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IILM Journal of Management (IJoM)

International Bi-Annual, Interdisciplinary and Peer-Reviewed E-Journal

VOLUME NO. 1 (2024)
ISSUE NO. 1 (JUNE)

ABOUT THE JOURNAL

IILM Journal of Management is an International bi-annual, interdisciplinary and peer-reviewed E-Journal. The Journal covers broad functional areas of Marketing, Economics, Human Resources, Operations, Analytics, Technology, Sustainability, Finance, Accounting, Entrepreneurship, and Business Environment. The journal accepts empirical papers, perspectives, teaching cases, systematic literature reviews, and book reviews on contemporary advances in business and management.

AIMS AND SCOPE

IILM Journal of Management aims to disseminate research and reflections relevant to academicians, professionals, researchers, and students. The journal aims to provide a platform for research scholars, academicians, and practitioners to promulgate contemporary advances in the field of business and management.

OBJECTIVES:

- To provide a platform for academicians, researchers, and practitioners to share professional and academic knowledge in all domains of business.
- To be a leading and credible source of scholarly articles and research papers through the promotion of research publications
- To form a broad and inclusive understanding of business and management through the dissemination of cross-cutting interdisciplinary research.

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EDITORIAL

The contemporary world is characterized by Volatility, Uncertainty, Complexity, and Ambiguity (Acronym VUCA). This makes increasingly higher demands on academicians and industry professionals to unlearn and relearn. Research enables us to navigate the challenges encountered in the present world. The discourses and discussions enable driving progress, addressing challenges, fostering innovation, and improving the quality of life for individuals and societies. The journal is an initiative to promote the spirit of inquiry and dissemination of knowledge on various pertinent issues in the domain of management.

The articles cover broad topics in areas of Macro-Economics, Mental Health issues, Influencer Marketing, and Supply Chain Optimization.

The first Paper includes revisiting the Marshall-Lerner Hypothesis using the data from India's Trade Dynamics data. The paper seeks to challenge the applicability of the hypothesis in the Indian Context. The findings of the paper open numerous possibilities for further studies in the field of Macro-Economics. The second paper covers a multitude of social, demographical, and biological factors that contribute to a person's well-being. Elderly adults are more susceptible to anxiety stress and depression because of their physical and psychological conditions. This paper is an attempt to get an insight into the causes of stress among older adults. The findings of the paper are pertinent as mental health issues, especially in Geriatrics are a cause of concern. The third paper investigates the relationship between transparency and disclosure in influencer marketing and consumers' purchase intentions, with a focus on ethical considerations within this marketing strategy. The fourth paper encompasses data-driven approaches to supply chain optimization. The findings pave way for further research around inventory management, production planning, and decision-making processes.

I hope that the first issue will prove to be pertinent to all stakeholders and the subsequent issues will garner support from the distinguished contributors.

Dr. Neha Tiwari
(Editor)

GUIDELINES FOR THE CONTRIBUTORS

Submission Guidelines Highlights

1) The submitted article must not have been previously published, nor should it be under consideration for publication anywhere else, while under review for this journal. Maximum word limit is 6000 words excluding abstract and References.
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It is the author's obligation to provide complete references with the necessary information. References should appear in the text as: "Cavory et al. (2005) reported that…" and the list of all the references must be placed at the end of the manuscript in the APA Style.

- Papers are processed through a blind referral system by experts in the subject areas. To ensure anonymity, the writer's name, designation and other details should appear only on the first page along with the title of the paper and should not be repeated anywhere else.

REVISITING MARSHALL-LERNER HYPOTHESIS: EVIDENCE FROM INDIA'S TRADE DYNAMICS

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ACKNOWLEDGEMENT

Author acknowledge ICSSR, New Delhi for the award of a Full-Term Doctoral Fellowship in providing financial support for carrying out research. The research paper forms part of the research work sponsored by ICSSR under the provision of a Full-Term Doctoral Fellowship for the Research Scholars.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available in Database on Indian Economy – Reserve Bank of India at https://dbie.rbi.org.in/#/dbie/home. These data were derived from the following resources available in the public domain.

DECLARATION

I confirm that all authors of the manuscript have no conflict of interest to declare. I also confirm that the manuscript is the authors' original work, and the manuscript has not received prior publication and is not under consideration for publication elsewhere.

ABSTRACT

The paper aims to study the Marshall-Lerner (M-L) Hypothesis in respect of India. The paper used the elasticity approach to validate the Hypothesis. The correlation between Trade Balance (TB) and Real Effective Exchange Rate (REER) was observed. The elasticity method was involved in this study in which TB was divided into Exports (EXP) and Imports (IMP). The Auto-Regressive Distributed Lag (ARDL) estimation is used to verify the hypothesis in the Indian context. Firstly, the result of the Bound test shows that not a single ARDL model has a long run cointegration. After that long run multipliers were used, and it shows that the M-L Hypothesis is proved to be true. But the result is shown to be insignificant as well and the result of the short-run analysis shows that the M-L hypothesis does not exist. So, paper concludes that there is low evidence to support the M-L hypothesis in India.

Keywords: Marshall-Lerner Hypothesis, Exchange Rate, Trade Balance, Auto-Regressive Distributed Lag, Bound Cointegration Test.

JEL Classification: C22, C50, F14, F32.

1. INTRODUCTION

Nowadays, no economy is immune to business cycle fluctuations; as a result, every economy will experience depression and recession, resulting in a Trade Balance (TB) deficit. Marshall (1923) and Lerner (1944) presented one of the most significant insights into the promotion of TB through the weakening of the national currency, that is a significant understanding. Therefore, the aim of this research was to explore the Indian economy in the framework of the M-L Hypothesis.

$$\epsilon_x^d + \epsilon_m^d > 1 \quad (1)$$

This Hypothesis states that TB will improve with depreciation only when the summation of the Price elasticity of Demand for Exports (EXP) and Imports (IMP) is greater than one. If this sum is less than 1, the TB will deteriorate with the depreciation of the currency. If the sum is equal to 1, then the TB will remain unchanged with the change in exchange rate (ER).

As a result, the ultimate effect of depreciation on TB is established by an economy's elasticity of demand for both IMP and EXP. The relationship or correlation between ER and TB is essential to any nation's foreign policy. M-L and J-curve are two of the most significant theories in international trade, so many investigations examining the impact of ER shifts on a country's TB have focused on both of these concepts - M-L is a long-term effect, and the J-curve is a graphical representation of TB's response to ER changes.

In this problem, we have found rich amount of empirical evidence from which this study picked only the most relevant studies. Starting from Rose (1991) who has studied the 5 major OECD countries in the post-Bretton Woods era and found that there is low evidences to prove that M-L Hypothesis holds in these countries. Boyd, Caporale and Smith (2001) in their study of 8 OECD countries used the Vector Auto-Regressive Distributed Lag model (VARDL) and found that M-L Hypothesis holds for all 8 cases while 5 out of 8 cases has a significant negative coefficient. Bahmani, Harvey and Hegerty (2013) studied 29 countries using the ARDL-ECM method and found that M-L Hypothesis was met for only 1/2 of the cases studied. Pandey (2013) studied M-L Hypothesis in the Indian economy using the Vector Error Correction model and found M-L Hypothesis holds in India. Amaral and Breitenbach (2021) worked upon Fragile 5 Economics (Brazil, India, Indonesia, South Africa, and Turkey) using the ARDL Bound test and found that there is little evidence from the study to support validity of M-L Hypothesis. Adams and Metwally (2021) analysed M-L Hypothesis existence in Egypt using the Vector Error Correction model (VECM) and found that M-L Hypothesis is satisfied in Egypt.

2. THEORETICAL BACKGROUND

The modelling of the relationship between ER and TB is discussed in many papers. Theoretically, the Real-ER, E_t, is defined as the domestic price level, P_t multiplied by the Nominal-ER, S_t and divided by the foreign price level, P_t^*.

$$E_t = (S_tP_t)/ P_t^* \quad (2)$$

On the other hand, TB is calculated as the ratio of total EXP divided by total IMP as shown in equation (3):

$$B_t = (P_tX_t)/(P_t^*S_tM_t) \quad (3)$$

total EXP is obtained by multiplying the domestic price level with the EXP volume while total IMP is calculated as the foreign price level multiplied by the nominal spot ER and the IMP volume. By expressing equation (3) into logarithms form (using lowercase letters),

$$b_t = x_t - m_t - (s_t - p_t + p_t^*) = x_t - m_t - e_t \quad (4)$$

We define the long-run demand functions for EXP and IMP as in equations (5) and (6):

$$x_t = \alpha_x + \beta^* y_t^* + \gamma_x e_t \quad (5)$$

$$m_t = \alpha_m + \beta y_t + \gamma_m e_t \quad (6)$$

where y_t^* and y_t are the real income for the foreign country and domestic country respectively; γ_x and γ_m are the elasticities of EXP and IMP respectively. Taking both equations into the TB equation in (4), we finally get the long-run TB equation as below:

$$b_t = (\alpha_x - \alpha_m) + \beta^* y_t^* - \beta y_t + (\gamma_x + \gamma_m - 1)e_t \quad (7)$$

For M-L Hypothesis to be held, we should fulfil the following Hypothesis:

$$(\gamma_x + \gamma_m - 1) > 0 \quad (8)$$

$$\gamma_x + \gamma_m > 1 \quad (9)$$

3. MODEL AND DATA SPECIFICATION

Table 1: Variables Description and Sources

Variables	Description	Unit of account	Source
Real Exports **Real Imports**	EXP (IMP) of goods and services represent the value of all goods and other market services provided to (received from) the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, licence fees and other services, such as communication, construction, financial, information, business, personal and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. (World Development Indicators, 2022)	Constant 2015 US dollars	World Development Indicators
Real GDP World **Real GDP India**	GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. (World Development Indicator, 2022)	Constant 2015 US dollars	World Development Indicators
Real Effective Exchange Rate	The ER of the Indian Rupees against a basket of 65 trading partners' currencies. The Index based on CPI is converted in 2015 base.	Index based on 2015	Bruegel database

Source: World Bank, Bruegel Database

The variable has annual frequency and starts from 1980 to 2022. Since, GDP, EXP and IMP data are not available for every month, while REER is not available for every quarter. So, the analysis is bound to imply annual data and to make the analysis more reliable number of observations is increased and extended to 4 decades. The starting point of 1980 is selected because this analysis wants to capture more periods of managed flexible ER system adopted by India in 1994. The variables are converted into logarithms. The analysis is performed with the help of R Studio.

4. RESULTS

Table 2: Descriptive Statistics

Variables	*LN($DGDP_t$)*	*LN($WGDP_t$)*	*LN(EXP_t)*	*LN(IMP_t)*	*LN($REER_t$)*
N. Obs.	43.00	43.00	43.00	43.00	43.00
Min.	26.33	30.90	23.52	23.58	4.14
Max.	28.71	32.13	27.20	27.37	5.17
1st Quartile	26.87	31.22	24.09	24.17	4.30
3rd Quartile	28.14	31.85	26.69	26.89	4.64
Mean	27.50	31.53	25.33	25.53	4.55
Median	27.46	31.53	25.25	25.41	4.50
Sum	1,182.62	1,355.60	1,089.05	1,097.65	195.56
SE Mean	0.11	0.06	0.20	0.20	0.05
LCL Mean	27.27	31.41	24.93	25.13	4.45
UCL mean	27.73	31.64	25.72	25.92	4.64
Variance	0.55	0.14	1.67	1.64	0.10
St. Dev.	0.74	0.38	1.29	1.28	0.31
Skewness	0.08	-0.06	-0.05	-0.07	0.66
Kurtosis	-1.35	-1.33	-1.62	-1.59	-0.82

Source: Authors' Computation

4.1. UNIT ROOT TESTING

In this section, the first step of analysis has been done on the time-series data. The study involved only the Phillip-Perron (1988) unit-root test. The result of the PP test shows that all the variables are stationary at first difference.

Table 3: Phillips and Perron (1988)

Level		**First Difference**	
Variables	**Statistics**	**Variables**	**Statistics**
LN($REER_t$)	-1.17	*$REER_t$*	-3.64**
LN($DGDP_t$)	-2.41	*$DGDP_t$*	-6.19***
LN($WGDP_t$)	-2.71	*$WGDP_t$*	-6.62***
LN(EXP_t)	-1.84	*EXP_t*	-5.49***
LN(IMP_t)	-1.66	*IMP_t*	-5.52***

Source: Authors' Computation

With the result of the unit root test, it can be analyzed that all the variables are at I(1) which permits us to go further with the autoregressive (AR) techniques.

4.2. AUTO-REGRESSIVE DISTRIBUTED LAG (ARDL) BOUND TEST

In this section, the test for long-run cointegration was analyzed. The bound F test (Pesaran, Shin, & Smith, 2001) was used to check the cointegration in the model.

Table 4: Bounds Test for Cointegration

Bound Test	**Export Model**	**Import Model**
F	4.17	2.03
5% Critical Value I (0)		3.79
5% Critical Value I (1)		4.81

Source: Authors' Computation

The bound test results show that there is no long run cointegration exists in both models. There are other tests like (Johansen, 1988), and (Engle & Granger, 1987) test for estimating long-run cointegration in the model but as the data is confined more towards the AR estimator it is been wise to incorporate the (Pesaran, Shin, & Smith, 2001) Bound test for the analysis.

4.3. FINDINGS

In this section, the paper analyses the findings from different models incorporated. First, table (5) shows the ordinary least squares result of EXP and IMP Models.

Table 5: Ordinary Least Squares Results

Variables	Export Model (1)	Import Model (2)
LN(REER$_t$)	0.09 [0.1]	-0.13 [0.11]
LN(DGDP$_t$)	-	1.68*** [0.04]
LN(WGDP$_t$)	3.41*** [0.08]	-
Constant	-82.49*** [2.78]	-20.12*** [1.46]
Observations	43	43
R-Squared	0.98	0.98
Adj. R-Squared	0.98	0.97

Source: Authors' Computation

The EXP Model (1) in Table 5 shows the relationship between EXP, Real Effective Exchange Rate (REER), and World GDP respectively. The result (1) shows that REER has a positive but insignificant relationship with EXP. This means that with an increase in REER, there is an increase in EXP in the country. Theoretically, the relationship was found to be false as REER increases, it makes the EXP of a country expensive which in turn decreases the EXP. The IMP Model (2) in Table 5 shows the relationship between the IMP, REER, and Domestic GDP respectively. The result (2) shows that REER has a negative but insignificant relationship with IMP. This means that with an increase in REER, there is a decrease in IMP in the country. Theoretically, the relationship was found to be false as REER increases, it makes the IMP for a country cheaper which in turn increases the EXP.

Both models have an insignificant relationship with REER in OLS modelling. Now this study shifts towards AR Techniques. Table (6) shows the ARDL (Pesaran & Shin, 1999) model result. Since there is no significant long-run relationship in the model as analyzed by the Bound F (Pesaran, Shin, & Smith, 2001) test. The study examines the short-run model.

Table 6: Auto Regressive Distributed Lag (1999) Results

Variables	Export (1)	Import (2)
LN(EXP$_t$)(-1)	0.94*** [0.06]	-
LN(IMP$_t$)(-1)	-	0.89*** [0.07]
LN(REER$_t$)	-0.11*** [0.03]	-0.09* [0.05]
LN(WGDP$_t$)	2.92*** [0.70]	-
LN(DGDP$_t$)	-	1.82*** [0.58]
Constant	-3.84 [5.33]	-1.31 [1.74]
Observation	43	43
R-Squared	0.99	0.99
Adj. R-Squared	0.99	0.99

Source: Authors' Computation

Table (6), EXP Model (1) shows the effect of REER and WGDP on the EXP. The results show that REER has a negative impact, while WGDP has a positive and significant impact on EXP. The IMP Model (2) shows the effect of REER and DGDP on the IMP. In this model, REER has a negative impact and low significance, while DGDP has a positive and significant impact on IMP.

After analysing the results of the short-run ARDL, the M-L Hypothesis, i.e., $\epsilon_x^d + \epsilon_m^d > 1$, is not satisfied in the case of India.

