman et al., 2015), and the sampling method was Qualitative -Purposive (NVIVO); (RO1). The sample size of the study 14 senior management university portal has been selected, and respondents from Chancellery, Dean, HOD, and Directors. Qualitative analysis conducted the study with interviews and focus group discussions. 437 sampling was selected for the specific research out of 450. The entire data source has been collected from Public and Private HEIs (Higher Education Institutions) in Malaysia. According to Krejcie & Morgan (1970), the study followed the sampling size determination table. 5 Point Likert Measurement Scale was used and surveyed through the individual questionnaire. According to Data Screening and Normality of Measurements, Skewness and kurtosis values should be confined between ± 1.50 as the acceptable limits. Thus, both Skewness and kurtosis findings indicate that the responses in this study's dataset are typically distributed (Tabachnick et al., 2007). Study analyzed with frequency analysis, multiple regression and AMOS structural model for testing the hypothesized direct effects with standardized regression weights.

From chart 1, it is observed that the majority 52.17% (228), are in the age group of 18 to 21, 34.32% (150) are in the age group of 22 to 30, and 13.51% (59) respondents are in the age group of above 31.

According to the gender frequency, it is observed that the majority 50.50% (222) of respondents belongs to the female category, and 49.20% (215) respondents are in the male category.

According to the Ethnic frequency, it is observed that the majority of 33.19%(145) respondents belongs to the Bumiputera category and 33.19%(145) respondents belongs to the Chinese category as well as all the respondents belonging to Malaysian origin.

According to the course and degree frequency, it is observed that the majority, 34.12%(150) of respondents belongs to Ph.D.

33.64%(147) respondents belongs to the Bachelors degree category, and 32.04% (140) respondents are in Masters degree category.

According to the years' frequency, it is observed that the majority, 38.44%(168) of respondents, are in the second-year category. 27.92%(122) respondents are in the fourth year category, 23.34%(102) respondents are in third year category and 10.30%(45) respondents belongs to first-year category.

Three regression models determine the mediating effect. Figure 2 shows the three models and the results for academic performance, retention, and attainment. Employability is also taken as a variable in the model. However, it is treated as a covariate in the mediating model. There are three direct models. The first one is academic performance and its influence on attainment (Ngalo-Morrison, 2017).

The second and third models are indirect models. The second model is the academic performance on retention. The third one is retention in academic attainment. Models 2 and 3 determine the indirect influence after bringing in retention in the model. Usually the product of the beta coefficients of models 2 and 3 will reveal the indirect influence of academic performance on attainment via retention. The results are given below in the four tables. The first and third tables give the model fit parameters and their results. Table 2 and 4 gives the results of beta coefficients and their significance.

Table1 shows the model fit parameters for model 2, which exhibits the influence of academic performance on retention. The R-value is the correlation coefficient which is 88%. This high correlation indicates that academic performance is positively related to retention. The R Square value is 78%, indicating the model's strength. The Mean Square Error (MSE) is also minimum (MSE=4.02). The F value (764.80) and associated degrees of freedom show 0.00 as P-value. This value is <0.005, the benchmark for any academic hypotheses testing. These results indicate the fitness of the independent and dependent variables. The significant P-value indicates the fit of dependent and independent variables in the model, which is good here.

The beta coefficients are given for the second model, which explains the influence of academic performance on retention. Employability appears in the model as a co-variable. The beta coefficient can be explained as one unit of academic performance increase will bring a positive change of 3.84 in retention. The P- value for academic performance is 0.00, which is less than 0.1 percent, indicating the strongest acceptance

of the influence of academic performance over retention. ($\beta_1=3.84$; $p=0.00$). The employability through the control variable in the model does not show any significant P-value; hence the influence of employability on retention is rejected as negligible. So the contribution of employability to retention is meager ($\beta_2=0.01$; $p=0.67$).

The influence of retention over attainment and academic performance and attainment are given in figure 2. The influence of academic performance on attainment is the direct relationship; the indirect relationship is exhibited in model 3 in figure 1. The results are given in table 3 and table 4.

The model fit for model 2 and model 3 are given in table 3. The R-value (0.36) indicates the overall relationship between academic performance and attainment. The correlation coefficient for the entire model is 36% which indicates a positive relationship, a moderate value. Any correlation of 50% will be a good relationship. The R square for the entire model is (0.13), which indicates the interaction of the models on attainment. In social sciences expecting a very high R² is futile. The F value is (21.19), showing a P-value of 0.00. It indicates the match of dependent and independent variables.

The beta coefficient and the significant P values are given in table 4 for the two models. The first model reveals the direct relationship results between academic performance and attainment. The second model, retention to attainment results, is also exhibited here. One unit increase in performance attainment increases by 0.12. The veracity of this statement is tested by P-value, which is 0.71. This P-value is very high when compared to the standard of 0.05; hence the above statement is rejected. It is noted that academic performance does not influence attainment. Even if influences it is negligible or marginal. The retention of attainment is given in the third row of table 4. One unit of retention increase will negatively influence the attainment by -0.01. This statement is also rejected because the P-value is 0.84. Employability as a co-variant influences attainment positively by 38% (0.38). This statement is accepted as accurate as the P-value is 0.00. Overall the influence of retention and academic performance is meager.

The direct effect, as explained earlier, shows the beta coefficient value between academic performance and attainment as 0.12, whose significance is 0.71. These two values indicate no direct relationship between academic performance and attainment.

The mediating effect of retention over attainment is quantified as an indirect effect given in the last column of table 5. This effect of -6% is low and can be considered as no indirect influence. This indirect effect is computed by multiplying model 1

3.84 (academic performance beta score) and model 2 retention coefficient -0.01 ($3.84 * -0.0146=0.056$).

According to Baron and Kenny (1986), if all three models' beta values are significant, it is considered a complete mediation. Any two or more significant model values are considered partial mediation. No significant value in any model is considered to be no mediation effect. In this study, the academic performance on retention is significant, but model 2 retention influence on attainment and model 3, which is the influence of academic performance on attainment, are insignificant; therefore, it is concluded that there is a partial mediation effect between retention and attainment.

The joint influence of any two variables is addressed as a moderation effect. This article analyzes the moderation effects of Financial Integration, Motivation, Financial Integration, and Academic Integration in the regression process as discussed in Hayes, A. F. (2012).

The results for moderation regression are given in table 1. The R-value discusses the positive correlation of model parameters as 0.71. The coefficient of determination ($R^2 = 0.50$) indicates the explanatory power of the independent variables, such as academic Integration and motivation, on the dependent variable retention. The F-value is 71.26 and shows a P-value of 0.00. This indicates the fitness of the independent variable and dependent variable in the model.

Table 2 explains the beta values and their significance. Four independent variables' influence on dependent variable retention is given. Financial integration and retention are positively related, and the influence value is 1.55, with a significance of 0.00. It indicates that financial integration is essential in student retention at HEIs in Malaysia. Similarly, motivation and retention ($\beta = 1.22; 0.00$) are also crucial in student retention. Social integration and retention are also significant because the beta value is 0.65, and the significance is 0.00. This result also indicates the importance of social integration in student retention in HEIs in Malaysia. Finally, the academic integration influence on

retention is examined and found to be insignificant ($\beta=0.08$; $p=0.46$). It seems academic integration is poorly contributing to the retention of students in HEIs in Malaysia.

The joint influence of Financial Integration and Motivation on retention is examined and found to be insignificant ($\beta=-0.14$; $p=0.13$). It indicates that Financial Integration and Motivation excrete a meager influence on retention in HEIs Malaysia.

Another common effect is excreted by Financial Integration and Academic Integration on the retention of students in HEIs in Malaysia. This result is also insignificant ($\beta=-0.02$; $p=0.58$). It shows the joint influence is very low on student retention in HEIs Malaysia.

The model parameters and the fit indices will change when the moderating effect is brought into the model. The fit indices change results are given in Table 3. The R^2 -change is not even touched 1% as all the values are less than 0.00. The F-value change is also small, and all produce insignificant p-values. These results indicate that the model does not change when joint variables are brought into the model.

Four independent variables are included in the original model, out of which three directly influence the retention decision of Malaysian students. Academic integration alone contributes poorly to the retention decision. As explained above, the combined effect (moderation) of two sets also does not contribute to retention.

The above table 4 exhibits R , R^2 , adjusted R^2 , and standard error R (.791) represents the multiple correlation coefficient. i.e., it is the correlation between the empirical and envisioned values of the dependent variable. R^2 (.587) is the recommendation of variation in the dependent variable explained by the regression model. Sample R^2 tends to estimate how well the model fits the population optimistically. Adjusted R^2 (.542) attempts to correct R^2 to better recall the model's merit of fit in the population.

Table 5 outlines the results of the analysis of variance. The Sum of squares, degrees of freedom, and mean square are displayed for two references of variations, regression and residual. The above output for regression exhibits details about the variations accounted for by the measure. The output for a total (485.771) is the Sum of data for regression (262.342) and residual (235.429). A model with a large regression sum of squares

approximated to the residual Sum of squares suggests that the model accounts for most of the variation in the dependent variable. F statistics (27.018) are the regression mean square dividend residual mean squared. The regression degree of freedom is the listed degree of freedom, and the residual degree is the denominator degree of freedom for the 'F' statistics. The total number of degrees of freedom is the number of cases minus 1. If the significance of 'F' statistics is minor (0.05), then the independent variable presents the variation in the dependent variable.

The multiple R was found to be 0.791, indicating a relationship of 79.10 percent between the variables responsible for learning objectives that will give better employment and the academic program that has prepared students' employment. The R square value of 0.587 ensures that the explanatory factors explain only 58.7 percent of the variation in Overall involvement of the proposed framework will lead to Student Retention, Attainment, and Employability positively to the Malaysian HEIs.

SEM: Structural Model for Research Model

Structural model examines the direct effects of the independent variables, namely, LA Status, Student Retention, Students Attainment and Students Employability on Supporting Malaysian HEIs, the dependent variable. The 4 effects pertain to H1, H2, H3 and H4, respectively.

Direct Effects of Variables

Fig. 3 shows the AMOS structural model for testing the hypothesized direct results with standardized regression significances.

Fig. 3. AMOS Graph of Structural Model

VIII - DISCUSSION RESULTS

Our study has connected two primary factors regarding the influence analyzed through the focus on the higher education institutional level. Firstly, higher education institutional support, such as student assistance, admission, new course orientation, technology and IT support, and specialized programs, is a top factor impacting student retention in learning environments among Malaysian HEIs. We detected a few justifications for why HEIs support is essential in enhancing student retention. Several

students from higher education backgrounds need to be qualified regarding experience learning readiness. Unfortunately, actuality often displays the opposite circumstances.

From our review, we have found pedagogical-related elements among the most notable factors influencing the effectiveness of analytics of learning, such as the facilitation of student concentration and understanding of course structures, facilitation of the teachings, and curriculum and Instructional design. Elements found in the instructors, such as in the pedagogical element, contribute to student retention results. Many students are knowledgeable that the instructional approaches deployed in the course stimulate students to stay continuous.

Students have a pre-existing inclination for lecture delivery methods. There demonstrates a preceding commencement of digitalized learning. Specifically, student perceptions toward registration in virtual courses are influenced by perceived ease of technology use, inspiration, and unexplored learning possibility. Amidst these factors, student encouragement is the most remarkable since it helps support their endurance to complete the specialized and enrolled courses among Malaysian HEIs.

According to the above results of the study, Overall involvement of the proposed framework will lead to Student Retention, Attainment, and Employability positively to the Malaysian HEIs and the LA and its influence in supporting the Malaysian HEIs, which are LA status, Student retention, Students Attainment, and student's employability. The outcomes of this study are constant with the findings (Yassin et al., 2020; Li et al., 2018; Herodotou et al., 2020).

This analysis also revealed that observing Student Retention, Attainment, and Employability by Malaysian HEIs is positively influenced by LA status, Student Retention, Student Attainment, and student employability. These results are consistent with the findings of previous research (Gosch et al., 2021; Nguyen et al., 2020; Martín-García et al., 2020). Malaysian HEIs LA adoption and several factors mainly influenced by Student retention, Students Attainment, and employability. Student retention and attainment connected with the Institution's activities were the significant factors influencing Malaysian HEIs.

IX - CONCLUSION

The analysis broadly examines the influential factors and advanced techniques of student retention, attainment, and employability. Future studies may profoundly consolidate each aforesaid significant aspect and suggestion. For example, big data, machine learning, AI, and analytics methods for the detection and forecast of at-risk students merit in-depth exploration and investigation so that outcomes can be accomplished as precisely as attainable. Another constraint is that the distinctive ways of delivering support to other stakeholders, such as faculty associates, were not concerned profoundly. We recommend an inquiry that investigates the effectiveness of HEIs faculty support, such as professional expansion opportunities such as vocational college, training, seminars, workshop, and regular national and international conference with industry speakers and lectures. Additional classes of faculty support, like techniques and methods to deliver instructional development, curriculum design, and e-learning technology assistance, are also in demand for further research. Rather than reinventing the wheel, other higher educational institutions can discover from these institutions successfully executing such faculty development programs and management development programs.

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**SOCIAL VARIABLES AND PROMISCUITY AMONG SENIOR SECONDARY
ONE STUDENTS IN EKET SENATORIAL DISTRICT OF AKWA IBOM
STATE**

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ABSTRACT

The study sought to determine the relationship between social variables and promiscuity among SS1 students in Eket Senatorial District of Akwa Ibom State. Three research questions were raised and three hypotheses were formulated to guide the study. A correlational research design was adopted while population of the study comprised all the 15,222 Senior Secondary One (SS1) students in the 63 public secondary schools in Eket Senatorial District, Nigeria. A sample size of 375 Senior Secondary One (SS1) was selected for the study. A simple random sampling technique was used to select a sample size of 25 public secondary schools out of 63 as well as 15 SS1 students from each of the sampled schools for instrument administration. The researcher's developed and validated instrument titled "Social Variables and Students Promiscuity Questionnaire (SVSPQ) were used for data collection. Pearson Product Moment Correlation (PPMC) was used to answer the research questions and testing of hypotheses, all at the degree of freedom of 373 and at .05 significant levels. Findings of the study revealed a very high positive and significant relationship between peer pressure, family discipline, exposure to video films and promiscuity among SS1 students in Eket Senatorial District of Akwa Ibom State. The findings further showed a high positive and significant relationship between parental upbringing, desire for materialism and promiscuity among SS1 students in the study area. Conclusion was drawn from the findings while the researcher recommends among other things that, school administrators, parents and teachers should wake up to their responsibilities of monitoring and advising students on the kind of associations they should keep, so as to reduce peer influences towards premarital sex.

INTRODUCTION

Promiscuity is a common social problem affecting the general health and well-being of secondary school adolescents in Nigeria. As one of the contemporary social problems, young ones are usually observed involving in promiscuous activities due to some social variables within their living environment. Some of the social variables include but not limited to parental upbringing, parental level of education, peer pressure, family discipline, desire for materialism and many others. Epstein (2012) noted that the social interaction and connectedness between students, parents, teachers and peers in the social environment may have severe impact on the overall behaviour and moral conduct of learners in secondary schools.

Social conditions within the environment where young ones live tend to be fundamental determinants of promiscuity among students. This is because human beings are never static; changes occur in all aspects of human life, be it physical, social, emotional, psychological and intellectual. These changes took place at different rates according to one's environment. According to Safra and Collinge (2011), if the environment is favorable, one will develop maximally behaviourally, physiologically, socially and emotionally; but if the environment is unfavorable, promiscuous behaviour as well as other maladaptive behaviour sets in. A favourable environment of learning is one that promotes the growth and development of good behaviour and conduct of the individual.

Secondary school students', male or female, tend to develop strong sexual urge or desires at adolescence period due to social factors observed within their environment. This is because adolescence period is mostly considered very turbulent, as the psychological and physiological changes accompanying this period predispose young people to a number of risky sexual behaviours. The adolescence period seem to be very influential in exposing students to risk of promiscuity because according to Okeke and Deborah (2016), students' lifestyle at adolescence period is predominantly characterized by experimentation and risk taking. More often than not, this earns them social stigma that could cause serious harm to their overall health and well-being.

Therefore, it is observed that if an in-dept and critical study is conducted on social variables and promiscuity among senior secondary one students in Eket Senatorial

District of Akwa Ibom State, will go a long way in solving some of the health related problems associated with premarital sex among students.

Therefore, it is observed that if an in-dept and critical study is conducted on social variables and promiscuity among senior secondary one students in Eket Senatorial District of Akwa Ibom State, will go a long way in solving some of the health related problems associated with premarital sex among students.

Statement of the Problem

Promiscuity has become a common social problem which negates societal moral standards. Both male and female students are sometimes involved in promiscuous acts in Eket Senatorial District, Akwa Ibom State. As observed by the researcher in the study area, it is very common to find two members of opposite sex who are not yet married sharing romantic expressions, love and sex. Some of the observed acts of promiscuity common among students are masturbation, lesbianism, rape, homosexuality, coitus among others. Though promiscuous acts are highly discouraged and unappreciated, it is common to find students engaging in such unacceptable act with opposite sex. Sometimes, one would hear a student briefing his or her friends about their sexual experiences with a lover. Such condition may be attributed to social variables such as peer pressure, exposure video films, desire for materialism and parental upbringing among others.

Peer pressure sometimes lures many students into sexual relationship with the view of receiving social acceptance and recognition among friends. Due to pornography shown on home video and phones, it is very common to see some students copy the immoral behaviours of actors and actresses. The prolonged desire for material things as observed by the researcher sometimes make some students' exchange sex for money, phones and materials possession. It is also observed in the study area that due to parents' inability to give adequate information about sex, some students' venture into promiscuous acts. Sometimes, when a child is present and parents are discussing issues about sex, such a child is usually sent away from sight. An inquisitive child who ventures to ask questions about sex is usually called "a bad child". Many homes in the study area consider discussions of sexual issues as a taboo. Most parents find it too difficult, awkward and

uncomfortable discussing sex related issues with their children because of this. In most homes, children are usually condemned and beaten when they mention a word referring to some sexual organs. As a result of these social pressures, some secondary school students in the study area are exposed to sexual transmitted diseases, unwanted pregnancy, abortion, school dropout, poor school performance and many other social problems.

Though the Federal Government through the Federal Health Management Board (FHMB) has been engaging in series of campaigns to create public awareness on the dangers of promiscuous practices, the issue of indiscriminate acts of promiscuity still persists in the study area. Also, although researches might have been conducted by academic researchers on sexual promiscuity, the researcher observed that no research have been conducted on promiscuity in connection with social variables in the present study area. Therefore, the researcher sought to fill this gap by investigating the relationship between social variables and promiscuity among senior secondary one students in Eket Senatorial District, Akwa Ibom State.

Purpose of the Study

The purpose of the study is to determine the relationship between social variables and promiscuity among senior secondary one students in Eket Senatorial District, Akwa Ibom State.

Specifically, the study sought to determine:

- (1) The relationship between peer pressure and promiscuity among senior secondary one students in Eket Senatorial District, Akwa Ibom State.
- (2) The relationship between parental upbringing and promiscuity among senior secondary one students in Eket Senatorial District, Akwa Ibom State.
- (3) The relationship between desire for materialism and promiscuity among senior secondary one students in Eket Senatorial District, Akwa Ibom State.

Research Questions

The following research questions are put together to guide the study:

- (1) What is the relationship between peer pressure and promiscuity among senior secondary one students in Eket Senatorial District, Akwa Ibom State?
- (2) What relationship exists between parental upbringing and promiscuity among senior secondary one students in Eket Senatorial District, Akwa Ibom State?
- (3) What is the relationship between desire for materialism and promiscuity among senior secondary one students in Eket Senatorial District, Akwa Ibom State?

Hypotheses

The following null hypotheses were tested at .05 level of significance.

Ho₁: There is no significant relationship between peer pressure and promiscuity among senior secondary one students in Eket Senatorial District, Akwa Ibom State.

Ho₂: There is no significant relationship between parental upbringing and promiscuity among senior secondary one students in Eket Senatorial District, Akwa Ibom State.

Ho₃: There is no significant relationship between desire for materialism and promiscuity among senior secondary one students in Eket Senatorial District, Akwa Ibom State.

Review of Related Literature

Promiscuity is the practice of engaging in sexual activity frequently with different partners or being indiscriminate in the choice of sexual partners. The term can carry a moral judgment if the social ideal for sexual activity is monogamous relationships. According to Leclerc-Madlala (2013), promiscuity refers to engagement to sexual activities with different partners and that behaviour can have undesirable effects such as HIV/AIDS and other sexual transmitted diseases (gonorrhoea, syphilis, candida, herpes). Luke (2009) added that an alarming proportion of sexually promiscuous female students in universities end up being pregnant and forced to leave school prematurely.

Barnett, Maticka-Tyndale and Team (2011) noted that female students are sometimes involved in cross-generational promiscuous acts to overcome their poverty stricken backgrounds. The authors added that severe financial hardships, cultural practices, gender-norms and partner separation are key factors which propel female students into promiscuity. Hornby (2009) defined promiscuous habit as having many sexual partners

or the uncontrollable sexual urge which is not appropriate or suitable. It is also having sex with some body one is not married to. Promiscuous acts according to Onyebuchukwu, Sholarin and Emerenwa (2015) is an act of engaging in sexual relationship (intercourse) before marriage. The author added that such acts practiced by people who are unmarried. According to Nabaraj and Saraswati (2017), promiscuity can also be seen as a sexual activity practiced by people who are unmarried.

Peer Pressure and Students Promiscuity

Peer pressure is a strong predictor of students' promiscuity. Peer pressure refers to the influence exerted by a peer group in encouraging a person to change his/her attitudes, values in order to conform to group norms (Kirk, 2010). According to Ryan (2011), peer pressure comes to play when people of similar age or age brackets encourage or urge other people of the same age bracket to do something or to keep from doing something else, no matter if the person personally wants to do it or not. This is because as students begin to socialize with their peers, they tend to shift from values they learnt from home socialization to reliance on their peers. A number of students see some of their peers as role models. Teachers, parents and peers all provide adolescents with suggestions and feedback about what they should think and how they should behave in social situations. These models can be a source of motivation or a lack thereof.

Modelling refers to individual changes in cognition, behaviour, or effects that result from the observation of others (Ryan, 2011). Observing others perform a particular behaviour or voice a certain opinion such as playing truant can introduce an individual to new behaviours and viewpoints that may be different from his or her own. Observation also enlightens an individual on the consequences of such behaviour and opinions. Depending on these consequences, observation of a model can strengthen or weaken the likelihood that the observer will engage in such behaviour or adopt such beliefs in the future.

Parental Upbringing and Students Promiscuity

Parenting or child rearing promotes and support the physical, emotional, social and intellectual development of a child from infancy to adulthood. Parenting refers to intricacies of raising children and not exclusively for biological relationship. Parents are

expected to teach the children moral values, attitude and acceptable pattern of behaviour expected of them in the society. Through family interaction, parents may have influence on child sexual behaviour and in so doing transmit values, knowledge and attitudes about sex. According to Brooks (2012), the style of parenting have significant role to play in students sexual attitude and behaviour. The author added that female students raised in households characterized by uninvolved and permissive parents, are likely to be involved in concurrent sexual promiscuous relationship. According to Gavazzi (2012), permissive parents are characterized by less demand and their children have difficulties with self-control and demonstrate egocentric tendencies that can interfere with proper development of peer relationships. As noted by Shinyanga, Iringa and Mbeya (2012) parents with permissive style of parenting are most likely to produce children who are sexually promiscuous.

Uninvolved parents, on the other hand, do not guide their children nor discipline them. They usually have “I don’t care attitude” and their adolescent females tend to display personalities which could be associated with sexual promiscuity. Psychologists and sociologist agree that the pattern of a person’s character and socialization is laid within the confines of the home because, the greater part of the child’s life is spent at home. Brooks (2012) asserted that the home serves as the bedrock of education in every child’s life, because the first interaction start with the immediate environment, such as learning the mother tongue and interacting with the brothers and sisters in the home. The family lays the foundation of education before the child goes to school and the personality that the child takes to school is determined by the home. The father is to provide the necessary tools for the education of the children, while the mother is supposed to supplement the father’s effort.

Desire for Materialism and Students Promiscuity

Materialism is viewed as a personal value that is reflected by people’s beliefs about the importance that possessions play in their lives and the display of their acquired assets (Roberts, 2011). Owning the right possessions is a key to happiness and the success is judged by the things they own. The possession of materials things sometimes bring happiness and joy to the acquired. As noted by Richins (2011), a great portion of time

and energy is dedicated to acquiring, possessing and thinking about material things. Students with materialistic inclination are more concerned about tangible objects than intangible feelings or ideas. They can be driven to have more and more money or possessions to the extent where they neglect to consider their emotional well-being. Sometimes, the assets they gain do not give them the pleasure in life or enhance their subjective well-being.

Most students have set making a lot of money one of their future goals. Materialistic values in students affect the balance between their private life and the level of sacrifice they are willing to make for the public. Students with materialistic values have decreased subjective possessions, social statuses and images with those of others. When they have no material possessions that their peers have, Pugh (2009) noted that they experience this deficit acutely and feel they need to compete with the high materials achievers. Students from low socio-economic homes often feel insecure in life. As noted by Sivanathan and Pettit (2010), students from poorer families, who are deprived of the opportunity plan for the future of themselves and family members, feel insecure about their life so they accord more importance to possessions and money than people from families with higher education and better financial status. Moreover, students who feel inadequate in terms of personal and professional competencies try to compensate insecurity with a high-status automobile. Chan and Cai (2009) stated that students growing up in families where the parents lack financial stability would become more materialistic than those who are from families where the parents are more financially secure.

METHODOLOGY

Research Design

The correlational research design was adopted for the study. Therefore, this design is considered suitable for this study because it enables the researcher to measure the interrelationship between social variables and promiscuity among senior secondary one (SS1) students in Eket Senatorial District of Akwa Ibom State. The population for the study comprised all the 15,222 Senior Secondary One (SS1) students in the 63 public secondary schools in Eket Senatorial District, Nigeria (Directorate of Planning and

Research Statistics, Akwa Ibom State Secondary Education Board, Uyo, 2021). A sample size of 375 Senior Secondary One (SS1) was selected for the study. Thereafter, random sampling method (hat and draw) was used to select 15 students from each of the sampled schools, which gave a total of 375 sampled respondents. The researcher's developed and validated instrument titled "Social Variables and Students Promiscuity Questionnaire (SVSPQ) were used for data collection. The SVSPQ had two sections. Section A contained 25 items, 5 each on social variables while section B contained 10 items measuring students' promiscuity. SVSPQ was measured in a four point rating scale of: Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2, Strongly Disagree (SD) = 1. The questionnaire instrument was personally administered on the respondents in their respective schools by the researcher together with two trained research assistants. The research assistant was given instruction by the researcher on how to go about with the exercise. Also, the researcher sought for the permission of the respective principals to allow the respondents respond to the items in the instrument. In addition to items written on the questionnaire, the subject was given verbal instructions and clarifications where necessary. Copies of the questionnaire were filled and collected instantly by the researcher to avoid loss of questionnaire. Data generated was analyzed using Pearson Product Moment Correlation (PPMC) statistics.

RESULTS

Research Question 1

What is the relationship between peer pressure and promiscuity among senior secondary one (SS1) students in Eket Senatorial District, Akwa Ibom State?

Pearson Product Moment Correlation (PPMC) was used for answering the research questions, using the r-value to determine the magnitude or weight of relationship between variables.

Table 1: Correlation analysis of responses between peer pressure and promiscuity among SS 1 students

Variables	N	$\sum x$	$\sum x^2$	$\sum xy$	r-	Remark
		$\sum y$		value		
				$\sum y^2$		

Peer Pressure (x)	375	76984	Very High Positive Relationship
Promiscuity among SS1 Students (y)	5416	75237	
	375	74718	
	5494	0.86	

Source: Field data (2022)

Result in Table 1 shows a correlation value of 0.86. From the decision rule, it is noticed that a very high positive relationship occur between peer pressure and promiscuity among SS1 students in Eket Senatorial District, Akwa Ibom State. The implication of this result is that students tend to exhibit promiscuous acts if they observed or perceived their friends to be sexually active and vice versa.

Research Question 2

What relationship exists between parental upbringing and promiscuity among senior secondary one (SS1) students in Eket Senatorial District, Akwa Ibom State?

Table 2: Correlation analysis of responses between parental upbringing and promiscuity among SS 1 students

Variables	N	$\sum x$	$\sum x^2$	$\sum xy$	r-	Remark
		$\sum y$		value		
			$\sum y^2$			
Parental Upbringing (x)	375		81074			High Positive Relationship
		5374		80453	0.62	
Promiscuity among SS1 Students (y)	375	5494		74718		

Source: Field data (2022)

Result in Table 2 shows a correlation value of 0.62. Hence, from the decision rule, it is noticed that a high positive relationship exists between parental upbringing and promiscuity among SS1 students in Eket Senatorial District, Akwa Ibom State. This result implies that students tend to be involved in premarital sex if they do not learn values of responsible sexual behaviour from parents and vice versa.

Research Question 3

What is the relationship between desire for materialism and promiscuity among senior secondary one (SS1) students in Eket Senatorial District, Akwa Ibom State?

Table 3: Correlation analysis of responses between desire for materialism and promiscuity among SS 1 students

Variables	N	$\sum x$	$\sum x^2$	$\sum xy$	r-	Remark
		$\sum y$		value		
				$\sum y^2$		
Desire for Materialism (x)	375	5349	76984	73923	0.66	High Positive Relationshi p
Promiscuity among SS1 Students (y)	375	5494	74718			

Source: Field data (2022)

Result in Table 3 reveals a correlation value of 0.66. From the decision rule, it is seen that a high positive relationship occur between desire for materialism and promiscuity among SS1 students in Eket Senatorial District, Akwa Ibom State. The implication of this result is that students tend to be involved in sex out of wed-lock if the urge for material possessions is strong and vice versa.

Testing of Hypotheses

Hypothesis 1

There is no significant relationship between peer pressure and promiscuity among senior secondary one (SS1) students in Eket Senatorial District, Akwa Ibom State.

Pearson Product Moment Correlation (PPMC) was used for testing of hypotheses by comparing the r-value with the critical value, so as to determine the direction or significant of the relationship between variables all at .05 level of significance and at 373 degree of freedom.

Table 4: Pearson Product Moment Correlation analysis of responses between peer pressure and promiscuity among SS 1 students

Variables	N	$\sum x$	$\sum x^2$	$\sum xy$	r-	r-crit
		$\sum y$		value		Decision
				$\sum y^2$		
Peer Pressure (x)	375	5416		76984		0.196
Promiscuity among SS1 Students (y)	375	5494		75237	0.86*	Rejected
				74718		H ₀

* Significant; P<.05; df = 373; critical r = 0.196

Source: Field data (2022)

Table 6 shows that the calculated r-value of 0.86 is greater than the critical value of 0.196 at the degree of freedom of 373 and at .05 significant levels. Hence, the null hypothesis is therefore rejected, while the alternate hypothesis is retained. This means that there is a significant relationship between peer pressure and promiscuity among SS1 students in Eket Senatorial District, Akwa Ibom State.

Hypothesis 2

There is no significant relationship between parental upbringing and promiscuity among senior secondary one (SS1) students in Eket Senatorial District, Akwa Ibom State

Table 5: Pearson Product Moment Correlation analysis of responses between parental upbringing and promiscuity among SS 1 students

Variables	N	$\sum x$	$\sum x^2$	$\sum xy$	r-	r-crit
		$\sum y$		value		Decision
				$\sum y^2$		
Parental Upbringing (x)	375	5374		81074		0.196
Promiscuity among SS1 Students (y)	375	5494		80453	0.62*	Rejected H ₀
				74718		

* Significant; P<.05; df = 373; critical r = 0.196

Source: Field data (2022)

Table 7 shows that the calculated r-value of 0.62 exceeded the critical value of 0.196 at the degree of freedom of 373 and at 0.05 significant levels. Hence, the null hypothesis is therefore rejected, while the alternate hypothesis is retained. This means that there is a

significant relationship between parental upbringing and promiscuity among SS1 students in Eket Senatorial District, Akwa Ibom State

Hypothesis 3

There is no significant relationship between desire for materialism and promiscuity among senior secondary one (SS1) students in Eket Senatorial District, Akwa Ibom State.

Table 6: Pearson Product Moment Correlation analysis of responses between desire for materialism and promiscuity among SS1 students

Variables	N	$\sum x$	$\sum x^2$	$\sum xy$	r-	r-crit
	$\sum y$			value		Decision
				$\sum y^2$		
Desire for Materialism	375			76984		0.196
(x)	5349		73923	0.66*		Rejected H_0
Promiscuity among SS1	375			74718		
Students (y)	5494					

* Significant; $P < .05$; $df = 373$; critical $r = 0.196$

Source: Field data (2022)

Table 8 shows that the calculated r- value of 0.66 exceeds the critical value of 0.196 at the degree of freedom of 373 and at .05 significant levels. Hence, the null hypothesis is rejected, while the alternate hypothesis is retained. This means that there is a significant relationship between desire for materialism and promiscuity among SS1 students in Eket Senatorial District, Akwa Ibom State.

DISCUSSION OF FINDINGS

The researcher made a combined discussion of results gotten from the research questions and hypotheses of the study.

Result from research question one and hypothesis one revealed that there is a very high positive and significant relationship between peer pressure and promiscuity among SS1 students in Eket Senatorial District, Akwa Ibom State. This finding is in tandem with the finding of the study conducted by Musa and Abdullahi (2013) who found a significant influence of peer pressure on students' promiscuous behaviour. This finding is also in line with that of Alo, Lawrence, Benedict, Uche and Omaka (2016). The

authors found a significant association between peer relationship and students sexual behaviour. This corroborates the finding of Collins (2017), that young people who are active in religious affairs would have increased contact with adults who might mentor them to delay sexual involvement. Involvement in religious institutions would also enhance the chances of young people making friends with peers who have restrictive attitudes towards premarital sex. Based on this finding, the researcher wishes to observe that peer pressure could make students appreciate promiscuous acts.

Results from research question two and hypothesis two revealed a high positive and significant relationship between parental upbringing and promiscuity among SS1 students in Eket Senatorial District, Akwa Ibom State. This finding is in line with the finding of the study conducted by Esuabana (2017), who found a significant influence of parents teaching of sex education and students' involvement in pre-marital sexual behaviour. This finding also agrees with that of Omowunmi (2010), who found that greater percentage of students usually engaged in premarital sex due to poor impartation of sex education by parents at home. The author added that parents' inability to provide or give adequate information about sexual behaviour is associated with students' engagement in sexual risk-taking behaviour in school. This corroborates the finding of Fatusi and Blum (2011) that students' premarital sexual behaviour in public is as a result of lack of parents' early initiation of sex education to children at home; and that such condition is prevalent in Nigeria because of low educational levels of parents. From the above finding, the researcher wishes to observe that students' involvement in promiscuity is strongly associated with parent inability to teach their children issues about sex.

Results from research question three and hypothesis three revealed a high positive and significant relationship between desire for materialism and promiscuity among SS1 students in Eket Senatorial District, Akwa Ibom State. This finding is in line with the finding of the study conducted by Ekpenyong and Ekpenyong (2016), who found that students' sexual relationship is significantly associated with their utmost desire for materialism. This finding is also in consonance with the finding of the study conducted by Jacob (2012), who found that students' sexual behaviour is associated with their

strong desire to acquire material things. This corroborates the finding of Abdullahi (2014) that in most public schools, while some male students rape girls, others use money power to engage in sex. The author added that students between the ages of 15-29 engage in sex for material goods in Nigeria. Based on this finding, the researcher wishes to observe that strong desire for material possessions could induce students into sex.

Results from research question four and hypothesis four revealed a very high positive and significant relationship between family discipline and promiscuity among SS1 students in Eket Senatorial District, Akwa Ibom State. This finding is in line with the finding of the study conducted by Tumuti (2013), who found that students from highly disciplined homes are less likely to be involved in deviant behaviour in schools than those from less disciplined homes. This finding also conform to that of Crosswhite and Kerpelman (2018), which revealed that lack of proper discipline from parents at home increases the chances of sexual molestation among students. Hence, it is observed from this finding that lack of family discipline can encourage adolescent involvement in promiscuous acts.

Results from research question five and hypothesis five revealed a very high positive and significant relationship between exposure to video films and promiscuity among SS1 students in Eket Senatorial District, Akwa Ibom State. This finding is in line with the finding of the study conducted by Ijaduola (2007), who found that consistent watch of video films with sexual content significantly influence students premarital sexual behaviour. This corroborates the finding of Elegbe and Salako (2014), that majority of students who regularly watch Nollywood films portraying romantic and sexual actions often experiment sexual behaviour in schools. This finding is also in tandem with the finding of the study conducted by Adieza (2014), who found that most video films depict sexually related behaviour and when children watch such movies, they are sexually aroused especially the adolescents and this could often lead to anti-social vices such as sexual addiction, lesbianism and homosexuality. Based on this finding, the researcher wishes to observe that consistent viewing of video films with sexual content can induce students into promiscuity.

CONCLUSION

Based on the findings of the study, the following conclusions were drawn.

Peer pressure has a strong association with students' promiscuous behaviour. Students tend to get involved in sex before marriage if they perceive their friends to be sexually active. Consistent watching of video films with sexual contents could increase students' desire for premarital sex which could lead to unwanted pregnancy, school attrition and sexual transmitted diseases. Also, strong desire for material possession (financial favours and gifts) tends to strengthen students' urge for sex out of marital relationship. Students' involvement in promiscuous acts is associated with parent inability to teach their children issues about sex as well as less discipline at home. The overall conclusion of the study is that social factors have strong connection with promiscuity among SS1 students.

RECOMMENDATIONS

- 1.) School administrators, parents and teachers should wake up to their responsibilities of monitoring and advising students on the kind of associations they should keep, so as to reduce peer influences towards premarital sex.
- 2.) Parents should ensure that sex education is given to children particularly at early stage of adolescent so as to increase their knowledge about sexual promiscuity.
- 3.) Parents, teachers and the school administrators should always educate the students on the need to be contented with what they have and shun greed, so as not to be attracted by material possession most youth receive as exchange for sex.

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BIG DATA ANALYTICS WITH THE EMPHASIS OF CLASSIFICATION AND PROCESSING METHODS

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ABSTRACT

Big data Analytics has rapidly developed with huge information investigation has been broadly viewed as an advancement mechanical improvement in scholarly and Health venture, They are some common central issues are raised for example, information cleaning, catching, security and protection, and how information is imagined frustrate the extension of enormous information in the human services segment. In this paper, we talk about these difficulties, strategies used to conquer these difficulties, and results got. In light of the got outcomes, the end has been attracted to continue progressing in the human services segment. In any case, current intelligent system like AI frameworks is execution driven – the emphasis is on the predictive/classification precision, in light of realized properties gained from the preparation tests. For example, most AI based nonparametric models are known to require high computational expense so as to locate the worldwide optima. With the learning task in an enormous dataset, the quantity of concealed hubs inside the system will hence increment fundamentally, which in the long run prompts an exponential ascent in computational multifaceted nature.

Keywords: Big Data Analytics, Machine learning ,Computational modeling, Artificial Intelligence.

1. INTRODUCTION

Supervised learning

The supervised learning algorithms are a subset of the family of machine learning algorithms which are mainly used in predictive modeling.

A predictive model is a model constructed from a machine learning algorithm and features or attributes from training data such that we can predict a value using the other values obtained from the input data.

Unsupervised learning

Mainly used in pattern detection and descriptive modeling. There should be no output categories or labels here based on which the algorithm can try to model relationships. Algorithms are applied and procedures are implemented on the input data to mine for rules, detect patterns, and summarize and group the data points which help in deriving the significant insights and illustrate the data better to the users.

Reinforcement Learning

It is one of the technique aims at using some findings gathered from the interaction with the environment to take actions that would maximize the reward or minimize the risk.

Reinforcement learning algorithm is also called as Agent which continuously learns from the environment in an iterative fashion. In this method, the agent learns from its facts of the environment until it discover the full range of possible states.

Accumulation of raw data captured from various sources (i.e. discussion boards, emails, exam logs, chat logs in e-learning systems) can be used to identify fruitful patterns and Relationships.

1.2 Data cleaning in big data Healthcare

Data cleaning incorporates a few components like standardization, noise reduction and missing information. Clinical records much of the time has noise data and missing information. Quality of acquired information could be influenced while entering information in missing fields. In health care area, filling of missing information ought to be performed with most extreme precision as lousy choices may have serious repercussions. Numerous tools are utilized to deal with missing value, for example, Expectation Maximization (EM) calculation and various Imputation calculations.

Incorrect Entry

Incorrect section of information fields, for example, name, address, social security number can create enigmatic information records. At the point when the information conveyed is one-sided however erasure or false sections, emendation may be discovered that are false.

Data Staging Area

Data staging area is a medium to store information that is utilized for information handling during the concentrate, change and burden process. Traditionally, information arranging mistakes include information movement, homogenization, machine-to-machine translation, and database-to-database change. Normal change activity incorporates expelling of whitespace, trailing zeros location normalization schedules etcetera. During information reconciliation from different sources may increase mistakes. As electronic congruity is taken and fuse from different associations or even particular sources in a similar association, certain data cleaning and transformation functions are initialized to ready data for storage and analysis. To cite an example, there is a field holding the date. Checking is done that the date is of the correct format. False dates can be viewed as e.g. 26/07/1979. In the event that the date is invalid, at that point the ETL procedure changes the value to a predetermined value or left blank. For instance, a chemist can gather errors by deleting not detected by willing reporting.

2. Predictive Analytics

Predictive analytics tells what is likely to happen. It uses the findings of descriptive Diagnostic analysis. The past data can be measured against with the other data to answer the question of why something happened. Find out dependencies and identify patterns. Companies go for diagnostic analytics as it gives in-depth insights into a particular problem, a retailer can drill the sales and gross profit down to categories to find out why they missed their net profit target a retailer can drill the sales and gross profit down to categories to find out why they missed their net profit company's expansion based on cash flow analysis and forecasting.

Descriptive Analytics

A healthcare provider will observe how many patients were hospitalized since from the last month a retailer – the average weekly sales volume a manufacturer – a rate of the products returned for a past month, etc. instance, can identify the subscribers who are most likely to reduce their spend and trigger targeted marketing trends, which makes it a valuable tool for forecasting. A telecom company, for and diagnostic analytics to detect tendencies, clusters and exceptions, and to predict future.

3. Algorithms

Principal Component Analysis

PCA works in an exceptionally associated condition. In this way, it chooses a lot of factors that are exceptionally needy with one another, and yet, they are totally uncorrelated with various subsets of factors which are consolidated to shape a factor.

The essential thought here is that these recently shaped elements drive the central procedure because of which the factors in the informational collection are thought to associate with one another. The particular objectives are to sum up examples of relationships among watched factors, to decrease countless watched factors to fewer components, and to give a furnished definition to a fundamental procedure by utilizing watched factors.

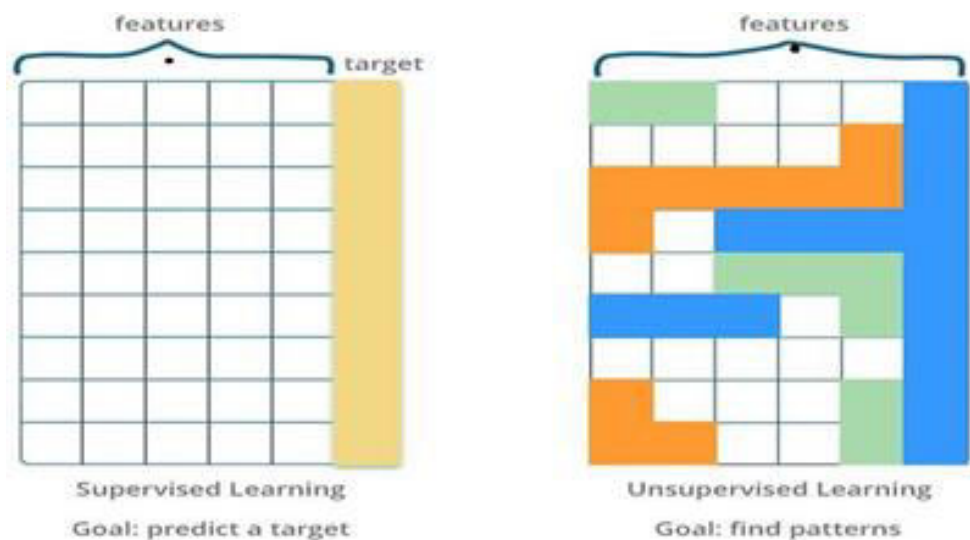
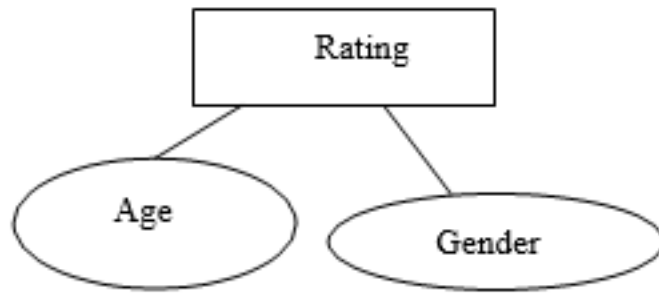


Fig.1: supervised Learning and unsupervised learning

Naive Bayes The Naive Bayes calculation speaks to a supervised Machine Learning AI strategy for arrangement. It utilizes a probabilistic model by deciding probabilities of the results. It is utilized in demonstrative and prescient issues. Naïve Bayes is vigorous to noise in input dataset . Decision tree learning algorithm uses a predictive model which maps the input about an item to output of the item.

Tree models with limited classes of output are called classification trees. In these tree structures, leaves represent class labels and branches represent relation between attributes that result.



Dislikes| Neutral |Likesa b 1-a-b

Table 1: Classification of Data

Rating	Youth	Adult
Dislike	C	1-c
Neutral	D	1-d
Like	E	1-e

The SVM is a managed AI calculation for edge arrangement. It puts a hyperplane between the classes. SVM performs characterization undertakings by amplifying the edge which isolates the classes while limiting the classification errors.

4. IMPLEMENTATION AND FINDINGS

Primarily the dataset is divided into training dataset and test dataset. The training dataset is being into the algorithms. The algorithms learn from the dataset. Afterwards, in the test dataset, all the columns except the last one are taken in the algorithms. The last column is the actual outcome. The algorithm takes the input data, forms a column of its own. Which has a learned pattern from the training dataset? From the given predicted algorithm is then compared to the actual column in the dataset. This comparison gives the actual accuracy.

The work-flow of this research work has been depicted as a flowchart in

The first step in PCA is to normalize the data and make sure all features are normally distributed. The data will then follow a standard normal distribution, with mean equal to zero and standard deviation equal to one. There are several ways to normalize your features, usually called feature scaling. One of them is the Z-score Normalization, also referred to as Standardization.

To apply Z-score normalization to your dataset you update the value each data point such that:

normalized value= $\frac{\text{value} - \text{feature mean}}{\text{feature standard deviation}}$

(1)

Featured standard deviation

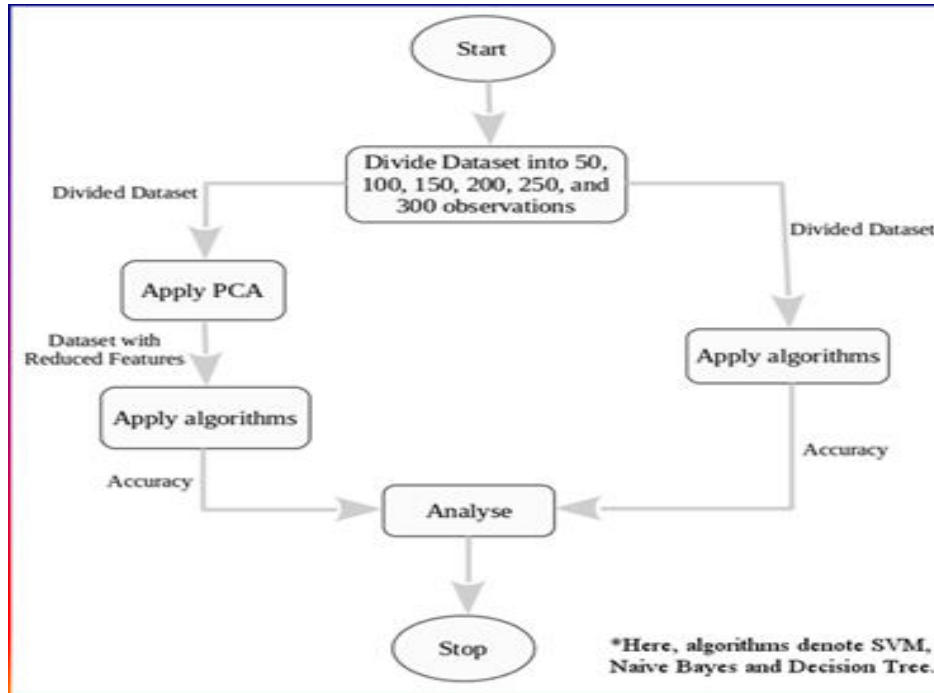


Fig.2. Data Flow of PCA

5. CONCLUSION

In this paper discussed different machine algorithms and proposed an algorithm As we have a proposed an approach called Principal component analysis. Which is maily reducing the given input data volume and to accelerate the process of data analyticsCan also be used to speed up the computation time of data analytics.

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TRUE LABOUR PAIN DETECTOR**Sibiya P, Sneha S R and Jeya Daisy I**

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ABSTRACT

The recurring pain that women experience throughout childbirth, known as labour pain, is an emotional experience that is mediated by both physiological and psychological causes. This equipment can determine if a discomfort is legitimate labour pain or not. Determining the intensity of labour pain is important for preserving both the mother's and the unborn child's health. Using this equipment, the hospital's staff nurses, non-gyno physicians, and other supporting personnel may determine whether a patient is indeed experiencing pain and can alert the chief doctors if a problem arises during labour. Using the ElectroMyoGraphy signal that is received, the detector gadget determines if a woman is indeed in labour, and with the aid of IOT, it sends a message to a digital device over Wi- Fi. Here, the real EMG signal is analysed using an EMG sensor.

Keywords: Labour pain, EMG sensor, uterine contraction, IOT.

I. INTRODUCTION

False labour pain is irregular and discrete, whereas true labour pain is regular and continuous. Most pregnant women have doubts about whether their pain is true or false. If they fail to recognise their true labour pains, it may lead to many complications during their delivery. It may even cause danger to the baby inside the maternal woman's womb. To overcome these issues, we are working on this project, which recognises whether the pain is true or false labour pain and is a doctor- friendly device. Many women are unsure whether their pain is caused by labour or by something else. Labour pain is very sensitive pain and it is important to determine whether it is true or false labour pain because assuming true labour pain as false pain and ignoring it can lead to many dangerous problems, like complications in delivery, and it can even lead to the death of the baby inside the womb of a pregnant woman. As a result, determining labour pain is critical to protecting the health of both the baby and the pregnant woman.

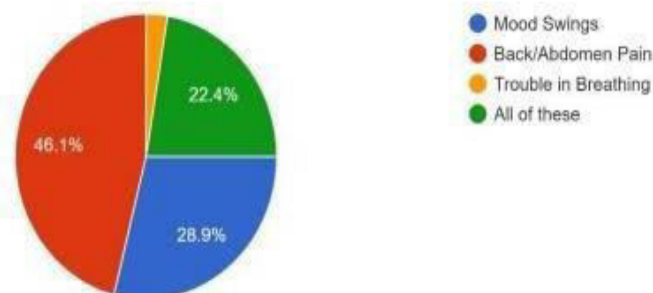
This detection device assists the maternal woman in determining whether the pain pulse is true or false. Women who are located on the outskirts of the city, where there are no gyno-centres or big hospitals nearby, get very much benefited by using this detection system as the healthcare helpers and other staff nurses can diagnose whether it is true or false labour pain. If this detection system comes into existence, the small healthcare centres and clinics can detect the true labour pains, which will be helpful. There is no portable product in existence currently to predict true labour pain in a portable way. If this product comes into existence, the staff nurses, non-gyno doctors, and other assisting staff in the hospital can diagnose whether the pain is true or false and if there is any complication in labour, they can communicate the situation to the head-doctors. When this belt comes into existence, there will be a positive response in society, among doctors and in the medical field.

A. Literature Survey

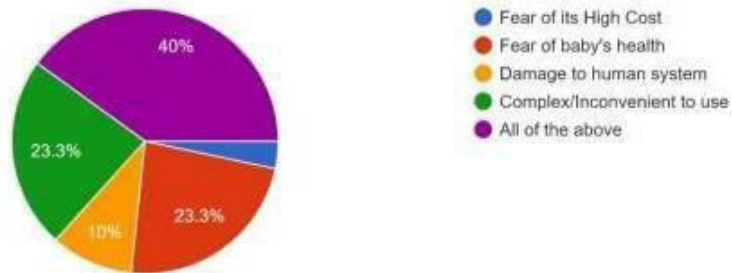
We wanted to get feedback from different women in order to get a clear idea of the concept of our project as well as their opinion on our project model in order to keep in mind the shortfalls identified by the feedback survey that we created. We received responses from around 110 people. A majority of people wish to have a handy device to check their labour pains, whether they are true or false. We asked, why don't they wish to have a portable device like this? for so many reasons, such as damage to the human system, fear of the baby's health, fear of high cost, and so on. To overcome all these problems, our handy device will be helpful for them in their day-to-day life. Definitely, this product will be helpful in the medical field

What was really difficult for you during your pregnancy period ?

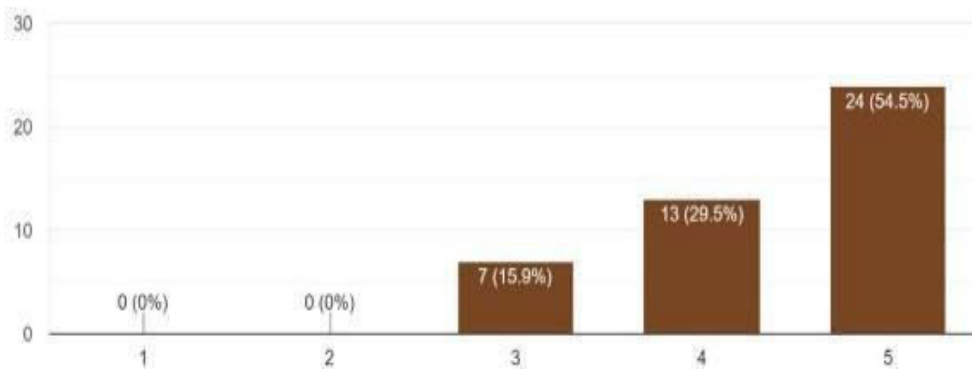
76 responses



Why don't you wish to have a device like this ?
30 responses



How useful this device would be for maternal women ?
44 responses



II. CURRENTLY USED METHODS TO DIAGNOSE LABOUR PAIN

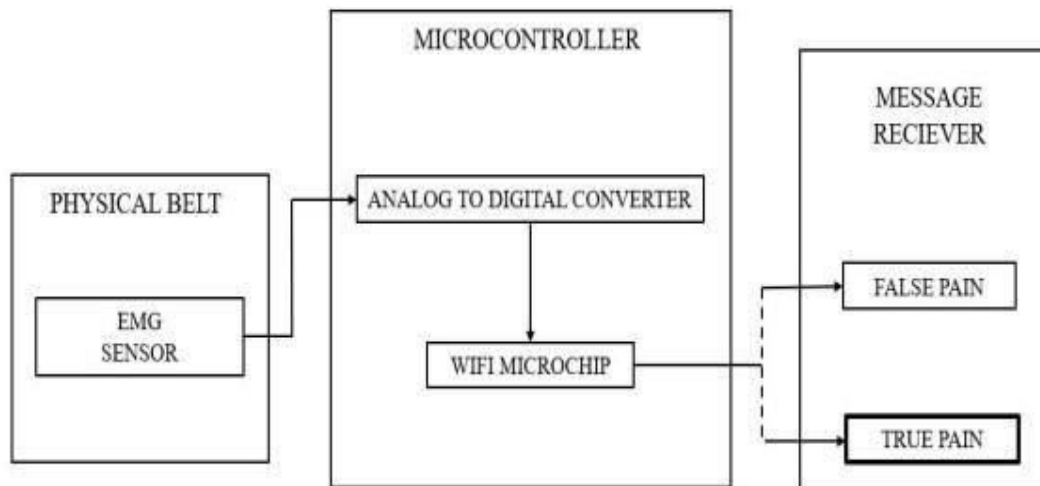
The diagnosis of labour depends on the presence of uterine contractions analyzed by means of tocodynamometer and analysis of cervix change by digital cervical examination. True labour pain does not mean the contractions which may happen commonly in normal pregnancy period. Many women take the normal pregnancy periods contractions to be that of true labour pain.

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These are false assumptions by the maternal women. We have documented evidence from many studies that shows that practical recordings and practical readings of uterine electrical activity that has been calculated from the abdominal surface of a pregnant woman. This ElectroMyGraphy can diagnose true labour pain with almost precision than any other method used today.

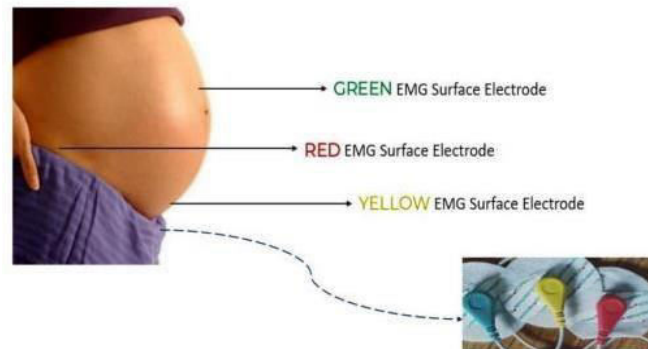
III. ROLE OF ELECTROMYOGRAPHY (EMG) FOR DIAGNOSING TRUE LABOUR

By obtaining the mother's uterine muscular contractions, the EMG sensor, which is the primary sensing device, is utilised to identify the pain signals produced in the uterus of pregnant women. It is used to track the electrical activity produced by skeletal muscles and to feel the irritation that pregnant women's mid-regions induce. An EMG sensor, also known as an electromyography sensor, reacts to the tiny electrical impulses your muscles make as you move them. This includes movements like raising your arm, tightening your grasp, or even the simplest ones like wiggling a finger.



On the input side, there is an EMG sensor, which is the main sensing unit, and it is used to detect the pain signals produced in the uterus of pregnant women by acquiring the uterine muscle contractions from the mother. In the PROCESS, there is the microcontroller, which is a Raspberry Pi 3B+, in which the filtered and signal-conditioned input signal is received and processed through the analogue to digital converter module and messages are transmitted through Wi-Fi. On the output side, there is a digital message receiver, i.e., the health care assistant's digital device where the message can be received through Wi-Fi. The overall process involves acquiring the pain signal, analysing it, comparing the signals, and transmitting the message as false or true labour pain accordingly.

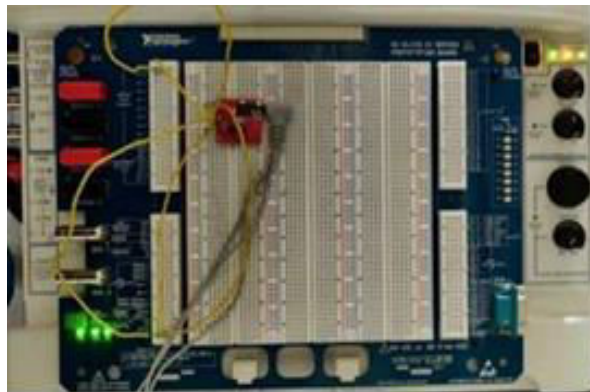
A. Position of belt and uterine contraction



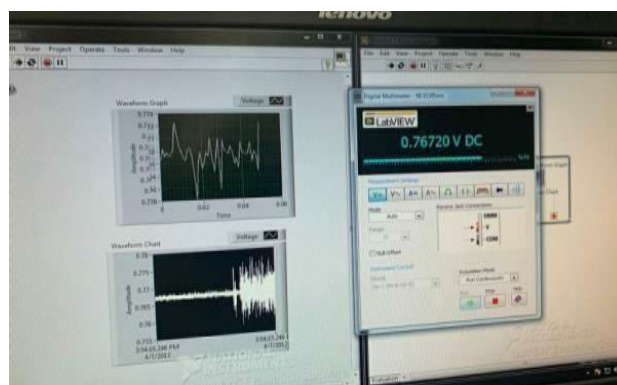
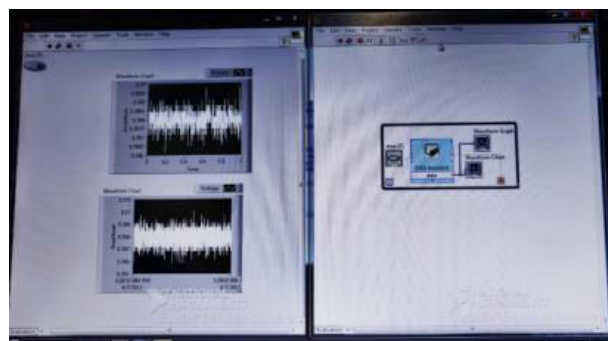
The position of the belt on the human body is important to sense whether the pain signal generated is true or false labour pulses. The designed belt with all inbuilt sensors (EMG) is to be positioned in the lower abdomen region of the body of the maternal woman in order to acquire the perfect pain signal produced in their body.

At the time of delivery, in the lower abdomen region, the pain from all the three sides of the lower abdomen, pain pulse will be the same and uniform(continuous). This condition will persist only during the delivery time whereas at other times like the mid-pregnancy period, the pain will not be of uniform range(discrete). The sensor used in the process is an EMG sensor, which has the key benefits of surface electrodes and is very quick and easy to apply and helps doctors to analyse even single muscle activity. The "S" alludes to the surface, where this kind of EMG sensor takes estimations by setting surface EMG anodes on your skin. This EMG sensor type uses non-obtrusive innovation, making this EMG sensor type easy. This is usually pertinent in facilities and sports wellbeing. The interaction starts with the EMG sensor position, where it is set in the innervation zone of the two ligaments for better identification quality. Anodes start to recognise electrical action produced by muscle development and compression. The specifications of our EMG sensor are: the diameter of the electrode pad is 52mm, the cable length is 2 feet, the power supply to the sensor is +3.5v, and the type of electrode used here is surface electrode. The EMG sensor is connected with NI ELVIS II (the NI Engineering Laboratory Virtual Instrumentation Suite (NI ELVIS) II) and the output variations are observed through LAB VIEW . The necessary connections are made as shown in the picture.

B. EMG Sensor Simulation



Electromyography (EMG) sensor is employed as the main sensing element in our project. The EMG sensor is a measurement of the electricity (voltage) produced by movement (contraction) in the muscle tissue. The EMG sensor which is used to monitor the uterine contractions and record some changing data as output (v).