4.4. AUTO-REGRESSIVE DISTRIBUTED LAG MULTIPLIERS

Consider the basic ARDL model with an exogenous variable, which is of the form:

$$y_t = c_0 + \sum_{k=1}^{p} \beta_k y_{t-k} + \sum_{j=1}^{l} \alpha_j x_{t-j} + u_t \tag{10}$$

Where y represents the dependent variable, p represents the AR order of the ARDL, where it is directly associated with the y (the dependent variable). X is an exogenous explanatory variable that has *l* lags (also a contemporaneous value of x can be included) and the residual term u.

The equation (10) of ARDL is not a long-run function it is more of a short-run model. Therefore, the actual impact of x through α must be done considering the size and orders associated with the dependent variable y through β. The above leads to a situation where the cumulative impact of α is weighed and this can be done by using a long-run multiplier. Blackburne and Frank (2007) indicated that an approximation to this long-run multiplier would involve a non-linear transformation to get a long-run coefficient, such transformation is given in the general form of:

$$\theta = \frac{\sum_{j=1}^{l} \alpha_j}{1 - \sum_{k=1}^{p} \beta_k} \tag{11}$$

This is the long-run multiplier of the variable X. It uses the sums of the coefficient α associated with the independent variable (and its lags) divided by 1 minus the sums of the AR β coefficients. The upper part corresponds to the Long-Run Propensity of X towards y, which is simply the sums of the coefficients, and it's interpreted that given one permanent change of one unit in x, the sums would be the long-run propensity as the impact on y. The down part represents the weight associated with the response of the AR structure.

Now, this paper uses a long-run multiplier to know the long-run propensity of REER as an impact on EXP and IMP.

Table 7: Long Run Multipliers

Variables	Export Model (1)	Import Model (2)
LN(REER$_t$)	-1.92 [2.26]	-0.87 [0.72]
LN(DGDP$_t$)	-	1.49*** [0.23]
LN(WGDP$_t$)	3.11*** [0.08]	-
Constant	-63.94** [27.33]	-11.76 [8.84]

Source: Authors' Computation

4.5. DIAGNOSTIC CHECKING

To check the robustness of the results, the diagnostic test was run on the EXP (1) and IMP (2) models provided in Table (6) and the stability test was applied to the EXP (1) and IMP (2) models which have been shown in Figure (1) and (2). The diagnostic test and stability test on both models shown that models are robust.

Table 8: Diagnostic Test

Test	Exports	Imports
Breusch (1978) and Godfrey (1978) Test	0.014 (0.91)	0.11 (0.74)
Ljung and Box (1978) Test	0.015 (0.90)	0.10 (0.75)
Breusch and Pagan (1979) Test	2.15 (0.71)	6.30 (0.18)
Shapiro and Wilk (1965) Test	0.98 (0.57)	0.98 (0.59)

Source: Authors' Computation

Figure 1 Stability test of ARDL Export Model

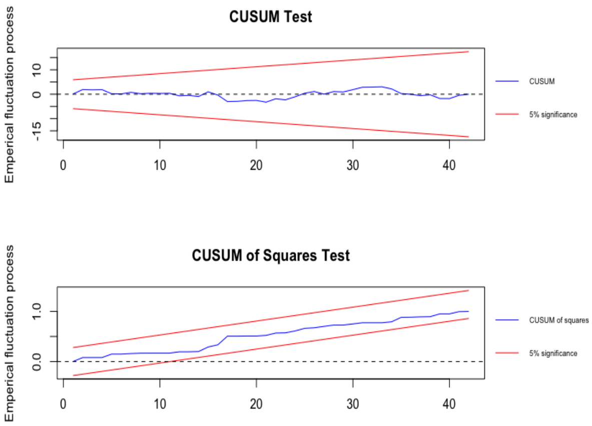
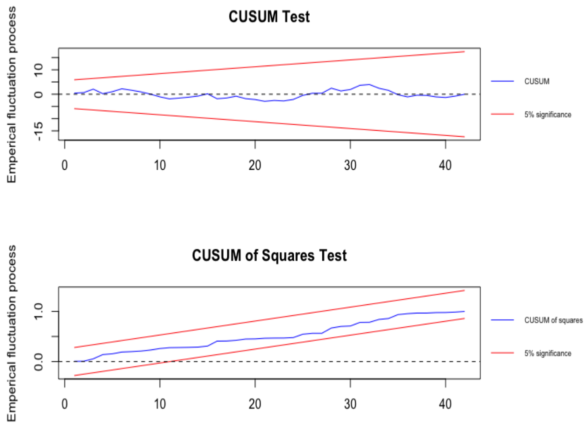


Figure 1 Stability test of ARDL Import Model



Source: Authors' Compilation

To verify the M-L Hypothesis, the coefficients of REER from both the IMP and EXP models were added. Table 9 shows the verification of the M-L Hypothesis.

Table 9: Verification of Marshall-Lerner Hypothesis

Method of Modelling	Condition (|Exp| + |Imp| > 1)	Result
Ordinary Least Squares	0.09 + 0.13 < 1	False
Auto-Regressive Distributed Lag	0.11 + 0.09 <1	False
Long-Run Multipliers ARDL	1.92 + 0.87 > 1	True

Source: Authors' Computation

5. CONCLUSION

From the analysis done in the previous sections, it is clear that unlike (Amaral & Breitenbach, 2021), this study result isn't able to find the M-L Hypothesis existence in the case of India. In the case of long-run multipliers, it was seen that M-L exists in India but that case too doesn't have any significance. Also, the study showed that there is no long-run coefficient exists in both the models. The models were proved to be robust but the non-existence of a long-run model can be due to the limitation of the model period. The study can be extended in future with the help of other methodologies used by different researchers like (Lucy, Sunday, & Pacific, 2015) who used the VECM model. In the end, with all the empirical study done in this paper on the topic it is right to conclude that for India M-L Hypothesis has no or low existence.

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AN EXPLORATORY ASSESSMENT OF MENTAL HEALTH OF OLDER ADULTS IN DEHRADUN REGION: IMPLICATIONS FOR COMMUNITY AND POLICY MAKERS

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ACKNOWLEDGEMENT

OBJECTIVE

A multitude of social, demographical and biological factors contribute to a person's wellbeing. Elderly adults are more susceptible to anxiety stress and depression because of their physical and psychological conditions. This paper is an attempt to get an insight into the causes of stress among older adults in Dehradun City.

METHOD

Focus group interviews of older adults in the range of age 65-75 were conducted to find out the main issues related to their mental health. 6 different areas in Dehradun were selected randomly and data was collected through 6 focus groups in these different areas. Each focus group consisted of 6 members and 3 interviews were conducted with each focus group for collecting exhaustive information.

RESULTS

It was concluded through focus group interviews that majority of the older adults were depressed because of medical problems like rheumatism, arthritis, which restricted their physical movement dementia and Alzheimer which limited their psychological progress. The feeling of dependency and loneliness which is created because of these medical problems, led to stress and anxiety in them. Lack of adequate transport facilities and professional care givers was also a major concern.

ORIGINALITY

Mental health of elderly is an issue not taken up very seriously in India. The mental health problems are underestimated by the family and taken for granted. This research paper generates awareness about the grave mental health problems of the elderly in India and also suggests measures that Community and Government should undertake to contribute towards better mental health of adults.

IMPLICATIONS

An assessment of the needs of elderly will help in creating awareness among their own family members, society and also the policy makers. Family members should be trained in dealing with various medical problems of elderly. N.G.O'S should also focus on needs of this segment of the society. Similarly government should make policies which are senior citizen friendly.

AN EXPLORATORY ASSESSMENT OF MENTAL HEALTH OF OLDER ADULTS IN DEHRADUN REGION: IMPLICATIONS FOR COMMUNITY AND POLICY MAKERS

The world's population is ageing rapidly, and by 2050, the percentage of the world's older adults is estimated to increase from about 12% to 22%. In India itself, there are 104 million older persons, and the number is expected to grow to 324 million by 2050. There has been a rise in the average life expectancy levels from 40 years in 1951 to 64 years today.There is a shift towards higher life expectancy, leading to an increase in the proportion of elderly people in the total population.

This demographic transition is associated with a number of challenges for the well-being of older adults. As population ageing becomes more evident the concern for Mental Health of adults is increasing. Mental health of adults has been identified as one of the important agenda of public health mission in U.S. Taking care of elderly is also a challenge for Japan as Japan has the highest population of elders above 60. Similarly when we talk about China and Korea the same problem persists, well-being of elderly is not very sound and is reflected as higher suicide rates among adults. According to a report by World Health Organization (WHO), depression in patients above age of 55 is a major reason for increase in their death rate due to heart disease. Pilania et al (2013) conducted a meta-analysis of 74 studies, which involved 487,275 elderly individuals and their results indicate a worldwide prevalence rate of depressive disorders to be between 4.7% and 16%. In India the rate of geriatric depression ranged from 11.6% to 31.1%. The rates of depressive and anxiety disorders are also expected to increase. For example, between 1990 and 2013, the burden of disease due to these conditions in India increased sharply in the general population, a trend that is expected to continue as the population ages. (Anand A, 2017). These studies show that mental health of adults is a worldwide concern and now India also has to pay attention towards it. Creating awareness about mental health especially in countries like India where too many misconceptions are existing, has become necessary now. The concept of mental health in India encompasses only the treatment of seriously mentally ill person admitted in the mental hospital, otherwise mental problems are not taken seriously

Taking care of elderly has never been a major issue in India because of its joint family system. (https://www.thebetterindia.com/145604/geriatric-mental-health-india/). Indian culture is such that it is respectful and supportive of elders. But in today's scenario India is going through many demographic, social and technological changes. Its effects can be seen in the emergence of nuclear family systems. The family structure in India has changed considerably due to societal modernization. In the past, the elderly were decision makers in the family; they were nurturing roles and they were guardians of traditions. (Sanjay T.V et al, 2014) But with the advent of nuclear families and the women also moving out to work there are changes in the family structures. Lack of time, resources and space makes it difficult for the younger generation to take care of their aged parents. This has become a challenge for the elderly who, with their weakening health conditions, are unable to take care of themselves.

In a study conducted in Goa (Alex Cohen Et al, 2016) the elderly shared their apprehensions about their growing old. They expressed fears of widowhood and incapacitation. They feared of being alone without their spouse as they are dependent on the spouse for emotional and physical support. Elders also feared of becoming incapacitated by illness. They were concerned about performing daily chores like getting their grocery, cooking food. Elders were also anxious about being bed ridden. The inability to act independently and perform activities on their own reduces their self-esteem and they feel depressed. (Buvneshkumar M et al, 2018)

In a study conducted on ageing and well-being in Goa the main factors which affected well-being of elderly were neglect and abuse by children after drinking, conflicts around money and property and complexity of family relations. One very intriguing fact of the research was that although complexity of family relations was one significant reason for the poor mental well being, they thought it was best to live with their families. Another fact highlighted was that once the son gets married the family structure changes.

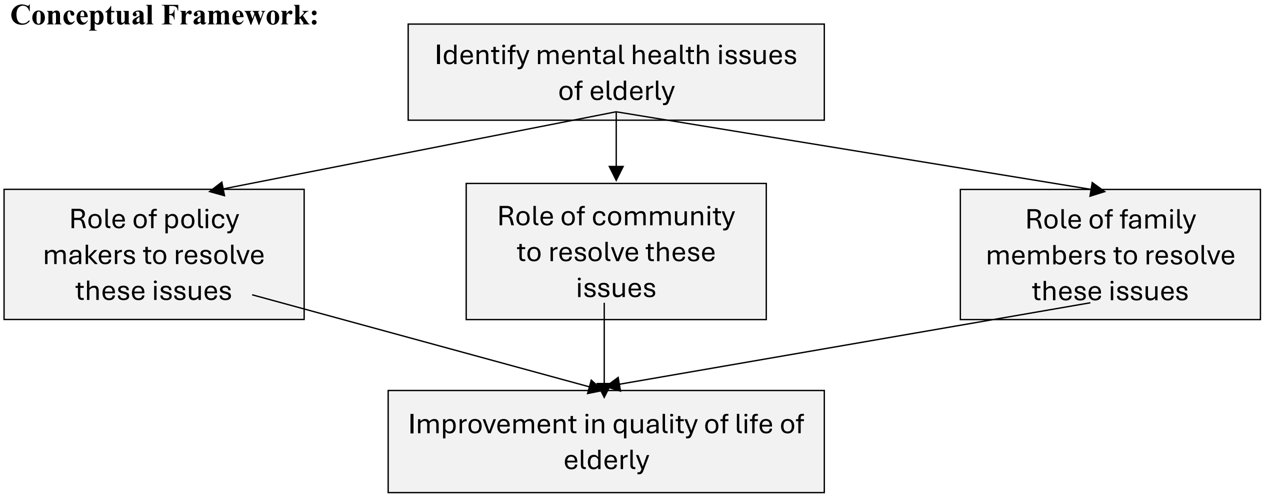
A study on Mental Health of elderly in Tamil Nadu also reported similar findings. Majority of the elderly participants who were a part of the Focus group discussions in South India felt that the values of the younger generations are changing, resulting in less respect towards older people. (Mani G et al, 2014). Rate of depression among females was high as they face more stressful events and are more profoundly impacted by these events.

Help age India an organization working for and with disadvantaged elderly conducted a study to study the influence of technology and social media on the Mental Health of Elders and found that elders felt neglected because of the phenomenon that their children are giving more attention to smartphones and social media even when they are at home. Older adults now feel lack of respect and importance in their own home. Research has shown that poor family support, isolation, dependency, insufficient time spent with children are all causes of poor mental health. (Dorji et al, 2018, Prasad Rajendra ,2017, Ammar & Zaidi ,2015, Julius et al.2017, F.Jabin ,2016.

Hence the changing socio-demographical scenario in India has raised the issue of mental health of elders. Drastic change in temperament, insomnia, amnesia, dementia, shifts in mood, erratic behavior, anxiety disorders among elders are all symptoms of mental health problems. But these issues are not take seriously and explained as the phenomenon of *sathiyana (a hindi phrase)* which means changes in elders associated with age.(Chavan B.S et al,2018).The mental health problems of older adults are often denied by their families. They feel that these are them as natural ageing problems which do not require any psychiatric intervention. As a result, medical care for complaints such as headaches, insomnia, dizziness or any other vague physical symptom is provided to elderly patients but psychiatric care is neglected.

Quality of life of the elderly is deteriorating because of the mental health issues they are facing. Moreover there is a stigma attached to mental health issues because of which the elderly and their family members do not take help of experts. (Philip S, 2021) An understanding of the reasons which lead to poor mental health of adults is required to improve their quality of life. Once the reasons are identified the policy makers, community and government can take relevant steps for developing an infrastructure to support the elderly.

Conceptual Framework:



Research Objectives:

1) Explore and Identify mental health problems of the elderly in Dehradun Region

2) Identify specific problems related to elderly women in Dehradun Region

3) Explore the infrastructural support available to handle the mental health issues of elderly

4) Identify the role of family community and policymakers in dealing with mental health issues of elderly

Research Methodology:

Focus group discussion, a tool for qualitative enquiry was used for the purpose of collecting data. Researchers in Sociology and Psychology have used the method since the 1940s. However, now it is being used across a wide range of disciplines including education, communication and media studies, sociology, health research and marketing research. Focus group discussions are very useful when we need deeper understanding of the phenomena being studied, for generating information on collective views, and the meanings that lie behind those views.

Focus group discussion is a method where a researcher invites a group of individuals to discuss a pre-defined topic, aiming to draw from the personal experiences, views, perceptions and attitudes of the participants through a moderated interaction (Ochieng et al, 2018). Therefore choosing the right participant is very important. Participants were sampled by convenience and varied as per gender, income and age. Respondents for our study included both females and males in the age group of 65-75 belonging to different income segments (No Income, Lower Income, Middle Income and Upper income) and different geographic locations in Dehradun.

Participants:

Group Number	Constituents	Number of participants	Socio economic status
1	Male	9	Low income and no income
2	Male	10	Upper and middle income
3	Male	7	Low income and no income
4	Female	8	Low income and no income
5	Female	7	Upper and middle income
6	Female	8	Low income and no income

*No Income: Totally Dependent on kids

*Low Income: Below Rs 20000

*Middle Income: Rs 20000-50000

*Upper Income: Above Rs.50000

There is no consensus among the researchers about the exact size of the focus group. But most of them suggest a range of 4-12 (Muijeen, K et.al.2020, Andrew & Jonathan (2006), Krueger & Casey (2020). Therefore, the range of the focus group size for our study was from 7-10, the average size being seven. Groups were kept homogeneous so that people with similar backgrounds were able to share their ideas. Each focus group discussion ranged from a period of 60 minutes - 90 minutes keeping in mind the physical health of the elderly.