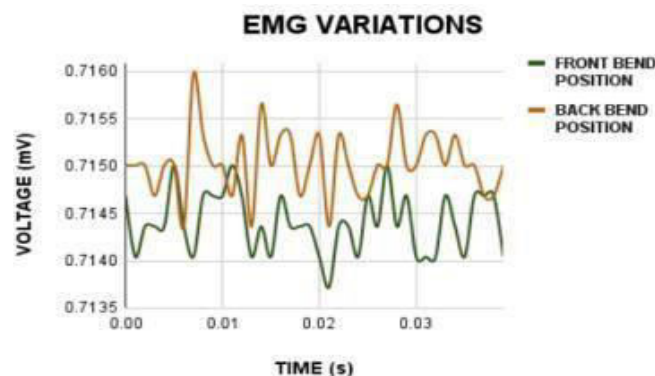


EMG Sensor Voltage Acquisition Using NI ELVIS II

This is the data that we acquired from the lab view software. It shows the waveform graph and waveform chart. Thus the recording is tabulated below,

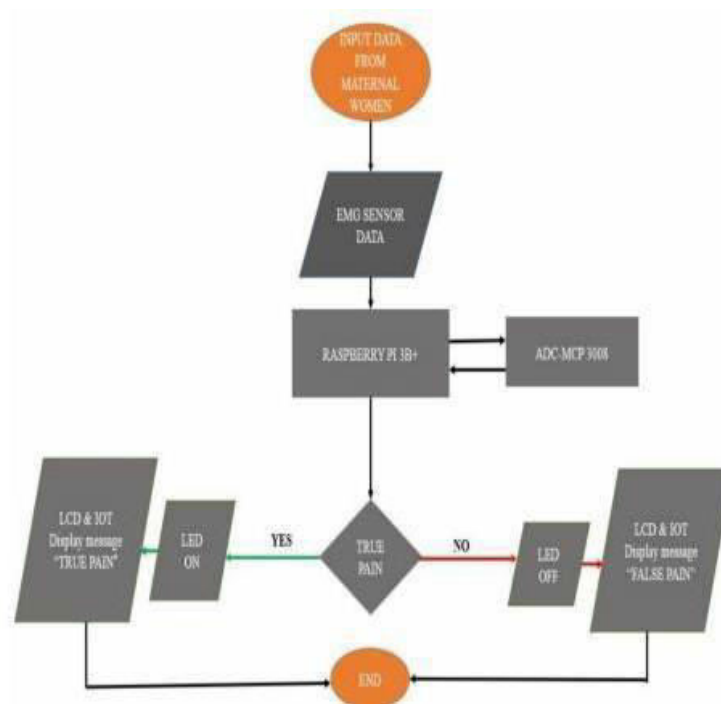
	A	B	C	D	E	F	G
1				VOLTAGE(mV)			
2	TIME(s)	RELAXATION POSITION	FRONT BEND POSITION	BACK BEND POSITION	SLEEP POSITION	CONTRACTIO N POSITION	DEVIATION FROM RELAXATION AND CONTRACTION POSITION(mV)
3	0	0.771334	0.714687	0.715009	0.773267	0.770689	0.000645
4	0.001	0.771978	0.714042	0.715009	0.772622	0.771011	0.000967
5	0.002	0.771978	0.714364	0.715009	0.772945	0.771011	0.000967
6	0.003	0.771978	0.714364	0.714687	0.773267	0.771011	0.000967
7	0.004	0.771334	0.714364	0.715009	0.772622	0.771011	0.000323
8	0.005	0.771656	0.715009	0.715009	0.772622	0.771011	0.000645
9	0.006	0.772622	0.714367	0.714364	0.772622	0.770689	0.001933
10	0.007	0.771656	0.714042	0.715975	0.772945	0.771334	0.000322
11	0.008	0.771978	0.714687	0.715331	0.772945	0.771334	0.000644
12	0.009	0.771334	0.714687	0.715009	0.7723	0.770689	0.000645
13	0.01	0.771978	0.714687	0.715009	0.772945	0.771011	0.000967
14	0.011	0.7723	0.715009	0.714687	0.773267	0.771011	0.001289
15	0.012	0.771978	0.714687	0.715331	0.772945	0.771011	0.000967
16	0.013	0.771656	0.714042	0.714364	0.7723	0.771334	0.000322
17	0.014	0.7723	0.714364	0.715653	0.772622	0.771334	0.000966
18	0.015	0.771656	0.714042	0.715009	0.773267	0.771011	0.000645
19	0.016	0.771656	0.714687	0.715331	0.772945	0.770689	0.000967
20	0.017	0.771656	0.714364	0.715331	0.772945	0.771011	0.000645
21	0.018	0.771978	0.714364	0.714687	0.772945	0.771334	0.000644
22	0.019	0.771334	0.714364	0.715009	0.773267	0.771334	0
23	0.02	0.771978	0.714042	0.715331	0.772622	0.771334	0.000644
24	0.021	0.771334	0.71372	0.714364	0.7723	0.771656	-0.000322
25	0.022	0.771656	0.714364	0.715331	0.772622	0.771334	0.000322
26	0.023	0.771656	0.714364	0.715009	0.772945	0.770689	0.000967
27	0.024	0.771334	0.714042	0.714687	0.772945	0.771334	0
28	0.025	0.771656	0.714687	0.714687	0.772945	0.771334	0.000322
29	0.026	0.7723	0.714364	0.715009	0.772945	0.771656	0.000644
30	0.027	0.771656	0.715009	0.715009	0.772945	0.771334	0.000322
31	0.028	0.771978	0.714364	0.715653	0.7723	0.771011	0.000967
32	0.029	0.771978	0.714687	0.715009	0.772945	0.770045	0.001933
33	0.03	0.771978	0.714042	0.715009	0.772622	0.770689	0.001289
34	0.031	0.771978	0.714042	0.715331	0.772622	0.771011	0.000967
35	0.032	0.771978	0.714042	0.715331	0.772622	0.770689	0.001289
36	0.033	0.771978	0.714687	0.715009	0.7723	0.771011	0.000967
37	0.034	0.771656	0.714364	0.715331	0.773267	0.770689	0.000967
38	0.035	0.771334	0.714042	0.715009	0.772945	0.771334	0
39	0.036	0.7723	0.714687	0.715009	0.772945	0.770689	0.001611
40	0.037	0.771978	0.714687	0.714687	0.7723	0.770367	0.001611
41	0.038	0.771978	0.714687	0.714687	0.773267	0.770689	0.001289
42	0.039	0.771656	0.714042	0.715009	0.772622	0.771334	0.000322
43							
44	AVERAGE	0.771817	0.7144047	0.715033075	0.772815775	0.771027475	0.000789525

EMG sensor voltage readings in Excel sheet format



Graphical representation of EMG output

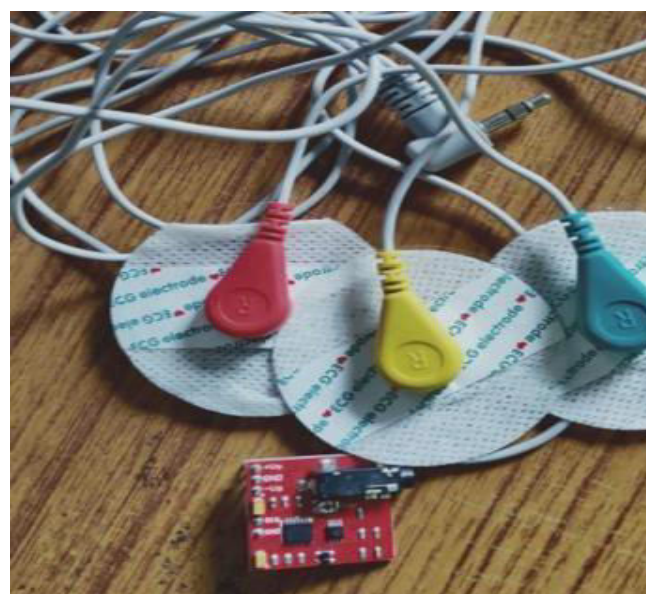
IV. DESIGN FLOW AND COMPONENTS OF LABOUR PAIN DETECTOR

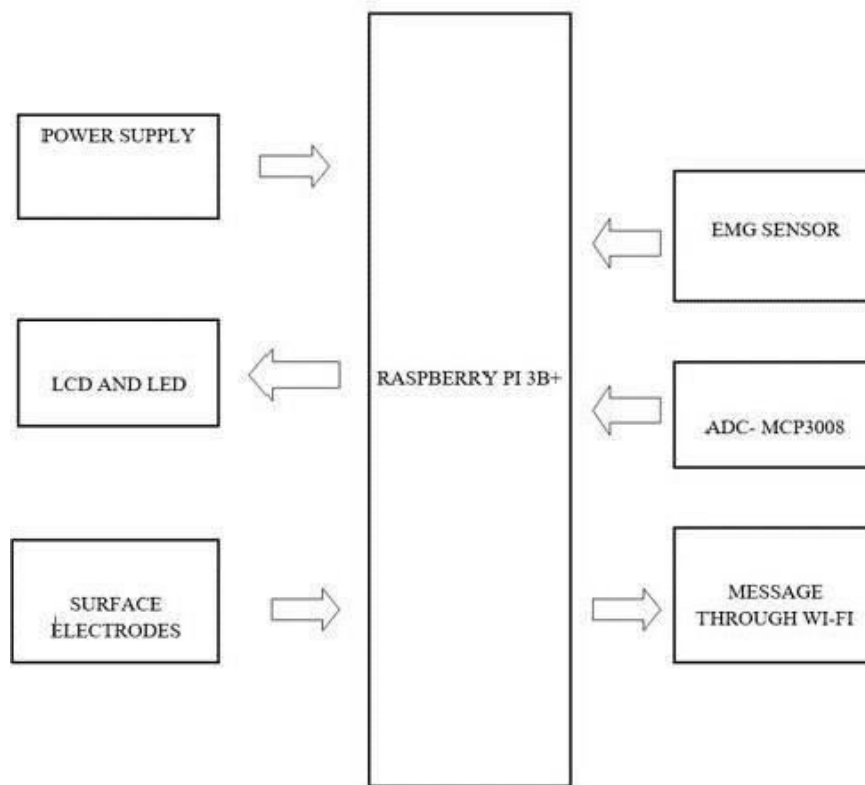


Some of the components used in the prototype are EMG(ElectroMyoGraphy) sensor (EC-3224), ADC- MCP3008, Raspberry Pi 3B+, LCD Display 16*02, LEDs.

V. IMPLEMENTATION OF EMG SENSOR(WORKING MODEL)

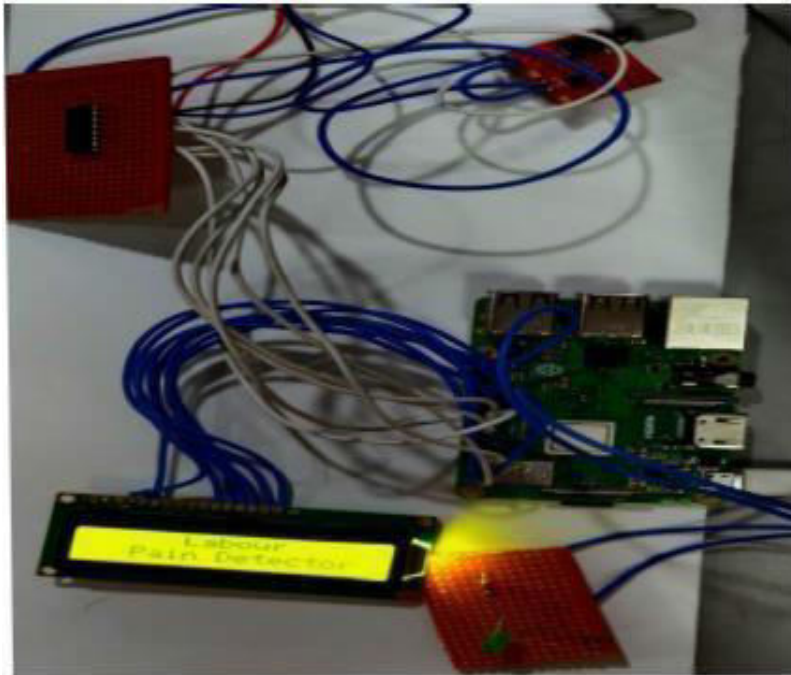
The hardware design for the device is much complicated to integrate with a belt(portable), but it is easy to show in a prototype.





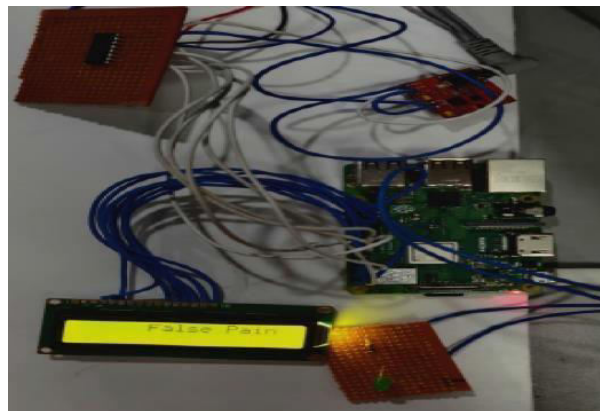
HARDWARE DESGIN

The Raspberry Pi's output data is saved on the server. Through the website, complete patient information is recorded and saved on the server. The hardware design shows how different components are connected to one another. The sensor is attached to the patient's body to get the input data. Then, the sensor gathers information from the abdomen of the maternal woman. Here, the data collection process gets initiated. After the data is collected, the data is sent as an input to the Raspberry Pi. The analog data is transformed into digital form during this process. The Raspberry Pi now receives the data for processing. Every parameter is checked throughout the processing stage to verify if it falls within the acceptable range. In the event of the data falling inside the specified range, a report has been generated for storage. If the data collected is not in the specified range, it shows that the patient is not in a normal state, so it sends an alert to the doctor's health care device. The alert is generated whenever there is disturbance in the EMG data as it is important to notify if it is a true labour pain range. The specialist will evaluate the patient's body condition and treat it accordingly. Healthcare doctors have complete access to patient history.

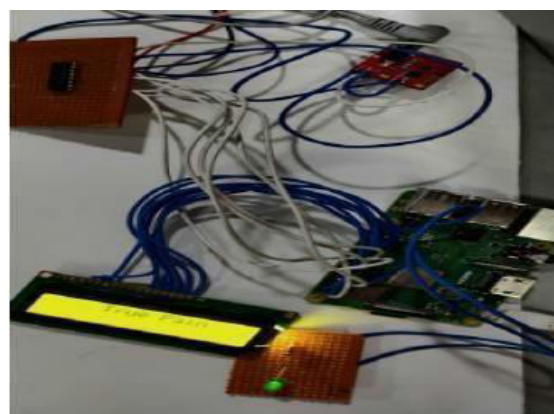


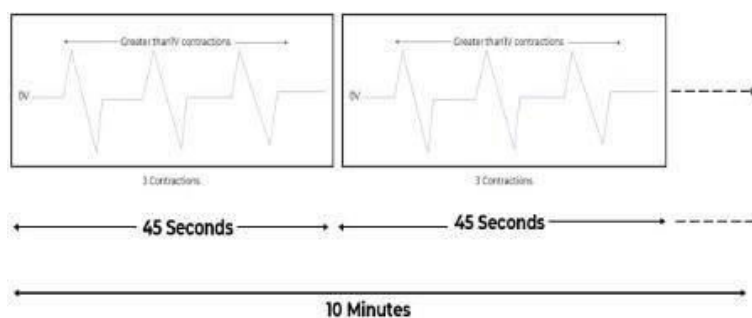
The input EMG data from the maternal woman is acquired from the surface electrodes. The data is processed via the Raspberry Pi 3B+ and the analogue data is converted to digital via the ADC-MCP 3008 module. If the data from the maternal women are that of true labour pain, the LED gets on and the LCD displays True Pain, and the message is also transmitted through Wi-Fi. If the data from the maternal women is that of false labour pain, the LED gets off and the LCD displays "False Pain" and messages are also transmitted through Wi-Fi. True labour pain is continuous and uniform, i.e., if a particular voltage value repeats three times every 45 seconds in a time period of 10 minutes, then the pain is true labour pain. The True Pain message transmission occurs every 20 seconds to the digital gadget and gets off only if we see the message and on the switch in the Ubidots app. Ubidots is an IoT Platform which is used in project based learning and we can send data to cloud through internet.

This 20 second message acts as a reminder/warning for true pain. False pain is discrete and un-uniform, i.e., if a particular voltage value does not repeat three times every 45 seconds in the time period of 10 minutes, then the pain is false labour pain. The false pain message gets displayed once and does not occur repeatedly like a remainder, as it's not an uncertain situation.



The process stops when the true pain message is viewed and turned off by the digital gadget user who views the message. Thus, the True Labour Pain detector serves the purpose significantly.





VI. CONCLUSION

It is important to determine whether it is true or false labour pain because assuming true labour pain and ignoring it can lead to many dangerous problems, like complications in delivery, and it can even lead to the death of the baby inside the womb of pregnant women. The detection device serves the purpose of identification and differentiation between true and false labour pain in maternal women. There are maternity belts which give support to the backbone and womb of women, in which this detection device can be fitted and integrated into a belt form which is more efficient to use. Also, it will be more comfortable and convenient for pregnant women. Even when the maternal woman is facing false labour pain, there are chances for the baby to be in some abnormal situations, like the umbilical cord surrounding the baby's neck, foetal hand or leg approaching the cervix, and

lessening of foetal oxygen supply. In order to get over all these, in this detection device, we can also have a foetal heart rate monitoring device which monitors the baby's health inside the womb. The integration of these into the True Labour Pain Detection device can accelerate the overall efficiency of the product to use this in a doctor-friendly environment. Usage of uterine ElectroMyoGraphycan helps in diagnosing true labour pain. Thus, non-invasive diagnosis will be the future technology.

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**SEMANTIC SIMILARITY MEASURE USING DOMAIN
ONTOLOGY CONSTRUCTION**

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ABSTRACT

Ontology construction is viewed as one of the most effective methods to discover the new latent concept, which is significant to self-learning and machine learning. The basis of our approach is the application of Fuzzy Formal Concept to construct a Concept Lattice that better describes the semantic relations of incoming patterns for a collection of Documents. There has been little work that evaluates the effect of various techniques and parameter settings in the word space construction from corpora. The present paper experimentally investigates how the choice of a particular domain helps the user to discover the information which is much closer to his preferences. A formal evaluation provided evidence that the technique can produce useful results but is better suited to detect the semantic relations between Objects. An evaluation of this work with respect to the related papers is performed to encounter the challenging issues of Ontology construction in Semantic Web.

Index Terms - Web content mining, Fuzzy concept, semantic similarity, Information Extraction, Web text analysis.

1. INTRODUCTION

Ontology is also expressed as a formal representation of knowledge by a set of concepts within a domain and the relationship between these concepts. Ontology has gained

much importance not only in the field of artificial intelligence but also in the fields like information organization, natural language processing, information retrieval, knowledge representation. Ontology's are known for reusability in which instead of creating a new ontology the existing ontology can be reused. □ Formal community time-Shared viewpoint over a certain universe of discourse. Swartout et. al [19] divides ontology into two categories: domain ontology and theory ontology. Domain ontology describes the formal description of the classes , while theory ontology deals with time, space, plans etc. Ontology's can be constructed by using three different approaches[20]. They are single ontology approaches, multiple ontology approaches and hybrid ontology approaches. These approaches help in providing the integration task to describe the semantics of the information sources. Ontology construction is an iterative process and involves the following steps:

1. Design: Specifies the scope and purpose of the ontology. Also reveals the relationship among classes and sub class
2. Develop: Decides whether construction of ontology has to be done from scratch or to reuse an existing ontology.
3. Integrate: Combine the developed ontology with the already existing one.
4. Validate and Feedback: The completeness of the constructed ontology is verified with the help of automated tools or by seeking the opinion of the experts.
5. Iterate: Repeat the process and incorporate the changes given by the expert.

To possess a language means, to understand and correctly apply words, sentences and arguments, i.e. it is to master a technique, a skill that can be tested. These are the rules of syntax which are common to all the language games constituting a language and the *ontology's*. An ontology is a linguistic representation of the structural properties of a conceptual model for a domain of discourse The vocabulary of an object language for a given domain consists of names representing the individuals of the domain, predicates standing for properties and relations, and of logical constants. We can express restrictions on the possible meaning of predicates by means of *axioms*. An axiom is an implicit definition that relates the *primary terms* of the vocabulary. It follows that the

semantics of a formal language is completely given by the interpretation of the primary terms.

On the other hand, the axioms of a formal system determine the set of possible interpretations of the primary terms that turns the formal system into a language. An ontology thus contains information about the meaning of the vocabulary that can be exploited and which is exploited in computer systems. In general, from a theoretical point of view, ontology concepts are identified with FCA concepts [2]. However, in many applications, the canonical match is between ontology concepts and FCA attributes, that is alone are unreliable when measuring semantic similarity.

The paper is organized as follows. In the next section the need of Fuzzy Lattice for Ontology Construction is studied briefly. In Section 3, a survey of domain ontologies and the role of Fuzzy Concept is given with the various applications in the field of Natural Language Processing. Successively, in Section 4, the overview of the proposed method for constructing the Concept Lattices is presented, followed by the comparative study of related methods used by various authors is tabulated. Finally, Section 6 concludes the paper with some hints about future work.

2 MOTIVATION

The main objective of this phase is to identify the need and purpose for ontology construction. This phase takes care of identifying whether the ontology has to be built from the scratch or an existing ontology can be reused. It also identifies the range of the users and the type of questions which the ontology should answer.

Ontology provides a common understanding of specific domains that can be communicated between people and application systems. Many deficiencies still exist in ontology. It is difficult to determine the granularity of ontology and the depth of concept expression [5]. Thus fuzzy ontology is introduced to solve the above problems. The application of formal concept analysis and concept lattice theory in ontology building, mapping and merging not only makes the building automate, but also makes the generated ontology more formalized, thus increases flexibility of ontology in heterogeneous system and the operational aspects of the Semantic Web [6]. It should be a better way to combine formal concept analysis with ontology to expressing and

processing knowledge. Therefore, we propose a novel method of fuzzy ontology merging based on fuzzy concept gluing. The results of our method show that the accuracy of merging is largely improved. Moreover, it can discover the implicit concepts and relationships.

3. LITERATURE SURVEY

In [9] construction of TextOntoEx is explained. The authors had considered natural text as input. In [18] the scope was identified as building an ontological structure for the coronary heart disease. The medical ontology was constructed by considering western medicine and traditional medicine. The scope of [6] was to construct the ontology in military intelligence automatically by using existing resources, thesaurus and databases.

Chen Huei Chou [15] developed an ontology structure of elements for natural disaster management system. Further, a website was developed for disaster management. The input was taken from an inventory of 6,032 web pages identified from 100 disaster management websites. David Sanchez [8] addressed the scope as constructing medical ontology from the web with respect to cancer.. This is accomplished with the help of automatic and unsupervised ontology learning methods.

Fernando Batista [7] identified the domain as cooking, since they found many interesting factors in this domain. The inputs were gathered from cooking books like “Pantagruel” and “O grande livro ilustrado daCulin´aria” and websites like Wikipedia.

Current research studies show that fuzzy logic and its area of concerns provide efficient base for text categorization, dimensionality reduction, feature selection and extraction, and similarity analyzer related issues. Fuzzy logic is considered as a branch of logic especially designed for representing knowledge and human reasoning in such a way that it is amenable to processing by a computer [3]. The major concepts of fuzzy logic are fuzzy sets, linguistic variable, possibility distributions, and fuzzy if – then rules. Fuzziness or Degree of Uncertainty pertains to the uncertainty associated with a system, i.e., the fact that nothing can be predicted with exact.

Fuzzy set theory provides a consistent basis for information processing and an elegant, mathematically well-founded, representation of the uncertainty in the data. Since the data that are to be processed are often imprecise, using fuzzy set theory or its derivatives

(e.g., possibility theory or belief function theory) has become a common approach in recent years [4].

4. Overview of Proposed Method

FFCA can support ontology construction when some information is more relevant than other data, or Semantic Web search when the user is not sure about what he/she is looking for. In this paper, we show how rough set theory can be employed in combination with FFCA to perform Semantic Web search and discovery of information in the Web. According to this proposal, in the case the required data are not modeled by any formal concept, the user can search and discovery information in the Web that are closer to his/her preferences by following a twofold approach. Fuzzy sets are derived by generating the characteristic function to a membership function

$$u(x) = (x)^2 / (x)^2 + 1$$

which ranges from [0-1]. After the processing of sections above is performed, the fuzzy concept lattice to be merged and the source fuzzy concept lattice are glued into a big one. Since concept lattice is complete. Concept lattice can be clustered into concept hierarchies automatically. Therefore, concept lattice is classified to different concept resulting from nuances. In this scenario, it is necessary that domain expert should be introduced to delete undesirable concept node. Then the fuzzy concept lattice is converted to fuzzy ontology. Fig. 1 shows the conversion rule.

#Rule 1: Concept Node \rightarrow class
#Rule 2: Extension collection of Concept \rightarrow Instance of Class
#Rule 3: Intension collection of Concept \rightarrow Attribute of class

Figure 1. Conversion rules

4.1 Principles Of Ontology Construction

There are two ways of conceiving ontology construction, the bottom up approach that is predominant in the methodology of mathematics and a top down approach that is predominant in disciplines where the domain consists of objects of the world *a priori* given as in science. With respect to the top down approach the object language for a

domain is loosely given as a fragment of natural language. The task is then to specify the relations between the predicates on the basis of their pragmatic use. This consists in accomplishing the following tasks:

1. Specify the domain of discourse
2. Identify a primary vocabulary
3. Establish the axioms
4. Introduce secondary terms by intensional definitions
5. Introduce further secondary terms by extensional definitions

Task number one is preliminary but important because if we do not delimit the domain properly we cannot establish a language of description with a well defined vocabulary. It is the nature of the individuals of the domain that determines the predicates needed for their descriptions. The primary vocabulary consists of the names of the individuals and predicates that represent properties and relations needed to describe the individuals. The structural properties of *the* domain are described by axioms in terms of a primary vocabulary. The formulation of axioms will in general not use the name, but a variable that is representing an individual of a certain kind as in the following example, “if x is the Son Of y and y is the Brother Of z then z is the UncleOf x” which is an axiom relating the predicates “SonOf”, “BrotherOf” and “UncleOf”. x, y and z are here understood to represent unidentified persons. Notice that this axiom is picturing a structural property of family relations for a domain of persons. At the same time it expresses implicit dependencies of the possible meaning of the predicates. The secondary vocabulary is constructed from the primary terms. The numbering of the tasks does not refer to the ordering of their execution. One better keeps in mind the different tasks to be accomplished and work iteratively.

4.2 Ontology Construction Approaches

The bottom up approach for ontology construction is based on linguistic analysis. This is primarily a human endeavour, however, methods exist that aid the work. In this section, we will discuss ontology construction approaches of ontology learning. Based on the compilation concept of a dictionary, the hierarchy of concepts is mechanically

formed. Conventional dictionaries contain items together with their synonyms, root words, word origins, etc. The definitions and relationships presented in the dictionary are used to determine the hierarchy relationships of concepts [21][22][23]. The dictionary-based construction method is the basis for other construction methods. The other methods are in some way related to the dictionary-based construction method either in the preliminary construction phase or in the final pruning and verification stage.

The dictionary-based approach is by and large limited to the volume size of the dictionary and can thus form domains having different scopes. It cannot offer considerable ontological framework without being combined with other modes. Using this method alone will prove incapable of adapting to the ceaselessly changing environment. On the whole, the ontology constructed using the dictionary-based method has a general description and is not domain specific. Once it is combined with another method it gives an essential ontological framework.

5. Proposed Method

Fuzzy Formal Concept Analysis (FFCA) is a generalization of FCA for modeling uncertainty information [3]. FFCA can support ontology construction when some information is more relevant than other data, the user is not sure about what he/she is looking for. In this paper, we show how rough set theory can be employed in combination with FFCA to perform Semantic Web search and discovery of information in the Web. According to this proposal, in the case the required data are not modeled by any concept, the user can search and discover information in the Web that are closer to his/her preferences by following a twofold approach. For instance, consider a context named Sardinia Hotels, suppose that the set O defined by the following six objects representing six different hotels: $O=\{H1,H2,H3,H4,H5,H6\}$ and the set A is defined by six possible attributes of these objects:

$$A=\{\text{Tennis, SwPool, Meal, Sea}\}$$

where SwPool stands for swimming pool. Furthermore, suppose the hotels are related to the above attributes according to the binary relation defined by Table 1.

Hotels/Objects	Tennis	SwPool	Meal	Sea
H1			x	X
H2	x	x	x	
H3			x	X
H4	x	x		X
H5			x	X
H6	x	x		X

Table 1: The Sardinia Hotels context in (non-fuzzy) FCA.

for instance, the hotel H4 has, or is described by, three attributes, namely Tennis, SwPool, and Sea, and vice versa, these three attributes apply to the object H4. A concept of the Sardinia Hotels context is, for instance (H4,H6),(Tennis,SwPool,Sea) since both H4 and H6 have the attributes Tennis, SwPool, and Sea, and vice versa, all these attributes apply to both the objects H4, H6.

Given two concepts of a context, (E1, I1), (E2,I2), it is possible to establish an inheritance relation between them according to the following condition: In particular, (E1,I1) is called subconcept of (E2,I2) and (E2,I2) is called super concept of (E1,I1).

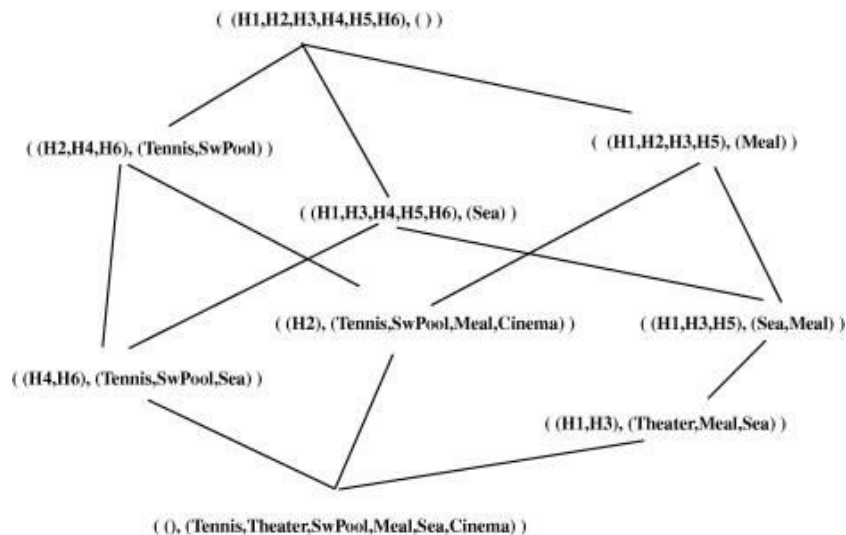


Figure 2. Formal Concept Lattice

Formal Concept Lattice (Fig.2) incorporates fuzzy logic into FCA in order to represent vague information. Similar to FCA, in FFCA a concept is defined within a Fuzzy Formal context. Below, we start by recalling the notion of a fuzzy concept. Given a

domain X , a fuzzy set A in X is characterized by a membership function $\mu_A(x)$ which associates each point in X with a real number in the interval $[0,1]:=\{(x,\mu_A(x))|x\in X\}$. The value $\mu_A(x)$ represents the “grade of membership” of x in A . Note that for an ordinary set, the membership function can take only the values 1 and 0, depending on x does or does not belong to A , respectively. Just to provide an example, assume X is a set of people, a fuzzy set Young is defined by associating with each person in X a real number in $[0, 1]$ establishing the degree of youth of the person, such that the nearer this value to unity, the higher the grade of membership of a person in the set Young. The notion of a fuzzy relation can be obtained by generalizing the notion of a fuzzy set as follows. A fuzzy relation R in $X\times Y$ is a fuzzy set in the product space $X\times Y$. Given a traditional set of items S (crisp set), we denote as $f(S)$ a fuzzy set generated from S , i.e., $f(S)$ is a fuzzy set where each item in S has a membership value in $[0,1]$. Analogously, given two crisp sets S, T , $f(S\times T)$ is a fuzzy relation in $S\times T$. For instance, consider the set of objects O and the set of attributes A of the Sardinia Hotels context in the previous section. A fuzzy relation $f(O\times A)$ can be defined as follows: where each pair in $(O\times A)$ is associated with a membership value in $[0,1]$. Below, the notions of a Fuzzy Formal Context and a Fuzzy Formal Concept are given.

Consider the Sardinia Hotels fuzzy context specified by the fuzzy relation given in [Table 2](#). In particular, crosses in [Table 1](#) have been replaced by grades of membership, from 0 to 1, each allowing us to quantify “how much” an object has, or is described by, an attribute and viceversa an attribute applies to an object.

Hotels/Objects	Tennis	SwPool	Meal	Sea
H1			1.0	1.0
H2	0.6	1.0	0.5	
			0.5	0.7
H4	0.8	1.0		1.0
H5			1.0	0.3
H6	0.8	1.0		0.8

Table 2: Fuzzy Formal Concept Analysis.

For instance, consider the hotel H2 in [Table 2](#). It has the attribute SwPool with grade of

membership 1.0, which means that such attribute fully applies to the hotel H2 (and viceversa the hotel H2 can be properly described by the attribute SwPool). Instead, the object H2 has the attribute Meal with a membership value 0.5, which means that such an attribute partially applies to this hotel (for instance it could provide meals just for dinner). Analogously, in the case of H3, the value 0.7 in correspondence with the attribute Sea means that this feature better describes the hotels H1, H4 or H6 than H3, but it is more appropriate to H3 than H5 (having H5 a lower grade of membership with Sea, i.e., 0.3). In order to address only objects related to attributes with relevant grades of membership, a threshold is fixed such that the pairs with membership values less than the threshold are ignored. For instance, consider our running example and assume that a threshold is fixed equal to 0.5. The grade of membership 0.3 between H5 and Sea is ignored and treated analogously to the grades of membership that in [Table 2](#) are not specified (they are equal to zero).

A fuzzy concept of the Sardinia Hotels fuzzy context is, for instance, the pair : $((H1,0.7),(H3,0.5)),(Theater, Meal, Sea)$ pair. In fact the objects H1,H3 share the attributes Theater, Meal and Sea and, vice versa, these three attributes apply to the objects H1 and H3 with membership values which are not less than the threshold. Also in Fuzzy Concept Lattices, for any subset of concepts, the greatest common sub concept and the least common super concept are always defined. For instance, consider the concepts: $((H4,0.8),(H6,0.8)),(Tennis,SwPool,Sea)$ where, in the fuzzy set intersection, the minimum among different grades of membership associated with the same object has been selected (for instance, in the case of H4, 0.8)

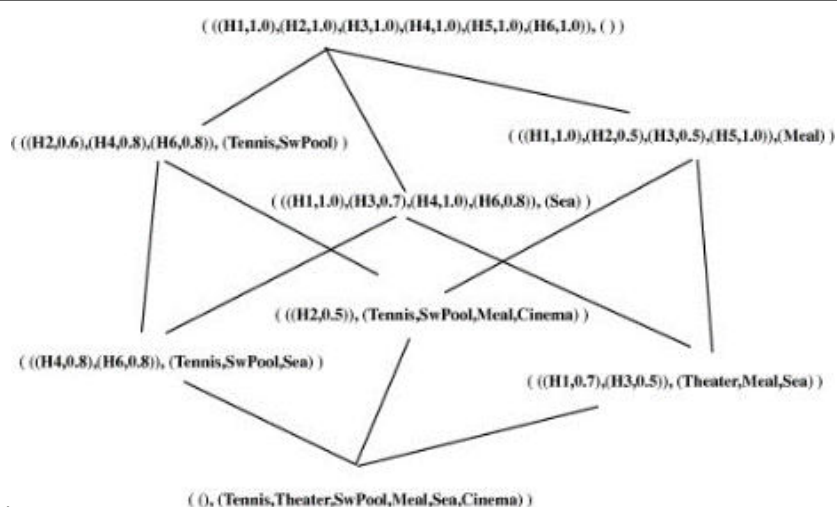


Figure 3: Fuzzy Formal Concept Lattice

6. RESULTS AND DISCUSSION

In particular, FFCA, RST, SWS, FCA, and FT stand for Fuzzy Formal Concept Analysis, Rough Set Theory, Semantic Web Search, Formal Concept Analysis, and Fuzzy Theory, respectively. The Goal column has been inserted to point out that for the majority of these papers the scope, although in the context of Semantic Web, is not on SWS. They concern for instance, the performances of Web search Engines (WE), the problem of ontology merging and/or ontology building, with the support of RST or FCA, the development of Description Logic (DL) reasoned and so on. Table 3. Gives a comparative study of the above techniques in Ontology Construction, Clustering and Similarity Measures.

	FFCA	RST	SWS	FCA	FT	Goal
Chen and Lin						Keywords extr.
Doherty et al.		x				Ont. building
Formica	x					Similarity
Hwang et al.				x		Ont. building
Jiang et al.		x				DL reasoning
Miao et al.		x				Clustering
Ngo and Nguyen		x				Clustering
Stumme and Maedche				x		Ont. merging

Tho et al.	x					Ont. building
Zhang et al.					x	Ont. building
Zhao and Halang		x		x		Similarity
Zhao et al.		x		x		Similarity
This proposal		x	x	x		Domain Ontology Construction

Table 3: A Comparative Study

For the above reason, we arranged an experiment consisting in the following steps: (i) selection of a set of documents in the Web from the tourism domain, (ii) generation of a Fuzzy Concept Lattice by using the FOGA framework , (iii) definition of a set of predefined queries specified in terms of sets of attributes matching with the intents of the concepts of the Fuzzy Concept Lattice, (iv) evaluation of the answers to the set of predefined queries according to this proposal (v) submission of the predefined set of queries, with given grades of preferences for some attributes, to a selected group of people (human judgment) and (vi) evaluation of the correlation of the answers obtained according to the eight proposals with human judgment.

For instance, in [3] FCA (without fuzziness) is used as a knowledge acquisition tool to yield more focused search results. In particular, the user query is matched with the intents of the Concept Lattice without using approximation operators and without having the possibility of selecting the objects that better satisfy the user needs according to fuzzy values. In our proposal, FFCA allows the user to choose the preferred answers on the basis of “grades of membership” that specify “how much” objects are properly described by the searched attributes. For this reason, we decided to restrict the comparison to the four proposals addressing SWS and FT.