Process of the FGD

6 focus group discussions were conducted at different locations all over the city. Houses of elderly people and community centers were used as the location because it was convenient for the elderly. Researcher and co researcher were the moderator and co moderator to conduct the focus group discussions. A semi structured discussion format was used with a facilitator leading each group through a set of predetermined questions. The focus group conversations were recorded and transcribed. The moderator focused on the verbal messages and the co-moderator took down notes. During the interview, the moderator's role was to probe comments, create a comfortable environment, to enhance group interactions, ensure that important topics are covered from the prepared outline by asking open-ended questions, increase involvement and response, and control the allocation of time. Open-ended questions asked in the groups included: *What helps them manage chronic disease(s)? What are some of the emotional and mental health (MH) issues faced by elders in our community? What support and services do elders in our community need but have a hard time accessing? What are their feelings about medication to be taken? How do they view their relationships with their children and grandchildren?*

The co-moderator helped the moderator to facilitate discussion within the group, took down notes, acted as time keeper, reflected the issues of individuals or subgroups to the whole group, and ensured that all the points were covered during the discussion. The Focus Group discussions ended by a summary of the major opinions by the moderators and a verification by the participants.

RESULTS

PHYSICAL PROBLEMS

Most common diseases found among the elders are Alzheimer, dementia, arthritis, short sightedness, memory loss, heart diseases and lung related diseases.

Respondent 1 shared "*I face problems in going to the market for my daily shopping as there is lots of traffic on the roads. It is now difficult for me to drive the car at night, during day time I can manage but there are visibility problems in the evening. Because of this we are not able to go for parties and marriages."*

Respondent 2 shared **"***My wife died two years back. I am alone in the house whole day, my daughter in law is also working and comes home at 04:00 pm. I have to manage on my own the whole day. I have severe pain in my knees because of which I face problems in moving here and there. One day I fell down and had no one to help me, got up on my own with a lot of difficulty.*

Respondent 3 said "*I have started forgetting things, have to put in a lot of efforts to remember things and also face problems in hearing now.*

Respondent 4 who was a driver and is longer able to work because of his shortsightedness shared that "I *am a patient of asthma and have to for treatment to the government hospital for treatment which is far* away from *my house and have to wait for a long time*

Hence physical problems are common to elders irrespective of age and gender**.** They also face problems in going for their daily morning and evening walk as Traffic and rash driving are a major problem. Even crossing a road is a mammoth task for them. They face problems in doing their daily shopping chores also. Physical mobility is a problem because of which social interaction gets reduced. Participants also shared that they had problems in walking long distances, got tired very soon and their heart beats increased, were not able to

FEAR OF OLD AGE:

Participants mentioned that they were scared of the old age as old age is related to reduction in physical capacity.

When asked about their fears related to their age Respondent 5 said "*I am very scared of being bedridden or being admitted in the hospital. I am very uncomfortable when staying in the hospital. These thoughts really scare me."*

Respondent 6 shared *"As I am staying alone with my wife if anything happens to one it is difficult for the other to survive. The very thought of living without my wife is very difficult."*

When asked about the problems they face because of the age related factors Respondent 7 shared "*I face problems in going to the market for my daily shopping as there is lots of traffic on the roads. It is now difficult for me to drive the car at night, during day time I can manage but there are visibility problems in the evening. I am scared that who will do all this work when I grow more old and not able to walk?*

When asked about their fears about their age Respondent 8 said "*I am really scared of being bedridden. I pray to God every day that I should die without getting bedridden. I am also very scared to go to the hospital as they put you in the ICU where you cannot even meet your family members and have to lie down quietly the whole day. I have seen a friend of mine who was very sick and remained in the ICU for one month because of a chronic disease.*

The responses of the participants show that they are scared of the situation where their physical movement will be restricted because of old age. Most of the participants were scared of getting bedridden and said that they wanted God to give them a call before they reached such a condition. They were also concerned about what will happen if their spouse dies before them. They have negative beliefs about going to the hospital as they are more comfortable in their home settings.

FAMILY RELATIONS

Most of the participants had a lot of dissatisfaction regarding their relationship with their children. Participants who belonged to the higher income group were staying away from their children and they have their own set of problems.

When asked about why they don't stay with their children Respondent 9 said "*My children are well settled and staying in Bangalore. But I am quite comfortable as I have a spacious house in Dehradun. My son lives in a flat and me and my wife don't feel comfortable in the flat."*

He also added *"At times I compare myself with my friends who have their business and feel they are better than me as their children are staying with them."* Respondent 10 said "*Our children are so busy in their own lives that even if we stay with them they are not able to spend time with us. My son comes home late from office and has to give time to his wife and daughter also. So I feel it is better to stay alone at Dehradun.*

When asked about their relationship with children Respondent 11 shared "*I have one son and one daughter. Both are married now and busy in their own lives. They visit us once or twice in an year. Both are independent and are busy in their own lives*

When asked about the idea of staying with their children all of them said that they do not want to stay with kids as they have their own houses in Dehradun, they are attached and are more comfortable in their houses. They perceive the families of kids as a self-contained unit with no place for parents. Accommodation is also a problem in bigger cities as their kids have small houses in cities like Mumbai etc. Elders don't want to lose their independence which they have in their homes. They also have frequent transfers and it is not easy for elders to relocate. Their kids don't understand their needs, there is a generation gap. One of the participants mentioned that life of the present generation has become so stressful and complex because of the present materialistic scenario and they did not want to burden themselves by looking after their parents.

Participants of the lower income group are staying with their children and have their own different set of problems

Respondent 12 said "My *daughter in law is working so I have to look after my grandchildren and also take care of household work. My knees ache and there is a lot of pain in my shoulders and I feel very tired always."*

Respondent 13 shared that "*My children have small house and they have converted a verandah into a room for me. It is not very comfortable but I have to stay there. Because if I am not staying with my kids I do not have any other option.*

Respondent 14 shared "My *husband had died a year back. I live with my son and his family. My husband worked with a private firm so I do not get any pension. I am totally dependent on my son. I hesitate in asking for medicines and my daughter in law creates a scene whenever I have some health problems and have to visit the doctor*."

Respondent 15 "I *have a room on the first floor in the house and my kids stay on the ground floor. It is difficult for me to climb and go down the stairs but I have to do it as it is not possible to stay alone in the small room the whole day*"

Respondent 16 *"I am totally dependent on my son as I am not physically fit to earn now. I used to work as a guard but the agency has its own age limits and I can't work after 65. So now my son has to take care of me. His income is also not very high and he also has his own family to take care of. At times he gets frustrated and gets very angry. I feel I am a burden on him. I am ready to work but my health does not allow.*

The main problem of participants of the lower income group is financial. They do not have any income after they stopped working and were dependent on their children for their daily and medical needs. They feel they are being neglected by their children and their children are not interested in their well-being.

It can be concluded from the statements that the change in the traditional system of society is creating problems for the elders in the society. The traditional system in the Indian households was that the lady of the house looked after the elders. But this is changing slowly as women are also working to support their families and do not remain at home all the time. Hence elders are considered a burden.

The participants of this group shared that their children had small houses where it is difficult to adjust. So the problem which we identified is lack of space for elders. The elders were either moved to small rooms or open spaces which were covered for the elderly. This caused a lot of inconvenience for the elderly.

LONELINESS AND DEPRESSION

The focus group discussions did not give us the information directly that mental health problems are there in the elderly but the symptoms which the elderly shared made it clear that their mental well-being was low. When the discussion about mental problems was done, the respondents did not agree that a mental problem exists. They are not even aware of names like Alzheimer and dementia. But the symptoms which they shared show that they are having mental health problems.

Respondent 5 "I *have become very moody and get irritated and angry at small things. Many a times they don't feel like doing anything and feel very depressed.*

Respondent 7 "I *really miss my children very much at times and also my grandchildren. I want to spend more time with them but they have their busy schedules and not able to spend time with us. They come and stay with us for 3-4 days on festivals and then go back"*

Respondent 17 who *is a widow shared "After my husband's death I feel very lonely. I am not happy, remain displeased with my family members, have lost interest in all things, I don't like dressing up, taking care of myself."*

The symptoms like feeling moody, getting angry, losing interest in things are all signs of poor mental health. Most of the participants have mentioned that they feel lonely. Loneliness is linked to social isolation and it leads to negative feelings among the elderly. Loneliness is also linked to depression and suicidal tendencies and also tendency of developing high Blood pressure.

The reasons which elders have given for feeling is that their children and grandchildren are staying away from them and meet them only once or twice an year. When asked about their relationship with grandchildren, they replied that grandchildren are attached till the time they are young but when they grow up they also get disconnected from grandfather and mother. Parents feel children are wasting their time when they interact with grandparents. Loss of spouse is also major cause for loneliness and depression.

SPECIFIC PROBLEMS OF WOMEN

All the participants reported that their health issues are neglected as they have to take care of themselves as well as their spouses. Women underplayed their health problems as they did not want to cause inconvenience to their spouses. Inconvenience in terms of visiting the doctor or getting any treatment done or in terms of payment of consultation fee.

When talking about health issue Respondent 18 *said "Many a times I don't share my problems with my husband as he himself is a heart patient and gets worried. Driving the car, going to the doctor are all hassles for him.*

During discussion participants also compared the present with the past and mentioned *"Ladies of our age group were given a lot of respect and their advice was sought in all religious matters but now the present generation does not have time for religious ceremonies so the respect given to elderly women has reduced.*

Respondent 19 shared "Me *and my husband are almost of the same age but still I have to take care of all his needs. I have to cook, wash clothes and take care of the house. At times I feel very tired and feel difficulty in sleeping. My legs and shoulders ache like anything."*

Respondent 20 shared "*My husband is bed ridden because of a nerve related disease, he is totally dependent on me. My son and daughter in law do not have time as they have a very busy schedule. I get so tired that I feel irritated at times and feel like crying a lot.*

Respondent 21 shared "*I went to live with my son when he had a child. But it was very tiring for me as I am suffering from arthritis and had my own set of problems. I became quite sick and had to come back to my house at Dehradun where I took rest and recovered."*

They also mentioned indirectly that most of their daughter in laws are working and looked upon them for help when they have small children which is not easy at times. One of the participant mentioned that after the age of 60 they have their own physical limitations and it is not easy to take care of a small child.

One very interesting issue was raised by this group. They said that traditionally elderly women played a very important role in the religious ceremonies of the household but the present generation does not assign value to the elaborate religious ceremonies and hence value of elderly women is also undermined. This shows that elders feel a lack of respect when the younger generation is dealing with them. They are not consulted on family matters and they feel bad about it.

ROLE OF ELDERLY IN SOCIETY AND COMMUNITY

Before their retirement most of the males were engaged in productive work but after retirement they felt very redundant. They are not playing an active role in the society and the roles in the families have also changed.

Respondent 11 said "I am staying alone in Dehradun, here I do all the shopping for my family but when I go and stay with my kids they don't let me do anything as they have domestic helps for everything.

Respondent 12 "I am also ready to offer voluntary services in any organization, just to be busy but they don't want to give jobs to elderly. They ask us why we want to work at this age."

Respondent 22 "I try to help my daughter in law in the household work but she has her own style of working and does not want me to interfere. Our kids do not consult in any kind of matters and take all decisions on their own."

Women in the lower middle class who largely had been housewives and were responsible for all the household work throughout their life, faced a very specific problem of being sidelined from the house hold chores which they were doing. Now the daughter in law, who felt that the household chores be done according to her style of working, assumed all the responsibility. And this created a vacuum in the life of the elderly women. This lack of a clearly defined role makes the elderly isolated and depressed. They feel neglected by their children and the society.

GOVERNMENT POLICIES FOR ELDERLY

Most of the participants were not aware about the government policies. When we informed them about the policy the higher income group were not interested in the meager amount and the lower income were scared of the paperwork involved in the procedure.

One of the participant from the higher income group shared "*I have my own pension which is enough for me."*

Respondent 23 shared "Once *I told my son to help me in fulfilling the form for old age pension, he got very angry and said are we not capable enough to take care of you. There is no need of doing all this"*.

Respondent 16 shared "*I faced a lot of problems in getting the BPL certificate. As I was not able to go to the government offices alone, my kids had to go with me always, they got fed up of it and told me not to get into all these formalities.*

Respondent 14 shared "*I had to wait for one year after filling the form and completing the formalities.*

Hence long waiting period and complicated process becomes a major hurdle in applying for the old age pension in Uttarakhand. Similar findings have been reported in studies in Punjab. The average waiting time to get pension facilities in Punjab is one year (Nanda et al., 2011) and six months in Karnataka and Rajasthan. (Dutta et al, 2010). Moreover lack of awareness is one factor which causes problems for the elderly. (Times of India, Dehradun)

Mr.Ajeetpal said *"I am not aware about any help from the government, our only support is our children and we have to live with them.*

FINDINGS:

MENTAL HEALTH PROBLEMS OF ELDERLY

The focus group discussions did not give us the information directly that mental health problems are there in the elderly but the symptoms which the elderly shared made it clear that they are suffering from poor mental health. When we discuss about mental problems, the respondent is never going to agree that a mental problem exists. They are not even aware of names like Alzheimer and dementia. But the symptoms like irritation, getting angry, not feeling like doing anything all show that they are having mental health problems.

High income groups face loneliness as they are living away from their children and low income groups face neglect and abuse of their children as they do not have an option to stay alone. Loneliness and neglect both give rise to mental health problems. Lower income groups face financial problems as they are financially dependent on their children and do not have any source of income.

Most common diseases found among the elders are Alzheimer, dementia, arthritis, short sightedness, memory loss. All these diseases restrict their mobility which leads them to a social seclusion and a feeling of helplessness. The higher density of traffic and lack of senior citizen friendly transport facilities further restrict their mobility. They become confined to their homes and this further leads to issues like loneliness and depression.

The results of the focus group discussions make us aware about the presence of mental health problems among elderly.

SPECIFIC PROBLEMS OF ELDERLY WOMEN

Problems faced by elderly women are a bit different than their male counterparts. They are responsible for taking care of themselves as well as their spouse in spite of the fact they are also aging. Their daughter in laws are also working and look upon them to take care of their young kids which again is very taxing for them in this age.

INFRASTRUCTURAL SUPPORT FOR DEALING WITH MENTAL HEALTH ISSUES OF ELDERLY

In developing nations like India the family's role in talking care of elders is overestimated. Research shows that in developed nations state plays an active role in taking care of elders and in the developing nations they are still a responsibility of the family. New ideas are now emerging now on institutionalization and community care of individuals. Policy makers now have to understand that **the** elders are the responsibility not only for their children but of the whole community.

In Japan, there were laws which bound children to care for parents but now they have been revoked. Japan has now introduced a compulsory, long-term care insurance system to which every citizen aged 40 and over contributes premium. (Nagaya Y, Alipio A, 2017) The system is for people who require care in their old age. The elders are provided range of services which include home-based, community-based and institutional care options run through public-private partnership that is part payment by government and rest by the patient (Mayumi Hayashi (2015). Similarly in India factors like increasing urbanization, breakdown of the joint family system, women getting more career-oriented are changing the scenario of elderly care. Now state and community also have to take the responsibility as in other developed nations.

In the western nations many organizations are voluntarily supporting the elders through their initiatives. Many western nations are now using innovative methods to take care of their elders. A survey conducted in Japan shows that older people prefer to live at their own homes rather than at their child's home or a medical institution. Hence Japan shifted from a policy of 'Care at facilities' to 'care at home'. The care at home program requires health professionals to provide health and medical care to elders at home. Doctors and nurses visit homes of elders to monitor their health conditions. Home living support also includes services such as meal preparation, bathing, and purchase of medical equipment for long term care.