7. CONCLUSION

The present paper experimentally investigates how the choice of a particular domain helps the user to discover the information which is much closer to his preferences. A formal evaluation provided evidence that the technique can produce useful results but is better suited to detect the semantic relations between Objects. The proposed method can be applied in many tasks where such taxonomies do not exist or are not up-to-date. The

application of formal concept analysis and concept lattice theory in ontology building, mapping and merging not only makes the building automate, but also makes the generated ontology more formalized, thus increases flexibility of ontology in heterogeneous system and the operational aspects of the Semantic Web.

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A STUDY TO IDENTIFY WOMEN'S VASOMOTOR SYMPTOMS THROUGH MACHINE LEARNING

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ABSTRACT

The menopause, defined as the final menstruation or climacteric, which informs the aging of a woman's reproductive system.[1] Menopause typically occurs between 49 and 52 years of age. Medical professionals often define menopause as having occurred when a woman has not had any menstrual bleeding for a year. Menopause-related hormonal changes begin several years before the menopause and are characterized by a gradual increase in follicle-stimulating hormone (FSH) and more rapid decline in systemic female sex steroids (estradiol and estrone) within 6 months around the menopause.[2] Reproductive aging among women has a far-reaching effect on the function of different body systems, and also on the psychological functioning and well-being among middle-aged and older women. Menopause is an important life transition phase and has been suggested to be a time of increased vulnerability in wellbeing.[5]. These severity of climacteric complaints is routinely determined by using the Kupperman Menopause Index (KMI). The Kupperman Index are widely used internationally. The Menopause Specific Quality of Life Questionnaire (MENQOL) is a validated questionnaire for the assessment of menopausal women's symptoms and an effective instrument (MENQOL). The Menopause Rating Scale (MRS) is a health-related quality of life scale (HRQoL) and was developed in response to the lack of standardized scales to measure the severity of aging-symptoms and their impact on the HRQoL in the early 1990s.

Machine learning is a subfield of artificial intelligence, which is broadly defined as the capability of a machine to imitate intelligent human behavior. Artificial intelligence

systems are used to perform complex tasks in a way that is similar to how humans solve problems. In this system the Machine learning is greatly useful for the early detection of the vasomotor problems of the women so that we can detect her menopause early to make her well being from the long term complications like osteoporosis, fractures, obesity, depression, diabetes, and cardiovascular disease, decreased functional ability and mortality.

Keywords: Menopause, Machine Learning, Kupperman Menopause Index, MENQOL, MRS Rating Scale

NEED OF THE STUDY

In most countries, there is an increase in the aging population as a result of both longer life expectancy and declining fertility rates [6]. The World Health Organization has adopted a Global strategy and action plan on ageing and health to ensure adults live not only longer but healthier lives. Demographic data have shown that every year, 25 million women worldwide experience the menopause. This will result in 1.2 billion postmenopausal women worldwide by 2030. Symptoms that may appear during menopause and continue through post menopause include painful intercourse, vaginal dryness, atrophic vaginitis – thinning of the membranes of the vulva, the vagina, the cervix, and the outer urinary tract, along with considerable shrinking and loss in elasticity of all of the outer and inner genital areas. Other physical symptoms of menopause include lack of energy, joint soreness, stiffness, back pain, breast enlargement, breast pain, heart palpitations, headache, dizziness, dry and itchy thinning, tingling skin - rosacea, weight gain, urinary incontinence, urinary urgency, interrupted sleeping patterns, heavy night sweats and hot flashes and finally Mood and memory effects Psychological symptoms include anxiety, poor memory, inability to concentrate, depressive mood, irritability, mood swings, and less interest in sexual activity. So the early detection of the menopause is more important for the women to improve her well being. Machine learning and in particular deep learning models based upon artificial neural networks can draw upon diverse data that include clinical images and medical notes, as well as sensor generated and genomic data. Such

models can iteratively learn from large clinical databases and bring to bear the expertise of multiple medical specialties upon the data of individuals.

INTRODUCTION

Menopause, also known as the climacteric, is the time in women's lives when menstrual periods stop permanently, and they are no longer able to bear children. Menopause typically occurs between 49 and 52 years of age. Medical professionals often define menopause as having occurred when a woman has not had any menstrual bleeding for a year. It may also be defined by a decrease in hormone production by the ovaries. In those who have had surgery to remove their uterus but still have ovaries, menopause may be considered to have occurred at the time of the surgery or when their hormone levels fell. Following the removal of the uterus, symptoms typically occur earlier, at an average of 45 years of age.

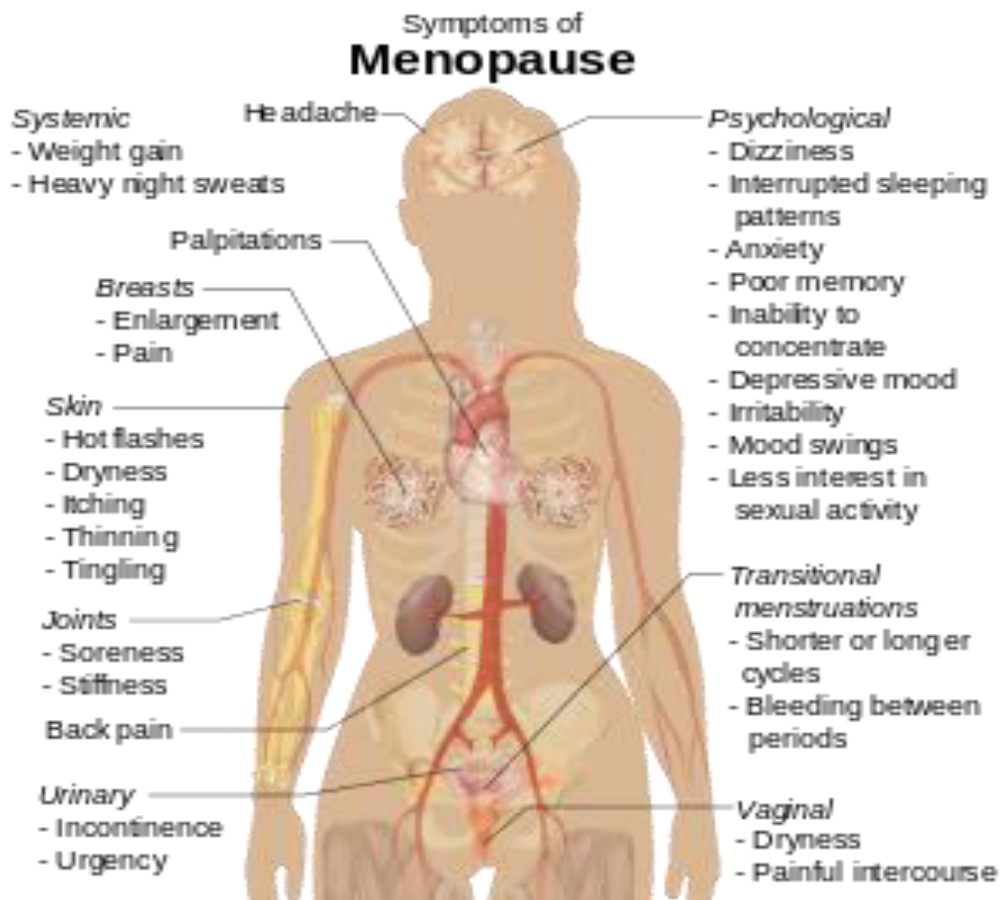
PHYSIOLOGICAL CHANGES OF MENOPAUSE

During early menopause transition, the menstrual cycles remain regular but the interval between cycles begins to lengthen. Hormone levels begin to fluctuate. Ovulation may not occur with each cycle

The term menopause refers to a point in time that follows one year after the last menstruation. During the menopausal transition and after menopause, women can experience a wide range of symptoms. Symptoms that may appear during menopause and continue through post menopause include painful intercourse, vaginal dryness, atrophic vaginitis – thinning of the membranes of the vulva, the vagina, the cervix, and the outer urinary tract, along with considerable shrinking and loss in elasticity of all of the outer and inner genital areas. Other physical symptoms of menopause include lack of energy, joint soreness, stiffness, back pain, breast enlargement, breast pain, heart palpitations, headache, dizziness, dry and itchy thinning, tingling skin - rosacea, weight gain, urinary incontinence, urinary urgency, interrupted sleeping patterns, heavy night sweats and hot flashes and finally Mood and memory effects Psychological symptoms include anxiety, poor memory, inability to concentrate, depressive mood, irritability, mood swings, and less interest in sexual activity. Menopause-related cognitive impairment can be confused with the mild cognitive

impairment that precedes dementia. Tentative evidence has found that forgetfulness affects about half of menopausal women and is probably caused by the effects of declining estrogen levels on the brain, or perhaps by reduced blood flow to the brain during hot flashes. Menopause confers that a possible but contentious increased risk of atherosclerosis. The risk of acute myocardial infarction and other cardiovascular diseases rises sharply after menopause, but the risk can be reduced by managing risk factors, such as tobacco smoking, hypertension, increased blood lipids and body weight. Increased risk of osteopenia, osteoporosis, and accelerated lung function decline. Women who experience menopause before 45 years of age have an increased risk of heart disease - death and impaired lung function

Menopause can be induced or occur naturally. Induced menopause occurs as a result of medical treatment such as chemotherapy, radiotherapy, oophorectomy, or complications of tubal ligation, hysterectomy, unilateral or bilateral salpingo-oophorectomy or leuprorelin usage



ENDOCRINE CHANGES OF MENOPAUSE

The menopausal transition, and post menopause, is a natural change, not a disease state or a disorder. The main cause of this transition is the natural depletion and aging of the finite amount of oocytes (ovarian reserve). This process is sometimes accelerated by other conditions and is known to occur earlier after a wide range of gynecologic procedures such as hysterectomy (with and without ovariectomy), endometrial ablation and uterine artery embolisation. The depletion of the ovarian reserve causes an increase in circulating follicle-stimulating hormone (FSH) and luteinizing hormone (LH) levels because there are fewer oocytes and follicles responding to these hormones and producing estrogen. The transition has a variable degree of effects. The stages of the menopause transition have been classified according to a woman's reported bleeding pattern, supported by changes in the pituitary follicle-stimulating hormone (FSH) levels. In younger women, during a normal menstrual cycle the ovaries produce estradiol, testosterone and progesterone in a cyclical pattern under the control of FSH and luteinizing hormone (LH), which are both produced by the pituitary gland. During peri menopause the estradiol levels and production remain unchanged or may increase compared to young women, but the cycles become frequently shorter or irregular. The increase in estrogen is presumed to be in response to elevated FSH levels that, in turn, is hypothesized to be caused by decreased feedback by inhibin. Similarly, decreased inhibin feedback after hysterectomy is hypothesized to contribute to increased ovarian stimulation and earlier menopause. The menopausal transition is characterized by marked, and often dramatic, variations in FSH and estradiol levels. Menopause occurs because of the sharp decrease of estradiol and progesterone production by the ovaries. After menopause, estrogen continues to be produced mostly by aromatase in fat tissues and is produced in small amounts in many other tissues such as ovaries, bone, blood vessels, and the brain where it acts locally. The substantial fall in circulating estradiol levels at menopause impacts many tissues, from brain to skin. In contrast to the sudden fall in estradiol during menopause, the levels of total and free testosterone, as well as dehydroepiandrosterone sulfate (DHEAS) and androstenedione appear to decline more or less steadily with age.

Hot flashes and other vasomotor symptoms accompany the menopausal transition. While many sources continue to claim that hot flashes during the menopausal transition are caused by low estrogen levels. The exact cause of these symptoms is not yet understood, possible factors considered are higher and erratic variation of estradiol level during the cycle, elevated FSH levels which may indicate hypothalamic dysregulation perhaps caused by missing feedback by inhibin. It has been also observed that the vasomotor symptoms differ during early perimenopause and late menopausal transition and it is possible that they are caused by a different mechanism. Long-term effects of menopause may include osteoporosis, vaginal atrophy as well as changed metabolic profile resulting in cardiac risks. Premenopause is a term used to mean the years leading up to the last period, when the levels of reproductive hormones are becoming more variable and lower, and the effects of hormone withdrawal are present. "perimenopause", which literally means "around the menopause", refers to the menopause transition years before the date of the final episode of flow. The term "postmenopausal" describes women who have not experienced any menstrual flow for a minimum of 12 months, assuming that they have a uterus and are not pregnant or lactating. The reason for this delay in declaring post menopause is because periods are usually erratic at this time of life. Therefore, a reasonably long stretch of time is necessary to be sure that the cycling has ceased. At this point a woman is considered infertile; however, the possibility of becoming pregnant has usually been very low (but not quite zero) for a number of years before this point is reached. A woman's reproductive hormone levels continue to drop and fluctuate for some time into post-menopause, so hormone withdrawal effects such as hot flashes may take several years to disappear. A period-like flow during post menopause, even spotting, may be a sign of endometrial cancer.

Menopausal women experience a number of physical changes such as loss of muscle strength and flexibility, which is considered to be a major contributor to musculoskeletal disorders (Sutton-Tyrrel et al., 2005). Yamamoto et al. (2009) identified flexibility as a determinant of arterial stiffness, which is known to be an independent risk factor for cardiovascular disorders, target organ damage (Coutinho et al., 2011), and increased mortality risk (Vlachopoulos et al., 2010). Menopause is a natural part of the aging process in women and is defined as occurring 12 months after

the last menstrual period and marks the end of menstrual cycles.[11]. Menopause is a universal and physiological event in a woman's life occurring around the age of 50 years in most developed countries. [12].It is caused by the aging of ovaries leading to a decline in the production of ovarian gonadotrophins estrogen and progesterone.[13] The deficiency of these hormones elicits various somatic, vasomotor, sexual, and psychological symptoms that impair the overall quality of life (QoL) of women.[14, 15,16]

STATISTICAL TOOL

KUPPERMAN INDEX QUESTIONNAIRE

The first widely accepted attempt to measure the severity of menopausal complaints in women was the *Kupperman Index*. It is classified into six areas-vasomotor disorders, urinary symptoms, psychoneurological symptoms, motor symptoms, digestive symptoms, and systemic symptoms. Hot flash, weight gain, insomnia, irritability, low sex drive, depression,fatigue, muscle/joint pain,headache, heart palpitations, vaginal dryness and finally forgetfulness.

Rating is

0: No symptom

1: Slight

2: Moderate

3: Severe

THE MENOPAUSE RATING SCALE (MRS)

The Menopause Rating Scale (MRS) is a **health-related quality of life scale (HRQoL)** and was developed in response to the lack of standardized scales to measure the severity of aging-symptoms and their impact on the HRQoL in the early 1990s.

Menopause Rating Scale (MRS)

Which of the following symptoms apply to you at this time?
 (X ONE Box For EACH Symptom) For Symptoms That Do Not Apply, Please Mark "None".

Symptoms:

	none	mild	moderate	severe	extremely severe
	-----	-----	-----	-----	-----
Score =	0	1	2	3	4
1. Hot flashes, sweating (episodes of sweating).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Heart discomfort (unusual awareness of heart beat, heart skipping, heart racing, tightness).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Sleep problems (difficulty in falling asleep, difficulty in sleeping through the night, waking up early).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Depressive mood (feeling down, sad, on the verge of tears, lack of drive, mood swings).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Irritability (feeling nervous, inner tension, feeling aggressive)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Anxiety (inner restlessness, feeling panicky).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Physical and mental exhaustion (general decrease in performance, impaired memory, decrease in concentration, forgetfulness).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Sexual problems (change in sexual desire, in sexual activity and satisfaction).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Bladder problems (difficulty in urinating, increased need to urinate, bladder incontinence).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Dryness of vagina (sensation of dryness or burning in the vagina, difficulty with sexual intercourse).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Joint and muscular discomfort (pain in the joints, rheumatoid complaints)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

MENQOL

The Menopause Specific Quality of Life Questionnaire (MENQOL) is a validated questionnaire for the assessment of menopausal women’s symptoms and an effective instrument.[17,18]. the evaluation of the Menopause-Specific Quality of Life (MENQOL) Questionnaire, a tool used by clinicians to understand women’s symptomatology as they progress through the menopausal transition. [19,20]

The Menopause-Specific Quality of Life Questionnaire

For each of the following items, indicate whether you have experienced the problem in the **PAST MONTH**. If you have, rate how much you have been *bothered* by the problem.

				Not at all bothered	0 1 2 3 4 5 6						Extremely bothered	
1.	HOT FLUSHES OR FLASHES	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
2.	NIGHT SWEATS	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
3.	SWEATING	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
4.	BEING DISSATISFIED WITH MY PERSONAL LIFE	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
5.	FEELING ANXIOUS OR NERVOUS	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
6.	EXPERIENCING POOR MEMORY	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
7.	ACCOMPLISHING LESS THAN I USED TO	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
8.	FEELING DEPRESSED, DOWN OR BLUE	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
9.	BEING IMPATIENT WITH OTHER PEOPLE	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
10.	FEELINGS OF WANTING TO BE ALONE	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
11.	FLATULENCE (WIND) OR GAS PAINS	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
12.	ACHING IN MUSCLES AND JOINTS	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
13.	FEELING TIRED OR WORN OUT	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
14.	DIFFICULTY SLEEPING	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
15.	ACHES IN BACK OF NECK OR HEAD	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
16.	DECREASE IN PHYSICAL STRENGTH	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
17.	DECREASE IN STAMINA	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
18.	FEELING A LACK OF ENERGY	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
19.	DRYING SKIN	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
20.	WEIGHT GAIN	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
21.	INCREASED FACIAL HAIR	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
22.	CHANGES IN APPEARANCE, TEXTURE, OR TONE OF YOUR SKIN	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
23.	FEELING BLOATED	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
24.	LOW BACKACHE	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
25.	FREQUENT URINATION	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
26.	INVOLUNTARY URINATION WHEN LAUGHING OR COUGHING	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
27.	CHANGE IN YOUR SEXUAL DESIRE	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
28.	VAGINAL DRYNESS DURING INTERCOURSE	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	
29.	AVOIDING INTIMACY	<input type="checkbox"/> No	<input type="checkbox"/> Yes	→	0	1	2	3	4	5	6	

The Menopause-specific Quality of Life (MENQOL) Questionnaire.

ARTIFICIAL INTELLIGENCE

Artificial intelligence can not only mimic but also greatly extend human intelligence. The medical decisions and personalized therapy for a single patient be informed by vast, collective experience [8]. Artificial intelligence (AI) methods and algorithms are being applied in varying ways across clinical and research domains. Machine learning (ML) has only begun to be applied to the menopausal transition. The end of a woman's fertility is a physiological state that is part of aging, and it is accompanied by a myriad of symptoms that include hot flashes, disrupted sleep, loss of energy, anxiety, and feelings of sadness and loss. These can transition to pathological phenomena such as incremental bone loss, diabetes, and cardiovascular disease and mortality. The complexity of menopause challenges general practitioners, gynecologists, and women's health practitioners to provide comprehensive care [9]. Implementation of AI is in an early phase, conditions such as osteoporosis that are prominent during and after menopause are being approached with deep learning (DL) models. Machine learning also has shown promising results diagnosing menopause symptoms. AI can also improve personalized treatment in menopause. (Barack et al.,) developed a computerized hybrid decision-making system. to assist physicians by combining a clustering algorithm with knowledge- based algorithms to recommend hormone therapy for peri- and postmenopausal women [10]. It is important to understand that AI algorithms can assist and facilitate the work of health professionals and make them better, but cannot replace them.

DISCUSSIONS

The quality of life among menopausal women has become an increasingly hot topic in recent medical and sociological research. Specifically, vasomotor and psychological symptoms remain at the forefront of common, bothersome symptoms which affect a woman's quality of life. As many as 95% of menopausal women may exhibit vasomotor symptoms, which may frequently disrupt work, sleep and other activities. Furthermore, psychological symptoms such as depression are common in as many as 60% of women going through the menopausal transition.

The severity of climacteric complaints is routinely determined by using the Kupperman Menopause Index (KMI) and the menopause rating scale (MRS). Artificial intelligence (AI) methods and algorithms are being applied in varying ways across clinical and research domains. In this system the Machine learning is greatly useful for the early detection of the vasomotor problems of the women so that we can detect her menopause early to make her well being from the long term complications like osteoporosis, fractures, obesity, depression, diabetes, and cardiovascular disease, decreased functional ability and mortality. Even though there has been progress in the application of AI to the study of women's health during and after the menopausal transition, there is not yet evidence of its application in clinical practice. Translating AI to clinical care will require two lines of development. First, our understanding, identification, and measurement of mechanisms underlying menopausal metabolic traits must advance to get optimal input datasets. Second, robust algorithms and systems are needed along with access to larger datasets within an ethical framework that guarantees privacy and data protection. This has special importance for the application of DL models, which allow extraction of features and patterns that expose underlying, relevant characteristics through training with a large amount of data.

CONCLUSION

Machine learning provides an invaluable decision support system for the prediction of Vasomotor symptoms of the Menopausal women so that we can prevent her from all the long term problems. Machine learning methods are free from unrealistic assumptions. Machine learning is a statistical tool that uses artificial intelligence to allow computers to perform tasks by learning from examples without being explicitly programmed.[21,22,23]

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TRANSFORMATION OF INDIA'S DIGITAL PAYMENTS LANDSCAPE - CASE STUDY ON DIGITAL WALLETS

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ABSTRACT

Pandemic has revolutionized the world and emphasised on digitalisation in all sectors. The government's push towards making India a cashless economy has further led to the widespread adoption of digital payment methods in the country. Digital wallets have emerged as a game changer in India's digital payments landscape, bringing about a significant transformation in the way transactions are conducted. This paper examines transformation in digital payment mechanisms and usage of digital wallets from 2020-2021 to 2022-2023 on India's digital payments landscape.

The study aims to analyze and evaluate the growth and adoption of digital wallets in India. It reflects a comparative study of digital wallets- Phone pe, Google pay and Paytm in terms of its resources and services offered to users in India.

Keywords: Digital wallets, Digital payments, Phone pe, Google pay, Paytm

INTRODUCTION

India is a country with a large population and a diverse economy. The emergence of digital payments in India has brought about a transformation in the country's economy. The government's emphasis on financial inclusion has led to the launch of various programs aimed at promoting digital payments. Mobile banking initiatives have made it easier for people to access financial services and conduct transactions digitally. The launch of digital payment methods such as UPI, BHIM, and mobile wallets has further accelerated the shift towards a cashless economy.

The shift towards digital payments has had a significant impact on the Indian economy. It has made transactions faster, cheaper, and more convenient, thus promoting financial inclusion. The adoption of digital payment methods by small businesses and individuals

has helped to bring more people into the formal economy, enabling them to access a range of financial services such as loans and insurance. The use of digital payment methods has also helped to reduce the amount of black money in circulation, as digital transactions leave a traceable record of all transactions. In India, mobile wallet payment system has been widely used for transactions during pandemic. Paytm, PhonePe, and Google Pay are the leaders in digital payments industry in India.

This paper aims to explore the usage of digital wallets on India's digital payments landscape. As the number of digital payment transactions in India has seen a significant increase, there is a need to examine the role of digital wallets in this growth and their impact on the country's economy. This study will analyze the various challenges faced and benefits achieved using digital wallets in India, highlighting their potential to promote digital transactions and bring growth in digital economy.

NEED FOR THE STUDY

As per the data published on digital payments by RBI, the number of digital payment transactions in India reached 4.73 billion in March 2021, from 3.31 billion transactions in March 2020 This reflected a growth rate of 43% in digital payments. Considering the significant growth of digital wallets, rise in trends of mobile payments in India, there is a need to highlight on role of digital wallets in India's payment landscape.

OBJECTIVES OF THE STUDY

1. To analyze and evaluate the growth and adoption of digital wallets in India.
2. To identify the leading digital wallets available in India.
3. To examine the impact of digital wallets on the digital landscape in India.
4. To identify the challenges and opportunities for digital wallets in India.

LITERATURE REVIEW:

- According to Ghosh (2021), Google Pay's contribution to India's digital payment landscape has been significant as it has introduced several features such as UPI payments, bill payments, and online shopping Payment methods.

- Kumar & Singh (2020) in the research conducted that adoption of digital payments in India has been significant, with several factors contributing to the growth of digital payments.
- Mahapatra & Mohanty (2021) in their study stated that government's push towards a cashless economy, increasing internet penetration, and the availability of affordable smartphones have all contributed to the growth of digital payments in India. The study concluded that concerns around security and privacy, which have affected the adoption of digital payments in India.
- Nair (2020) conducted a study on digital payments in India and found that one of the major challenges faced by digital payment platforms in India is the lack of awareness and trust among users.

RESEARCH METHODOLOGY

- The study is undertaken using secondary data available from reports, websites and journals.

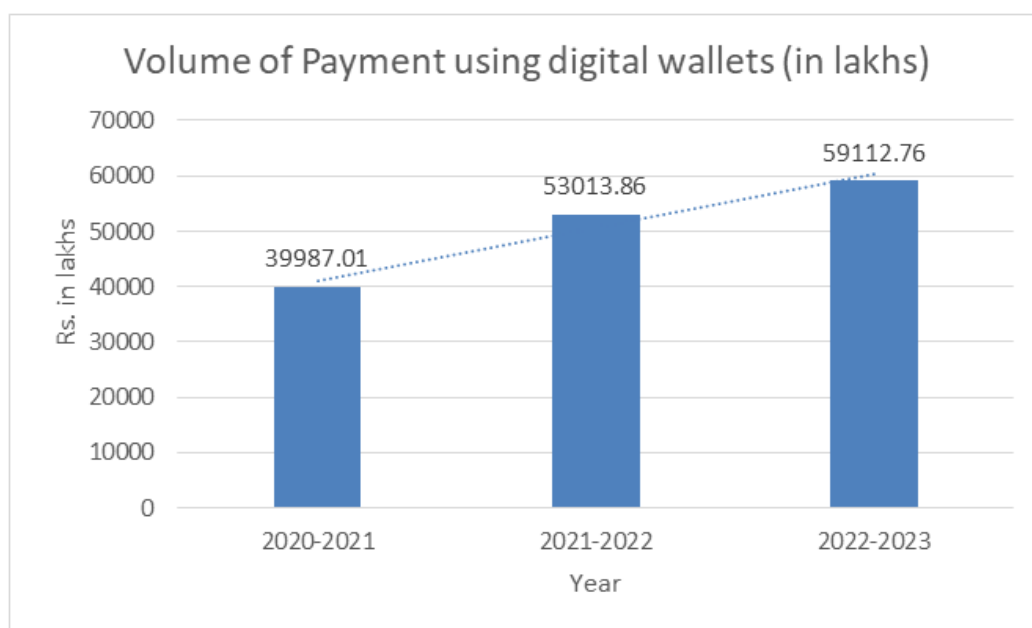
SCOPE OF THE STUDY

- The study covers sample of 3 leading digital wallets – Phone pe, Paytm and Google pay.
- Period of study is 3 years from 2020-2021 to 2022- 2023.

FINDINGS:

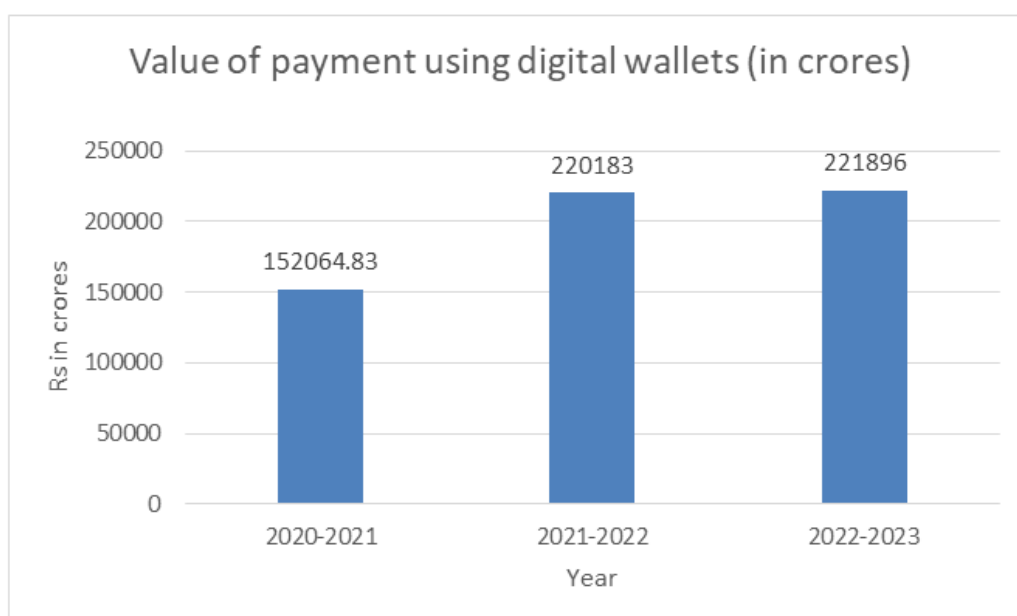
India has become a digital economy where electronic payments have become common rather than using cash transactions. With the increase in technology, many digital payment platforms have emerged in the Indian market.

- A. Digital wallets in India have experienced rapid growth in the past few years. Also, a shift has been observed in customers behaviour and approach towards usage of digital wallets for transactions in India. According to a report by Bain & Company, digital payments accounted for 20% of all e-commerce transactions in India in 2020, and this number is expected to grow to 34% by 2025. is one of the simpler use cases for adoption.

Fig. 1: Trends in volume of payment settlements using digital wallets in India

Source: <https://www.rbi.org.in>

Fig:1 shows an increasing trend in volume of payment settlements using digital wallets in India from the year 2020-2021 to 2022-2023.

Fig. 2: Trends in value of payment settlements using digital wallets in India

Source: <https://www.rbi.org.in>

Fig:2 reflects increasing trend in value of payment settlements using digital wallets in India from the year 2020-2021 to 2022; however, there is a reduction in value of payment settlements from 2021-2022 to 2022-2023.

Considering fig 1 & 2, it can be stated that digital wallets are still preferred for payment settlement transactions of less value after pandemic and the users have adopted digital wallets for small payments.

B. A wallet held by both payer and payee assists in usage of Peer-to-peer payments. The companies- Paytm, PhonePe, and Google Pay are the dominant players in India's digital wallet market.

a. Phone pay

PhonePe is a digital payments platform founded in 2015. It is owned by Flipkart, one of India's largest e-commerce platforms. The company is backed by Walmart, largest retailer at global level. It is an Indian mobile payment platform that allows users to transfer money, pay bills, and make purchases both online and offline. According to a recent report by EY, PhonePe processed over 1 billion transactions in December 2020, with a total payment volume of \$27 billion. The report also stated that PhonePe had a market share of 42% in the Unified Payments Interface (UPI) transactions in India, which is the largest payment system in the country.

b. Paytm:

Paytm is a digital payments and financial services company founded in 2010. Paytm is backed by Alibaba Group and SoftBank Group. Alibaba group has a market capital of over \$ 580 billion and SoftBank group being technology conglomerate has a market capitalisation of over \$ 208 billion. The company offers a range of services, including mobile recharge, bill payments, and online shopping. Paytm also has its own digital wallet and paytm payments bank which allows users to store money and make payments online. According to reports, Paytm had over 450 million registered users as of 2020, and the company processed over 1.2 billion transactions in January 2021. Paytm also reportedly has a market share of around 30% in UPI transactions in India.

c. Google Pay:

Google Pay is a digital payment platform owned and developed by Google. Google Pay was launched in 2015 as Android Pay and later rebranded to Google Pay in 2018. Google is a subsidiary of Alphabet Inc which has a market capitalisation of over \$1.4 trillion. It allows users to make payments and transfer money using their mobile devices. Google Pay is available in several countries, including India, the United States, and the United Kingdom. According to reports, Google Pay had over 75 million registered users in India as of 2020. The company also reportedly had a market share of around 10-15% in UPI transactions in India. As on 2022, Google pay has over 150 million active users globally and is available in 30 countries.

C. Comparative evaluation of these three digital wallets is as follows:**a. User Interface**

All three payment platforms possess a well-designed and user-friendly interface. The interface of Paytm is quite colorful and cluttered, which may make it a bit complex for new users. PhonePe offers an easy interface for shopping, recharging and even booking bus tickets. Google Pay offers the simplest interface of all.

b. Security

All three payment platforms are safe and secure. They use multi-level encryption and advanced security measures to protect any transaction made. PhonePe uses the highest level of encryption standards, and Google Pay is secured by Google's own backend security system. Paytm is secured with advanced encryption technologies.

c. UPI Integration

PhonePe, Google Pay and Paytm all support UPI transactions. Google Pay is the most widely used UPI platform in India, offering instant UPI fund transfers. PhonePe offers UPI payments, but also offers a recharge facility, bill payments and linking other bank accounts. Paytm is the oldest UPI platform in India and offers an easy-to-use, secure online payment process.

d. Offers

All three payment platforms offer attractive offers to attract users. However, Paytm is well-known for its cashback offers on recharge, bill payment and shopping. Google Pay

offers cashback with each transaction, and PhonePe's offers are typically merchant-centric.

e. CSR activities

In response to the Covid-19 pandemic, PhonePe made several contributions to aid the relief efforts, including a donation to the PM Cares Fund and the setting up of a relief fund for daily-wage earners. The company also launched an initiative in collaboration with local NGOs to distribute masks and sanitizers. Paytm has also undertaken several CSR activities in response to the pandemic, including resource mobilization for use in Covid-19 hospitals, distribution of essential items, and a contribution to the PM Cares Fund. Paytm has also partnered with various organizations and NGOs to support underprivileged communities. In addition, Paytm recently launched an environmental sustainability initiative called 'Go Green' aimed at reducing the carbon footprint of its operations. Google Pay has also contributed to Covid-19 relief efforts, particularly in providing resources and support for small businesses. The company has also launched several CSR initiatives aimed at promoting education and digital literacy, particularly in rural areas.