Similarly Australia has made mental health training mandatory for staff working in the aged care and community support sectors. Workshops for training staff in dealing with mental problems of elders are organized. (Julius Ohrnberger et al, 2017)

Germany has also introduced changes in its traditional health care system. Till 1994, long term caregiving was mainly the task of the family but after 1994 Germany launched a system where the elders are looked after at their own homes. Assistance is given to elders in maintaining personal hygiene, feeding, mobility and any type of rehabilitation activities. (Schulz Erika, 2010)

Similarly Canada also focuses on providing elder care at home on the same lines as Japan and Germany. The Canadian Medical Association has suggested a National Seniors Strategy which would include a comprehensive continuum of health services to provide optimal care and support to elder citizens. The focus of the strategy is on providing health care to the elders at home and make it possible to remain at their home as far as possible. The CMA also suggests to create age friendly communities and environments. Accessible transport services for elders are also there to improve mobility of elders. (CMA, 2016)

Seoul is carrying out following policies to cope with aging society. First, it is the creation of jobs for senior citizens. It is one of the main welfare projects for senior citizens to obtain effects like senior citizens' health, expansion of social participation, and subsidiary income support, by creating 'jobs suitable for senior citizens' targeting people older than 65 years.

Second is the expansion of cultural facilities for senior citizens. Seoul is planning to establish leisure welfare facility infrastructure for senior citizens in Public Parks. It is also planning to open a Sports Center for Senior Citizens by changing the worn-out underground shopping district in (Yang.Y, 2018, Seung-Hyeon et al, 2016)

Cuba is a country doing very well in the field of geriatric health care. Their geriatric care is as per needs of the elderly. They permanent live-in facilities for elders, grandparents' home for those who are day guest, grandparents club for those who want to come for a small duration of time for social interaction, and eat-in-together for those who are living alone to meet their nutritional needs. Besides this, special awareness and educational sessions are conducted among the families with an intention to increase respect and consideration for the elderly. (Pastor Castell-Florit Serrate, 2019)

In India, there are many cultural factors because of which children look after their parents. This was legalized by the Parents Maintenance Act, 2007, which legally requires children and heirs to take care of their parents through a monthly stipend.

There is a National Policy on senior citizens which was framed in 2011-12 which includes suggestions like

-Setting up a helpline for senior citizens,
-Establishing a National Commission for Senior Citizens, and
-Establishing a National Trust for the Aged

India has good policies for the elderly but there are gaps in implementation. The Standing Committee on Social Justice and Empowerment has raised issues on the implementation of schemes for the welfare of senior citizens in February, 2014, but still situation is same. There is a pension scheme for elderly under which elders falling below the poverty line and between the age of 60-79 can avail a pension benefit of Rs.1000 in which central government contributes Rs. 200 and Rs 800 is contributed by the respective state. But this amount of Rs1000 is not sufficient to lead a life with dignity.

India is still in a phase of transition and needs to develop a comprehensive system to meet the specific issues of elderly population. A change in the mindset is required that only the family is responsible for the elderly and NGO'S and the government have to take the initiative in taking care of the elderly. They have to develop a framework in which the elders can live with dignity and self-respect and ensure their economic independence.

IMPLICATIONS FOR NGO'S

Non-Governmental Organizations (NGOs) can play a key role as advocates, service providers, activists and researchers on a range of issues related to elderly in India. NGO's can involve the community and initiate a movement for launching a program of action for elderly care based on Private, Government, and Community partnership.(Tripathy J.P,2014). NGOs should collaborate to launch an Advocacy Programme which will influence policy makers like Parliamentarians and State level political leaders and other opinion makers. The basic purpose of the advocacy program would be to create awareness through data related to physical and mental health of the elder population. Once the awareness is generated among the policy makers, NGO's should lead them towards formulation of effective programmes for improving mental health of the elderly.

NGO and Community leadership must use media to generate an opinion in favor of policies for the elderly. Digital Media should be used to constantly keep the public and policy makers aware and alive with success stories and reporting of failures.

NGO'S should run day care centers as it is a very good way to fulfill the social and medical needs of the elders. The elders stay connected with their family and can also interact with people of their age. Day care centers help in reducing social isolation of elders and hence improves their mental health.

NGO'S should also train home care workers to care for elderly. For example in Japan care givers are educated women from rural areas who travel to the cities to be hired by old people. This serves a two pronged purpose by giving employment to the rural women and also taking care of health of elderly.

NGO'S should try to provide home living support to elders like help for cooking and other housekeeping activities. These welfare services should be provided to those elderly who are not well off financially and rely on old age pension of the government.

IMPLICATIONS FOR POLICY MAKERS

Government has made many policies for the welfare of the elders but the key lies in the implementation of these policies. The question of elderly rights has recently assumed importance in our country as the Supreme Court is also now interfering on the question of rights of elderly and has directed the center and state governments to ensure that rights of elders to live with dignity, mental and physical health should not only be protected but also enforced.(http://www.theshillongtimes.com/2018/12/14/rights-of-elderly-must-be-recognised-sc).The verdict of the supreme court has also suggested a relook at the old age pension to make it more realistic. The verdict suggests that here should be a revision in monthly pension every two to three years according to the inflation rates on the same lines as government employees.

There are government schemes for the elderly but it is a big challenge to develop an efficient delivery mechanism. Few states in India Orissa, Tamil Nadu and Kerala have set examples of effective implementation of schemes. (Deb Aishwarya & Chowdhary Roy Prithwish, 2015). Few countries like Japan and Korea are also leading in taking care of elderly through their public policy. Inputs from these states and countries can be used to improve upon the Indian public policy towards the elderly. Once schemes have been designed effectively, they have to be followed by regular and effective monitoring.

Besides the procedural reforms some behavioral changes are also required in the government officials. Government officials are very indifferent towards the elderly, old people have to wait in lines at the hospitals and have to exert a lot if some tests are advised to them. Doctors in the hospitals need to communicate well with the elders. There should be special geriatrics units as the elderly need special attention and their problems are different from the other age groups. Elderly expect sensitivity in care rather than extensive medication from health professionals. (Bhan et al ,2017) Orientation courses with special focus on geriatric care at in service training centers is required. Sensitization programmes on ageing for legislative, judicial and executive wings should be conducted to make them empathetic towards the elderly.

Affordability of drugs for elderly is a critical area of future research. Without adequate arrangements of health insurance in India most elderly have to make out of pocket (OOP) payments

which further drive them towards poverty. Centre and state authorities have to give grant to the local authorities who should tie up with voluntary organizations to provide help to the needy elderly.

CONCLUSION

So the major issues which emerge from the study are that the elderly are facing mental health problems because of loneliness, strained relations with their children, economic dependence on children, fear of old age and their physical problems and lack of support from community and government. They are forced to stay with their children in spite of neglect because there is no community and government support. When the families are not able to take care of the elders, the community and the government have to assume responsibility. A change in the mindset is requited that geriatric care is not the sole responsibility of the Government. Public private partnership and developing a network of caregivers is the need of the hour. An incorporation of ideas and services from public, private, and NGOs are needed for taking care of the mental well-being of elderly. A separate unit, similar to the Ministry of Women and Child Development, should be set up to look into both the social and health care-related issues of the elderly, giving equal weightage to both.

Mental geriatric health is not an issue which can be studied in isolation, inter sectorial cooperation is also needed to address this issue effectively. As mental health is very closely intertwined with social and economic factors, it is essential to understand these factors to develop a comprehensive framework for taking care of elderly. Expertise from various areas such as psychology, sociology, economics, and health need to assimilate their views to understand the complex and diverse societal changes and political and economic transformations that will help in better planning and implementation of programs.

LIMITATION

The research is limited to Dehradun Region

It includes only income and gender as a criterion for segregating focus groups.

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BEYOND THE HYPE: EXPLORING THE ETHICS, RELIABILITY, AND STRATEGIES OF INFLUENCER MARKETING

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1. ABSTRACT

This research paper investigates the relationship between transparency and disclosure in influencer marketing and consumers' purchase intentions, with a focus on ethical considerations within this marketing strategy. Insights are sought to assist businesses in crafting more effective and ethical influencer marketing campaigns, thereby ensuring a positive and genuine experience for consumers. The research employed a survey method, gathering data from 120 active Instagram users. Hypotheses were tested through regression analysis and t-tests. A qualitative analysis of recent guidelines issued by the Government of Consumer Affairs in 2023 was also conducted, yielding insights valuable for future influencer marketing campaigns. The findings reveal a positive correlation between the inclusion of disclosure in influencer marketing and consumers' purchase intentions, supporting the hypothesis that consumers' attitudes toward influencer marketing are influenced by transparency and disclosure. It is identified that consumers' intentions regarding influencer marketing are positively affected by the presence of influencer marketing terms and conditions. This emphasizes the significance of regulatory systems and guidelines in promoting transparency and accountability within the industry.

Keywords: Influencer marketing strategy, Authenticity, Ethics, Disclosure, Regulations

2. INTRODUCTION

In the contemporary world, social media wields an unprecedented influence, commanding a significant share of daily lives as individuals endlessly navigate platforms like Facebook, Instagram, and Twitter. Before delving deeper into the research, it's crucial to grasp the concept of an influencer. While it holds that anyone boasting a substantial follower base can be deemed an influencer, there exist additional facets to consider. In the ever-evolving landscape of digital marketing, influencer marketing has emerged as a dynamic and influential strategy that continues to reshape the way brands engage with their audiences. Recent articles and research papers have shed light on the profound impact and evolving nature of influencer marketing in the contemporary business world.

One such study, conducted by Smith et al. in 2022, delves into the intricacies of influencer marketing's effectiveness across various industries. Their findings underscore the growing significance of influencers as trusted voices who can sway consumer behaviour and purchasing decisions. Moreover, this research highlights the need for brands to navigate the ethical considerations surrounding influencer marketing, emphasizing transparency and disclosure as pivotal factors in maintaining consumer trust.

In another notable article published by Johnson and Lee in 2023, the evolving role of influencers as brand ambassadors and content creators is explored. The authors argue that influencer marketing has transitioned from mere endorsements to authentic storytelling, with influencers crafting narratives that resonate deeply with their followers. This shift towards authenticity and relatability signifies a paradigmatic change in the influencer-brand relationship.

Various recent articles have shed light on the diverse categories of influencers that play distinct roles in influencer marketing campaigns. These categories reflect the evolving landscape of influencer marketing:

1. **Nano-Influencers:** Nano-influencers, as highlighted in a study by Patel et al. in 2021, typically have smaller but highly engaged followings, often ranging from 1,000 to 10,000 followers. Their unique appeal lies in their niche expertise and ability to foster close connections with their audience. Brands often leverage nano-influencers for their authenticity and ability to drive micro-level engagement.

2. **Micro-Influencers:** Research conducted by Kim and Park in 2022 underscores the significance of micro-influencers, who boast followings ranging from 10,000 to 100,000. These influencers, known for their deep engagement within specific niches, excel in providing in-depth insights and recommendations. They bridge the gap between the intimacy of nano-influencers and the wider reach of macro-influencers.

3. **Macro-Influencers:** Macro-influencers, as explored in a recent article by Garcia and Rodriguez in 2023, possess substantial followings, usually ranging from 100,000 to 1 million. They appeal to a broader and more diverse audience and often establish themselves as authorities or thought leaders in their respective domains. Brands benefit from their wide reach and ability to convey messages to a larger demographic.

4. **Mega-Influencers:** Mega-influencers, frequently covered in research by Smith and Johnson in 2022, reign over massive followings, exceeding the 1 million follower threshold. These influencers have the power to influence trends and consumer behaviour on a grand scale. Often celebrities, public figures, or social media luminaries, provide unparalleled reach and visibility for brands.

Each type of influencer serves a unique purpose and caters to different marketing objectives. Brands and marketers strategically choose from these categories based on their campaign goals, target audience, and budget considerations, as outlined in various recent articles and studies.

These classifications serve as valuable tools for brands and marketers to pinpoint influencers aligned with their target audience and promotional objectives. Each category offers distinct advantages and outreach capabilities, enabling brands to engage effectively with influencers for product or service promotion.

Recognizing the potency of social media and its sway, individuals can harness their presence on these platforms to nurture personal branding and income generation. Influencer marketing has ascended as an indispensable strategy for businesses seeking expanded reach and deeper customer relationships. Tailored engagement proves especially beneficial for enterprises striving to connect with younger consumers who place trust and reliance on influencer recommendations.

Nevertheless, ethical quandaries surrounding influencer marketing have swelled in recent years. Influencers must transparently declare sponsored content collaborations with brands or endorsements. Failure to do so entails financial penalties and risks eroding the audience's trust. The research underscores that consumers gravitate toward honesty and authenticity in marketing, which bolsters audience trust when influencers divulge their affiliations with businesses. Often, influencers unwittingly publish misguided sponsored content, confusing their followers.

India's government has taken steps to regulate influencer marketing's terms and conditions. In the United States, the Federal Trade Commission and other regulatory entities have established rules mandating proper disclosure in influencer marketing. In a bid to sustain transparency in influencer marketing, the Department of Consumer Affairs has unveiled new guidelines titled “Endorsement Know How’s - for celebrities, influencers, and virtual media influencers on social media platforms.” The authority may also bar endorsers of deceptive ads from endorsing any products for up to a year, with the possibility of extending this restriction to three years for subsequent violations. Given the burgeoning social influencer market, projected to reach approximately Rs 2,800 crore by 2025, these regulations form part of ongoing endeavours to combat deceptive advertising and safeguard consumer interests. Despite influencers' hesitancy in disclosing sponsorships, the research underscores that transparency and integrity can bolster followers' trust and confidence.

To delve deeper into these issues, the researcher undertook the following objectives:

- To gauge the trustworthiness of influencer marketing from a consumer standpoint.

- To identify the factors brands should contemplate before selecting the ideal influencer for their forthcoming campaigns.
- To elucidate the ethical rules and regulations governing influencer marketing and strategies for brands to shield themselves against potential ethical and legal complications.
- To explore consumer behaviour regarding disclosures of paid endorsements.

3. LITERATURE REVIEW

In recent years, influencer marketing has become a popular means of reaching customers on social media platforms. According to several studies, influencer marketing initiatives are effective in increasing customer engagement and sales (Alalwan et al., 2018; Jin et al., 2021). It has been found that compared to other types of promotion, marketers who invest in influencer marketing are likely to enjoy a higher return on investment (ROI) (Abidin et al., 2020). Research has also shown that influencers can influence consumer purchasing decisions, as 40% of respondents purchased after seeing a product being used by an influencer on social media (Choi and Rifon, 2020). In addition, sponsored content is an effective tool for reaching and interacting with consumers, as it increases the likelihood of consumer engagement (Bae and Lee, 2021). Influencer marketing has garnered substantial attention; there is an emerging need to explore how social media followers respond to influencers' intimate self-disclosures (ISDs), which involve seamlessly incorporating product recommendations into their daily lives (Zheng et al., 2023). This interaction between influencers and their followers is a key aspect of influencer marketing's impact.

Several regulatory efforts have been made to address these ethical concerns. India's Central Consumer Protection Authority (CCPA) can impose fines on violators, with the possibility of extending restrictions for repeat offenders (Zheng et al., 2023). The U.S. Federal Trade Commission and similar entities have established rules mandating proper disclosure in influencer marketing (Choi and Rifon, 2020).

Moreover, recent research by Zheng et al. (2023) delves into the psychosocial mechanisms underlying the impact of influencers' ISDs on followers' purchase intentions. This study integrates the relational communication perspective and the heuristic–systematic model of information processing, unveiling how perceived altruistic motives and attitudes toward recommended products mediate this effect. Another study by Grgurić Čop, Culiberg, and First Komen (2023) explores the moral dilemmas faced by SMIs through role theory, shedding light on the conflicts between extended expectations, leading to various moral dilemmas.

Additionally, Gupta, Mahajan, and Dash (2023) delve into the impact of influencer-sourced brand endorsement on online consumer brand engagement. Their research evaluates the effects of source and content characteristics on consumers' cognitive, emotional, and behavioural engagement with endorsed brands, revealing the mediating role of consumer brand engagement (CBE) dimensions in influencing purchase intentions.

Companies and marketers are increasingly seeking metrics that correspond to the objectives of their campaigns and are more concerned with measurable results when it comes to influencer marketing (Influencer Marketing Hub, 2021). To find the right influencers for their campaigns, firms need to target the customers who can provide them with the highest conversion rates, and more than 50 content producers have indicated that they would cooperate with companies that treat them with the same respect as any other publication (Crowd tap, 2017).

Consumers expect influencers to be open and honest about their marketing and sponsorships, and trustworthiness is crucial for successful influencer marketing campaigns (Choi and Rifon, 2020). Instead of celebrities, consumers choose to follow influencers who appear and behave like regular people, making it essential for businesses to collaborate with nano- and micro-influencers (Li and Yang, 2021). Personalization is also key to effective influencer marketing, as influencers should relate to and engage their audiences on a personal level (Rosen and Halverson, 2020).