D. Opportunities and challenges for usage of digital wallets in India

COVID-19 pandemic has accelerated the adoption of digital payments in India, as people are increasingly avoiding physical cash transactions to minimize the risk of infection. This has led to a surge in the use of digital wallets and contactless payment methods. The notable developments in the digital payment space includes Unified Payments Interface (UPI) transactions. UPI has emerged as one of the most popular payment modes in India, with a total transaction volume of over 4.3 billion in March 2021. This is largely due to the increased adoption of digital payment platforms such as Paytm, PhonePe, Google Pay, and others, which have integrated UPI into their platforms. The government's push towards a digital economy has also led to the emergence of new digital payment methods such as Bharat QR and BHIM Aadhaar Pay, which are gaining popularity in the country. In addition, the Reserve Bank of India has introduced several initiatives to promote digital payments, such as the introduction of a

new payment infrastructure called the National Automated Clearing House (NACH), which allows for seamless payment processing.

While digital payments have many benefits, they also face several challenges in India. One of the biggest obstacles is the lack of digital literacy among the population. Many people in India, especially in rural areas, are still not familiar with digital payment methods, and this can be a hindrance to adoption. Another challenge is the lack of reliable internet connectivity, especially in rural areas. This can affect the performance of mobile payment systems, making them unreliable in certain areas.

OBSERVATIONS

Digital payment platforms like Paytm, PhonePe, and Google Pay have made a significant contribution to the digital landscape in India. These platforms have enabled individuals and businesses to make cashless transactions easily and securely, and have played a crucial role in promoting financial inclusion and driving the country's digital transformation.

One of the primary contributions of digital payment platforms is the convenience they offer. With these platforms, individuals can make transactions from the comfort of their own homes, without the need to carry cash or visit a bank. This has led to a significant increase in the adoption of digital payments in India, particularly in urban areas. Moreover, the rise of mobile wallets has enabled people to pay for a wide range of goods and services, including utility bills, groceries, and even transportation.

Digital payment platforms have also played a critical role in enabling financial inclusion in India. With a large portion of the population having limited access to traditional banking services, digital payment platforms have opened new avenues for individuals to conduct financial transactions. For example, people can now open a digital wallet account with minimal documentation, and transfer money to other individuals even if they do not have a bank account. This has also led to increased transparency and security in financial transactions. They offer features such as two-factor authentication, encryption, and biometric authentication, which have reduced the risk of fraud and cybercrime. Additionally, these platforms provide users with detailed transaction records, allowing them to keep track of their spending and budget effectively.

Lastly, digital payment platforms have opened new opportunities for businesses, particularly in the e-commerce sector. With the rise of mobile payments, businesses can now accept payments from customers easily and securely, leading to a significant increase in online sales. This has allowed small and medium-sized businesses to compete with larger players, and has contributed to the growth of the Indian e-commerce industry.

CONCLUSION

In conclusion, digital wallets have revolutionized the way transactions take place in India, promoting financial inclusion and reducing the amount of black money in circulation. The opportunities for digital payment in India have continued to grow since 2021, driven by government initiatives, technological advancements, and changing consumer behaviour.

The widespread adoption of digital payment methods in India is a promising sign for the country's growth and development. All three payment platforms have their unique features and offer an easy transaction process. PhonePe's interface is more user-friendly. Paytm is the oldest and most popular platform in India, offering a wide range of services, cashback offers, and a reliable customer service department. Paytm is best for people who want a complete financial services platform, including banking services, investments, and insurance. Google Pay is best for tech-savvy individuals who need a convenient and secure payment platform. However, challenges such as lack of awareness and trust among users and concerns around security and privacy need to be addressed to further promote the growth of digital payments in India.

To conclude, leading digital wallets like Paytm, PhonePe, and Google Pay have made a significant contribution to the digital landscape in India. These platforms have enabled greater convenience, financial inclusion, transparency, and security in financial transactions, and have opened new opportunities for businesses. Their impact on the digital economy in India is likely to continue to grow in the coming years, as more people adopt digital payments and businesses continue to innovate and leverage these platforms.

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A MULTIDISCIPLINARY APPROACH TO IMPROVING LEARNING OUTCOMES FOR DISADVANTAGED STUDENTS

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ABSTRACT

Multidisciplinary refers to a process that combines or involves several disciplines or skills to address a topic or problem. The multidisciplinary approach focuses on identifying external environmental problems supported by multidisciplinary methods and generating solutions to problems based on new understanding of complex situations. , behavioral problems, learning problems, cultural discrimination, sexual orientation, lack of resources, etc. It is transferred to the student without making any sense. Informal learners face a variety of challenges that cannot be adequately addressed by a single discipline because they require expertise in many areas. This article briefly explains how multidisciplinary methods can provide effective education for underserved students.

Keywords: multidisciplinary approach, marginalized students, single-disciplinary approach, quality education.

INTRODUCTION

The multidisciplinary approach involves the use of different disciplines to reassess environmental problems and find appropriate solutions and encourage mutual cooperation, which allows students to develop their critical thinking skills and enables more "real world" development. Multidisciplinary research involves collaboration that brings together multiple disciplines and contributes to a common goal (Fiore and Salas 2007). Interdisciplinary opportunities are provided where possible bring together different disciplines and find different ways of thinking about the same problem. Marginalized students are confined to the bottom or outside of society because; homemade violence, health problems, lack of parents, behavioral problems, learning problems, substance use, racism, sexual identity, substance abuse, abuse, etc. referred to as borderline chemistry students. Access to primary education remains a challenge for

marginalized students as they are affected by differences in income, social status and many other factors. Their opportunities to participate in society are limited, they lack self-confidence.

Development of society cannot be achieved without marginalized sectors. Distracted students face many problems that cannot be solved by teaching alone as it requires expertise in many fields. The list below briefly describes the various disciplines for improvement quality of education for disadvantaged students.

MULTIDISCIPLINARY RESEARCH

Multidisciplinary research should work with experts from different fields with different the background and skills to find solutions in a multidimensional way; it can help create new ones value, especially in times of international competition. Different backgrounds different groups can provide different perspectives and experiences for better communication. A creative project is considered a good and useful experience that gives students the ability to create new ones ideas and new things (Joachim & Petra, 2004). The collaboration between art and computer science, for example, provides a multidisciplinary environment and students are often encouraged to examine the limits of one's own practice, which leads to influencing work in other fields and a better understand their own roles and values. (Sonnenwald, 1995).

Single-subject education generally does not support creativity. Multidisciplinary research can combine specialized skills with others to form multidisciplinary teams that can lead to creative and extensive research. For example, we consider artificial intelligence (ATC), which refers to computer technology specifically designed to help people compensate for cognitive impairments. ATC also covers a wide range of equipment, including cheap and critical equipment and special equipment. ATC is the use of technology to improve and support cognitive processes such as listening, memory, self-control, orientation, emotional awareness and management, planning and activities. Regional reviews have shown that the number of ATCs is growing rapidly, but most focus on memory and planning, with emerging evidence of their effectiveness and importance in implementing new ATCs (LoPresti, Mihailidis, & Kirsch, 2004). Research studies in this area clearly show the need for expertise in many areas such as

science, special education, general education, and psychology. A multidisciplinary approach is essential to discovering new ways to experience technology.

Jack Leeming (2017) adds that multidisciplinary research can lead to extraordinary findings. Much good research comes from the interactions of scientists in different fields. Paul Lauterbe (chemist) and Peter Mansfield (physicist) are a good example of this for their discovery of "magnetic resonance" for which they won the 2003 Nobel Prize in Physiology or Medicine. An independent scientist who designs and conducts his own experiments does not have this opportunity (Jack Leeming2017).

One important advantage of multidisciplinary collaboration is that all collaborators are forced to communicate, either to preserve their ideas or to avoid complex programming, and therefore improves communication ability. The process of multidisciplinary collaboration is difficult to learn without real experience, so the advantage of such multidisciplinary collaboration is to become familiar with the complex process in industry. In this way, they will become familiar with the process of cooperation in product development. Similarly, multidisciplinary collaboration promotes collaborative skills, especially with partners from different backgrounds.

The lack of a shared common language and knowledge requires better collaboration skills. Carrying out a multidisciplinary project through ideas to implementation for the betterment of marginalized students provides a sense of reality and prepares them for all-round development. At the same time, this process gives them the confidence to handle their future careers.

All participants learned things from other participants with different backgrounds. In industry or in monodisciplinary research, it is not usual to work for a whole year in a heterogeneous group. However, this experience gives everyone the opportunity to observe different ways of developing and learn teamwork by complementing each other. In addition, it improves the sense of achievement and professional skills. Otto Muskens (2013) stated the following advantages of multidisciplinary research;

1. A specific approach and knowledge may be standard for a discipline but new in other fields. Applying knowledge in this new field can provide a leadership advantage and a unique angle in solving unsolved problems.

2. Monodisciplinary fields can be overcrowded with specialists and the number of different topics to study is limited. Often, a particular school or professor will produce a number of graduate students who want to pursue a career in science. Not everyone can do the same things in the same field all the time.
3. Teaming up with complementary research groups can bring together collective expertise and gain synergy. This has the effect of increasing the chances of original research (with high impact) and the potential to obtain more outputs with less work (Otto Muskens 2013).

Applying knowledge from multiple fields provides an advantage and a unique angle to address the extraordinary challenges facing marginalized students. Collective expertise and synergy from multiple disciplines would support quality education for marginalized students.

CHALLENGES

Although a multidisciplinary approach is an effective approach to providing quality education for marginalized students, it has certain limitations. Haydee Maria Cuevas et al., (2012) noted that the primary challenge in conducting multidisciplinary research is to meet the constraints of different stakeholders with different agendas. Thus, a potential disadvantage of multidisciplinary research is that conflicting data collection requirements may hinder the project team's ability to meet the diverse research goals of all its members. Mitigating this problem requires establishing a systematic process by which the project team can objectively agree on a primary goal. While still allowing stakeholders to identify their specific research goals and carefully prioritize their data collection requirements to meet that goal.

They further emphasized that for a multidisciplinary team, researchers not only need to complete their own work, but also spend time communicating and responding to changes made by their peers. The last two elements do not exist in a non-cooperative process. Another limitation is the differences in the background of the multidisciplinary research collaborators. The first difference was in their career level. The work schedule of a researcher was very different from that of an engineer who was a full-time

programmer at a company. Therefore, they had very little mutually convenient time to discuss the details of the project.

A diverse training pathway is more complex to navigate than traditional specialized pathways – but can be more rewarding (Myrna Watanabe, 2003). The move towards broader multidisciplinary training is relatively new. In monodisciplinary, one collaborator would handle, say, mathematics and the other biology. Where as in multidisciplinary experts from mathematics, statistics, bioinformatics, biology and other disciplines should work together to achieve a holistic approach to finding solutions. However, Myrna Watanabe (2003) quotes Charles Delisi, Metcalf Professor of Science and Engineering at Boston University, as warning that mixing majors is not for everyone. People who prefer high specialization should take a more traditional path to their scientific career, while people who like to see relationships and enjoy breadth would benefit from a multidisciplinary path. Multidisciplinary research is the search for truth with the help of many specialized fields of learning, aiming to achieve a common goal with the help of knowledge from other fields. However, achieving a common goal with different knowledge-based experts is a difficult task because each one has different approaches and strategies to solve the problem. In developing countries, a multidisciplinary approach to problem solving is very much in vogue. It represents the progressive scientific method.

The weaknesses of multidisciplinary research are mainly related to communication problems between people from different fields. These problems require more time to solve than conventional research projects would require (Lawrence A. Baker, 2006). Ayush Choudhary (2015) argues that for these reasons most people reported that in multidisciplinary projects there is a high initial cost to achieve a good level of understanding between partners. The physical proximity of partners through frequent meetings or exchange students is also essential. This is more important than in the case of monodisciplinary projects, because people need to learn more about other disciplines, not only in terms of knowledge, but also in terms of methodologies, tools and limitations. In basic research, it is considered essential to achieve a good level of

interaction. Therefore, travel costs are more important than in the case of monodisciplinary projects.

A multidisciplinary researcher has to be more patient and sometimes has to explain things several times. They should be trained to effectively communicate the fundamentals of their discipline and to understand each other. They should also be able to adapt to the customs of other fields. Therefore, researchers should carefully consider these limitations when adapting a multidisciplinary approach to providing quality education to marginalized students.

CONCLUSION

Multidisciplinary research is the investigation or investigation of a problem to establish a hypothesis combining many academic approaches, disciplines or methods. Furthermore, it can be defined as the search for knowledge by an objective and systematic method for an original contribution to the existing body of knowledge involving a combination of several disciplines and methods. Molteberg and Bergstrom (2000) argue that "Multidisciplinary Studies deals with contemporary, topical problems, with a focus on their solutions – it tends to be applied and action or policy oriented." However, it has to work with different competencies. Different competences also mean different approaches to problems that can generate conflicts. Therefore, the management of such projects is crucial (Ayush Choudhary, 2015). Although multidisciplinary approaches have certain limitations, they have many advantages, such as promoting synergy between different professionals and providing different solutions to problems faced by marginalized students. They have multi-dimensional problems; this multi-dimensional approach solves the various problems they face.

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**A STUDY ON THE DYNAMICS OF STOCK EXCHANGES FOR THE
GROWTH AND DEVELOPMENT OF INDIAN ECONOMY**

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ABSTRACT

The stock exchanges of a country are the source of providing a capital for the industrial development. The habit of public savings and through mobilisation of public deposits leads to Capital investment in a country which will boost up industrialisation. Industrial development improves the productivity. Establishment of various industries in a country creates the employment generation directly and indirectly. Income sources through employment opportunities, enhances the purchasing power of public and so that creates the demand for the products and services. Industrial development fulfils the need and desires of people. The total goods and services, exports, industrial growth, and development promotes the GDP of a country which is yard stick and benchmarks for the economic development of a country.

The stock exchanges will create and provide the market opportunities to the investors to trade their equity, securities, investment, debt bonds, debentures, and mutual funds. The dynamic role of stock exchanges in a country leads to industrial growth and development by providing capital investment.

According to the Securities contract act, 1956, the stock exchange, has been defined, as "An Association, organisation, or body of individuals whether incorporated or not, established for the purpose of assisting, regulating, and controlling, business in buying, selling, and dealing in securities. Therefore, the stock exchange activities in a country are the measuring stock for the growth and development of industrial economy.

This paper examines, the dynamic activities, services and functionalities of Indian stock exchanges and evaluates their dominant role in trading of securities of investors and for providing capital investment for the growth and development of industrial economy of our country.

Keywords: GDP., Incorporated, Measuring stick, Benchmark, dynamic and dominant role, Industrial growth and Development, Industrial economy.

INTRODUCTION

Indian financial system has so many controls and government procedures and regulations. Government playing a regulatory role in many sectors like in banking, insurance, and on capital market public stock exchanges. Government of India under the ministry of Finance the Reserve bank of India will monitor and supervise the activities of Indian banking. Stock Exchange activities promotes Indian capital market, debt market and money market activities who provide capital investment resources for the industrial development of a country.

The following financial institutions are playing dynamic role for the industrial development in providing industrial finance, corporate business finance, venture capital for the various industrial project ventures, industrial projects' preparation, and in evaluation of industrial projects. Merchant Banking, Venture Capital, I.C.I.C.I, I.D.B.I., S.I.D.B.I, I.F.C.I and S.F.C are some financial institutions are playing major role for industrial development.

Merchant banking, industrial Development Bank of India. ICICI bank, Industrial Finance Corporation of India and State Finance corporation are some of the specialised financial organisations are only for the industrial development, industrial consultancy services, for the Preparation and evaluation of industrial projects and for underwriting of new capital issue. Moreover, they will also act as arbitrators for Mergers and acquisitions, Capital issue activities, investment banking portfolio and, also act as business advisory consultants.

Merchant banking will support in many aspects for the industrial corporation in providing corporate finance. It will undertake public issue, stock broking, underwriting portfolio for the upcoming corporate entrepreneurs. In our country, the portfolio activities of merchant bank are supervised, monitored, and regulated by the Securities Exchange Board of India (SEBI). Functions of the merchant banking for the growth and development of Indian industrial economy is given below.

Fig: 1- SNAPSHOT OF MERCHANT BANKING CORPORATE FINANCING

CORPORATE CONSULTANCY		PROJECT CONSULTANT	CAPITAL STRUCTURING		PORTFOLIO MANAGEMENT
CAPITAL ISSUE MANAGEMENT	CREDIT SYNDI- CATION	WORKING CAPITAL	VENTURE INVESTMENT	LEASE FINANCE	LONG-TERM FIXED DEPOSITS
BILLS DISCOUNTING AND ACCEPTANCE CREDIT			SPECIALISED CORPORATE SERVICES		

Moreover, the banks and Non-Banking Financial corporations like Industrial Financial Corporation of India (IFCI), State Financial corporation (SFC), I.C.I.C.I AND Industrial development Bank of India (I.D.B.I) and public sector banks Private sector banks are financing liberally for the growth and development of industrial economy in our country by offering various terminal loans, and in venture capital, industrial projects preparation and industrial Projects evaluation etc.,

The small public saving deposits either in the public and private sector banks or in Indian postal saving Banks are playing a dynamic role in the growth and development Indian economy. Through the small savings accumulated deposits in postal banks and in public sector and private sector banks are converted into industrial capital investment through the primary market and secondary market.

Moreover they are the best sources for the government for offering term loans to priority sector development like agriculture, industrial development, small scale industries development, and village, and khadi industries and Medium Small and Micro Enterprises of state and central level(M.S.M.Es) Even for small business developments, professions, these small saving deposits are giving as business loans for the industrial growth and development by many banks. Life insurance Corporation of India also playing a dynamic role in financing for the industrial sector development, government infrastructure development projects irrigation development projects, rural infrastructural development projects.

SIGNIFICANCE OF THE STUDY:

For the rapid economic growth in a country all the priority sectors should be developed. For the growth and development of industrial economy, establishment of various industries and the productivity should be improved. Employment will be generated through industrial establishment and development. With the enhanced purchasing power of the public, demand for products and services will be created. To meet the demand for goods and services industrial establishment is inevitable. For the establishment of various industrial manufacturing companies in a country, capital investment resources are very much required. Industries and manufacturing companies can be established either on public or on private sector. For the establishment of public sector enterprises or public sector undertakings, public sector units, the government will provide capital investment funds and working capital resources or allow them to procure capital investment through the public subscription in the primary market.

Stock Exchanges are the best platforms to provide and create the market opportunities to trade the listed shares in the capital market. The activities of stock exchanges in a country and stock market upward trend of index is the measuring instrument for the country's economic growth and development. Public and small-scale depositors and the small and medium investors they invest their hard-earned money in the equity of the reputed company shares by purchasing shares either from primary or secondary markets. Moreover, the stock exchange, brokers, traders, or operators, undertakes the minimum subscription in the primary market invest huge amount in shares of a company assuring minimum subscription.

Therefore, the activities of stock exchanges must be evaluated and examined as how the secondary market having its impact on the growth and development of Indian industrial economy and on GDP. Industrial growth and development having its impact on GDP (Gross Domestic Product) employment generation, and on productivity of goods and service, also on the promotion of foreign trade. The main fuel for the industrial productivity, employment generation and promotion of foreign trade is the capital investment for the establishment of various industries. Government only cannot provide the capital and run the business, manufacturing, and the marketing organisations on its

own. Government will play only the regulatory and controlling functions through the Apex and autonomous body SEBI (Securities Exchange Board of India) to assure for public subscription of capital investments. Public and Private partnership, and on foreign collaboration through F. D. Is (Foreign Direct Investments), the industries shall be established. Government also inviting F. D. Is directly from the foreign investors, N. R. Is (Non-Resident Indians) to start the industries in our country using their technological collaboration.

REVIEW OF THE LITERATURE:

1. Salvatore Capasso.,(2006), deeply studied in his working paper No.166 that how the stock exchange activities through their stock market trading helpful a country's economic growth and development. Finally, they concluded that the development of stock market through a well-established and well performed stock-Exchanges in a country achieved the capital growth and accumulation, switching from debt capital financing to low-cost equity financing. Therefore, the development of equity stock market and stock exchange activities in a country is highly and significantly needed for the industrial and economic growth and development. with the industrial development, not only increase in GDP, productivity, foreign trade but also improve the generation of employment and promotes purchasing power among public so that demand for products and services will enormously be increased. In his paper he further has discussed elaborately about the capital growth and accumulation with empirical evidence.

2. Sudip Banerjee & Monu Sharma (2018) studied in their paper about the 'oscillating' investment attitude of young people and about their dilemma of their investment where to do, how to select the best choice to invest, and about which company is performing well for investment decision. Therefore, their study mainly focussed to provide basic investors' education and create awareness among lower- and middle-class fresh investors about the activities of stock exchanges and their activities. The portfolio of the stock exchanges if observed constantly every investor will get some awareness of stock investment and trading portfolio. In their study they tried to provide fundamental information and knowledge about the stock exchange activities.

3. Rajasekhar et.al (2018) they observed in the paper on stock market volatility, evaluating the portfolio of the important largest stock exchanges., in India i.e., B.S.E. Mumbai., N.S.E., New Delhi and C. S.E., Kolkata and their activities. There three stock exchanges are playing a dominant role in Indian equity and capital market. They concluded finally that well developed stock market institutions will provide higher returns to those investors in a longer period. Their evaluation of Indian stock exchanges created encouraged environmental concept to all customers of all times past, present, and future.

4. Kavita, Mohd Noor et.al., (2020) their research paper examined the great impact of Covid 19 lockdown situation on the stock market in India. They compared the activities of stock market pre period and post period of lock-downs periods selecting the sample as BSE, Mumbai. And found that the results indicated positive trends of stock market during the lockdown situations and, also found positive impact on stock exchange activities during pre and post lock down periods. Poor, average, and middle-class public they were completely jobless and Income less restricted to their houses only with no work and no pay.

5. Ashutosh Duda., (2020) in his research paper on the interlinkage of stock Market and GDP mainly focussed on the connectivity of Stock market and GDP of a country. It has revealed the connectivity of stock exchange and its financial market activities and advancement in monetary growth and development of a country. Their study finally concludes that the stock market activities and economic growth have a negative impact on economic growth. According to their study, there is no substantial evidence of connectivity of stock exchange activities and economic growth of a country.

SUMMARY OF REVIEW OF LITERATURE:

On the observation of above reviews, the following opinions, findings were made during their research. Stock exchanges undertake stock trading activity through which they provide capital investment to various industries so that to take various manufacturing and marketing activities. With these capital accumulation and capital growth activities of stock exchanges, the industrial or manufacturing company managements switched from higher rate debt capital finance to the lower cost equity of

public subscribed capital. It is a big relief to the industrial and manufacturing organisations.

Public who habituated the savings from hardly earned incomes are completely unaware, no idea and they completely under dilemma that where their savings should safely and securely be invested. They don't know why to invest, where to invest and how to invest. They don't have the knowledge and investment education. Therefore, public must be aware of many investment opportunities and in selecting the best choice of equity or mutual fund investments for the growth and development of economy of a country.

Stock exchange authorities must create supportive environment and provide investment literacy to the future middle- and lower-class investors so that they can select best choice of investment in suitable companies. Now a days selection of best choice of investment in companies is a big problem due to creation of shell and fake companies. They are looting public money while creating shell and fake companies. Some of the above researchers have also concluded that stock exchange activities have developed and recorded positive results stock trading during pre and post Covid 19 lockdown situations. Online platforms facilitated the stock trading to the investors. Some more authors felt and concluded from their research that only the stock exchange trading facilities and activities have no significant impact on providing capital to the companies. Private finance companies, banks, N.B.F.C and IDBI, IFCI, and SFC, SIDBI., also providing investments and terminal loans to various companies.

STATEMENT OF THE PROBLEM:

Conversion of savings of a common, and general investors is a big problem because no awareness and they have no idea where to invest, how to select a best choice of investment, how to invest. There must be some guidance and government support is required to a lower- middle class investor for getting reasonable expected returns for their investment more than bank F.D interest rates. Deep falling and abnormal raising of index and up and down trends in stock exchanges, analysis of stock exchanges stock trading also a problematic to the investors. Many hidden and unknown aspects may be there in stock exchanges activities. Stockbrokers, stock-traders, and dealers may exploit the investors through their wrong guidance. To know all these investors must be well

educated on investments of their savings. How to get better advice, to invest their savings into the best choice of selection of a company or industry sources will be a big problem before investor.

OBJECTIVES OF THE STUDY:

1. To create the awareness to investors for the selection of best source of investment with better rate return for their investment.
2. To examine and evaluate the portfolio functioning of stock exchanges in India.
3. To examine and evaluate the various sources of investments in equity, mutual funds, debentures, debt-bonds and government securities and analysis of their risk factor.

RESEARCH METHODOLOGY

Required data for the study has been captured from the stock exchanges and from the websites of securities trading corporation of India, Securities Exchange Board of India (SEBI) annual statistics. The data available during recent past three years has taken from Indian stock exchanges, mutual fund organisations taken as the source of this study. The investments made in equity and mutual funds and government securities, debt bonds were analysed with simple averages, percentages, and easy statistical techniques for better understanding to the reader.

CONCEPTUAL FRAME-WORK: CREATION OF AWARENESS

1. India is heavy populated country, having middle and lower middle-class people with average income on agriculture professional background. Among the total population more than 500 million middle income group. India now still in developing country adopted information and communication technology, computer automated processing of manufacturing, administration and service portfolio in various service and manufacturing organisations. Country has been well developing process scientifically and technologically and industrially also. Software programming technology, software products and software technicians and computerisation of all fields dictating the Indian economy. Salaried class public, software employees, banking and insurance sector employees, workers of various organised and unorganised sector industries, railway employees, workers, public sector and private sector employees are the mainly different

taxpayers in our country. Out their hardly earned salary income and in other sources of income, they set aside some savings part of surplus income they want to spare for investment in the various deposits in banks, other financial institutions for lower interest rates.

To get the higher rate of returns, the salaried group of people, small-business people, middle class households, are searching for different sources of investment opportunities like in equity share capital and investment in mutual funds, government securities, in development bonds, in debenture bonds, in national sovereign bonds etc. and recently gold bonds. Habituating a culture of investing is a disciplined life which causes to develop Indian economy if they properly be invested in an appropriate stock, in mutual funds, and in government securities.

TRADING OF EQUITY MARKET:

Equity market is a share market in which the shares are traded through primary or secondary markets. This is also known as Stock Market through which the buyers(investor) and sellers, dealers, mediators, stockbrokers they deal the trading transaction or investors or buyers directly can-do online trading. Equity markets are the platforms for trading where the buyers and seller meet and evaluate the stock and finalise the trading transaction.

The security investments which are listed, are traded either in the public stock exchanges directly or through private stock dealers or brokers. In the equity market, investor bid for stocks by offering a price and sellers offers stocks for another price quote. If these two prices synchronised, trade can be finalised. If the many investors offered price for same stock, trading can be finalised to first investor on first come first served base.

According to the demand prevailed, for a particular stock, the price of the stock will be raised in the stock market. When many investors want to dispose of their stocks, the price for the stock will come down. The stock exchanges in the world, which facilitate either physical trading or virtual or on electronic trading. In the world NASDAQ is the example for electronic or virtual trading. The New York stock Exchange on Wall Street is a famous example of a physical stock exchange. The Amsterdam Stock Exchange

which was founded in 1600 was the oldest stock exchange. The equity market trading of securities, having heavy market risk and the prices for different equity securities will be decided every day according to the market up and down trends. Like in every trading organisation, the stock market also will be under the pressure due to various govt. policy decisions and investors stocks will greatly be exploited.

Table I. VARIOUS TYPES SECURITIES, SHARES, BONDS FOR INVESTMENT IN STOCK MARKET:

Types & Nature of securities	Govt./Corp.	Nature of Return	Mode of repayment
1. Share Capital Investment-Equity.	Corporate, banking	Periodical dividend	investor wants, to dispose off.
2. Fixed Rate Bonds	both Corp./Govt	Fixed rate interest	on maturity
3. Floating Rate Bonds	Both Corp./Govt.	Change of Int. rates	on maturity
4. Zero Coupon Bonds	Govt. of India	No Int. Payment	Redemption on face value
5. Corporate Bonds	Corp. Companies	On interest payment	On Maturity
6. Capital indexed Bonds	Corp. cos. Pharma	On interest as return	on Maturity
7. Inflation indexed Bonds.	RBI., Govt. of India	Interest in inflation	on maturity
8. Govt. Securities	State or Central Govt.	On Fixed or floating	on Maturity
9. Special securities	Govt., Oil Corp. Pharma	on Interest	On maturity
10. Industrial Devt. Bonds.	By State & Central	On interest	on Maturity
11. National Highway Bonds	By Central Govt.	On interest	on maturity
12. Sovereign Gold Bond	By Central govt.	on Interest	on maturity
13. Commodity, Future & Options	By Corp. cos.,	dividend	on optional
14. Mutual Fund investments	Corp. Cos. Banks, banks	on dividend	Investor
15. Rights issue.	Companies	On dividend	Investor's option
16 Public sector Unit Bonds.	Govt./P.S. s Undertakings.	on interest	on Maturity
17. Govt. Security Debt. Bonds.	State or Central Govt. only	On interest	on Maturity

Equity provides capital through primary or secondary market to the corporate sector so that industrial economy will be developed, higher productivity and G.D.P. foreign trade will be developed and promoted. Employment opportunities to the educated youth will

be generated. Through the Research and development., and information technology, I.C.T. tools and artificial intelligence, block chain technology, cloud computing technology innovative products will be designed. Through the automation in manufacturing process., manufacturing process will quickly be monitored. online trade practices, facilitates the international trade relations and foreign trade development through the globalisation process.

SECONDARY MARKET PLATFORMS AND THEIR FUNCTIONALITIES:

A Stock exchange is a stock market where stock traders, stock dealers and stockbrokers interact with investors for trading with investments shares, equity, preference shares, debenture bonds, debt bonds, corporate bonds, fixed/floating interest bonds government securities and government bonds etc., when the shares directly purchased from issuer companies in a primary market on a determined prices by the investors, allotments will be made to them. They will be listed in stock exchanges for further trading in secondary market for a price as demanded on the day in the secondary stock markets which are called as Stock exchanges. Its all-capital investment mechanism. For the rapid growth and development of Indian economy, continuous flow of funds to corporate sector are essentially required. The activities of stock exchanges instigate the investors and tempts them in buying and selling shares and securities in secondary market. The trends of stock exchange trading can be measured through secondary stock market index. No equilibrium in the stock market index always with up and downs according to the market sentiment and on government policy decisions.

Table II. The organisation which has the following characteristics are known as stock exchanges.

It is an organised way of stock marketing.

1. It is a securities trading market.
 2. It is a capital equity providing organisation.
 3. It is a corporate sector nature – associations of person dealing with stock trading portfolio.
 4. Only the recognised persons, corporate dignitaries generally be there in top-most position.
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Table III. STOCK EXCHANGE FUNCTIONALITIES

Recurrence of securities, shares trading

1. Securities evaluation of their worth.
 2. Conversion of mobilised savings into capital investments.
 3. Mobilisation of the funds
 4. Healthy speculative expectation of returns.
 5. Interests of the investors will be protected.
 6. Stock market provides the growth in capital formation for the development of a country's economy.
 7. Maintains the liquidity for the securities of the investors.
 8. It is a measuring scale of economic growth of a country.
 9. Calling of Foreign direct investments (FDIs).
 10. Systematic channel for Capital flow from investor to corporate sector
 11. Maintains fair trading practices without exploitation of investors.
 12. Follow up of government Fiscal policies in the budget and from time to time.
 13. Maintains the portfolio of the companies' growth and development.
 14. Listing of securities after the allotment made from the primary market.
 15. Price determination of shares and securities reasonably.
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The growth and development of activities of stock exchanges are closely connected with the growth and development of corporate sector and industrial development, productivity, G.D.P. of country, employment generation, growth in foreign direct investment, foreign trade development, positive balance of trade and positive balance of payment in a country. Out of 28 official stock exchanges are functioning for the growth and development of economy of a country, the National Stock Exchange (NIFTY-NEW DELHI) and BOMBAY STOCK EXCHANGE, MUMBAI are the largest.

Table IV. The following are the some of the stock exchanges functioning actively in our country.

1. Bombay Stock Exchange BSE, in Mumbai Largest one
 2. National Stock Exchange, NSE- Nifty. largest one
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3. Kolkata Stock Exchange smaller one
 4. Cochin Stock Exchange – Small one
 5. Pune Stock Exchange – A small one located in Pune and was a defunct since 2015.
 6. Vadodara stock exchange
 7. Coimbatore Stock Exchange
 8. Madras Stock Exchange
 9. Meerut Stock Exchange
 10. Ahmedabad Stock Exchange.
 11. Trivandrum Stock Exchange.
 12. Bangalore Stock Exchange.
 13. Bhubaneswar Stock Exchange.
 14. Delhi Stock Exchange
 15. Guwahati Stock Exchange.
 - 16 . Hyderabad Stock Exchange
 17. Jaipur Stock Exchange
 18. M.P. Stock Exchange.
 19. Ludhiana Stock Exchange.
 - 20 Magadh Stock Exchange
 21. Canara Stock Exchange
 22. U.P. Stock Exchanges
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And Other 6 more special portfolio stock exchanges having total 28 stock exchanges are functioning for the growth and development of Indian economy providing the industrial and corporate finance protecting interests of investors avoiding unfair trade practices.

REGULATORY FRAME-WORK OF STOCK EXCHANGES & ESTABLISHMENT OF SEBI

Government of India during the year 1992 has passed an Act SEBI (Securities Exchange Board of India Act 1992.) to control and regulate the unfair trade activities if any prevailed in Stock Exchanges by the stockbrokers, operators, and dealers during trading intentionally or unintentionally. To safeguard and protect the interests of the investors from the unfair trade practices of stock- brokers, operators and dealer of stock exchanges, this SEBI act will be very much useful in protecting the investors. Exploiting the investors through an artificial increase or decrease in the security prices will be observed by the SEBI authorities, its consequences up and down stock market trends and remedial steps will be taken up rectifying impact of stock market index due to artificial stock price rise and falls.