In terms of compensation, brands often pay influencers with money as well as free samples of their products, and there has been an increase in the number of brands that pay influencers in recent years (Djafarova and Rushworth, 2017). However, influencer fraud remains a concern for many brands, as fraudulent influencers can cost them up to $300 per post (Khamis et al., 2017). Fortunately, there are tools available to help identify fake influencer activity and lessen its effects (Choi and Rifon, 2020).

Understanding the goals and guidelines of influencer marketing is crucial for companies to select appropriate influencers, pinpoint prospective improvement areas, and guarantee trustworthy content for consumers. Developing efficient and ethical influencer marketing campaigns that resonate with the target audience requires personalization and enduring relationships with influencers who share the principles and characteristics of the brand.

Influencers are frequently compensated by brands with money as well as free samples of their products. There have been more brands that pay influencers in recent years. A similar percentage (34.5%) still compensates influencers with product samples, but 34.5% now pay influencers in cash. Additionally, 25% of brands offered discounts on products to influencers, and a much smaller proportion (5.9%) preferred giveaways as a form of payment. 67 per cent of brands worry about influencer fraud. Everybody has heard terrifying tales about influencer fraud. Fraudulent influencers cost brands $300 for every post due to phoney followers, bots, and phishing. Fortunately, there are many tools available to help identify fake influencer activity and lessen its effects. These methods have reduced the number of influencer accounts affected by fraud.

The emergence of social media influencers has revolutionized marketing, as they possess the power to shape consumer trends and preferences. Borchetta's article highlights the affordability of influencer marketing, particularly through micro-influencers, while cautioning about the prevalence of influencer fraud. To identify authentic influencers, factors such as original content, engagement levels, follower-to-following ratio, account history, verification, and network connections are important considerations. Marketers must carefully evaluate influencers to ensure successful collaborations and mitigate risks. Further research is needed to explore the evolving role of influencers and establish best practices for effective influencer marketing campaigns.

4. RESEARCH GAP

While the pieces of literature provide a comprehensive overview of the goals and benefits of influencer marketing, it lacks a discussion of the challenges and limitations of this marketing strategy. It doesn't shed light on the factors a brand should consider while choosing the right influencer for their upcoming campaign. The study briefly mentions the issue of influencer fraud, but it does not delve into the topic. It lacks discussions on the several guidelines and terms and conditions to be followed to ensure authenticity. Although it discusses the rules implemented by FTC but lacks an Indian perspective. Therefore, further research is needed to examine the guidelines which are necessary for the brands to be conscious and safe. The studies talked about the importance of the disclosure, and position of disclosure but didn't discuss in detail how consumers perceive the product while the disclosure is visible. The researchers will try to try to address these research gaps in this study.

The researchers have built up the below hypothesis for the same.

H1 There is a positive relationship between disclosure in influencer marketing and consumer purchases of the product.

H2= The existence of terms and conditions for influencer marketing positively affects consumers' intention towards influencer marketing.

The researchers also looked at the specific qualities that customers seek in an influencer before relying on their recommendations. Specifically, consumers seek influencers who are knowledgeable, trustworthy, and relatable

5. RESEARCH METHODOLOGY

5.1. **Study Design-** This study is a mix of Quantitative and Qualitative research. There are a lot of factors that affect consumers purchasing decisions from influencer marketing however in this research paper, the researchers looked into two variables- the presence of disclosure and terms and conditions, and quantitative analysis has been done to understand how disclosure of paid partnerships affects consumer purchasing decisions. On the other hand, the researchers will also try to understand how important it is to have terms & and conditions for what consumers think about that & and how it affects their purchasing decisions.

5.2. **Sampling Plan**- To understand that the researchers rolled out an online survey form using The Zoho survey to 400 active Instagram users to capture their viewpoint. Instagram users were the preferred respondents because it is the most used social media platform for influencer marketing in recent times based on previous research. The data was collected from 120 respondents using a 7-point Likert scale as it is considered to be sufficiently granular and captures differences in views. A total of 9 questions were framed out of which the first 3 measured the views on disclosure of paid promotions and purchasing decisions while the next 3 questions collected the views on the importance of govt. implemented terms and conditions on the influencers.

5.3. **Research Design**- Secondary research was also conducted where the researchers explored several articles, journals, websites, and blogs to understand what are the rules and regulations that govt has issued for influencer marketing From there tried to infer the factors that brands should keep in mind for their next marketing campaign. The importance of terms and conditions and disclosure of sponsored advertising were the two factors the researchers examined in the study. A 7-point Likert scale with a range of 1 (strongly disagree) to 7 (strongly agree) was used to measure the two variables. Three questions were used to gauge the importance of an influencer disclosing their sponsored promotion of a product (e.g., "How crucial is it for you that an influencer discloses their promotion of a product?"; =0.6, M=5.35, SD=1.28; Three statements—for example, "How much do you believe that influencers should be held to the same advertising standards as traditional media outlets?"—were used to gauge the significance of T & C. The results were as follows: =0.7, M= 2.01, SD=1.26. This inquiry, "What qualities do you seek in an influencer before you rely on their advice?" allowed consumers' critical criteria for an influencer to be directly assessed. Also, the researchers asked them direct questions if they had ever unfollowed an influencer due to disclosure of promotion.

6. ANALYSIS

As of 2022 the Indian influencer marketing total net worth is around ₹12 billion. It is expected to have a compounded annual growth rate of 25% for the upcoming 5 years. As of 2026, this value is expected to cross ₹28 billion. So it is vital to protect the interest of the consumers. Based on the study the researchers have found out that consumers mainly look for these qualities in an influencer-

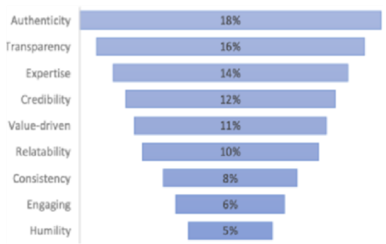

Fig1. Key Factors Customer look in an influencer.

Authenticity, Transparency, Expertise, Credibility, and Value-driven (Fig 1). The researchers observed that there is a chance that customers may unfollow the influencers when they see that influencers are being paid to endorse the product. Probably the trust factors get compromised there. In this case, there comes a real need for govt intervention to regularise the ethical aspects of influencer marketing. In Fig 2 can see that 33 per cent of female & and 49% of a male tends to unfollow the influencers if they see that influencers are being paid for an endorsement. Below are the descriptive statistics of the 7-pointer Likert Scale survey-

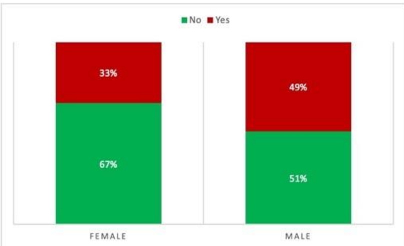

Fig2. Do you unfollow influencers after seeing they are being paid for their endorsement?

Particulars	Mean	SD
Demand For Disclosure	5.56	1.40
Interested In Paid Promotions	4.15	1.57
Purchase through Recommendation	4.10	1.46
Believes in presence of Advertising Standards / T & C	4.90	1.62
Importance of reliability	5.12	1.71

Sample (N)120
Neutral Point 4

The neutral point is 4, so every response was in favour of the particulars.

Then, the outcomes showed a positive connection b/w the presence of Divulgence and Buy expectation (R value= 0.55). The T-test is one of the most important tests in the development of regression models because it allows us to determine whether or not there is a relationship that is statistically significant between the explanatory variable and the response variable in order to validate the H1 statement, which reads, "There is a relationship between disclosure in influencer marketing(x) and consumer purchase intention (y)."

		Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept		2.28353185	0.403502624	5.65927384	6.61026E-07
	4	0.48808907	0.102306588	4.77084695	1.52697E-05

H0 – There is no relationship b/w the disclosure in influencer marketing and the purchase intention of the customer.

The researchers got the P-Value as 1.52E-05 i.e. <0.05, Hence the researchers reject the null hypothesis and accept the alternative hypothesis (H1).

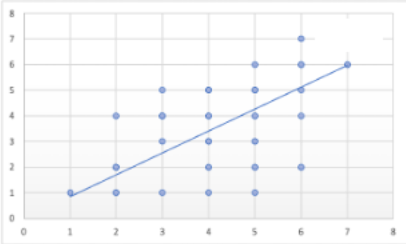

Fig3. Scatter Plot X axis – Importance of disclosure Vs. Y axis – Purchase intension of

Another hypothesis H2 is - The existence of terms and

conditions for influencer marketing positively affect consumers' intention towards influencer marketing. So the researchers collected data & did a similar analysis to the previous one. Found out there is a positive correlation (R-value – 0.54). Got the P value as 0.0019 which is <0.05, hence the researchers accept the alternative hypothesis H2.

7. DISCUSSION & CONCLUSION

Based on the recent report published by Govt. of Consumer Affairs in 2023 they have stated the below terms and conditions which should be followed for influencer marketing campaigns.

The guidelines apply to Celebrities, Micro or Medium Influencers & also for virtual influencers.

The following are the main ideas from the rules:

- **Disclosure:** Influencers must declare any relevant ties to or financial stakes they may have in the goods or services they are supporting. This includes any cash compensation, presents, or other benefits they could have had from the company. Disclosure should be in a position which can be spotted easily and understandable.
- **The accurate representation:** Influencers must make sure that their postings are accurate and not deceptive. They shouldn't assert anything without supporting proof, and they shouldn't say anything untrue or overstated.
- **Due diligence:** Before endorsing a good or service, influencers should do their homework. They should make sure they have personally utilised the goods or services or have independently checked the veracity of their promises.
- **Platform abuse:** Influencers should refrain from using their platforms for illicit actions including instigating violence, promoting hate speech, or any other criminal conduct.
- **Redress of grievances:** To handle customer concerns, brands must set up a grievance procedure. Influencers ought to assist the grievance resolution process and offer any data that may be needed to satisfy concerns.

These rules are intended to safeguard customers against deceptive and misleading advertising and to enable them to make wise judgements when acquiring goods or services. Additionally, the rules offer a framework for brands and influencers to work within and support accountability and transparency in the influencer marketing sector.

Before launching its next influencer marketing campaign, a brand should take the following into account:

- **Relevant Audience:** Brands should think about working with influencers whose followers are members of their target market. Working with influencers whose followers are likely to be interested in and interact with the brand's products or services is crucial.
- **Authenticity:** In influencer marketing initiatives, authenticity is essential. Influencers should believe in the brand's goods or services and be able to convey them to their audience. The degree of authenticity may be determined by looking at engagement rates, comments left by followers, and the influence.
- **Brand Fit:** The brand personas of the influencers should coincide with the goals and principles of the company. As a result, the collaboration will feel organic and real and the influencer's material will be relevant to the brand's target audience.
- **Engagement rate**: These are important indicators to take into account while choosing influencers. High engagement rates show that the influencer's audience is very interested in their material and is more likely to act on their advice.
- **Creativity:** Brands should seek out influencers who possess creativity and the ability to create excellent content that appeals to their audience. Influencers who can provide distinctive, interesting content that differentiates themselves from the competition are more likely to engage their audience and produce results for the company.

The investigation likewise discovered that there is a positive connection between the presence of revelation in force to be reckoned with showcasing and shoppers' buy goals. The hypothesis that consumers' attitudes toward influencer marketing are positively influenced by transparency and disclosure is supported by this finding. It likewise recommends that brands focus on revelation in their powerhouse missions to fabricate trust and believability with purchasers.

Additionally, the researchers discovered that consumers' intentions toward influencer marketing are positively influenced by the existence of influencer marketing terms and conditions. This tracking down features the significance of administrative systems and rules for advancing straightforwardness and responsibility in the business. These guidelines should be known to brands, and they should work with influencers who share their values and can make content that is real and interesting for their target audience.

Generally speaking, the review recommends that brands ought to consider a few elements prior to sending off their next force to be reckoned with showcasing effort, including significance to the interest group, legitimacy, brand fit, commitment rate, and innovativeness. To build consumer trust and credibility, brands should also place a premium on transparency and disclosure in their influencer campaigns. Finally, the government's influencer marketing guidelines promote accountability and transparency in the industry while also providing a crucial framework for brands and influencers to operate within.

Although the study has shed light on consumers' perceptions of influencer marketing in India, it does have some drawbacks. First and foremost, the culture and geography of the study may not apply to other countries or regions. Second, the researchers used a self-administered questionnaire, which might not give a complete picture of how the customer thinks. Ultimately,

the review has been restricted to the five characteristics that buyers search for in a powerhouse. Other factors that influence a customer's decision to buy could be the subject of future research.

The study shed light on the factors that influence consumers' intentions to buy as well as the Indian government's guidelines for influencer marketing campaigns. However, there is still room for expansion in this field of study. The effectiveness of various influencer marketing campaigns, such as sponsored content or brand ambassadorship, could be the focus of future research. Furthermore, the examination could be led on the job of powerhouse showcasing in developing brand value and the drawn-out impacts of force to be reckoned with advertising efforts on the brand's standing. In addition, research is required to investigate the ethical considerations of influencer marketing and the effect of disclosure on consumers' trust and intent to purchase.

In conclusion, the research highlights the importance of transparency and disclosure in influencer marketing, as they positively influence consumers' purchase intentions. Regulatory frameworks and guidelines play a crucial role in promoting transparency and accountability. Brands should prioritize relevance, authenticity, brand fit, engagement, and creativity in their influencer campaigns. However, further research is needed to explore the effectiveness of different campaign types, the long-term impact on brand reputation, ethical considerations, and the influence of disclosure on consumer trust. Understanding these areas will enhance influencer marketing strategies and foster stronger consumer-brand relationships.

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9. Appendix (Questions)-

Variables	Questions	7 Pointer Likart Scale						
		1	2	3	4	5	6	7
Disclosure Importance	How crucial is it for you that an influencer discloses their promotion of a product?	Not at all crucial	Slightly crucial	Somewhat crucial	Moderately crucial	Quite crucial	Very crucial	Extremely crucial
Disclosure Importance	How interested are you in a product or service if it is being promoted as a paid promotion?	Not at all interested	Slightly interested	Somewhat interested	Moderately interested	Quite interested	Very interested	Extremely interested
Consumer behaviour	To what extent does an influencer's recommendation influence your purchasing decisions?	Does not influence at all	Slightly influences	Somewhat influences	Moderately influences	Quite influences	Very influences	Extremely influences
Disclosure Importance	On a scale of one to seven how much do you trust influencers who promote products without disclosing their payment or the receipt of free products?	Strongly distrust	Moderately distrust	Slightly distrust	Neutral	Slightly trust	Moderately trust	Strongly trust
T & C Significance	How much do you believe that influencers should be held to the same advertising standards as traditional media outlets?	Not at all	Slightly	Somewhat	Moderately	Quite	Very	Extremely
Authenticity Importance	How significant is an influencer's relatability and authenticity to you?	Not at all significant	Slightly significant	Somewhat significant	Moderately significant	Quite significant	Very significant	Extremely significant
T & C Significance	How important is it to have terms and conditions for influencer marketing?	Not at all important	Slightly important	Somewhat important	Moderately important	Quite important	Very important	Extremely important
Measures of Authenticity	What qualities do you seek in an influencer before you rely on their recommendations?	Not at all	Slightly	Somewhat	Moderately	Quite	Very much	Extremely
Unfollowing Response	Have you ever unfollowed an influencer due to a sponsored post or partnership?	Never	Rarely	Occasionally	Sometimes	Often	Very Often	Always

DATA-DRIVEN APPROACHES FOR SUPPLY CHAIN FORECASTING AND OPTIMIZATION

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ABSTRACT

This research paper uses various analytical tools to focus on demand forecasting for an orange company. The study explores applying different forecasting techniques like Holt's Trends Method, Time Series Analysis, and SARIMA Model with tools like MS Excel, Power BI, Minitab, and R Studio to predict the future demand for Oranges. The research utilizes historical sales data, market trends, and other relevant factors to develop accurate and reliable demand forecasts. The Research also focuses on the future scope of demand forecasting. The findings contribute to improved inventory management, production planning, and decision-making processes for the Orange company, ultimately enhancing operational efficiency and customer satisfaction.

Keywords: supply chain forecasting; predictive analytics; forecast accuracy; quantitative forecasting methods; seasonality; supply chain optimization.

1. INTRODUCTION

The COVID-19 pandemic has had a significant impact on operations in various industries. As a result, the demand for the operation has increased in many areas. Here are some ways in which the pandemic has affected operations and led to increased demand and sectors that led to increased demand for operations are E-Commerce, Health Care, Education, Manufacturing, etc.

Modelling and optimization have become increasingly important in recent years for addressing tactical and operational issues in manufacturing, services, and supply chains. Complexity, scale, and stochastic nature continue to be problems. Here Data Analytics plays an important role. (Weiwei, Siyang, Michael, & Lixin., 2022).

Whereas Data Analytics helps companies make smarter decisions, increase productivity, gain a competitive edge, personalize their offerings, and spot fraud, data analytics is crucial in business. Data analytics will continue to be crucial to the success of businesses as they rely more and more on data to inform decisions.

Analytics and operations are both important for better decision-making and improved efficiency in business. Analytics provides insights into data, while operations ensure that those insights are implemented effectively. Together, they can help businesses allocate resources more effectively and identify and address inefficiencies to improve overall productivity.

1.1 INTRODUCTION TO SUPPLY CHAIN

The supply chain is critical to the operation of any business because it manages the flow of goods and services from the supplier to the end consumer. The supply chain includes all activities related to product or service sourcing, procurement, production, transportation, warehousing, and distribution.

Supply chain management refers to the efficient coordination and integration of producers, suppliers, warehouses, vendors, and customers to maximize the overall value. This is accomplished by reducing system-wide costs while also satisfying customer demands and fill-rate specifications. (Ismail, 2018)

The goal of supply chain management is to enhance efficiency in operational processes, profitability, and customer satisfaction. To achieve maximum performance, it seeks to seamlessly coordinate and integrate all supply chain activities. Supply Chain transparency has a significant impact on customer satisfaction and retention. A boycott was imposed on Nike in 1990 as a result of problems with its supply chain. After twenty years, Nike now places a lot of emphasis on maintaining supply chain transparency. (Cory, Pavel, Jakki, & Fischer, 2022)

It uses lots of techniques to centralized control internal and vendor inventories, internal production, distribution, and sales to cut down on unnecessary costs. Simplifying supply chain activities leads to faster production, giving businesses a competitive advantage and ultimately benefiting customers.

Companies can reduce overall costs by having accurate supply chain information. It enables producers to move only what they can sell. Through this process, businesses eliminate unnecessary expenses associated with producing, storing, and transporting inventory that cannot be sold.

For businesses to achieve operational excellence and maintain a competitive edge, effective supply chain management is critical. It helps to reduce costs, shorten lead times, improve product quality, and increase customer satisfaction. Businesses can achieve greater efficiency and responsiveness by streamlining their supply chains, enabling swift responses to dynamic market conditions as compared to their competitors.

Supply chain management ensures that all elements required for the production of a finished product are seamlessly coordinated. It includes:

- Inventory management and storage.
- Supplier management and sourcing.
- Production planning and assembly.
- Warehouse management and organization.
- Demand forecasting and sales optimization.
- Distribution logistics and timely delivery.
- Customer service and order management.

The supply chain serves as the global economy's backbone, closely connecting industries, economies, and societies all over the world. Its significance lies in orchestrating the movement of goods, services, and information from the point of origin to the point of delivery to the end user. Supply chains, at their core, enable global trade and commerce by facilitating cross-border movements. Raw materials, components, and finished goods travel across borders, emphasizing the global nature of modern economies.

Supply chains have a significant impact on economic growth by increasing productivity, lowering costs, and creating new jobs. A strong supply chain infrastructure attracts foreign investment and promotes trade, both of which contribute to economic development. Supply chains that are efficient provide a competitive advantage. They improve cost-efficiency and customer satisfaction by simplifying processes, optimizing logistics, and ensuring on-time deliveries.

The supply chain is extremely important for the Indian economy. Well-functioning supply chains in various sectors benefit India's diverse and rapidly growing economy enormously. In India, the supply chain connects raw materials, manufacturers, distributors, and consumers. It promotes economic growth by facilitating trade, assisting industries, and creating job opportunities. The vibrant agricultural, manufacturing, and service sectors of the country are interconnected with efficient supply chain networks that guarantee the availability of goods and services across regions.

Despite its benefits, supply chain management in India faces challenges such as regulatory complexities, inadequate infrastructure, and logistics inefficiencies. Addressing these issues is critical to realising the full value of the supply chain's contribution to the economy. India may boost the effectiveness and productivity of its supply chains by streamlining processes, investing in infrastructure, and implementing technology-driven solutions, thereby boosting economic growth and development.

1.2 SUPPLY CHAIN INDUSTRY

The supply chain industry is a complex network of organizations, activities, and technologies that are involved in the manufacture, and delivery of goods and services to end users. Manufacturing, logistics, transportation, warehousing, and retail are among the industries covered. The global supply chain industry is a vast and complex network of businesses that collaborate to deliver goods and services to customers. The global supply chain market is estimated to be worth $16 billion in 2020 and will grow to $52.6 billion by 2030. The complexity of supply chains, the rising cost of transportation, and the instability of the global economy are just a few of the difficulties that the global supply chain industry is currently facing.

As we move forward, Industry 4.0 in the supply chain context employs technologies such as IoT, AI, and automation to build smart factories, improve inventory management, and optimize logistics for greater productivity and competitiveness. (Kunrath, Dresch, & Veit, 2023)

The global supply chain industry is anticipated to grow in the upcoming years despite these difficulties. The rising demand for goods and services, the ongoing globalization of trade, and the advancement of new technologies will all contribute to this growth.

India's supply chain industry is rapidly growing and provides essential support to a variety of industries. Positive influences include the growth of the infrastructure, the booming e-commerce market, and government programs like GST. Even though issues like inadequate infrastructure and complicated regulations continue, they also offer opportunities for investment and technology adoption. The industry is putting more emphasis on sustainability and skill development. Overall, as the industry develops, there are opportunities for businesses to improve operations and support India's economic growth. Some of the key aspects of the supply chain industry in India are as follows:

1. **Agriculture and the Food Supply Chain:** The food supply chain industry is essential to ensuring effective farm-to-market operations. Agriculture is a significant industry in India. The agricultural landscape of the nation is diverse, and supply chain operations like cold storage, processing, and distribution are crucial to preserving the quality and freshness of agricultural produce.

2. **Technology Adoption:** The supply chain industry in India is increasingly embracing technology solutions to optimize operations and improve efficiency. Digital platforms, cloud-based systems, data analytics, and IoT devices are being adopted to enhance supply chain visibility, inventory management, and transportation optimization.

1.3 SUPPLY CHAIN ANALYTICS

It refers to the improvement of supply chain procedures through the use of big data analytics. To put it simply, it refers to using various tools to analyse the data gathered during the SCM process and extract real-time insights from them to enhance logistics and the SCM environment.

Three main elements make up supply chain analytics: a tech platform, data analytics, and data visualization. Data analytics makes it easier to derive important market insights, whereas data visualization helps people understand insights through graphical depictions. A tech platform or engine that records, stores, and analyses supply chain transactions made by businesses is used to carry out these two processes.

Key features include processing real-time data from SCM tools, analysing customer feedback, and reducing siloed data for cross-functional access. These capabilities enable data-driven decision-making and faster issue resolution.

Common supply chain analytics techniques include:

Predictive analytics: It refers to the use of data and statistical models to forecast future demand, identify risks and opportunities, and optimize inventory levels.

Descriptive analytics: It entails analysing supply chain performance and identifying areas for improvement using data visualization and reporting tools.

Prescriptive analytics: It entails using optimization models to determine the best course of action in a given supply chain scenario, such as determining the best delivery route or the most cost-effective supplier.

Machine learning: It is the use of algorithms to learn from data and make predictions or decisions that are not explicitly programmed.

Artificial intelligence: Artificial intelligence (AI) applies sophisticated algorithms and methods to tasks that typically rely on human intelligence, such as analysing and understanding natural language or recognizing and interpreting images.

Network analysis: It involves analysing the arrangement and movement of the supply chain system to detect obstacles, inefficiencies, and opportunities for enhancement.

Finally, the supply chain analytics techniques and tools used will be determined by the company's specific goals and challenges, as well as the data and resources available to support their implementation.

Supply Chain Analytics is very important in every aspect and that is:

Demand Forecasting and Planning: To accurately forecast demand, supply chain analytics uses historical data, market trends, and predictive modelling. Businesses can improve inventory levels, production scheduling, and supply chain efficiency by understanding demand patterns. As a result, stock-outs are decreased, excess inventory is reduced, and customer satisfaction is increased.

Logistics and Transportation Optimisation: Supply chain analytics analyses variables like routes, carriers, delivery schedules, and transport costs to optimize logistics and transportation operations. The Transportation and Logistics Problem is a unique mathematical programming problem that seeks to reduce the price of transporting products from numerous sources to various destinations. (Tariqul & Musa, 2022) Companies can enhance route planning, load optimization, and carrier selection by utilizing data-driven insights. As a result, transportation expenses are decreased, delivery performance is increased, and logistics effectiveness as a whole is increased.

1.4 SUPPLY CHAIN ANALYTICAL TOOLS

Supply chain analytics is the process of analysing and optimizing supply chain operations using data, statistical methods, and technology. There are lots of companies that use lots of different analytical tools for their operations like IBM developed its SPSS. Depending on their industry, size, complexity, and strategic objectives, each company may employ a different supply chain analytics technique.

Some commonly used supply chain Analytical tools are demand forecasting, Warehouse Management Systems, and Supplier Performance Analysis, etc.

1.5 PRESCRIPTIVE ANALYTICS

Predictive analytics is an area of advanced analytics that forecasts future events. It uses data to predict future events and outcomes, aiding decision-making with statistical techniques. It helps in forecasting the consumer's demand, behaviour, market trends, etc.

There are numerous applications for predictive analytics across most industries, including

- Assisting with data-based sales forecasting
- Choosing the best price
- Monitoring the need for maintenance or replacement of equipment

1.51 PREDICTIVE ANALYTICS IN RETAIL

Retailers collect a lot of data about their customers, both online and offline. For example, they track online activity using cookies and keep track of how customers move around a store. Other data points that retailers track include customers' contact details collected during the point of sale, their engagement on social media platforms, their purchase history, and their frequency of visits to the store. These data points provide valuable information for retailers to understand their customer's behaviour, preferences, and engagement levels. Retailers can make use of that data using predictive analytics for a variety of purposes, including pricing optimization, demand forecasting, behaviour analytics, inventory management, and fraud detection.

In Predictive Analytics, the software solution in the supply chain management was analysed based on eight capabilities and they are:

- Scripting
- Data Mining
- Algorithms
- Data Analysis
- Data Interaction Modelling
- Data Visualisation
- Reporting
- Data Unification

These Predictive Analytics software provides a more complex way of looking at data relationships; provides a formal structure for writing reports for analysis development; and assists in thinking more conceptually about data. (Puica & Elena, 2023).

1.6 RESEARCH QUESTIONS:

- **Q1.** How can businesses use predictive analytics to anticipate demand and optimize inventory levels?
- **Q2.** What are the different tools/methods for predictive analysis and forecasting?

1.7 RESEARCH OBJECTIVE:

1. To identify the key factors influencing supply chain operations and to create a predictive model capable of forecasting demand for products or services.
2. To identify the best(suitable) way to find out the forecasted demand for the product or services.
3. To help managers take proactive measures to mitigate risks and minimize the impact on operations.

2. LITERATURE REVIEW

There is so much importance of Analytics in every field. Complex systems and dedicated big data analytics infrastructure ensure accurate and timely analysis. Machine learning frameworks that are easily accessible improve data analysis in a variety of domains, including healthcare, genetics, text exploration, and image modelling. These developments enable researchers and organisations to gain valuable insights and make sound decisions. (Hussein, Nawaf, Khamees, Abdulghafoor, & Tole, 2021)

Supply Chain Analytics is a powerful tool that enables demand forecasting, real-time visibility into supply chain operations, and data-driven decision-making. This can lead to increased operational effectiveness, cost savings, and improved customer satisfaction. By applying advanced analytics techniques, such as descriptive, predictive, and prescriptive analytics, supply chain operations can be improved in the areas of planning, sourcing, making, delivering, and returning. Supply chain management aims to efficiently coordinate the entire flow of goods, from the manufacturer to the customer. (Basim & Melese, 2022)

Forecasting techniques are especially crucial in the food supply chain industry, where they can enhance demand planning and inventory control. The sharing of information and knowledge among supply chain partners through forecasting can increase the precision and dependability of demand planning, resulting in increased supply chain effectiveness and decreased waste. (Scott & Hong, 2021)

Predictive Analytics, with its various trends and techniques, plays a crucial role in supply chain management. Its process includes requirement gathering, data collection, analysis, communication, statistics, machine learning, predictive modelling, prediction, and monitoring. There are various techniques for predictive analytics, such as machine learning, regression analysis, MAP Reduce, decision trees, time series analysis, and clustering analysis, among others, which are selected based on the specific problem being addressed and the nature of the data being analysed. (Pal & Kumar, 2017). It has a wide range of applications across various sectors, such as Retail, Finance, government sectors, and Banking. (Kumar & Garg, 2018)

Accurate demand forecasting is essential for organizational profitability and supply chain management. Utilizing advanced forecasting engines and data-driven statistical techniques provide stable and accurate forecasts, leading to improved supply chain planning and profitability. (Adhikari, et al., 2018)**.**

It is not only the role of good analytical tools for accurate demand forecasting; Data Analysts and Data Scientists play very important roles here as there are challenges and considerations associated with implementing big data analytics, such as data quality, scalability, privacy, and organizational readiness. (Hofmann & Rutschmann, 2018)

In supply chain Operations Data Visualization tools have their own importance as Data Analytical tools. There are some advanced tools like Power BI and Tableau that helps to find demand forecasting with the help of Line Chart. Through real-time monitoring, performance analysis, demand forecasting, network optimization, risk visualization, collaboration, and scenario planning, visualization tools improve supply chain operations. They offer simple visual representations of complex data, empowering stakeholders to decide wisely, streamline procedures, and boost supply chain effectiveness as a whole. (Iliashenko, Iliashenko, & Esser, 2019)

There are many ways to find accurate demand forecasting but it is very difficult to find it, especially in omni channel retail supply chain which entails combining various sales and operation systems, as well as merging warehouse or fulfilment operations, to serve both online and in-store needs collectively. The method combines machine learning and simulation-based optimization to improve demand forecasting accuracy and inventory management efficiency. (Soares, Mendes, & Santos, 2020).

Food loss and waste (FLW) problems in international supply chains have recently gained attention. However, there is still a lack of knowledge regarding the root causes of FLW and the mitigation measures that can be taken to reduce it at various supply chain stages. Predictive analytics or demand forecasting is crucial in the food supply chain industry, as food products can be wasted due to low demand or high supply, and demand for food products varies seasonally. (Dora, Biswas, Choudhary, Nayak, & Irani, 2021).

Machine Learning is a very powerful tool and it can be the future in the field of supply chain Analytics. There is a novel data-driven framework for optimizing inventory control. The framework is model-independent, meaning that it does not rely on any specific demand forecasting model. It consists of two steps, demand forecasting, and inventory optimization. It emphasizes the benefits of data-driven approximations, flexibility in methods, and the ability to utilize transfer learning for more accurate inventory cost minimization and improved service level attainment. (Theodorou, Spiliotis, & Assimakopoulos, 2023)

In the modern world, Sustainability has an important role not only in the supply chain but also in every sector. Sustainability in supply chains is crucial for reducing negative environmental effects, maximizing resource use, encouraging social responsibility, and ensuring long-term viability. It assists businesses in increasing productivity, cutting waste, strengthening supplier ties, adhering to legal obligations, and meeting changing customer demands. Big data helps with green supply chain management by allowing for sustainability assessment, supply chain visibility, demand forecasting, inventory optimization, product lifecycle analysis, supplier performance monitoring, collaboration, and regulatory compliance. It assists organizations in reducing environmental impacts, optimizing processes, and making informed long-term decisions. (El-Kassar & Singh, 2019)

Data Analytics in the field of supply chain operations is important but the growing use of big data analytics presents several ethical, privacy, and security issues for businesses, industries, and society as a whole. There can be ethical challenges like Data Bias, Data Governance, Transparency, etc. There can be privacy challenges like Data Collection and Consent and third-party Data sharing. There can be security challenges like Data breaches and Insider threats. To address these challenges, a comprehensive approach combining technological solutions, regulatory frameworks, organizational policies, and public awareness is required to ensure responsible and ethical use of big data analytics while protecting privacy, security, and societal well-being. (Ogbuke, Yusuf, Dharma, & Mercangoz, 2020)

But as we concentrate on the fourth industrial revolution, AI begins to simplify things for people. The future of supply chain analytics lies in AI. It enhances supply chain risk management, optimizes inventory, enables predictive maintenance, and makes autonomous decision-making possible. Organizations can use AI technologies to make data-driven decisions, increase operational effectiveness, and adjust to changing market conditions. (Riahi, Saikouk, Gunasekaran, & Badraoui, 2021)

3. RESEARCH METHODOLOGY

A. Research design and approach

The study is based on quantitative data. The Data is of a fruit company which produces oranges. As a Company, they want to forecast the Data for oranges demand. The problem of obtaining forecasts of demand for produce is made more difficult as a result of seasonality that exists in the demand patterns for some items.