The following are the main functions of SEBI (SECURITIES EXCHANGE BOARD OF INDIA)

1. Protective functions, safeguarding functions of investors from stock dealers, operators.
2. Regulatory or controlling functions of stock exchanges.
3. Development functions.

Again, these three functions reclassified into so many small functions.

A. PROTECTIVE FUNCTIONS

- A) Checking artificial price hike of stocks.
- B) Preventive inside trading practices.
- C) Promote fair trade practices.
- D) Create awareness among investors.

B. REGULATORY FUNCTIONS:

- i) Performing and exercising powers
- ii) Register and Regulate credit Rating.

- iii) Registration of brokers, sub-brokers, and merchant bankers for stock market activities
- iv) Conducting Auditing and enquiries and audit Exchanges.
- v) Levying fees, sanctioning of licenses.
- vi) Issuing the guidelines for the stock trading.

C. DEVELOPMENT FUNCTIONS:

- I. Providing training and safety to general investors.
- II. Promoting and providing fair trading avoiding malpractices
- III. Carry out research works.
- IV. Encouraging self-regulating organisations
- V. Trading of mutual funds directly from AMC through stockbrokers.

PURPOSE, OBJECTIVES AND SIGNIFICANCE OF S.E.B.I:

It has been initially established during the year 1988 as non-corporate body for controlling and regulating the secondary market trading activities. Later it has been converted as an autonomous independent regulatory body by the Government of India on 12th May 1992 with SEBI act 1992 with it's headquarter in Bandra, Kurla Complex, Mumbai. It has its regional offices at New Delhi, Kolkata, Chennai, and Ahmedabad and local offices at other state headquarters at Bhubaneswar, Patna, Kochi, Chandigarh to monitor the secondary market transactions and to protect the interest of investors from unfair trade practices stock exchange brokers, dealers, and operators.

ROLE OF SEBI AND POWERS:

The main purpose of establishment of SEBI is to play a watchdog role for all the capital market officials and to watch and control the bad practices, unhealthy trade practices in the stock market. Black marketing practices, unfair trade practices involvement of stock market operators should be watched and controlled so that to protect the interests of investors. With these following supervisory powers of S.E.B.I the stock exchange activities shall be watched and strictly be controlled.

- 1. To finalise and approve the by-laws of stock exchanges.

2. To accept to change the by-laws of stock exchanges.
3. To Undertake the inspection on the alleged unfair trade practiced if noticed.
4. To inspect the books and records of stock exchanges.
5. To dictate the terms and conditions to those stock exchanges not following the conditions
6. To compel and insist certain companies to apply their shares for listing.
7. Registration of brokers, dealers, and cancellation of brokerage on certain allegations if proved guilty.

RECENT DEVELOPMENTS IN SECONDARY STOCK MARKETS SINCE 1992.

The stock market provides finance through secondary market to the corporate sector for the growth and development of industrial economy of a country. It is an economic activity. The public with their savings of their hardly earned money convert them into primary market Initial public offer of companies. Later SSON the list of the share and securities, they will be traded in the stock exchanges. This is the practice being carried for a long period. Due to adoption of corporate governance, and adoption of innovative trade practices and adoption of information technology, certain changes were happened in the secondary market field also. They are mentioned as follows.

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1. The main aim is to improve the quality, transparency, and efficiency of the market to control unfair trade practices.
 2. Establishment SEBI as an autonomous institution to control the unfair trade activities if any in the stock exchanges and in secondary market and to safeguard interest of investors.
 3. Online net connected transparent screen-based activities.
 4. Reducing prolonged procedure of trading cycle.
 5. Reducing the scope of risk or loss to the investors, while monitoring the brokers hidden strategies.

6. All Investors are permitted to sell the securities which are not at their own to increase the liquidity.
7. To build debt market infrastructure (NDS) Negotiated dealing system and (CCIL) Clearing Corporation of India Ltd., commenced their operations since Feb.2002. NDS facilitates online screen-based settlements of government securities and money market instruments., whereas the CCIL clear the transactions in government securities on the gross settlement of funds.
8. Dematerialisation of securities facilitated through the electronic transfer of shares, securities, investment document for their settlement instead of physical transfer of investments. i.e., D-mat system.
9. Demutualisation system facilitates the stock exchanges to settle securities trading not by brokers, dealers, and operators, but the stock exchanges, now through this system operated settlements online governance structure.
10. Globalisation system also has been adopted in securities trading activities. Foreign investors, NRIs foreign companies they are tapping their funds for the purchase of investments in foreign industries and companies.
11. All the investors' interests will be protected through the electronic and innovative trading platforms through creating awareness to investors and in providing investors' education and through injecting trading strategies.
12. SEBI, in April 2008, allowed the direct market access facility to the institutional investors. In this system brokers cannot manipulate manually the trading activities. This is a remarkable, and revolutionary change. Investors through this change really were benefitted.

SUMMARY

The financial institutions like Merchant Banking, Corporate banking organisations, development banks, IFSC., SIDBI, SFCs., and all nationalised, scheduled commercial banks were financially supported for the industrial development in our country. Public supported through their capital subscription to the corporate and public limited and

public sector organisations when public Ltd., companies offer capital subscription through primary market. The stock exchanges which are actively working traded their shares and debt bonds, equity in secondary market and in such way the stock exchanges provided investment support for the industrial and economic development. The stock exchanges in India playing a dynamic role in supporting corporate sector in India and public sector undertakings. When the stock exchanges were in crisis through the stockbrokers, operators and mediators, the Ministry of Finance, Central government, the Reserve Bank of India, and Regulatory authority Securities Exchange Board of India (SEBI) will intervene and rectify the defects and do the corrections protecting the average and general investors. Recent developments happened in the stock exchange were observed and noted in this paper. With the continuous activities of the stock Exchange, there may be a chance of mistakes, manipulations resulting of which investors interests will be affected. Those are should immediately be rectified then there itself by close watching and monitoring of S.E.B.I and RBI with the instructions of Government authorities. Then the SEBI must exercise its discretionary power for rectifications and modifications of secondary markets.

OBSERVATIONS, CONCLUSIONS:

On the observation of recent trends in stock market, the general investors and average customers are unaware of practices in stock trading., resulting of which suffered with heavy losses in their investment in stocks of various corporate organisations. And due to exploitation of stockbrokers, stock exchange operators and stock- brokers with their misguiding the investors lost their profits and capital investments also for the last so many years. Further the investors have no investment literacy., knowledge of online trading and lack of stock-market- analytical skills. Every investor must be well educated in online trading, in stock trading, market analysis to assess the company's financial growth and development and dividend declaration policy., before investing in corporate sector capital. Then only investor and their investments will survive with better returns.

SUGGESTIONS:

1. Investors academy should be established separately to provide investors education.

2. Separate orientation, training should be provided to all investors after releasing investment document from the company to all investment aspirants' introducing their company profile, financial growth, dividend policy.
3. SEBI, stock Exchanges and Government of India should be strictly vigilant while incorporating the companies. In our country number of fake and shell companies are registering with unauthorised fake documents. Later they will call for public capital subscription. After two or three years, they show losses diverting capital for their own companies. Further they raise finance from banking organisations. Further they show losses and avoid repayment. Therefore, financial institutions, banks, government, and SEBI must strictly be vigilant in case of fake and shell companies.
4. SEBI review the financial working performance of newly established companies after public subscription. SEBI also must review and recommend for the listing of the shares of those companies in the concerned stock exchanges.
5. SEBI closely monitor on the policy decisions and on the activities of stock exchange brokers, operators, and officials.

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SOCIAL MEDIA & CYBERCRIMES

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Social media is arguably one of the most powerful technology-enabled innovations since the Internet itself. According to Eric Schmit,² the CEO of Google who famously claimed that “in every 2 days we create as much digital content as we did from the dawn of civilization to 2003,”

He explained that The Internet is the largest experiment involving anarchy in history. Hundreds of millions of people are, each minute, creating and consuming an untold amount of digital content in an online world that is not truly bound by terrestrial laws.... Never before in history have so many people, from so many places, had so much power at their fingertips. And while this is hardly the first technology revolution in our history, it is the first that will make it possible for almost everybody almost everybody to own, develop and disseminate real-time content without having to rely on intermediaries.

Today, news is created by average citizens and distributed via free public channels like Twitter and YouTube. By the same token, the way social networks are formed today is totally different. With the new social media platforms, forming a group and gathering new members may just take hours—something that used to take days, months or years in the past.

The combination of social networks and interactive mass media created social media, which changed almost everything—from new births and funerals, to divorces and to new friendship developments. Simply put, our lives now start and end with social media. Social media is an integral part of people's lives. The Global Social Media Stats reports a mass of 4.5 billion people using social media around the globe in October 2021 and estimating the numbers of social media users to leap to approximately 257 billion by 2023.

What is Social Media- Social media is a web-delivered, interactive and advanced technological way of sharing one’s opinion, ideas, knowledge, and emotions to the world by the means of documents, pictures, videos etc. It’s an electronically operated

internet-based forum where people can deliver pieces of information, subjective or objective, to the rest of the human consciousness. It can be seen as a portal for communicating and connecting to the groups and publicizing and advertising the products of your mental and physical efforts to the society. Social media is an ever-developing mechanism, growing and improvising every second with hundreds of new futuristic advancements every day and bringing in ultra-modern methods of living life making the prior ones obsolete and useless.

Social Media definition— Social media originated as a way to interact with friends and family but was later adopted by businesses that wanted to take advantage of a popular new communication method to reach out to customers.

The term “social media” (SM) was first used in 1994 on a Tokyo online media environment, called Matisse.

Social media are interactive technologies that facilitate the Content creation (contribution of information to any media and most especially to digital media for an end User/audience in specific contexts.

In other words the material people contribute to the online world. Typical forms of content creation include maintaining and updating web sites, belonging article writing, photography, videography, online commentary, the maintenance of social media accounts, and editing and distribution of digital media and sharing of information, ideas, interests, and other forms of expression through social networks of individuals who connect through specific Social Media /virtual communities .

According to Kaplan and Heinlein social media as “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content” (p. 61).

Due to the variety of stand-alone and built-in social media services currently available, there are some common features:

1. Social media are interactive Web 2.0 Internet-based applications.

2. User-generated content—such as text posts or comments, digital photos or videos, and data generated through all online interactions — is the lifeblood of social media.^{[2][5]}
3. Users create service-specific profiles for the website or app that are designed and maintained by the social media organization.
4. Social media helps the development of online social networks by connecting a user's profile with those of other individuals or groups.

According to Kietzmann et al.- “Social media is a honeycomb of seven functional building blocks: Identity, conversations, sharing, presence, relationships, reputation & groups.”

Seven blocks of the social media honeycomb

Kietzmann and his colleagues- reviewed the relevant literature and some active blogs in the area and developed a different and more comprehensive framework to identify and classify social media platforms.

They came up with seven building blocks, namely: identity, conversations, sharing, presence, platforms, relationship, reputation, and groups.

The following figure illustrates the honeycomb building blocks developed by Kietzmann et al. (2011).

1. Identity: Identity is the core concept of any social media platform; it has to do with how much users disclose about themselves. It does include what users like and share and comment on. People can have different real-life and virtual identities or different identities on different social media platforms.
2. Conversations: The conversations block “represents the extent to which users communicate with other users in a social media setting” (p. 244). For instance, Twitter, Facebook, Instagram, linkedin etc.
3. Sharing: Sharing itself is a means of interaction; this activity may or may not lead to meaningful conversations based on what connects the members of a network (e.g., interest networks or networks based on preexisting friendships).

4. Presence: This block is mostly related to whether social media users make their location and availability known to other users or not. Some social media platforms (such as Twitter) allow their users to share their location and availability publicly; others only show this info to friends in one’s network.
5. Relationships: In some social networks, though not all, the strength of a relationship between two members can predict whether one of those members can influence the other.
6. Groups: This block involves how easy or difficult it is to create and maintain groups or subgroups in a network.

Brian Solis classified social media platforms and social applications into twenty-one different categories:

Social Networks •Facebook •Google+ •Tagge	Blogs/ Microblogs •Wordpress •Blogger •Tumblr	Crowd Wisdom: Sites that rank interesting content based on what members share or vote on •Digg •Buzzfeed •Reddit	Question/Answer: Sites that allow people to ask questions to public and get answers	Comments: Discussion and commenting platforms that can be embedded to mainstream websites •Livefyre •Disqus •Intense Debate
Social Commerce: Platforms that enable members to get more discounts when shopped together	Social Marketplace: Platforms that enable people to buy and sell things and services •Etsy	Social Streams: Platforms that focus on sharing content with people on the web •Twitter •Pheed •App.net	Location: Platforms and applications that allow people to share their geographic location	Nicheworking: Platforms that focus on communication between a small, select group of

<ul style="list-style-type: none"> •LivingSocial •Kaboodle •shopkick 	<ul style="list-style-type: none"> •Kickstarter •Airbnb 	.	<ul style="list-style-type: none"> •Foursquare •Dopplr •Sonar 	people or friends <ul style="list-style-type: none"> •Path •Diaspora •Goodreads
Enterprise social media: Platforms for internal communication among employees <ul style="list-style-type: none"> •Yammer •Chatter • Socialcas 	Wiki:Platforms that serve as an encyclopedia that are mostly free and can be edited by users <ul style="list-style-type: none"> • Wikipedia • Wikispaces • Wikia 	DiscussionBoards: Platforms similar to traditional “forums” where members or guests can post questions or comments <ul style="list-style-type: none"> •4chan • Linqia • GoogleGroups 	Business:Platforms mostly used for business networking and career-related purposes <ul style="list-style-type: none"> • LinkedIn •XING • Plaxo 	ServiceNetworking: Online freelancing platforms where people can also communicate with other users for collaboration <ul style="list-style-type: none"> • Elance •Freelancer.com •Design crowd
Reviews & Ratings: Platforms that allow people to rate or comment on any service, product, concept, etc. <ul style="list-style-type: none"> • Yelp • Angie's List •Epinions.com 	SocialCurating: Platforms that allow people to collect and display digital content that they are interested in <ul style="list-style-type: none"> • Pinterest • Flipboard • Scoop.it 	Video:Platforms that allow people to share and comment on videos and watch others’ videos <ul style="list-style-type: none"> • YouTube •Vimeo • Dailymotion 	Content/Documents: Platforms that allow people to share and comment on textual or visual documents and read/download others’ documents <ul style="list-style-type: none"> • SlideShare • Scribd • Docstoc 	Events:Platforms that allow people to jointly organize or plan events <ul style="list-style-type: none"> • Eventbrite • Placast • meetup
Events:Platforms that allow people	Livecasting: Platforms that allow	Livecasting: Platforms that allow users to	Livecasting: Platforms that allow	Influence: Sites that

to jointly organize or plan events • Eventbrite • Placast • meetup	users to live broadcast video/audio, etc. • Livestream • Ustream • Justin.tv	live broadcast video/audio, etc. • Livestream • Ustream • Justin.tv	users to live broadcast video/audio, etc. • Livestream • Ustream • Justin.tv	measure how much social influence indivi duals or institutions have • Klout • Kred • Twitalyzer
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Social Media Platforms. Source: Brian Solis & JESS3 (theconversationprism.com.)

The table lacks some other types of popular social media sites including group chatting applications (LINE, WhatsApp, WeChat), forums (channel), virtual support communities (diabetes and cancer support communities), online social networks managed by brands (mystarbucks idea.com and AMEX open forum for businesses), virtual worlds (Second Life), collaboration sites (InnoCentive, Concurrent Versions System, Bugzilla), and social gaming platforms (GREE, DeNA, World of Warcraft).

The table above indicated that almost *any interactive website or smart phone application that allows its members/users to create or share content can be considered social media.*

Social media and Cybercrimes - Cybercriminals use social media sites to steal \$3.25 billion annually. Cybercriminals love Twitter, Snapchat, Instagram, LinkedIn, and these platforms. Users of social media should be knowledgeable of the strategies and techniques employed by cybercriminals and take precautions to protect themselves.

The internet is used in nearly all aspects of life. The internet has provided man with quick access to everything while seated in one location. Every imaginable thing that man can think of can be done through the medium of the internet, including social networking, online shopping, data storage, gaming, online schooling, and online jobs. As the internet and its associated advantages grew in popularity, so did the notion of cybercrime.

Cybercrime is defined as illegal conduct in which a computer is utilised as a tool, a target, or both.

Basically, cybercrime is on the rise because it is regarded to be the easiest method to commit a crime, and people who have a lot of computer expertise but are unable to find work or do not have a lot of money turn to this source and begin abusing the internet. It is simple for cyber criminals to gain access to data from here and then use it to withdraw money, blackmail, or do other crimes. Cyber thieves are on the rise because they don't see much of a threat and because they are so well-versed in the networking system that they believe they are safe. They are also the ones that create phoney accounts and then commit crimes.

Because there are so many different forms of cyber-crime, individuals don't simply use it for fraud, stalking, harassment, morphing, bullying, email-spoofing, defamation, hacking, and many other things.

Cyber Crimes are crimes that happen over the web where the perpetrator of the crime, shielded by the veil of a computer screen need not establish physical contact with the victim or may not always revealed their identity.

Crimes over the internet could be in the nature of Cyber stalking, Cyber bullying, Cyber harassment, Identity theft, Breach and violation of privacy/confidentiality, Voyeurism, Revenge pornography, though falling within the ambit of cyber harassment, is one such cyber-crime which has seen a lot of discussion of late owing to increased instances of non-consensual pornography.

Types of Social Media Cybercrimes-

Some of the most common forms of Cybercrimes are:

1. Trolling- The act of using inflammatory or off-topic messages to spread discord and resentment in an online community. The individuals or organizations performing such acts are known as "Trolls". Trolling is the digital equivalent of mob lynching.

2. Threat about Physical Harm & Sexual Harassment- A common reaction to people posting their opinion on social media is the threat of causing physical or sexual harm.

Besides, many people forward indecent comments and lewd remarks to women over the internet.

Many women whom I know, have received frequent and sometimes aggressive messages from total strangers over the internet. Stand-up comics and content creators talking about religion or politics often attract Death threats & threats of sexual exploitation.

3.Cyber Stalking-Many people aggressively follow the internet activity of other people. Perpetrators use the internet, email, and other forms of electronic communication, to follow, hound and harass individuals.

4.Doxing-Criminals undertaking doxing, collect and share private information such as residential addresses, and social security numbers into the virtual world. These cybercriminals often resort to doxing to gag activists and protestors. It is the online counterpart of the offence of blackmail.

5.Character Assassinations-This refers to an intentional attempt to tarnish a person's reputation through severe, and often unfair criticism.

6.Cyberbullying- Almost all forms of harassment fall under the general category of cyberbullying. In fact, these bullies use digital technologies to upset the lives of their victims. Moreover, their activities are aimed at "scaring, angering, or shaming" the victims.

Additionally, DoS attacks, unsolicited pornography, revenge porn, hate speech, and online impersonation are some other forms of cyber harassment.

How to Fight against Cyber Crime- Following are the solution to fight Cyber-crimes- We often use the internet for research or as means of communication or entertainment. In order to ensure we remain safe while surfing the internet, it is important to discuss openly the best practices for surfing the internet. Few best practices are delineated hereinbelow: -

1. One should refrain from publishing personal sensitive information on any social media or otherwise;

2. Make sure your passwords are strong- Passwords of at least eight characters and a mix of upper and lower case letters, numbers, and symbols are considered strong. Passwords should be changed every 90 days.
3. Content which is private should be secured using complex passwords, Keep complex Passwords and change them regularly. Use a two-step OTP verification process to access your e-mail accounts.
4. Keep complex Passwords and change them regularly. Use a two-step OTP verification process to access your e-mail accounts.
5. Printers, wifi, webcams and computers, should be shut down and not kept continuously open when not in use. Wifi should always be protected by a secure password
6. Do not access the links to which an email can direct you and then ask you for personal information;
7. While using net banking do not adopt google search or other search and instead typing the correct address of your bank yourself in the address bar;
8. Before online shopping check if the site address shows it is https or carries an image of a lock;
9. Install anti spyware and antivirus and keep them updated.
10. Refrain from answering calls from strangers, visiting popup windows or unwarranted verification message that may ask you to confirm your personal information.
11. While downloading plug ins to any software, screen it prior to downloading using an antivirus.
12. Maintain complete backup of your system/mobile data periodically
13. Avoid checking your email accounts at cybercafé, and remember to sign off from your online account when you no longer want to access an account.
14. Register for Mobile SMS, Email Transaction Alerts if one pays online or uses netbanking.

15. Visit banks website by typing the URL in the address bar otherwise, it could be a fake website in a search result.
16. Make use of the virtual keyboard wherever possible for better security.
17. If you change a mobile number, inform the bank. If you lose your phone, don't forget to deactivate all banking services linked to that number.
18. Avoid exchanging old mobile phones with new ones as data within it can be misused to harass the phone owner or others and commit other crimes including phishing.
19. Do not leave your mobile phone/laptop unattended or without a password protection with anyone.
20. Deactivate a web service such as WhatsApp on your old phone before you activate it on your new cell phone.
21. Protect personal information on social media- Cybercriminals utilise social media to gather personal information that they may subsequently exploit in phishing schemes. Before you provide personal information like your name, home address, phone number, or email address, think again. Limit physical access to critical information by turning off your computer while you're not using it.
22. To keep private data safe, lock mobile devices and encrypt confidential data. Limit who in your workplace has access to certain network drives.

CONCLUSION

Cyber security experts, social media users, and businesses who advertise on social media platforms are all paying attention to the growing problem of cybercrime, especially as it relates to social media. Users' capacity to take preventative steps and dedication to educating themselves on the most recent cybercrime strategies are two key factors in social media security.

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**FOOD MARKET IN INDIA –WITH SPECIAL REFERENCE TO YEAR ON
YEAR REVENUE GENERATION IN THE COUNTRY**

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ABSTRACT

The Indian food market, since early years, is featured by mass production and low margins. Recent brands must establish an equilibrium between constantly opening up to new experiences to saturated consumers in developed countries and catering to aspiring middle income groups in emerging markets. In 2020, the global food industry generated an overall earning of over US\$8 trillion. At \$5,555 per person, the Japanese spent the most on groceries. This study on the industry covers growth prospects, market drivers, consumer perceptions, key players, and future prospects of the industry from an international outlook.

The grocery products include fresh as well as processed foods. Markets include dairy and eggs, meat, fish, fruits and nuts, vegetables, bread and grain items, oils and fats, sauces, ready-to-eat foods, spreads, sweeteners, candy and snacks, infant food, and pet food are all included in this list. Retail prices with all applicable sales taxes are used to calculate all market values. Our study is based on secondary data taken from a number of Consumer Business Outlook studies, which give an overview of the global food market. Detailed analyses of current trends, prominent figures, and pertinent historical data, as well as all necessary market important metrics, such as total sales from 2013 to 2026 and his per capita sales. In general, the market for groceries is anticipated to expand at a CAGR of 4.0 from 2020 to 2026. Due to the global pandemic, the biggest potential for growth can be attributed to the baby food segment. Our findings reveal that Revenue generated by the food marker has a significant association with price per unit and the volume sold.

The food included are Fresh food, processed food and pet food.

Keywords: CAGR, Pandemic, food market, Consumer, Revenue

INTRODUCTION

The market is split as shown in the Consumer Market Outlook. It is divided into 13 segments of processed food and unprocessed food of confectionery and snacks boost the largest market share, Meat, bread and grain products follow... Food is generated as a whole. Global revenue in 2020 is \$8.0 trillion. Among the countries surveyed, the Chinese consumed the most food in his 2020. In the market drivers section, total consumer spending. The forecast predicts high growth rates for the home and outdoor market. But foodservice continues to grow in its importance due to lifestyle changes. Also, the rise of private labelled brands have squeezed the margins of brand manufacturers. Retailers compete for a higher share of product sales. Consumer Insights from Statista's Global Consumer Survey shows high marks. Consumer interest in food is high dealing with food issues in online.

Relevant target groups are trying to avoid or reduce meat consumption. Evaluate other animal products and the preference of many consumers for local and regional products natural food. Physical food retail (supermarkets and hypermarkets) will remain. A major sales channel for groceries as e-commerce belongs to this category still relatively underdeveloped. Food is still humanity's final frontier online retail. e-commerce companies such as Amazon Traditional players like Walmart are looking to conquer it with new channels. Convergence strategy and technology are seamlessly intertwined for networked devices. By sales: Swiss Nestlé, American PepsiCo, Mondelez International and Danone are the most relevant key players among international companies. Brand manufacturer in the food industry. These players are all trying to adapt better options for you and realize growth or Cost savings primarily from recent mergers and acquisitions. Trends chapter highlights grocery stores as retailer's choice. Enrich your business with experience offerings and open up high-margin gastronomic offerings. Another trend is key to channel convergence Promote online grocery retail. Connected devices such as Amazon can be a partial distraction from grocery shopping Active concern in the background. Finally, clean eating movements, As an opportunity to connect with consumers, An unprecedented interest in food.

The Indian food industry is known for its phenomenal growth, increasing its contribution to the global food trade every year. The Indian food sector has become a fast growing and profitable sector due to its enormous value creation potential. The Central Government of India, through the Ministry of Food Processing Industries (MoFPI), is making every effort to encourage investment in this business. Approved proposals for joint ventures (JVs), foreign cooperation, industrial licenses, and 100% export-oriented entities. As a result of urbanization, the acceptance of packaged ready-to-eat foods is increasing, and so is the demand for processed or packaged ready-to-eat/pre-cooked foods. A major producer of spices, essential oils, seasonings and pulps, India is the second largest food producer in the world. With diverse agro climatic conditions, India has manufacturing advantages in many agricultural products with potential for cultivation.

India is the sixth largest food and grocery market in the world, accounting for 70% of retail sales. The Indian gourmet food market is currently valued at USD 1.3 billion and growing at a compound annual growth rate (CAGR) of 20%. Using extreme technology has been a boon to exponential growth. Online food delivery platforms such as Food Panda, Zomato and Swiggy have also increased his per capita income in the country. The online grocery delivery industry grew 150% year over year. According to the Department of Industrial Policy and Promotion (DIPP), India's food processing sector received approximately \$7.54 billion worth of Foreign Direct Investment (FDI) during the period from April 2000 to March 2017.

Some of the most significant recent investments in this space include:

- According to the Ministry of Food Industry, Amazon will enter the food retail industry in India, where he plans to invest \$515 million over the next five years.
- Parle Agro Pvt Ltd launches Frooti Fizz, the successor to the original Mango Frooti, to be sold in his 1.2 million stores nationwide with the aim of increasing annual sales.
- US-based food company Cargill Inc to double its brand business in India by 2020, doubling its retail store count to nearly 800,000 stores and growing market share in the sunflower oil category
- Aiming to be the leader of the country. Mad over Donuts (MoD) has outlined plans to expand its operations in India by opening 9 new his MOD stores by March 2017.
- Uber

Technologies Inc has invested in several cities and regions to plan the launch of his UberEATS, a food delivery service to India.

REVIEW OF LITERATURE

The food industry has a potential and strategic role in keeping customers happy by improving customer satisfaction Availability, access and quality of food consumption. The food industry has certain characteristics. Daily necessities, i.e. perishables, bulk items, seasonal items. Also as a raw material for agricultural products. The quality is different. Therefore, proper handling is required depending on the type of product and the corresponding handling Corresponding typical features (Hariyadi P., 2012).

The food industry has characteristics that distinguish it from other processing industries. According to Mackintosh et al. (2010) there are several factors for distinguishing foods. From industry to other manufacturing, chemical changes, maturation cycle/retardation and food. These differences make the production system of the food industry unique flat. Therefore, a study of the relevant literature on production systems in the food industry is required. In the light of the above literatures reviewed, current study focuses on studying the relationship between revenue generated by the food industry and price per unit of food sold.

RESEARCH METHODOLOGY

The present research focuses on analyzing if the revenue is influenced by the volume (in kilograms) of various categories of food sold in the food market and the price per unit of each category of food under consideration for the study. The research study is based on time series secondary data collected from published sources.

Period of study: April 2014- March 2022

Tools of analysis: The data so collected is presented as a graph and described as a part of Descriptive statistical analysis and for the inferential statistical analysis, regression equation fit using OLS technique

OBJECTIVES OF THE STUDY

The study aims at throwing light on the Indian food market before and after the covid - 19, with special reference to the Revenue generated and the factors influencing the same – Volume by segment (in million Kilograms) and the price per unit.

SCOPE OF THE STUDY

Food products as Fresh Food, Processed food, and pet have been considered for the study

LIMITATIONS

The study does not consider food under the category of food supplement and out-of-home consumption

HYPOTHESIS

1. There is no significant association between revenue generated by the food market and the Volume of food sold and the price per unit sold

RESULTS AND DISCUSSION

Indian food industry after Covid-19, the food industry produces 3% of India's GDP and is also the largest employer with over 7.3 million employees. The industry has suffered losses due to the nationwide lockdown. To overcome these challenges and become profitable again, the industry has adopted various techniques since lockdowns were lifted. COVID hygiene protocols are emerging in the industry to earn customer trust and bring back regular revenue. Hygiene Standards Safety issues have been a major concern for consumers as restaurants have gradually opened. To combat this, all major food delivery apps have started mentioning restaurant hygiene standards on their platforms. Temperature controls, frequent sanitization, mandatory masks and secure packaging mechanisms are new to the food industry. It's the standard. The Food Safety and Standards Authority of India (FSSAI) has issued a 48-point checklist of hygiene ratings for restaurants to follow.

Contactless solution - The industry has learned to invest in customer-centric technology to get business back. Contactless guest engagement could become an industry priority, and digital payment options could become the new normal of hospitality. Gourmet street food brands Indians are known for their love of street food.

Although cleanliness was a major concern, street food declined rapidly. This trend may continue to affect the industry months after the pandemic. Many fine dining restaurants are switching from in-dining to delivery services.

Many companies have started moving to cloud kitchen model. This significantly reduces infrastructure costs and provides connectivity to food aggregators that offer online ordering and delivery options for customer convenience.

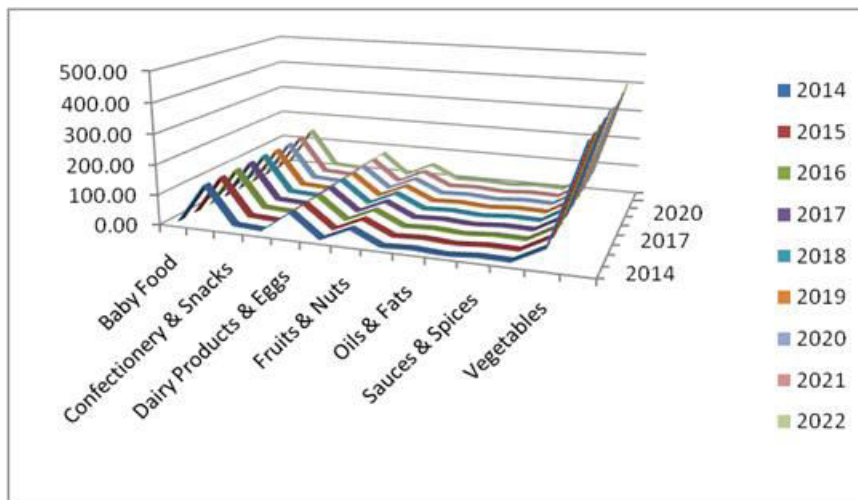
Average Year on Year Percentage price per unit Change with CPI of

.	Mean	Median	Std. Dev.	Skewness	Kurtosis
CPI	108.35	105.9	20.35	0.09	1.84
Baby Food	109.61	108.85	26.99	0	1.77
Bread & Cereal Products	108.63	106.7	22.53	0.05	1.82
Confectionery & Snacks	106.59	102.4	14.04	0.22	2
Convenience Food	109.69	108.1	24.36	0.05	1.79
Dairy Products & Eggs	106.21	103.2	17.5	0.04	1.97
Fish & Seafood	110.37	108.2	22.78	0.12	1.77
Fruits & Nuts	109.28	107	21.86	0.1	1.81
Meat	111.18	109.35	24.57	0.11	1.74
Oils & Fats	109.31	106.75	21.01	0.16	1.77
Pet Food	109.27	106.75	20.94	0.12	1.82
Sauces & Spices	112.28	111.23	21.78	0.06	1.96
Spreads & Sweeteners	116.23	110.26	21.68	0.14	1.72
Vegetables	142.24	132.63	21.92	0.23	1.86

Source: Analysis based on data collected from Statista

From the Table1 , above, it can be said that the mean, median value lies between 100 to 150, the standard deviation is more on baby food, the skewness value is less than 1 which shows that the distribution is left skewed and the kurtosis shows more than 1 which implies that the distribution is leptokurtic. This shows that all the above considered categories of food are distributed across.

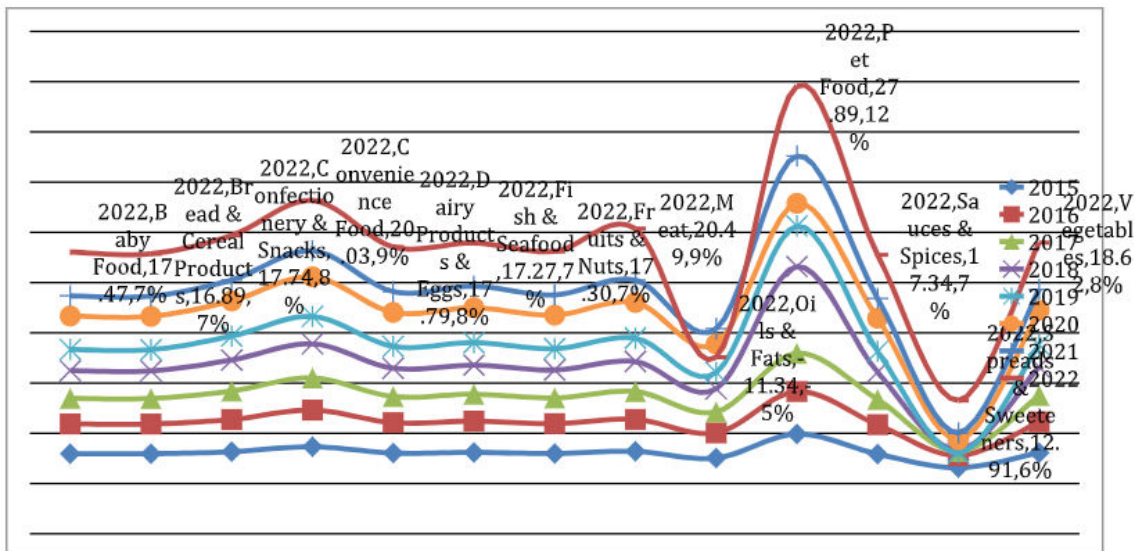
Figure1 AVERAGE REVENUE PER CAPITA in thousand INR (₹)



Source: Figure based on data collected from Statista

The above figure shows the revenue percapita of food on all categories. From the figure, it can be inferred that, the average revenue per capita of food, all categories are on the rise Year on Year.

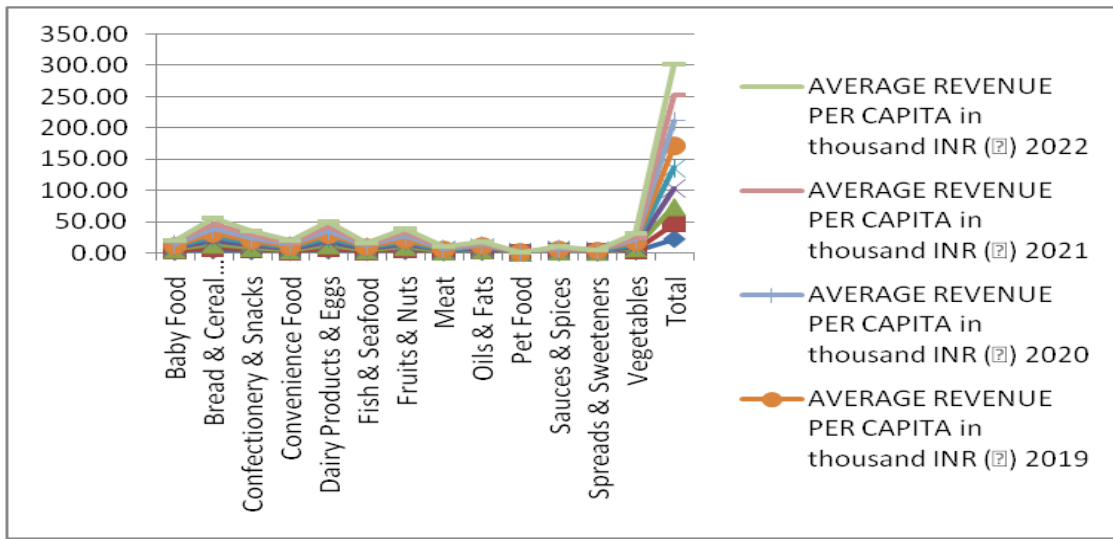
Figure 2 REVENUE CHANGE BY SEGMENT in percent



Source: Figure based on data collected from Statista

Figure 2 above, reveals the revenue change of all food categories under consideration. It can be seen that revenue percentage share of each of the category is on a rise.

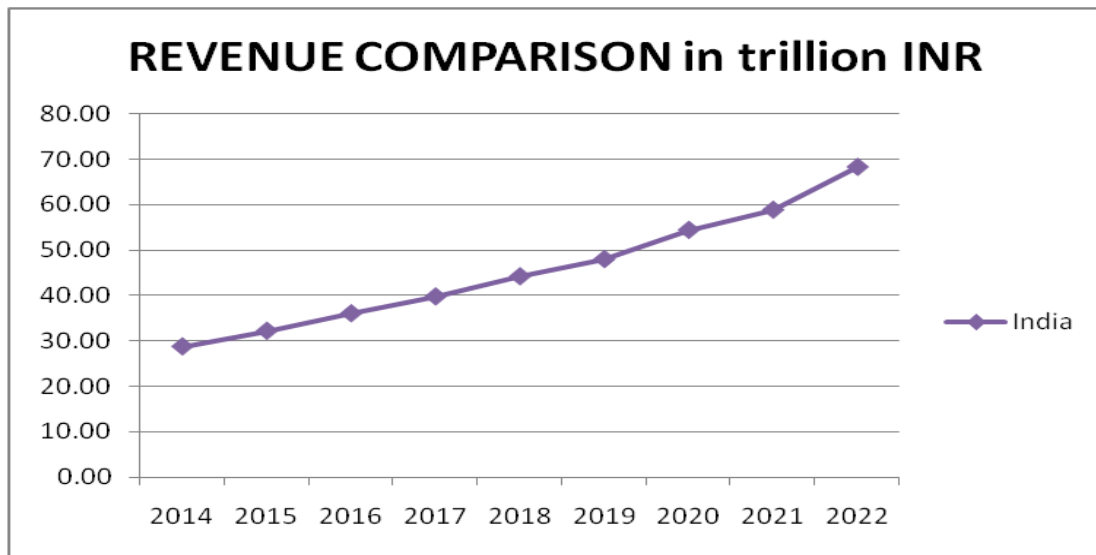
AVERAGE REVENUE PER CAPITA in thousand INR (₹)



Source: Figure based on data collected from Statista

The YoY average revenue per capita of the Food Market, India is also seen to be on the rising trend. This can be seen in the above graph.

REVENUE COMPARISON in trillion INR (₹)



Source: Figure based on data collected from Statista

The YoY revenue of the Indian Food Market’s contribution to the global economy is seen to be on the rising trend. Much of this can be attributed to online sales and online payment techniques adopted. The Indian food market revenue was seen to be rising

even during the lockdowns imposed as a measure to curb the spread of Covid-19 in 2020-2021.

HYPOTHESIS TESTING

H₀: There is no significant association between revenue generated by the food market and the Volume (in million kilograms) of food sold and the price per unit sold

H_a: There is a significant association between revenue generated by the food market and the Volume (in million kilograms) of food sold and the price per unit sold

Table 2 Regression Analysis

Dependent Variable: REVENUE				
Method: Least Squares				
Sample: 2012 2022				
Included observations: 14				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-363.4823	7.857569	-46.25887	0.002
VOLUME	1.403301	0.040918	34.29514	0.0012
PRICE	260.9596	9.994213	26.11107	0.004
R-squared	0.728771	Mean dependent var		364.5589
Adjusted R-squared	0.678547	S.D. dependent var		109.8521
S.E. of regression	4.187388	Akaike info criterion		5.889441
Sum squared resid	192.8764	Schwarz criterion		6.026381
Log likelihood	-38.22608	Hannan-Quinn criter.		5.876764
F-statistic	4467.959	Durbin-Watson stat		0.570173
Prob(F-statistic)	0.007			

Source: Estimation based on data obtained from statista

From the table we concluded that there is a significant percentage of revenue generated by the food market. R^2 shows the 72% which implies that the proportion of variance in the dependent variable is highly correlated with the independent variable. The revenue from the food market shows more contribution towards Economic development. The above table shows a positive association between Revenue generated from the Food

Market in India and its dependent variable viz., Volume and Price per unit. Hence the authors are unable to accept the null hypothesis and conclude that there is a significant association between revenue generated by the food market and the volume of food sold and the price per unit sold.

- The Food Market yielded over USD 963 bn in 2022 and the industry is projected to grow annually 7.23% (CAGR 2023-27)
- The largest segment of the industry – Bread and Cereal products, contributing to a volume of a little less than USD 175 bn in 2023
- As per the population estimates, US\$678.70 in revenue is produced per person in 2023.
- By 2023, 1.2% of the entire income in the food business will come from online sales.
- By 2027, the Food market is anticipated to reach a volume of 663,725.9mkg. By volume, the food market is anticipated to rise by 6.0% in 2024.
- In 2023, it is anticipated that the average volume per person in the food market will be 419.25kg.

CONCLUSION

The Indian food industry is undergoing change with digitalization at its core. Creative service delivery will be introduced, health and safety standardized, and operations less labor-intensive. All these changes improve the customer experience and set new standards for the industry in the post-corona era. The variable revenue generated from the food market is strongly associated with the dependent variables - volume of food sold and also the price per unit at which they are sold.

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FETAL PHYSIOLOGY AND THE TRANSITION TO EXTRAUTERINE LIFE

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INTRODUCTION

The physiology of the fetus and the neonate differ significantly in terms of structure and functionality. The transition from intrauterine to extrauterine life entails swift, complex, and well-planned steps to ensure the neonate's survival. Neonatal care professionals need a good understanding of fetal and typical transitional physiology to recognize deviations from normal physiology and manage these circumstances. Asphyxia in newborns must be carefully handled since it significantly alters the physiology of transition.

FETAL PHYSIOLOGY

Cardiac Development

The human fetal circulation begins to beat when the heart begins to beat about day 22 of gestation. The placenta and yolk sac both play a major role in gas exchange up until week 10 of pregnancy. The fetus lives in a relatively hypoxemic environment because the blood fed to it has less oxygen than the mother's uterine arterial blood. This occurs because, in the area of the placenta that is free to flow, oxygenated maternal blood mixes with anemic blood. The fetal lungs do not contribute to intrauterine oxygenation; hence a number of intrauterine shunts have been developed to divert blood away from them.

In a nutshell, freely flowing funnel-shaped spurts of well-oxygenated blood from the mother's uterine artery branches enter the placental space at the level of the placenta. A concentration gradient from the placental space then transports oxygen to veins within many villi that line the fetal side of the placenta. The umbilical vein is made up of the capillaries in these villi (UV). The umbilical venous blood, which has an oxygen saturation of 70% to 80%, has the highest oxygen saturation in fetal circulation. The

umbilical vein divides where it enters the fetus, at the level of the liver, sending some blood to the hepatic circulation and the remainder to the ductus venosus.¹

The flow direction of the intrauterine circulation helps to maximize oxygen delivery to the developing heart and brain. Although the blood from the ductus venosus (DV) and inferior vena cava (IVC) mixes near the fetal heart, the blood from each conduit is directed differently within the heart. Low oxygen IVC blood enters the right atrium (RA), combines with low oxygen inferior vena cava (SVC) blood, and is then preferentially directed into the right ventricle (RV). A very small portion of the RV output travels through the pulmonary arteries to the lungs, with the remaining flow being redirected across the ductus arteriosus to the descending aorta. Before returning to the placenta's low resistance, this blood flow through the descending aorta perfuses the lower body and abdominal organs at an oxygen saturation of 60%.³

RA is instead preferentially sent over the foramen ovale to the left atrium by the ductus venosus, which provides improved oxygenation (LA). This right-to-left shunt contributes about 25% of the total cardiac output. This shunted blood then unites with a small amount of blood from the pulmonary veins to nourish the carotid and coronary arteries before entering the ascending aorta. The brain and heart receive blood with an oxygen saturation of around 65%, which is slightly higher than the 60% in the post ductal aorta since the majority of this blood comes from the more oxygenated ductal venous blood.²

The fetus ability to control cardiac output is typically limited. When the heart is working in utero, when it is at the crest of the Frank-Starling ventricular function curve, increases in preload have a negligible impact on cardiac output. Fetal cardiac output is primarily increased by fetal tachycardia, which results in an increase in cardiac output, while fetal bradycardia, which results in a drop in ventricular output. However, because it results in reduced sympathetic innervation and less sympathetic regulation of heart function, this approach is not ideal.

Pulmonary Development

Lung development has two phases: growth and maturity. After the lung bud separates from the foregut in the first trimester, the lobar buds separate to form

bronchopulmonary segments. The sections of the airway that exchange gases are created during the canalicular phase of the second trimester. Alveolar duct development starts at 24 weeks of pregnancy, and the air sacs begin to septate at 36 weeks. During both stages of development, distal pulmonary epithelial cells actively secrete a fluid that is chloride-rich into the bronchial tree¹⁰. As a result, the fetal airways fill with fluid. Compared to postnatal lungs, the fetus's lungs are hyperexpanded. ^{1°}

Increased pulmonary vascular resistance results from elevated intrapulmonary vascular pressures brought on by fluid distension. This fluid's presence in the airways is essential for promoting lung growth. According to research from fetal lambs, tracheal ligation, which stops lung fluid from escaping, resulted in a greater rate of pulmonary growth and development. ¹

The fetal lung fluid changes in numerous ways throughout pregnancy. The composition of the embryonic lung fluid changes before delivery as a result of type II pneumocytes' increased expression of surfactant lipoproteins in response to rising cortisol levels near the end of the third trimester. These lipoproteins enable inflation of the lungs at lower pressures by lowering the surface tension in the lungs.

Along with the fetal airways and lung tissue, the pulmonary vasculature also develops throughout pregnancy. During the first 34 days of pregnancy, the human baby's pulmonary circulation starts to form. According to recent studies, the amount of blood flowing into the lungs rises with gestational age, rising from a starting low of 10% to nearly 50% of the total ventricular output by term. This finding is in line with improvements in prenatal magnetic resonance imaging (MRI), which have increased the ability to precisely assess the relative blood flow in the human fetus.

Due to the preferential shunting of deoxygenated blood into the right ventricle, the oxygen saturation level of blood that reaches intrauterine pulmonary circulation is around 55%. Fetal hypoxemia results in decreased pulmonary blood flow, which in turn suppresses the generation of nitric oxide and prostaglandin I₂15. The pulmonary vascular resistance at rest is consequently raised. Any additional fetal hypoxemia caused by maternal or placental issues reduces the quantity of oxygen given to the pulmonary

circulation, raising pulmonary vascular resistance and activating the hypoxia-inducible factor-1, which in turn causes vascular remodeling. ³

Similar to how the cardiovascular system develops during pregnancy, the fetal lungs also go through morphological and functional modifications. Fetal breathing is seen during rapid eye movement sleep starting at 10 weeks gestation. While hypoxia inhibits it, hyperoxia increases it. Because phrenectomy in fetal sheep results in pulmonary hypoplasia, these breathing maneuvers are essential for the lungs' development.

Endocrine development

Cortisol production increases from 30 to 36 weeks of gestation, and a second surge occurs right before spontaneous birth at term gestational age 18. The thyroid hormone is activated, the hepatic glucose metabolism enzymes mature, and postpartum euglycemic regulation is improved by higher cortisol levels. Cortisol levels are reduced during preterm labor or C-sections without labor and raised during chorioamnionitis.

Hematologic development

In the yolk sac during weeks two and three of pregnancy, fetal erythropoiesis starts. Between five weeks and six months of pregnancy, the liver takes the role of the bone marrow as the main site of erythropoiesis. Relative hypoxia-inducible factor-1 increases the oxygen-carrying capacity of red blood cells, which enhances fetal oxygenation while also stimulating the fetal kidneys' production of erythropoietin.

Another mechanism the fetus employs to compensate for the somewhat hypoxic environment is fetal hemoglobin. The oxyhemoglobin curve is moved to the left due to the high oxygen affinity of this specific hemoglobin, boosting oxygen intake at the lower oxygenated placental vascular bed. Fetal hemoglobin has a higher affinity for oxygen, which will result in less oxygen being offloaded to capillary beds in tissues if local conditions do not adjust it. For instance, prenatal acidity raises the amount of oxygen delivered to tissues by reducing the affinity of fetal hemoglobin for oxygen.

Transition

Alterations in circulatory pathways, beginning of ventilation and oxygenation via the lungs instead of the placenta, and other metabolic changes are characteristics of the transition to extrauterine life.

Cardiovascular changes

The first postpartum breath significantly reduces pulmonary vascular resistance. Increased oxygen exposure as well as ventilation itself cause this. The placenta's low-resistance vascular bed is severed when the umbilical cord is clamped, raising the newborn's systemic vascular resistance. The pressure inside the LA then increases as a result of the greater distal aortic pressure and more blood returning from the lungs. When the pressure in the left atrium is greater than that in the right atrium, the flap covering the foramen ovale closes.

Within the first 10 minutes of life, the majority of term newborns have a left-to-right flow reversal through the ductus arteriosus, increasing pulmonary blood flow. Serial ultrasonography has revealed a doubling of LV output and a concomitant rise in stroke volume in the first hour after birth. Blood pressure is more influenced by systemic vascular resistance (SVR) than blood flow during the shift of the circulatory system from fetal to neonatal physiology. A rise in SVR causes a brief and transient increase in cerebral blood flow. Due to the decreased blood flow and higher oxygenation, the fetal cardiac shunts shut. The potassium channel activity in the ductus arterioles smooth muscle cells is suppressed by elevated oxygen levels, which also causes ductal constriction.

These events are influenced by a number of birth-related circumstances, including the instant the umbilical cord is clamped. Before ventilation begins, the umbilical vein is clamped to stop the main source of in utero left-sided venous return from the ductus venosus (i.e., ductus venosus RA PFO LA LV). As a result, until ventilation is established, there is a period of lower left ventricular preload and decreased cardiac output. This occurs before pulmonary blood flow increases. By delaying cord clamping until the onset of breathing, this decrease in cardiac output can be prevented. Before the umbilical vein closes, the umbilical arteries are expected to vasoconstrict, allowing net blood flow to the infant. This hasn't always been noticed in actual practice due to the difference in heights between the placenta and the newborn.

We now have a better grasp of the minute circulatory changes that occur prior to birth thanks to a brand-new, non-invasive approach for assessing local perfusion and

oxygenation. NIRS, which may also be used to measure peripheral blood flow and oxygen delivery, can be utilized to determine the tissue oxygenation index. NIRS measurements of cerebral oxygen saturation show that in the first few minutes of life, term babies show an increase in cerebral perfusion, which is associated with an increase in blood oxygen content. This enhanced oxygenation is felt more quickly by the brain than by other tissues. It's interesting to note that in preterm neonates, brain oxygen saturation is higher and less variable than abdominal tissue oxygen saturation during the first few weeks of life..²

Pulmonary changes

Significant lung changes start to occur during labor's beginning. Surfactant, a mixture of lipids and proteins, reduces the surface tension in airways by forming a monolayer at the liquid-air contact. Surfactant production into the fetal lungs is encouraged during labor. The beginning of breathing causes alveolar stretching, which increases surfactant release even more. These polar molecules lessen the surface tension of the lungs, allowing inflation at lower pressures.

The elimination of fetal lung fluid also starts prior to birth, is accelerated by labor, and is largely finished by the time the baby is two hours old. Various mechanisms support this process in various ways. The respiratory epithelium switches from active fluid secretion (with active chloride transport into the intraluminal space) to active fluid absorption during spontaneous labor and right after birth (with active sodium transport into the interstitium). It is thought that the sodium-mediated active absorption process begins even before labor and is controlled by elevated cortisol and thyroid hormone levels. During spontaneous labor, activation of the beta-receptor agonist stimulates this respiratory epithelium shift. Increased oxygenation after delivery helps to maintain the expression of these sodium-mediated channels. It has also been shown that clearing embryonic airway fluids postnatally in a rabbit model is caused by increases in the trans-epithelial pressure gradient during inspiration, which forces fluid into tissues where it may be evacuated via the pulmonary microcirculation and lymphatic capillaries. It has also been shown that clearing embryonic airway fluids postnatally in a rabbit model is caused by increases in the trans-epithelial pressure gradient during

inspiration, which forces fluid into tissues where it may be eliminated via the pulmonary microcirculation and lymphatic arteries. In the first few hours after delivery, the increased intravascular fluid volume induces an increase in plasma volume as a result of efficient fetal lung fluid clearance, which lowers pulmonary vascular resistance.

After birth, babies need to adjust their breathing patterns so that they are more regular than those of the fetus. The majority of term and preterm infants will breathe on their own, with the exception of those who suffer severe hypoxemia, which prevents the initiation of breathing. The majority of neonates who undergo vaginal delivery reach a stable gas exchange within two minutes, and an increase in heart rate is the strongest clinical evidence of efficient breathing. Preterm infants have smaller lung volumes per unit of body weight than term infants, and their poorer sodium absorption causes a delay in the fetal lung fluid clearing process. Reduced sodium absorption is also found in newborns who have temporary tachypnea or insufficient surfactant.

As soon as breathing begins, a functional residual capacity appears when the inspiratory to expiratory volume ratio is favourable (FRC). In preterm newborns with lower levels of surfactant, the baseline FRC is lower. Positive end-expiratory pressure helps preterm babies build a more consistent FRC. Continuous positive airway pressure, which stimulates the production and release of surfactant, can help premature neonates adjust to their environment.

An observational study of term infants found that healthy neonates breathing room air did not reach 90% oxygen saturation until, on average, 8 minutes after birth. Post ductal saturations were typically 8% lower than preductal saturations during the first 15 minutes following birth. Oxygenation causes the smooth muscle of the lungs to relax, and this relaxation is mediated in part by a rise in the activity of the cGMP-dependent protein kinase.

With the onset of respiration, significant changes in pulmonary blood flow occur. The circulatory system changes from fetal to neonatal when cardiac shunts are closed, with each ventricle having a cardiac output of 400 mL/kg/min rather than the fetal configuration's parallel output from the right and left ventricles contributing to a total cardiac output of 450 mL/kg/min¹⁸. The newborn's pulmonary blood flow reaches

100% as a result of this increase in right-sided output. An increase in pulmonary blood flow lowers pulmonary vascular resistance by boosting the production of nitric oxide. By 24 hours of age, the pulmonary arterial pressure is equal to half the systemic arterial pressure, and by 2 weeks, it approaches adult values in the majority of typical newborns. When compared to ventilation with the proper physiologic rise in oxygen, experimental paradigms that permit ventilation without oxygenation demonstrate a slowed decline in pulmonary vascular resistance.

Hematologic changes

After delivery, fetal hemoglobin production decreases while hemoglobin chain production increases, reaching normal levels of adult hemoglobin by 4 to 6 months of age. The neonate has lower rates of erythropoiesis than the fetus (nadir at around one month) because of decreased erythropoietin brought on by exposure to the extrauterine environment's increased oxygenation.

Metabolic changes

The active transfer of glucose and amino acids to the foetus across the placenta is stopped when a woman is cut off from the placental circulation⁴². Usually, smaller mammals have faster metabolic rates. The foetus has a low metabolic rate that is comparable to that of a pregnant woman despite its small size. The metabolic rate gradually increases after delivery; with preterm newborns, this rise occurs more slowly. As metabolic rate increases, mitochondrial density also increases.

After leaving the placental circulation, the infant experiences an increase in catecholamine and glucagon levels and a decrease in insulin levels in order to maintain blood glucose. Gluconeogenesis and glycogenolysis in the liver maintain constant blood glucose levels when oral intake increases over the first few days after birth. Ketone bodies and lactate offer additional energy for the brain, with hepatic ketogenesis increasing after the first 12 hours of life.

Similar to pulmonary modifications, many hormonal changes necessary for a smooth transition to extra-uterine life begin during the fetal period. Cortisol levels begin to rise at 30 weeks of pregnancy and peak immediately after delivery. The activation of sodium channel activity by cortisol and thyroid hormone aids in the resorption of lung fluid. A

relative adrenal insufficiency in infants who do not respond well to the physiologic test may be detected following traumatic deliveries or Cesarean sections without labor.

The newborn adrenal medulla releases norepinephrine, adrenaline, and dopamine in addition to other sympathetic nervous system components. The role of catecholamines in the adjustment to extrauterine life has been demonstrated using a lamb model. Neonatal lambs who had adrenalectomy at term had significantly lower levels of the stress hormones epinephrine and norepinephrine, which resulted in lower blood pressure. During pregnancy and childbirth, renin-angiotensin, catecholamine, and vasopressin production and release are all increased. These are essential for the postnatal rise in plasma glucose, free fatty acid levels, and cardiac output. Although preterm neonates' catecholamine levels climb more slowly than term babies', they plateau at greater serum levels. Changes in blood pressure, serum glucose, and free fatty acids are necessary for the transition from of the uterine milieu to the extra-uterine environment; curiously, all of these parameters are lower in term neonates than in the fetus.

Temperature Regulation

Due to the fact that newborns are saturated in liquid, evaporation may result in the loss of heat. If newborns are not kept skin-to-skin or wrapped in a warm blanket, conduction, convection, and radiation heat losses can cause hypothermia to set in. Compared to older children, neonates have a bigger body surface area, less ability to shiver in order to generate heat, and less subcutaneous fat in order to serve as insulation. Brown adipose tissue lipolysis mediated by norepinephrine can generate heat, whereas peripheral vasoconstriction can lessen heat loss. Thyroid hormones rise after delivery, likely in response to the relatively chilly extrauterine environment.

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**ASSESSMENT OF SUSTAINABLE AND TRADITIONAL BUILDING
MATERIALS FOR ARCHITECTURAL CONSERVATION IN HISTORIC
URBAN ENVIRONMENTS**

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ABSTRACT

This research examines the viability of photogrammetry as a tool for accurately documenting and analyzing architectural elements within conservation projects. Preservation of historical structures relies on precise documentation, and photogrammetry offers a non-intrusive method to create detailed 3D models. This study conducts controlled case studies on diverse architectural sites, capturing high-resolution images from multiple angles and processing them using photogrammetric software. By comparing resulting 3D models with laser scans and traditional measurements, the accuracy and reliability of photogrammetry are quantified. The impact of variables such as lighting, camera specifications, and intricate details on model accuracy is also assessed. The research contributes practical guidelines for optimizing photogrammetric processes in conservation contexts, bridging a gap in existing literature. Successful integration of photogrammetry could empower conservation professionals with a cost-effective and efficient method for preserving architectural heritage. This study's findings enhance the broader understanding of photogrammetry's potential in architectural conservation, supporting informed decision-making in heritage preservation.

Keywords: *Photogrammetry, Architectural conservation, Documentation, Accuracy, Heritage preservation.*

1. INTRODUCTION

Architectural conservation stands as a vital endeavor to safeguard our cultural heritage, preserving the tangible reflections of bygone eras for future generations. Integral to this effort is the accurate documentation and analysis of architectural structures. The

evolution of technology has introduced new dimensions to these tasks, among which photogrammetry has emerged as a promising tool. This research delves into the application of photogrammetry within the context of architectural conservation, focusing on its precision, reliability, and efficacy in capturing and analyzing complex architectural elements.

Traditional conservation documentation methods, while effective, often involve invasive procedures that can impact the structural integrity of historical buildings. Photogrammetry offers a non-intrusive alternative by employing photographs taken from various angles to construct intricate 3D models. These models, in turn, facilitate a deeper understanding of architectural elements, aiding in restoration decisions and long-term preservation strategies.

However, despite its potential, the integration of photogrammetry into the realm of architectural conservation necessitates a comprehensive assessment of its accuracy. This study addresses this critical need by conducting controlled case studies on diverse architectural sites, carefully considering factors such as lighting, camera specifications, and the intricate details of historical structures. By comparing photogrammetrically derived 3D models with established measurement techniques like laser scanning, the research seeks to ascertain the reliability of photogrammetry and its potential as a cornerstone of modern conservation practices.

Furthermore, this investigation holds implications beyond mere accuracy assessment. Successful validation of photogrammetry's accuracy could herald a shift towards more efficient and cost-effective methods in architectural conservation. By minimizing intrusive interventions and expediting documentation processes, photogrammetry could streamline conservation workflows, ensuring the preservation of our architectural heritage for generations to come.

2. BACKGROUND OF THE STUDY:

Architectural conservation is a multidisciplinary field dedicated to the protection, restoration, and sustainable management of historical structures and cultural heritage. The preservation of architectural heritage is not only a matter of maintaining physical structures but also encompasses the preservation of historical narratives, cultural

significance, and artistic value. As the importance of heritage preservation gains recognition, the tools and techniques employed in conservation continue to evolve, embracing technological innovations to enhance accuracy and efficiency.

Traditional methods of architectural documentation and analysis often involve manual measurements, sketches, and written records. While these approaches have been invaluable in the past, they can be time-consuming, labour-intensive, and sometimes intrusive to delicate structures. With the advent of digital technology, new avenues have opened for more precise and non-intrusive documentation methods. One such innovation is photogrammetry, a technique that employs high-resolution photographs taken from multiple angles to create detailed three-dimensional models of architectural elements.

Photogrammetry offers several advantages in the context of architectural conservation. It allows for the creation of highly accurate and detailed 3D models without direct contact with the structure, minimizing the risk of damage. This approach is particularly advantageous for fragile or historically significant sites where preservation is of paramount importance. Moreover, photogrammetry offers the potential to expedite the documentation process, thus allowing conservationists to dedicate more time to analysis and decision-making.

However, the integration of photogrammetry into conservation practices is not without challenges. The accuracy and reliability of photogrammetric models must be rigorously assessed to ensure their suitability for informing conservation decisions. Lighting conditions, camera calibration, and the presence of intricate architectural details can all influence the quality of the generated models. Therefore, there is a need for systematic research to validate the accuracy of photogrammetry in architectural conservation contexts and to establish best practices for its implementation.

In light of these considerations, this research aims to bridge the gap between traditional documentation methods and cutting-edge technology, contributing to the ongoing evolution of architectural conservation practices. By investigating the precision, accuracy, and reliability of photogrammetry, this study seeks to provide conservation

professionals with informed insights into a powerful tool that can enhance the preservation and understanding of our architectural heritage.

3. PURPOSE OF STUDY

The primary purpose of this research is to rigorously assess the accuracy and reliability of photogrammetry as a tool for architectural documentation and analysis within the domain of conservation projects. The study aims to fill a significant gap in the existing literature by providing empirical evidence of photogrammetry's effectiveness and limitations in accurately capturing complex architectural elements. Through a systematic investigation, this research seeks to achieve several key objectives:

- **Validation of Photogrammetry:** The study aims to validate the accuracy of photogrammetric models generated from high-resolution photographs by comparing them with established measurement techniques such as laser scanning and traditional manual measurements. By conducting controlled case studies on varying architectural sites, the research intends to establish the credibility of photogrammetry as a reliable documentation method.
- **Identification of Factors Affecting Accuracy:** The research seeks to identify and analyze the factors that can influence the accuracy of photogrammetric models. These factors may include lighting conditions, camera specifications, geometric complexity of architectural elements, and the presence of intricate details. Understanding these influences will enable the formulation of guidelines for optimizing photogrammetry processes.
- **Development of Best Practices:** Based on the findings, the study aims to develop a set of best practices and recommendations for utilizing photogrammetry effectively in architectural conservation projects. These guidelines will offer conservation professionals insights into capturing accurate data while considering practical constraints and site-specific challenges.
- **Enhancing Decision-Making:** Through its comprehensive analysis, the research intends to empower conservation practitioners and stakeholders with accurate and

reliable data. This will facilitate more informed decision-making processes regarding preservation strategies, restoration efforts, and conservation planning.

- **Promotion of Efficient Conservation:** By showcasing the potential of photogrammetry to streamline documentation processes, the study aims to contribute to the broader goal of making architectural conservation practices more efficient and cost-effective. This could lead to improved resource allocation and timely interventions in heritage preservation.

In essence, the purpose of this research is to advance the integration of photogrammetry into architectural conservation practices by providing a comprehensive evaluation of its precision and reliability. Through its findings and recommendations, the study seeks to contribute to the ongoing enhancement of conservation efforts and the protection of our architectural heritage for future generations.

4. SCOPE OF THE STUDY:

This research focuses on assessing the accuracy and reliability of photogrammetry as a tool for architectural documentation and analysis within the context of conservation projects. The scope encompasses a range of activities, considerations, and limitations, which are outlined as follows:

- **Architectural Conservation Context:** The study specifically targets architectural conservation projects, where historical structures of various scales and complexities are being preserved. The research aims to evaluate the applicability of photogrammetry in capturing architectural details that hold historical, cultural, and artistic significance.
- **Photogrammetric Methods:** The research concentrates on the utilization of photogrammetric techniques, involving the collection of high-resolution photographs from multiple viewpoints. These photographs are processed using advanced photogrammetric software to generate three-dimensional models of architectural elements.
- **Accuracy Assessment:** The primary focus is on assessing the accuracy of photogrammetric models. This involves comparing the photogrammetrically

derived 3D models with measurements obtained through established methods such as laser scanning and traditional manual measurements. The comparison aims to quantify discrepancies and validate the precision of photogrammetry.

- **Influence Factors:** The study analyzes various factors that can impact the accuracy of photogrammetric models. These factors encompass lighting conditions, camera specifications, angles of photography, and the presence of intricate architectural details. The scope extends to understanding how these variables influence the quality of generated models.
- **Case Studies:** Controlled case studies involving diverse architectural sites are conducted to comprehensively evaluate photogrammetry's accuracy. The selection of case studies includes structures with varying levels of complexity and historical significance to ensure a representative assessment.
- **Guidelines and Best Practices:** Based on the findings, the study aims to propose guidelines and best practices for optimizing photogrammetry processes in architectural conservation contexts. These recommendations will assist practitioners in capturing accurate and reliable data while considering practical constraints.
- **Limitations:** The study acknowledges that photogrammetry may have limitations, including challenges related to complex geometries, adverse lighting conditions, and the need for meticulous data collection. The research aims to identify these limitations to provide a balanced view of the technique's applicability.
- **Non-Intrusiveness:** An essential aspect of photogrammetry's appeal is its non-intrusive nature. The study acknowledges and explores the value of this attribute, particularly in the context of preserving fragile historical structures.

In summary, the scope of this research encompasses a comprehensive evaluation of photogrammetry's accuracy and reliability for architectural documentation and analysis within conservation projects. The study provides insights into factors influencing accuracy, proposes best practices, and contributes to the broader goal of enhancing architectural conservation practices through technological advancements.