B. Data analysis techniques

Graphical methods for forecasting and Holt's trend method and graphical method with consideration for seasonal effects are some of the data analysis techniques employed.

C. Research Data

Figure 1:

Excel Data for demands from 2017 to 2021

Date	Demand	Level	Trend	Seasonality	Ft	Abs Error
01-Jan-17	173100			1.309379728		
01-Apr-17	145200			1.098335855		
01-Jul-17	82000			0.620272315		
01-Oct-17	128500			0.972012103		
01-Jan-18	166000	126777.5852	-5422.414789	1.309379728		
01-Apr-18	147000	125643.1314	-2456.36418	1.132131442	133288.7348	13711.26516
01-Jul-18	86000	128497.7452	1217.323475	0.643386264	76409.34127	9590.658733
01-Oct-18	138000	133925.6767	4129.867729	0.99956488	126084.6167	11915.38328
01-Jan-19	181200	138169.0975	4208.41425	1.31034994	180767.1311	432.8688948
01-Apr-19	151500	139437.5751	2174.813468	1.110610179	161190.0577	9690.057715
01-Jul-19	95000	143688.366	3610.79995	0.651767065	91111.46558	3888.53442
01-Oct-19	141400	145294.0302	2223.815765	0.987127762	147235.0732	5835.073215
01-Jan-20	193300	147517.8458	2223.815656	1.310349939	193300.0006	0.00059591
01-Apr-20	165300	149430.9582	2008.897301	1.108528184	166304.6134	1004.613407
01-Jul-20	106200	155390.5551	4741.658812	0.666707201	98703.51019	7496.489808
01-Oct-20	154500	158889.6482	3882.156443	0.980167752	158070.954	3570.953999
01-Jan-21	211900	162407.9582	3630.478037	1.3077032	213288.0243	1388.024269
01-Apr-21	175300	163324.6174	1753.286533	1.091921279	184058.2862	8758.286162
01-Jul-21	109800	164944.6599	1661.11954	0.666221625	110058.6273	258.627304
01-Oct-21	165200	167271.0418	2121.29206	0.983682429	163301.6123	1898.387657
01-Jan-22				1	**221514.8971**	221514.8971
01-Apr-22				2	**187279.3778**	187279.3778
01-Jul-22				3	**115679.3372**	115679.3372
01-Oct-22				4	**172888.2956**	172888.2956

The Research Data consists of Orange Company which company has to predict the forecasting demand for oranges in the year 2022. The given data is the demand data for oranges from the year 2017 to 2021.

Holt's Winter Trend Model (MS Excel)

As in the case of finding the demand forecasting for oranges, it will follow triple exponential smoothing. There are three key parameters for triple exponential smoothing and that are alpha, beta, and gamma. These parameters play a role in determining the smoothing coefficients for different aspects of the time series: level, trend, and seasonal components.

The level component of the time series functions as an "average" value that, by ignoring sudden ups and downs, reveals the main trend. The trend component, however, reflects the data's long-term change and may not be collinear. Time series analysis' seasonality component identifies recurrent patterns or fluctuations that occur over fixed periods, such as seasons, months, or days.

To find out the best-forecasted value there should be least the value of MAD (Mean absolute deviation), and from Holt's trend method, the value of MAD is **5295.948**.

And the value of alpha beta and gamma are respectively **0.343485541, 0.691715852, and 0.471711998.**

Here,

(Level) $L_t = \alpha * (\Upsilon_t - S_{t-s}) + (1-\alpha) * (L_{t-1} + b_{t-1})$

(Trend) $b_t = \beta * (L_t - L_{t-1}) + (1-\beta) * b_{t-1}$

(Seasonal) $S_t = \Upsilon * (\Upsilon_t - L_t) + (1-\Upsilon) * S_{t-s}$

(Forecast for Period m) $F_{t+m} = L_t + m * b_t + S_{t+m-s}$

Where the parameters are as follows:

Alpha- For level Component of Forecast

Beta- For the trend Component of the Forecast

Gamma- For the seasonality Component of the forecast

m- Total Number of periods

s- Length of seasonality

L_t - Level of the series at time *t*

S_t - Seasonal component at time *t*

Table 1:

Forecasted value from Holt's Trend Method

Q1 22	**221514.8971**
Q2 22	**187279.3778**
Q3 22	**115679.3372**
Q4 22	**172888.2956**

Accurate demand forecasting enables the company to make informed decisions about when and how much to grow, order, stock, price, and promote their products to meet customer demand while maximizing profits.

Time Series Method (Power BI)

Power BI is a very powerful tool for aggregating, visualizing, and analysing data. Power BI is also used for advanced analytics like finding the forecast value. It is a very easy-to-use tool because of its interface.

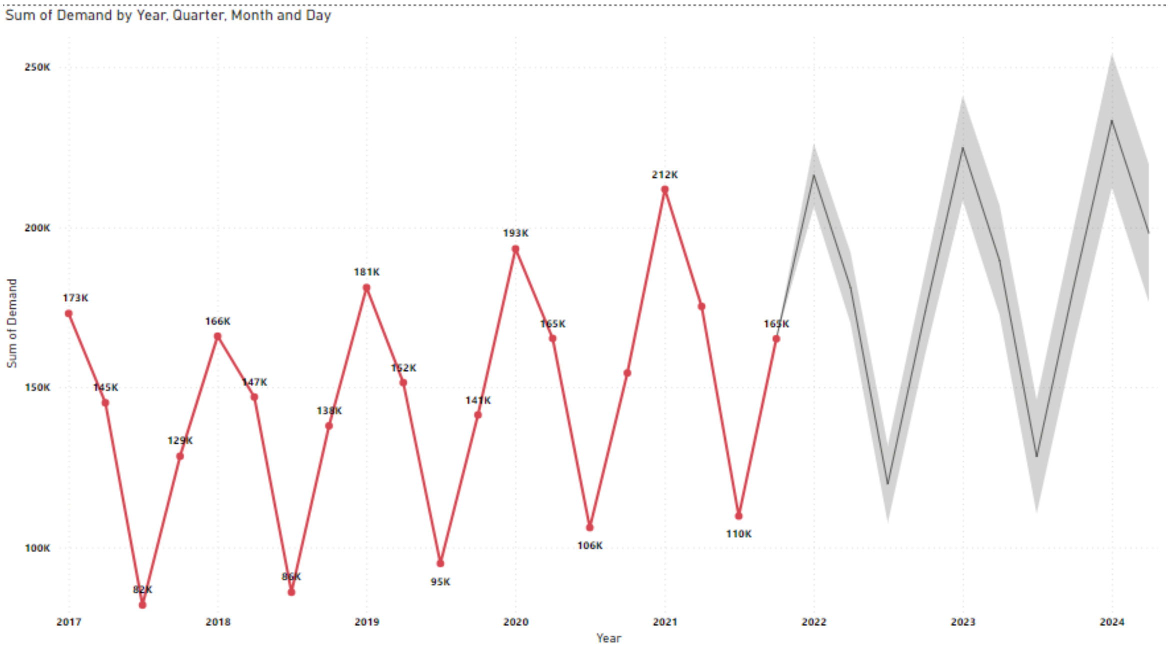
Time Series Analysis is a useful statistical technique for analysing, and finding patterns, trends, and behaviour that evolve over time.

Time Series Analysis with Power BI is an extremely powerful tool for determining forecasted demand. It assists businesses in understanding how data points change over time and identifying patterns.

The steps to find forecasted demand with the help of Power BI are:

- Load Data into Power BI
- Create a Line Chart
- Go to Analyse section, then go to forecast
- From the forecast Section, we can select forecast length as well as confidence level
- Then we get the estimated demand value from the given Data.
- From the Chart, we get the forecast value, upper bound (the highest possible value), and the lower bound (the least possible value).

Figure 2:



Demand Line Chart with Power BI

In the chart below, the red lines represent the actual data, while the grey lines represent the forecasted value for three years.

Table 2:

Forecasted Values from Graphical Method

Date	Forecast	Upper bound	Lower bound
Q1 22	216315	226179	206451
Q2 22	181093	192122	170065
Q3 22	119759	131841	107677
Q4 22	173739	186790	160689

Winters' Method (Minitab)

The Minitab tool can perform the Triple Exponential Smoothing model, also known as Winter's Exponential Smoothing. This tool analyses and forecasts time series data that exhibit trend and seasonality. The steps involved here are:

- Load Data in Minitab.
- Access the Exponential Smoothing Tool
- Choose the Settings option as per the requirement
- Generate Forecast

Figure 3:

Minitab's Winter Method to find the forecasted value

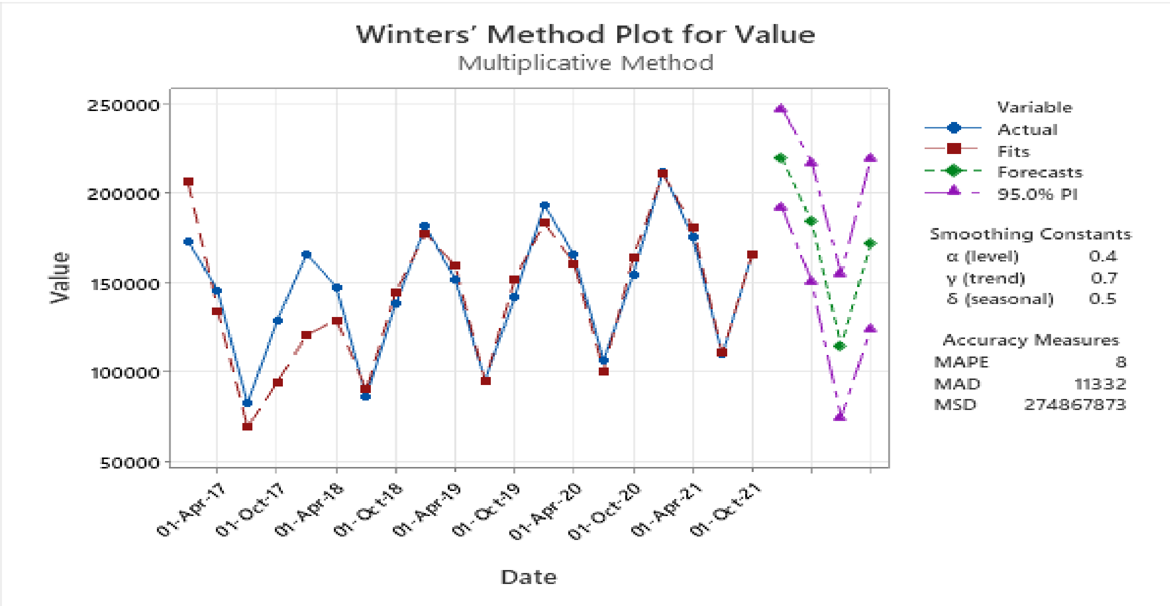


Table 3:

Forecasted value from Winter's Method

Period	Forecast	Lower	Upper
Q1	219672	191909	247436
Q2	184164	150784	217544
Q3	114367	74145	154589
Q4	171869	124102	219635

SARIMA Method Using R

The SARIMA model, also known as Seasonal Auto-Regressive Integrated Moving Average is an extension of the ARIMA model. Unlike ARIMA SARIMA considers both seasonal and seasonal components when analyzing and forecasting time series data.

In this model, we represent SARIMA as follows;

SARIMA (p,d,q) (P,D,Q)m

Where;

p represents autoregressive lags

d represents the order of integration

q represents moving average lags

P represents seasonal AR lags

Q represents the seasonal MA lags

D represents the seasonal difference
m represents the length of the seasonal cycle

To differentiate between nonseasonal components
in the model uppercase notation is used for the former while lowercase notation is used for the latter.

The seasonal component of SARIMA consists of three elements;
1. **Seasonal Autoregressive (P);** This element explores how the current value of a series relates to its values at seasonal lags.
2. **Seasonal Integrated (D);** to seasonal differencing, this element accounts for adjustments required to eliminate seasonality from the series.
3. **Seasonal Moving Average (Q);** This element models dependencies between the value and residual errors from predictions at specific seasonal lags.

Steps to run the SARIMA model in R

1. Import the Data
2. Attach the Data File
3. Install some packages like tseries and forecast and use the library function
4. Apply the test to check the stationarity
5. Apply Auto.Arima test to find the best model
6. Create a Model and use the forecast function

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```
#1. Import the Data
Orange_data<-
  read.csv("C:/Users/pranav/Desktop/Business Analytics/Orange data.csv")

#2. Install and use library function for forecast,teseries and timeseries.
library(forecast)
library(tseries)
library(timeSeries)

#3. Use tseries function in the Data
Orange_data.ts<-ts(Orange_data$Demand,start   = 2017,frequency = 4)
View(Orange_data.ts)
#4. Check the stationarity in the Data
ggtsdisplay(Orange_data.ts)
adf_test<-adf.test(Orange_data.ts)
adf_test
plot(Orange_data.ts)

#5. Find the best model for SARIMA
sarima_model<-auto.arima(Orange_data.ts,seasonal = TRUE)
sarima_model