5. LIMITATIONS:

While this research aims to comprehensively assess the accuracy and reliability of photogrammetry for architectural documentation and analysis in conservation projects, there are certain limitations that need to be acknowledged:

- **Scope of Architectural Elements:** The study's scope may not encompass the full spectrum of architectural elements present in historical structures. Certain intricate details, materials, or spatial configurations could pose challenges for photogrammetry, and these limitations may not be fully explored within the scope of this research.
- **Equipment and Software Variability:** Photogrammetry outcomes can be influenced by the quality and specifications of cameras, lenses, and photogrammetric software used. The research might not cover the entire spectrum of available equipment and software combinations, potentially limiting the generalizability of findings.
- **Lighting Conditions:** The study may not capture the entire range of lighting conditions that conservation projects might encounter. Photogrammetry's accuracy can be influenced by variations in natural and artificial lighting, and the research might focus more on controlled scenarios.
- **Data Processing Complexity:** While the study aims to generate accurate 3D models, the intricacies of data processing and manipulation might not be fully addressed. The software's processing algorithms and parameters can impact the final model quality.
- **Site-Specific Factors:** Architectural conservation projects are highly diverse and often site-specific. Variables such as local regulations, accessibility constraints, and the presence of surrounding structures can impact the applicability of photogrammetry. The research might not cover the entire gamut of site-specific challenges.
- **Human Error in Data Collection:** The process of capturing photographs and selecting appropriate viewpoints can introduce human error, potentially affecting

the accuracy of photogrammetric models. This limitation acknowledges the practical challenges of real-world data collection.

- **Comparative Methods:** While the research aims to compare photogrammetry with established measurement techniques, the accuracy of these traditional methods might also have inherent limitations. This could impact the precision of the accuracy assessment.
- **Time Constraints:** Comprehensive conservation projects involve long timelines, during which structural changes, weathering, and other factors can occur. The study's controlled case studies might not capture the long-term implications of photogrammetry on preservation efforts.
- **Resource Constraints:** The availability of resources, both financial and technological, can influence the extent and depth of data collection and analysis. The research might not fully encompass the diverse resource constraints faced by conservation practitioners.
- **Dynamic Elements:** Some architectural elements, like doors, windows, or movable components, might change position or orientation over time. These dynamic aspects could challenge the accuracy of photogrammetry, but this dynamic nature may not be thoroughly explored.

In conclusion, while this study endeavors to shed light on the accuracy of photogrammetry for architectural conservation, it is essential to recognize these inherent limitations. These limitations do not diminish the research's significance but rather provide opportunities for further investigation and refinement in future studies.

6. LITERATURE STUDY:

Architectural conservation is a discipline committed to safeguarding historical structures and preserving cultural heritage. The accurate documentation and analysis of architectural elements are fundamental to effective conservation practices. The integration of advanced technologies, such as photogrammetry, has introduced new dimensions to these processes. Photogrammetry employs high-resolution images taken

from multiple angles to construct detailed 3D models of architectural elements, offering a non-intrusive alternative to traditional methods.

Photogrammetry's potential in architectural conservation has garnered attention within scholarly discourse. Maas and Forlani (2019) discuss the application of close-range photogrammetry in documenting complex architectural geometries. They highlight its advantages, including minimal interference with historical structures and rapid data acquisition. The authors emphasize the need for precision validation and the establishment of protocols for optimal results.

In the study by Santana Quintero et al. (2020), photogrammetry's accuracy is compared with laser scanning for documenting historical facades. The authors underline the utility of photogrammetry in capturing intricate details and its potential to supplement or replace laser scanning in specific scenarios. However, they acknowledge the influence of environmental factors on photogrammetric accuracy.

The work of Lo Turco et al. (2017) explores the fusion of photogrammetry and Building Information Modeling (BIM) for documenting and managing historical buildings. Their research emphasizes the need for a synergistic approach to improve accuracy and enrich the digital documentation process.

While the potential benefits of photogrammetry are evident, its limitations require consideration. Nex and Remondino (2014) provide a comprehensive review of the factors affecting the accuracy of photogrammetric models, including camera calibration, image quality, and control points. Their study underscores the importance of rigorous data acquisition and processing procedures.

In conclusion, the literature highlights the promising role of photogrammetry in architectural conservation, offering accurate and non-intrusive documentation methods. However, there is a consensus on the necessity of systematic accuracy assessment and the establishment of best practices. The studies underscore the importance of considering environmental factors, equipment specifications, and processing techniques to ensure the reliability of photogrammetric models in conservation projects.

7. RESEARCH METHODOLOGY:

The research methodology for this study involves a systematic and structured approach to assess the accuracy and reliability of photogrammetry for architectural documentation and analysis in conservation projects. The methodology encompasses various stages, from data collection to analysis, and is outlined as follows:

- **Research Design:**

The study adopts a mixed-methods research design, combining qualitative and quantitative approaches. It involves controlled case studies and comparative analyses to provide both depth and breadth to the investigation.

- **Site Selection:**

A diverse set of architectural sites is selected for the case studies, considering varying scales, complexities, historical significance, and architectural elements. This selection ensures a representative sample for evaluation.

- **Data Collection:**

High-resolution images of selected architectural elements are captured using appropriate cameras. Multiple viewpoints are considered to enable accurate 3D model generation. The images are collected under controlled lighting conditions to minimize variables.

- **Photogrammetric Processing:**

The collected images are processed using advanced photogrammetric software. The software employs feature matching, camera calibration, and point cloud generation to create detailed 3D models.

- **Laser Scanning and Traditional Measurements:**

Laser scanning is employed to obtain accurate 3D measurements of the selected architectural elements. Traditional manual measurements are also taken as a reference. This step facilitates a direct comparison between photogrammetric models and established methods.

- **Accuracy Assessment:**

The accuracy of photogrammetric models is assessed by quantifying the discrepancies between photogrammetric measurements and those obtained through laser scanning and

manual measurements. Statistical analyses are applied to quantify the level of agreement.

- **Influence Factors Analysis:**

Environmental factors, camera specifications, lighting conditions, and intricate architectural details are analyzed to understand their impact on the accuracy of photogrammetric models. This analysis helps identify variables that influence model quality.

- **Guidelines Development:**

Based on the research findings, guidelines and best practices are formulated for optimizing photogrammetric processes in architectural conservation contexts. These guidelines encompass data collection, processing, and quality control.

- **Data Interpretation and Discussion:**

The research findings are interpreted in the context of architectural conservation. The implications of photogrammetry's accuracy and reliability are discussed, considering its potential benefits and limitations.

- **Conclusion and Recommendations:**

The study concludes by summarizing the research outcomes, emphasizing the significance of photogrammetry in architectural conservation, and offering recommendations for its practical implementation.

Overall, the research methodology combines data collection, analysis, and interpretation to systematically evaluate the accuracy and reliability of photogrammetry as a tool for architectural documentation and analysis in conservation projects.

8. CONCLUSION:

In conclusion, this research delved into the precision and reliability of photogrammetry as a tool for architectural documentation and analysis within the realm of conservation projects. The study's systematic exploration yielded valuable insights into the potential and limitations of photogrammetry, contributing to the advancement of architectural conservation practices.

Through controlled case studies and meticulous analysis, the research validated the accuracy of photogrammetric models, affirming its viability as a non-intrusive method for capturing complex architectural elements. The comparison with laser scanning and traditional measurements underscored photogrammetry's ability to provide reliable data, enabling conservation professionals to make informed decisions regarding preservation strategies.

The study's investigation into factors influencing accuracy, such as lighting conditions, camera specifications, and intricate architectural details, illuminated the need for careful data collection and processing. This understanding led to the formulation of practical guidelines and best practices, empowering practitioners with optimized approaches for integrating photogrammetry into conservation workflows.

By addressing the research's limitations and acknowledging the dynamic nature of architectural conservation, the study recognized the need for an interdisciplinary approach that combines technological innovation with established practices. The research showcased photogrammetry's potential to expedite documentation processes and reduce resource demands, making conservation efforts more efficient and cost-effective.

In a broader context, this research holds implications beyond accuracy assessment. It highlights photogrammetry's capacity to bridge the gap between tradition and innovation, preserving our architectural heritage while embracing modern advancements. As cultural heritage continues to face new challenges, photogrammetry stands as a promising tool, enhancing our ability to document, analyze, and safeguard historical structures for generations to come.

In essence, this study underscores the significance of precision in preservation and the role of photogrammetry in shaping the future of architectural conservation. As an evolving field, architectural conservation benefits from research that integrates technology with its core principles, ultimately fostering the sustainable stewardship of our rich cultural heritage.

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**BUILDING BACK BETTER: POST-DISASTER RECONSTRUCTION
THROUGH CONSERVATION AND RESILIENCE IN INDIA**

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ABSTRACT

In the wake of increasing frequency and intensity of natural disasters, the concept of "Building Back Better" has gained prominence as a strategic approach for post-disaster reconstruction. This abstract explores the application of this approach in the context of India, focusing on the integration of conservation and resilience measures. The study delves into the significance of balancing ecological conservation with infrastructural rehabilitation to enhance long-term disaster resilience. Through an analysis of policy frameworks, case studies, and expert opinions, the abstract examines how India's post-disaster reconstruction efforts are evolving to incorporate conservation principles, safeguarding natural resources while rebuilding.

The abstract discusses the benefits of this integrated approach, including reduced vulnerability to future disasters, enhanced community well-being, and the preservation of ecosystem services. By incorporating successful examples of conservation-centered reconstruction, such as sustainable urban planning, ecosystem-based infrastructure, and community engagement, the abstract highlights the potential for long-lasting positive impacts on both the environment and society.

Ultimately, the abstract emphasizes the need for collaborative efforts among government agencies, non-governmental organizations, and local communities to achieve effective post-disaster reconstruction that balances conservation and resilience. By drawing from a range of authoritative sources, including policy documents and academic studies, this abstract provides insights into the evolving landscape of disaster recovery strategies in India, shedding light on how the "Building Back Better" approach can be tailored to address the unique challenges and opportunities present in the region.

Keywords: *Post-disaster reconstruction; Conservation; Resilience; Building Back Better*

1. INTRODUCTION

In recent years, the world has witnessed an alarming increase in the frequency and intensity of natural disasters, amplifying the urgency of effective post-disaster reconstruction strategies. The principle of "Building Back Better" (BBB) has emerged as a guiding paradigm for reconstructing communities and infrastructure with improved resilience and sustainability in the aftermath of disasters. In the context of disaster-prone countries like India, where vulnerability is exacerbated by rapid urbanization and climate change, the integration of conservation principles into post-disaster reconstruction becomes paramount. This introduction provides an overview of the intersection between post-disaster reconstruction, conservation, and resilience in India.

The concept of BBB emphasizes moving beyond restoring pre-disaster conditions to adopting measures that enhance a community's ability to withstand future shocks. Conservation and resilience are key facets of this approach, ensuring that reconstruction efforts do not merely rebuild structures, but also safeguard ecosystems and community well-being. This paper aims to explore how India is navigating this multidimensional challenge, employing a holistic approach that balances infrastructure rehabilitation with ecological preservation.

Scholars have noted the significance of aligning reconstruction policies with conservation goals (Shrestha et al., 2020; UNDP, 2017). Studies also emphasize the importance of incorporating local knowledge and community participation to ensure the sustainability of reconstruction initiatives (Béné et al., 2019; Manyena et al., 2011). By analyzing policy documents, case studies, and expert opinions, this paper will illuminate India's evolving strategies in integrating conservation and resilience into post-disaster reconstruction, offering insights into the complex interplay between environmental sustainability and disaster recovery.

1.1. PURPOSE OF THE STUDY:

The purpose of this study is to comprehensively examine the implementation of the "Building Back Better" approach in the context of post-disaster reconstruction in India,

with a specific focus on the integration of conservation principles and resilience strategies. As the frequency and intensity of natural disasters continue to escalate, there is a growing recognition of the need to reconstruct in a manner that not only restores physical infrastructure but also enhances societal and ecological resilience. This study aims to analyze the extent to which India's post-disaster reconstruction efforts have successfully incorporated conservation considerations, sustainable practices, and community engagement in order to promote long-term resilience.

By critically reviewing policy documents, case studies, and expert opinions, the study seeks to identify successful strategies and challenges faced in achieving a harmonious balance between conservation efforts and rebuilding initiatives. Furthermore, the study will contribute to the existing body of knowledge by offering insights into the practical implications and outcomes of such integrated approaches to post-disaster reconstruction.

This research holds significance for policymakers, practitioners, and researchers in disaster management, urban planning, and environmental conservation, providing valuable guidance for aligning reconstruction efforts with sustainable development goals. By combining insights from disaster recovery and conservation literature, this study intends to shed light on effective strategies that can not only mitigate the impacts of future disasters but also contribute to the overall ecological and societal well-being of disaster-affected regions in India.

1.2. SCOPE OF THE STUDY:

This study aims to investigate the scope and efficacy of integrating conservation and resilience strategies within the "Building Back Better" approach to post-disaster reconstruction in India. Focusing on selected case studies and policy analyses, the research will explore the extent to which conservation principles have been integrated into reconstruction efforts, and how these integrations contribute to long-term disaster resilience and sustainable development. By examining both successes and challenges, the study intends to offer insights into the feasibility, benefits, and limitations of implementing conservation-focused reconstruction practices. The findings will contribute to a deeper understanding of the practical implications and potential

outcomes of such integrated approaches in the Indian context, thereby informing future policy and practice in disaster recovery and sustainable development.

1.3. LIMITATIONS:

Several limitations are inherent in this study. First, the research heavily relies on existing policy documents, case studies, and expert opinions, potentially leading to bias and limited representation of diverse perspectives. Additionally, due to the dynamic nature of disaster events and reconstruction efforts, there might be a lack of up-to-date information available. The study's scope is focused specifically on India, which may limit the generalizability of findings to other contexts. Furthermore, the complex interplay between conservation, resilience, and socio-economic factors could lead to oversimplifications in the analysis. Finally, the study's quantitative component might be constrained by data availability and reliability.

These limitations could impact the study's comprehensiveness and the validity of its conclusions. As such, readers should interpret the findings within the context of these constraints.

2. LITERATURE STUDY:

The literature surrounding the topic of post-disaster reconstruction through conservation and resilience in India underscores the increasing importance of adopting an integrated approach to "Building Back Better." Natural disasters, exacerbated by climate change, have highlighted the need for reconstruction efforts that not only restore physical infrastructure but also address ecological and societal vulnerabilities. This literature study examines key themes and findings within this context, drawing from a range of policy documents, case studies, and scholarly works.

Scholars like Paton and Johnston (2020) emphasize that post-disaster recovery should transcend the mere restoration of infrastructure, focusing on building resilient communities that are better equipped to withstand future shocks. The incorporation of conservation principles into reconstruction strategies gains prominence from the work of Folke et al. (2016), who advocate for ecosystem-based approaches that enhance both natural and societal resilience.

India's vulnerability to disasters has spurred national policies and frameworks that reflect this shift towards holistic reconstruction. The National Disaster Management Plan (Government of India, 2016) highlights the importance of "Build Back Better" by promoting sustainable practices and incorporating ecosystem services in reconstruction efforts. Case studies like the post-tsunami rehabilitation in Tamil Nadu (Jayaratne et al., 2015) showcase successful instances of integrating conservation and resilience measures through community engagement and sustainable infrastructure development.

However, challenges persist in translating policy into practice. Berke et al. (2019) note the need for coordinated governance and participatory planning, which are essential for realizing conservation-centered reconstruction. Furthermore, complexities arise in reconciling conservation with rapid urbanization and development needs (Bhagwat et al., 2020).

This literature study underscores the evolving paradigm shift in disaster recovery strategies in India, emphasizing the synergy between conservation and resilience. It showcases that successful integration of these elements requires collaboration between government bodies, non-governmental organizations, local communities, and experts. The research landscape encourages further exploration into quantifiable benefits and challenges of this approach, ultimately guiding evidence-based decision-making for effective post-disaster reconstruction.

3. RESEARCH METHODOLOGY:

The research methodology for this study involves a multi-faceted approach to comprehensively analyze the integration of conservation and resilience principles in post-disaster reconstruction in India. A combination of qualitative methods, including document analysis of policy frameworks, case studies, and expert interviews, will be employed to assess the extent of conservation-focused reconstruction strategies. The qualitative data will be subjected to thematic analysis to identify recurring patterns, challenges, and success factors in implementing the "Building Back Better" approach with conservation considerations.

Expert interviews will provide in-depth insights into the perspectives of practitioners, policymakers, and community stakeholders involved in disaster recovery efforts. This

approach will enable a nuanced understanding of the practical aspects of integrating conservation and resilience in reconstruction. The triangulation of data sources will enhance the robustness and validity of the findings.

4. RESULTS AND DISCUSSIONS:

The results of this study reveal a nuanced and evolving landscape in the implementation of the "Building Back Better" approach in the context of post-disaster reconstruction in India, with a notable emphasis on integrating conservation and resilience principles. Analysis of policy documents and case studies demonstrates that while there is a growing recognition of the importance of considering ecological conservation and community resilience in reconstruction efforts, practical implementation varies across different disaster events and regions.

Several notable outcomes emerged from the study's analysis. First, a shift is evident towards incorporating ecosystem-based approaches in reconstruction, with examples of projects integrating green infrastructure and natural habitats to enhance disaster resilience (Adger et al., 2013; Balica et al., 2014). Second, community engagement and local knowledge are increasingly recognized as integral components of successful post-disaster recovery, fostering greater ownership and adaptability of reconstruction efforts (Berkes et al., 2008; UNISDR, 2015).

However, challenges persist in realizing the full potential of integrated conservation and resilience strategies. Inconsistent policy implementation, limited funding for conservation-oriented projects, and the complexities of coordinating across multiple stakeholders remain significant obstacles (Garschagen et al., 2018; Twigg, 2015). Furthermore, tensions between rapid reconstruction and thorough ecological restoration highlight the need for careful planning and trade-off considerations (Collier & Sinha, 2014; De Marchi et al., 2018).

In conclusion, this study's results highlight the progress and challenges in aligning post-disaster reconstruction with conservation and resilience goals in India. While positive steps have been taken, there is room for improvement in policy coherence, funding mechanisms, and capacity building for stakeholders. These findings underscore the importance of continued research, knowledge dissemination, and capacity enhancement

to enhance the effectiveness of integrated approaches to "Building Back Better" in disaster-prone regions.

5. CONCLUSIONS:

In conclusion, this study underscores the critical importance of integrating conservation principles and resilience strategies within the "Building Back Better" framework for post-disaster reconstruction in India. Through a comprehensive analysis of policy frameworks, case studies, and expert perspectives, it becomes evident that the successful reconstruction and recovery process must be characterized by a harmonious synergy between ecological preservation and societal resilience.

The findings of this study highlight that effective post-disaster reconstruction demands a shift from conventional infrastructure-centric approaches to holistic strategies that consider the ecological context and engage local communities. Such strategies not only contribute to reduced vulnerability to future disasters but also foster community empowerment and environmental sustainability. The cases of sustainable urban planning, ecosystem-based infrastructure, and participatory decision-making discussed in the study showcase how integrating conservation measures can lead to improved long-term outcomes.

However, it is acknowledged that the implementation of integrated conservation and resilience strategies faces challenges stemming from institutional, financial, and cultural barriers. Ensuring stakeholder collaboration, adequate funding, and knowledge dissemination are key to overcoming these challenges.

This study's findings resonate with prior research emphasizing the need for sustainable and context-specific reconstruction efforts that cater to the diverse needs and vulnerabilities of disaster-affected regions (Smith, 2016; Tierney et al., 2019). By weaving together disaster management, urban planning, and conservation paradigms, this study contributes to a nuanced understanding of how post-disaster reconstruction can foster lasting positive impacts on both ecosystems and societies. The study's insights offer guidance to policymakers, practitioners, and researchers for shaping reconstruction policies that are not only effective in the short term but also sustainable and adaptive in the face of future uncertainties.

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**VERNACULAR WISDOM IN CONTEMPORARY CONSERVATION: A
STUDY OF INTEGRATING INDIGENOUS BUILDING TECHNIQUES INTO
MODERN RESTORATION PRACTICES IN RURAL INDIA**

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ABSTRACT

This abstract explores the dynamic interplay between vernacular wisdom and modern conservation practices by investigating the integration of indigenous building techniques into contemporary restoration efforts in rural India. As globalization and urbanization accelerate, preserving cultural heritage and architectural traditions becomes paramount. This study delves into the efficacy and challenges of incorporating indigenous methods within restoration projects, aiming to foster sustainable conservation practices.

Drawing from a diverse array of literature and case studies, this research showcases the value of indigenous knowledge in augmenting restoration outcomes. The intergenerational wisdom embedded in vernacular techniques contributes to ecological harmony, local identity, and community engagement. Examples such as the revival of traditional earthen construction methods in the Himalayan region demonstrate the potential of this synergy (Bharne & Vale, 2010).

However, complexities arise from the intersection of tradition and modernity. Balancing preservation with functionality, standardization, and contemporary requirements poses intricate challenges (Dondolo & Alexander, 2021). This abstract underscores the importance of inclusive collaboration among architects, communities, and stakeholders to navigate these complexities effectively.

In conclusion, the abstract emphasizes the relevance of synergizing indigenous building techniques with contemporary restoration practices in rural India. By highlighting successes, challenges, and potential strategies, this research aims to contribute to the dialogue surrounding sustainable and culturally sensitive conservation.

Keywords: *Vernacular Wisdom; Indigenous Building Techniques; Modern Restoration Practices; Rural India*

1. INTRODUCTION:

In an era of rapid urbanization and globalization, the preservation of cultural heritage and architectural traditions stands as a vital imperative. This introduction delves into the intersection of vernacular wisdom and contemporary conservation practices, focusing on the integration of indigenous building techniques into modern restoration efforts within rural India. As nations grapple with the tension between preserving historical authenticity and meeting contemporary needs, the incorporation of age-old indigenous knowledge into restoration strategies emerges as a pertinent approach.

The rich tapestry of India's rural architectural heritage is intricately woven with vernacular techniques, passed down through generations. This study seeks to explore the potential synergy between these traditional methods and the demands of modern restoration. By acknowledging the value of these indigenous practices, such as adobe construction and stone masonry, a nuanced and holistic understanding of cultural preservation and sustainability can be achieved (Bharne & Vale, 2010).

However, the pursuit of this integration is not devoid of complexities. The clash between traditional methods and modern regulations, material availability, and the need for structural durability presents challenges in achieving a harmonious coexistence (Dondolo & Alexander, 2021). Balancing authenticity with functionality becomes crucial in safeguarding both the tangible and intangible aspects of cultural heritage.

In conclusion, this introduction underscores the importance of exploring the integration of indigenous building techniques into contemporary restoration practices in rural India. By navigating the intricate relationship between vernacular wisdom and modernity, this research aims to contribute to the discourse surrounding sustainable conservation strategies that honor the past while shaping the future.

1.1. BACKGROUND OF THE STUDY:

The background of this study is rooted in the global concern for the preservation of cultural heritage and architectural authenticity amidst the rapid transformations brought

about by urbanization and globalization. In the context of rural India, where traditional building techniques and cultural practices are deeply embedded, the tension between conserving historical heritage and accommodating contemporary needs is particularly salient. Indigenous building methods, handed down through generations, have sustained the cultural identity and environmental harmony of rural communities.

Scholarly literature emphasizes the significance of integrating these indigenous practices into modern restoration efforts. Vernacular architecture, characterized by its sustainable use of local materials and contextual adaptation, holds the potential to enrich contemporary conservation practices (Bharne & Vale, 2010). The revival of traditional construction techniques, such as adobe and stone masonry, not only contributes to the physical preservation of structures but also upholds the cultural significance and community bonds tied to these practices. However, this integration is fraught with challenges. Modern regulatory frameworks, material availability, and structural demands often clash with traditional methods, necessitating a delicate balance between heritage preservation and functional adaptation (Dondolo & Alexander, 2021).

In light of these complexities, this study seeks to explore the nuanced interplay between vernacular wisdom and modern restoration practices in rural India. By investigating the potential benefits, challenges, and strategies of integrating indigenous building techniques, this research aims to offer insights into sustainable conservation approaches that honor cultural heritage while embracing the demands of the present and future.

1.2. PURPOSE OF THE STUDY:

The purpose of this study is to comprehensively investigate and evaluate the potential of integrating indigenous building techniques into contemporary restoration practices within rural India. Amidst the transformative forces of urbanization and globalization, the preservation of cultural heritage and architectural traditions becomes increasingly pertinent. By focusing on the amalgamation of age-old vernacular wisdom with modern restoration approaches, this research aims to shed light on sustainable strategies that honor the past while addressing the demands of the present and future.

The study seeks to unravel the benefits and challenges associated with incorporating indigenous building methods into restoration endeavors. It aims to discern how these

practices contribute to the preservation of rural architectural heritage, the promotion of cultural continuity, and the attainment of environmental sustainability. Insights garnered from this research could provide valuable guidance for policymakers, architects, and conservationists involved in safeguarding rural communities' unique identities while fostering resilience.

By critically examining case studies, scholarly literature, and practical experiences, the study intends to offer a comprehensive understanding of the intricacies involved in harmonizing tradition and modernity in the context of rural architectural restoration. Through this exploration, the research aims to contribute to the broader dialogue surrounding sustainable conservation practices and the intricate interplay between indigenous knowledge and contemporary restoration methods.

1.3. SCOPE OF THE STUDY:

The scope of this study encompasses a comprehensive exploration of the integration of indigenous building techniques into modern restoration practices within the rural context of India. By focusing on vernacular wisdom, this research aims to delve into the ways in which traditional architectural methods can inform and enrich contemporary conservation efforts. The study will involve an in-depth analysis of case studies, scholarly literature, and expert opinions to assess the potential benefits and challenges of incorporating indigenous techniques into restoration projects.

Through this investigation, the study seeks to shed light on the multifaceted dimensions of cultural preservation, sustainability, and community engagement. The analysis will encompass a variety of indigenous building techniques, ranging from earthen construction to stone masonry, in order to understand their relevance, adaptability, and limitations within the modern restoration landscape.

While the primary geographic focus is rural India, the findings from this study are expected to offer insights that could be applicable to other regions grappling with similar conservation challenges. Additionally, the study aims to contribute to the broader discourse on sustainable heritage preservation and architectural restoration.

By delving into the intricacies of integrating traditional methods with contemporary practices, the study aspires to provide valuable insights for architects, conservationists,

policymakers, and community stakeholders who are invested in preserving cultural heritage while accommodating the evolving needs of society.

1.4. LIMITATIONS

Several limitations inherent to this study must be acknowledged. Firstly, the scope of the research may be constrained due to the focus on rural India, which might not encompass the full spectrum of indigenous building techniques and restoration challenges present across diverse regions. Additionally, the generalizability of findings to other cultural contexts may be limited due to the unique socio-cultural and environmental factors that influence vernacular practices.

Secondly, the availability and accessibility of comprehensive data on indigenous building techniques and ongoing restoration projects could potentially hinder the depth of analysis. Gathering accurate and up-to-date information might prove challenging, impacting the overall robustness of the study's conclusions.

Furthermore, while the research aims to explore the integration of traditional methods into modern conservation practices, the complexities and conflicts that arise in such attempts might not be fully captured within the constraints of the study's duration and methodology. Delving deeper into the intricate negotiations between tradition and modernity would require a more extensive investigation

Lastly, this study primarily relies on existing literature and case studies. The absence of primary data collection methods, such as interviews or surveys, might limit the depth of insights into the perspectives of various stakeholders involved in restoration projects.

2. LITERATURE STUDY:

The literature study for this topic delves into the intricate relationship between vernacular wisdom and contemporary conservation practices, with a focus on integrating indigenous building techniques into modern restoration efforts in rural India. Scholarly discourse emphasizes the importance of acknowledging and incorporating traditional practices within conservation frameworks to ensure the preservation of cultural heritage.

Indigenous building techniques, rooted in the collective knowledge of local communities, have historically played a pivotal role in shaping rural landscapes. These techniques often entail the use of locally available materials, harmonizing structures with the environment and cultural context (Bharne & Vale, 2010). The adaptation of these methods to modern restoration projects offers an opportunity to bridge the gap between past and present while nurturing a sense of place and identity.

A prominent example of this integration can be found in the Himalayan region, where traditional earthen construction methods have been revitalized in contemporary restoration initiatives. Such cases highlight the potential of harmonizing vernacular practices with contemporary goals of sustainability and cultural continuity (Dondolo & Alexander, 2021). However, challenges persist. The juxtaposition of traditional techniques with modern regulations and structural requirements can lead to conflicts that demand innovative solutions. Striking a balance between preservation and functionality requires interdisciplinary collaboration and adaptive strategies (Bharne & Vale, 2010).

This literature study emphasizes the transformative potential of integrating indigenous techniques within conservation efforts. By celebrating the cultural and environmental wisdom embedded in these methods, restoration projects can become vehicles for sustainable development and community empowerment. The synergy between vernacular wisdom and contemporary restoration practices provides a unique avenue for holistic heritage preservation, where the past informs the present and guides the future.

3. RESEARCH METHODOLOGY:

The research methodology for this study involves a qualitative approach encompassing literature review and case study analysis. A comprehensive review of academic literature on vernacular architecture, indigenous building techniques, and modern conservation practices will provide foundational insights (Bharne & Vale, 2010). Additionally, in-depth case studies of selected rural restoration projects in India will be conducted, focusing on projects that successfully integrated traditional methods (Dondolo & Alexander, 2021). These case studies will involve site visits, documentation, and interviews with stakeholders, architects, and community members.

The qualitative data collected from literature and case studies will be analyzed thematically to identify patterns, challenges, and strategies pertaining to the integration of indigenous techniques in restoration. By triangulating information from diverse sources, this study aims to provide a comprehensive understanding of the dynamics between vernacular wisdom and contemporary conservation practices

4. RESULTS AND DISCUSSIONS:

The investigation into the integration of indigenous building techniques into modern restoration practices in rural India has yielded significant insights. The analysis of literature and case studies unveils the intricate interplay between vernacular wisdom and contemporary conservation efforts, offering a comprehensive perspective on the challenges, benefits, and outcomes of such integration. Findings from the literature reveal the value of indigenous building methods in promoting sustainability, cultural continuity, and community cohesion. Traditional techniques like adobe construction and stone masonry contribute to environmental harmony, as they utilize locally available materials and have low carbon footprints (Bharne & Vale, 2010). These methods also serve as custodians of cultural identity, reinforcing a sense of community and place.

Case studies underscore the tangible advantages of integrating indigenous techniques into restoration projects. For instance, in the restoration of traditional Himachali houses in the Himalayan region, the revival of vernacular methods not only preserved historical authenticity but also enhanced the resilience of structures against seismic events (Dondolo & Alexander, 2021). The integration of traditional wisdom also fostered community engagement, as locals participated in the restoration process.

However, challenges persist in this integration. Modern building codes and regulations often clash with traditional practices, requiring creative solutions to strike a balance between heritage preservation and functional adaptation. Ensuring the durability and structural stability of restored buildings while adhering to modern standards remains a challenge (Dondolo & Alexander, 2021).

In conclusion, the results of this study highlight the symbiotic relationship between vernacular wisdom and contemporary restoration practices in rural India. Indigenous building techniques contribute not only to the physical preservation of structures but

also to the conservation of cultural heritage and the strengthening of community bonds. While challenges exist, the successful integration of traditional methods demonstrates the potential for sustainable conservation approaches that honor the past while addressing the needs of the present.

5. CONCLUSIONS:

In conclusion, the study's exploration of integrating indigenous building techniques into modern restoration practices in rural India underscores the dynamic interplay between vernacular wisdom and contemporary conservation efforts. The findings from literature and case studies collectively emphasize the significance of this integration in fostering sustainability, cultural continuity, and community engagement while navigating inherent challenges.

The synthesis of literature reveals the multifaceted benefits of indigenous methods. Vernacular techniques not only align with sustainable principles by utilizing local resources and reducing environmental impact (Bharne & Vale, 2010) but also safeguard cultural heritage and community identity. By weaving age-old practices into restoration projects, a harmonious coexistence of traditional wisdom and modern necessities is established.

Case studies provide concrete evidence of successful outcomes. For example, the rehabilitation of traditional Himalayan houses exemplifies how the integration of indigenous techniques not only restores historical authenticity but also enhances structural resilience (Dondolo & Alexander, 2021). Such successes demonstrate that vernacular wisdom offers invaluable insights for crafting sustainable and contextually sensitive conservation practices.

Nevertheless, the challenges in this integration are palpable. The tension between regulatory standards and traditional methods, coupled with structural durability concerns, necessitates adaptive strategies that honor heritage without compromising functionality (Dondolo & Alexander, 2021). The preservation of indigenous knowledge alongside the evolution of construction techniques remains a delicate task.

In the broader context of architectural conservation, the integration of indigenous building techniques into modern restoration practices highlights the potential for holistic

approaches that merge heritage with innovation. This study reaffirms that cultural preservation need not be at odds with contemporary demands. Instead, vernacular wisdom can guide resilient solutions that embody the essence of local communities and their historical narratives.

Moving forward, acknowledging the value of indigenous practices and fostering dialogue among stakeholders, architects, and local communities will be pivotal. By building upon the lessons learned from successful case studies and addressing challenges constructively, the conservation landscape can continue to evolve in a manner that respects the past while embracing the future.

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ABOUT THE BOOK

This edited book presents research on various topics in interdisciplinary areas. Students who are considered as the future of humanity, represents the important resource for growth and development of any country. The first paper focuses on students' promiscuity and its causative factors at parental and family level. This calls for various interventions to help students. Focusing on students, another paper tries to understand Malaysian Higher Education Institutions investigating factors like Student Retention, Attainment, and Employability.

In addition, it is well known that computers-assisted technologies have taken over almost every field at present times. One of them is the Big data analytics which includes process of examining large data through different tools helping to discover unknown or hidden patterns and have been proven to be instrumental in decision-making. Similarly, machine learning provides a vital decision-making arrangement for the prediction of women's vasomotor symptoms (VMS). The book also presents a systematic review focusing on the effect of Pilates Postmenopausal Women with Non-Specific Low Back Pain.

Hence, we hope this book will help readers to be updated with recent researches happening in interdisciplinary ways and they will gain knowledge in the process.



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