#6. Create the model and forecast the values
forecast_values<-forecast(sarima_model,h = 4)
forecast_values
plot(forecast_values)
```

Table 4:

Forecasted value from SARIMA Model

Period	Forecast	Lo 95	Hi 95
Q1	222600	210229.72	234970.3
Q2	186000	168505.78	203494.2
Q3	120500	99074.05	141926
Q4	175900	151159.44	200640.6

4. Results and Discussion

Forecasting helps orange fruit businesses plan production schedules, manage inventory levels, set competitive prices, and tailor marketing and sales strategies to meet customer demand. These advantages aid in the optimization of operations and the achievement of business objectives. The orange company can take their decision by knowing the forecasted values and they can manage their inventory levels.

There are so many various tools and methods for calculating the forecasted demand, as I've used three different tools (Power BI, MS Excel, Minitab and R Programming).

From these three methods/tools, the forecasted values we get are almost the same, which means this is a consistent forecast. This result can be useful for decision-making and planning, as it suggests that the forecast is reliable and can be used to inform decisions. But Every method has its strengths and weaknesses,

a. Holt's trend method takes more time than other methods, but because it has a lower MAD for the forecasted data, it is more reliable.

b. Power BI's graphical method takes very little time, but it's unreliable due to its high MAD value and limited ability to forecast value using graphical trends.

c. Minitab's Winter Model Method takes less time and is more focused on the details. Changes in alpha, beta, and gamma can alter the MAD value.

Different approaches can be used to achieve better results. Using MS Excel and Minitab to find the anticipated demand is a good idea. Finding forecasted demand can also be done using AI and machine learning. It is crucial to understand the inherent uncertainty and variability associated with any forecast because there is always a chance of uncertainty in the future. As a result, initiatives to give decision-makers a variety of potential outcomes and the corresponding probabilities can aid in decision-making under uncertainty.

d. When compared to Microsoft Excel, Power BI, and Minitab, R is a versatile open-source programming language and environment that provides unparalleled flexibility and customization for time series forecasting. While Excel is user-friendly but limited in advanced modelling capabilities, Power BI excels in visual dashboards but may lack complex modelling capabilities, and Minitab is user-friendly but primarily focused on statistical analysis, R stands out for its extensive libraries and packages, allowing users to create custom forecasting models, incorporate machine learning techniques, and automate forecasting pipelines, making it a strong choice for data scientists and analysts seeking advanced forecasting solutions.

We can easily predict the forecasted demand for oranges in the upcoming year from these three different methods. But we cannot rely on these methods as they are not 100% accurate because of some factors and that are:

External factors: Many external factors can influence demand, including changes in economic conditions, technological advancements, geopolitical events, and natural disasters. These factors are frequently unpredictable, adding uncertainty to forecasts. Forecasting demand may also be impacted by seasonality and weather. Temperature and rainfall are two factors that may have an impact on an accurate demand forecast for fruits. War, trade agreements, and geopolitical tensions are examples of geopolitical events that can also have an impact on supply chains, global trade, and consumer confidence, all of which can affect demand.

Market Trends: Consumer preferences and behaviours can shift unexpectedly, causing shifts in demand patterns that are difficult to predict. Price fluctuations could also be the cause because they have an impact on demand.

Competitor Actions: The strategies, new product launches, and marketing campaigns of competitors can all have an impact on demand. New entry of competitors can also be the reason here. It is difficult to predict these actions and their consequences.

Regulatory Changes: Changes in regulations, tariffs, or trade policies can have an immediate impact on supply chains and demand, causing uncertainty.

Consumer Sentiment: Consumer sentiment and psychology can have a significant impact on demand. Predicting shifts in sentiment is very difficult and risky. Social media, as well as influencers and trends that quickly gain widespread popularity, can cause sudden shifts in demand for specific products.

Unexpected Events: Unexpected events, such as the COVID-19 pandemic, can disrupt markets and drastically alter demand patterns, creating uncertainty.

But in the future AI can be a key role player in finding the accurate demand forecast. Some of the major reasons are as follows:

Machine Learning Algorithms: To model demand based on historical data, techniques such as time series analysis, regression, and machine learning algorithms (e.g., random forests, neural networks) can be used. As new data becomes available, these models adjust their predictions based on past patterns.

Forecasting Accuracy: By taking into account a wide range of variables and their interactions, AI models can improve forecasting accuracy. This reduces the impact of manual forecasting methods' biases and inaccuracies.

Real-Time Data Accuracy: AI can process and analyse real-time data indefinitely, allowing for dynamic adjustments to forecasts as conditions change. This is especially useful in industries with volatile demand patterns.

Incorporating External Factors: Artificial intelligence (AI) can incorporate external data sources such as social media trends, economic indicators, and competitor information to provide a more holistic view of demand drivers.

Scenario Analysis: Artificial intelligence can simulate various scenarios and their potential impact on demand. It can, for example, assess how changes in pricing, marketing campaigns, or external factors may affect future demand.

5. CONCLUSION

Forecasting tools can assist the orange fruit industry in making informed decisions regarding planning, production, harvesting, inventory management, and pricing. They forecast future orange production, demand, and prices using historical data and statistical models, which can lead to more efficient resource use, less waste, and higher profits.

Businesses in the orange fruit industry should collect and analyse data, invest in forecasting tools, collaborate with partners, monitor and adjust forecasts, and stay up-to-date on industry trends to optimize their operations through business analytics related to forecasting. These actions can result in more efficient resource use, less waste, and increased profitability.

The forecasted results can't be the same with the different techniques and also, we cannot judge which method is better compared to the other. That is why accurate forecasting is important. Accurate forecasting necessitates an organized and systematic approach that includes high-quality data, precise models and tools, and ongoing validation and evaluation. Businesses can improve the accuracy of their forecasts and make more informed future decisions by implementing these practices.

AI-driven demand forecasting has the potential to significantly transform the orange industry at various stages of the supply chain. AI provides a path to more accurate predictions for orange growers, processors, distributors, and retailers by capturing the inherent seasonal variability of oranges. This is accomplished by combining historical data and real-time weather forecasts to predict shifts in demand based on temperature, precipitation, and other climatic factors that influence consumer preferences. Furthermore, AI goes beyond traditional methods by incorporating external factors such as health trends, economic conditions, and consumer behaviour, resulting in a more comprehensive view of demand determinants.

Through its real-time data processing capabilities, AI-driven demand forecasting accommodates dynamic adjustments, allowing for quick responses to unexpected events such as weather disruptions. Its scenario analysis capabilities enable decision-makers to investigate the potential consequences of various strategies, allowing for more informed decisions. The industry can optimise resource allocation and contribute to sustainability efforts by minimising waste through accurate predictions.

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DECODING THE INTRICACIES OF THE INDIAN LABOR MARKET: A LITERATURE REVIEW

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ACKNOWLEDGEMENT

India is second most populated country in the work and majority of the population is below the age group of 35. The number of workers in India is mammoth and is only next to China. A large number of workforce is employed in informal and unorganized economy. India as a developing economy has unleashed various reforms to propel the country on path of economic recovery and development post COVID -19. For economic resilience, labor resilience proves to be an indispensable requirement. The study is conceptual in nature and attempts to explore the current status of Labor market in India. The study is exploratory and is an attempt to summarize various indicators of labor markets like labor resilience, employment, unemployment, skill supply and demand mismatch and wages. The study is based on review of latest data and literature on Indian labor market indicators. The findings of the study will provide an overview of Indian labor market and its problems and prospects. The study will contribute in providing a conceptual ground for further research and exploration in the domain of Indian labor market.

Keywords: Indian labor market. Labor resilience, employment, unemployment, skill supply and demand mismatch, wages

INTRODUCTION

COVID 19 has undoubtedly changed the face of the world. Economies face unprecedented challenges post-pandemic and labor markets have been worst hit by the pandemic. Indian economy is characterized by weak Labor market conditions. Technological disruptions coupled with the aftereffects of COVID 19 have exacerbated the importance of resilience. Resilience is the general ability to recover from shocks and respond to sustain, grow, and transform.

The future of work is characterized by the acronym VUCA which refers to Volatile, Uncertain, Complex and Ambiguous. To cope with the challenges from technological disruptions to climate change, it is imperative that the labor markets are resilient. A resilient labor market can generate sustainable demand for a wide range of occupations and also ensure an incessant supply of quality work. Resilient labor markets are characterized by inclusiveness, sustainability, and ability to withstand shocks because of their adaptability and flexibility.

REVIEW OF LITERATURE

In the wake of Pandemic, the demand side of Labor is obviously impacted. Government imposed Lockdowns and the imperative of social distancing leads people to venture less out of their home in public spaces. Hence number of consumers demanding products and services take a nosedive and therefore demand of labor gets reduced **(**Baker et al., 2020a, 2020b; CBO, 2006; Muelbauer, 2020; OECD, 2020). As a result of strong containment measures, the supply of labor is also reduced due restricted movement of citizens (Dingel & Neiman, 2020; Hicks et al., 2020; McKibbin & Fernando, 2020; Rio-Chanona et al., 2020).

A study conducted by Estupinan et al (2020), concluded that only 29.4 % jobs in urban areas and merely 11.6 % jobs in rural areas can be done from home. It was also reported that highly skilled workers like legislators, managers etc. were equipped to handle remote work while those on the lower end of skill continuum were devoid of remote working capacity. Hence it can be concluded that Low skilled and those hailing from rural area will be at higher risk of losing jobs in wake of pandemics. He also reported that out of 116.18 million workers were found to be at risk of losing their employment during Lockdown 1.0 among them around 60 million casual and own-account workers were there. These come from economically poorer households, having limited skills and education, lack formal recognition and are paid on day to day basis. (Rani & Belser, 2012)

According to the latest CMIE (Centre for Monitoring of Indian Economy), 2022 According to CMIE, a decline in the employment rate from 36.7% in February 2022 to 36.5% in March was observed. It is noteworthy that the unemployment rate fell to 7.6% from 8.1% in February. During the month of March both employment and unemployment rate registered a decline. This raises concerns about the health and prospects of labor and employment situation in India. What is more alarming that even labor participation rate (LPR) fell to 39.5% in March 2022 from 39.9% in February. This figure is even lower than the steep fall registered during the second wave of Covid-19 in April-June 2021 when it had fallen to 39.6% in June.

The Global Labor Resilience Index published annually ranks countries on resilient labor markets. The index considers two broad pillars with several indicators for the calculation (Appendix I). The structural pillar is an assessment of the intrinsic components of a country that may either mitigate or amplify the response to disruptions. The factors in the structural pillar comprise of Demography, Country capabilities, Economic development and macro-economic stability, Trade Vulnerability and inequality. It is not easy to change these factors in the short run. The factors account for 33 percent of the weighted average in calculation of the Index. The second pillar, termed as cyclical capability pillar comprises of 67 percent weighted average in the calculation of the index. The cyclical pillar considers the policy measures in response to disruptions. The four sub capabilities under the cyclical pillar are:

- Absorptive Capability includes the level of social protection, employment regulations and inclusiveness that minimize the impact of shocks on workers and jobs.
- Transformative capabilities include investments in future technologies, ICT infrastructure, technology adoption and investments in R& D. They determine the level of adaptation for future technology and readiness.
- Adaptive capabilities include measures that are related to dynamism of the economies and Labor markets that lead to quick recovery from shocks and also are capable of creating new jobs in lieu of the ones displaced due to the disruptions.
- Institutional Capabilities include the enablers which enable resilient response and agility in all phases of disruptions. (Whiteshield Partners, Global Labor Resilience Index 2022)

India ranks 65th in the GLRI 2022 but it ranks first in the Labor market resilience Gap. The Labor Market Resilience gap implies that there is huge gap between structural pillar and cyclical pillar. India fares well on the structural performance pillar with a rank of 26 but it has a dismal rank of 90 on the pillar of cyclical resilience. India needs to significantly work towards improving inclusiveness of the labor market including tackling the share of informal employment, the participation of the youth and the ratio of women to men in the labor market.(White shield Partners, Global Labor Resilience Index 2022).

LABOR FORCE PARTICIPATION, WORKFORCE PARTICIPATION AND UNEMPLOYMENT RATE

Labor Force Participation Rate, LFPR is defined as the percentage of population who were either employed or actively seeking employment. Workforce Participation Rate, WPR, is defined as the percentage of employed persons in the total population. The LFPR and WPR are almost stagnant before and after Pandemic.

Unemployment Rate is defined as the percentage of unemployed persons in the labour force. As per the data from the Economic Survey 2021-22, the unemployment rate was highest during April June 2020 with 20.8 percent, thereafter the unemployment rate fell drastically and came to almost Pre-pandemic levels during January-March 2021 at 9.3 percent (Table I & Appendix I)

Table I

Survey Year	Quarters	LFPR	WPR	UR
2019-20	July-Sept, 2019	47.3	43.4	8.3
	Oct-Dec, 2019	47.8	44.1	7.8
	Jan-March, 2020	48.1	43.7	9.1
	April-June, 2020	45.9	36.4	20.8
2020-21	July-Sept, 2020	47.2	40.9	13.2
	Oct-Dec, 2020	47.3	42.4	10.3
	Jan-March, 2021	47.5	43.1	9.3

Labor market indicators for Urban sector (age: 15 & above) in percent

Source: Economic Survey 2021-22

4.75 Crore additional persons joined the workforce during 2018-19 and 2019-20 largely due to the rural sector in comparison to the urban sector. The number of unemployed persons in 2019-20 has also decreased by 23 lakhs, constituted largely by males from the rural sector. The decline in unemployment rate, touching almost to the pre pandemic level is an indication about the recovery of the labor market in India. (Table II).

TABLE II

Estimates of Labor Force, Employment, and Unemployment for the years 2017-18 to 2019-20 (all ages; principal status+ subsidiary status, in crore)

Description	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
2017-18									
Labour Force	25.48	8.67	34.15	13.25	3.57	16.82	38.73	12.24	50.97
Employment	23.91	7.70	31.61	12.39	3.15	15.53	36.29	10.85	47.14
Unemployment	1.57	0.97	2.54	0.86	0.42	1.29	2.44	1.39	3.83
2018-19									
Labour Force	25.77	8.77	34.54	13.60	3.68	17.28	39.37	12.45	51.82
Employment	24.37	8.46	32.83	12.64	3.31	15.96	37.01	11.77	48.78
Unemployment	1.40	0.31	1.71	0.96	0.37	1.33	2.36	0.68	3.04
2019-20									
Labour Force	26.64	11.12	37.76	14.23	4.35	18.58	40.87	15.47	56.34
Employment	25.45	10.81	36.26	13.32	3.95	17.27	38.77	14.76	53.53
Unemployment	1.18	0.32	1.50	0.91	0.40	1.31	2.09	0.72	2.81

Source: Economic Survey 2021-22

Declining unemployment rate and increase in the persons joining workforce is undoubtedly a sign of recovering Labor market.

FORMAL AND INFORMAL EMPLOYMENT IN ORGANIZED AND UNORGANIZED SECTOR

According to the National Commission for Enterprises in Unorganized Sector (NCEUS) classification,"The unorganized sector comprises of all unincorporated private enterprises owned by individuals or households engaged in the sale and production of goods and services operated on a proprietary or partnership basis and with less than ten total workers.

Informal workers are those who work in unorganized enterprises or households, excluding regular workers with social security benefits, and the workers in the formal sector without any employment benefits/social security provided by the employers." (NCEUS, 2007a, p.3).

It is evident that majority of the workers are engaged in the informal employment in unorganized sectors. These workers are devoid of any social security schemes or employment benefits which pose a concern about the quality of life of those workers.

Table III

Formal-Informal Employment (ps+ss) across Organized and Unorganized Sector (in Crores)

Type of Employment	Organized	Unorganized	Total
2017-18			
Formal	4.43	0.28	4.70
Informal	4.62	37.79	42.43
Total	9.05	38.07	47.13
2018-19			
Formal	4.91	0.45	5.35
Informal	4.55	38.87	43.43
Total	9.46	39.32	48.78
2019-20			
Formal	5.09	0.80	5.89
Informal	4.46	43.19	47.64
Total	9.55	43.99	53.53

Source: Estimated using PLFS 2017-18, 2018-19 and 2019-20 Surveys.

As per the Economic Survey 2021-22 industry wise employment has shown the upward trend in Agriculture, whereas manufacturing sector has witnessed a decline. Despite plethora of policy reforms aimed to revive the manufacturing sector in India, the decline raises serious concerns. Agriculture still seems to engage maximum workforce hence it is an imperative to revolutionize the agriculture sector.

SKILL MISMATCH IN THE INDIAN LABOR MARKET

According to the World Bank Human Capital Index Report 2020, India has a rank of 116 among 174 countries in Human Capital index. A study by Gupta and Kumar (2020) concluded that there is disparity in the demand and supply of skills in the Labor market. The majority of educational and training institutions are churning out low and medium skilled labor force. Among the labor force 40 of them have received only primary education. It is also explicit that employed proportion of middle and lower skilled employees was higher as compared to the high skilled professionals, the author also calculates and presents an interesting finding about the skill mismatch index. The skill mismatch is calculated as difference between population having a certain level of skill and workers employed in that particular group. The highest skill mismatch was observed for the technical education level with skill mismatch index of 24.02. Massive job losses were reported for low to medium skilled employees. The highest job losses were reported in travel and tourism sector.

SCENARIO OF WAGES IN INDIA

According to the ILO Report on Global Wage- Wages and Minimum wages in the times of COVID-19 (2020-21), in the Asia-Pacific region India has one of the lowest real wage growth even lower than Pakistan. According to the report the wages of informal workers fell by 26.6 % post COVID -19. The growth in India’s “real wage" is also very dismal and signals a gloomy scenario for workers. The real wages in India grew by only 2.8% in 2015, 2.6% in 2016, and 2.5% in 2017, while it remained flat in 2018. The figures post 2018 are yet to be released (Nanda, 2020).

CONCLUSIONS & IMPLICATIONS

The economic repercussions of pandemics and market fluctuations have significant impact on Indian labor market. The skill mismatch will further aggravate the plethora of challenges in Indian Labor market. In a developing country like India, majority of the demography still lacks access to upskilling and reskilling opportunities. In such a scenario comprehensive action plan is required to narrow down the demand and supply of skills in Labor market. Still a substantial chunk of Labor market works in formal and unorganized, where workers have no security and protection towards economic and social contingencies. There is a strong imperative for the government policy makers and institutions to provide income support measures for informal workers such as social protection transfers, and unemployment benefits. The fall in wages will negatively impact poverty alleviation and economic recovery, hence urgent and comprehensive policies and actions are required to alleviate the wage scenario in India.

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